
Saint
Bartholomew's Hospital

A

DESCRIPTIVE CATALOGUE

OF THE

ANATOMICAL AND PATHOLOGICAL MUSEUM

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DESCRIPTIVE CATALOGUE

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PUBLISHED BY ORDER OF THE GOVERNORS.

VOLUME II.

TERATOLOGY.
ANATOMY AND PHYSIOLOGY.
BOTANY.

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PREFACE.

Since the former Catalogue of the Anatomical and Physiological Preparations was printed, several hundred specimens have been added to this portion of the Museum. Some of these are entirely new, but many take the place of others of a similar nature which have from time to time required renewal. The series illustrating the Anatomy and Physiology of the Generative Organs in the Female, and of the growth and development of the Fœtus, have been rendered almost complete by the presentation in June, 1879, of Dr. Matthews Duncan's Collection. He is also the donor of a valuable collection of obstetric instruments.

The whole of this section of the Museum Collection has now been re-arranged and re-numbered, and several selected specimens from Dr J. R. Farre's Collection have been included in the General Catalogue.

All the descriptions have been revised and collated, and some of them amended or extended.

The specimens are now numbered consecutively throughout the Collection. Those included in the former Catalogue may be identified by the old numbers, which are placed at the lower right-hand corner of the description.

The Catalogue of the Invertebrata is almost entirely compiled from a manuscript catalogue formerly written by Dr. Church.

The Catalogue of the Botanical specimens has been written by the Rev. G. Henslow, the Lecturer on Botany, by whom the specimens described therein have been presented.

In the Teratological Catalogue are included, in addition to specimens of congenital deformity, others in which the malformation has been acquired. The chief reason for this arrangement is that these latter have not found a place in the Pathological Catalogue already published.

The Teratological specimens are numbered in direct continuation with the Pathological specimens in Vol. I.

The general arrangement of the Teratological Catalogue is in accordance with that adopted by Mr. B. T. Lowne in the Teratological Catalogue of the Royal College of Surgeons of England.

The following is a brief explanation of the classification.

These preparations are placed in eight series, comprising the various constituent parts of the body. In each series the specimens therein contained are further sub-divided into the following six classes:—

Class I. Variation.
„ II. Duplicity.
„ III. Excess of Growth.
„ IV. Arrest of Growth.
„ V. Arrest of Development.
„ VI. Disease.

The Catalogue has been prepared under the direction of the Museum Committee.

I have received valuable aid in the revision of many of the series from members of the Hospital Staff, especially from Dr. Matthews Duncan and Dr. Norman Moore; to the latter belongs the entire credit of revising the Comparative Osteology. To Mr. D'Arcy Power, the present Curator, I am greatly indebted for the able assistance rendered by him in revising the proof sheets.

ANTHONY A. BOWLBY.

August, 1884.

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SERIES I.

ABNORMAL CONDITIONS OF THE AXIS.

CLASS I.—VARIATION.

(A.) SITUS MUTATUS.

3400. Part of a Fœtal Calf, with partial transposition of viscera and other malformations. The apex of the heart is directed forwards and to the right; and the aorta passes along the right side of the spine. The spine is tortuously curved. The œsophagus terminates in a cul-de-sac at the lower part of the chest. A. 176

3401. Body of a Child, about ten months old, with partial transposition of the viscera, and an irregular arrangement of the blood vessels. A. 175

"The appearance of the body strongly implied that the child had, when living, possessed much vigour of constitution. The situation of the heart was reversed; the base of that organ was placed a little to the left of the sternum, whilst its apex extended considerably to the right, and pointed against the space between the sixth and seventh ribs. The cavities usually called the right auricle and ventricle were consequently inclined to the left side of the body. The inferior vena cava passed as usual through a tendinous ring in the right side of the centre of the diaphragm; it afterwards pursued the course of the vena azygos, the place of which it supplied; after having united with the superior cava, the conjoined veins passed beneath the base of the heart, to expand into the anterior [or transposed right] auricle. The veins returning the blood from the liver united into one trunk, which passed through a tendinous aperture in the left centre of the diaphragm, and terminated immediately, also in the anterior auricle.

"The distribution of blood to the lungs, and the return of it from these bodies, were accomplished after the usual manner.

"The aorta, after it had emerged from the posterior ventricle of the heart, extended its arch from the left to the right side, but afterwards pursued its ordinary course along the bodies of the dorsal vertebræ.

"From the curvature of the aorta there first arose the common arterial trunk, which, in this subject, divided into the left carotid and subclavian arteries, whilst the right carotid and subclavian proceeded from the aorta by distinct trunks.

"The inferior aorta gave off the cœliac, which as usual divided into three branches; however, that artery which was distributed to the liver appeared larger than common; it exceeded by more than one-third the size of the splenic artery of this subject. This was the

only vessel which supplied the liver with blood, for the purpose either of nutrition or secretion.*

"The vena portarum was formed in the usual manner, but terminated in the inferior cava, nearly on a line with the renal veins. The umbilical vein of this subject ended in the hepatic vein.

"The liver was of the ordinary size, but had not the usual inclination to the right side of the body; it was situated in the middle of the upper part of the abdomen, and nearly an equal portion of the gland extended into either hypochondrium.

"The gall-bladder lay collapsed in its usual situation; it was of a natural structure, but rather smaller than common; it measured one inch and a half in length, and half an inch in breadth. On opening the bladder we found in it about half a teaspoonful of bile.

"The intestines did not contain much alimentary fæcal matter: this was, however, as usual, deeply tinged with bile."—Extract from the account of the case related by Mr. Abernethy, in the *Philosophical Transactions*, vol. lxxxiii, p. 60, 1793.

CLASS II.—DUPLICITY.

Sub-Class I.—DICHOTOMY.

(A.) ANTERIOR DICHOTOMY.

3402. A Fœtal Kitten, showing Anterior Dichotomy involving only the head. The median eyes are united. A. 285

3403. A Chicken, the Head of which is partially subdivided. There are two separate beaks, and the contiguous eyes are blended into one. The body and limbs are normal.

Presented by the Rev. G. Henslow.

3404. The Head of an Anencephalous Fœtus, in which the palate has a wide fissure, and at its anterior parts is broadly expanded and divergent, in adaptation to Duplicity of the lower jaw and tongue. The outer condyles of the lower jaws are normally articulated: their median or inner condyles, closely approximated, are articulated with a mass of bone projecting between and from the fronts of the divisions of the hard palate. The tongues are of full size and united posteriorly. A. 7

(B.) POSTERIOR DICHOTOMY.

3405. A monstrous Kitten, exhibiting the condition known as "Posterior Dichotomy." The head and neck are single. Two forelegs rest on the ground, while two others project upwards from the scapular region. Behind this point the bodies are double, four hind legs and two tails being present. A. 208

3406. A monstrous Kitten, exhibiting a similar condition. The head and upper portion of the trunk appear single, and there are but two forelegs. Two imperfectly formed jaws and two tongues are present. The heart lies to the right side. The body below the umbilicus is double, and there are four hind legs and two tails.

* This statement refers to the extra-uterine period of the child's life. Before birth the blood of the umbilical vein was, probably, as usual, carried through the liver; the branches of that vein remain in the liver, and it is nearly certain that the terminations of the hepatic artery pass into connection with them in the usual manner.

3407. A similar malformation in a Hare. The head is single, while the trunk and limbs are double. A. 4

3408. A partially double heart, taken, probably, from an example of double monster, in the Sheep. It has two auricles and four ventricles. Each auricle opens into two ventricles. There are two aortæ, which are united soon after their origins, and two pulmonary arteries, from each of which a ductus arteriosus is continued. From two of the ventricles an aorta and pulmonary artery arise: from the other two arise two arteries, which are continued into the aortæ. A. 6

Sub-Class II.—HOMOLOGOUS UNION.

(A.) PROZYGOSIS.

3409. A Monster exhibiting that form of homologous union known as Prozygosis, the bodies cohering by the thoracic and abdominal parietes above the umbilicus, and the heads being fused into one. This single head exhibits signs of partial duplicity behind, where it is much broader than natural; the jaws also are not completely fused. The lower extremities are well formed and of proper size; the genital organs of both fœtuses are female. A. 3

3410. Female Twin Fœtuses united by the Thoracic laminæ above the umbilicus, and by the sides of the head and neck. The faces are so fused that it appears as though only one was present; there is no median eye, but the right eye of the one fœtus and the left of the other are normal in position and appearance; the condition of the ears is similar to that of the eyes. The brain cavity is common, and a large part of the nervous matter appears to have been contained in a cyst at the junction between the occipital and parietal bones. The nasal septum is complete. The buccal cavity, with the tongue, is well developed, and forms a common mouth, in which is contained a mass of tissue, which, apparently, represents the fused maxillary bones of the right side of one fœtus and the left of the other respectively. In this mass are tooth capsules, and attached to it, in an inverted position, is another tongue. There are two larynges, the larger being on the right and communicating with the two posterior lungs, the other being connected to the anterior pair. The thoracic cavity is common, and the four lungs are well developed. Two hearts exist, one being immensely larger than the other, and occupying an anterior position. It consists of six cavities, apparently three auricles and three ventricles. The septum between the normal right and left ventricles is incomplete, and the former also communicates with the additional ventricle which is situated in the septum between the other two. One large trunk is the only vessel which is given off from the ventricles, with all three of which it communicates. From it are given off two aortæ, one to each fœtus, and one pulmonary artery to the anterior pair of lungs. The division between the three auricles is incomplete. The other heart is situated between the posterior pair of lungs, and consists of two cavities, a large inferior vena cava and a vein from the thymus being the only vessels communicating with it.

The œsophagi and stomachs are separate, as are also the upper portions of the small intestines, the lower portions being joined and forming a single common tube which subsequently bifurcates to form two cœca; the large intestines are separate. The livers are mainly fused into one large quadrilateral mass, there being, in addition, a small separate lobule. The rest of the abdominal viscera are normal.

Presented by E. J. Jenkins, Esq.

(B.) OPISTHOZYGOSIS.

3411. Male Twin Fœtuses united by the left sides of the lower lumbar vertebræ. At this point the spine of each is bent at an angle of 90° towards the right, so that the pelvis and lower extremities of each fœtus are placed directly opposite to, and in the same straight line with, corresponding portions of the opposite fœtus. The union is by bony plates uniting the transverse processes of the vertebræ. The thoraces are separate, the abdominal cavities common. The stomach and greater portions of each small intestine are entirely separate, but just above the ileo-cœcal valve the latter unite to form a common canal, which again, almost immediately, subdivides into two cœca, the large intestine being normal. The testes are undescended, and lie close to the internal rings. The urachus of each fœtus unites in a common umbilical cord, which contains three arteries and one vein. One fœtus is altogether larger than the other.

Presented by Dr. Matthews Duncan.

3412. Twin Fœtuses at the sixth week of intra-uterine life. The abdominal walls are fused below the umbilicus, otherwise each fœtus is entirely normal.

Presented by Dr. Matthews Duncan.

(C.) PARAZYGOSIS.

3413. Twin Thoracopagous Fœtuses at the fifth month of intra-uterine life. The visceral laminæ of the thoraces are united anteriorly. The adhesion extends from the episternal notch nearly to the umbilici, which are distinct. The bond of union is formed by the junction of the costal cartilages of corresponding sides; in the posterior wall there is a rudimentary sternum. The skeleton and soft parts of both fœtuses are otherwise well formed. The two hearts are contained in a common pericardium; the number and arrangement of the blood vessels are normal, but the right heart is displaced to the right side. The lungs and thymus glands are normal. The diaphragm is common to both, as also the liver, which is of large size and saddle-shaped, being apparently formed by the union of two livers at the upper and posterior surfaces. The umbilical veins enter the opposite sides of the organ. Each fœtus has a normal stomach, from which the intestine passes into a large triangular pouch beneath the liver; from the lower angle of this cavity a common intestine extends for about four inches, there bifurcates, and proceeds to either anus. About seven inches below the bifurcation a well developed cœcum is seen, having an extremely long appendix. The other abdominal viscera are normal. The circulation of each fœtus was quite distinct and normal.

Obstetrical Society's Transactions, 1879, p. 88.

3414. The skeletons of two Thoracopagous Fœtuses. Each skeleton is perfect, except at the anterior wall of the chest. Only one thoracic cavity exists. There are two sterna, which are placed, not in the median line, but at the sides of the thoracic cavity. With each sternum are connected the costal cartilages of the corresponding side of each skeleton. The upper piece of each sternum appears double, so as to be nearly equally connected with the upper ribs of both skeletons; the other pieces of each are normally formed. A. 1.

Hydrocephalus, with great enlargement of the cranium, existed in one of the children. The mother was naturally and safely delivered.

Presented by Richard Eyles, Esq.

3415. Female Thoracopagous Twins in the third month of pregnancy. The abdominal walls are united above the umbilici. One fœtus is considerably longer than the other.

Presented by Dr. Matthews Duncan.

3416. Human Female Twins from a woman in the second month of pregnancy united by a thin band attached to the lower part of the middle line of the thoracic wall and the upper part of the abdomen.

The mode of union here seen is the same as that which existed in the "Siamese twins."

Presented by Dr. Matthews Duncan.

3417. Twin Kittens with fusion of the head and thoracic walls. The larger fœtus is well formed as far forwards as the occipital region, where the right side of the head becomes united to the left side of the head of the smaller fœtus, so that the right ear of the one, and the left of the other are joined. There is scarcely any attempt at the formation of a face, but all the limbs are well formed. The smaller fœtus is represented by a well formed, hydrocephalic head fixed as above described, two anterior well formed limbs, and two hind legs united in nearly their whole extent; there is scarcely any body, the limbs appearing to grow from the thoracic parietes of the larger fœtus. A. 195

3418. A Pleuropagous, double-headed (Dicephalus, Dibrachius) human Female Monster, born at the full term of gestation.

The heads are well developed. The spinal columns diverge, but are distinct throughout, and there are two well developed sacra, placed side by side. The pelvis is completed by an os innominatum of the ordinary size on either side; there is no trace of a mesial lower extremity.

The mesial upper extremity produced a hump at the upper part of the back.

There is a large, common thoracic cavity, bounded in front by a single sternum, to which the clavicles and ribs were connected in the usual manner. On the posterior wall of the cavity the interval between the converging spinal columns is filled in by single rib-like bones, articulated to the vertebræ on either side.

The right half of the diaphragm is deficient, and the corresponding thoracic cavity contains the right stomach, pancreas, spleen, a portion of the liver, and all the small intestines.

Organs of Circulation.—The hearts are fused. That on the left side is nearly normal, but the development of the right heart has been arrested.

Two large systemic veins, corresponding to the superior and inferior venæ cavæ, empty themselves into an extremely large auricular cavity common to both hearts.

The common auricle communicates by an opening, inferior and to the left, with the right ventricle of the left heart; the auriculo-ventricular opening is only provided with one large anterior valve; otherwise the left heart is in every particular normal. The left auricle, which receives only the blood from the left pair of lungs, is separated from the common auricle by a thin perforated septum.

The right heart, attached to the right side of the left, consists solely of a single small ventricle with a muscular tube resembling a *bulbus aortæ* leading from it. The ventricle communicates by a large opening, having only one valve, with the common auricle described above. There is an indication of a ventricular septum in the form of a muscular partition, which projects slightly forwards from the wall of the ventricular cavity.

The ventricle communicates above by two small openings with a muscular tube about half-an-inch long, and about the size of a slate pencil. The openings are of unequal size, placed side by side, and are unprovided with valves.

Near the middle of the posterior surface of the tube three parallel folds are seen, which appear to be indications of valves.

It will be observed from the above description that the right heart presents an extraordinary resemblance to that of the fishes (except amphioxus); the single auricle and ventricle, the muscular tube, which may be considered the analogue of the *bulbus aortæ*, and further, the indications of additional valves, such as are found in the aortic bulbs of ganoid and elasmobranch fishes, render the simulation well nigh complete.

Blood Vessels.—The arrangement of the pulmonary artery and of the aorta and its branches is perfectly normal on the left side.

On the right side the aorta curves to the right, and, after giving off the two carotids and the right subclavian, passes downwards to join the left aorta, thus forming a common aortic trunk.

The ductus arteriosus on the right side is an extremely long slender vessel, which is given off from the concavity of the aortic arch nearly opposite to the right carotid.

No trace of a left subclavian passing to the mesial upper extremity existed.

Respiratory Organs.—There are two pairs of contracted lungs, one on either side of each spinal column; they were not contained in distinct pleural cavities.

Alimentary Canal.—There are two distinct alimentary canals, with their associated organs, as far as the duodena, which unite to form a common small and large intestine.

The right stomach, with the spleen and pancreas attached to it, lay in the right pleural cavity as before mentioned. The left stomach, spleen, and pancreas occupy the usual position beneath the diaphragm.

The duodena converge and unite beneath the liver, where the single common bile duct joins them.

The livers are fused, but the smaller portion, comprising the right half, is attached to the remainder only by a thin band of liver substance: it occupied the right pleural cavity as before noted.

Two small pedunculated additional lobes attached to the left half of the liver pass upwards behind the diaphragm into the thoracic cavity.

The fundus of the gall bladder is bifid.

The Genito-Urinary Organs are well developed and not re-duplicated.

Nervous System.—There were two distinct and perfect spinal cords, giving off nerves on either side.

See Description by Mr. Eve, *Obstetrical Society's Transactions*, 1880, p. 74.

3419. Skeletons of Pleuropagous Twins, one of which is considerably larger than the other. The visceral laminæ of the thoraces are united, so that only one thoracic cavity exists. The pelves are partly fused, only the left side of the one and the right of the other being fully developed; the remaining halves of each are represented by a mass of soft and partially ossified tissue. To this is attached a single, large, and ill-formed femur, which articulates with a tibia and fibula of unusual size. The foot has two ossa calces and eight toes. The two other lower extremities are normal. A. 2

Obstetrical Society's Transactions for 1880, p. 74.

3420. Skeletons of twin Pleuropagous Females. The ribs on opposite sides of either fœtus are united by a strip of cartilage resembling a sternum: the fœtuses being placed side by side.

Sub-Class III.—HETEROLOGOUS UNION.

(A.) BY IMPACTION.

3421. A Kitten with a headless acardiac parasite impacted between the contiguous halves of the sternum. The body cavities of both autosite and parasite are continuous. A. 5

Sub-Class IV.—DUPLICITY AFFECTING EGGS.

3422. A double Egg from a Hen. Two eggs of ordinary size, but with their membranes imperfectly calcified, are united by an intermediate slender cylinder an inch and a half long. The cylinder is formed of a continuation of the membranes of the two eggs, and appears to contain albumen. A. 6A

Presented by Alfred Tylor, Esq.

3423. An imperfect and small Fowl's Egg, which was found within another of ordinary size. It contains little more than albumen, spotted in one place with yellow, as if by a diffused yolk-substance. The shell and its lining membrane are thin, and were broken by the expansion of the contained air during boiling. A. 183

Presented by Mr. William Coyte.

CLASS V.—ARREST OF DEVELOPMENT.

Sub-Class I.—CRANIAL ARREST.

3424. The Head of a Fœtus, with a wide Fissure extending through the whole length of the palate and uvula. The lower border of the nasal septum projects into the middle of the fissure. A. 10

3425. The Head of a mature Fœtus, with a Fissure extending through the entire length of the hard and soft palate and uvula. The tongue and larynx have been divided through the median line, and their halves are set apart. The muscles of the soft palate are dissected, and bristles are passed beneath those of the right side. All the muscles occupied their natural positions. The palato-glossus was found proportionally larger than in the adult. The tensor palati was, in its outer portion, very short, the pterygoid plates appearing imperfectly developed; its inner or horizonal portion did not appear fibrous. The azygos uvulæ was large, each half of the uvula having its proper muscle. The levator palati was large, and passed between some of the fibres of the palatine portion of the palato-pharyngeus. The last named muscle appeared normal. A. 10A

Presented by G. F. Lane, Esq.

3426. Specimen showing a complete cleft of the Soft and Hard Palate, extending through the alveolar process on the right side, the left nostril and left side of the lip. The intermaxillary bone is fused with the right maxilla. A. 230

Presented by Dr. Connolly.

3427. Skull of a Fœtal Lamb, with defective formation of the lower jaw. The ascending rami are nearly normal, but they are connected only by a short transverse plate of bone. The mouth terminated posteriorly in a cul-de-sac, having no communication with the œsophagus. A. 148

3428. A male "Cyclopian" Fœtus, showing the deformity resulting from arrested development of the anterior portion of the cranial axis. The single orbital cavity is situated immediately above the palate, and the eyeballs are fused into a single mass. The proboscis which projects above the median eye consists of the naso-frontal process, partially perforated by a single nostril. The ethmoid bone is absent. The fœtus is otherwise well formed. A. 148A

The mother had borne nine other healthy children.

3429. Brain of the Fœtus last described. It is greatly malformed. The corpus callosum and the fornix are absent, the cerebral lobes are small and fused anteriorly, and the third and lateral ventricles are opened out into a large cyst.

3430. The Head of a Fœtal Pig exhibiting a deformity similar to that seen in the preceding specimen. The eyes are only partially fused, and above them projects a proboscis perforated by the nostrils. A. 144

3431. A similar specimen. The eyes are in the same orbital cavity, but are not completely fused. A. 145

3432. Skull of a Fœtal Pig. The upper wall of the single orbit is formed by the coalition of the orbital plates of the frontal bone and the lesser wings of the sphenoid; these being united by sutures into one broad plate, at the posterior margin of which are the posterior formina. The inferior wall of the orbit is chiefly formed by the diminutive and approximated superior maxillary bones.

All the cranial bones are closely joined by sutures. The frontal bones, completely united at their anterior part, and thence projecting, bear at their extremity the long and deformed nasal bones, on which depends the proboscis-like form of the snout. A. 146

3433. A Male "Cyclopian" Fœtus, in which, through absence of the ethmoid bone, both eyes are placed in one orbital cavity, and are mutually compressed. The optic nerves have a common optic foramen. The eyelids also are united so as to form a single wide aperture; there is no external appearance of a nose. The mouth is small and contracted. A. 143

The naso-frontal process by its absence indicates a yet higher stage in the lack of development, and shows that not only the ethmoid (as in the preceding specimens) is wanting, but also probably the vomer, nasal, and part of the frontal bones.

3434. A similarly malformed "Cyclopian" Kitten, in which a yet further arrest of development has taken place: the mandible being absent, and the ears approximated just above the hyoid bone. A. 143A

3435. An Acephalous Human Monster. There is no trace of any attempt at the formation of a head or upper extremities. The lower extremities are large and malformed, and a small portion of intestine may be seen in the abdominal cavity. A. 244

Presented by Dr. Matthews Duncan.

SUB-CLASS II.—IMPERFECT DEVELOPMENT OF THE BRAIN AND ITS MEMBRANES, WITH OR WITHOUT CORRESPONDING DEFORMITY OF THE CRANIUM.

3436. Part of a Cerebral Dura Mater, deficient in the anterior half of the falx. A. 125

3437. A similar specimen. A. 126

3438. Part of the anterior Lobes of a Cerebrum. The right Olfactory nerve, spread out and flattened, projects slightly on the surface of the brain, lying by the side of the groove which it should have occupied. Its extremity is narrowed and tapering, and contrasts with that of the left nerve, which retains its natural appearance and position. A. 185

From the body of a man who died with valvular disease of the heart. The brain was in other respects natural, nor did any symptoms exist during life to indicate malformation of either of the olfactory nerves.

3439. A Brain, in which the corpus callosum and fornix are imperfectly formed. In place of the corpus callosum is a transverse band, or commissure, measuring only an inch and a quarter from its anterior to its posterior margin. In this band the anterior margin, or knee, of the corpus callosum appears well formed, but is partially separated by a fissure from the rest of the substance. This remaining substance, representing the body of the corpus callosum, is a very thin layer consisting of transverse and oblique fasciculi of nerve-fibres, which are traced outwards and backwards into the substance of the hemispheres. The posterior margin of the corpus callosum thus imperfectly formed corresponds with the front of the optic thalami, leaving the remainder of those bodies, the corpora quadrigemina, the pineal gland, and the posterior and middle commissures, covered by the velum alone. Of the septum lucidum no trace exists, and of the fornix only the lateral portions. The rest of the brain appears well formed. A. 139

The brain was taken from a girl twenty-one years old, who presented an ordinary condition of mind. The case is related, and the brain more minutely described, by Mr. Paget in the *Medico-Chirurgical Transactions*, vol. xxix, p. 54.

3440. Brain of a Girl twenty-two years old, who from birth was completely idiotic. It is of extremely small size, measuring only four inches in its greatest length, three and a half inches in its greatest width, and three and a quarter in its greatest depth. But, with this smallness, it observes the usual proportions in its several parts; its growth alone seems to be defective. Its convolutions are few, but of the normal width. A. 121

3441. The Skull of the same Idiot Girl. The form and size of its cranial portion exactly correspond with those of the brain; its facial portion is comparatively large and well formed, yet is below the average size. A. 122

3442. Brain of a Man twenty-one years old, idiotic from birth. In its total size it is rather less than that last described. Its weight, in the recent state, was 13oz. 2dr. avoirdupois. It is however distinguished from the brain described in No. 3440 by the imperfect development, as well as imperfect growth, of the cerebrum, which is small in comparison with the cerebellum, and of which the posterior lobes are so diminutive that they do not cover more than the anterior third of the cerebellum. A. 123

3443. The Skull of the same Idiot. It cranial portion exactly corresponds with the brain in size and form; its facial portion is of average dimensions. It has been described as—

"The cranium of a human Idiot, in whom nature may be said to have performed for us the experiment of arresting the development of the brain, almost exactly at the size which it attains in the Chimpanzee, and where the intellectual faculties were scarcely more developed. Yet no anatomist would hesitate in at once referring this cranium to the human species.

"A detailed comparison with the cranium of the Chimpanzee or Orang, shows that all those characters are retained in the Idiot's skull which constitute the differential features of the human structure.

"The cranial cavity extends downwards below the level of the glenoid articulatory surfaces. The nasal bones are two in number, and prominent. The jaws and teeth exhibit the bimanous characters as strongly as in the most elevated of the human race. The cuspidati do not project beyond the contiguous teeth; and consequently there are no interruptions in the dental series, as in the Orang's, where they are required to lodge the disproportionate crowns of the canine teeth."—Owen, *On the Osteology of the Chimpanzee and Orang-Utan*, in the *Transactions of the Zoological Society*, vol. i, p. 343. Plates 57 and 58 are from this skull. A. 124

Models of the brains of both these idiots, and a cast of the head and face of the last described, are preserved. Nos. 52–55.

Sub-Class III.—POSTERIOR AXIAL ARREST.

3444. Skeleton of a Fœtus in which the left lower extremity and the left half of the pelvis are deficient. The spinal canal is open in the lumbar and sacral regions, through defect of the vertebral arches; indeed, those of the left side of the sacrum and of the last three lumbar vertebræ appear never to have been formed. To the posterior part of the right ilium a series of bones are attached, which may represent rudiments of the ilium, ischium, femur, and tibia that are wanting on the left side. One dorsal vertebra (probably the ninth), together with the corresponding rib on each side, is wanting. The bodies of the two next vertebræ are represented on the right side by two halves, but on the left side by a single half. The last dorsal and the lumbar and sacral vertebræ are normal, some of the upper dorsal vertebræ are bilobed. On

the right side are eleven ribs, seven true, two false, and two floating. On the left side there are the same number, but the eleventh and twelfth are partially fused. A. 164

Presented by Thomas Stocker, Esq.

3445. A Siren Fœtus. The lower extremities are contained in a single sheath of integument. The ossa calces are fused together, but the bones of the legs and thighs are separate. The femora are in a position of complete external rotation, and are articulated with the innominate bones at a point considerably behind the normal position of the acetabulum. In consequence of this, complete extension of the lower extremities on the pelvis is not possible, and this movement is therefore supplemented by preternatural mobility at the junctions of the lumbar vertebræ with each other and the sacrum. There is no anus, the rectum ending in a pouch filled with meconium. The place of the external genitals is taken by a small papilla of integument, while inside the abdomen are a pair of normal testes. The other viscera were natural.

Presented by Dr. David Davies.

3446. A Siren Fœtus. The femora are fused into a single bone, which articulates above with an imperfectly formed os innominatum. The fused femora are completely rotated on their vertical axes, so that the single patella is found on the posterior surface of the stunted lower extremity. The bones of the legs and feet are represented by a small lump of cartilage, at the tip of which is a minute papillary projection, indicating an attempt at the formation of the digits. There are no external or internal genital organs, and the kidneys are absent. The bones of the right upper extremity are normal, but on the left side the radius is absent.

The mother was aged twenty-six years, had borne one other healthy child, and said that she had been suddenly frightened six months before parturition.

3447. Skeleton of a Siren Fœtus, in which the arches of the lower lumbar vertebræ are imperfectly formed, and in place of the sacrum there is a single distorted bone. The ischia are absent or rudimentary, and a single bone, representing the heads of both femora, articulates in the middle line with both the imperfect acetabula. The two femora are fused in their upper halves and completely rotated on their long axes, so as to be fused by their external surfaces. Their diverging lower halves articulate with the tibiæ fused into a single short conical bone. Behind and beyond the tibiæ a series of small bones represent the fibulæ and feet, but cannot be severally recognized. The cervical vertebræ are natural, with the exception that the left half of the body of the fourth is absent. The body of the first dorsal vertebra is obliquely placed, the left side being much lower than the right. The right halves of the bodies of the second and third vertebræ appear naturally formed, but on the left side a single half vertebra to which they are both anchylosed takes their place; the laminæ corresponding to these vertebræ are present. The bodies of the fourth and fifth appear natural, except that they are bilobed, and placed obliquely with their right sides lower than their left. The body of the sixth is absent, that of the seventh is bilobed and articulates with the fifth. The bodies of the eighth and ninth are fused on the right side but not on the left, that of the tenth is bilobed, its right side being higher than its left. Only the right halves of the eleventh and twelfth vertebræ are present, the latter being fused to the body of the first lumbar; the laminæ of the two last dorsal vertebræ are present, though fused. The bodies of the lumbar vertebræ are fused into a shapeless mass, and their laminæ are not united behind. The sacrum is also represented by an irregular lump of bone. There are twelve ribs on the right side, thirteen on the left, the thirteenth being apparently a lumbar rib. On the right side the

ribs are normally formed, the sixth articulating with a little nodule (which represents that part of the body of the missing vertebra which is external to the neuro-central suture) placed between similar nodules belonging to the fifth and seventh vertebræ. On the left side the nodule corresponding to the sixth half is fused with a similar protrusion from the seventh, and the heads of the sixth and seventh ribs are fused; the laminæ of the sixth vertebra are normal. On the left side, in addition, the first and second, and the sixth, seventh, eighth, ninth, and tenth ribs are more or less fused, the twelfth being also united to the lumbar rib. A. 165

3448. A Siren Fœtus. The lower extremities are entirely fused into a conical mass, some three or four inches in length, presenting no trace of differentiation into limbs. There are no genital organs.

Presented by Dr. Matthews Duncan.

3449. A Fœtus in which the inferior extremities appear to be wholly wanting. The wrist-joints are deformed, being flexed so that the thumbs are bent upwards towards the radii. A. 189

Sub-Class IV.—DEFECTIVE CLOSURE OF THE THORACIC AND ABDOMINAL CAVITIES.

3450. A Sternum, presenting a median deficiency of ossification, due to failure of development.

3451. Skeleton of a Male Fœtus, with fissure of the sternum. The first two ribs of both sides are united by a single portion of cartilage, with which also the clavicles are connected. The cartilages of the remaining ribs on each side are connected with a single narrow slip of cartilage, representing an ill-formed half sternum. In the right arm a single cylindrical bone has taken the place of radius and ulna; and another, united to it by cartilage, represents alone the bones of the hand.

A large aperture existed in the front wall of the abdomen, through which the viscera were protruded with a peritoneal sac. A. 163

Presented by William Taylor, Esq.

3452. Congenital Diaphragmatic Hernia. The intestines occupy the left side of the thorax. The child lived for six weeks.

Presented by Dr. Matthews Duncan.

3453. A Fœtus exhibiting a congenital deficiency of the left half of the diaphragm. Nearly the entire intestinal canal lies in the thorax.

3454. A Male Fœtus, at about the third month. A considerable portion of the intestinal canal is contained in a membranous sac in front of the umbilicus. The lower part of the vertebral canal is open posteriorly, and the left hand is distorted. A. 14

3455. Portion of small Intestine, about two feet in length, and closely convoluted, which was protruded through the umbilicus of a child born at the full period. This intestine had no covering of peritoneum or abdominal wall; the umbilicus closely surrounded it, where it was continued into the abdomen. A. 15

The child lived forty hours after birth. See Case-Book, No. 167, p. 142.

Presented by S. A. Philbrick, Esq.

3456. A congenital umbilical Hernia. The lower end of the ileum, the cæcum, and ascending colon are protruded through the umbilicus, and were contained in a cavity bounded by the extended substance of the umbilical cord. The darkness of the walls of the intestine, and the lymph on its surface, indicates that it was strangulated and inflamed. A. 184

3457. Portion of a Fœtus at full term with ectopia of the abdominal viscera. The hernial sac is formed by the abdominal parietes at and above the umbilicus; it contained the liver and small intestine. A section has been made through the sac to show its contents.

3458. A Fœtus at about the eight month of pregnancy. The greater portion of the small intestines is contained in a membranous expansion of the cord. A sixth finger is present on each hand. There is apparent sloughing of a portion of the abdominal wall around the umbilicus.

Presented by Dr. Matthews Duncan.

Sub-Class V.—DEFECTIVE CLOSURE OF THE AXIAL CANAL OF THE CEREBRO-SPINAL SYSTEM.

(A.) ANENCEPHALIA.

3459. The Skull of an Anencephalous Fœtus. Its base is complete, but small and flattened; the several bones appearing crowded, and shorter, thicker, and rounder at their edges than in the natural state. The upper part of the skull is very incomplete, and presents a large round central aperture, the margins of which are formed by the edges of the rudiments of the frontal, parietal, and occipital bones. These rudiments consist of little more than narrow slips of bone flatly depressed towards the base of the skull, and so nearly touching it that the hollow which represents the cranial cavity is only about two lines in depth. The orbits also are peculiarly flattened, and their superior walls small and receding. A. 136

3460. Skeleton of an Anencephalous Female Fœtus. The defect of the cranium is like that in the last specimen; but the bones of its upper part are even less developed, so that its base projects between and above them. The arches of the vertebræ are separate and everted in nearly the whole length of the vertebral column. In the dorsal portion rudiments of neural spines are formed along the middle line distinct from the arches. The remainder of the trunk and the limbs of the fœtus appear well formed.

The dorsal spine is very irregularly malformed. The first dorsal vertebra is normal. The second and third are represented by two distinct halves on the left side, but by a single half on the right side, though it is difficult to say to which vertebra the latter belongs. The fourth vertebra consists of two distinct halves. The fifth is normal, but placed obliquely, so that its left end is considerably higher than the right. The right half of the sixth is absent; but the seventh, eighth, ninth, and tenth, although bilobed, are otherwise normal. The two last vertebræ are normal, the upper nine ribs on the left, and the second, third, and fourth on the right side, are fused from their tubercles to their angles. A. 137

3461. A similar specimen of conjunction of Anencephalia and complete Spina Bifida in a Female Fœtus. The bones of the upper part of the skull are in this case larger, and the parietal, as well as the frontal bones, meet in a median

suture; but as in the preceding cases they are depressed nearly into contact with the base of the skull. The cervical vertebræ are so fused that it is impossible to decide with certainty whether or no they are normal in number. Only ten dorsal vertebræ are present, though which are missing is quite uncertain. Some of the bodies are bilobed, and the fourth from the last is represented by only the left half. There are nine ribs on the right side and ten on the left: several of the former being bifurcated at their vertebral extremity, and fused in other parts. The number of the lumbar and sacral vertebræ is normal. A. 138

3462. The separate Bones of the Skull of an Anencephalous Fœtus, marked according to the descriptions of the cranial vertebræ. A. 139

3463. The disarticulated Bones of the Skull of an Anencephalous Fœtus. A. 191

3464. An Anencephalous Fœtus. The spinal cord and medulla oblongata appear normal, but no trace of brain exists. The spinal nerve-roots are perfect, as well as some of those arising from the medulla oblongata; bristles are placed beneath the cranial portion of the accessory nerve. A. 117

3465. A similar specimen. The cerebral extremities of the cranial nerves, which are not connected with the medulla oblongata, lie free at the base of the cranial cavity. A. 118

3466. A Fœtus similarly malformed, showing the loose, soft, and vascular or bloody tissue, with which the collapsed and nearly obliterated cranial cavity is covered. A. 119

3467. A Fœtus similarly malformed, and having its skin marked with large dark brown spots, which were believed to be due to syphilis. A. 120

Presented by Dr. Conquest.

3468. A dwarfish, adult, Anencephalous Fœtus. A portion of the liver and small intestines protrudes through the anterior abdominal wall (exomphalos). The greater portion of the spinal canal is open posteriorly.

Presented by Dr. Matthews Duncan.

3469. A similar specimen of Anencephalia, with Spina Bifida in a premature Fœtus.

Presented by Dr. Matthews Duncan.

3470. Section of an Anencephalous Female Fœtus at full term. The skull-cap with the supra-occipital bone is entirely absent; the neural arches of the vertebræ are absent along the whole length of the column. The membranes of the brain project from the occipital region; some broken down brain matter was adherent to their inner surface.

The limbs, viscera, and genito-urinary organs were well developed. A. 240

(B.) ENCEPHALOCELE.

3471. A Brain, a large portion of the substance of which was contained in an Encephalocele. The following is an account of the dissection:—

The skull was small and ill-developed, especially in the frontal region. A soft, flattened spheroidal mass was attached by a narrow pedicle to the uppermost part of the vertex. On either side of the apex of the mass there were two ulcerated apertures in the skin covering it as large as a crown piece, through which the contents protruded.

On laying open the skin, the tumour was found to be filled with a discoloured mass of brain substance, enclosed by membranes, which were almost entirely covered by a thick layer of lymph and gelatinous pus.

The surface of the projecting brain presented the ordinary convolutions.

The pedicle of the mass, supported by the thickened membrane, passed through the anterior fontanelle, which was not much enlarged. On removing the brain from the skull the nerves at the base were found to be normal. The cerebellum was small, and its various parts were not differentiated; it was attached along a considerable extent of the posterior surface of the medulla and the elongated pons varolii.

The right half of the cerebrum was fairly large; the left half was much smaller, but in both a fissure of Sylvius and temporo-sphœnoidal lobe were observed.

No trace of the corpus callosum existed; but a narrow band of white substance as large as an optic nerve united the two anterior cerebral lobes. A column of brain substance extended upwards from the pons varolii, appearing in fact to be an abnormal elongation of that structure and the crura cerebri; in passing upwards it gave off on either side a peduncle to the cerebral hemispheres, and was then continued into the mass of the brain substance external to the skull. Narrow bands of brain substance passed between the extracranial mass and the cerebral hemispheres. Lymph was effused beneath the membranes generally.

Judging from the relation of the parts, it appears that the extruded mass corresponded to the upper and posterior portions of the hemispheres.

A larger portion of it appertained apparently to the left hemisphere, in correspondence with the smaller size of this half of the cerebrum.

The patient was a child, who lived four weeks. The tumour was twice punctured, and on one occasion blood, on the other sero-pus, flowed from the canula. The child never cried.

A cast of the head is preserved.

See *Obstetrical Society's Transactions*, 1880, p. 131.

3472. A Sac, formed in the occipital region by protusion of the dura mater through an aperture in the occipital bone similar to those in the sacra shown in the succeeding specimens of spina bifida. With the dura mater a portion of brain, covered with pia mater and arachnoid, is protruded. The aperture in the occipital bone is about two lines in diameter, and situated in the median line below the spine. A. 131

The case is described by Mr. Earle in the *Medico-Chirurgical Transactions*, vol. vii, p. 427.

(C.) SPINA BIFIDA.

3473. Part of a Fœtal Skeleton, from a case of hydrocephalus with spina bifida. Except those of three dorsal and two cervical vertebræ, all the laminæ are deformed and disparted like those in No. 3475. The occipital bone also appears to have been similarly defective.

The bodies of many of the vertebræ appear bilobed. The left half of the body of the ninth dorsal vertebra, the left lamina, and left processes of the body are wanting. The eighth and the tenth vertebræ are approximated to each other on the left side, and their left laminæ appear somewhat overgrown. The left ninth rib is absent, and the first and second ribs on the same side are partially fused. The left lamina of the fifth dorsal vertebra is in contact in the middle line with both the fourth and fifth on the right side, and the fourth on the left side is in contact with, though on a lower plane than, the third on the right. A. 134

3474. Two specimens of defect in the formation of the posterior Arch of the first Cervical Vertebra. In one, the deficiency is median, the ends of the

laminæ, symmetrically formed, being about a quarter of an inch apart. In the other, the right lamina is entirely deficient, and the left has rather less than its due length. A. 135

3475. Dorsal and lumbar portions of a Fœtal Spine. The spinal canal is wide open behind, the laminæ of nearly all the vertebræ being disparted and turned outwards. They are not deficient in size; rather, they are overgrown and expanded at their distal ends. The left half of the ninth dorsal vertebra is wanting. A. 133

3476. The Spinal Column of an Infant at the period of birth, from a case of spina bifida. The laminæ are wanting as far up as the cervical region. A. 196

Presented by Mr. Key.

3477. Part of the wall of a Lumbar Spina Bifida. The nerves, having been dissected out, are seen spread over and adherent to its inner surface. A. 189

3478. A Spina Bifida. The spines and laminæ of the lower lumbar and sacral vertebræ are deficient. Through the gap thus formed there is a protrusion of the spinal membrane in the form of a sac. The cavities of the sac and of the spinal canal are shown by lateral section; a bristle is passed into the sub-arachnoid space, the fluid from which distended the sac during life. Two large nerve roots appear to have protruded, and are adherent to the sac wall. A. 127

3479. A Lumbo-Sacral Spina Bifida. The sac contains the termination of the spinal cord and many large nerve trunks.

Presented by Dr. Gibson.

3480. Lumbar and Sacral Spine of an infant with a spina bifida. The posterior wall of the cyst has completely sloughed away as the result of treatment. It will be seen that the termination of the spinal cord, together with several of the nerves, pass directly into the cyst. The cyst wall appears to be formed of the integument together with the dura mater, and probably the arachnoid. The pia mater still covers the termination of the cord, and the central canal does not open into the cyst. With the exception of the failure in the arches, the vertebræ appear in other respects to be normal.

See *Sitwell Ward Book*, vol. v. p. 147.

3481. A Sacral Spina Bifida. The sac, which is very thin, communicates by two minute apertures with the cerebro-spinal canal. The bodies of the vertebræ have been removed, and the cord may be seen to be adherent at the point of communication between the sac and the sub-arachnoid space. The central canal of the cord is much dilated, but neither it nor any of the nerves are contained in the sac.

Presented by Dr. Matthews Duncan.

3482. A Sacral Spina Bifida. The chief deficiency of the laminæ appears to be situated at the first sacral vertebra. The sac is opened from behind. Several nerve roots pass out from the spinal canal, and are adherent to the inner surface of the sac. A. 128

3483. A similar specimen of Sacral Spina Bifida, from a child about 6 years old. The spinal canal and sac are laid open from behind, showing the passage of some of the sacral nerve roots from the cord into the sac. The spinal cord reaches to the last lumbar vertebra. A. 129

3484. A similar specimen. The spinal cord extends into the sacral portion of the canal. In this, as in all the preceding specimens, the sac is formed by a protrusion of both layers of the arachnoid, and the fluid contained in it is the sub-

arachnoid or cerebro-spinal. In most of the specimens in which the soft parts have been preserved portions of the cord and of the spinal nerves are contained in the sac. A. 130

3485. Spina Bifida with considerable distortion of the Pelvis and Lumbar Spine. The sac, which is of large size, communicates with the arachnoid cavity, and not with the sub-arachnoid space as in the preceding specimens. The arches of the sacral and lower lumbar vertebræ are deficient posteriorly. Below the abortive laminæ of two of the lumbar vertebræ, just above the attachment of the tumour, is a separate portion of bone of a horseshoe shape partly filling the deficiency. The sacrum and coccyx are exceedingly irregular in form; their whole direction is altered, the upper part of the sacrum lying on the left side of the middle line, the coccyx and lower part of the sacrum pointing towards the right side. The right iliac bone is attached to the sacrum and lumbar vertebræ by fibrous tissue. There were not any nerves in the sac.

For notes of case during life, see *Lucas Ward Book*, vol. iv, p. 70.

3486. The Sac of a Spina Bifida successfully removed from the upper dorsal region by excision. The fluid in this specimen was contained in the arachnoid sac, and not in the sub-arachnoid space. There were no nerves within the sac. A. 202

Presented by Dr. Wilson.

The specimen is fully described in the *Pathological Transactions* for 1863, vol. xiv, p. 214.

3487. The Sac of a Spina Bifida that was excised. The child recovered. A. 220

Presented by J. Wilson, Esq.

SPINA BIFIDA WITH SACRAL CYST.

3488. The lower portion of the Spine of a Child. The laminæ of the last lumbar and of the sacral vertebræ are deficient, and a considerable protrusion of the spinal membranes has occurred at this spot. The sac thus formed contains the termination of the Spinal Cord, which, together with many large nerve roots, is adherent to the inner surface of the sac; the lining membrane of the latter is stained with iodine. Situated on the posterior surface of the spina bifida is a coccygeal cyst, the walls of which have become partially adherent to each other, so that there was not more than two drachms of fluid in the cavity. A bristle is passed through an opening by which the two cysts communicated, but which was found blocked up by recent adhesions.

From a child, aged 8 months, the subject of a large cyst, which was thought to be a spina bifida. On October 11th ten ounces of fluid were removed by a trocar, and half a drachm of "Morton's fluid" was injected. On November 10th the swelling was found much decreased in size; was again tapped and re-injected with the same solution. On January 1st three ounces of fluid were drawn off, and a drachm of "Morton's fluid" injected. The child immediately became very livid and died comatose in a few hours. It is most probable that in the first two operations the sacral cyst only, and not the spina bifida, was injected.

CLASS VI.—DEFORMITY RESULTING FROM DISEASE.

(A.) HYDROCEPHALUS.

3489. The Skeleton of a Fœtus, born with hydrocephalus. It is well formed, except at the head, which measures twenty inches in circumference, and seventeen inches from the nose to the foramen magnum. The bones of the upper part of the cranium are wide apart, lying separate on the extended dura mater. The base of the cranium is flattened out and widened. A. 140

The uterus was ruptured in parturition, and is preserved in Series XLVI. No. 3081.

Presented by Dr. Conquest.

3489a. A similar specimen. There is in addition a large lumbar Spina Bifida.

3490. Skull of a Fœtus, born with hydrocephalus. The ossification of the bones of the upper part of the skull is extremely irregular. A. 141

Presented, with the preceding, by Dr. Conquest.

3491. Skull of an Hydrocephalic Fœtus. A. 141 A.

3492. Skull of a Lamb congenitally hydrocephalic. A. 141 B.

(B.) SPORADIC CRETINISM.

3492a. Skeleton of a Fœtus, twelve inches in length, showing the condition of the extremities which is typical of cretinism. The head is enlarged and singularly deformed, and its enlargement having taken place in the vertical and transverse directions, it is broadly pyriform, measuring four inches from base to vault. A single and continuous case of bone, widely open in front and above, occupies the place, and imperfectly imitates the form of the frontal, parietal, and occipital bones, there being complete synostosis of the segments of the latter. The other cranial bones are depressed, set apart, and bowed out by the pressure of the hydrocephalic fluid; thus, the squamous portion of the temporal looks vertically downwards, as does also the external auditory meatus, the direction of the zygoma being mainly upwards and forwards. All the bones of the cranium are light, dry, and porous. The spine is natural, the clavicles are very long in proportion to the height of the body, and the ribs are thick and heavy, but not beaded. Both the upper and lower extremities are very stunted. The arms measure but three inches and a quarter from the shoulder to the finger tips, and do not reach below the anterior superior spines of the ilium. The lower limbs from the head of the femur to the heel show a similar measurement. The total length of the spine is four inches and a-half, almost half as long again as the inferior extremities. All the bones of the limbs, including the phalanges, are thick, heavy, and firmly ossified; they are, in addition, more or less curved, especially the fibulæ, which are bowed outwards and backwards. Although, on account of the mode of preparation, the epiphyses have considerably shrunken, it is evident that they are very large in proportion to the size of the shafts. The characteristic swelling at the junction of the epiphyses with the diaphyses which is met with in rickets is conspicuous by its absence. A. 142

3492b. A very large Male Cretinous Fœtus which was born at term, and lived one hour. The body is well formed. The back of the neck is occupied by large masses of fat. The head is very large, but well shaped, and a longitudinal section shows that its cartilaginous base is normal. The nose is very flat and broad. The mouth is of natural size. The arms are abnormally shortened, only

reaching to the level of the umbilicus. The skin of the trunk, arms, head, and groins is the seat of an irregularly distributed rash, appearing in patches for the most part of rounded or oval shape, of a slightly reddish-brown tinge, and not raised from the surface, except at the margins, which are serpiginous, and minutely papillated. In all the bones of the extremities the epiphyses are large in proportion to the shafts. The epiphysial cartilage at its junction with the diaphysis presents a layer of tissue evidently differing from hyaline cartilage, and found by microscopical examination to be composed of loose connective tissue. The epiphyses are very easily separable from the diaphyses. Lying under the periosteum in many of the bones is a layer of a soft white material, the nature of which it is difficult to decide; portions of similar material may be seen in the centre of the bony shaft of the tibia and the fibula, and in the lower epiphysis of the former bone. The ribs are not beaded, but at their external ends present an oblique fissure, giving an appearance as if the rib was made up of two separate segments which had subsequently become united.

All the bones are extremely softened, so as to cut readily with a knife; this condition, however, is probably due to the immersion of the fœtus for many years in spirit which had become acid. A microscopic examination does not show any marked abnormality in the minute structure of the bone itself. Each of the epiphysial cartilages shows various abnormal changes in the process of development. The cartilage cells are all of about the same size, and are not arranged in rows at the junction of the epiphysis with the shaft; there is no evidence of ossification progressing at this point, and between the bone of the shaft and the cartilage of the epiphysis is a well marked layer of connective tissue. This condition was constant in all the bones which were examined. It is not improbable that the white material found beneath the periosteum is a result of the long soaking in acid spirit, and does not represent any pathological change.

3492c. A Cretinous Fœtus, born at term. It is about nine inches in length, and the body is of normal size. The head is fairly natural in shape, but the nose is broad and flat both at the root and tips. A longitudinal section of the skull shows that its cartilaginous base is natural, being neither unduly shortened or prematurely ossified. The ribs are rather short, and their anterior extremities enlarged and nodular. All the limbs are extremely shortened, the upper extremities looking more like pins than arms. On removing the soft parts on the right side, the clavicle is found to be of normal length and shape. The humerus is very short, and consists mainly of the two epiphysial cartilages, each of natural shape and size, the shaft being represented by a small piece of compact bone very little more than a quarter of an inch in length; there is no swelling at the junction of the epiphyses with the diaphyses as in rickets. The radius presents a similar disproportion between the bulk of its epiphyses and diaphyses, the whole bone being but half an inch in length; at its upper part there is a sharp posterior curve. The ulna is very slightly shorter than the radius, its epiphyses are large, and the shaft is short as in the two bones just described. In the lower extremity the deformity is of a precisely similar nature; the femur is one inch in length, the tibia three quarters of an inch, and the fibula rather more than half an inch. In each bone the epiphyses form more than three-fourths of the whole length, but in none of the epiphyses is there any attempt at ossification.

The microscopical appearances of the epiphysial cartilages and of the neighbouring bones were exactly similar to those described in the previous specimen, there being in each bone an ingrowth of connective tissue separating the epiphysial cartilage from the diaphysis.

3492d. Part of the Head, with the legs and forearms of a Fœtus, which presents some evidences of cretinism. The head appears to have been about the natural size which is found in recently born children. The palate is most extensively cleft, and the nose much deformed. The bones of the forearms are abnormally short, the left radius measuring one inch, the ulna of the same side one inch and

one-eighth. Both these bones present a more marked posterior curve than is natural, but their epiphyses are not very large. The bones of the right forearm are similarly shortened, the radius however being one-eighth of an inch longer than its fellow on the opposite side. At its upper end, the right ulna presents a very sharp curve with the concavity posteriorly. On the right hand there are six digits, on the left a similar number, but the little finger of this hand has in addition a small outgrowth from the tip of the fifth finger. The bones of the lower extremity are, like those of the upper, much shortened. The epiphyses of the right tibia are large compared with the shaft, which is curved in an outward and forward direction; the fibula is also shortened. Only a part of the left tibia and fibula have been preserved; their shafts are thickened, and their lower epiphyses large compared with the rest of the bone. The right foot has six metacarpal bones, but seven toes, two of the latter being connected with the first metacarpal bone. On the left foot are seven toes. A complete absence of all attempts at ossification at the junction of the epiphyses with the diaphyses was found on microscopical examination. As in the preceding specimens, there was also an ingrowth of fibrous tissue similar to that already described.

The four previous specimens are described by Mr. Bowlby in the *Transactions of the Pathological Society* for 1883–84.

SERIES II.

ABNORMAL CONDITIONS OF THE LIMBS.

CLASS I.—VARIATION.

(A.) IN THE SHOULDER GIRDLE.

3493, 3494. The Scapulæ and Clavicles of an Adult. On the inferior surface of each clavicle, about an inch from its scapular extremity, there is a broad oval process, the flattened free surface of which articulates with the upper surface of the base of the coracoid process. The articulations were provided with cartilages and synovial membranes.

3495. Portion of a Scapula and the Acromial end of a Clavicle. An irregular buttress of bone projects from the under surface of the clavicle, about one inch from its acromial extremity, and was connected by ligamentous tissue to an irregular expanded articular surface upon the upper border of the scapula and inner surface of the coracoid process. The promontory of bone occupies somewhat the position of the conoid ligament.

Obtained from the dissecting room.

3496. A Shoulder Joint. The long tendon of the biceps muscle is unusually slender, and lies between the synovial and fibrous layers of the capsule. A. 156

3497. A Shoulder Joint in which there is partial absorption of the articular cartilage upon the head of the humerus and glenoid cavity. The tendon of the biceps is continued on the outside of the capsule of the joint, to the upper edge of the glenoid cavity. There is also a distinct slip of this tendon adherent to the lower part of the bicipital groove in the humerus.

It is not known whether this condition of the tendon of the biceps was the result of injury or disease, or a congenital defect. The other shoulder joint presented a similar arrangement.

(B.) IN THE DIGITS.

3498. Portion of an Adult Hand with a Supernumerary Thumb. This thumb is small and distorted; but it has a distinct flexor muscle and tendon, and a slip of tendon passes to it from that of the long flexor of the normal thumb. There is an appearance of a separate extensor tendon passing to the additional thumb. A. 158

3499. Two Supernumerary Little Fingers removed from a Child's Hands. They are malformed, and were attached by narrow pedicles. A. 159

Presented by J. F. Crookes, Esq.

3500. The Hind Leg of a Guanoco with a supernumerary digit.

CLASS III.—EXCESS OF GROWTH.

3501. Half the Great Toe of a Girl, aged 10 years, which had been hypertrophied at birth, and continued to preserve its abnormal relation to the other toes during the gradual growth of the child. The increase in size is due to fat and fibrous tissue. The joints are normal; the last phalanx is the only one of the bones which appears to be hypertrophied. The joint-capsules were very loose before removal, so that the joint of the toe could be bent back upon the dorsum of the foot.

See *Lucas Ward Book*, vol. v, p. 36.

3502. The three intervening Toes of the left foot. The enlargement which they present was congenital; it is due to an excess of all the structures which enter into their formation. It affected, though in a less degree, all the corresponding metatarsal bones and the soft parts covering them. Over the ball of the foot there was an enormous cushion of fat. The malformation was the source of so much inconvenience to the patient, who was a sailor, that the parts were amputated.

CLASS IV.—ARREST OF GROWTH.

3503. A Fœtus born at full term with failure of development of the lower extremities. The lower limbs are perfect as far down as the knee, but immediately below this joint on the left side, and a few inches further down on the right, the extremities terminate in rounded stumps, which present an appearance very similar to that which might result from a circular amputation in this region. A. 182

3504. A Two Months' Fœtus. Immediately above the right knee the thigh presents a marked constriction as though a tight band had encircled it in this situation.

Presented by Dr. Matthews Duncan.

3505. A Malformed Hand from a new born Child. The palm is shapeless, and the fingers and thumb are represented by small papillæ each joined by a very narrow neck to the rest of the hand. This appears to be one of the stages of so called "intra-uterine amputation."

Presented by Dr. Matthews Duncan.

CLASS V.—ARREST OF DEVELOPMENT.

ABSENCE OF THE TIBIA.

3506. Congenitally Deformed Leg and Foot, removed by amputation from a girl 9 years old. The tibia is absent, the fibula is seen to be large, strong, and well formed; it articulated above with the external condyle of the femur, below, with a large bone representing the os calcis, astragalus, and scaphoid. The cuboid, middle, and external cuneiform bones are well formed, but there is no internal cuneiform. The four outer metatarsal bones are normal, but the first is very small and ill developed, its base articulating almost entirely with the second metatarsal bone. The phalanges are normal.

See *Lucas Ward Book*, vol. v, p. 286.

3507. Congenital Deformity of the Right Leg and Foot. Removed from an infant 8 months old. The tibia is absent. The fibula is large, strong, and curved, with the convexity projecting outward and backward; it is flattened antero-posteriorly. Above, it was loosely attached to, and articulated with, the external condyle of the femur: below, it is connected by means of a mass of cartilage with the os calcis, and what appears to be the astragalus. The os calcis is well developed. The quadrangular flattened bone which articulates with the anterior half of the upper surface of the os calcis may be presumed from its position to represent the astragalus. Projecting upward from its upper surface is a small mass of cartilage, which may be a rudiment of the epiphysis of the tibia. The scaphoid, cuboid, and cuneiform bones are represented by a mass of cartilage having grooves on its surface, which indicate subdivisions. There are six metatarsal bones and seven toes. The four outer metatarsal bones with their corresponding toes have a normal appearance and arrangement, thus indicating the second metatarsal bone as probably corresponding to the great toe. This bone is large and widened out at its distal end, where there are two articular facets for two well formed toes. The innermost metatarsal bone with its toe would thus appear to be the supernumerary one; it is attached rather to the inner part of the foot. Before the separation of the soft parts there was a wide interval between the three inner and four outer toes; all the toes were well formed. The foot was turned inward and at right angles to the leg. There were some depressions and linear indentations of the integument of the leg. The child was otherwise well formed, of good size, and healthy. It made a good recovery.

See *Sitwell Ward Book*, vol. v, p. 341.

3508. A Leg, presenting a congenital absence of the Tibia. The fibula, which articulated with the external condyle of the femur, is well formed. The foot is placed in a position of extremely exaggerated equino varus, so that the sole looks directly upwards. The os calcis is well formed, and articulates with the lower end of the fibula. The only other tarsal bones developed are the cuboid and external cuneiform. Three metacarpal bones are present. The extensors and flexors of the existing toes are normal at their insertions, but many of the muscles usually attached to the tibia arise from the fibula. The patella was absent, and the lower end of the femur greatly increased in size, apparently by an overgrowth of the condyle in a lateral direction.

From a girl aged 12 years, whose hands were also deformed by the absence of the middle digit. With the exception that a sister had a similar condition of the hands, there was no family history of any deformity. Casts of the leg and hands are preserved, Nos. 71 and 88.

TALIPES.

3509. Skeleton of a Congenital Club-Foot from a young woman. The foot is in the position of talipes equino varus, the greater part of the deformity being caused by an upward and inward displacement of the tarsal bones and the front of the foot at the mid-tarsal joint, the cuboid being partially dislocated from the os calcis, and the tubercle of the scaphoid approximated to the internal malleolus of the tibia. The foot is a little extended at the ankle joint, but the axes of the astragalus and os calcis relatively to that of the bones of the leg are but slightly displaced. The bones on the inner side of the foot are compressed, and not fully developed.

3510. The Skeleton of a Man, about 30 years old, who had a singular deformity of the chest, and talipes varus of both feet. The sternum, though itself well formed, is depressed so as to be within from two to three inches of the dorsal vertebræ. The anterior extremities of the ribs, normally directed in their first course, bend backwards to the level of the sternum, to which they are as usual connected by costal cartilages that pass nearly transversely. The bones of the legs and feet are small, light, and fatty. The chief deformity is, or begins, in the astragalus, the head or anterior part of which is directed inwards, so as to form a right angle with its posterior and upper part. The articular surface of the head of the astragalus is so placed that what is normally its transverse diameter is directed from before backwards. All the bones of the foot are adapted to this inward turning of the head of the astragalus; the long axes of them all (except the os calcis) being directed inwards instead of forwards. The anterior part of the os calcis is directed somewhat inwards, but much less so than that of the astragalus; and the os cuboides is adapted to the deformity by being displaced to the inferior part of the os calcis, with which it articulates on an unusual surface. On the left side the chief tendons are left attached to the bones of the foot. A. 162

(In Case C.)

Presented by Sir George Burrows.

3511. Lower Extremities, with distortion of the Feet. Each foot is turned upwards and backwards, so that its tibial margin is in contact with that part of the leg which corresponds with the posterior and internal margin of the tibia. The feet are thus placed in an extremely exaggerated position of talipes equino varus. A. 161

3512. An Astragalus removed by operation from a foot affected with Talipes Equino Varus. The anterior portion of the bone is smaller than natural, and the head twisted so that its articulating surface for the scaphoid looks almost directly inwards.

A cast of this foot after the operation is preserved, No. 85.

For an early condition of Talipes Varus, see specimen No. 1205.

ABSENCE OF RADIUS.

3513. The Upper Extremities of an Infant. On the left side the radius is entirely absent, and only three digits are present, the thumb and index finger being deficient. On the right side the radius is only partially developed, being altogether smaller than the ulna, and its shaft pliable and unossified. On the corresponding hand the thumb is imperfect, and is represented by a small cutaneous papilla. A. 160

Presented by Dr. Conquest.

CLASS VI.—MALFORMATIONS FROM DISEASE (NOT CONGENITAL).

3514. A Knee Joint from a Leg which was affected with well-marked Genu Valgum. No change in the ligaments was observed on dissection; they have since contracted from immersion in spirit. The internal condyle is slightly longer than the external, and consequently appears unduly prominent. The external condyle is flattened, especially along its external edge, and in front is a depression corresponding to the semilunar cartilage; the articular cartilage covering the bone at this spot was of a slightly yellow colour. The internal condyle of the tibia projects somewhat higher than the level of the external.

The specimen was taken from the body of a child aged 11, who was killed by an injury to the head. The opposite limb was normal.

3515. The Foot and Part of the Leg of a Girl, aged 16 years, amputated on account of its uselessness and interference with walking. The leg had not been used since the age of 4 years, when, to judge from the history, the patient suffered from an attack of infantile paralysis. The specimen is a typical example of acquired talipes equino varus. The muscles vary much in appearance, some being in an advanced state of fatty degeneration, more particularly the gastrocnemius, soleus, tibialis posticus, and extensor longus digitorum, whilst others, especially the flexor longus digitorum and the peronei, look remarkably healthy. Of the bones, the astragalus was the only one which was in any way altered, its superior articular surface showing an absence of the articular cartilage towards the front, the part which would be separated from the tibia in the position of talipes equinus. The articular surfaces of the tarsal bones were in many cases partially separated from each other, the cartilage itself being thinned and transparent.

See *Lawrence Ward Book*, vol. ii, p. 402.

3516. Skeleton of the Foot of a Chinese Woman. It is shortened antero-posteriorly. The natural concavity of the sole is greatly increased. The bones are compressed and much smaller than their normal size. The toes are doubled down and distorted. A. 200

3517. A similar specimen, in which, however, the soft parts have not been removed. A. 190

SERIES III.

ABNORMAL CONDITIONS OF THE OSSEOUS AND MUSCULAR SYSTEMS.

CLASS I.—VARIATION.

3518. An Os Hyoides with the left Styloid Process and the two Stylo-Hyoid Ligaments. The latter are ossified, and articulate at their extremities with the bones they connect.

3518a. An Adult Male Skull. On the right side of the base of the skull an unusual conoidal process, three quarters of an inch in length, and half an inch in diameter, extends downwards, and at its extremity curves slightly forwards. It proceeds from the inferior surface of the occipital bone, immediately behind the jugular foramen, midway between the condyle and mastoid process. On the anterior aspect of its distal extremity is a smooth oval surface, by which it articulated with a corresponding surface on the posterior part of the right transverse process of the atlas. The other parts of the skull are normally formed. A. 147

3519. The first four Cervical Vertebræ of an Adult. The foramina for the passage of the left vertebral artery are much smaller than those for the right in the first, third, and fourth vertebræ; and in the second no aperture exists on the left side, the two constituent portions of the transverse process being completely fused. A. 149

3520. An Adult Spine, with thirteen Ribs on each side. The additional ribs are connected with the seventh cervical vertebra, and are formed by its pleurapophyses, or anterior portions of its transverse processes, being exceedingly developed. These were cut off near the spine, so that their length and mode of termination cannot be stated. A. 150

3521. Portions of a Spinal Column. The transverse processes of the seventh cervical vertebræ are very large, while a distinct cervical rib is attached to that on the right side. A. 150

3522. An Adult Female Thorax. The twelfth rib is deficient on the left side, and rudimental on the right. The left fifth rib is bifurcate; but the cartilages connected with its two portions are united before their junction with the sternum. A. 151

ANCHYLOSIS OF THE SCAPULA TO THE SPINE.

3523. Specimen of Congenital Malformation of the Spinal Column, Thorax, and left Scapular Arch from a Woman aged 31 years. The posterior curve, which is normal in the dorsal region, is replaced by a slight anterior convexity. There is a sharp lateral curve with the convexity to the left in the upper

dorsal region, corresponding to the absence of the right half of the third dorsal vertebra, and a longer and slighter compensatory curve in the lower dorsal region. Four and a half of the dorsal vertebræ are missing. Of the two lowest cervical vertebræ which are preserved, the upper is fairly normal, except that the spinal canal is narrowed in its right half, and the left side of the vertebra anchylosed to an irregular process of bone springing from the scapula. The anterior part of the transverse process of the seventh cervical vertebra is prolonged into a cervical rib, which is united to the first true rib close to its tubercle. The dorsal vertebræ present appear to correspond to the first, second, half the third, fourth, seventh, tenth, eleventh, and twelfth.

Of these the following peculiarities may be noted. The first is anchylosed to the superjacent last cervical vertebra. The left half of the body of the second is anchylosed to what appears to be the left half of the body of the third, this again being fused with the left half of the body of the fourth. The four remaining dorsal vertebræ are normal.

The intercostal spaces are very wide, and the ribs are deficient in number. On the right side there are seven: four true, one false, and two floating; the second and third of these are fixed posteriorly into a solid mass of bone attached to the first, second, and fourth vertebræ. The remaining ribs are normal, the last two evidently corresponding to the eleventh and twelfth respectively. On the left side there are eight ribs, five true, two false, and one floating. The first two are fused together at their angles, but separated elsewhere. The two next are united from their heads to their tubercles, and are articulated with the second, the left half of the third, and the fourth vertebræ. The remaining ribs are natural.

The sternum is placed obliquely, the sternal notch looking upwards and to the right; its upper end is only three quarters of an inch from the spine, its lower end three inches. The cavity of the thorax is diminished in all its diameters, especially in the antero-posterior; the capacity of the right side being also less than that of the left.

The left scapula is much deformed. There is a broad bridge of bone extending from the middle third of the posterior border of the scapula backwards and upwards to the lamina and spinous process of the sixth cervical vertebra. The transverse axis of the scapula is elongated, whilst the vertical is shortened, and the bone so rotated forward that the glenoid cavity looks nearly directly forwards, the plane of it being nearly an inch in front of the left sterno-clavicular articulation. The upper border and spine, instead of being directed nearly horizontally outwards from the bone, slope downwards and forwards as well. The left clavicle is directed upwards, forwards, and outwards, and presents only a single posterior curve throughout its entire length.

The woman from whom this specimen was taken was of average height, and whilst uncovered did not present any noticeable deformity. Owing to the extreme wideness of the intercostal spaces the impulse of the heart's apex was much diffused. She died of morbus cordis.

Casts are preserved, vol. ii, No. 67.

For other instances of deficiencies in the vertebræ, *see* Nos. 3473 and 3474.

See account by Mr. Willett and Mr. Walsham in vol. lxiii, p. 257, of the *Royal Medical and Chirurgical Society's Transactions.*

3524. A small plate of Bone, which connected the upper and inner border of the left Scapula to the Spines of the upper Dorsal Vertebræ. The edge connected with the scapula is cartilaginous. This abnormal condition appears to be due to an overgrowth of part of the epiphysis from which the posterior border of the scapula is developed. A. 269

The specimen was successfully removed from a child, a cast of whose trunk is preserved, vol. ii, No. 68.

See description of case by Mr. Willett and Mr. Walsham in the *Transactions of the Royal Medical and Chirurgical Society*, vol. lxvi, p. 146.

SERIES IV.

ABNORMAL CONDITIONS OF THE VASCULAR SYSTEM.

(I.) OF THE BLOOD VESSELS.

CLASS I.—VARIATION.

3525. The Arch of an Aorta, giving off only two principal branches. From one of these, as an arteria innominata, proceed the right subclavian and two carotid arteries : the other is the left subclavian. A. 41

3526. A similar specimen. In both these instances the arteria innominata passes obliquely across the front of the trachea. A. 42

3527. A similar specimen. The left carotid arises very near the origin of the innominate artery. A. 44

3528. The Arch of an Aorta, from which arise:—(1) an arteria innominata, that gives off, as in the preceding specimens, the right subclavian and both carotid arteries; (2) the left vertebral artery; (3) the left subclavian. A. 45

3529. A similar specimen. The left vertebral artery entering the canal at the fourth cervical vertebra. A. 47

3530. The Arch of an Aorta, with an abnormal arrangement of its branches, seen from behind. It gives off (1) the right carotid; (2) the left carotid; (3) the left subclavian; (4) the right subclavian. This latter artery arises from the posterior part of the aorta, ascends, and then passes transversely to the right, behind the œsophagus and trachea, to the right side of the neck. A. 48

3531. The Arch of an Aorta, showing an abnormal arrangement of its principal branches. The right subclavian artery, as in the last specimen, is the fourth branch, and passes behind the trachea and œsophagus. A. 48A

3532. A similar specimen. The right vertebral artery arises from the right carotid, and enters the foramen in the transverse process of the fourth cervical vertebra. A. 49

3533. A similar specimen seen from the front. The subclavian artery does not rise so high in the neck as in the last specimen. The right inferior laryngeal nerve branches from the pneumogastric opposite the lower border of the cricoid cartilage, and then passes to its distribution in a direct instead of a recurrent course. A. 51

3534. The Arch of an Aorta, from which arise:—(1) the right carotid artery; (2) the left carotid; (3) the left vertebral; (4) the left subclavian; (5) the right subclavian. A. 52

3535. The Arch of an Aorta, showing an abnormal arrangement of the branches. The carotids are given off by a large trunk corresponding in position to the innominate artery. The left subclavian is the second branch; the right subclavian is given off from the termination of the arch, and passes between the trachea and œsophagus to the right side.

Presented by W. Harrison Cripps, Esq.

3536. An Abdominal Aorta giving off on the left side four, and on the right three, renal arteries. A. 53

3537. An Abdominal Aorta, with five renal arteries proceeding from it to the left kidney. A. 54

3538. The Bifurcation of an Abdominal Aorta; the common iliac arteries are less than an inch in length. A. 55

3539. The Bifurcation of an Abdominal Aorta, with common iliac arteries three inches and a half in length. It is probable that this difference of length in the common iliac arteries was due entirely to the variation in the place of division of the aorta; and that in both cases the division of the common iliacs took place opposite the same point, the upper margin of the sacro-iliac symphysis. A. 56

3540. Arteries from a Neck. The innominate gives a branch to the thyroid gland (arteria thyroidea ima). A. 57

3541. A similar specimen. A. 58

3542. A Thyroid Gland of ordinary size, to which six arteries pass, each as large as an average inferior thyroid artery. Of the two additional arteries, one proceeds from the innominate, the other from the right common carotid an inch from its origin. A. 59

3543. Common Carotid Arteries, dividing opposite the cricoid cartilage. A. 60

3544. An external Carotid Artery, giving off all its branches close to its own origin. The bulbous form of the internal carotid artery is here very marked. A. 61

3545. Right Carotid Arteries. Of the usual branches of the external carotid, two arise from the common carotid, namely, the occipital and the superior thyroid; and one, probably the posterior auricular, arises from the internal carotid. A. 62

3546. An external Carotid Artery, with two superior thyroid arteries arising close to its origin. A. 63

3547. Internal Carotid Arteries, each of which makes a long sigmoid curve before entering the petrous bone. A. 64

3548. A Left Subclavian Artery, passing in front of the scalenus anticus muscle. The right subclavian takes the usual course. A. 65

3549. Arteries of the Neck. The right vertebral artery enters its canal at the fourth cervical vertebra, the left at the sixth. A. 66

3550. An additional Inferior Thyroid Artery, passing from the right subclavian across the front of the common carotid, about half an inch from the division of the innominate artery. A. 67

3551. An Arm with its Arteries. The artery which has the place of the brachial, and divides into the radial and ulnar, is of small size, and gives off no branches in the upper arm. On its inner side is a large artery derived from the axillary; and this, pursuing the usual course of the brachial, and giving off the usual branches in the upper arm, passes, at the bend of the elbow, into the position of a median artery, and anastomoses with the ulnar to form the superficial palmar arch. A. 70

3552. A Brachial Artery, from which the ulnar arises at the middle of the arm, and passes over the muscles at the inner side of the bend of the elbow. A. 73

3553. A Brachial Artery, giving off, at the upper part of the arm, a large branch, which descends on its inner side, and joins the ulnar at the bend of the elbow. A. 75

3554. A similar specimen. The superficial palmar branch of the radial artery is long and large. A. 76

3555. A similar specimen, in which, moreover, the branch descending from the brachial to the ulnar is joined by one of equal size from the inferior profunda. A. 77

3556. A Brachial Artery giving off the radial at the upper part of the arm. A. 80

3557. A similar specimen, except in that the radial artery passes down the arm on the inner side of the brachial, and crosses in front of it at the bend of the elbow; while in the preceding specimens the radial artery lies outside the brachial in its whole length. A. 81

3558. A Brachial Artery, giving off near its commencement a large branch, which descends on its outer side and joins the radial artery. A. 82

3559. Arteries from both Arms of the same Person. In the right, the brachial artery divides high up in the arm; the radial artery gives off the interosseous; and a branch from the deep palmar artery of the radial unites with a branch of the superficial palmar arch to supply the middle finger. On the left side there is a similar high division of the brachial artery; and a large branch from the ulna descends superficially in the forearm and ends in communications with the superficial palmar arch and one of the branches given from the radial to the thumb. A. 83, 83A

3560. A Brachial Artery, from which the interosseous arises at the middle of the arm. A. 84

3561. A Brachial Artery, dividing, two inches above the bend of the elbow, at once into radial, ulnar, and interosseous. Thus three large arteries lie close together and superficially in the front of the joint. A. 85

3562. An anterior Interosseous Artery, which in the lower part of its course passes to the inner margin of the ulna and divides into branches to the inner and back part of the hand. The ulnar artery arises from the brachial high up in the arm and passes over all the muscles at the bend of the elbow except the palmaris longus. A. 86

3563. An Ulnar Artery, giving off at the upper part of the forearm a large median artery, from which arise, in the palm, the digital arteries for the first finger and the radial side of the second. A. 87

3564. A Radial Artery, dividing near its origin into two branches of nearly equal size, which pursue an almost parallel course in the forearm. At the wrist one of them passes like an ordinary radial artery to the back of the radius; the other remains in front and gives off the superficial palmar branch. A. 88

3565. A Radial Artery, similarly dividing or giving off its superficial palmar branch in the middle third of the forearm. A. 89

3566. A Radial Artery, giving off its superficial palmar branch higher than usual, and then passing to the back of the radius over the extensor tendons of the thumb. A. 90

3567. A similar specimen. The superficial palmar arch is not formed. The deep palmar branch of the radial is very large, and from it and the deep palmar arch large branches proceed to join the digital arteries. A. 91

Presented by W. B. Jackson, Esq.

3568. A Radial Artery, whose terminal branch passes along the palmar surface of the metarcarpal bone of the forefinger, and unites with the digital artery supplying the adjacent margins of that and the second finger. A. 92

3569. A Radial Artery, whose deep palmar branch is of large size, and joins the first digital branch of the superficial palmar arch. A. 93

3570. An anterior Interosseous Artery, passing across the front of the lower end of the radius, and uniting with the radial artery. A. 94

3571. An Ulnar Artery, given off from the brachial in the middle of the arm, and passing superficially over the muscles on the inner side of the bend of the elbow. The deep palmar branch of the radial artery is unusually large, and, where it joins the corresponding branch of the ulnar, it gives off the digital artery for the opposite sides of the third and fourth fingers. A. 95

3572. Internal Pudic Arteries giving off the arteries of the bulb, at about the junctions of the ischia and ossa pubis. From their origins the arteries of the bulb proceed almost transversely across the perineum, and their trunks are an inch in length. A. 97

3572a. Pelvic Organs and Arteries. The right internal pudic artery gives off in addition to its usual branches a large artery, the accessory pudic, which proceeds forwards by the side of the lower part of the bladder, then close along the right side of the prostate gland, anterior to which it passes through the triangular ligament and enters the penis. In the penis this artery takes especially the place of the dorsal artery. The right internal pudic artery takes its usual course, but terminates in the perineal artery. A. 96

3573. An external Iliac Artery, from which the epigastric and obturator arteries are derived by a common trunk. The obturator curves over the outer margin of Gimbernat's ligament to its aperture in the pelvis. A. 98

Similar specimens are in the Pathological Catalogue, Series XIX, Nos. 2147, 2148.

3574. A Femoral Artery, from which a large branch, arising in the upper part of the thigh, is continued parallel with the trunk, and, after a course of about seven inches, ends in the popliteal artery. A. 99

3575. A Posterior Tibial Artery, accompanied in its whole course along the leg by a large branch, which is given off from it near its origin, and which ends, near the ankle joint, in anastomosis with the peroneal artery. A. 100

3576. A Leg, in which there is no posterior tibial artery. The peroneal artery is of large size, and its trunk passes across the back of the ankle joint to the inner side of the os calcis, and thence takes the place, and supplies the usual branches, of the posterior tibial. A. 101

3577. A Leg, with a very small anterior tibial artery, and a peroneal artery as large as the posterior tibial. The anterior branch of the peroneal artery gives a large transverse branch to the anterior tibial; and from the junction of these the anterior tibial is of ordinary size. A. 102

3578. A Leg, in which there is no peroneal artery. A. 103

3579. Vena Cava Inferior, ascending, on the left side of the aorta, to the diaphragm, and then obliquely crossing over the aorta to the inferior surface of the liver. A. 104

3580. A similar specimen: the aorta is in the median line. A. 105

3581. Common Iliac Veins, ascending to the first lumbar vertebra before uniting to form the inferior cava. A. 106

3582. Two left common Iliac Veins. At the junction of the left external and internal iliac veins, two large trunks are formed, which proceed parallel to each other, and of which one joins the right common iliac vein, and the other joins the trunk thus formed a little higher up. A. 107

Cases of transposition of blood vessels are in Nos. 3400, 3401.

(II.) OF THE HEART.

CLASS I.—VARIATION.

(A.) IN THE VALVES OF THE HEART.

(I.) MALFORMATIONS OF THE PULMONARY, AORTIC, AND TRICUSPID VALVES.

3583. The Heart of a Girl, æt. 6, with Congenital Malformation of the Tricuspid, Pulmonary, and Aortic Valves. The tricuspid valve forms a continuous septum without any division into cusps. The pulmonary valve is represented by a triangular membranous projection rising up into the commencement of the pulmonary artery: a minute aperture at the apex of it being the sole communication between the ventricle and the artery. Only one semilunar flap of the aortic valve is developed.

The child was well grown and apparently healthy. She was under observation as an out-patient for eighteen months, during which period there was noticed an increased impulse, and loud systolic murmur audible over the whole cardiac region and in both carotids, but loudest in the left subclavian region and at the inferior angle of the left scapula. There was no cyanosis. She died from erysipelas.

(II.) ABNORMAL NUMBER OF VALVES.

3584. Portions of a Heart taken from a Man, æt. 31, who died from an attack of apoplexy, a large clot being found in the third cerebral ventricle. Four semi-

lunar valves exist in connection with the pulmonary artery. In the septum between two of them is an orifice through which a piece of string is passed. All the other valves are natural. No abnormal heart sounds could be detected during life.

3585. A Pulmonary Artery with four valves. One is of less than the natural size, but of healthy tissue. A. 37

586. A similar specimen, but the additional valve is even smaller. A. 38

3587. Congenital malformation of the Pulmonary Valve. Only two segments exist. The tissue of the valve is quite healthy. The foramen ovale is completely closed, and there is no communication between the ventricles. The tricuspid valve is not so clearly divided into its three segments as usual. The valves on the left side are quite normal. A. 194

3588. A Heart with only two Pulmonary Semilunar Valves. 12-140

3589. Part of a Heart, with an aorta having but two valves. One of the valves has a nodule of indurated tissue near one of its angles; and in both there are small fatty deposits. A. 39

3590. A similar specimen. A. 40

Several examples of aortæ having but two valves, and those diseased, are in the Pathological Series. They illustrate the peculiar liability of valves thus defectively formed to become the seats of later disease; and are examples of what appears to be a general rule, that parts originally misshapen are more liable to disease than are well shaped parts.

(B) A DIVISION OF A CAVITY BY AN ADVENTITIOUS SEPTUM.

3591. Heart of a Woman, æt. 35. The left auricle is divided as it were into two, the auricular appendix and the left portion of the auricle being shut off from the upper and right part by a septum, in which is a button-hole shaped opening. A glass rod has been passed through the latter. All the blood must have passed through this foramen in the course of the circulation; neither the right nor left cavities of the heart are at all dilated or hypertrophied. The pulmonary and tricuspid valves are both somewhat thickened, and the chordæ tendineæ shortened. The heart is of normal shape and size, and weighed $10\frac{1}{2}$ ounces; but the capacity of the double-chambered left auricle exceeded that of a normal auricle. The same changes are observable in the left cavities. The pulmonary veins about the root of the right lung were of unusual size, but no abnormal disposition was noticed. The pericardium over the left auricle and the root of the large vessels was extensively ecchymosed. 12-117

See *Post Mortem Book*, vol. i, No. 92; also *Pathological Transactions*, vol. xix, p. 188.

3592. A Right Auricle partly divided into two cavities by a fold of the endocardium.

CLASS V.—ARREST OF DEVELOPMENT.

(A.) ARRESTED CLOSURE OF FORAMEN OVALE.

3593. A Heart in which there is a large oval opening in the septum between the auricles. The opening is an inch in diameter, and not valvular. The heart is enlarged, and all its parts appear increased in equal proportion.

The patient, a woman 30 years old, had good health till within a few months before death, when she began to have signs of disease of the heart, which gradually increased.—*Case Book*, vol. i, p. 110, No. 137.

3594. A similar Specimen. From a man aged 43, who died of phthisis.

3595. The Heart of an Adult, in which the septum of the auricles is almost wholly wanting. Its place is represented by only a crescentic fold projecting from the upper part of the single auricular cavity. In this fold, at the upper and back part, the fossa ovalis is distinct. The adjacent portions of the tricuspid and mitral valves appear continuous with each other over the septum of the ventricles. The rest of the heart appears well formed. A. 25

The patient, a man about 40 years old, lived and died without signs of disease of the heart. He died with diseased kidneys. The case is related by Dr. Kirkes, in the *London Medical Gazette*, 1851.

3596. A Heart having a widely patent foramen ovale. The ductus arteriosus, although pervious, is contracted, and its walls are thickened.

From the Collection of J. R. Farre, Esq., M.D.

(B.) ARRESTED CLOSURE OF THE FORAMEN OVALE AND OF THE DUCTUS ARTERIOSUS.

3597. A Heart in which the Ductus Arteriosus and Foramen Ovale are patent. The former appears to be somewhat dilated. The communication between the auricles is unusually free.

From the Collection of J. R. Farre, Esq., M.D., in whose work on the Heart it is described (p. 12).

(C.) HYPERTROPHY OF THE WALLS OF THE RIGHT VENTRICLE, WITH PARTIAL OBLITERATION OF ITS CAVITY, AND NARROWING OR CLOSURE OF THE PULMONARY ARTERY.

3598. The Heart of a Child about 10 years old. The right auricle appears normal, except in that the foramen ovale is wide open. The tricuspid valve is a narrow ring of membrane with scarcely a trace of tendinous cords. The right ventricle is scarcely more than half an inch in diameter; its walls are thick, but much fibrous tissue appears mixed with the muscular. The pulmonary artery is closed in the situation of its valves; beyond its closure it gains a normal diameter. The ductus arteriosus was pervious. The left auricle, left ventricle, aorta, and their valves, are normal, except in that the aorta is large from its origin to its communication with the ductus arteriosus. A. 26

3599. The Heart of a Child 10 years old, similarly, but in a less degree, malformed. The foramen ovale is closed; the right ventricle is larger than in the preceding; its wall is very thick and strong; the pulmonary artery is not closed,

but is very narrow at its orifice. A portion of glass is passed from the right ventricle, through the narrow pulmonary artery, the ductus arteriosus, and the aorta. A. 27

Presented by Henry Bateman, Esq. *Case Book*, No. 92, p. 52.

3600. The Heart of a Child 7 weeks old. The right auricle is normal, except in that the foramen ovale is wide open. The right ventricle is extremely small. The orifice of the pulmonary artery is very narrow; its trunk of more nearly natural size. The ductus arteriosus is closed, or so nearly closed that a bristle could be passed through only part of its length. The left side of the heart and the aorta are of normal shape, but very large. A. 28

(D.) IMPERFECT VENTRICULAR SEPTUM, WITH NARROWING OR CLOSURE OF THE PULMONARY ARTERY.

3601. The Heart of a Person about 16 years old. The right auricle appears normal, and the foramen ovale is closed. The walls of the right ventricle are thick, and its fleshy columns are so large and numerous that it appears as if divided into two cavities, communicating by narrow orifices indicated by bougies. The part of the right ventricle which leads to the pulmonary artery is very small, and so is that artery at and near its orifice. At the upper part of the ventricular septum is a large, oval, smooth-edged aperture, above which the aorta is so placed that both ventricles alike open into it. The left auricle and ventricle are normal. The aorta is large; the ductus arteriosus is closed. A. 31

3602. The Heart of a Person 28 years old, malformed like the preceding. The communications between the pulmonary artery and right ventricle is a narrow channel, just admitting the passage of two portions of fine straw. Earthy matter is deposited at the upper orifice of this channel, and above it the pulmonary artery acquires a nearly normal diameter, but has thin coats. The foramen ovale and ductus arteriosus are not preserved. A. 32

Case Book, No. 78, p. 40.

3603. The Heart of a Male Child, who lived 6 weeks. The pulmonary artery is very much reduced in size, and at its commencement is a simple pouch, no communication whatever existing between it and the right ventricle. The aorta is unusually large, and communicates freely with both ventricles. The ventricular septum is deficient in its upper part. The auricles appear normal, but it is not clear whether any communication between them existed. The ductus arteriosus is not preserved. A. 213

In this case it would appear that the blood could have reached the lungs only by flowing from the aorta into the pulmonary artery by means of a pervious ductus arteriosus or by the bronchial arteries.

3604. A Malformed Heart from a Child, 15 days old. The upper part of the ventricular septum is absent; the pulmonary artery is imperforate at its origin, so that both ventricular cavities propelled the blood into the large aorta, which is laid open. The aorta divides into two branches, one of which, the larger, passes to the right, and after giving off the right carotid and subclavian arteries, is continued as the thoracic aorta. The left carotid and subclavian arteries are given off close together from the left branch, which passed downwards to supply the lungs. The child was not cyanotic, and died of chronic hydrocephalus.

The case is related in the *Obstetrical Society's Transactions* for 1881, p. 179.

3605. Heart of a Man, æt. 21. The layers of the pericardium are adherent and thickened at two points near the apex. On opening the heart its ventricular part is seen to consist of one large cavity, occupying the position of the right ventricle, but extending considerably to left of the middle line, and of a small cavity on the left side, which is little more than an appendix to the large one. The auricles are of the normal proportions and appearance. A well marked muscular ridge separates the insignificant representative of the left ventricle from the large right ventricle. Below the base of this ridge a transverse section of the heart would include only the right ventricle. The opening between the ventricles is larger than a shilling. Immediately to the left of its upper edge is the orifice of the aorta, and to its right the orifice of the pulmonary artery. The aortic orifice is of the normal size, and has the usual valves. The aorta becomes considerably reduced in calibre at the point of junction of the ductus arteriosus. The ductus arteriosus is closed throughout. It is to be observed that while the aorta opens distinctly into the left ventricle, the opening between the ventricles is so situate that the stream of blood may have passed almost without obstruction into the aorta from the right ventricle. The orifice of the pulmonary artery is without valves, and is bounded by a thickened ring in the centre of a small tract of membrane. This is probably the product of the adhesion of the pulmonary valves. Above the orifice the artery is of normal width, but is slightly narrowed at the junction of the ductus arteriosus. Immediately below it, and close to the edge of the opening in the inter-ventricular septum, the mitral valve opens into the right ventricle. The tricuspid valve opens into the same cavity in front of the mitral and a little above it. The mitral orifice is a very little less wide than normal. Both valves are normal as to their flaps. The vessels on the surface of the heart follow the groove between the actual right and left ventricle, and do not at the upper part of their course run independently of it.

See *St. Bartholomew's Hospital Reports*, vol. xi, p. 225.

3606. The Heart of a Child, 10 years old. The auricles form a single very large cavity, which communicates with the left ventricle alone. A red rod is passed into the opening of the inferior vena cava, and a green one into one of the pulmonary veins. The right ventricle is a small flattened cavity, and communicates with the left ventricle by a circular aperture, little more than a line in diameter, through which is passed a blue rod. The pulmonary artery appears nearly normal, but is slightly narrowed. The left ventricle is very large and strong-walled. The ductus arteriosus is not preserved. A. 29

3607. A Heart, said to be from an Adult, but of small size. The ventricular septum is imperfect, the aorta communicating freely with both ventricles, but more with the right than with the left; the pulmonary artery is much narrowed, and the foramen ovale open. A. 33

3608. The Heart of an Adult of ordinary size. The pulmonary artery appears completely closed by the adhesion of the valves at its narrow orifice, and beyond this closure its trunk is small and thin-walled. Earthy matter is deposited in the valves. The defect in the ventricular septum, and other malformations, exist as in the preceding specimens. The foramen ovale is slightly and obliquely open at the front; the ductus arteriosus is not preserved A. 34

3609. The Heart of a Lad, 16 years old, with an extremely narrow two-valved pulmonary artery, a deficient ventricular septum, and other malformations similar to those in the last preceding specimens. The ductus arteriosus is nearly closed, only a bristle could be passed through it. The foramen ovale is obliquely and slightly open at the front. A. 35

3610. A similar specimen, from a Lad, 18 years old. The foramen ovale is wide open. The ductus arteriosus is not preserved. A. 36

Presented by Henry Bateman, Esq.

3611. A Malformed Heart. White directors point to the abnormal conditions. The foramen ovale is patent. The aorta arises from the right and left ventricles. The ductus arteriosus is pervious. The septum ventriculorum is wanting at the undefended space where the aorta arises. The pulmonary artery is obliterated as it emerges from the wall of the right ventricle. At this point a round clot, firm and decolorized, fills the extremity of its canal, clinging to its walls and to rudimentary valve cusps. A. 188

Presented by Dr. Baly.

3612. A Malformed Heart, the aorta communicating with both ventricles. The septum ventriculorum is perforated, and the aorta arises over the aperture from both ventricles, but chiefly from the right, which, with its auricle, is larger than the left. The pulmonary artery is imperforate as far as its bifurcation. Its branches were supplied with blood in a retrograde course from the aorta through the enlarged ductus arteriosus. Bristles are passed through the aperture in the septum, and from the aorta into the two ventricles.

From a feeble female child, 5 weeks old, who suffered from cyanosis, cold skin, hurried respiration, and diarrhœa.

The case is fully described by Dr. Farre, in his *Essay on the Malformation of the Human Heart*, p. 27, and the specimen was formerly in his collection.

(E.) IMPERFECT VENTRICULAR SEPTUM, WITH NARROWING OF THE AORTA.

3613. Part of the Heart of a Man, æt. 38. The septum between the ventricles is incomplete above, so as to allow of a free communication between their cavities by an opening which will admit three fingers. The foramen ovale is patent, and the aorta much smaller than normal. The whole heart was larger than natural. A. 211

The man enjoyed good health generally, but occasionally became livid, and died suddenly after expectorating a small quantity of blood.

3614. The Heart of a Boy who had cyanosis. It is of very large size, all its cavities being dilated. The walls of the right ventricle are rather thicker than those of the left. An oval aperture, nearly an inch in diameter, exists at the upper part of the ventricular septum, exactly between the orifices of the pulmonary artery and the aorta. The orifice of the pulmonary artery is of natural or rather more than natural size; its valves are well formed, but some earthy deposits existed at their base; the orifice of the aorta is rather smaller than natural. In the fossa ovalis there is a small anterior aperture. A. 36A

The boy died suddenly with rupture of the right auricle just below the entrance of the vena cava inferior, the walls of the auricle being distended to extreme thinness. The condition of the ductus arteriosus does not appear.

Presented by Thomas Warner, Esq.

(F.) GENERAL COMMUNICATION BETWEEN ALL THE CAVITIES.

3615. The Heart of a Child about 3 years old. In place of the septum of the auricles only a slender cord crosses their common cavity; and between the ventricles no rudiment of septum appears. Thus the heart has but a single cavity. Externally it has nearly the natural shape and size, and the walls of

the ventricles are almost uniformly thick. The rudiments of the mitral and the tricuspid valves are arranged like a single valve in a ring between the auricular and ventricular cavities. The pulmonary artery is very small, and has no valves. The ductus arteriosus is removed, but there is an opening in the aorta at the point of its usual junction with the duct. A. 30

3616. A Heart. Both auricles and the right ventricle are greatly dilated; the left ventricle moderately. There is a large opening in the septum at the unprotected spot between the auricular and ventricular septa. All the cavities of the heart are thus placed in communication with each other. The upper edge of the opening is inverted towards the left auricle. The foramen ovale is closed. The tricuspid valve consists of only two large cusps, the inner of which is attached to the lower margin of the opening described. The mitral orifice is contracted; the valve consists of three thickened imperfectly differentiated cusps; the inner sides of the anterior and posterior cusps are attached to the lower margin of the opening. The pulmonary and aortic valves are normal; the pulmonary artery is dilated; the aorta is small.

From a young woman, aged 17 years, who died with cyanosis and dyspnœa, which had existed for ten days before her admission. There was a presystolic thrill; systolic, and presystolic musical murmurs were heard at the apex.

See *Post Mortem Book*, vol. viii, p. 16; and *Hope Ward Book*, vol. viii, p. 242.

3617. The Heart and Lungs of a Child. At birth the heart was outside the thoracic cavity, in front of the anterior wall of the chest (ectopia cordis). The heart itself indicates a general deficiency of development. The two auricles form one cavity, with scarcely a trace of septum. The septum of the ventricles is not complete, the two cavities communicating at their upper part, and the ventricles themselves appear to be imperfectly developed. Thus the heart has but a single cavity. A. 193

Presented by Mr. Edward Daniell.

(G.) TRANSPOSITION OF THE AORTIC AND PULMONARY ARTERIES.

3618. Malformed Heart. The ventricles are modified only in the relative thickness of their walls. The right ventricle, which gives rise to the aorta, is more muscular than the left, from which the pulmonary artery arises, but the right valve is tricuspid and the left mitral. The veins also terminate correctly. The foramen ovale is imperfectly closed by a cribriform valve. The ductus arteriosus is much contracted, the pulmonary artery considerably dilated.

In this child black blood, with the exception of a very little red blood conveyed into the aorta by the narrow ductus arteriosus, was always circulating through the right side of the heart, and through every part of the body except the lungs, and red blood was always circulating through the left cavities of the heart and the lungs, except the small quantity of black blood which passed through the imperfect foramen ovale.

He lived five months, suffering from dyspnœa and frequent cough, pulsation in the epigastrium, excessive coldness of skin, and could only lie upon the right side. He had frequent fits, and was subject to diarrhœa. The immediate cause of death was an attack of small-pox.

The case is fully described by Dr. Farre in his *Essay on the Malformation of the Human Heart*, and was formerly included in his collection.

(H.) ORIGIN OF BOTH THE AORTIC AND THE PULMONARY ARTERIES FROM THE RIGHT VENTRICLE, WITH IMPERFECTION OF THE VENTRICULAR SEPTUM.

3619. A Heart exhibiting an imperfection of the ventricular septum, the aorta and pulmonary artery both arising from the right ventricle; the deficiency of

the septum is at the base, and will allow the passage of the tip of the index finger. The walls of the left ventricle are thicker than those of the right, but its cavity is much less capacious. The aorta arises entirely from the right ventricle, and was otherwise natural. The coronary arteries, one of which is much smaller than the other, arise close together behind the same valve. The orifice of the pulmonary artery is situated in the septum ventriculorum, being partly occluded and subdivided by a large columna carnea which crosses it obliquely. The lower of the two openings thus formed, which is also the larger, presents signs of old endocarditis, and from it a probe can be passed downwards behind some columnæ carneæ as far as the apex of the heart, apparently almost in the substance of the septum. A partial adhesion seems to have occurred between the cusps of the pulmonary valves, so that the orifice of the artery will barely admit the tip of the little finger. This condition, combined with the peculiar mode of origin of the artery, must have offered considerable obstruction to the pulmonary circulation. The calibre of the pulmonary artery itself is but slightly diminished. The auricles communicate by a partly closed foramen ovale. The right auricle is the larger. The ductus arteriosus was not pervious. The heart weighs $8\frac{1}{2}$ ounces.

The specimen was taken from a boy, aged 8 years, who died of typhoid fever. His mother stated that whenever he had a cold he became very blue, but that at other times this was not the case. On admission he was very cyanosed; the apex beat of the heart was in the fifth intercostal space, immediately in the nipple line; the area of dulness was natural, and a soft systolic murmur could be heard, being most clearly marked at the apex. The fingers and toes were much clubbed.

The specimen is described by Dr. Tooth in the *Transactions of the Pathological Society* for 1883-84.

(I.) IMPERFECTION OF THE VENTRICULAR SEPTUM AT THE APEX OF THE HEART.

3620. Heart from a Fœtus at full term, in which an opening was found in the ventricular septum. The aperture admits a crowquill, and is in a very unusual situation, being near the apex, instead of (as is more common) near the base of the septum. A. 229

The case is reported fully in the *Journal of Anatomy and Physiology* for October, 1876.

(J.) CONGENITAL NARROWING OF THE LEFT VENTRICLE IMMEDIATELY BELOW THE AORTIC VALVES.

3620a. The heart and aorta of a man, aged 18 years, who died with Bright's disease and pericardial effusion. The right side of the heart is normal. The aortic valves are free from disease and of the usual form, and did not permit of regurgitation when fluid was poured into the aorta. When depressed in this way by fluid the aortic valves approached a fibrous ring with the tissue of which their bases are continuous. Looked at from the ventricle this abnormal structure appears as a circular ridge attached to the uppermost part of the ventricular septum and to the mitral valves. The part attached to the ventricular septum may be divided into two parts. The posterior and lesser crosses the bare spot two-thirds of the way up, and projects about half a line downwards into the ventricle. At the anterior boundary of the bare spot a very slight spur or puckering projects one line downwards on the surface of the septum ventriculorum. The anterior part of the ridge increases in downward projection as it extends forwards till it reaches the depth of one line. This it does at a point one-fifth of an inch from the projection of the anterior wall of the ventricle from the septum ventriculorum. At this point there is another spur from the ring extending one-third of an inch on to the septum.

The opposite part of the ring is continuous with the tissue of the mitral

valve; the latter structure is quite natural. A microscopic examination shows that the ring is certainly not of inflammatory origin, but was probably formed late in fœtal life from some unknown cause. There is an aneurism in the ascending part of the arch of the aorta.

See description of specimen by Dr. Norman Moore, in the *Transactions of the Pathological Society*, vol. xxxiv, p. 29.

(K.) CONGENITAL ABSENCE OF THE PERICARDIUM.

3621. The Heart and part of the left Lung of a Man in whom no pericardium existed. The heart, naturally formed, lay in the cavity of the left pleura. The serous covering of the heart is continuous, through the medium of that of the pulmonary vessels, with the pulmonary pleura; and the serous covering of the aorta and venæ cavæ is reflected into continuity with the parietal or costal pleura. The left phrenic nerve, lying on the pleura, passes to the right side of the heart, in front of the right phrenic nerve. A. 36B

Presented by Dr. Baly.

SERIES V.

ABNORMAL CONDITIONS OF THE BLOOD GLANDS.

CLASS I.—VARIATION.

(A.) OF THE LIVER.

3622. Portions of a Liver with a small abnormal lobe, attached partially to the gall bladder, and partially to the contiguous liver substance.

3623. A Sheep's Gall Bladder bilobed at its fundus. A. 24

SERIES VI.

ABNORMAL CONDITIONS OF THE DIGESTIVE ORGANS.

CLASS I.—VARIATION.

(A.) OF THE TEETH.

3624. A Supernumerary Tooth, which was developed in the intermaxillary suture (middle third) of the upper jaw. Removed from a lad, aged 17.

(B.) OF THE PHARYNX AND ŒSOPHAGUS.

3625. Portion of the Œsophagus and Trachea of a Boy, æt. 19. In the wall of the œsophagus, just below the bifurcation of the trachea, there is a small pouch, and about half an inch further down another still smaller. Through each of these a bristle is passed. The boy died of renal disease. A. 218

3626. An Œsophagus, in which there is a small pouch or diverticulum in the posterior wall, about the middle of the tube. The mucous membrane, which is quite healthy, is drawn in and puckered around the orifice; there is no thickening of the surrounding tissues.

See description of case by Dr. Moore, in the *Transactions of the Pathological Society*, vol. xxiii, p. 191.

(C.) OF THE STOMACH.

3627. A Stomach, a narrow portion of which nearly midway between the cardiac and pyloric orifices is extremely contracted, so as to divide the organ into two compartments, which communicate only by a small orifice, admitting the passage of the index finger. The stomach appears otherwise healthy.

From a woman in the dissecting rooms. *See* description of case by Mr. Morrant Baker, in vol. xvii of the *Transactions of the Pathological Society*, p. 105.

3628. A Stomach, presenting an hour-glass contraction. The cardiac end is somewhat dilated, the pyloric extremity is natural. The middle portion of the stomach is much contracted, so as only to admit the passage of two fingers; its walls are thickened and its mucous membrane thrown into longitudinal folds.

3629. A similar specimen to that last described. The thickening of the walls appears to be due to an increase in the muscular coat. XI. 5

3630. A dried Stomach, presenting a similar malformation. In none of these stomachs is there any evidence of new growth or of ulceration. XI. 6

(D.) OF THE INTESTINES.

3631. Malformed Intestine from a Negro. The whole seems to be contained in a cyst, after the fashion of a mesenteric hernia. In the caput coli are the openings of three small intestines. That into which a quill is inserted is the ileum, which has a natural course. The wires are inserted into the two extremities of a very small adventitious intestine, which has both its origin and termination in the caput coli. It is of considerable extent, and is filled with folds of mucous membrane. It makes innumerable convolutions in the sac, and at last terminates near the point at which it commenced.

From the collection of J. R. Farre, Esq., M.D.

3632. A Cæcum and Vermiform Appendix. The latter instead of being curled up and held in folds by the peritoneum is perfectly straight and tapering like that of one of the feline tribe.

3633. Pouch of Peritoneum, containing nearly all the small intestines. The pouch lay altogether behind the small (gastro-colic) omentum and the colon, which latter was greatly displaced downwards, the small omentum being proportionally stretched; the large omentum was much atrophied. The pouch, which is about the size of a greatly distended urinary bladder, is composed of unaltered peritoneum; its mouth was situated at the attachment of the mesentery, reaching from the origin of the left iliac artery upwards to near the pancreas. The contained intestine was natural and undistended. The foramen of Winslow was natural. A. 223

From a woman, æt. 25, who died of diabetes mellitus. There were no abdominal symptoms during life. Case 76, *Post Mortem Book*, vol. iii, July 20, 1872.

CLASS IV.—ARREST OF GROWTH.

3634. The Stomach and Intestines of a Boy about 12 years old, and four feet three inches high. The stomach is of less than usual size; the small intestines, of ordinary calibre, are only two feet long; the large intestines measure four feet. A. 11

The case is described by Mr. Abernethy, in the *Philosophical Transactions*, vol. lxxxiii, p. 64.

CLASS V.—ARREST OF DEVELOPMENT.

(A.) INTESTINAL DIVERTICULA.

3635. A portion of an Ileum, with a large diverticulum, situated two feet ten inches from the ileo-cœcal valve.

3636. A similar specimen. The diverticulum was two feet from the ileo-cœcal valve.

3637. Portion of an Ileum, with a diverticulum about two inches and a half in length, the remains of an unobliterated omphalo-mesenteric duct.

3638. A similar specimen, but the diverticulum is shorter.

(B.) IMPERFORATE ANUS.

3639. The Rectum of a Child with imperforate anus. The rectum terminated more than half an inch above the anus, and above this point forms a sac about five inches in length and four inches in diameter. A. 16

Presented by Thomas Warner, Esq.

3640. The Rectum, Bladder, and other parts from a similar case of malformation. The cutaneous and subcutaneous portions of the anus appear well formed, a conical depression from the perineum, with converging folds of skin and mucous membrane, existing as in the natural state. But the space between this depression and the closed termination of the rectum is filled with cellular tissue in a layer between one and two lines thick. Directly above this layer the rectum is dilated into a large pouch. A. 17

3641. A similar malformation of the Rectum and Anus. A layer of cellular tissue, nearly an inch in depth, intervenes between the anal depression and the closed end of the intestine. A large rupture of the colon, about four inches from the cæcum, was occasioned by the accumulation of fæcal matter. A. 19

Presented by William Radnor, Esq.

3642. A similar malformation, in which the anal depression is well formed, and more than half an inch deep; but between it and the dilated termination of the rectum, an interval of nearly an inch deep is filled with cellular tissue. A bristle is placed in an aperture in the end of the rectum, made with a trochar in an attempt to give passage to the fæces. A. 20

3643. A similar specimen; but the trochar passed by the side of the rectum, and did not enter it. A. 21

3644. The Pelvic Viscera of a male Child with a similar malformation. The rectum terminates about one and a half inches above the anus, its extremity being completely covered by peritoneum. The anal cul-de-sac is laid open and a piece of glass is passed within an opening in the peritoneum made by a bistoury in an attempt to open a communication with the rectum. On post mortem examination general peritonitis was found.

See *Henry Ward Book*, vol. ii, p. 291.

3645. The Rectum of a Child with Imperforate Anus. The mucous membrane of the lowest part of the bowel has been peeled up in the form of a cul-de-sac to the extent of about an inch and a half, whilst higher up are small blood extravasations in the submucous tissue. At the place where the separation of the mucous membrane stops is a circular aperture in the wall of the rectum (in which is placed a piece of catheter) communicating with the peritoneal cavity.

See *President Ward Book*, vol. ix, p. 234.

A bristle is passed into a very minute hole in the pouch of mucous membrane through which the cavity of the gut communicated with the anal aperture.

From a child aged 4 days. Previous to admission into the Hospital, a surgeon had attempted to pass his finger into the rectum, and it would appear that in so doing he had peeled up the mucous membrane as seen in the specimen, for on passing the finger into the anus it entered a capacious pouch which did not apparently communicate with the bowel. The hole in the rectal wall was caused by an attempt to relieve the obstruction by the passage of a catheter.

3646. A Rectum and Bladder. The rectum terminates in a cul-de-sac about an inch from the anus. The uraehus is pervious. There is no anal depression. A. 18

Presented by Thomas Davis, Esq.

3647. The Rectum of a Child 14 months old, in which, at birth, the anus was imperforate. The rectum was punctured from the anus with a trochar, and the aperture remained open for the passage of fæces. Where the partition existed between the rectum and anus there is now an annular fold of mucous membrane, projecting, like a perforated diaphragm, in the canal of the intestine, about two-thirds of an inch from the anus. At this fold the mucous membrane is smooth, and appears very dense; above and below it is deeply wrinkled. The muscular coat of the rectum above the fold is very thick. A. 22

Presented by Henry Bateman, Esq.

3648. A similar specimen from a Child who lived two years after the puncture of the rectum. The tissues punctured appear to have been torn or cut in making the preparation; but the insufficiency of the aperture is proved by the great distension, the thick muscular walls, and the large follicles, of the rectum above it. A. 23

SERIES VII.

ABNORMAL CONDITIONS OF THE URINARY ORGANS.

CLASS I.—VARIATION.

(A.) OF THE KIDNEY.

3649. Kidneys united at their lower ends by a broad band of renal substance, so as to form a continuous mass shaped like a horse-shoe. Each lateral half has a pelvis, the median portion has none. A. 108

3650. A similar specimen of unusually large size. The median portion has separate arteries and veins, but no pelvis. A. 109

3651. A similar specimen. A. 110

3652. A Dissection of a Horse-shoe Kidney in an Infant.

3653. A Horse-shoe Kidney from an Infant. It lay to the left of the vertebræ.

3654. Kidneys of unequal size, and combined into an irregular form by portions which passed across the median line. A. 111

3655. A lobulated Kidney from an Adult. It consists of several nearly distinct portions loosely connected with a common elongated pelvis, and of unnatural structure, apparently from granular degeneration. The other kidney was sound. A. 111A

3656. A Kidney, the infundibula of which unite to form the ureter, without the intervention of a pelvis. A. 112

3657. A right Kidney, with the adjacent blood vessels injected. The kidney rests on the right common iliac artery, with its hilus directed forwards. It receives one artery, at its hilus, from the left common iliac, and two from the aorta, just above the bifurcation. One of these two passes behind the kidney, winds round it to its anterior surface, and nearly reaches the hilus before it enters the kidney. A. 115

3658. The Kidneys from a Man, aged 24 years. The left kidney, which is smaller and rounder than natural, lay on the spinal column between the common iliac arteries; it was not easily movable, that is not a floating kidney; the pelvis lay between the organ and the spine. The kidney was supplied by three small arteries derived from the right common iliac; no trace of the left renal

artery existed. The left renal vein passed upwards so as to enter the vena cava nearly in the natural position. The left ureter was normal, but the pelvis of the kidney was dilated. The left supra-renal body was not displaced, but lay in the usual situation. The right kidney and supra-renal body were natural.

See *Post Mortem Book*, vol. iii, p. 233.

3659. The Kidneys and adjacent parts. The right kidney is displaced some three inches below its normal site and the hilus is turned forwards. Both organs are apparently healthy. The left supra-renal body lies in its usual position. From a boy, aged 5 years, who died of tubercular meningitis.

See *St. Bartholomew's Hospital Reports*, vol. xii, p. 252.

3660. The Kidney, Bladder, and Ureter, with part of the Aorta, of a Woman. The kidney lay on the anterior surface of the sacrum; it is of an oval, flattened shape, and appears healthy. The renal artery is derived from the right common iliac, and the renal vein enters the corresponding venous trunk.

CLASS II.—DUPLICITY.

(A.) OF THE KIDNEYS AND THEIR DUCTS.

3661. Double Ureter, extending from the right kidney to the corresponding side of the Bladder. A. 197

3662. A Kidney, with two Ureters. A. 113

3663. Ureters from the left Kidney coalescing before they reach the Bladder. A. 198

This and the previous preparation were obtained from the body of a man brought in for dissection.

3663a. A similar Specimen. The ureters unite about three inches from their single opening into the bladder. A. 114

CLASS III.—EXCESS OF GROWTH.

(A.) OF THE KIDNEY.

3664. A Single Right Kidney. The organ lay on the right side in the usual position. The upper margin was curved somewhat inwards, but did not transgress the mesial line of the body. It was supplied by two renal arteries, but there was only one renal vein. The ureter was rather large, and passed normally to the right side of the fundus of the bladder. There was no trace of left kidney or ureter, or of an opening into the trigone of the bladder on the left side. Both supra-renal bodies were present in their usual positions. The kidney weighed 9 ounces; its length was four and three-quarter inches,

and its width three inches at the largest transverse diameter. The structure of the organ appeared healthy, but the capsule was adherent in several places. The liver was fatty, and weighed 4 lbs.; the spleen, large and pale, but not waxy, weighed $10\frac{1}{2}$ ounces.

From a woman, aged 38 years, who died of pulmonary phthisis.

3665. A very large Kidney, weighing $13\frac{1}{2}$ ounces.

Removed from a man who died of morbus cordis. The other kidney was absent, a small mass of connective-tissue and fat being in its place.

A microscopical examination showed that the enlarged kidney is the seat of chronic nephritis.

CLASS V.—ARREST OF DEVELOPMENT.

(A.) OF THE KIDNEY.

3666. A Structure removed from the position usually occupied by the right kidney. It consists chiefly of a plexus of veins and arteries. It terminates below in two blind pouches, resembling ordinary calices. Three principal arteries pass upwards towards the aorta; two of them unite, being slightly dilated at the point of junction, but the third is continued to the supra-renal, of which it is a branch. The renal artery of the right side is absent.

The left kidney was hypertrophied, weighing 9 ounces 4 drachms. The supra-renal capsules were natural in appearance. A. 187

From the body of a man who died after amputation at the thigh.

(B.) OF THE BLADDER. EXTROVERSION OF THE BLADDER.

3667. The Pelvis of a Female Infant, with the Kidneys, exhibiting an extroversion of the Urinary Bladder. A small piece of glass rod is inserted into the mouth of each ureter. At a point corresponding to the orifice of the urethra are two duct-like apertures leading into a normal vagina, posterior to which a piece of blue glass is placed in a cul-de-sac, which corresponds to the normal vaginal orifice; the uterus and ovaries are natural. The posterior wall of the bladder and the openings of the ureters are bulged forwards; the kidneys are normal. During life the rectum was prolapsed.

The dissection of the specimen is described by Dr. Champneys in vol. xiii of *St. Bartholomew's Hospital Reports*. Drawings of the case are preserved, No. 15.

Presented by Dr. Champneys.

3668. The Pelvis of a Male Child, aged 18 months, exhibiting an extroversion of the bladder for which an operation was performed some weeks before death, but without success. The line of incision still remains, and the portion of integument raised up on the left side of the bladder may be seen, though much contracted. Two black rods are placed in the ureters, two bristles in the vasa deferentia, and the third bristle in the sinus pocularis. There is no symphysis pubis, the two pubic bones being separated by an interval of one inch and a half, and the recti muscles diverging on each side of the extroverted bladder. The innominate bones themselves are normally developed, but the articulations of the ilia with the sacrum are at a more obtuse angle than usual. The testes, which were normal, have been removed, and the vesiculæ seminales are of natural size.

See *Silwell Ward Book*, vol. iv, p. 73.

SERIES VIII.

ABNORMAL CONDITIONS OF THE GENERATIVE ORGANS.

CLASS III.—EXCESS OF GROWTH.

(A.) OF THE OVARY.

3669. Two Ovaries, taken from a Woman on the day after delivery at the full term. One of them has the normal form, but is twice as large as is natural. The other is yet larger, and of an elongated oval form, and measures two inches and a half in length. In this ovary is a large corpus luteum. A. 168

CLASS V.—ARREST OF DEVELOPMENT.

(A.) OF THE URINO-GENERATIVE TRACT.

I. IN THE HUMAN SUBJECT.

(A.) In the Male.

3670. The Penis of an Adult, with Epispadias. A median cleft along the back of the penis extends into the urethra, from its orifice to the pubes. A loose fold of integument covered the fissure in its whole extent. The penis is short; the other parts are well formed. A. 167

3671. Urinary Bladder, with the Genital Organs, of a Man, 50 years old. The left vas deferens terminates abruptly in a cul-de-sac at the situation of the external inguinal ring. The other parts of the spermatic cord are continued to the scrotum, where there is a slight expansion of their tissues, but no trace of any of the structures of a testicle. The vas deferens is pervious in its whole course, and is connected in the usual manner with the vesicula seminalis. The right testicle, and the parts connected with it, are normal; and the vesiculæ seminales are of equal size. A. 166

The case is described by Mr. Paget in the *London Medical Gazette*, August 20th, 1841.

(B.) In the Female.

UTERUS UNICORPOREUS SEPTUS.

3672. A Uterus, from a middle-aged Woman. Its cavity, from its fundus to the upper part of its cervix, is divided into two parts by a thick median partition. Each division of the cavity communicates with its corresponding Fallopian tube. On the exterior of the uterus only a slight depression in the middle of its upper surface marks the interior division. A. 169

UTERUS UNICORPOREUS SEPTUS ET VAGINA DUPLEX.

3673. A Uterus and Vagina. The uterus, externally single, is divided into two parts by a septum, which extends into the vagina, and nearly reaches the pudenda. Each uterine cavity communicates with a Fallopian tube, but that to the right of the septum is considerably the larger of the two.

Presented by W. J. Walsham, Esq.

UTERUS UNICORNIS DEXTER.

3674. Portion of a Uterus whose fundus at the entrance of the right Fallopian tube is enlarged upwards so as to resemble in part the form of uterus met with in the sheep and similar animals; the name of "Unicorn uterus" has been given to this malformation. The left kidney was absent.

Presented by Dr. Matthews Duncan.

ATRESIA OF OS UTERI.

3675. Section of a Female Pelvis and of the structures contained therein. The uterus is seen lying between the bladder and the rectum, its muscular wall greatly hypertrophied. A shallow fissure indicates the cavity which it contained. The uterus terminates below in a vagina which scarcely exceeds an inch in length. A director is passed along a groove marking the course pursued by a trochar in puncturing, during life, the uterine wall, which was here prominent and bulging from the distension of its cavity with retained menstrual discharge. No natural outlet existed for the escape of the contents of the uterus. A. 186

The patient, aged 19 years, died ten days after the operation from an attack of acute peritonitis.

The other half of the pelvis is in the Museum of the Royal College of Surgeons.

ABSENCE OF UTERUS.

3676. The Internal Genital Organs of a Woman in whom no uterus existed. The ovaries are perfect and marked with cicatrices. Only one Fallopian tube exists, and this is not pervious in its whole length. The vagina terminates in a cul-de-sac. A. 168. A

The patient was 45 years old, and died with apoplexy. She had been married twenty years; but her hymen, which had a circular aperture, remained entire. The sexual peculiarities of other parts than the uterus and tubes appeared in no respect wanting; and she had been "regular" within a month or two of her death.

Presented by W. F. Barlow, Esq.

3677. The Pelvic Viscera of a Woman. The uterus and vagina are absent. The ovaries occupy the normal position, and are of the usual size. A deep pouch is formed by the reflection of peritoneum between the bladder and rectum.

There was a shallow pouch, externally, in the situation of the fossa navicularis. The parts were taken from a middle-aged woman, who had cohabited with a man as his wife for some years; she appears to have been a woman of strong sexual passions. The pelvis is preserved. Series XLVII, No. 3104.

Presented by Dr. Matthews Duncan.

II. IN ANIMALS.

3678. Part of the impefectly formed Male Genital Organs of a Mule between the Horse and Ass. The testicles are very small and irregularly shaped, and have scarcely any trace of natural secreting structure. The vasa deferentia and epididymes are more nearly normal: on one side they are injected with mercury. A. 170

3679. The remaining Male Genital Organs of the Mule, with the Urinary Bladder. The vesiculæ seminales, prostate gland, and Cowper's glands are displayed, and appear of normal size. A. 171

3680. The Female Genital Organs of a Mule between the Horse and the Ass. They appear not imperfectly formed. A. 172

3681. The Internal Genital Organs of a Free-Martin, or Calf born as a twin with a bull-calf, and having external characters of a cow-calf. The genital organs are hermaphrodite, consisting of an imperfect vagina ending in a cul-de-sac; a rudiment of an uterus, apparently devoid of cavity; Fallopian tubes and small wrinkled ovaries; vasa deferentia, and vesiculæ seminales.

Presented by Dr. Conquest.

3682. The Organs of Generation of an hermaphrodite sheep. This case is chiefly remarkable for the complete union of male and female organs. There are two testes possessing a natural structure, and seminal vesicles with a uterus and vagina. During life the sheep was regarded as an ewe.

This specimen is described and figured by Mr. Savory in the *Medico-Chirurgical Transactions* for 1859. A drawing is preserved, No. 19.

ANATOMICAL

AND

PHYSIOLOGICAL CATALOGUE.

SERIES I.

NATURAL CONSTITUENT COMPOUNDS OR PROXIMATE PRINCIPLES OF ANIMAL SUBSTANCES.

1. Olein, from fat. 1. 1

2. Stearin, from fat. 1. 2

3. Cholesterin, from human biliary calculi, in the form of white, transparent, and glistening lamellæ.

4. Sugar of Milk, or Lactose, from cows' milk, in powder and in masses of minute crystals. 1. 3

5. Parts of two large cylindriform masses of crystallized Sugar of Milk. 1. 5

6. Impure Sugar from diabetic urine, in irregular crystalline lumps and coarse powder, of pale brown colour. 1. 6

Presented by Dr. Ormerod.

7. Urea, from human urine, crystallized in long, clear, white four-sided prisms. 1. 7

8. Uric or Lithic Acid, from the mixed urine and fæces of the boa constrictor, in white imperfectly crystalline powder. 1. 8

9. Casein, from cows' milk, in thin transparent pellicles, or pieces of membrane, like shavings of horn. 1. 9

10. Hæmatin, from human blood, in small, hard, and nearly black lumps. 1. 10

The preceding specimens, with the exception of Nos. 5 and 6, were prepared and presented by Thomas Taylor, Esq.

11. Impure Fibrin; one specimen, in a thick, firm, and compact layer, probably from a "buffy coat" of inflammatory blood; the other, in irregular strings and small lumps, obtained probably by stirring blood before it coagulated. 1. 11

12. Dried impure Fibrin. 1. 12

13. Dried impure Albumen. 1. 13

14. Impure hydrated peroxide of Iron, from blood. 1. 14

15. Pure peroxide of Iron, from the blood of an ox. 1. 15

Obtained and presented by Dr. Rolleston.

16. Cholesterin. 1. 16

Obtained by Dr. Edwards.

17. Lymph from a chronic abscess. 1. 17

SERIES II.

THE BLOOD AND OTHER COMPONENT FLUIDS OF THE BODY.

18. A Clot of Blood, in the formation of which the red corpuscles sank below the surface before the fibrin coagulated. A layer of fibrin has thus coagulated on the surface of the clot, without any admixture of red particles, forming a white or "buffy" coat on the top of the dark clot. The contraction of this portion of the coagulated fibrin not being hindered, as that in the dark part of the clot was, by red corpuscles imbedded in it, its margins are drawn towards its centre, puckered, and incurved, giving a "cupped" appearance to the clot. **2. 1**

19. Similar Clots of "buffed and cupped" Blood: a section of one of them displays the thickness and almost pure whiteness of the buffy coat. **2. 2**

20. A layer of Fibrin, or Buffy Coat, removed from the surface of a clot of blood, such as is shown in the preceding specimens. **2. 3**

21. A mass of Fibrin, split into thin membranous layers and filaments. **2. 4**

22. A colourless branched Clot of Blood, withdrawn from the pulmonary artery and its ramifications. In the slow coagulation of the blood after death the red corpuscles had time to subside to the posterior branches of the pulmonary artery, leaving the other constituents of the blood to form this pale coagulum in the upper and anterior branches. **2. 5**

23. Serum, which in the recent state had a milky appearance, from the minutely divided fatty matter mingled with it. **2. 6**

24. Ashes of burnt blood. They are spotted with peroxide of iron. **2. 7**

25. Oil from Human Fat; a mixture of Olein and Margarin. **2. 8**

26. A colourless branched Blood Clot, removed from the branches of the pulmonary artery in a case of broncho-pneumonia. **2. 10**

SERIES III.

CELLULAR, FIBRO-CELLULAR, AREOLAR, OR CONNECTIVE TISSUE.

27. Two portions of Cellular Tissue, from the scrotum, inflated and dried. The air impelled into the tissue has separated the bundles and lamellæ of its component filaments, so that they form a kind of cells or spaces, communicating with each other, and of various size and shape. **3.** 1

28. Fibro-cellular Tissue, in the form of membrane, from the Peritoneum. The membrane is formed by the interweaving of bundles of the component filaments of the tissue. **3.** 2

29. A similar specimen, extended and in some measure unravelled, so as to show more plainly the irregularity of size and direction in the fasciculi of which it is composed. **3.** 3

30. A portion of Peritoneum, dried after the minute injection of its blood vessels. The arrangement of the principal vessels is arborescent, with widely diverging branches, and numerous anastomoses. Each artery appears associated with a vein. **3.** 4

31. A portion of Pleura, similarly prepared, and exhibiting a similar arrangement of its blood vessels. **3.** 5

The two preceding specimens were prepared by Professor Scarpa, and given by him to Sir George Burrows, by whom they were presented to the Museum.

32. A portion of Adipose Tissue from the abdominal cavity of a Boa Constrictor (Python Sebæ). The lobules are extremely large, and remarkably distinct, being loosely connected by a small quantity of areolar tissue. **3.** 6

SERIES IV.

FIBROUS AND TENDINOUS TISSUES.

33. A Tendo Achillis, with its parallel component fasciculi of tendinous fibres spread out and a little separated. **4. 1**

34. A Tendo Achillis, of which the component fasciculi are more completely separated. The margins of several of the fasciculi are flocculent with the cellular tissue by which they were connected to those adjacent to them. **4. 2**

35. Tendons of the extensor muscles of the fingers dried after the injection of their blood vessels. The principal vessels within the tendons run in long parallel lines in the cellular tissue between the fasciculi, and communicate by short transverse branches. The arborescent vessels apparent on the surfaces of the tendons belong to the cellular tissue with which, as with sheaths, the several tendons were invested. **4. 3**

36. One of the flexor tendons of the fore leg of a Calf, exhibiting, more perfectly than the preceding specimen, the arrangement of the long parallel blood vessels in the interfascicular cellular tissue, and their transverse communicating branches. **4. 4**

The specimen is described by Mr. Paget in a paper "On the Blood Vessels of Tendinous Tissues," in the *London Medical Gazette*, vol. xxiv, p. 562.

37. Part of a Tendon from a Horse, dried after the minute injection of its blood vessels with mercury. Longitudinal vessels are shown like those in the preceding specimens; but the vessels here principally shown are the arborescent arteries and veins of the cellular tissue investing the tendons. These form an intricate network, and every artery appears to be accompanied by two veins. **4. 5**

Prepared and presented by Thomas Wormald, Esq.

SERIES V.

MUSCULAR TISSUE.

38. The lower half of the Biceps Muscle of an Arm, with its fasciculi separated by the removal of the cellular tissue by which they were invested and mutually connected. 5. 1

39. Part of a Semi-tendinosus Muscle dried after a fine injection of its blood vessels. The principal vessels are shown running parallel to the muscular fibres. One vessel of large size extends along the boundary between the muscle and the tendon. 5. 2

SERIES VI.

CARTILAGINOUS AND OSSEOUS TISSUES.

40. Part of a Rib, including portions of both its bone and its cartilage. The continuity of the periosteum and perichondrium, their common investing membrane, is shown. 6. 1

41. Two Ribs from which salts of lime and other bases were removed by solution in dilute hydrochloric acid. The remaining animal substance, mingled with the substances insoluble in the hydrochloric acid, retains the original form and size of the bones, but is so soft and flexible that it has been tied in knots without breaking. 6. 2

42. Portion of a Rib from an Egyptian mummy. It was immersed like the preceding specimen in dilute hydrochloric acid, and the usual proportion of animal matter remains, preserving the original size and shape of the bone itself and of a quantity of new bone formed in the repair of a fracture. 6. 3

43. The animal matter of several of the bones of a child, retaining their form and size after the removal of their saline constituents. 6. 4

44. Portions of Bones which were boiled for several hours in a solution of potash. The animal matter of the bones was thus dissolved; but its earthy and saline matter remains, preserving the original form and size of the bones, but of chalky whiteness, brittle, and easily separated into lamellæ, or rubbed into powder. 6. 5

45. The earthy and saline portion of part of a Tibia prepared in the same manner as the preceding specimens. 6. 6

46. Portions of several Bones after the removal of their animal matter by calcination. Their shape and apparent texture are not altered by the process. 6. 7

47. A mass of Sulphate of Lime, precipitated on the addition of sulphuric acid to the solution of chloride of calcium and phosphate of lime obtained by the immersion of bones in dilute hydrochloric acid. 6. 8

48. Portion of a Fibula, after immersion in sulphuric acid. It is very little softened; and the sulphate of lime by which the decomposed carbonate is replaced is deposited in small lumps on the surface of the bone. 6. 9

49. Portions of the Cartilages of a Fœtal Skeleton which were boiled for many hours on each of several successive days. They were little changed: and no gelatine was obtained from them. 6. 10

50. The Skull of a young Pig, to which madder was given with its food for a considerable time before death. The surfaces of all the bones have a bright red colour, derived from the madder which combined, with the phosphate of lime, was deposited in the growing bones during its administration. 6. 11

51. A similar specimen dried. The tinge of colour is less deep in this than in the preceding skull; and the centres of the surfaces of the parietal, squamous, and superior maxillary bones are white, probably because the ossification of these parts was complete before madder was mixed with the food, and it is chiefly or only that phosphate of lime which is deposited while the colouring matter is in the blood that receives its tinge. 6. 12

52. Section of the lower part of a Femur, displaying the arrangement of its cancelli, and that the chief of them are in the form of delicate fibres and lamellæ, running vertically down to the articular surface, and slightly converging towards its centre. In the middle of the cancellous tissue, above the articular portion of the bone, the fibres are very delicate; and most of them are placed across the axis of the bone, as for the support of the medullary adipose tissue. 6. 14

53. Transverse section of the upper part of a Tibia, displaying the construction of its cancellous tissue, the principal lamellæ of which, though much interrupted, are arranged in vertical planes, with their borders directed to the front and back parts of the bone. Within the tubercle of the tibia the cancellous tissue is very close, and its lamellæ thick and strong. 6. 15

54. Section of a Patella, showing the uniform, finely alveolar construction of its cancellous tissue, and its thin wall of compact tissue, arranged according to the general plan of structure of round or spongy bones. 6. 16

55. Part of a Femur, in which, after the removal of its earthy salts by solution in acid, the outer part of the wall has been separated into thin layers. The deeper substance of the wall has also been more coarsely split into layers and fibres, of which the principal direction is parallel with the axis of the shaft. 6. 16A

56. Portion of a Humerus. After long immersion in dilute hydrochloric acid, a part of the walls of the shaft has been split into bundles of coarse interlacing fibres, the chief of which are parallel to the axis of the shaft. 6. 17

57. Portion of a Fibula, similarly dissected into layers and bundles of fibres. 6. 18

58. Section of an Os Calcis, dried after the minute injection of its blood vessels. 6. 19

59. Section of the lower part of a Tibia, similarly prepared. 6. 20

60. Section of a Tibia, the vessels in all parts of which have been partially injected through the medullary artery. 6. 21

61. Section of a Tibia, in which vessels have been injected in the medullary tissue as well as in the walls, through the arteries derived from the periosteum. 6. 22

The anastomoses through which in these instances the injection passed are in the inner layers of the walls of the bone, between the arteries which they derive from the periosteal arteries without, and from the medullary or great nutritive artery within.

62. Section of a Tibia, dried and put in turpentine, after the injection of its medullary artery, and the removal of its earthy matter by solution in dilute hydrochloric acid. The trunk of the medullary artery passes very obliquely through the posterior wall of the bone, from above downwards, and extends along the axis of the medullary tissue into the lower third of the bone. In its course it gives off many branches, which supply the medullary tissue and the inner part of the wall. Its principal branch is given off shortly beyond its entrance into the medullary tissue, and after passing downwards for a short distance takes a recurrent course, and supplies the upper part of the shaft of the tibia. 6. 23

63. The lower part of a Tibia, from which a portion of the walls has been removed, to exhibit the branchings of the injected medullary artery. 6. 24

64. The upper part of a Skull, from which the outer table is removed to show the large osseous canals for veins ramifying in the diploe. The walls of the canals are painted blue. 6. 25

65. Section of the upper part of the Femur of a Woman 73 years old. It shows, as the usual degeneration of old age, the comparative thinness and defective hardness of the walls, the wider spaces in the cancellous tissue, and the larger quantity of fatty matter not removable by maceration. 6. 26A

66. The Vertebral Column of a Fœtus about 4 months old. In the centre of the body of each vertebra is an opaque spot, or a small mass of yellowish cancellous bone, indicating the commencement of ossification. The process is furthest advanced in the lower dorsal and the upper lumbar vertebræ; proceeding from these, both upwards and downwards, its progress in the successive vertebræ appears gradually less. 6. 31

67. The Vertebral Column and Pelvis of a Child about 1 year old. It shows the further advanced ossification of the bodies of the vertebræ, and the nearly completed ossification of the laminæ, transverse, and articular processes, and pedicles. The parts which remain cartilaginous, and thus constitute the epiphyses of the vertebræ, are the spinous processes, the extremities of the transverse processes, and the anterior roots of the transverse processes of the cervical vertebræ. The anterior half of the ring of the atlas also contains only a small central portion of bone. 6. 32

68. The Sternum of a Fœtus about 7 months old. One portion of bone occupies the centre of its upper piece; three portions of smaller size are placed irregularly in the second or middle piece. 6. 33

69. The Sternum of a Fœtus about 8 months old, exhibiting the further progress of the ossification from several centres, the beginning of which is shown in the preceding preparation. 6. 34

70. The Sternum of a Child less than 1 year old. In the further progress of the ossification two new portions of bone, or centres of ossification, have been formed in the inferior angles of the upper piece of the sternum; and there are six portions in the middle piece, of which the two upper are placed in the middle line, and the four lower symmetrically on each side of it. Besides these several very small portions of bone are irregularly placed in the cartilage. 6. 35

71. The Sternum of a Child about 3 years old, exhibiting one large disk-shaped mass of bone in the upper, and five, of various sizes, in the middle piece.

These are all symmetrically formed, and placed one above the other across the middle line. 6. 36

This series of specimens, while they display a general uniformity in the process of ossification, show that, in different instances, there is some diversity in the plan according to which it is accomplished in the sternum.

72. Bones of the Pelvis of a Child about 3 years old. In the os innominatum it will be seen that the crest of the ilium, the tuberosity of the ischium, the symphysis of the os pubis, and portions of cartilage between each of these bones, remain unossified. In the sacrum, the spinous processes, and portions of cartilage between the bodies of the vertebræ and their transverse processes, and at the extremities of the latter, are in the same state. The bone already formed is not completely covered with compact tissue: parts of it, especially on the ilium, present a porous surface with close-set minute apertures and fine short grooves. 6. 37

73. The Femur, Tibia, and Fibula of a Fœtus, dissected so as to show that the cartilaginous and partly ossified tissue of their walls may be split into longitudinal fibres. 6. 38

74. The Parietal and Frontal Bones of a Fœtus, displaying the arrangement of the first formed bone, in fibres radiating from the centre of ossification, and connected by short transverse and oblique intermediate bands. 6. 39

75. The Parietal Bones of an older Fœtus. The radiating fibres of bone are seen, especially at the edges, projecting in a pectinate manner; the central parts of the bones have become, in the further progress of ossification, thicker and more compact, but the appearance of radiating fibres may be observed on their surfaces. 6. 40

76. A Fœtal Parietal Bone, in which the blood vessels are injected. The principal vessels lie parallel to the radiating osseous fibres. 6. 41

77. Parietal Bones of a Fœtus, injected. 6. 50

From the Collection of J. R. Farre, Esq., M.D.

78. A series of Frontal Bones showing the development of the sinuses. 6. 48

79. Sections of the Femur of a Fœtus 8 months old. The walls and medullary tissue of the shaft are ossified and well formed. The epiphyses are entirely cartilaginous; they include, at the upper end of the bone, the head, neck, and great trochanter; at the lower end, the condyles and the trochlea. 6. 42

80. Section of a Femur of a young Child, the blood vessels of which are injected. In the shaft the vessels appear very numerous and uniformly distributed through the medullary tissue. In the epiphyses, especially in the lower one, vessels are shown running in canals from the circumference towards the centre, but wide apart, so that the colour of the cartilage is scarcely altered by the injection. In the centre of the epiphysis the small portion of bone already formed appears bright red from the abundant supply of vessels ramifying in it. 6. 43

81. Sections of a Femur displaying the same facts. 6. 44

82. Section of the lower part of the Femur of a Child about 10 years old. The ossifying process has extended through the greater part of the epiphysis; and the same contrast is shown between the vascularity of the central portion of bone, and the apparent bloodlessness of the remaining cartilage. 6. 45

83. Bones (articulated) of the upper extremity of a Fœtus. 6. 53

From the Collection of J. R. Farre, Esq., M.D.

84. Ulna of a Fœtus injected. 6. 52

From the Collection of J. R. Farre, Esq., M.D.

85. Numerous Bones from a Fœtus 9 months old. Bristles are introduced into the canals in the walls of the bones through which blood vessels passed. These canals are in several of the bones more numerous than in after life. For example, the femur, which in the adult has but two canals for the medullary or nutritive arteries, is here shown with four canals in one limb, and two in the other: the tibia also has four on one side and two on the other; in one scapula four canals are shown, in the other five. 6. 46

86. Several Bones of young Dogs and young Pigeons, after a series of experiments to determine the mode in which growing bones increase in length. Needle points were introduced at measured distances into different parts of the bones a certain number of days before the animal was killed. After death, by measuring in each case the distances between the needle points, and between each of them and the ends of the bone, it could be ascertained whether the bone had grown in length between the points, or beyond them. The result of the experiments showed that the bones increased in length by addition to their extremities, especially their distal extremities; and that when any part of the walls of a bone in a young animal is thoroughly hardened by ossification it ceases to increase in length. 6. 47

87. Sections of the Femur of an Ostrich (Struthio Camelus) displaying as its chief characteristics thinness but extreme hardness of walls, and a very large medullary tube traversed with hollow bony beams and plates which supported the membranes of air cells. The air cells within the bone communicated with the lungs by apertures (foramina pneumatica) near the proximal articular end of the bone. 6. 27

88. Sections of the Humerus of a Swan (Cygnus Olor), showing the same general characters. 6. 28

89. Sections of the Femur of a Turtle (Chelone Midas). Its walls are thin, except at the middle of the shaft, where is the principal curvature of the bone; within the walls nearly the whole of the bone consists of a very close cancellous tissue, the spaces in which contained medulla. 6. 29

90. Sections of the Coracoid Bone of a Turbot (Rhombus maximus). It displays, as characteristics of the bones of fish, lightness and whiteness of its general texture, and a laminated and fasciculate appearance of its surface, with little diversity of internal construction. 6. 30

SERIES VII.

THE TEETH.

91. Section of an Incisor and a Molar Tooth, showing the disposition of their component structures: the ivory or dentine surrounding the pulp-cavity, and forming the greater part of the tooth; the enamel covering the dentine of the crown; and the bone covering the dentine of the fang. **7. 1**

92. Sections of Teeth after maceration in dilute hydrochlorie acid. The greater part of the saline and earthy constituents of the teeth having been decomposed or dissolved in the acid, their animal matter remains, preserving their natural form and size, but soft and pliant. The animal matter consists principally of gelatine. **7. 7**

93. Sections of Burnt Teeth. The dentine is almost completely blackened by the charring of the animal matter it contains; but the enamel, containing an exceedingly small portion of animal matter, is only tinged with yellow. In some of the specimens the dentine is more completely blackened near the pulp-cavity than near the outer surface of the teeth; as if indicating that the animal matter is most abundant in the former situation, where also the dentine tubes are largest. **7. 3**

94. Sections of a Molar Tooth of a Horse similarly burnt, and displaying similar appearances. The bone is not so black as the dentine; perhaps because its animal matter is more completely burnt. **7. 4**

95. Portions of the Lower Jaw of a mature Fœtus, from which the outer wall is removed, so as to show the outer surfaces and general forms of the capsules of the teeth. **7. 5**

96. A similar specimen, displaying the capsules of the Teeth in the upper jaw. **7. 6**

97. The Upper Jaw of a Fœtus from which parts of the anterior wall are removed, together with the anterior walls of the capsules of the teeth. In the cavities of the capsules thus laid open the rudiments of the teeth are shown, on the right side, consisting of caps of dentine and enamel like the crowns of the deciduous teeth without fangs. On the left side, the caps of dentine are removed from the pulps, to the surfaces of which they were exactly adapted. The pulps, presenting the forms of the crowns of the several teeth, are connected with the bases, or deepest parts of the capsules; their blood vessels are imperfectly injected. **7. 7**

98. A similar preparation of a Lower Jaw; showing, on the right side, the rudimentary teeth, and on the left the teeth-pulps. **7. 8**

99. Sections of an Intermaxillary Bone removed in an operation for hare-lip. The section has passed through the capsule and rudiment of a tooth of the second set. The lower section displays part of the tooth turned off its pulp. In the upper section bristles are placed between the pulp and the substance of the tooth, in which is visible, besides the layers of dentine and enamel, the thin layer of bone with which the enamel of the crown is covered for some time after its protrusion. 7. 9

100. A Molar Tooth of the second set, the crown of which is completely formed. A portion of the capsule is preserved, to show that, when the formation of enamel is complete, the capsule becomes a thin, tough membrane, much less vascular than it was before. 7. 12

101. A set of Rudimentary Teeth from the left side of the jaws of a mature fœtus. 7. 13

102. A set of specimens to show the development of a Canine Tooth; including (1) the formation of a thin cap of dentine; (2) the enlargement of this, till it acquires the size, and then the thickness, of the complete crown of dentine; (3) the gradual coating of the crown with enamel; and (4) the growth of the fang. 7. 14

103. A similar set of specimens, to show the development of a Molar Tooth. 7. 15

104. A Set of Teeth, showing the effects of mastication. The surfaces of their crowns are slightly concave, and bordered with a narrow, sharp-edged layer of enamel. The rest of the enamel and the greater part of the original dentine of the crown is worn away, but the pulp-cavity is not opened, because while the exterior of the dentine was being removed new matter was added to its interior. The new dentine thus formed in the part of the pulp enclosed within the crown of the tooth is of yellow colour, and does not possess the perfect minute structure of the original dentine. It has received the name of Osteo-dentine, to indicate that its structure combines those proper to bone and dentine. 7. 16

105. Fœtal Jaw Bones, showing between the anterior and posterior walls of their alveolar portions the grooves for the lodgment of the capsules of the teeth. In the anterior half of each jaw the groove is divided by partitions into distinct rudimentary sockets or alveoli; in the posterior half the divisions are not yet formed. 7. 22

106. Jaw Bones from an older Fœtus, with the alveoli more completely formed. 7. 23

107. Jaw Bones of a Child, with the alveoli similarly shown. One large cavity, undivided by partitions, exists in each half of the lower jaw for the capsules of the permanent true molar teeth. 7. 24

108. A Lower Jaw, with the outer wall removed to display the alveoli of the teeth, the canals for the trunks of the inferior dental nerves and vessels, and the minuter canals for their branches passing to the apices of the alveoli. 7. 25

109. Lower Jaw of an aged Person, exhibiting changes consequent on the loss of the teeth. The alveoli of the incisors, canines, and first molars, remain; all the rest have disappeared by the absorption of the alveolar part of the jaw, whose upper margin is slightly hollowed out, and marked with a line of minute apertures in the situation of the former alveoli. The angle of the jaw is more obtuse than is natural. 7. 26

110. A similar specimen, with more complete absorption of the alveolar portion of the jaw, and greater obtuseness of its angle. The whole jaw bone is very small and slender, but the dental and mental foramina are large. **7. 27**

111. A Lower Jaw, exhibiting the same changes in a yet more advanced degree. The last molar tooth on the right side alone remains, but nearly the whole length of its fangs is exposed by the absorption of the alveolar part of the jaw. Similar absorption on the left side has much reduced the depth of the alveolus of the corresponding tooth. The angle of the jaw can scarcely be discerned; the posterior border of the ascending ramus is continued with a nearly uniform curve into the lower border of the body of the jaw. **7. 28**

112. Portion of an Upper Jaw, displaying part of the process for the replacement of a temporary by a permanent incisor tooth. The temporary incisor, with its fang nearly absorbed and its alveolus filled up, is connected with the jaw only by the attachment of the gum around its neck. Immediately above it is the osseous capsule, containing the permanent incisor. The section has passed through this tooth and its capsule, and displays in the tooth the pulp cavity, the crown fully formed, the rudimentary fang, and the successive layers of dentine, enamel, and bone forming the crown. The layer of bone through which the permanent tooth would have to pass in being protruded is about half a line thick. **7. 29**

113. The right half of the Upper Jaw of a Child. The temporary incisor and first molar teeth are completely protruded. The capsule of the temporary canine tooth is obscurely shown from behind: that of the second temporary molar is completely exposed, but not turned downwards. The capsules of the permanent incisor and canine teeth are removed from the cavities and turned down, remaining attached by only the slender cords or gubernacula which connect them with the gum behind the necks of the corresponding temporary teeth. The capsule of the first permanent molar is shown *in situ*: and part of the very small cavity for the capsule of the first permanent premolar or bicuspid. **7. 30**

114. A similar preparation, showing the corresponding parts in the left half of the Lower Jaw of, probably, the same Child. Here also the capsule of one of the premolar teeth is shown. The capsules of the permanent incisors are of nearly equal size, while in the preceding upper jaw the capsule of the first permanent incisor is fully four times as large as that of the second. **7. 31**

115. The left half of the Lower Jaw of a Child. All the deciduous teeth are protruded. The capsules of the permanent incisors are laid open and collapsed: that of the permanent canine is suspended by its gubernaculum; that of the first permanent molar is opened, and the rudimentary tooth exposed within it. **7. 32**

116. The Jaws of a Child, probably about 6 years old, with a complete set of deciduous teeth, and the capsules and rudiments of all the permanent teeth. Bristles are passed from the capsules of the permanent teeth through small foramina in the margin of the alveolar border of the jaw just behind the necks of the deciduous teeth. These foramina, the remains of the communications which existed between the capsules of the several teeth of the deciduous and permanent sets, indicate the parts through which the permanent teeth would be protruded, and the attachments of their several gubernacula. **7. 33**

117. The Jaws of a Child of about the same age as the preceding. The same relations of the two sets of teeth are here shown from behind, which, in the preceding specimen, are displayed from the front. **7. 34**

118. The Jaws of a Child, probably about 7 years old. The rudiments of all the permanent teeth are larger, and their fangs more nearly complete, than in the preceding specimens. The first permanent incisors and the first permanent molars are protruded in both jaws; the apices of the fangs of the second temporary incisor and second temporary molar on the right side of the lower jaw. 7. 35

119. The Jaws of a Child, probably about 10 years old. There are twelve teeth set out in each jaw; the ten belonging to the deciduous set, and the two first molars of the permanent set. All of them are perfect and well formed. 7. 36

120. Human Jaw Bones, with a complete set of teeth, the last molars having been in process of protrusion. The chief essential characters of the human teeth are (1) their number, thirty-two, comprising in each half of each jaw two incisors, one canine, two bicuspids or premolars, and three molars; (2) the equality in the length of the crowns of them all, so that the points of all in each jaw are nearly in one plane; (3) the equal closeness of all the crowns, and especially the absence of a space between the upper lateral incisor and the upper canine tooth; (4) the conical form and obtuseness of the canine teeth; (5) the nearly vertical direction of the crowns, especially of those of the incisors. 7. 37

121. A complete set of Adult Human Teeth, in sections, showing their external shapes and their cavities. 7. 38

122. Jaws of an Angler Fish (Lophius Piscatorius). 7. 58

123. Jaws of a Ray (Raia Batis). 7. 59

Presented by Mr. Stewart.

124. A similar specimen. 7. 61

Presented by Mr. F. Wood.

125. A similar specimen. 7. 54

126. A young Saw Fish, with its saw, formed of teeth lodged in sockets at the sides of its peculiar elongated rostral cartilages. 7. 52

127. The Saws of Four Saw-fish (Pristis antiquorum), of various lengths. 7. 51

Presented by Philip Hurlock, Esq.

128. Head of a Pike (Esox Lucius), displaying the crowds of slender conical teeth in the intermaxillary, premandibular, palatine, vomerine, lingual, branchial, and pharyngeal bones. 7. 55

129. Jaws and Teeth of a Dog Fish. 7. 53

130. Jaws of a Calamary (Loligo vulgaris). 7. 60

131. Sections of the Mouth and Mandibles of a Calamary (Loligo vulgaris). The mandibles are broad horny plates, with sharp, curved, median processes, which in closing pass each other like those of the parrot's beak, except in that the lower passes in front of the upper one. Their bases are fixed in the thick muscular walls of the mouth. 7. 57

132. The Upper Jaw of a Turtle (Chelone Midas), with the horny sheath of its lower border, which serves as a substitute for teeth. 7. 47A

132a. Fossil Tooth of a Crocodile.

132b. Fossil Tooth of a Shark.

Presented by E. Charlesworth, Esq.

133. The Head of a large venomous Snake, from the Island of St. Lucia, with the poison glands and fangs displayed. The poison fang is the first of the series of large curved teeth exposed by the dissection; it is tubular, and the upper end of its tube receives the duct of the poison gland, which rests on the outer side of the upper jaw. 7. 47

Presented by Major Gibson.

134. The right half of the Lower Jaw of a Fœtal Calf, with the capsules of the teeth displayed by the removal of the inner wall of the bone. 7. 10

135. The Capsules of two Molar Teeth from a Fœtal Calf, laid open, so as to show the rudiments of the teeth and part of their connection with the pulps. 7. 11

136. The anterior portions of the Jaws of a Horse, about 2 years old, with the incisor teeth. The "mark" is shown, formed by a central isolated portion of enamel, which is raised in an oval ridge, surrounded by and enclosing shallow depressions or cavities in the discoloured cement. 7. 45

137. Transverse sections of the Crowns of two Molar Teeth of a Horse, showing the complex and convoluted arrangement of their component structures. 7. 46

138. Sections of a Molar Tooth, probably the third, of a young Elephant. The enamel, dentine, and crusta petrosa or cement are shown in each of its thirteen plates. The anterior three plates alone are worn by mastication so as to expose the dentine and enamel. 7. 43

139. Transverse section of the fourth Molar Tooth of an Asiatic Elephant, showing the relations of its component dentine, enamel, and cement. 7. 44

140. Molar Tooth of an Indian Elephant.

141. A Tooth of the Mastodon giganteus; probably the last deciduous molar. 7. 41

142. A last, or true Molar Tooth of the Mastodon giganteus, with five transverse bifid ridges and a posterior talon. 7. 42

Found, with the preceding, at Big-bone Lick, Kentucky.

143. Sections of a Canine Tooth from an old Lion. The pulp-cavity is closed, and crystals of phosphate of lime are deposited on its walls. 7. 21

144. Skull of a Rat (Mus decumanus), showing the chief characteristics of the teeth of such rodents, viz., in each jaw, the long curved chisel-edged incisors, whose mode of growth is described under No. 145; the wide edentulous space between them and the molars, canine teeth being not present; and the transversely ridged three molar teeth on each side. 7. 46A

145. Sections of the Head of a Rat, with its incisor teeth. The cavities in which these teeth are set are shown. They are very deep, extending in the upper jaw to the wall of the orbit, and in the lower jaw to the base of the coronoid process. Each cavity is filled with the fang of a tooth, and at its bottom has a vascular pulp, in which the growth of the tooth constantly goes on. The growth, by

constantly protruding the tooth, compensates for the continual waste of substance which it undergoes in the rodent mode of mastication. Enamel, of a yellowish colour, is placed on the anterior surface of the tooth, and forms its cutting edge. **7.** 17

146. The left half of the Lower Jaw of a Rat, in which the incisor tooth has acquired an unnatural length, and is recurved so as to form a nearly complete circle. **7.** 20

147. The Skull of a Rabbit, from which the incisor teeth were removed. The inferior incisors being no longer subject to attrition, and continuing to be protruded by the additional substance added from their pulps, have gained a length of more than an inch. **7.** 19

148. The Lower Jaw of a Rabbit, in which a similar outgrowth of one of the incisor teeth has occurred in consequence of a deformity of the jaw after an ill-repaired fracture. **7.** 19A

149. Skull of a Rodent. On account of an injury to the left side of the lower jaw and interference with its movements, both the upper and lower incisors, being no longer subject to attrition, have become very long and recurved in the form of a semicircle. **7.** 62

150. Sections of the Lower Jaw of a Beaver, showing similar incisor teeth, and their cavities extending under the fangs of the molar teeth. **7.** 18

151. Skull of a small insectivorous Bat (Vespertilio Pipistrella), showing the numerous small spinous prominences on the edges of its molar teeth. **7.** 39A

152. The Skull of a Monkey (Cercopithecus Sabæus), with a perfect set of teeth at the same period of nearly completed dentition as those in the human jaws, No. 120. **7.** 39

SERIES VIII.

THE OSSEOUS SYSTEM.

(A.) HUMAN OSTEOLOGY.

153. A Human Skeleton. The characters by which it is chiefly distinguished in comparative anatomy are as follows:—(1) the position of the occipital condyles, which is such that, in the erect posture, a vertical line from the centre of gravity of the head would fall between them; (2) in the same posture, the nearly horizontal plane of the articular surfaces of the condyles; (3) the plane of the face being nearly the same with that of the front of the frontal bone; (4) the arrangement of the curves of the spine, so that a vertical line drawn from the summit of the column would fall nearly on the centre of its base; (5) the length and pyramidal form of the lumbar portion of the spine; (6) the great breadth of the sacrum in proportion to its length, and its deep arch; (7) the width and shortness of the pelvis; (8) the great length of the femur, its direction slightly inwards, and the length and obliquity of its neck; (9) the width of the bones of the knee-joint, and the lengthening of the internal condyle of the femur; (10) the great proportionate size and strength of the foot, the large size of the first, or "great," toe and its parallel position to the others, the arch of the sole, and the length, size, and arched form of the os calcis, and the strength of its tuberosity; (11) the expansion of the chest, especially its flatness in front and its great transverse diameter, and its hollows at the sides of the spine; (12) the length and strength of the clavicle; (13) the outward direction of the glenoid cavity of the scapula; (14) the hemispherical head of the humerus, its adaptations to free movement, and its shortness in comparison with the femur; (15) the articulations of the radius and ulna for mutual rotation; (16) the whole construction of the hand, especially its size and strength, and the capacity of the thumb to be forcibly opposed to any or all of the other digits.

Presented by Luther Holden, Esq.

154. Skull of a European, probably of an Englishman. Its principal distinctive features, as one of the "Caucasian form," are (1) the width and elevation of the forehead, the frontal bone becoming wider, and the whole frontal region more capacious, in the ascent from the orbits to the vertex of the cranium; (2) the nearly vertical direction of the forehead; (3) the regularly and smoothly oval form of the whole cranium; (4) its capacity in proportion to the size of the face; (5) the narrowness of the face, so that the zygomata do not project beyond the lateral boundaries of the skull; (6) the slight projection of the jaws, and the consequently large facial angle; (7) the nearly vertical position of the alveolar processes and of the teeth, constituting, with the preceding feature, the orthognathous character.

155. Skull of a European Woman. **28.** 31

155a. A similar specimen.

156. Skull of a European Child, about 2 years old. **28.** 32

157. Skull of a European Child, at birth. **28.** 33

158. The disarticulated Bones of a Human Fœtal Skull. **28.** 346

159. The Skull of Bellingham, who, in 1812, was executed for the murder of the Right Hon. Spencer Perceval. **28.** 61

160, 161. Two Skulls, dug from a ground believed to have been used for burials during the great plague in London. **28.** 63, 64

162. Skull of a Greek, from the Island of Scio. The outline of the cranium forms an elongated and nearly regular ellipse. **28.** 35

Presented by Charles Steel, Esq., R.N.

163. Skull of a Swedish Man. **28.** 36

164. Skull of a Swedish Woman. **28.** 37

Presented, with the preceding, by Professor Andreas Retzius.

165. Skull of a Native Maltese. **28.** 38

Presented by Professor Galland.

166. Skull found in a tumulus at Ewell, near Epsom, with some very rude pottery, which was considered to be early British. **28.** 39

Presented by Hugh Diamond, Esq.

167. Skull of a German. **28.** 40

168. Skull of a German. **28.** 41

169. A Skull, supposed to be that of a Roman, taken from a sarcophagus which was discovered in 1878 during the digging of the foundations for the Medical School of St. Bartholomew's Hospital. The whole of the facial bones are twisted to one side, so that a line drawn down the middle of the cranium falls considerably to the right of the mesial line of the jaw. Many of the bones of the skeleton showed signs of rheumatoid arthritis.

170. Skull, supposed to be that of a Roman female, discovered together with the preceding specimen.

171. Skull of a Chinese. The chief features of the Mongolian or pyramidal form which it illustrates are:—(1) the width of the space between the zygomata, due to the width of the superior maxillary bones and of the anterior parts of the malar bones; (2) the largeness of the zygomata; (3) the flatness of the face, due to the want of prominence of the nasal bones and of the nasal processes of the superior maxillary bones; (4) the width and the slight prominence of the alveolar margins of the maxillary bones; (5) the comparatively narrow forehead, and its narrowing as it ascends towards the vertex; (6) the shortness of the antero-posterior diameter in proportion to the lateral diameter of the skull. **28.** 42

172. Skull of a Turk, having the chief characters of the brachycephalic form indicated by Professor Retzius, in the smallness of its antero-posterior diameter as compared with either the lateral or the vertical diameter. **28.** 43

173. A Skull from a tomb at Sakkam. **28.** 338

174. A similar specimen. **28.** 339

175. A similar specimen. **28.** 340

The three preceding specimens were presented by Mr. G. W. George Perry.

176. Head of an Egyptian Mummy from a tomb in the Necropolis of Thebes. The ethmoid bones have been removed by the embalmers to enable them to extract the brain. "In the more perfect specimens of this art they draw the brain through the nostrils, partly with a crooked piece of iron and partly by the infusion of drugs."—*Herodotus*, lib. II, cap. 86. c. 40

Presented by Alfred Waters, Esq.

177. Head of an Egyptian Mummy from Thebes. c. 38

178. A similar specimen.

179. Skull of an Hindoo. The brachycephalic character is well marked; the occiput very flat and high; the jaws very prominent, and the incisor and canine teeth as oblique as in the most prognathous African skull. **28.** 44

180. Skull of an Hindoo, in form nearly intermediate between that of the preceding and the oval or Caucasian form. **28.** 45

Presented, with the preceding, by R. Roberts, Esq.

181, 182, 183. Skulls from North Canara, Bombay Presidency. No. 181 belonged to a man of gigantic stature, a so-called "seedie," *i.e.*, a descendant of the negro slaves who, before the rule of the English in India, were brought in large numbers to the Malabar coast from the east of Africa. Nos. 182 and 183 belonged to brothers, Brahmins of the "Sheenee" caste.

The three men were hanged for pillage and murder during the Indian Mutiny.

184. Skull of a Peruvian Indian, in most of its features resembling No. 180, but with a larger cranial cavity, and peculiarly wide in the space between the parietal prominences. From a cemetery of Indians at the village of Quillague, belonging to the republic of Peru, lat. 51° 53′, about twenty miles from the western coast of America. **28.** 46

Presented by Dr. Pratt.

185. Skull of a Pampas Indian from the south-west of the province of Buenos Ayres. Killed by a blow from the butt-end of a musket.

Presented by Dr. Andrew.

186. Skulls, in section, of natives of Vancouver's Island, showing the effects of pressure on the cranial bones during infant life. The bones are light and the diploe is indistinct. The sagittal sutures cannot be traced, the cranial cavity is elongated from before backwards.

187. Skulls from Port Augusta, Vancouver's Island.

Presented by Mr. E. B. Bogg.

188. Skull of one of the Aborigines of Siam (now extinct).

Presented by J. W. Leahy, Esq., R.N.

189. Skull of a Kaffir. 28. 344

190. A similar specimen. 28. 345

190a. Calvaria of a Hottentot who was hanged for murder.

191. Skull of an African Negro, illustrating the "Negro form," and presenting, very strongly marked, the prognathous and dolichocephalic characters. (1) The jaws are very prominent, and the facial angle commensurately small; (2) the incisor and canine teeth project obliquely forwards, meeting at an obtuse angle; (3) the face is flat, though less so than in the preceding form; (4) the forehead is very narrow, receding, low, not widening as it ascends; (5) the length of the skull is great in proportion to its width and height; (6) the total capacity of the skull is small. 28. 47

192. Skull of an African Negro. With the other characteristics rather less marked than in the preceding skull, this shows a peculiar flatness of the temporal and lower parietal regions, and a marked hollowing of the temporal portion of the sphenoid bone, leaving a great space for the temporal muscle. 28. 48

193. Skull of an African Negro. Except in a somewhat greater prominence of the jaws, it scarcely deviates from the average characters of the oval or Caucasian form. The temporal suture is obliterated. 28. 49

194. A similar specimen; but with a rather flatter and wider face, and with a more pyramidal form of the forehead. 28. 50

195. Skull of an African Negro, in which width and flatness of the face are combined with prominence of the jaws. In other characters also this skull has a form intermediate between the well-marked pyramidal and prognathous forms. 28. 51

196. Skull of an African Negro, in form intermediate between the oval and the prognathous. 28. 52

197. A similar specimen. 28. 53

198. Skull of a Man, the offspring of a Mulatto and an European. The slight projection of the jaws and chin, and the flatness of the temporal regions, are the only Negro features that it presents. 28. 54

Presented by C. L. Norton, Esq.

199. A Skull, probably that of a Negro, from Antigua. 28. 55

Presented by Dr. Conquest.

200. Skull of an Ashanti.

201. Skull of a Native of New South Wales. The face is broad and flat; the jaws very wide, but not very prominent; the supra-orbital ridges are very prominent, and between them a remarkable prominence over the frontal sinuses far overhangs the nasal bones; the forehead is extremely narrow, and becomes narrower as it ascends; the general form of the cranium is long, narrow, and high; its height however is chiefly in its median part, and its base is wide. 28. 56

202. Skull of a Native of Moreton Bay, New South Wales, presenting the same characteristics, but rather less marked. 28. 57

Presented, with the preceding, by Joseph Hodgson, Esq.

203. Skull of a Native of New Zealand. In its general features it resembles the last two; but the orbital and frontal prominences are less marked, the forehead is less receding, and the median part of the cranium less raised. 28. 58

Presented by Thomas Wilson, Esq.

204. Dried Head of a New Zealander tattoed. c. 45

205. A similar specimen.

206. Skull from New Holland. 28. 59

Presented by George Langstaff, Esq.

207. A Skull, marked for the study of phrenology. 28. 65

Presented by Dr. Spurzheim to Mr. Abernethy.

208. A Skull of unusually large size. 28. 60

209. A Skull of remarkable width and roundness, supposed to have been that of a man killed at the battle of Hastings. 28. 62

210. Skull of an European of unusual shape: long, wide, and low. 28. 66

211. Skull of an European, unusually flattened in the interorbital and parietal regions. 28. 67

212. Skull of an European, with the parietal and occipital regions very low in comparison with the frontal. 28. 68

213. An European Skull, of which the right side is higher than the left, giving it an appearance of obliquity, or defective symmetry. 28. 69

214. A Skull of similar shape, but with the left side higher than the right. Six ossa triquetra, or "Wormian" bones, are in the line of the lambdoidal suture. 28. 70

215. A Skull with a similarly oblique form, in which all the parts of the right side are smaller than the corresponding parts of the left. 28. 71

216. An obliquely formed Skull, having its right half somewhat more anterior than the left, and in its occipital region rather smaller. 28. 72

217. A Skull in which the right half of the coronal suture is obliterated. 28. 73

218. A Skull with the frontal suture persistent. 28. 74

219. A Skull with all the sutures nearly obliterated. 28. 75

220. A similar specimen, but the obliteration is not so well marked.

221. A Calvarium, with the sagittal suture nearly entirely obliterated.

222. A similar specimen. The bone varies much in thickness, being quite translucent in places.

223. A Skull, with many Wormian bones occupying the situation of the posterior fontanelle and part of the lambdoid suture. The frontal suture is persistent.

224. A similar specimen.

225. A Calvarium, the position of whose anterior fontanelle is occupied by a large Wormian bone, about two inches in diameter and somewhat square in shape.

226. Antero-posterior section of a Skull, with the chief processes of the dura mater, falx major, falx minor, and tentorium. 28. 80

227. The posterior half of a Skull, showing especially the position and connexions of the tentorium. 28. 81

228. Section of a Skull, with the same processes of dura mater. 28. 82

229. Base of a Skull, with the course of the chief blood vessels marked on it. 28. 84

230. A Skull, on the exterior of which the course of the chief sinuses is marked. 28. 85

231. A similar specimen.

232. An Articulated Skull, in which sections have been made in various directions.

233. An Adult Male Skull, disarticulated.

234. An Adult Male Skull, the bones of which have been separated from each other and mounted in their relative positions.

235. A Disarticulated Skull of a Child; the teeth of the second dentition are *in situ*. Sections have been made of the internal and middle ear on either side.

Presented by H. S. Webb, Esq.

236. Disarticulated Skull of a Fœtus: the bones being mounted in their relative positions to illustrate the "vertebral theory" of Professor Owen.

236a. An antero-posterior section of a Fœtal Skull, with the bones numbered according to the system of Professor Owen.

237. A Skull, in which the external table has been removed to show the diploe.

238. A Skull with the vertex removed, sawn so as to expose the frontal sinuses.

239. A similar specimen.

240. A Skull, in whose frontal bone are two trephine holes, showing unusually large and deep frontal sinuses.

241. A Skull, whose frontal bones have been scraped so as to show the entire absence of the frontal sinuses.

242. A Skull, from which the sphenoid bone has been removed in order to demonstrate the manner in which it articulates with and binds together the larger number of the bones of the skull.

243. Part of a Skull divided through the vertical median plane. 28. 78

244. Two lateral portions of a Skull, divided a little to one side of the middle line, showing the nasal septum and meatuses.

245. An antero-posterior section of part of a Skull, showing the communications of the nasal meatuses with the surrounding cavities.

246. Section of the anterior portions of a Skull, showing the nasal meatuses and their communications with the antrum.

247. A similar specimen.

248. A similar specimen.

249. Vertical section of a Skull, with the soft parts dried and left *in situ*. The arteries are injected.

250. Vertical section of the anterior part of a Skull, similarly prepared. The nasal septum and meatuses are well shown.

251. A similar specimen.

252. A similar specimen.

253. A vertical section of the anterior portion of a Skull, with the arteries injected.

254. Bones forming the middle and anterior fossæ of the base of the Skull, cut so as to show the numerous foramina and sinuses.

255. Part of a Skull, divided transversely and vertically through the junction of the occipital and sphenoidal bones. 28. 79

256. Sections of a Skull, showing the nasal fossæ and sphenoidal sinuses from behind.

257. Several specimens of the Bones composing the Cranium.

258. Sphenoid Bones.

259. Several specimens of Temporal Bones.

260. Temporal and Sphenoid Bones articulated.

261. A Sphenoid and Vomer, mounted so as to show their articulating surfaces.

262. An Ethmoid and Lachrymal Bone articulated.

263. Section of Ethmoid with Vomer attached *in situ*.

264. A Right and Left Superior Maxilla.

265. Two Inferior Maxillæ; one from an Adult, the other from a Child.

266. The Maxillary Bones of a Child, showing the teeth of both the first and second dentition.

267. Right and Left Malar Bone.

268. The Frontal, Malar, and Maxillary Bones, disarticulated and mounted in their relative positions.

269. Several specimens of Palate Bones.

270. Specimens of the Smaller Bones of the Face.

271. A Superior Maxilla and Palate Bone from a Fœtus 1·5 months.

272. A Superior Maxilla and Malar Bone from a Fœtus 2·3 months.

273. A Superior and Inferior Maxilla from a Fœtus 1·1 month.
An Inferior Maxilla from a Fœtus 2·3 months.
An Intermaxillary Bone from a Fœtus 3 months.
An Inferior Maxilla from a Fœtus 3 months.
An Inferior Maxilla from a Fœtus 3·5 months.

274. Bones of the Face, with the Intermaxillary Bone detached, from a Fœtus 3·7 months.

275. Palate and Vomer from a Fœtus 2·3 months.

276. All the Facial Bones, with the exception of the nasal and lachrymal, from a Fœtus 4·3 months.

A Superior Maxilla from a Fœtus 4·7 months.

277. Bones of the Face, excepting the nasal and lachrymal, of a Fœtus aged 4·7 months.

278. Bones of the Face from a Fœtus 6·5 months.

279. A similar specimen from a Fœtus 6·7 months.

280. A similar specimen from a Fœtus 9 months.

281. Structures forming the Face, the Maxillary Lobes, Frontal and Nasal Processes, ridges for Ethmoid and the Turbinate Cartilages, from a Fœtus of four months' growth.

282. The Inferior Maxilla, showing the notched-out extremity (left side) and Cartilage of Meckel, from a Fœtus 1·5 months.

283. Antero-posterior section of Skull, showing the parts in the middle line, from a Fœtus 3·5 months.

284. Lachrymal bone, *in situ*, from a Fœtus 4·7 months.

285. Superior Maxilla and Præmaxilla from a Fœtal Pig two inches long.

286. A similar specimen from a Fœtal Kangaroo.

287. A similar specimen.

Nos. 271–287 illustrate Mr. Callender's paper in the *Transactions of the Royal Society* for 1869, vol. 159, pt. i, p. 163, on "The Formation and Early Growth of the Bones of the Human Face."

288. Two longitudinal sections of the Skull, with the Spinal Column, Shoulder, and Pelvic Girdles attached.

289. Two similar specimens. The ribs also are left attached to the column.

290. Cervical, Dorsal, and Lumbar Vertebræ from an Adult. The typical cervical vertebra is composed as follows:—Its centrum or body, transversely oval, presents at its lower border a broad descending process, or hypapophysis, answering to that of the cervical vertebra of the Bird. From each side of the body proceeds a "transverse process" composed of three elements: namely, a parapophysis anteriorly, a diapophysis posteriorly, and a pleurapophysis externally. The pleurapophysis or cervical rib is bifurcate: one portion, answering to the tubercle of a thoracic rib, being united with the diapophysis; the other, answering to the head of a thoracic rib, being united with the parapophysis. The foramen for the passage of the vertebral artery and vein is thus enclosed by the junction of the three elements, di- par- and pleur-apophysis, together with the first portion, or pedicle, of the neurapophysis or lamina. (See the plainer relations of the corresponding parts in the cervical vertebra of the Crocodile.) With the junction of the pedicles and the posterior parts of the diapophyses are connected, on each side, the two zygapophyses, oblique or articulating processes; and from the same point proceed the laminæ or neurapophyses. The neurapophyses, converging to enclose the neural canal, meet posteriorly at an angle, and bear a bifurcate neural spine or spinous process.

The typical dorsal vertebra is composed as follows:—The conditions of the

centrum or body, the zygapophyses or articulating processes, the neurapophyses, with their pedicles and laminæ, and the neural spine or neurapophysis, closely correspond with those in the cervical vertebræ. But the parapophysis is not developed; and the diapophysis forms a strong clavate transverse process. The pleurapophysis, developed to the full size of a thoracic rib, is articulated moveably with two points; namely, by its tubercle with the extremity of the diapophysis, and by its head with the bodies of this and the next vertebra above. At its distal extremity each rib has a costal cartilage, the homologue of the hæmapophysis, such as is shown in the thoracic vertebra of the Bird, and these hæmapophyses unite with a portion of the sternum, as with their hæmal spine, to enclose the great hæmal organs.

The characters in which the elements of the lumbar vertebra chiefly deviate from those last described are, that the pleurapophysis or rib appears here as the transverse process, having coalesced with the side of the centrum or body, and with the lowly developed diapophysis. The character of the transverse process, as a rib, will be evident by comparing it with the twelfth and eleventh ribs in the entire skeleton. The same comparison will illustrate the characters of the diapophyses in this vertebra. In the eleventh and twelfth dorsal vertebræ the diapophysis presents two processes near its distal extremity: one ascending, named metapophysis; the other descending, named anapophysis. Similar processes may be seen on this lumbar vertebra; but, in consequence of the extreme shortening of the diapophysis, they here appear placed, the superior on the upper and posterior part of the superior zygapophysis or articulating process, and the lower at the junction of the pleurapophysis and rudimental diapophysis.

291. Adult Sacra and Coccyges. The sacrum, an apparently single bone, is composed of the elements of five vertebræ. The five centra or bodies are distinguished by transverse elevated lines at their junctions anteriorly. The five pairs of neurapophyses are equally distinguishable, though united so as only to leave apertures for the transmission of the posterior branches of the sacral nerves. Four of the pairs of neurapophyses bear neural spines; the fifth pair do not coalesce, the lower part of the neural canal being here closed by dura mater. In front there is a similar union of pleur- di- and zyg-apophyses, room being left for the transmission of the anterior branches of the sacral nerves.

28. 20

292. Antero-posterior section of a Sacrum, showing the medullary canal.

293. An Atlas and Axis, Cervical, Dorsal, and Lumbar Vertebræ, showing their centres of ossification.

294. The Cervical Vertebræ articulated.

295. Adult Human Ribs.

296. Hyoid Bones.

297. The Sternum of an Adult.

298. A similar specimen, but the bone is curved, with the concavity forwards.

299. A Sternum with the ensiform and rib cartilages attached.

300. A similar specimen.

301. The Bones composing the Shoulder Girdle and Upper Extremity articulated.

302. The Bones of the Upper Extremity articulated.

303. Clavicles, showing differences in size and curvatures.

304. Scapulæ, right and left.

305. Humeri, right and left.

306. Bones of the Forearm.

307. The Bones of the Hand, articulated and disarticulated.

308. A large Male Pelvis, with the upper parts of the femora, and their principal ligaments. 28. 90

309. A Female Pelvis. 28. 91

310. A Pelvis through which sections have been made.

311. The Pelvis of a Young Person, with one of the ossa innominata divided into its component elements, ilium, ischium, and pubis. 28. 92

312. Right and Left Innominate Bones.

313. Left Os Innominatum of a Child, with one lateral half of the Sacrum. The ilium, ischium, and pubis have not yet united.

314. A similar preparation in a younger Child.

315. Femora, right and left.

316. A longitudinal section of a Femur, showing the arrangement of the cancellous tissue.

317. A longitudinal section of a Femur from a young Adult, showing the epiphysis not yet united to the shaft.

318. Patellæ, right and left.

319. Bones of the Leg.

320. A longitudinal section of a Tibia from a young Adult, showing the epiphysis not yet united to the shaft.

321. Bones of the Feet, articulated and disarticulated.

B.—OSTEOLOGY OF ANIMALS.

I.—SKELETONS.

GROUP I.

ICHTHYOPSIDA.

CLASS I.—PISCES.

322. Skeleton of a Sea Angler (Lophius Piscatorius). The fish derives its name from the three slender dermal spines which are movably articulated with the supra-occipital and frontal bones, and which, covered with integument, and bearing vascular processes at their ends, serve as bait by which smaller fish are attracted to the neighbourhood of its wide-expanded jaws. The vertebral column is of very simple construction; the abdominal vertebræ have no ribs, and only rudiments of parapophyses. "The bodies of these vertebræ interlock at their lower and lateral part by a short angular process fitting into a notch in the next vertebra; the lower border of this notch represents the parapophysis in other fishes; it is obsolete in the anterior abdominal vertebræ; begins to appear about the middle ones; shows its true character in the tenth; and elongates, bending downwards, backwards, and forwards, to coalesce with its fellow, and form the hæmal arch, at the twelfth or thirteenth vertebra, from which the hæmal spine is developed."—(Owen, *Lectures on the Comparative Anatomy and Physiology of the Vertebrate Animals*, part i, p. 62.) Only three dermal spines are placed above the abdominal vertebræ. The opercular bone is very long and large, and bears a slender fin-ray near its articulation with the epitympanic. Extremely long branchiostegal or gill-cover rays also are borne on the kerato-hyal bones, and serve to support a large pouch-like membrane on each side of the head. In the pectoral fins the two carpal bones are peculiarly long, and in shape resemble a radius and ulna. The coracoid bone is of very large size, and the whole member so strong that it may be used effectively in springing upon dry ground. The ventral or pelvic fin is suspended from the coracoid bone: each pelvic bone having a cylindiform stem, representing probably an ilium, and a portion which bends inwards towards a kind of symphysis pubis. The six fin-rays diverge from the angle of junction of the two bones. 28. 313

323. A Dried Hippocampus.

324. A similar, but smaller specimen.

325. A Pipe Fish (Fistularia Tabaccaria).

326. A Globe Fish (Tetrodon).

327. Skeleton of a Flying Gurnard (Daetylopterus). 310

327a. A Flying Gurnard (Dactylopterus), dried. The great expanse of the pectoral fins on the long and strong fin-rays imitates the structure, and gives, in some measure, the power of the true Flying Fish (Exoeætus). The lowest pectoral fin-rays are detached, as in the preceding species. 28. 310A

328. Skeleton of a Dory (Zeus Faber). In its general form it presents an example of the "deep" or compressed fish. As in other fish with protractile snouts, the nasal portions of the premaxillary bones are very long, and slide on a groove on the upper part of the skull, extending nearly to the supra-occipital bone. The maxillary or descending portions of the premaxillary bones are attached by ligament to the maxillary bones, and these being similarly attached to the lower jaw, the jaws are both and altogether protruded by the single action which slides forwards the nasal portions of the premaxillary bones. In the lower jaw a large aperture exists between the dentary and articular bones. 28. 311A

328a. Skeleton of a Dolphin (Coryphæna Hippurus). The supra-occipital and frontal bones bear a high elevated crest or spine extending over nearly the whole length of the upper part of the skull. 28. 311

329. Skeleton of a Tench (Tinca vulgaris). 28. 315

330. Skeleton of a Spotted Wrasse (Labrus Trimaculatus). The pharyngeal bones, with their free surfaces covered with strong crushing teeth, are very large and strong, as in all the Labroid family of fishes. 28. 316

331. Skeleton of a Cod (Gadus Morrhua). In the abdominal vertebræ the very long and broad parapophyses (transverse processes) may be observed; they support the air bladder. 28. 317

332. Skeleton of a Plaice (Platessa vulgaris). The characters of its vertebræ, and their appended spines, are illustrated by the description of those of the Turbot. In the ordinary posture of the flat fishes such as this the neural elements of the vertebræ, which in other fish are superior, are directed to the left side of the spine, and the hæmal or inferior elements to the right side. There is a corresponding disposition of the bones of the head, but it is combined with a want of symmetry, by means of which both orbits are placed in the superior aspect of the head. The want of symmetry is due chiefly to the pre-sphenoid bone being twisted upwards to the neural or left side of the skull; and with this there is an inequality of size in some of the corresponding bones of the skull, the left parietal being smaller than the right, and the single frontal having its right side as it were scooped out to form the boundary of the right orbit. 28. 319

333. Skeleton of a Skate (Raia Batis). It presents the flat and broad skull usual in this family, the incompleteness of its upper part where it is closed by membrane, and the long pyramidal rostrum at its anterior part. Cartilages articulated with this prolongation connect it with the anterior part of the

lateral fin-rays. These fin-rays, upwards of a hundred in number on each side, extend along the lateral margin of the fish, and are closely connected with the coraco-scapular arch, which forms a kind of girdle suspended from the spines of the anterior abdominal vertebræ and extending round the fore part of the body. The coracoid and scapula expand at their outer extremities, and are connected at three points, to each of which is attached a cartilage on which are set the fin-rays. The anterior cartilage is connected with that of the rostrum; the posterior, with the ventral fin. In the ventral fin the rays are not attached directly to the extremities of the pubic arch, but on each side to two intermediate cartilages, which may represent a tarsus. 28. 321

334. Skeleton of an Eel (Anguilla). The proportionally large number of vertebræ; their low neural spines; their generally small size, and their distinctness, even in the tail, may be observed. Ventral fins are absent, as in the apodal fish generally. The feebly developed scapular arch is loosely suspended behind the opercular bones. 28. 326A

335. Skeleton of a Pike (Esox Lucius). 28. 333

336. A similar, but much larger specimen.

Presented by Dr. Andrew.

CLASS II.—AMPHIBIA.

337. Skeleton of a Jersey Toad (Bufo vulgaris). In this and the three following specimens, the chief characters of the Tail-less or Anourous Batrachia may be observed, including (1) the double articular condyles of the imperfectly ossified occipital bone; (2) the lateral occipital bones, or exoccipitals, ascending and converging so as to leave a wide open space between them and the atlas; (3) the para-sphenoid bone large and cruciform; (4) the position of the greater wings of the sphenoid filled by membrane; (5) the inferior wings, or pterygoid bones, having each one process directed outwards, and united with the supra-maxillary, palatal, and nasal bones, and another united with the tympanic bone; (6) frontal bones absent or anchylosed with the parietal; (7) superior maxillary and inter-maxillary bones large and widely arched; (8) the vertebræ of the trunk very few—in this species only eight; (9) a single sacral vertebra with very broad transverse processes; (10) the coccygeal style; (11) ribs not present; (12) sternum short and expanded posteriorly, or in two pieces, articulating respectively with the procoracoids and coracoids; (13) the place of scapula occupied by two bones, supra-scapula and scapula, of which the last, with the coracoid, forms the cavity for articulation with the humerus; (14) ilia very long and narrow, coalescing posteriorly with the small ischiatic and pubic bones, and forming with them a thin disk perforated by the acetabula; (15) the radius and ulna, and the tibia and fibula, united, but presenting grooves marking their division; (16) os calcis and astragalus long, and almost parallel; (17) phalanges elongated and numerous. 28. 304

338. Skeleton of a Bull Frog (Rana Mugiens). 28. 348

339. Skeleton of Common Frog.

GROUP II.

SAUROPSIDA.

CLASS I.—REPTILIA.

340. Skeleton of a Tortoise (Testudo Græca). 28. 356

341. Skeleton of a Land Tortoise (Pyxis Arachnoides). 28. 329

342. The Exo-skeleton of a Tortoise.

343. Skeleton of a Turtle (Chelone Midas). 28. 342

344. Skeleton of a Chameleon (Chamæleon vulgaris). 28. 330

345. Skeleton of an Iguana (Phrynosoma Cornutum). 28. 331

346. Flying Dragons (Draco volans). c. 61

347. Skeleton of a Boa (Python Sebæ). The following chief characters of Ophidia may be studied in it and the following specimens: (1) The body of the sphenoid bone (basi-sphenoid) elongated and narrow; (2) the pre-sphenoid extending forwards in a slender process; (3) pterygoid bones long, thin, and wide apart, united by suture internally with the palatine bones, externally with the superior maxillary, and posteriorly with the tympanic, and frequently bearing teeth; (4) the mastoid bones elongated; (5) the tympanic long and narrow, articulated movably with the mastoid; (6) the parietal and frontal bones small; (7) the palatine bones very long, and often bearing teeth; (8) the intermaxillary bones small; (9) the superior maxillary, in the ordinary serpents, long; but in the venomous short and thick, and bearing the poison-fangs; (10) the two halves of the lower jaw connected by extensile ligament; (11) the vertebræ short, with many mutual articulations and very numerous in this specimen, 347; (12) the ribs connected with the transverse processes of the greater number of the vertebræ; (13) no appearance of a sternum, or of anterior extremities; (14) rudiments of a pelvis and of posterior extremities in a pair of elongated bones, or series of small bones, beneath the skin, near the anus; the last of this series of bones supporting, in this specimen, a nail. 28. 301

348. Skeleton of a Python (Coluber Javanicus).
Presented by Dr. Symons.

349. Skeleton of a Common Snake (Coluber Natrix). 28. 303

350. Skeleton of a Rattle Snake. 28. 352
Presented by W. M. Baker, Esq.

CLASS II.—AVES.

Sub-Class I.—RATITÆ.

351. Skeleton of an Emeu (Casuarius Emeu). The characters of the Ratitæ or "Cursores" illustrated by this and the next two specimens are as follows: (1) The union by suture between the palatine bones and the pterygoid or inferior alæ of the sphenoid; (2) in the Ostrich, small lateral articulating surfaces on the atlas, in addition to its central articulating cavity; (3) the very long sacrum; the absence of any appended process or plate on the last caudal vertebra; (5) in this species four anterior pairs of false ribs, *i.e.*, on each side in front of the first rib that is connected with the sternum the next succeeding four pleurapophyses are of much larger size, and more like thoracic ribs than their homologues connected with the cervical vertebræ are; (6) the appendages of the ribs small, and united with them by movable articulations; in this species not present in all the ribs; (7) two pairs of posterior false ribs; (8) the sternum short, broad, concave, and without a keel; (9) the furcula absent, or, as in this species, rudimental; (10) the very small rudimental anterior extremities, wanting, in this species, the carpal bones; (11) in the Ostrich the pubic bones united by symphyses; (12) the extreme development of the hinder extremities. **28.** 267

352. The greater part of the Bones of an Ostrich (Struthio camelus). **28.** 268

353. Apteryx Australis from New Zealand.

Sub-Class II.—CARINATÆ.

354. Skeleton of a Silver Pheasant (Phasianus nychthemerus). The following characters common to the Alectoromorphæ, Peristeromorphæ, Pteroclomorphæ, and Turnicimorphæ (formerly included under "Gallinæ"), are illustrated by this and the following specimen: (1) The long jugal process from the sphenoid bone, uniting, or nearly uniting, with one from the temporal bone, so as to form a foramen or deep notch; (2) the short and thick pterygoid bones; (3) the small intermaxillary bones; (4) the deeply excavated nasal bones; (5) the small lacrymal bones; (6) the narrow palatine bones; (7) the vomer not distinct; (8) a process directed backwards from each angle of the lower jaw, the angular bone being elongated backwards; (9) the deeply-keeled sternum (especially in the Pigeons), and its very deep lateral or posterior notches; (10) the slender furcula, with, generally, a flat process at its angle; (11) the maxillo-palatines are free, and the vomer is pointed in front. **28.** 266

Presented by Benjamin Barrow, Esq.

355. Skeleton of a tame Pigeon (Columba Œnas). **28.** 265

356. Skeleton of a Magpie (Corvus Pica). This and the following specimen may illustrate the characters of the skeletons common to the Coracomorphæ, Cypselomorphæ, Celeomorphæ, and some of the Coccygomorphæ, all formerly included under the "Passeres," namely: (1) The projection of the posterior part of the skull behind the occipital foramen and its general smoothness; (2) the long and slender pterygoid bones; (3) the palatine bones narrow and wide apart; (4) a large opening in the posterior part of the lower jaw on each

side; (5) the sternum having its anterior median process bifurcate, and its posterior border deeply notched on each side; (6) a double obturator foramen between the ischium and pubis. In the Coracomorphæ, Cypselomorphæ, and Celeomorphæ the maxillo-palatines are free, and the vomer is truncated in front, but in the Coccygomorphæ the maxillo palatines are united. 28. 261

357. Skeleton of a Jackdaw (Corvus Monedula). 28. 260

358. Skeleton of a Green Woodpecker (Picus viridis). The characters common to the Psittacomorphæ and some of the Coccygomorphæ, formerly included under the "Scansores," are illustrated by this and the following specimens: (1) in the Parrots, the great development of the posterior, superior, or jugal process of the sphenoid bone, so that in some it completes, with the lacrymal bone, the ring round the orbit; (2) in the same genera, the intermaxillary bone united to the skull by ligament only, and therefore very movable; (3) the palate bones having their surfaces placed obliquely, or vertically in the Parrots, in which also they are very large and broad, and in which no vomer appears; (4) the deep broad lower jaw in the Parrots; (5) in the Woodpeckers, and others assisted by their tails in climbing, the body of the last caudal vertebra broad, and bearing a flattened concave plate beneath it; (6) the sternum generally small, and doubly notched on each side of its posterior border; (7) a single wide obturator foramen. The maxillo-palatine bones are united. 28. 262

359. Skeleton of a Cuckoo (Cuculus canorus). 28. 262A

360. Skeleton of a Parrot (Psittacus). 28. 263

Presented by W. S. Ward, Esq.

361. Skeleton of a Hen Harrier (Circus cyaneus). The following characters of the Ætomorphæ or Accipitres may be observed in this and the two following specimens: (1) The posterior part of the skull projecting more or less behind the occipital foramen; (2) the general smoothness of the surface of the cranium; (3) the long and thin ossa communicantia, pterygoid bones, and lower wings of the sphenoid bone; (4) the developed lateral portions of the ethmoid bone; (5) the developed lacrymal bones, helping to form the roof of the orbits, and supporting the ossa superciliaria; (6) the flat and broad palate bones, placed nearly horizontally; (7) the broad and deep-keeled sternum, without posterior notches, having its anterior median process single and undivided, and two round small openings in its posterior part; (8) in the diurnal species the furcula with its branches widely divaricated and arched; (9) the large and strong humeri; (10) the very long radii and ulnæ; (11) ossified pubo-ischiatic symphysis; (12) the ossa pubis converging behind their union with the ischia; (13) the femora in the diurnal species having air cavities. The maxillo-palatine bones are united. 28. 257

362. Skeleton of a Sparrow Hawk (Accipiter fringillarius). 28. 258

363. Skeleton of a Falcon. 28. 259

364. Skeleton of a Stork (Ciconia alba). The chief characters common to the Charadriomorphæ, Geranomorphæ, Amphimorphæ, and Pelargomorphæ, all formerly included under the "Grallæ, or Wading Birds," are shown in this and the following specimens, namely: (1) In many species the hollowed and grooved palatine bones, and a ligamentous union of the pterygoid bones with the body of the sphenoid; (2) in general a firm ligamentous or osseous union of the furcula with the keel of the sternum; (3) in general also the ossa

pubis divergent; (4) the great length and slenderness of the tibiæ, and more especially of the tarso-metatarsal bones. In the Charadriomorphæ and Geranomorphæ the maxillo-palatines are free, but in the Amphimorphæ and Pelargomorphæ they are united. 28. 269

365. Skeleton of a Woodcock (Scolopax rusticola.) The characters of the bones of this skeleton indicate that most of them contain marrow, not air; this is especially seen in the yellowness and greasiness of the wing-bones; the same character is usual in the smaller wading birds. 28. 272

366. Skeleton of a Snipe (Scolopax Gallinago). The occipital foramen lies far forwards, and, as in some others of the order, the upper portion of the occipital bone has two foramina or fontanelles. 28. 272A

367. Skeleton of a Ruff (Tringa pugnax). 28. 272B

368. Skeleton of a Heron (Ardea Cinerea). 28. 335

Presented by Mr. E. Oldfield.

369. Skeleton of a common Duck (Anas Boschus). The chief characters common to the Cecomorphæ, Spheniscomorphæ, Chenomorphæ, and Dysporomorphæ, all formerly included under the "Palmipedes," may be illustrated in this and in the following specimens: (1) The nearly vertical occipital foramen; (2) in many, strong ridges for the attachment of muscles on the occipital bone; in some, as the Duck, a fontanelle in it; and, in the Cormorant, a long bone attached to it by ligament, and projecting straight backwards; (3) in many species, as the Albatross and Tern, deep concave depressions or grooves on the frontal bone, for the lodgment of nasal glands; (4) the lacrymal bones large, and reaching, or nearly reaching, to the jugal arch; (5) the vomer large; (6) an elongated or double obturator foramen; (7) the phalanges of the feet long and large. In the Cecomorphæ and Spheniscomorphæ the maxillo-palatines are free, while in the Chenomorphæ and Dysporomorphæ they are united. 28. 277

370. Skeleton of an Albatross (Diomedea exulans). 28. 273

371. Skeleton of a common Tern (Sterna Hirundo). Most of its bones are greasy, containing marrow. 28. 274

372. Skeleton of a Cormorant or Shag (Phalacrocorax Carbo). 28. 275

373. Skeleton of a Razor-bill (Alca torda). The great length of the sternum and the backward elongation of its middle portion may be observed. 28. 276

374. Skeleton of a tame Swan (Cygnus Olor). The great number of vertebræ, twenty-three cervical and eleven dorsal, may be here noticed. 28. 278

Presented by W. B. Hurle, Esq.

375. Skeleton of a Penguin.

GROUP III.

MAMMALIA.

CLASS I.—ORNITHODELPHIA.

(A.) MONOTREMATA.

376. Skeleton of a Spiny Echidna (Echidna Hystrix). The following characters of the Monotremata may be observed in this and the following specimen: (1) The bird-like character of the skull, in the early union of all its bones, and the beak-like prominence of the jaws; (2) the large foramina incisiva; (3) the short sacrum, consisting in this species of only three vertebræ; (4) the ribs articulating with only the bodies of the dorsal vertebræ; (5) the early ossification of the anterior costal cartilages, and the expansion of the posterior into broad plates; (6) the T-shaped manubrium sterni, articulated not only with the first pair of ribs, but with a median process descending from the clavicles, and with processes descending from the scapulæ; (7) the clavicles, imitating the form of the furcular bone of birds, united in the median line, and there bearing the process that articulates with the sternum; (8) the scapulæ elongated, and, at their distal portions, bearing broad processes, which correspond with the coraco-clavicular bones in birds, and are connected with the sternum; (9) peculiar quadrangular bones lying between these portions of the scapulæ and the median portion of the united clavicles; (10) in this species the perforated acetabulum; (11) the marsupial bones; (12) the long and strong fibulæ, exceeding the tibiæ in length, by processes directed upwards; (13) in males, the spur attached to the hind foot. 28. 252

377. Echidna Hystrix.

378. Ornithorhynchus (Ornithorhynchus paradoxus).

The two preceding specimens were presented by Sir James Paget.

379. A similar specimen.

CLASS II.—DIDELPHIA.

(A.) MARSUPIALIA.

380. Skeleton of a Kangaroo (Macropus). The following characters of the Macropodidæ or Kangaroo-family of the Marsupialia are illustrated by this skeleton: (1) The extreme development of the posterior extremities in comparison with the anterior or with the trunk; (2) the great development of the coccygeal portion of the spine; (3) the inferior arches and spinous processes of the coccygeal vertebræ, forming a canal for the passage of the continued trunk of the aorta; (4) the short sacrum, composed in this species of only two vertebræ; (5) the clavicles; (6) the free capacity of rotation between the radius and ulna; (7) the marsupial bones, long narrow processes ascending from the anterior and upper borders of the ossa pubis; (8) the distinct fibulæ; (9) the metatarsal bones, of which, in this species, two are very long, strong, and partially united, and two are slender and rudimental; (10) the corresponding unequally-developed phalanges. 28. 251

CLASS III.—MONODELPHIA.

(A.) EDENTATA.

381. Skeleton of an Armadillo (Dasypus Conurus). 28. 328

(B.) UNGULATA.

382. Skeleton of an Ass (Equus Asinus). The following characters, distinguishing the Solidungula, whether as a division of the Pachydermata, or as a separate order, may be observed in this: (1) The small and early united parietal bones; (2) the long nasal bones; (3) the large lacrymal bones, each with a deep pit in its orbital portion for the reception of the Harderian gland; (4) the malar bone extended far backwards, and, with the frontal and zygomatic portion of the temporal, completing the ring of the orbit externally; (5) the single lower jaw; (6) the long and nearly erect spinous processes of the anterior dorsal vertebræ, for the attachment of the ligamentum nuchæ; (7) on the bodies of the cervical vertebræ an articulating cavity posteriorly and convexity anteriorly; (8) the sternum much compressed laterally; (9) the clavicles absent; (10) the ulna having a large olecranon, but its shaft soon becoming thinner and blended with that of the radius; (11) the metacarpus consisting of one large bone and two short styloid appendages (splint-bones); (12) the phalanges, a single series of bones; (13) between the metacarpus and first phalanx, or fetlock, two sesamoid bones (nut-bones); (14) between the second and third phalanges (coronary and coffin-bones) one sesamoid, or shuttle-bone; (15) the femur short and provided with a third trochanter; (16) the fibula, a slender appendage to the tibia; (17) the metatarsus and phalanges conformed with the corresponding bones of the anterior extremity. 28. 216

383. Skeleton of a Red Deer (Cervus Elaphus). The chief characters of the Ruminantia illustrated by this and other specimens are the following: (1) The small and early united parietal bones; (2) the bony processes on the frontal bones of the horned species; (3) the long nasal bones; (4) the lacrymal bone, with a deep pit for the Harderian gland; (5) the extended malar bone, uniting with the frontal to complete the ring of the orbit externally; (6) the large vomer; (7) the intermaxillaries bearing no teeth; (8) the long, slender coronoid processes of the lower jaw, and the small condyles of the same freely moveable upon the shallow glenoid surfaces or cavities; (9) the large intermaxillary foramina; (10) the long and strong spinous processes of the lower cervical and upper dorsal vertebræ; (11) the small scapulæ, without acromion; (12) the absent clavicles; (13) the single metacarpal and metatarsal bones, each marked with a median ridge or line, indicating its formation of two united bones, and each having at its sides two slender bones, the rudiments of others corresponding with themselves; (14) in each foot two principal digits, and two smaller "spur" or "dew claws," supported by the rudimental metacarpal and metatarsal bones. **28.** 224

384. Skeleton of a small Musk Deer (Tragulus Kanchil). **28.** 223

385. Skeleton of a fœtal Lamb (Ovis Aries) **28.** 334

386. Skeleton of a Collared Peccari (Dicotyles torquatus). The following are the principal characters of the pachydermata, illustrated by this: (1) The small and angular occipital foramen; (2) the lowly developed mastoid process; (3) the single frontal bone; (4) in the Elephant, the large size of the intermaxillary bones for the support of the tusks; (5) the lower jaw single by the early union of its two halves; (6) the numerous dorsal vertebræ, and the long spinous processes of the anterior among them; (7) the clavicles absent; (8) the radius and ulna anchylosed, but not in the Elephant; (9) the metacarpus and phalanges comprising in some (the Isodactyle) an even number of toes, in others (the Anisodactyle) an odd number; (10) in the Rhinoceros (196) and some others, a strong process from the middle of the femur, like a third trochanter; (11) the large patellæ; (12) the metatarsus and phalanges resembling those of the anterior extremities, and differing, like them, in different genera. **28.** 206

(C.) CETACEA.

387. Skeleton of a Porpoise (Phocæna communis). In this and in the succeeding specimen the following characters of the skeletons of Cetacea may be observed: (1) The jaws lengthened out in the shape of a snout; (2) the cranial bones united by squamous suture; (3) a greater or less deviation from lateral symmetry in the nasal and intermaxillary bones and the nasal orifices, the right being larger than the left; (4) the large size and exceeding hardness of the tympanic bones; (5) the absence of the mastoid processes; (6) the small, rounded, unsymmetrical nasal bones; (7) the small, thin, and flattened malar bone; (8) the large strong vomer; (9) the posterior ribs articulating with the transverse processes alone; (10) the early ossification of the costal cartilages; (11) the large number of false ribs (in this specimen six pairs); (12) the short and broad sternum; (13) the broad scapulæ; (14) the absent clavicles; (15) the short humeri; (16) the short and flat radii and ulnæ, lying immovable on one another, in the same plane with the fin-like carpus and hand; (17) the carpal bones without prominences; (18)

the four, five, or more phalanges in the longest fingers; (19) the simple rib-like pubic bones alone representing the pelvis, and bearing no posterior extremities; (20) the inferior laminæ and spinous processes (hæmapophyses and hæmal spines) of the caudal vertebræ. 28. 176

(D.) CARNIVORA.

388. Skeleton of a large Greyhound (Canis familiaris, var. Graius). As illustrations of the skeletons of Carnivora, the following characters may be observed in this specimen, and, with few exceptions, in those of the following: (1) The thin-walled ampulla, formed by the petrous portion of the temporal bone; (2) the small and united parietal bones; (3) the strong malar bone arched outwards to form part of the great zygoma; (4) the large palate bones; (5) the lower jaw, provided with a broad coronoid process, a sharp process directed backwards from its angle, and its condyle low, lengthened in the transverse direction, and so locked in the glenoid cavity as to admit of little or no lateral motion; (6) the long and narrow sternum; (7) the clavicle rudimental (absent in some, as the Coati; more developed in others, as the Cat;) (8) the free rotation of the radius on the ulna; (9) the length and narrowness of the ilia, and the obliquity of the pelvis; (10) the distinctness of the tibia and fibula, though they are very closely approximated at their distal ends. 28. 135

Presented by Stephen Stafford, Esq.

389. Skeleton of a Dog (Canis familiaris). 28. 343

390. Skeleton of a Dog (Canis familiaris). 28. 136

391. Skeleton of a Lioness (Felis Leo; fem.). 28. 154

392. Skeleton of a Cat (Felis domesticus). 28. 165

393. Skeleton of a Cat (Felis domesticus). 28. 166

394. A similar specimen.

395. Skeleton of a Coati Mundi (Nasua fusca). 28. 128

396. Skeleton of a Ferret (Mustela Furo). 28. 130

397. Skeleton of a Seal (Phoca Vitulina).

(E.) HYRACOIDEA.

398. Part of the disarticulated Skeleton of a Hyrax (Hyrax Capensis). This specimen illustrates some of the chief characters of the skeletons of the Hyracoidea, which are as follows: (1) The large number of the dorso-lumbar vertebræ, namely, twenty-nine to thirty-one; (2) the premaxillæ are large, and unite extensively with the nasal bones; (3) the post-orbital proecsses, which are chiefly furnished by the parietal and jugal, nearly meet, and part of the articular facet for the mandible is formed by the latter bone; (4) the scapula has no acromion process, there are no clavicles, but the coracoid process is well developed; (5) in the carpus, a line prolonging the axis of the third metacarpal bisects the os magnum and the lunare; (6) in the hind limb, the third trochanter is not nearly so conspicuous as in some rodents, the tibia and fibula are complete, and the extremity of the inner malleolus articulates with a shelf-like process of the astragalus. The first and fifth digits are not represented, and the terminal phalanx of the second is cleft.

Presented by Dr. Norman Moore.

(F.) RODENTIA.

399. Skeleton of a Norway Rat (Mus decumanus). This and the following specimens illustrate the chief characters of Rodentia, namely: (1) The thin-walled ampulla formed by the petrous portion of the temporal bone; (2) the large intermaxillary bones bearing the rodent incisor teeth; (3) the processes directed backwards from the angles of the lower jaw; (4) the long and posteriorly expanded sternum; (5) in many species, a process directed backwards from the end of the spine of the scapula; (6) the clavicles strong in some (404), in others slender (399), in others absent (401).

400. Skeleton of a Guinea Pig (Cavia aperea). 28. 245

401. Skeleton of an Agouti (Dasyprocta Aguti). 28. 247

402. Skeleton of a Squirrel (Sciurus vulgaris). 28. 332

403. Skeleton of a Hare (Lepus timidus). 28. 336

404. Skeleton of a Beaver (Castor fiber). 28. 238

Presented by John Allan, Esq.

(G.) INSECTIVORA.

405. Skeleton of a Mole (Talpa Europæa). It presents the following peculiar characters, most of which, adapted to its habits of burrowing and living in the earth, distinguish the Mole: (1) Its small and rudimental orbits; (2) the deeply keeled manubrium sterni; (3) the very long and narrow scapula; (4) the short quadrangular clavicle articulating with the humerus; (5) the short, strong humerus, very broad at both its ends, and bearing long processes on both for the attachment of muscles; (6) the thin ridge along the outer side of the ulna; (7) the anterior process at the upper end of the radius; (8) the long sickle-shaped bone on the inner side of the carpus; (9) the breadth and rake-like form of the fore-foot. The pelvis has no symphysis pubis. 28. 119

406. Skeleton of a Mole (Talpa Europæa). 28. 120

Presented by A. M. McWhinnie, Esq., Lecturer on Comparative Anatomy.

407. Skeleton of a Hedgehog (Erinaceus Europæus). 28. 367

Presented by Mr. Pottle.

408. Skeleton of a Hedgehog (Erinaceus Europæus). 28. 177

(H.) CHEIROPTERA.

409. Skeleton of a Bat (Noctula vulgaris). It illustrates the usual characters of the Cheiroptera in the following particulars: (1) The large occipital foramen; (2) the single frontal bone; (3) the widely separated intermaxillary bones; (4) the absence of spinous processes on the vertebræ; (5) the osseous, instead of cartilaginous, prolongations of the ribs to the sternum, forming a series of sternal ribs, like those of birds; (6) the T-shaped manubrium, and the anterior longitudinal crest, of the sternum; (7) the anthropoid form and long coracoid process of the scapula; (8) the long singly arched clavicle; (9) the long humerus; (10) the yet longer radius, with the rudimental ulna and its

olecranon; (11) the thumb small, free, supporting a claw; (12) the other very slender and long metacarpal bones and digits serving for the support of the membrane of the wing; (13) the pelvis elongated, and with its ossa pubis wide apart, but connected by ligament; (14) the long sharp spine on the os pubis, the rudiment of a marsupial bone; (15) the head of the femur placed between two equal and similar trochanters; (16) the fibula rudimental; (17) the os calcis, bearing a long spur-like bone for the support of that posterior part of the alary membrane which extends beyond the tail; (18) the general delicacy and lightness of the whole skeleton. 28. 116

410. A similar specimen. 28. 349

(I.) PRIMATES.

411. Skeleton of a young Oran-utan (Pithecus Satyrus). Principal characters of the skeletons of Quadrumana illustrated by this and the following specimens: (1) The generally anthropoid character; (2) the nearly horizontal direction of the occipital foramen; (3) the single frontal bone; (4) the smallness, and, in most of the following crania, the singleness, of the nasal bone; (5) the extended inner plate of the malar bone, forming part of the orbit and temporal fossa; (6) the small palate bones; (7) the single lower jaw, with its symphysis sloping downwards and backwards; (8) the general form of the skull, approaching the human form; (9) the sacral vertebræ, composing a sacrum which, though narrow in comparison with that of man, is broader and hollower than those of the foregoing mammalia; (10) the scapula long, but broad at its neck; (11) the clavicle long, thick, and strong; (12) the humerus very long; (13) the radius and ulna long and slender, and very freely rotating; (14) the fingers long and slender, but the thumb short and small; (15) the pelvis broad, and the ilia carried far back; (16) the ischium with a spine, and with broad and flat tuberosities; (17) the femur short in comparison with the humerus; (18) the tibia and fibula distinct; (19) the toes long and slender, except the inner toe, which is like the thumb, and thus, making the foot look like the hand, gives the especially quadrumanous character. 28. 102

Presented by Dr. Roupell.

412. Skeleton of a Pig-tailed Baboon (Macacus Rhesus). 28. 103

413. Skelcton of a young Baboon, probably of the same species as the last. 28. 104

414. Skeleton of a young Baboon (Cynocephalus). 28. 105

II. SKULLS.

GROUP I.

ICHTHYOPSIDA.

CLASS I.—PISCES.

415. The bones of the Skull of a Cod (Gadus Morrhua), disarticulated from each other, arranged in nearly their natural relative positions, and numbered after the system of Professor Owen. 28. 21

416. Dried Head of a Sturgeon (Accipenser Sturio). 28. 325

417. Skull of a Bony Gar-fish (Lepidosteus osseus). Three rows of sharp conical teeth, of different sizes, are set on each of the elongated jaws. The premaxillary and maxillary bones are divided into many pieces. The basi-occipital bone bears two plates, which enclose the epencephalon and support the ex-occipital bones; the supra-occipital is double. Behind the occiput some of the bony "ganoid" scales remain. 28. 326

418. Head of a Wolf-fish (Anarrhichas Lupus). It is chiefly remarkable for the strength of the bones that support its oral teeth, namely, the intermaxillary, premandibular, and palatine bones and the vomer, to which also are adapted the bones giving attachment to muscles of mastication. The dentigerous bones have strongly developed alveolar processes. 28. 312

419. Skull of a Pike.

420. Skull of a Cod (Gadus Morrhua).

421. The separated Bones of the Head, and the anterior five vertebræ of a Tobacco-pipe Fish (Fistularia tabaccaria). The anterior four vertebræ are elongated, and their bodies, neurapophyses, neural spines, and parapophyses are thin and laminar, and anchylosed, so as to present a remarkable likeness to cranial vertebræ. The first vertebra bears anteriorly a single concave surface, with which a corresponding convexity on the basi-occipital bone is articulated. All the bones of the head are remarkably lengthened, especially the vomer, the pterygoid, and the components of the tympanic portion of the tympano-mandibular arch. 28. 320

GROUP II.

SAUROPSIDA.

CLASS I.—REPTILIA.

422. The Bones of a Skull of a Turtle (Chelone Midas), disarticulated from each other, arranged in nearly their natural relative positions, and numbered after the system of Professor Owen. **28.** 22

423. Skull of a Turtle (Chelone Midas). **28.** 285

424. Vertical antero-posterior sections of a Turtle's Skull, numbered after the system of Professor Owen. **28.** 286

425. Separated Bones of the Skull of an East Indian Crocodile (Crocodilus biporcatus), marked according to the descriptions of the cranial vertebræ. **28.** 295

426. Skull of a Crocodile (Crocodilus paludinosus). **28.** 296

427. Head of a Crocodile. **28.** 363

428. Fossil Skull of an Ichthyosaurus.

CLASS II.—AVES.

(A.) RATITÆ.

429. The Bones of the Skull of an Ostrich (Struthio camelus). Disarticulated from each other, and numbered after the system of Professor Owen. **28.** 23

(B.) CARINATÆ.

430. Skull of Cross-bill.

431. Two Skulls of the Swallow.

432. Skulls of two Robins.

433. Skull of a Stonechat.

434. Skull of a Wryneck.

435. Skull of a House Sparrow.

436. Skull of a Hedge Sparrow.

437. Skull of a Stockdove.

438. Skull of a Blackbird.

439. Skull of a Blue Titmouse.

440. Skull of a Great Titmouse.

441. Skulls of Goldfinches.

442. Skull of a Greenfinch.

443. Skull of a King Vulture (Vultur Papa). 28. 255

444. Skull of an Eagle. 255A

445. Sections of the Skull of a Wood Owl (Strix Aluco). They show the remarkable elevation of the anterior part of the cranium, produced by the large air cavities in the diploe, especially of the nasal, frontal, and parietal bones. 28. 259A

446. Skull of an Owl.

447. Skull of an Owl.

448. Sections of the Skull of an Hornbill (Buceros). It presents a very remarkable example of the formation of air cavities in the bones, all the cranial and maxillary bones (like nearly all the rest of the bones of the skeleton of this bird) being internally intersected by slender osseous filaments and lamellæ, which in the recent state supported the membranes of air cells communicating with the lungs. The maxillary and nasal bones especially are as if inflated with air. The short and strong zygomatic or jugal arch, and the tubular form of the united palatine bones and vomer, may be also observed in this skull. 28. 262B

449. A similar specimen.

450. Skull of a Spoonbill (Platalea leucorodia). 28. 271A

451. Skull of a Macaw (Macrocercus). 28. 264

452. Skull of an American Crane (Mycteria Americana). The partition between the orbits formed by the ethmoid bone is here completely osseous, while in the preceding specimen it appears wanting, a large aperture existing which was closed by membrane. 28. 271

Presented by Arnold Henry, Esq.

453. Skull of a gigantic Crane or Adjutant (Ciconia Argala). 28. 270

454. Skull of a Heron (Ardea cinerea), 28. 270A

Presented by A. Clifton, Esq.

455. Skull of a Duck. 279A

456. Two Skulls of Ducklings.

457. Skull of a wild or whistling Swan (Cygnus ferus). 28. 280

458. Skull of a Cormorant. 28. 275A

459. Skull of an Albatross. The depression over the eye is noticeable as found in many genera of sea birds. 28. 273A

460. Sections of the Skull of an Albatross, with the bones numbered after the system of Professor Owen. 28. 273B

461. Skull of a gigantic Petrel (Procellaria) 28. 274A

GROUP III.

MAMMALIA.

CLASS I.—ORNITHODELPHIA.

(A.) MONOTREMATA.

462. Skull of a Duck-mole (Ornithorynchus paradoxus). 28. 253

CLASS III.—MONODELPHIA.

(A.) UNGULATA.

463. Skull of a Horse (Equus Caballus). 28. 213

464. A similar specimen. 213A

Presented by Dr. Norman Moore.

465. A similar specimen. 213B

466. Vertical antero-posterior sections of a similar Skull. 28. 214

467. Skull of an Hippopotamus (Hippopotamus amphibius). 28. 188

468. Skull of an American Tapir (Tapirus Americanus). 28. 189

469. Skull of a white lipped Peccari or Tajassou (Dicotyles labiatus). 28. 204

Presented by Arnold Henry, Esq.

470. A similar specimen. 204A

471. Sections of a similar Skull. 28. 205

472. Skull of a Wild Boar (Sus scrofa). 28. 207

473. Sections of a similar specimen, with the tusks cut. 28. 208

474. Skull of a Sow (Sus scrofa). 28. 209

475. Skull of a young Pig. 28. 210

476. Skull of a Babyroussa (Sus Babyroussa). 28. 211

Presented by Capel Bringloe, Esq.

477. Vertical antero-posterior sections of a similar Skull. 28. 212

478. Skull of a young Deer (Cervus). 28. 225

479. The Bones of the Skull of a Lamb (Ovis Aries), disarticulated from each other, and numbered after the system of Professor Owen. 28. 24

480. Skull, with the Horns, of an English Sheep (Ovis Aries). 28. 228

481. Skull of a Sheep. 210A

482. Skull of a Sheep with Horns.

483. Skull, with the Horns, of a Prussian Sheep (Ovis Aries, var. polyceros). 28. 229

484. Skull of a Hornless Sheep. 28. 230

485. Vertical antero-posterior sections of a similar Skull. 28. 231

486. Skull of an Indian Antelope (Antilope Coama). 28. 227

487. Skulls of Oxen (Bos Taurus). 28. 232

488. Skull of a Musk Ox (Ovibos moschatus). 28. 233

(B.) CETACEA.

489. Skull of a Dolphin (Delphinus Delphis). 28. 177

490. Skull of a Dolphin (Delphinus Delphis). 28. 178

491. Skull of a Delphinus. 28. 181

492. Sections of the Skull of a Delphinus. 28. 182

493. Skull of a small bottle-nosed Whale (Delphinus Tursio). 28. 179

493a. Skull of Sperm Whale (Physeter macrocephalus).

(C.) PROBOSCIDEA.

494. Skull of a young Asiatic Elephant. 28. 191

Presented by William Sams, Esq.

(D.) CARNIVORA.

495. Skull of a Black Bear of North America (Ursus Americanus). 28. 123

496. Skull of a White Bear (Ursus maritimus). A small abnormal conical horn-like bone is articulated by serrated suture with the anterior border of the right parietal bone. 28. 124

497. Skull of young Bear (Ursus arctos). 28. 125

498. Two Skulls of Indian Bears.

Presented by Surgeon-Major Waghorn.

499. The Skull of a Badger (Meles taxus). The large post glenoid process is well shown. 28. 126

Presented by Morris Lievesley, Esq.

500. Sections of the Skull of a Badger. 28. 127

501. Skull of a Pole-cat (Putorius vulgaris). 28. 131

502. Skulls of Bull-dogs. 28. 137, 138

503. Skull of a Mastiff. 28. 139

504. Skull of a Greyhound. 28. 140

505. Skull of a Terrier. 28. 141

506. Skull of a Spaniel. 28. 142

507. Skull of a Wolf-hound. 28. 143

508. Vertical antero-posterior sections of a Dog's Skull. 28. 146

509. A vertical transverse section of a Dog's Skull, showing the frontal sinuses and the perforated plates of the ethmoid bone. 28. 147

510. A horizontal transverse section of a Dog's Skull, with the bones at its base marked according to the descriptions of the cranial vertebræ as described by Owen. 28. 148

511. The separated Bones of a Dog's Skull. 28. 149

512. Skull of a Fox (Vulpes communis). 28. 151

513. A similar specimen.

Presented by W. S. A. Griffith, Esq.

514. Vertical antero-posterior section of the Skull of a Fox. 28. 152

515. Skull of a Jackal (Canis aureus). 28. 153

516. Skull of a young Lion (Felis Leo). It shows very well the small separate bone between the occipital and parietals. 28. 155

517. Skull of a Lion. 28. 355

518. Skull of a Tiger (Felis Tigris). 28. 159

Presented by Dr. Roupell.

519. Skull of a young Tiger (Felis Tigris). 28. 160

520. Skull of a young Tigress. 28. 161

521. Skull of a Leopard (Felis Leopardus). 28. 162

522. Skull of a young Leopard (Felis Leopardus). 28. 163

523. Vertical antero-posterior sections of the Skull of a Leopard. The bony tentorium cerebelli is well shown. 28. 164

524. Skull of a Cat. 28. 167

525. Transverse and longitudinal sections of Cats' Skulls, showing especially the bony tentorium. 28. 168

526. Transverse and longitudinal sections of Cats' Skulls, with the bones marked according to the descriptions of the cranial vertebræ by Owen. 28. 169, 170

527. Skull of a Walrus (Trichecus Rosmarus). 28. 172

Presented by Charles Beverly, Esq.

528. Skull of an Ichneumon (Herpestes griseus). 28. 129

529. Skull of a Weasel (Putorius erminеus). 28. 132

530. Skull of a Stoat.

Presented by W. S. A. Griffith, Esq.

531. Skull of an Otter (Lutra vulgaris). 28. 133

532. Skull of an Otter (Lutra vulgaris). 28. 134

(E.) **RODENTIA.**

533. Skull of a Rat. 28. 235

534. Two similar specimens.

Presented by W. S. A. Griffith, Esq.

535. The separate Bones of a similar Skull, marked according to the description of cranial vertebræ by Owen. 28. 236

536. Skull of a Mouse (Mus muscipulus). 28. 237

537. Skull of a Shrew.

Presented by W. S. A. Griffith, Esq.

538. Skull of a Beaver. 28. 239

539. Skulls of two Rabbits (Lepus Cuniculus). 28. 241 and 242.

540. A similar specimen. 242A

541. Skull of an Agouti (Dasyprocta Aguti). 28. 246

542. Skulls of two Agoutis (Dasyprocta Aguti). 28. 248 and 249

543. Skull of a Capybara (Hydrochærus Capybara). 28. 250

Presented by Arnold Henry, Esq.

(F.) **INSECTIVORA.**

544. Skulls of Moles.

Presented by W. S. A. Griffith, Esq.

545. Skulls of two Guinea Pigs. 121P

546. Skull of a Hedgehog. 121E

(G.) **CHEIROPTERA.**

547. Skull of a Bat.

Presented by W. S. A. Griffith, Esq.

(H.) **PRIMATES.**

548. Skull of a Mandril (Papio Mormon).

Presented by Samuel Weddell, Esq.

549. Skull of a Baboon.

Presented by W. S. A. Griffith, Esq.

550. Skull of a young Baboon (Macacas nemestrinus). 28. 107

551. Skull of a Monkey (Cercopithecus Mona). 28. 108

552. Skull of an American Monkey (Cebus Apella). 28. 109

553. Skull of a Monkey, with the cheek pouches (Cercopithecus). 28. 110

554. Horizontal section of the Skull of a Monkey. 28. 111

555. Vertical antero-posterior sections of the Skull of a Monkey (Cercopithecus). 28. 112

556. The separated Bones of the Head of a Monkey. In the three preceding specimens the bones are marked and numbered in accordance with the description of Owen's cranial vertebræ. 28. 113

III.—VERTEBRÆ, LIMBS, AND LIMB ARCHES.

GROUP I.

ICHTHYOPSIDA.

CLASS I.—PISCES.

557. The Body or Centrum of one of the Vertebræ of a Shark (Cestracion). It is short, cylindriform, and imperfectly ossified at its circumference, four deep depressions marking the parts at which the chief processes were, in the recent state, connected with the body. The terminal surfaces of the body are hollowed out in cones, and are covered with osseous plates marked with concentric circles. The centre of the body is perforated with a small aperture. 28. 1

558. Longitudinal sections of part of the Vertebral Column of the same Shark. By the mutual apposition of the bodies or centra of the vertebræ, cavities are enclosed of biconical form. Within these cavities, and retained by elastic ligaments uniting the bodies of the vertebræ, there was, in the recent state, a clear fluid, the remains of the chorda dorsalis, on and around which the vertebral column was developed. 28. 2

559. Transverse section of the Bodies or Centra of two Vertebræ of the same Shark. The part of each vertebra which is included between the terminal funnel-shaped plates, consists of osseous triangular laminæ, converging from its circumference to its centre. Four large spaces remain between the laminæ, two at the upper and two at the lower part of the vertebræ, which corresponded with the bases of the neurapophyses and parapophyses. 28. 3

560. Section of the Body of a Vertebra of another species of Shark (Galeus). Its general characters are similar to those just described, and it shows similar cavities, which corresponded with the bases of the neurapophyses and parapophyses. But the substance of the body is composed not of converging lamellæ, but of an irregular, soft, cancellous tissue. The arrangement of four portions converging to the centre marks the usual mode of ossification of the bodies of the vertebræ of fishes; namely, in two portions corresponding with the terminal concave plates, and four portions composing the intermediate substance of the body. 28. 4

561. Portions of the Vertebral Column of a Shark (Carcharias). 28. 322

562. Two Vertebræ of a Turbot (Rhombus maximus). The bodies or centra are thin and round, and their opposed surfaces present conical depressions; but the depression on one is much deeper and more uniform than on the other surface. From the upper part of each of the centra there extend upwards (or to the left as it would appear in the ordinary position of this flat fish) two laminæ, or neurapophyses, which converge to enclose the canal for the spinal

cord, and from their convergence bear a long spinous process or neural spine. The neural spine is grooved on its anterior and posterior surfaces, and into each groove is fitted a long slender bone, the interneural spine. Each of the two interneural spines belonging to each vertebra is connected at its extremity with a long dermo-neural bone, or fin-ray, which lying in the fin forms part of the exo-skeleton or dermal skeleton of the fish. With the lower or right border of the centrum of each vertebra, bones are connected, which correspond with those just described, but extend in the opposite direction. They are parapophyses, or inferior transverse processes, which converge and unite to form the hæmal canal; an hæmal spine, united with them at their convergence; two interneural spines, fitted in the grooves of the hæmal spine; and at their distal extremities two dermo-hæmal bones. From each side of the centrum, above the converging parapophysis a short process extends transversely outwards. This may be regarded as another branch or division of the parapophysis.* 28. 5

563. Two Vertebræ of a Herring (Clupea Harengus). They are among those most remarkable for the number of "appendages" to the proper elements of the vertebræ. On the junction of the neurapophyses where they enclose the spinal canal are two long thin neural spines; and a yet longer and more slender appendage is attached to the side of each neurapophysis, whence it extends upwards, outwards, and backwards, between the muscles of the back. Similar appendages diverge outwards from the short parapophyses or transverse processes attached to the lateral and inferior parts of the centrum; and again other very slender appendages proceed from the ribs or pleurapophyses near their articulation with the parapophyses. At their distal extremities the ribs are connected with a dermo-hæmal bone of scale like form, bearing two sharp diverging processes. 28. 6

CLASS II.—AMPHIBIA.

564. Articulated Bones of the extremities of a Frog. 28. 307

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* The skeleton of the plaice shows that when the parapophyses, according to the usual type in fishes, bend down and converge to form the hæmal arches in the caudal region, they, or at least those of the anterior caudal vertebræ, bifurcate or give off processes which extend transversely and form "spurious transverse processes."

GROUP II.

SAUROPSIDA.

CLASS I.—REPTILIA.

565. One of the Thoracic Vertebræ of a Turtle (Chelone Midas), as an example of the peculiarities of form produced by transverse extension of some of the vertebral elements. The neural arches of the vertebra extend over the intervertebral space next below it, and over the anterior half of the next vertebra; and their bases are united in the same manner to both these vertebræ. The neural spine bears a large quadrangular plate of bone, placed transversely over it, and united by serrated suture to similar plates on the vertebræ before and behind, and on the ribs. Each rib articulates with two centra and their intervertebral substance, and bears on its upper surface, or expands so as to form, a plate of bone, united, as already described, to the plate on the neural spine, and by a serrated suture to the similar plates on the ribs preceding and following it. It is by the close junction of these osseous plates on the neural spines and ribs that the "carapace" is formed for the support of the dorsal shell of the turtle, marks of which are impressed on the outer surface of the bones. The distal end of each rib is connected with narrow and longitudinally placed hæmapophyses which, by the junction of their ends with those of the other adjacent vertebræ, formed part of a complete ring of bone, placed beneath the outer border of the dorsal shell. With these bones are also connected by ligament two portions of the sternum, or plastron, which, as expanded hæmal spines, were joined by serrated suture with other similar portions, to form the osseous plate for the support of the inferior shell. 28. 15

565a. Cervical Vertebræ of a Plesiosaurus. 28. 300A, 300C

565b. Cervical Vertebræ of a Plesiosaurus dolichodeirus. 28. 300B

565c. Vertebra of an Inguanodon. 28. 300D

566. Two Vertebræ of a Boa (Python Sebæ). They are chiefly remarkable for the number of articulating surfaces which they present, each having twelve. At each extremity of the body there is such a surface, the anterior being concave, the posterior convex; these form ball-and-socket joints with the corresponding parts of the vertebræ preceding and following. At each extremity also of the neurapophyses there are two flat articulating surfaces, which are so arranged that the anterior part of the neurapophyses of each vertebra may be received within and slide upon the posterior part of the neurapophyses of the preceding vertebra. Corresponding movements can take place between the proper zygapophyses, of which each vertebra has four projecting outwards from the sides of the neurapophyses. Lastly, at the sides of the anterior part of each centrum are two low processes, with articulating surfaces for the ribs or pleurapophyses. 28. 13

567. A Cervical Vertebra from a Crocodile. It may be studied as combining nearly all the characters of a typical vertebra in a simple form. Its body or centrum elongated and cylindriform, is concave at its anterior and convex at its posterior extremity. At each side inferiorly the centrum bears a low process, the inferior transverse process or parapophysis; and superiorly, a similar but smaller process or diapophysis, which articulates with a prominence on the base of the neurapophysis. The neurapophyses or arches articulating with the body or centrum converge to enclose the spinal cord. They bear on the middle of the line of their convergence the spinous process or neural spine, and diverging from the extremities of the same line, the articulating processes or zygapophyses. The proximal portion of the pleurapophysis or rib is bifurcate; one of its divisions articulates with the diapophysis, the other with the parapophysis; and these several parts, together with the body of the vertebra, enclose an elongated aperture, within which the vertebral vessels lie. The distal portion of the pleurapophysis is prolonged backwards and forwards. In the median line of the inferior surface of the body is a slightly elevated ridge or hypapophysis. 28. 10

568. The Fifth Dorsal Vertebra of a Crocodile. The relations of the centrum, the neurapophyses, the neural spine, and the zygapophyses, may be at once recognized by comparison with those of the cervical vertebra. The diapophysis and parapophysis, or superior and inferior transverse processes, are combined in one broad, flat, and elongated process, bifurcate at its extremity. (In the complete skeleton it may be seen that in the successive dorsal vertebræ the parapophysis is placed more and more near to the superior part of the centrum, till, at the fifth, the small eminence that represents it is transferred to the side of the neurapophysis, and united to the diapophysis). At the end of this compound process are two articulating surfaces, to which are adapted those of the rib or pleurapophysis. The ribs arch downwards and inwards, and at their distal extremities are articulated with hæmapophyses, bones corresponding with the human costal cartilages. The hæmapophyses converge, and at their extremities are united to a portion of sternum, forming the hæmal spine of this vertebra. 28. 11

569. A Lumbar Vertebra of the same Crocodile. The pleurapophyses or ribs are not present as bones. The hæmapophyses form an inferior osseous arch, composing one of those which have been named abdominal ribs, which are represented by the tendinous lineæ transversæ of the human recti abdominis muscles. 28. 12

570. The Scapula and Coracoid Bone of a Turtle. 28. 291

571. The Articulated Bones of the anterior extremity of a Turtle. 28. 292

572. Pelvis of a Turtle. 28. 289

Presented by W. J. Bayntin, Esq.

573. A similar specimen. 28. 290

CLASS II.—AVES.

574. The Vertebræ of an Ostrich.

575. Four Cervical Vertebræ of a tame Swan. The articular surfaces of their bodies are convex in one direction and concave in the other; so that their articulation resembles and equals in mobility that of the human os trapezium and metacarpal bone of the thumb. 28. 278A

576. Sections of seven Cervical Vertebræ of a Swan, showing the widening of the spinal canal opposite each articulation. 28. 278B

577. Section of a Vertebra, Ribs, and Sternum of a Carinate Bird. 278D

578. Sternum of a Psittacula.

579. Sternum of a Woodpecker.

580. Sternum of a Canary.

581. Sterna of the Estrelda.

582. Sternum of a Stonechat.

583. Sterna of the Reed Warbler.

584. Sternum of a Blackbird.

585. Sternum of a Linnet.

586. Sterna of the Yellow Wagtail.

587. Sternum of Water Wagtail.

588. Sterna of Flycatchers.

589. Sterna of Swallows.

590. Sternum of a Phalarope.

591. Sterna of the Red-backed Shrike.

592. Sternum of a Lark.

593. Sternum of a Nuthatch.

594. Sternum of a Robin.

595. Sternum of Calamophillus-Binarchus.

596. Sternum of a Dartford Warbler.

597. Sterna of the House Sparrow.

598. Sterna of the Goldfinch.

599. Sternum of a Greenfinch.

600. Sternum of a Titmouse.

601. Sterna of Great Titmouse.

602. Sternum of a Black-headed Bunting.

603. Sternum of a Stormy Petrel.

604. Sternum, with the Trachea, of a Whistling Swan. The trachea passes between the branches of the furcula, and then between the two plates of the keel of the sternum, between which it extends through the greater part of the length of the keel. Then suddenly bending on itself, it passes forwards, and, emerging from the keel of the sternum, it ascends between the branches of the furcula, curved here for its passage, and bends backwards over the anterior border of the sternum. 28. 281

605. Pelvis of a Whistling Swan. 28. 282

606. Sections of the Pelvis of a Vulture; showing an extreme modification of the appearance of the vertebral column, through coalition of vertebræ, which, though coalesced, yet retain traces of their essential separateness. In the longitudinal sections of the sacrum are shown the principal elements of fourteen vertebræ, coalesced to form this apparently single bone. The centrum of the first sacral vertebra bears on its lower surface a large bifurcate hypapophysis, and at each upper margin an articulating process, or zygapophysis, like those of the thoracic vertebræ. This first centrum is also, by its larger size, distinguished from the others, which, successively diminishing in size, and laterally expanded, bear only faint traces of their distinction in the transverse lines that mark their inferior surface, and in the corresponding plates of bone by which they are partitioned within. The laminæ or neurapophyses are almost wholly united in one plate of bone closing the neural canal; but their distinctness is indicated by the foramina which gave passage to the several pairs of sacral nerves. One long keel-shaped ridge of bone is formed by the united neural spines, or spinous processes; but its composition of fourteen parts, corresponding with the other vertebral elements, is shown by the number of thin vertical lamellæ of bone by which its interior is partitioned. Rudiments of parapophyses appear in two small elevations on the first two vertebræ; and close by them are depressions, with which the heads of the last two movable ribs on each side articulated. From the third to the sixth vertebra, and from the tenth to the fourteenth, rudimental ribs, or pleurapophyses, are anchylosed at their expanded ends to the corresponding centra, and to strong diapophyses. To the whole extent of this junction of pleurapophyses and diapophyses is united the elongated ilium, which may be regarded as a second or distal portion of one pleurapophysis, developed beyond the rest, and connected with their distal ends, as well as with that of its own proximal portion. The ischium is united to the distal portion of the ilium, and the os pubis to that of the ischium, whence it curves inwards to complete the pubic arch; this hæmal arch being probably formed by two hæmapophyses, of which the os pubis represents that of a vertebra succeeding the one to which the ischium appertains.

GROUP III.

MAMMALIA.

607. Upper Dorsal Vertebra of a Rhinocerus (R. Indicus).

608. Dorsal Vertebræ and Ribs of the same Rhinocerus.

609. Lumbar Vertebra of the same Rhinocerus.

609a. Two Vertebræ of a Horse. 28. 215

609b. Cervical Vertebra of a Camel. 28. 217

610. A Vertebra from a Porpoise (Phocæna communis). The centrum consists of two thin plates of bone, separate from, but fitting, the surfaces of an intermediate thick disk. In this condition it permanently represents the usual mode of ossification of the bodies of vertebræ in Mammalia; namely, from three centres, of which one forms the chief mass of the body, and the others its terminal and articulating surfaces. The neurapophyses ascend from the middle piece of the centrum, and are united at their junction with a long neural spine. Equally long parapophyses extend straight outwards from the sides of the centrum. 28. 19

611. A similar specimen. 28. 183

612. A Whale's Vertebra. 28. 185

613. The first and second Cervical Vertebræ of a Lioness. 28. 156

614. A Scapula, Humerus, and Radius of a Rhinocerus (Rhinocerus Indicus). 191, 193, 194

615. The Innominate Bone, Femur, Tibia, and Fibula of a Rhinocerus (Rhinocerus Indicus). 195, 196, 197, 198

616. Bones of the Extremities, Pelvic, and Shoulder Girdles of a Horse. 215

617. Bones of a Camel (C. Bactrianus), namely, the Pelvis, Radius and Ulna, Carpus and Femur. 28. 222

618. Scapula of a Lion. 158B

619. The Pelvis and Caudal Vertebræ, with the Femora, of Lioness. 28. 157

620. Bones of the Fore-leg of a Cat. 28. 171

621. Scapula of a Walrus. 28. 175

622. Pelvis of a Rabbit. 28. 243

623. Articulated Bones of the Fore-leg of a Rabbit. 28. 244

624. Bones of the Fore-leg of a Hedgehog. 28. 118

625. Bones of the Fore-leg of a Monkey.

SERIES IX.

THE ARTICULATIONS OF THE SKELETON.

626. Part of the base of a Skull with the Superior Cervical Vertebræ. The spinal canal is laid open from behind; the occipito-axoidean ligament is turned down, exposing the transverse ligament of the atlas and the three odontoid ligaments, two lateral and one median, proceeding from the odontoid process to the occipital bone. 29. 2

627. Section of Dorsal Vertebræ showing the articulations of the ribs with the spinal column.

628. Section of a Spine in the lumbar region, showing the ligamenta subflava.

629. Portion of a Spine from the lumbar region, showing the articulations of the vertebræ, and especially the oblique decussating tendinous fibres composing the outer layers of the intervertebral fibro-cartilages. The superficial layers of fibres are removed from between the two upper vertebræ.

630. Sections of two Pubic Bones and their Symphysis. Bristles are passed into a narrow cavity in the middle of the symphysis. 29. 3

From a woman who died shortly after parturition.

631. A similar specimen, with the cavity displayed. 29. 4

632. A similar specimen. Considerable mobility existed between the two bones; and the sacro-iliac symphyses were similarly, though less, loosened. 29. 5

633. A Temporo-maxillary Articulation, with its interarticular fibro-cartilage. Two completely distinct synovial cavities are separated by the cartilage. 29. 6

634. A preparation of the chief Ligaments of the Lower Jaw; namely, the internal lateral, pterygo-maxillary, stylo-maxillary, and stylo-hyoid. 29. 6A

635. An Elbow-joint. Bristles are passed under the lateral ligaments. The orbicular ligament is divided in front and reflected in two portions. The tendon of the biceps is left attached to the tubercle of the radius; just below it, the oblique ligament passes from the radius to the ulna. 29. 7

636. A longitudinal section of the Humerus and Ulna at the Elbow-joint.

637. A Wrist-joint, in which are shown the triangular fibro-cartilage at the end of the ulna, the posterior, external lateral, and annular ligaments, and the synovial cavities between the carpal and metacarpal bones. **29.** 8

638. A Hip-joint, with the synovial and fibrous layers of its capsule separated. **29.** 9

639. A Knee-joint, dissected to show the external ligaments and the tendons contiguous to the articulation. **29.** 16

Presented and dissected by Anthony A. Bowlby, Esq.

640. A Knee-joint, with the crucial ligaments exposed and dissected. **29.** 10

641. A Knee-joint, with the semilunar cartilages, the inferior attachments of the crucial ligaments, and part of the bursa beneath the ligament of the patella. **29.** 11

642. Part of the Synovial Membrane round a Patella, with its blood vessels minutely injected. **29.** 12

643. Dissection to show the Subcrureus muscle and its attachment to the synovial membrane of the knee-joint.

Presented and dissected by J. W. Cockerill, Esq.

644. Part of a Tarsus, showing the ligaments connecting the os calcis with the os naviculare and os cuboides. **29.** 13

645. The Ligaments of the ankle-joint.

Dissected by C. J. Heath, Esq.

646. A dissection of the Dorsal and Plantar Ligaments of the Tarsus.

647. A Horse's Foot, with its principal ligaments and tendons dried. **29.** 14

648. A similar specimen, in which the blood vessels are injected. **29.** 15

SERIES X.

THE MOUTH AND TONGUE.

649. Portion of the walls of a Mouth, displaying the papillary surface and vascularity of the mucous membrane of the lips and cheek. 8. 1

650. Portion of an Upper Jaw, displaying in the mucous membrane of the hard palate and the gum the same kind of papillæ and the same vascularity as are shown in the preceding specimen. 8. 2

651. A Tongue, on which, together with its general form and connections, are shown the several kinds of papillæ. The upper surface of the tongue, its edges, and part of its inferior free surface, are covered with minute, uniform, cylindrical, and conical papillæ, "papillæ conicæ vel filiformes." Near the posterior part of the tongue, in two lines forming an angle with its apex directed backwards, are eight larger bodies, named "papillæ circumvallatæ." Each consists of a circular flattened elevation of the mucous membrane surrounded by a ring, from which it is separated by a narrow fossa. Both the elevation and the ring consist of close-set papillæ, like the "papillæ conicæ." Over the front part of the tongue, especially near its sides, are other papillæ, named "papillæ fungiformes," which are narrower at their bases than at their summits, and are covered with much thinner epithelium than that which invests the conical papillæ. 8. 3

652. A Tongue, of which the left lingual artery was injected with size and vermilion. Scarcely any of the injection has entered the vessels of the right side of the tongue. 8. 4

653. A similar specimen, in which also the papillæ of the tongue are very distinctly shown. 8. 5

654. A Tongue, with the trunks and principal branches of the glosso-pharyngeal, hypoglossal, and lingual nerves displayed. 8. 6

655. The Lower Jaw, Larynx, and Tongue, partly withdrawn from its sheath, of a Boa Constrictor (Python Sebæ) eight feet long. 8. 12

656. The head of a Green Woodpecker (Picus viridis), with the hyoid bone and tongue. The tongue is very long and slender, and the horny sheath with which, like most birds' tongues, it is tipped, is barbed at its sides with several sharp recurved processes. The hyoid bone has a slender body placed under the base of the tongue, whence its branches or cornua diverge, and extend backwards to

the sides of the vertebral column; then arching forwards over the back of the skull, they again converge, lie in a longitudinal furrow to the right of the middle line, and together enter a canal above the base of the right upper mandible. 8. 7

Presented by Drs. F. J. and A. Farre.

657. Portion of the Palate of an Ostrich, showing the numerous and close-set orifices of the palatine glands. 8. 8

658. The Tongue and Hyoid Bone of a Chameleon. The tongue is extended, as in the act of prehension of food. While at rest it lies retracted in the mouth, but by the action of its muscles it can be in an instant darted from the mouth, and extended to a length nearly equal to that of the creature's body. It is traversed by a central canal, and terminated by an elongated disk, the extremity of which is covered with a viscid secretion, to which the prey adheres while the tongue is retracted into the mouth. 8. 9

Presented by Drs. F. J. and A. Farre.

659. The Tongue and Larynx of a dog, showing a muscle which, composed of two fusiform, fleshy portions, arises on either side from the great horn of the hyoid bone, and is inserted by a single tendon into the front surface of the epiglottis. 8. 10

660. The Tongue and Larynx of a Sheep, showing the same muscle. 8. 11

The two preceding specimens were presented by W. S. Savory, Esq.

SERIES XI.

THE SALIVARY GLANDS.

661. A Parotid Gland, together with its duct, and the smaller and usually separate portion of the gland, named Glandula Socia Parotidis. 9. 1

662. A Parotid Gland injected. 9. 13

663. A Submaxillary and a Sublingual Gland, with their ducts, and a portion of the mucous membrane of the mouth. Some of the ducts of the sublingual gland open into that of the submaxillary gland; others open directly through the mucous membrane. 9. 2

664. Part of the Lower Jaw, with the floor of the Mouth, showing the terminations and orifices of the ducts of the submaxillary glands. 9. 3

The nine following specimens were prepared and presented by Luther Holden, Esq.

665. A Submaxillary and a Sublingual Gland, having their principal ducts injected with mercury. 9. 4

666. The Parotid Gland of a Dog, of which the principal ducts are injected with mercury and the arteries with wax. 9. 5

667. The Parotid Gland and Duct of a Dog. 9. 6

668. The Submaxillary and Sublingual Glands of a Dog, having part of their minute ducts filled with mercury, and their arteries injected with red size. 9. 7

669. A similar preparation dried. 9. 8

670. The Parotid Gland of a Dog dried after the minute injection of its ducts with mercury. 9. 9

671. A similar preparation. 9. 10

672. A similar preparation. 9. 11

673. The Parotid Gland of a Dog, displaying a similar minute injection of its ducts with quicksilver, and of its blood vessels with red size. 9. 12

SERIES XII.

THE ORGANS OF DEGLUTITION: FAUCES, PHARYNX, AND ŒSOPHAGUS.

674. A Tongue, with the soft palate and its arches, and the pharynx laid open from behind. 10. 1

675. A Pharynx, with the prineipal adjaeent parts. Fine injeetion impelled into the right thyroid arteries has filled the small vessels of the right halves of the pharynx, larynx, and thyroid gland, but has not passed into any vessels on the left side. 10. 3

676. Portion of an Œsophagus, displaying, in separated layers, the outer longitudinal, and the inner eircular muscular fibres, and the external surface of the mueous membrane. 10. 4

677. Portion of an Œsophagus and Stomach inverted, and showing the longitudinal folds and finely-wrinkled surfaee of the mueous membrane of the lower part of the œsophagus. 10. 5

678. The Tongue, Lingual Bone, and Pharynx of a Tortoise. The tongue is small, hard, thick, nearly covered with orifiees of small tubes. The lingual bone presents an elongated median body, and two long cornua. The pharynx is very large and simple. The glottis is widely opened. 10. 10

679. The corresponding organs in a Land Tortoise (Testudo). The tongue is eovered with long, soft, filiform papillæ. 10. 11

680. Part of the Œsophagus of a Turtle (Chelone Midas), inverted so as to show the strong reeurved and sharp-pointed eonieal proeesses with whieh its inner surfaee is beset, and whieh serve to keep baek during deglutition the slippery vegetable food on whieh the animal subsists. 10. 12

681. Part of the Œsophagus of a Boa. In its contracted state its eavity appears less than half an ineh in diameter, but it admitted of dilatation to the extent of three or more inches in diameter. 10. 13

682. The Tongue, and part of the Pharynx of an Ostrieh (Struthio Camelus), with the aperture of the glottis exposed. The tongue is of simple form, broad and short, deeply wrinkled and covered with thick eutiele, whieh is eontinued, growing thinner as it proeeeds, over the wall of the pharynx. In the wall of the pharynx are strong, eonical, eurved, and pointed proeesses. 10. 7

683. The Crop of a Pigeon, showing the changes it undergoes during the rearing of the young. When the crop was removed the young pigeon was eighteen days old. **10.** 14

684. Crop of a Cock Pigeon turned inside out, showing the changes it undergoes during the rearing of the young. The bird from which this was taken was the mate of the hen which furnished the last specimen. **10.** 15

685. The Fauces, Pharynx, and Larynx of a Calf. The soft palate has no uvula. **10.** 6

SERIES XIII.

THE STOMACH.

686. A Stomach inflated and dried, so as to show its natural size and form when fully distended. 11. 1

687. A Stomach, which, after similar inflation, has been divided into two parts by a vertical section from left to right. The œsophageal opening lies in the posterior section; the pyloric in the anterior. 11. 2

688. The Stomach of a Fœtus at full period, inflated and dried. Its fundus (greater or left end) is rather less developed, and the curve, from its greater or inferior border to the pylorus, is more nearly simple, than in the adult human stomach. 11. 3

689. A Stomach. The removal of its upper or lesser arch displays the numerous folds or wrinkles of mucous membrane that proceed tortuously, but in a general longitudinal direction, from the fundus to the pylorus. 11. 4

690. The Stomach of a Child, inverted after the minute injection of the blood vessels of its mucous membrane. 11. 7

691. Fœtal Stomach, injected and turned inside out, to show the extreme vascularity of its lining membrane.

From the Collection of J. R. Farre, Esq., M.D.

692. Portion of the Stomach and Duodenum, showing the narrow and nearly circular orifice of the pylorus. 11. 8

693. A longitudinal section of part of a Stomach and Duodenum, showing the size and form of the pylorus, the gradual thickening of the muscular coat of the stomach traced towards that opening, and the strong band of circular fibres which, like a sphincter, surround it. 11. 9

694. Portion of a Stomach and Duodenum, through which a longitudinal section has been made by the side of the pylorus, so as to show both its opening and the arrangement of the muscular fibres around it. 11. 10

695. Portion of the Stomach of a Child, in which, scattered beneath the mucous membrane of its lesser arch, numerous small bodies, like Peyer's glands, appear. 11. 11

696. The Stomach of a Lobster (Astacus marinus). Its walls support three hard tubercles of calcareous substance. By these, as gastric teeth, the food is broken and divided before passing into the intestines. The two lateral tubercles are moved so as to break the food upon the middle one. 11. 40

697. The Stomach, termination of œsophagus, and commencement of the intestine of a young Crocodile (Crocodilus Acutus), which measured about two feet in length. Between the pylorus and duodenum is a small pouch, somewhat similar to that in the heron. **11.** 44

698. Portion of the Proventriculus of the Ostrich (Struthio Camelus), displaying the gastric glands, arranged in a longitudinal band. Each gland is of large size, and presents a wide open orifice, and, at the cut edge of the specimen, a deep sacculated or lobed cavity. The bases of the glands rest on the muscular coat, and, in the upper part of the specimen, are exposed by its removal. **11.** 30

699. The lower part of the Œsophagus, with the Proventriculus, Gizzard, and part of the Small Intestine, of a Fowl (Gallus domesticus). The mucous membrane of the lower part of the œsophagus is thin and longitudinally folded, and presents numerous minute orifices of glands. In the proventriculus the mucous membrane becomes gradually much thicker and more vascular, and presents a broad ring of large gastric glands, opening on the summits of vascular papillæ. The muscular coat of the proventriculus is also thicker than that of the œsophagus. The cavity of the gizzard is laid open by the division of one of the middle tendons by which its two strong muscles are connected. These muscles are shown with the expansions of the tendons over their outer surfaces. The œsophagus and duodenum open into the upper part of the cavity which the muscles enclose. The flat sides of this cavity are lined with a thick and hard substance, like hard cuticle; its upper and lower parts, over which the tendons lie, are covered with a cuticle of the same kind, but thinner and softer. The mucous membrane of the intestine is very vascular, and covered with long slender villi. **11.** 29

700. The Stomach with the Œsophagus and Crop of a Kite (Milvus vulgaris s. ictinus) inverted. The mucous membrane of the upper part of the œsophagus, and of the crop, which is formed by partial dilatation of its wall, appears of nearly simple structure, presenting only a few small apertures like the orifices of gland-ducts. In the lower part of the œsophagus such orifices are much more numerous; and they become more so as the œsophagus approaches the proventriculus, into which it dilates, and which, with thicker walls, presents a more marked glandular structure. The gizzard, placed beyond the proventriculus, and separated from it by a slight constriction, is lined with simple mucous membrane. The pyloric orifice is small and plicated, and the duodenum covered with villi. **11.** 28

701. The Stomach of a Heron (Ardea Cinerea) laid open. Its shape is uniform, but the distinction between the glandular and pyloric portions is well defined in the interior by an abrupt change in the mucous membrane. The pyloric orifice leads into a small globular pouch, from which the duodenum arises. **11.** 43

702. The Stomach of a Fœtal Calf, as an example of the stomachs of Ruminants. The œsophagus, of comparatively small size, opens into a large cavity, called the rumen or paunch, which presents at its upper part, next to the œsophagus, two large chambers, or recesses from its main cavity, and at its lower part, two of smaller size. At its upper part the rumen opens, with a wide aperture, into a smaller cavity, with a reticular internal surface, named reticulum, or honeycomb-bag. A portion of the wall being removed from the reticulum, exposes both its opening into the œsophagus and also a muscular groove or canal, leading from the œsophagus to a third cavity, with a very deeply-plicated internal membrane, named psalterium or manyplies. Several of the deep

crescentic folds projecting into this cavity are shown by the removal of part of its wall; through which also is shown its large valvular aperture of communication with the fourth cavity of the stomach, the abomasum or rennet. In the ruminants, the food, after a first mastication, passes into the rumen; thence, being in portions transferred into the reticulum, it is from it regurgitated through the œsophagus. After a second mastication, it is conveyed through the œsophagus into the psalterium. For the muscular fibres of the groove or canal already referred to as extending between the orifices of the œsophagus and psalterium, being dilated, permit these orifices to lie (as in the preparation) far apart, and in this position the œsophagus opens directly into the rumen; but when, in the swallowing of the food masticated a second time, the same fibres contract, they move away from the œsophagus the orifices of the rumen and the reticulum, and bring into direct continuity with it the orifice of the psalterium. From the psalterium the food, having undergone the digestive action of its secretions, passes into the abomasum, where its gastric digestion is completed. Into this cavity, which has a simple elongated oval form, the milk of the suckling calf passes directly from the œsophagus, being subjected neither to rumination nor to the digestive action of the psalterium, the plicæ of which remain in contact so long as the young animal subsists on milk. **11.** 23

703. The Stomach of a Rat (Mus decumanus). The cardiac portion forms more than half the cavity of the stomach, the œsophagus entering at nearly the middle of the upper or lower arch. To the right of the œsophagus the stomach appears encircled with a line which marks the termination of the thick epithelium covering its cardiac portion. **11.** 21

704. The Stomach of a Rat (Mus decumanus). The muscular tunic of the pyloric portion terminates by a well-defined border about midway between the two extremities. **11.** 42

705. The Stomach of a Squirrel (Sciurus vulgaris). **11.** 45

SERIES XIV.

THE INTESTINAL CANAL.

706. Portion of Small Intestine, of which the outer longitudinal and the inner circular layers or coats of muscular fibres are separated and displayed. 12. 2

707. Portions of Small Intestine, dried after inflation of the cellular tissue connecting its several coats. 12. 3

707a. A portion of Duodenum inflated and dried. The valvulæ conniventes in several instances entirely surround the canal. 12. 54

708. Portions of Jejunum and Ileum inverted. They show the respective characters of the mucous membrane in each of these portions of the intestinal canal. In both it is covered with villi; but these are arranged more closely, and are larger and more prominent, in the jejunum. The mucous membrane of the ileum is smooth, with the exception of a few short and low transverse folds; that of the jejunum is thrown into wide overlapping folds or plaits, named valvulæ conniventes, which extend round nearly the whole circumference of the canal. 12. 4

709. Portion of Jejunum, displaying the arrangement of valvulæ conniventes. The larger folds, which nearly encircle the canal, are connected by smaller longitudinal and oblique folds of the mucous membrane. 12. 5

710. Portion of Jejunum spread open. Many of the valvulæ conniventes extend quite round the canal, and in most instances the free margin of one of them overlaps the attachment of the next below it. 12. 6

711. Portion of Jejunum, of which the valvulæ conniventes are remarkably developed. Besides being very large and close-set, many of them present small processes extending from their free margins and surfaces into the cavity of the intestine. 12. 7

712. Portion of Jejunum, in which the solitary glands are very prominent. 12. 8

713. Portion of Cæcum, exhibiting an appearance of the orifices of numerous small gland ducts opening on the surface of its mucous membrane. The orifices are especially numerous on the margins of the ileo-cæcal valve. 12. 9

714. Portion of Jejunum, displaying, in the bright redness of the mucous membrane after the injection of its blood vessels, its great vascularity. The villi are long and turgid. 12. 10

715. Portion of Jejunum, inverted and dried after the injection of its principal blood vessels. The arborescent arrangement of the arteries, while, after diverging from the mesentery, they proceed round the intestine, is distinctly shown. **12.** 11

716. A similar specimen. **12.** 12

717. Portion of a Colon, exhibiting a similar arrangement of its arteries. Their principal trunks diverge from two lines corresponding with the attachments of the great omentum and the mesocolon. **12.** 13

718. Part of a Rectum, with its large and tortuous veins injected from the trunk of the inferior mesenteric vein. **12.** 14

719. Portion of Jejunum, of which the veins are partially filled with a milky fluid, like chyle. **12.** 15

720. A similar Specimen. **12.** 16

These specimens were taken from the body of a middle-aged woman brought for dissection. The veins in the coats of nearly the whole length of the jejunum and ileum contained a similar milky fluid, which could be easily pressed from them, along their converging canals, to the larger branches of the superior mesenteric vein. The blood of the mesenteric vein also could be pressed down and mingled with the chyle-like fluid of the smaller veins. In different parts of the small intestine were four or five white patches, apparently produced by chyle effused between its coats; but these were in only a few parts, while the veins containing the chyle-like fluid were seen on all parts of the small intestines. The lacteals in the mesentery were not evidently turgid with chyle. Of the mesenteric glands, some appeared healthy, others were changed in structure, and decidedly diseased. (From Mr. Stanley's notes of the examination of the body, March, 1823).

721. The end of an Ileum, with the Cæcum and its Vermiform Appendix. The removal of part of the walls of the cæcum displays the ileo-cæcal valve, and the orifice of the appendix. The lanceolate form of the orifice of the valve is shown, as well as its projection into the cavity of the cæcum on the edge of a deep transverse fold, and its nearly transverse position with its apex directed upwards and to the left. **12.** 17

722. A similar specimen, dried. It shows more distinctly than the former how the two portions of the valve are formed by the projection of the walls of the ileum into the cavity of the cæcum. **12.** 18

723. The lower part of the Small Intestine, the Cæcum, and part of the Colon from a lad who was run over and killed during digestion. The specimen shows well the "solitary" and agminate glands, both of which are especially numerous and well developed immediately above the ileo-cæcal valve. **12.** 55

724. An Ileum and Cæcum, with the ileo-cæcal valve shown in section. The Peyer's and solitary glands of the ileum are well marked. **12.** 21

725. The Stomach and Intestine of a Skate (Raia Batis). The stomach presents a large cardiac portion, and a much smaller pyloric portion proceeding from it at an acute angle. The pylorus, with an abrupt bend, leads into a short intestinal canal, within which the mucous membrane is arranged in the form of a spiral valve, the several turns of which are nearly transverse, and lie close together. **12.** 47

726. The Duodenum of a Salmon, with its numerous cylindriform "appendices pyloricæ," injected with wax and dried. These appendices, or blind tubular prolongations, have been regarded as forming the homologue of a pancreas. **12.** 50

727. Portion of the Small Intestine of a Turtle (Chelone Midas). Its mucous membrane is arranged in undulating longitudinal folds, like valvulæ conniventes, extended in the direction of the axis of the intestine. 12. 39

728. Similar specimens, with the blood vessels injected. 12. 40 and 41

729. Portion of the Small Intestine of a Turtle, with the strong circular muscular coat exposed. 12. 42

730. Portion of the Large Intestine of a Turtle. Its mucous membrane is arranged in longitudinal folds or ridges, and appears highly vascular. 12. 43

731. Portion of the Duodenum of a Turtle, displaying its very thick circular muscular coat, and the reticular arrangement of the folds of its mucous membrane. Bristles are placed in the biliary and pancreatic ducts. 12. 44

732. Portion of the Small Intestine of an Ostrich, displaying its large, flat, and very vascular villi. 12. 35

733. Termination of the Small and the commencement of the Large Intestine of a Heron (Ardea Cinerea), showing the single small conical cæcum. 12. 51

734. Portion of the Small Intestine and the Cæca of a Fowl. The mucous membrane of the small intestine is covered with short, thick-set villi; its canal becomes rather smaller where it opens into the rectum between the cæca; and it has here a valvular orifice. Each of the cæca is about eight inches long. Their mucous membrane, less vascular than that of the small intestine, is covered with villous processes in the part near their junction with the rectum, but in the rest its extent is simple and smooth, or but slightly wrinkled. 12. 36

735. Portion of Small Intestine from a Dog. The villi and glands are greatly developed. The former give the internal surface of the intestine a woolly appearance; of the latter, some are solitary, the rest in clusters or patches. The patches, corresponding with the Peyer's glands of the human intestines, present numerous deep small pits between intersecting ridges of mucous membrane, and at the bottom of each pit a small opaque white spheroidal body, like the isolated acinus of a gland. 12. 24

736. A similar specimen, displaying especially the long villi of the dog's intestine. 12. 25

737. A similar specimen, in which many of the villi are white with the chyle contained in them. 12. 26

738. Termination of the Small and the commencement of the Large Intestine of a Dog (Canis familiaris), showing an abnormal condition of the Cæcum. The lower end of the ileum is entirely occupied by Peyer's glands. 12. 53

739. Cæcum of a Squirrel (Sciurus vulgaris). 12. 52

740. The end of the Ileum with the Cæcum and part of the Colon of a Rat. The cæcum is large in comparison with both the ileum and the colon, but is of simple form and not sacculated. 12. 32

741. The end of the Ileum and the Cæcum of a Monkey. They have nearly the same form as in man, but there is no appendix of the cæcum. 21. 27

SERIES XV.

THE LIVER AND GALL-BLADDER.

742. The larger Blood Vessels of a Liver, injected and exposed by corroding and washing away its other component parts. **13. 1**

743. Portion of the Surface of a Liver, displaying the stellate mode of branching of the interlobular branches of the portal vein. **13. 2**

744. A similar specimen. **13. 3**

745. Section of a Liver, in which the portal vein was injected with red, and the hepatic vein with blue material. The portal plexuses, formed of capillaries derived from the portal vein, are arranged around the borders of the lobules of the liver; they enclose small spaces, in the centre of each of which a small blue spot indicates the section of one of the intralobular branches of the hepatic vein. **13. 4**

746. A similar specimen, in which also the mode of branching of the intralobular veins is shown. **13. 5**

747. A similar specimen, from the Liver of a Cat. **13. 6**

The three preceding specimens were presented by Francis Kiernan, Esq.

748. A Duodenum, with the biliary and pancreatic ducts. A bougie is placed in the former duct, and a bristle in the latter; they open with a common orifice, at the summit of a papilla, in the second portion of the duodenum. **13. 12**

749. Liver of a Boa Constrictor (Python Sebæ) eight feet long. It illustrates well the elongated form assumed by the organs in the Ophidia. **13. 13**

750. The Gall-Bladder of a Boa Constrictor (Python Sebæ). **13. 14**

751. The Liver of a Rat from Cuba (Capromys Fournieri). It is constructed of very numerous and separate small polygonal lobes. **13. 7**

SERIES XVI.

THE PANCREAS.

752. A Pancreas, displaying its external form, and the arrangement of its lobes. 14. 1

753. A Pancreas dried after the injection of its principal ducts. 14. 2

754. A similar specimen. 14. 3

SERIES XVII.

THE ORGANS FOR ABSORPTION OF NUTRIMENT; LACTEAL AND LYMPHATIC VESSELS AND GLANDS.

755. Portion of Small Intestine, with its mesentery, in which the principal lacteal vessels are full of chyle. The veins are injected with some blue material. 15. 1

756. A similar specimen. 15. 2

757. Part of the Surface of a Liver, in which the lymphatics are filled with mercury. The beaded form of the vessels derived from the constrictions in the situation of their valves is distinctly shown. 15. 3

758. The Lymphatic Trunks of a Gall-Bladder filled with mercury. 15. 4

759. Part of a Spleen, with its lymphatic vessels similarly filled. 15. 5

760. Large Lymphatic Vessels, filled with mercury; they were probably seated in the subcutaneous tissue. 15. 6

761. A similar specimen. 15. 7

762. Large Lymphatic Vessels and Glands filled with mercury. The form and arrangement of the valves of the lymphatics may be discerned by the constrictions of their walls. Each large lymphatic, when, as an afferent vessel, it reaches the lymphatic gland, divides into several branches, which run on the surface of the gland, and subdividing give origin to the plexus of minute vessels of which the greater part of the gland appears composed. From this plexus are derived other and larger efferent lymphatics, which leave the gland in the same manner as the afferent vessels enter it, but proceed from it in the opposite direction. 15. 12

763. A similar specimen. 15. 13

764. A similar specimen, in which both the afferent and the efferent vessels are well shown. 15. 14

765. Portion of Small Intestine, with its mesentery, in which the lacteal vessels are displayed entering and leaving mesenteric glands, in the manner above described. 15. 15

766. A similar specimen. 15. 16

767. Portions of the Small Intestine of a Turtle, with their abundant lacteals minutely filled with mercury. 15. 9

768. A similar specimen, in which also the course of the lacteals in the mesentery is shown. 15. 10

769. The Femoral Lymphatic Vessels and Glands of a Horse filled with mercury. 15. 18

770. The principal Lymphatic Vessels and Glands of the lower extremity of a Horse. 15. 19

SERIES XVIII.

THE GLANDS WITHOUT DUCTS, OR VASCULAR GLANDS; THE SPLEEN, THYROID AND THYMUS GLANDS, AND SUPRA-RENAL CAPSULES.

771. The Blood Vessels of a Spleen filled with wax, and exposed by macerating and washing away the rest of its substance. 16. 1

772. Part of a Spleen, macerated after the removal of its capsule. By thus washing away the pulpy substance formed of nuclei and cells, together with the blood and lymph contained in the spleen, a cellular or spongy texture is exposed, which is formed by the close interlacing of fibrous filaments connected with the capsule of the spleen and the coats of its larger blood vessels. The spaces or interstices between the fibres of this spongy substance are called the cells of the spleen. 16. 4

773. A similar specimen. 16. 5

774. A similar preparation of the spleen of a Horse with the arteries injected. 16. 3

775. A similar preparation of part of the Spleen of a Calf, dried. 16. 6

776. Part of the Spleen of a Horse, showing the mode of branching of the splenic artery and vein. The branches of both vessels form nearly right angles with the trunks, and are small in comparison with them. Bristles are placed in the branches of the artery; those of the vein are laid open; both may be traced for some distance into the substance of the spleen, in which, at length, their minute branches cannot be distinguished from the fibrous cords which intersect it. 16. 2

777. The Spleen of a Dog. 16. 17

778. A Thyroid Gland, displaying the usual form of its lateral lobes, and of the middle lobe or isthmus connecting them. A section of the left lobe shows part of its structure. 16. 7

779. A Thyroid Gland, with the larynx and other adjacent parts. Bristles are passed under two slips of muscle, of which one, named Levator glandulæ thyroideæ, extends from the right side of the isthmus of the gland to the body of the hyoid bone, the other from the lower margin of the left ala of the thyroid cartilage to the same bone. 16. 8

780. The Thyroid and Thymus Glands, with the adjacent parts, of a child 9 years old. The thymus gland, which is much larger than is usual at this period of life, consists of two unconnected elongated portions, or lobes, which filled the anterior mediastinum, and extended upwards to the thyroid gland. **16.** 9

781. A Thymus Gland of ordinary size and form. **16.** 10

782. A Supra-Renal Capsule, dried after the injection of its arteries. They are derived from the renal, supra-renal, and phrenic arteries, whence they converge in radiating lines towards the borders of the capsule. **16.** 11

783. Specimens illustrating the development of the Thyroid Body. **16.** 12

No. 1. Thyroid Body from a Fœtus $3\frac{9}{10}$ inches long.
No. 2. ,, ,, $4\frac{3}{10}$,,
No. 3. ,, ,, $4\frac{6}{10}$,,
No. 4. ,, ,, $6\frac{4}{10}$,,

784. Specimens illustrating the development of the Thyroid Body. **16.** 13

No. 5. Thyroid Body from a Fœtal Hare 6 inches long.
No. 6. Thyroid Body from a Human Fœtus $8\frac{7}{10}$ inches long.

785. Thyroid Body from a Human Fœtus 12 inches long. **16.** 14

786. Thyroid Body from a Fœtal Rabbit $\frac{8}{10}$ of an inch long. **16.** 15

787. Thyroid Body from a Fœtal Pig $1\frac{2}{10}$ of an inch long. **16.** 16

The above specimens were presented by G. W. Callender, Esq.; *vide Proceedings of the Royal Society*, No. 96, 1867.

SERIES XIX.

THE HEART.

788. A Heart, with the Aorta and Venæ Cavæ, and some of their principal branches injected with wax and dried. They are placed in the position which they occupy when the body is erect. 17. 1

789. A Heart, with the large arterial and venous trunks, dried after the injection of their cavities with wax. 17. 2

790. A similar specimen: the right auricle and ventricle, the venæ cavæ and the pulmonary artery being filled with dark yellow wax; and the left auricle and ventricle, the pulmonary veins and the aorta, with red wax. 17. 3

791. A Child's Heart, with the large vessels similarly prepared. 17. 5

792. Casts in Wax of the four cavities of a Heart; those of the right side in yellow, those of the left in red wax. 17. 6

793. A Heart, with its cavities and principal vessels laid open, so as to display their forms, relative positions, and modes of communication. 17. 7

794. A Heart, in which the Eustachian valve at the opening of the vena cava inferior into the right auricle, and the valve at the opening of the coronary vein into the same cavity, are distinctly shown. The tricuspid and mitral valves are spread out. 17. 8

795. Portions of Adult Hearts, in both of which the foramen ovale in the septum of the auricles has remained open. The opening is in both instances oblique, valvular, one margin overlapping the other, and situated at the anterior part of the fossa ovalis. 17. 9

796. Section of a Heart. The tricuspid valve is depressed, and in the position which it assumes while the blood is flowing through the open orifice of communication between the right auricle and ventricle. The bicuspid or mitral valve is raised, so as to close the orifice of communication between the left auricle and ventricle, as it does while the left ventricle is propelling blood into the aorta. 17. 10

797. A Mitral Valve, with the ring of muscular and fibrous substance to which its attached border is connected, and the tendinous cords by which its free border and inferior surface are fastened to the fleshy columns of the left ventricle. 17. 11

798. Portion of an Aorta, with its semilunar valves closed. Parts of their surfaces, as well as their free borders, are in contact. 17. 12

799. Portions of Aorta and Pulmonary Artery. The semilunar valves of the aorta are closed as in the preceding specimen; those of the pulmonary artery are open. 17. 13

800. A Heart, with the coronary arteries and veins injected and dried. 17. 14

801. A Human Heart dissected to show the valves. 17. 23

802. The Tricuspid Valve from a Human Heart. 17. 24

803. The Ventricles of a Human Heart after prolonged boiling. The auricles and vessels were easily detached without dividing any muscular fibres. The anterior cusp of the mitral valve having been removed, the aortic aperture is shown to be continuous with the left auriculo-ventricular: no muscular tissue of the ventricle intervening. The pericardium having been removed, the direction of the superficial fibres of the ventricles is seen. 17. 25

804. The left Ventricle of a Human Heart, with the commencement of the aorta and the lower portion of the left auricle. A vertical section has been made through the posterior wall of the ventricle to show the attachment of the posterior cusp of the mitral valve, and the relation of the anterior cusp of the mitral valve to the posterior wall of the aorta. 17. 26

805. The commencement of the Aorta laid open with the anterior cusp of the mitral valve. The section has been carried through the anterior aortic valve, a portion of which adjacent to the vessel is seen passing over and resting upon the upper border of the left ventricle. Below the semilunar valves the ventricular surface of the anterior cusp of the mitral valve is seen. 17. 27

806. The base of the Ventricles dissected to show the origin of the fibres from the tendinous rings in the auriculo-ventricular orifices. 17. 38

807. Heart of a small Sea-angler (Lophius Piscatorius). The auricle is very thin-walled, and opens into the middle of the posterior part of the cavity of the ventricle, the aperture being guarded by two semilunar valves. Two similar valves are placed between the ventricle and the bulbus arteriosus. The interior surface of the bulbus arteriosus presents numerous longitudinal ridges, raised by bundles of muscular fibres, very like the "musculi pectinati" of a human right auricle. 17. 22

808. The Heart and Aorta of a Shark. The cavity of the single ventricle is laid open, and the section is continued through the bulbus arteriosus, so as to show its strong muscular walls and its three rows of semilunar valves. The edges of the valves of the lower rows are connected with the valves above them by tendinous cords; those of the upper row are free. Immediately behind the aorta is the large single auricle. 17. 21

809. Heart of a Pike (Esox Lucius).

810. Heart of a young Crocodile (Crocodilus Acutus). The septum between the ventricles is incomplete at its base. 17. 34

811. The Heart of a Boa Constrictor (Python Sebæ), eight feet long. 17. 35

812. The Heart and Large Blood Vessels of an Ostrich. At the orifice between the right auricle and ventricle are two strong muscular valves. The single pulmonary artery has three membranous valves. At the orifice between the left auricle and ventricle are two membranous valves. The large arteries, into which the left ventricle impels its blood, are the left and right arteriæ innominatæ, from which the subclavian and carotid arteries arise, and the aorta, which arches towards the right behind the venæ cavæ and over the right bronchus and pulmonary vessels. 17. 18

813. The Heart of a Condor Vulture, with its several cavities, and its auriculo-ventricular valves displayed as in the preceding specimen. The muscular substance of the heart and of the right semilunar auriculo-ventricular valve is very strong, and the walls of the ventricles are thick in proportion to their capacities, and more nearly of equal thickness than in the hearts of mammalia. 17. 19

814. Heart of a Porpoise. Apertures have been cut into the various cavities to show the origins of the main vessels.

815. The Heart and Large Vessels of an Elephant, injected and dried. Three venæ cavæ terminate in the right auricle. 17. 16

816. The left half of the commencement of the Aorta, with the adjacent portions of the left Ventricle and Auricle, from the Heart of an Ox. In front the section has been carried through the anterior aortic valve, and shows the broad basis of muscular tissue formed by the upper border of the ventricle, over which more than half of the semilunar valve passes, and upon which it rests. Behind, the section has been carried through the anterior cusp of the mitral valve, the formation of which is shown. It is seen to be continued down from the posterior wall of the aorta; while immediately behind the vessel the anterior wall of the left auricle, passing down, is attached to the posterior wall of the aorta and the upper border of the valve. 17. 28

817. Portion of the commencement of the Pulmonary Artery of an Ox. Two of the semilunar valves have been divided through the centre to show the broad basis of muscular tissue formed by the upper border of the right ventricle upon which a large portion of the valves is supported. 17. 29

818. Two large and two small Bones from the Hearts of Oxen. The large bones especially are seen to vary much in shape. 17. 30

819. The two Heart Bones of an Ox in their natural position, together with the adjacent parts, viz., the commencement of the aorta, the border of the left ventricle surrounding the vessel in front and at the sides, and the anterior cusp of the mitral valve. Behind, above the mitral valve, the extremities of the bones are observed almost to meet near the centre. They are seen projecting into the base of the pouches of the two posterior semilunar valves. The fibres of the ventricular septum are attached to the lower border of the anterior portion of the larger bone. Along the posterior wall of the aorta the termination of the anterior wall of the left auricle is seen. In the wall of the aorta are the orifices of the two coronary arteries. The muscular floor of the anterior aortic valve is also shown. 17. 31

The two preceding specimens were prepared by Mr. Savory.

820. The Vestibule of the Heart of a Sheep. The superficial layer of muscular fibres is dissected to show the vortex of the right ventricle. A piece of glass rod is inserted where the fibres turn inwards. 17. 37

821. Heart of the Hairy Armadillo (Dasypus Conurus). 17. 32

SERIES XX.

THE ARTERIES AND VEINS.

822. Portion of an Aorta, with its coats dissected. Part of the outer coat, composed of fibro-cellular tissue, mingled with elastic tissue, is separated and turned downwards. Above this the middle coat is similarly shown: it is composed of elastic mingled with muscular tissue, the fibres of which are, for the most part, arranged transversely to the axis of the artery. The outer surface of the internal or longitudinally fibrous coat is exposed, and its smooth compact texture shown: on its inner surface it bears the epithelium. **18.** 1

823. Portion of an Aorta inverted, and with its internal coat separated and turned downwards. **18.** 2

824. Portion of an Aorta, of which the middle or muscular and elastic coat is split into several layers. **18.** 3

825. Portion of the Splenic Artery of a Horse. When, shortly after the horse's death, the muscular coat of the artery was contracted, so that the canal of the artery was very nearly closed, the outer or cellular and the elastic coats were separated and turned aside. The canal of the artery was then cut open, and the muscular and internal coats laid flat. The contraction of the muscular coat is shown both by its wrinkling, and by its being now so much narrower than the elastic and cellular coats, which expanded when they were separated from it. **18.** 4

826. The Great Arterial Trunks of a Turtle. They were cut across near the heart during life, and their canals were closed by the contraction of their strong muscular coats. **18.** 5

827. The Spermatic Artery of a Horse, injected and dried so as to show its remakably tortuous and convoluted course. **18.** 6

828. A similar preparation of the Spermatic Artery of a Bull. **18.** 7

829. A similar preparation from a Bull, in which is shown also the convoluted arrangement of the spermatic artery on the tunica vaginalis testis. **18.** 8

830. Sections of the Spermatic Artery of a Bull, dried after injection with mercury. The various sections of the close convolutions of the single tube give an appearance of a cellular or cavernous structure. 18. 9

831. The Plexus, or Rete mirabile, formed by the branches of the vertebral arteries of a Calf. 18. 10

832. Portion of a Femoral Vein, laid open so as to show the general aspect of its coats and valves. Two pairs of large crescentic valves are shown in the main trunk of the vein, and another pair closing the orifice of a large vein opening into it. 18. 11

833. Portion of the Jugular Vein of a Horse inverted. At its upper part three crescentic valves are placed on the same level: and at its lower part two valves of larger size. 18. 12

834. The Body of a Child dissected to display the principal arteries and veins. The aorta and its branches are injected with red: the venæ cavæ and their branches with blue; the vena portæ with yellow. 18. 13

835. Part of a Spine, with the arch and thoracic portion of an aorta, the carotid and subclavian arteries, the venæ innominatæ, vena cava superior, and vena azygos. 18. 14

836. A similar preparation, in which, besides the above named vessels, the thoracic duct, and many of the intercostal arteries and veins are shown. 18. 15

837. A similar preparation, with the Aorta, Thoracic Duct, and Vena Azygos. 18. 16

838. The posterior part of the Walls of a Chest, showing the relations of the aorta to the œsophagus and left bronchus. The bronchial and phrenic arteries are also shown. 18. 17

839. Parts of a Chest, and of the Upper Extremities, with the arch and thoracic portion of the aorta, the arteria innominata, the carotid, subclavian, axillary, and brachial arteries, with their principal branches. 18. 19

840. A similar preparation, but with only the left upper extremity. 18. 20

841. Head and Neck, displaying the common, external, and internal carotid, and vertebral arteries, and all their principal branches.

842. A similar preparation. 18. 23

843. A similar preparation. 18. 24

844. Section of a Head, with the right carotid artery and its principal branches. 18. 25

845. The other section of the same Head, similarly prepared. 18. 26

846. A similar preparation, including the vertebral artery. 18. 27

847. A similar preparation of the arteries of the Head and Face, and of their corresponding veins, including the temporal, internal maxillary, external jugular, facial, and internal jugular veins. 18. 28

848. Parts of a Chest and Head; in which, together with the principal arteries, there are shown, on the right side, the trunks and chief branches of the facial, temporal, lingual, thyroid, and internal jugular veins, and the axillary and subclavian veins, the venæ innominatæ, and vena cava superior. 18. 29

849. The base of a Skull, with the circle of Willis, formed by the anastomosis of the branches of the internal carotid and basilar arteries. The principal cerebral and cerebellar arteries also are shown, as well as the trunks of the vertebral and internal carotid arteries passing tortuously to the base of the skull. 18. 30

850. The Arteries composing the circle of Willis, and the chief branches proceeding from them. 18. 31

851. Parts of a Chest and Upper Extremities, showing especially the subclavian and axillary arteries and their branches. 18. 34

852. An Upper Extremity, with its principal arteries arranged in the most usual manner. 18. 36

853. A similar preparation of both the arteries and the veins of an upper extremity. 18. 38

854. A similar specimen. 18. 39

855. A similar specimen. 18. 40

856. A Fore-Arm and Hand, with their principal arteries. 18. 41

857. Several specimens showing the free anastomosis of small arteries around the elbow joint.

858. Hands, with their arteries injected, showing the course of the palmar arches and their branches. 18. 44

859. A similar specimen. 18. 45

860. A Hand, with its arteries and veins injected with wax. The wax injected by the arteries passed into the veins, apparently without any extravasation. 18. 47

861. A Pelvis, with portions of its contained organs and the trunks and branches of the iliac arteries. 18. 54

862. Portions of a Pelvis and Femur, with the principal branches of the left iliac and femoral arteries and veins. 18. 55

863. The front of a Pelvis, with portions of the urinary bladder and penis. The internal pudic arteries and veins and their principal branches are shown. 18. 58

864. A left Lower Extremity, with its principal arteries. 18. 62

865. A similar preparation, from a Child. 18. 63

866. Part of a Lower Extremity, with the popliteal, tibial, and peroneal arteries and their branches. 18. 65

867. A Foot, with the lower part of a Leg, showing the course and relations of their chief arteries. 18. 66

868. Arterial System of a Dog. 18. 69

869. Arterial System of a Cat. 18. 70

870. Arterial System of a Monkey. 18. 68

SERIES XXI.

ORGANS OF RESPIRATION.

871. A Human Trachea and Larynx, in which the several cartilages are shown suspended from the hyoid bone and connected by their ligaments. By the removal of part of the left ala of the thyroid cartilage, the thyro-arytenoid or vocal ligaments are displayed, in such a position as they would naturally occupy in inspiration. The articulation between the left arytenoid and cricoid cartilages is laid open. **19.** 20

872. A Larynx, showing especially the Crico-arytenoid and arytenoid muscles. **19.** 29

873. A Dissection of the Cartilages of the Larynx. **19.** 20

The two preceding specimens were dissected and presented by Anthony A. Bowlby, Esq.

874. Dried Sections of the Laryngeal Cartilages, showing the attachments of the vocal cords.

875. A Thyroid Cartilage and a Hyoid Bone.

876. Longitudinal Sections of the Tongue, Larynx, Trachea, and surrounding parts.

Dissected and presented by C. B. Lockwood, Esq.

877. Portion of Lung from which, after inflation and drying, the pleura was removed, so as to show the form and arrangement of the air-cells at its surface. **19.** 1

878. A similar specimen. **19.** 2

879. Portion of a Lung of which the blood vessels are minutely injected. **19.** 3

880. Thin sections of a similarly injected Lung, showing the general form and arrangement of the air passages and cells. **19.** 4

881. A corroded preparation of a Heart and Lungs. The trachea, bronchi, and in several places the air-cells, were injected with dark green wax; the right cavities of the heart, and the pulmonary artery and its branches, with brown wax; and the pulmonary veins, the left cavities of the heart, and the aorta and coronary arteries, with red wax. After this injection the tissues of the lung and its vessels were removed by corrosion, maceration, and washing, and the wax remains like a cast of the parts which it filled. **19.** 5

882. A similar preparation, after the injection of both sets of blood vessels with red wax. 19. 6

883. A similar preparation of the Pulmonary Arteries and Veins, after a minute injection of the arteries with red, and of the veins with yellow wax. 19. 7

884. A similar preparation. The arteries were injected with red, and the veins with brown wax. 19. 8

885. A Lung, the bronchi of which have been injected with wax.

886. The branchial Lamellæ and other Organs of an Oyster. The lamellæ are four in number, and of crescentic form. Each consists of a single close-set series of plates, which are severally composed of rows of minute lamellæ set on median bars. 19. 19

887. Branchial Apparatus of a Lobster (Astacus Marinus). 19. 23

888. Branchial Apparatus, with the Heart and principal vessels, of a Poulpe (Octopus vulgaris). 19. 24

889. The principal Organs of Circulation and Respiration of a Calamary (Loligo vulgaris). The systemic heart, irregularly lozenge-shaped, is in the median line. From its anterior and posterior angles proceed large arteries, the anterior and the larger posterior aorta; each of its lateral angles receives a branchial vein. At the base of each branchia is a branchial heart, which receives the blood returning by the great veins, and propels it through the branchial circulation. The branchiæ consist, on each side, of a double series of pinnate laminæ, closely arranged along the borders of a median fusiform stem, each branchia bearing upwards of seventy pairs of plates. 19. 18

Prepared by W. S. Savory, Esq.

890. The Head of a Fish, with the operculum, or gill-cover, and other parts removed from its left side, so as to expose the branchiæ or gills. The branchiæ are composed of narrow, elongated lamellæ, in which branches of the branchial arteries are minutely distributed, and the axes of which are made stiff with cartilage. These lamellæ are close-set on four branchial osseous or cartilaginous plates, which are attached to the four branchial arches of the hyoid bone. 19. 17

891. The Lungs of a Frog (Rana temporaria), inflated after the injection of the pulmonary arteries. They are simple sacs, of ovate form, and the irregularities of their outer surface represent the cellular or reticulated character of their interior. 19. 14

892. The Lungs of a Jersey Toad, inflated and dried. 19. 15

893. Section of a similar Lung. It is a nearly simple sac, with ridges raised upon its inner surface so as to bound large polygonal parietal cells. 19. 16

894. Section of the Lung of a Turtle (Chelone Midas). The main bronchus, passing along the axis of the lung, gives off on each side numerous large diverging branches, the walls of which appear reticular, through the number of apertures by which they communicate with the larger air-cells. These air-cells are subdivided by very delicate tissue into much finer spaces, in which the minute branches of the pulmonary artery are distributed. 19. 10

895. Section of the Lung of a Turtle. 19. 28

From the Collection of J. R. Farre, Esq., M.D.

896. Section of the Lung of a Turtle, dried after inflation. The large size and incomplete partition of the air-cells near the surface of the lung are well shown. 19. 11

897. The Organs of Respiration, with the Heart and its large vessels, from a boa (Python). The walls of the trachea are composed, in the anterior and lateral parts, of cartilaginous rings, and posteriorly of fibrous tissue. At its lower part, the trachea, bifurcating, opens at once into the cavities of the elongated saccular lungs. The right lung, of which the anterior part alone is preserved, is laid open; its inner surface is beautifully reticulated with small elevated ridges, enclosing spaces of which the walls are again, by smaller ridges, subdivided into air-cavities or cells. The whole of this structure is highly vascular. The left lung is preserved entire. Its anterior third has the same structure and vascularity as that of the right lung; but in its posterior two-thirds the lung is a simple membranous sac, or reservoir for air; and its walls, though presenting traces of the same reticulation as those of its anterior part, are thin, and receive but few and small blood vessels. The right and left aortæ, the trunk of the carotid artery given off from the former, and their junction at some distance behind the heart, are shown, as are also the two branches of the pulmonary artery, and their prolongations along the inner margins of the lungs. 19. 12

898. Portion of the Lung of a Boa, showing its reticulated internal surface. 19. 13

899. Larynx, Trachea, and Lungs of a Crocodile (Crocodilus Acutus). The great length of the trachea and the complete circle which its rings form are well seen. 19. 25

900. The Trachea of an Ostrich, with its muscles. 19. 21

901. Section of the Lung of an Ostrich (Struthio Camelus), in part of which the blood vessels are injected. 19. 9

902. The Heart and Lungs of a Cat. 19. 27

903. The Heart and Lungs of a Guinea Pig. 19. 26

SERIES XXII.

URINARY ORGANS.

904. Section of a Kidney, in which the arteries have been injected, so as to show the contrast between the cortical portion of the organ, which is completely reddened by the injection, and the tubular portions, which remain nearly white. Some of the tubular portions, arranged in converging pyramids, are shown projecting their apices, or papillæ, into the extremities of the calyces, or branches of the pelvis of the kidney. 20. 1

905. A similar specimen. 20. 2

906. A similar specimen. The different appearances of these specimens are due only to the different degrees in which their blood vessels are injected. 20. 3

907. A similar preparation of the Kidney of a Child. The fibrous covering, or capsule, of the kidney is reflected from one-half of the organ. 20. 4

908. The principal Blood Vessels of two Kidneys, displayed by macerating and corroding the organs after injecting the arteries with red wax, the veins with yellow, and the ureter and pelvis with dark green wax. 20. 5

909. A similar preparation, after injecting the arteries with red and the veins with dark green wax. 20. 6

910. Section of a Kidney, with the ureter, pelvis, and infundibula displayed, after injection with wax. 20. 7

911. The Pelvis, Infundibula, and Calyces of a Kidney, injected with wax and dried. 20. 8

912. A similar preparation. 20. 9

913. Part of a Female Urinary Bladder, displaying the orifices of the ureters, and the muscular fasciculi extending from them to the vesical orifice of the urethra. 20. 10

914. Kidney of a Turtle; its arteries being injected with red, and its veins with blue. It is flattened and expanded, deeply and minutely lobed. 20. 14

915. The Kidneys of a Boa Constrictor (Python Sebæ) eight feet long. The right measures seven and the left five inches in length. 20. 17

916. Kidneys of a young Crocodile (Crocodilus Acutus). A section of one shows that there is no visible distinction between the medullary and cortical portions. **20.** 15

917. Kidneys, Ureters, and Cloaca of a Heron (Ardea Cinerea). **20.** 16

918. Kidney of a Dog, with the blood vessels of its cortical substance injected. The tubular substance is not arranged in separate pyramids, but forms a continuous mass occupying the interior of the kidney. **20.** 11

919. Kidney of a Cat, after an injection of the large and delicately branching veins upon its surface. **20.** 12

920. Kidney of a Bear. It is composed of about twenty separate coniform portions, each containing a proper cortical and tubular substance, and each having a distinct excretory duct, communicating with the renal pelvis, about which they are clustered. This form of kidney has peculiar interest, in that it represents a form through which the human kidney passes in its early development. Compare the specimens of the kidneys in the series illustrating the development of the Embryo. **20.** 13

921. The Urinary and Generative Organs of a male Guinea Pig. **20.** 18

SERIES XXIII.

THE BRAIN AND SPINAL CORD.

922. Portion of a Cerebral Hemisphere, showing the fibrous structure of its white substance. 22. 1

923. Portion of a Cerebrum, with its blood vessels injected. They are derived from those ramifying in the highly vascular pia mater. 22. 2

924. Portion of the Base of a Brain, displaying parts of the crura cerebri, and, in front of them, the corpora albicantia, tuber cinereum, infundibulum, pituitary body, optic tracts, and optic commissure. 22. 4

925. Vertical median section of a Cerebellum, Pons, Medulla Oblongata, and other adjacent parts, displaying especially the cavity and boundaries of the fourth ventricle, and of the canal from the fourth ventricle to the third. A bristle is passed beneath the fourth or trochlear nerve winding round the crus cerebri. 22. 5

926. A Medulla Oblongata, below which is shown the decussation of the fibres connected with the anterior pyramids. 22. 6

927. Portion of a Brain, including the pons and medulla oblongata. Fibres are shown passing through the pons from the right anterior pyramid to the right crus cerebri; while on the left side the fibres that appear to correspond with these, and lie at the same part of the pons, pass from the inferior part of the crus cerebri, to the left crus cerebelli. 22. 7

This and the two following specimens were prepared and presented by Holmes Coote, Esq.

928. Portion of Brain, in which a large bundle of fibres is shown passing from the right restiform tract forwards and inwards into the substance of the pons. 22. 8

929. Portion of Brain, with the origin of the sensory or ganglionic portion of the fifth, or trigeminal, nerve, on the right side. The root divides into three portions, of which one passes into the medulla oblongata between the restiform and olivary bodies, another into the middle of the crus cerebelli, and the third extends transversely into the pons. 22. 9

929a. A Spine, with the Spinal Cord, showing its membranes and the origins of the spinal nerves. 22 c.

930. The lowest part of a Spinal Cord, showing its almost sudden diminution of size before it ends in the filum terminale. 22. 11

931. A corresponding portion of Spinal Cord, with the numerous long roots of the lumbar, sacral, and coccygeal nerves by which the cauda equina is formed. 22. 12

932. Brain of a Sea-angler (Lophius Piscatorius). The long optic nerves are seen in the upper portion of the preparation. 22. 32

933. The Brain and Spinal Cord, with the origins of the nerves, of a Skate (Raia batis). The parts are placed with their inferior aspects directed forwards. In the middle, and above, are the optic nerves, diverging from their origins in the pedicles of the anterior cerebral lobes or cerebral hemispheres, the corpora mammillaria, and the optic lobes. At the sides of the optic nerves are the olfactory nerves, proceeding from the outer parts of the cerebral hemispheres. Below the corpora mammillaria the pituitary gland is suspended; and from above it proceed the third pair of nerves. From the sides of the medulla oblongata the fifth, the auditory, the glossopharyngeal, and the vagal, nerves are shown arising. On the posterior or dorsal aspect of the brain the several parts are shown as in the brain of the Cod; but they are all of larger size, and the cerebellum has two convoluted lobes or hemispheres attached to the sides of its middle portion. The spinal cord tapers regularly from above downwards, the several pairs of spinal nerves being given off from its sides at gradually increasing distances, and gradually diminishing in size. 22. 29

934. The Brain of a large Shark. The same parts are shown as in the preceding specimen. The chief objects to be noted are the large size, confluence and smoothness of the cerebral hemispheres; the olfactory lobes, beneath and closely attached to the hemispheres, from which a ventricle is continued into them; the corpora mammillaria, beneath the optic lobes, having between and beneath them the pituitary gland; the large size of the cerebellum, which is trilobed and transversely laminated, and extends forwards over the optic lobes as well as backwards over the anterior part of the fourth ventricle; and the vagal columns, a series of nodules projecting into the sides of the lateral ventricles, and corresponding with the roots of the vagal nerve. 22. 28

Presented by Mark Kebbell, Esq.

935. The Brain and the upper part of the Spinal Cord of a Cod (Gadus morrhua). From below, proceeding upwards, are shown the optic nerves, with the slender olfactory nerves between them, the cerebral hemispheres, the optic lobes (the left being laid open), the tongue-shaped cerebellum projecting backwards over the fourth ventricle, and the spinal cord. The origins of the large trigeminal and pneumogastric nerves from the restiform bodies are also shown. A bristle is passed from the fourth or cerebellar ventricle into the ventricle of the left optic lobe. 22. 25

936. A similar specimen. 22. 26

937. The same organs shown in a longitudinal section. The right half being removed, the central canal in the spinal cord, the fourth ventricle, and the cavity or ventricle in the left optic lobe, are exposed. 22. 27

Prepared and presented, with the two preceding specimens, by Holmes Coote, Esq.

938. The Brain and Spinal Cord of a Jersey Toad. The chief parts shown, *in situ*, are, from below upwards, the olfactory lobes, the elongated oval cerebral hemispheres, the pineal gland, the optic lobes, the cerebellum (a broad band dotted with black pigment), the large fourth ventricle, the short and wide spinal cord, and the cauda equina formed by the roots of the lumbar and sacral nerves. 22. 24

939. The Brain and the upper part of the Spinal Cord of a Turtle (Chelone Midas). From below, proceeding upwards, are shown, the olfactory lobes, the cerebral hemispheres, the pineal and pituitary bodies, the optic lobes, the nearly membranous cerebellum, the wide and shallow fourth ventricle, and the flattened spinal cord. 22. 23

Presented by Holmes Coote, Esq.

940. Brain of a Boa Constrictor (Python Sebæ). 22. 34

941. Section of the Brain of a Turkey (Meleagris Gallo-pavo), showing the cavity of the fourth ventricle and its prolongation between the lobes of the cerebellum, the pineal gland, and the absence of a corpus callosum. 22. 21

Presented by Holmes Coote, Esq.

942. The Brain and Spinal Cord of a common Fowl (Gallus domesticus). The portions of the spinal cord with which the origins of the nerves supplying the extremities are connected, are much larger than the portions either above or below them; and the portion corresponding with the nerves of the lower extremities is larger than that connected with those of the upper extremities. 22. 22

943. The Brain of a Kangaroo (Macropus Parryi). The upper part of the left cerebral hemisphere is removed, showing the very small corpus callosum, and the corpora quadrigemina, of which the anterior pair are much larger than the posterior. 22. 20

Presented by Holmes Coote, Esq.

944. Brain of an Armadillo (Dasypus Conurus). 22. 30

945. Brain of a Sheep (Ovis Aries). 22. 36

946. A vertical section through the middle line of the Brain of a Sheep, showing especially the cavity of the fourth ventricle, and the valve of Vieussens, of which the grey substance is continued through the corpora quadrigemina into the optic thalamus. 22. 17

Presented by Holmes Coote, Esq.

947. The Brain of a Cat (Felis domesticus). 22. 16

Presented by Holmes Coote, Esq.

948. Brain of a Young Kitten. 22. 38

949. The Brain of a Leopard (Felis Leopardus). The upper part of the left cerebral hemisphere, and the left half of the cerebellum, are removed, exposing the corpus striatum, optic thalamus, and the large hippocampus, the corpora quadrigemina, and the floor of the fourth ventricle. 22. 15

Prepared and presented by Holmes Coote, Esq.

950. Brain of a Ferret (Mustela Furo). 22. 13

951. Brain of a Dog (Canis familiaris). 22. 35

952. The Brain and upper part of the Spinal Cord of a Dog (Canis familiaris), showing especially the large olfactory lobes. 22. 14

The three preceding specimens were prepared and presented by W. Morrant Baker, Esq.

953. Part of the Brain of a Rabbit (Lepus cuniculus), showing the fornix and fibres extending from it along both the anterior and the posterior borders of the hippocampi. 22. 18

Presented by Holmes Coote, Esq.

954. Part of the Brain of a Rabbit. A fasciculus of fibres is traced from the anterior pyramid of the medulla oblongata, extending forwards, and then directly outwards into the crus cerebelli. 22. 19

Presented by Holmes Coote, Esq.

955. Brain of a Kangaroo Rat (Macropus minor). 22. 31

956. The Brain, *in situ*, of a Hedgehog (Erinaceus Europæus). 22. 13

957. Brain of a Hedgehog. 22. 37

958. Brain of a Guinea Pig.

SERIES XXIV.

THE NERVES.

959. Section of a Nerve, showing its principal fasciculi of filaments, and the vascularity of its neurilemma and of the fibro-cellular tissue between the fasciculi. 23. 1

960. A similar specimen. 23. 2

961. Part of a Sciatic Nerve, with its principal fasciculi of filaments separated and displayed. 23. 3

962. Part of a Popliteal Nerve similarly prepared. The minuter divisions, like branchings, of the fasciculi are here shown. 23. 4

963. The Trunk of a Trifacial or fifth Cerebral Nerve. A bristle is placed between its ganglionic sensory, and its nonganglionic motor, portion. 23. 5

This and the four following specimens were presented by A. M. McWhinnie, Esq.

964. Dissection of Nerves in the Orbit. The objects chiefly shown are the ophthalmic or lenticular ganglion; its long root from the nasal branch of the fifth or trifacial nerve; its short roots from the branch of the third nerve, which is proceeding to the inferior oblique muscle; the long ciliary nerves from the lenticular ganglion and from the nasal branch of the fifth; the short ciliary nerves; the supraorbital, lacrymal, and sixth nerves. 23. 7

965. Nerves in the front of a Sacrum and Coccyx, displaying the lower portion of the sympathetic or ganglionic system of nerves, and the communications between it and the anterior branches of the sacral nerves. 23. 8

966. The Penis of an African, with a dissection of the branches of the pudendal nerves distributed in its dorsal and lateral portions. 23. 9

SERIES XXV.

THE NOSE, AND OTHER ORGANS APPERTAINING TO THE SENSE OF SMELL.

967. The Nasal Cavities displayed in transverse section. Anteriorly the section passes through the septum and inferior turbinated bones, and in front of the middle turbinated bones; posteriorly, it passes through the septum and the inferior and middle turbinated bones, just behind the superior turbinated bones. The thickness, sponginess, and great vascularity, of the Schneiderian membrane lining the nasal cavities are shown. The orifices of the antrum, and of the nasal duct, are indicated by probes passed through them. 24. 1

968. The right outer wall of the Cavities of a Nose, displaying the three turbinated bones, the three meatûs behind and below them, and the openings of the antrum and nasal duct. 24. 2

969. A similar specimen, with the inferior turbinated bone raised so as to show more distinctly the position of the nasal duct, and with a probe passed through the Eustachian tube. 24. 3

970. Portions of a Skull, in which are shown the following parts having relation to the Nose: 1. The external nares, with the bones and cartilages bounding them. 2. The crista galli and cribriform plate of the ethmoid bone, with the orifices for the passage of the olfactory nerves. 3. The posterior nares, the sphenoidal sinuses and their openings into the nasal cavities. 4. The antra or maxillary sinuses, with their openings. 5. The nasal ducts with the portions of their walls projecting slightly into the cavities of the antra. 24. 4

971. Section of the Head of a Turtle, showing the left olfactory nerve traversing a long canal above the nasal septum, and distributed on the mucous membrane over the cartilaginous portion of the septum. A bougie is passed through the right nasal passage. 24. 5

SERIES XXVI.

THE EYE, AND OTHER ORGANS APPERTAINING TO THE SENSE OF SIGHT.

972. Section of an Eye, displaying (1) the sclerotic, its continuity with the sheath of the optic nerve, and its connection by bevelled edges with the transparent cornea; (2) the choroid membrane (which, as in most of the following specimens, is completely decolorised by the prolonged action of light and decomposed spirit); (3) the ciliary processes, surrounding and somewhat overlapping; (4) the iris; (5) the optic nerve, exposed within its sheath, and passing through a small opening in the sclerotic. 25. 1

973. A similar section, in which the Retina and Crystalline Lens are also included. 25. 2

974. Sections of an Optic Nerve, showing its mode of passage through the sclerotic, and its apparent constriction therein. 25. 5

975. Section of the posterior part of an Eye, displaying the internal surface of the Retina. 25. 6

976. An Eye, from which the posterior part of the sclerotic and choroid has been removed, so as to show the external surface of the retina and its connection with the optic nerve. 25. 7

977. The posterior part of an Eye. A slight starred depression extends between the point at which the optic nerve expands to form the retina, and the position of the macula lutea and foramen centrale of Sœmmering. 25. 8

978. A similar specimen. 25. 9

979. The Blood Vessels of a Retina, minutely injected. The nervous and other tissues have been washed from them. 25. 10

980. Part of an Eye, giving a view from behind of the retina, ciliary processes and lens. 25. 11

981. Section of an Eye preserved in chromic acid. It shows the vitreous humour, traversed by very numerous delicate membranous septa, which converge from its circumference towards its axis. The portion extending through the axis of the eye is homogeneous and undivided, the septa stopping short of it. 25. 15

Presented by Dr. Hannover.

982. An Hyaloid or Vitreous Membrane, distended and dried together with the lens. 25. 16

983. An Eye, in which, by the removal of portions of the sclerotic and cornea, the following parts are shown from the front:—(1) the external surface of the choroid; (2) the ciliary body or ligament; (3) the iris; (4) the anterior borders of some of the ciliary processes; (5) the lens. 25. 17

984. Part of an Eye, showing the same structures (except the lens) from behind. 25. 18

985. A nearly similar specimen, giving a posterior view of the choroid ciliary processes, iris, pupil, and cornea. 25. 19

986. The Choroid, with its principal arteries injected. 25. 20

987. Part of an Eye, with the choroid made uniformly red by the minute injection of its blood vessels. 25. 22

988. The Ciliary Processes of a Choroid, and an Iris, shown by the eversion of the anterior half of an eye. 25. 27

989. A similar preparation of Ciliary Processes. 25. 28

990. An Iris, after the removal of the uvea or black pigment from its posterior surface. 25. 29

991. A similar specimen. 25. 30

992. An Eye, with the cornea and iris detached and turned down, exposing the ciliary processes, ciliary ligament, and lens. 25. 31

993. An Iris, dried, after the injection of its principal arteries. 25. 32

994. Section of an Eyeball, showing the termination of the Retina at the Ora Serrata. 25. 63

995. Specimen showing the Ora Serrata, or anterior termination of the Retina, in the Human Eye.

996. Specimen showing the Ciliary Processes, Iris, and Cornea from behind, the vitreous humour and lens having been removed. 25. 64

997. The Eye of a Child, 5 years old, showing the folds or plaits which are seen on the Retina in young subjects. 25. 66

998. An Eye, in which the principal branches of the ciliary nerves are shown by the reflection of the sclerotic from the choroid. 25. 38

999. Two Lacrymal Glands, with their principal arteries injected. 25. 39

1000. The Cartilages of the Eyelids, or tarsal cartilages. On their opposed edges, near the posterior border of each, are a row of small apertures, marking the orifices of the Meibomian glands. 25. 41

1001. A Lacrymal Sac and Nasal Duct, dried after being filled with mercury. 25. 42

1002. The Head of a Frog. On the left side a bristle has been passed beneath the superior oblique muscle which arises from the front part of the inner wall of the orbit. On both sides a bristle has been passed beneath the muscles upon which the eyeball rests and which form the floor of the orbit. **25.** 58

1003. The Scaly Integument spontaneously detached from the Head of a Snake, including the transparent membranes separated in connection with it from the surface of the conjunctivæ. **25.** 4

1004. Eye of a young Crocodile (Crocodilus Acutus), showing the third eyelid or nictitating membrane. **25.** 47

1005. Section through the Eyeball of a Turtle, showing the cartilaginous sclerotic coat with its thickness very much increased at the posterior part of the globe. **25.** 52

1006. The Eye of a Turtle, with the lacrymal gland and duct. The gland is very large, elongated, and deeply lobed; a short duct, through which a portion of glass is passed, extends from it, and opens just above the external angle of the eye. **25.** 40

Presented by J. Bodman, Esq.

1007. The Cornea of a Turkey, dried, with the ring formed of imbricated bony plates with which it is surrounded, and which are enclosed in the substance of the sclerotic. **25.** 3

1008. Part of the Head of a Turkey. On the right side the oblique muscles are shown, and the superior oblique is seen to arise from the front and inner wall of the orbit, immediately above the inferior oblique. On the left side the muscles have been divided and a bristle passed beneath the so-called Harderian gland. **25.** 57

1009. The Eyeball of a Turkey. It shows the dark cartilaginous sclerotic, with the plates of bone around the margin of the cornea. **25.** 59

1010. The Cornea and front part of the Sclerotic of a similar Eyeball. **25.** 60

1011. The two halves of the Lens of a Norwegian Owl. The nucleus remains transparent notwithstanding prolonged immersion in strong spirit. **25.** 61

1012. Part of the Eye of an Ostrich, displaying the ciliary processes and iris, after the removal of the greater part of the dark pigment. **25.** 35

1013. Part of the Eye of an Ostrich, showing the Pecten or Marsupium, an organ peculiar to the eye of birds. It is formed of membranous folded laminæ, which are prolonged from the choroid, arranged in the shape of a four-sided pyramid, extending from around the entrance of the optic nerve to the posterior part of the crystalline lens. **25.** 36

1014. Section of the Eye of an Ostrich, in which are more distinctly shown the relations of the marsupium to the retina, and its attachment by a portion of the hyaloid membrane to one side of the posterior surface of the capsule of the lens. **25.** 37

1015. The Eye of a Brown Owl (Strix stridula), with the nictitating membrane and its muscles. The anterior part of the eye extends forwards, in a nearly

tubular form, bearing the cornea at the end of the prolonged sclerotic plates. The muscles of the nictitating membrane are two in number: one of them, called the quadratus nictitantis, or trochlearis, of an unequally four-sided figure, arises from the outer part of the eye-ball, whence its fibres converge towards the optic nerve, by the side of which they terminate in a free, curved, tendinous margin, which is perforated by a canal for the tendon of the opposite muscle. This, which is called pyramidalis nictitantis, or nictitator, is of a triangular form: its fibres arise from the inner and lower side of the eye-ball, and converge as they pass towards the quadratus, through the loop or pulley of which its cord-like tendon glides. The tendon, winding over the optic nerve, descends and enters a sheath in the lower part of the sclerotica, and then, passing below the cornea, is finally inserted into the lower angle of the free margin of the membrana nictitans, along which it is continued for some distance. By the simultaneous action of these two muscles, the third eyelid, or nictitating membrane, is drawn rapidly and forcibly outwards, and with an oblique inclination downwards over the forepart of the eye. The tendon of the pyramidalis gains the due direction for that office by winding round the optic nerve; and it is restrained from pressing upon the nerve by the counteracting force of the quadratus. The nictitating membrane returns, on the relaxation of its muscles, by virtue of its own elasticity, to the inner corner of the orbit, where it lies folded up when not in use. 25. 46

Presented by Richard Partridge, Esq.

1016. The Eyeball and Membrana Nictitans of a large Norwegian Owl. On the posterior part of the globe the muscles which move the nictitating membrane have been dissected out. 25. 53

1017. The Eyelids of a Horse, including the vertical eyelid, or nictitating membrane, and the Harderian gland connected with it. Bristles are passed into the numerous ducts of the lacrymal glands. 25. 43

1018. The Eye of a Horse, with the veins of the choroid membrane (venæ vorticosæ) filled with mercury. 25. 23

1019. Portion of the Choroid Membrane of a Horse, with its veins similarly injected. 25. 24

1020. The Eyelids and Harderian Gland of a Stag. Bristles are passed into the lacrymal canals and the ducts of the lacrymal gland. 25. 44

1021. The Eyelids of an Ass. The lacrymal canals and nasal duct are filled with mercury. 25. 45

1022. The Eyeball of an Ox, prepared to show the firm and definite sheath of the optic nerve. The sheath blends with the sclerotic coat of the eyeball. 25. 48

1023. The Sclerotic and Cornea of an Ox, showing the greatly increased thickness of the former at the back around the entrance of the optic nerve. 25. 49

1024. The Eyeball of an Ox. The conjunctiva has been detached from the globe except immediately around the cornea, where it is very firmly attached. 25. 50

1025. Section through the Eyeball of a Sheep, dividing the optic nerve. The nerve becomes narrowed as it enters the sclerotic. The lamina cribrosa is also seen. 25. 51

1026. The Crystalline Lens of a Sheep, broken up so as to show its fibrous structure. 25. 12

1027. Four specimens of the Lens of a Sheep, broken up so as to show its fibrous structure. 25. 13

1028. Part of the Eye of a Seal (Phoca vitulina), exhibiting the anterior branches of the ciliary arteries, passing through the anterior chamber, in front of the iris. 25. 33

1029. The Eye of a Dog, with the principal arteries of the choroid membrane injected with mercury. 25. 25

1030. Part of the Eye of a Cat, showing the peculiar silvery bluish surface of the tapetum. 25. 26

1031. Part of the Head of a Cat. The eyelids have been cut through so as to show the rudimentary third eyelid. 25. 54

1032. The Muscles of the Eyeball of a Cat, prepared to show especially the inferior oblique. 25. 55

1033. A similar specimen, prepared to show the superior oblique muscle with its pulley. 25. 56

1034. The Skull of a newly-born Kitten, with the integuments partly reflected from it. On the right side the integument is firmly attached around the margin of the cornea; on the left side it has been separated. 25. 62

1035. The Iris of a Rabbit, dried after the minute injection of its arteries. 25. 34

SERIES XXVII.

THE EAR, AND OTHER ORGANS APPERTAINING TO THE SENSE OF HEARING.

1036. The principal parts of the Organ of Hearing, from a human Fœtus. Proceeding from left to right are shown:— 1. The auricle, concha, or external ear. 2. The meatus auditorius externus laid open from the front. 3. At the end of the meatus, the membrana tympani, placed obliquely, and closing externally the cavity of the tympanum. 4. The cavity of the tympanum, exposed by the removal of its upper and anterior walls. 5. Within the cavity, the series or chain of the bones of the internal ear, or ossicula auditûs, namely, the malleus, with its handle attached to the inner surface of the membrana tympani, and its processus gracilis directed forwards towards the fissura Glaseri; the incus, articulating with the malleus, and having one process directed backwards to the mastoid cells, and another backwards and inwards to articulate with the orbicular portion of the stapes, the base of which is attached to the membrane of the foramen ovale. The base of the stapes is here raised so as to show the foramen ovale opening from the cavity of the tympanum into that of the vestibule. 6. The cavity of the vestibule; above and behind which are (7) the three semicircular canals, while in front of and rather below it, is (8) the cochlea. 26. 1

1037. The fibrous Cartilage of an external Ear. 26. 2

1038. Section of a Right Ear, in which are shown the meatus auditorius externus, the membrane and cavity of the tympanum, parts of the vestibule and semicircular canals, together with parts of the carotid canal through the petrous bone, and of the mastoid cells, in which bristles are placed. The lining of the meatus auditorius externus, immediately before its entrance into the bone, is perforated with numerous orifices of the ducts of ceruminous glands. 26. 3

1039. Section of a Left Ear, displaying, besides the parts shown in the last specimen, the Eustachian tube, which is laid open from the front, and is marked by a bristle passed into it from the cavity of the tympanum. 26. 4

1040. A similar section of a Right Ear. A bristle is passed beneath the chorda tympani nerve, as it proceeds across the handle of the malleus and the membrana tympani. 26. 5

1041. The Auditory and Facial Nerves (portio mollis and portio dura of the seventh pair of cerebral nerves) in the internal auditory passage. A bristle is passed under filaments passing from the trunk of one nerve to that of the other. 23. 6

1042. Sections of a Temporal Bone, showing the external auditory meatus and the mastoid cells.

1043. A Membrana Tympani, dried after the injection of its blood vessels. Many of the principal branches radiate towards the centre of the membrane to which the extremity of the handle of the malleus is attached. 26. 6

1044. Part of a Fœtal Temporal Bone, together with the tympanic osseous ring. The ring, which serves for the insertion of the membrana tympani, is slightly fixed to the lower part of the squamous portion of the bone. 26. 7

1045. A similar specimen, with the membrana tympani fixed in its ring, and the malleus and incus in their normal relations. 26. 8

1046. Sections of the Temporal Bone of a Child. The "tympanic bone" has not yet united to the remaining portion.

1047. Temporal Bone of a Fœtus, showing the ossicles. The tympanic bone is still separate from the remainder.

1048. The Ossicula Auditûs of a Fœtus. The small portion of bone which has been sometimes called "os orbiculare," is attached to the long process of the incus. 26. 9

1049. A corresponding set of Ossicula from an Adult. They are scarcely larger than those of the fœtus. 26. 10

1050. The Auditory Ossicles articulated.

1051. Part of an Ear, showing the ossicula and muscles within the cavity of the tympanum. The membrana tympani is removed, and bristles are passed under the stapedius, tensor tympani, and laxator tympani muscles. 26. 11

1052. Sections of a Temporal Bone, cut so as to show the ossicles and tympanum. A bristle is placed in the canal for the chorda tympani nerve.

1053. Sections of the Temporal Bone, showing the ossicles *in situ* and the carotid canal.

1054. Section of a Temporal Bone. Bristles are placed in the bony canals for the nerves of the tympanic plexus.

1055. Part of the petrous portion of a Temporal Bone, in which the vestibule, cochlea, and semicircular canals are exposed. The cavity of the vestibule is laid open. 26. 12

1056. A similar specimen, but with all the cavities of the vestibule, cochlea, and semicircular canals laid open. 26. 13

1057. A similar specimen. 26. 14

1058. A preparation of the Semicircular Canals.

1059. Section of the Temporal Bone, showing the cochlea and semicircular canals.

1060. The petrous portion of a Temporal Bone, cut so as to show the spiral turns of the cochlea.

1061. A Temporal Bone, with the petrous portions cut away to show the cochlea and semicircular canals. A bristle is placed in the Aqueductus Fallopii.

1062. Section of a Cochlea, showing the spiral curves.

1063. A Preparation of the Cochlea and Semicircular Canals.

1063a. Four Sections of Temporal Bones, displaying parts connected with the internal ear. 26. 18

1064. Part of the Internal Ear of a Skate (Raia Batis), with the trunk of the auditory nerve, and the semicircular canals, the membranous tubes and ampullæ within which are filled with mercury. 26. 24

1065. Section of the Head of a Turtle (Chelone Midas), showing the membrana tympani; the long, slender, and curved columella, expanded at its ends; the cartilaginous semicircular canals, and their ampullæ; the vestibule; and the trunk and principal branches of the auditory nerve. 26. 23

1066. The Membrana Tympani, with the Ossicula of an Ostrich (Struthio Camelus). The membrane is convex externally, that is, towards the meatus. The parts representing the malleus and incus are rudimental and cartilaginous: a long and slender bone, expanded at its distal extremity, and named "columella," or "bacillus," occupies the place of the stapes. 26. 21

1067. The Ossicula of the Ear of an Ostrich. 26. 22

1068. Part of the Temporal Bone of the Seal (Phoca vitulina), in which the membrana tympani, ossicula auditûs, cochlea, and vestibule, are displayed. Its chief peculiarities are that the cochlea has only two spiral turns; the semicircular canals are very large; the foramen rotundum is three times larger than the foramen ovale; and the branches of the stapes are very thick. 26. 19

1069. Sections, showing the corresponding structures in the Walrus (Trichecus Rosmarus). They are generally similar to the foregoing; but the cochlea has three turns, and the stapes has no opening between its crura, but is like a solid pyramid of bone. 26. 20

1070. The Tympanic Bones of a Whale (Balæna Mysticetus). 28. 187

1071. Tympanic Bone of a Whale (Balænoptera Boops). 28. 186

1072. Tympanic Bone of a Greenland Whale.

Presented by the Rev. J. Henslow.

1073. Fossil Tympanic Bones of several species of Extinct Whales from "Red Crag Pliocene Deposit" (Balæna Gibbosa, Balæna Affinis, Balæna Definita).

Presented by the Rev. G. Henslow.

The preparations of the tongue, and other organs for the sense of taste, are in Series VIII and X.

SERIES XXVIII.

THE SKIN, AND ITS APPENDAGES; THE ORGANS APPERTAINING TO THE SENSE OF TOUCH.

1074. Part of a Finger, in which the blood vessels are minutely injected. The curved double rows of sensitive papillæ on the ball of the finger, and those arranged in linear ridges on the bed of the nail, are made distinct by the fulness of their vessels. **27. 1**

1075. A Finger, dried after a mercurial injection of the blood vessels of the skin. The cuticle or epidermis has been removed in both these preparations. **27. 2**

1076. The Fore-arm and Hand of a Fœtus, injected so as to show the vascularity and general texture of the skin. **27. 3**

1077. A similar preparation of the Leg and Foot of a Fœtus. **27. 4**

1078. Portion of Skin from the neighbourhood of a chronic ulcer in the Leg of a Negro. Both the cutis and the epidermis are thickened. The cuticle or epidermis is reflected, so as to show the great size of the sensitive papillæ of the cutis, which are close-set, cylindriform, and conical vascular eminences, various in size and in some cases beset with slender processes. The forms of the papillæ may be distinctly seen impressed in the inferior surface of the reflected epidermis, in which also it may be observed that the part nearest to the ulcer is devoid of colour. **27. 6**

1079. Portion of Skin from an Axilla, showing, on the inferior surface of the cutis, a part of the layer of large, lobulated sweat-glands. The orifices of the short ducts of these glands are open on the external surface of the cutis. **27. 7**

1080. Portion of Skin from over a mammary gland. In raising the cuticle, the continuations of it, which are reflected inwards to form the linings of the hair-follicles, have been drawn out, and now project from its inferior surface. From some of the corresponding follicles in the cutis hairs project; bristles passed through others show their oblique course. **27. 8**

1081. Portion of Skin which has been tanned and coloured. **27. 9**

1082. Portion of Tattooed Skin. **27. 10**

1083. A similar specimen; but the epidermis has been removed, so as to show that the coloured particles are imbedded in the substance of the cutis. **27. 11**

1084. Portion of a Tattooed Skin from the fore-arm of a man. 27. 33

1085. Portion of Tattooed Skin. 27. 34

1086. Specimen of Tattooed Skin.

1087. The Skin surrounding an Anus, together with the lower part of the rectum, inverted, so as to show the contrast between skin and mucous membrane, and between the cuticles by which they are severally covered. 27. 13

1088. A similar preparation from an African. Here are also seen the orifices of the numerous sebaceous glands around the anus. 27. 14

1089. The Cuticle of an Infant's Hand, removed, after putrefaction, in a single piece. 27. 15

1090. A similar preparation of the Cuticle of a Foot. In both instances the nails are connected with the cuticle. 27. 16

1091. Portions of the Skin of a Negro. In the upper specimen a part of the dark brown cuticle is reflected in a single layer; and to the under surface of this layer are attached numerous colourless prolongations of cuticle, which extended into hair-follicles and sweat-glands. In the lower specimen a part of the cuticle is reflected in two layers, of which the internal is that which has been named rete mucosum or rete nigrum; the external dried and less coloured layer being that more especially named epidermis. 27. 17

1092. A similar specimen, with the cuticle reflected in two layers. The internal layer, or rete mucosum, is thicker than natural, in consequence of chronic inflammation of the skin. The specimen was taken from the same leg as 1078. 27. 18

1093. Part of the Skin of the Heel from the same leg. The cuticle is colourless, with the exception of a small quantity of pale brownish colouring matter in the deepest layers of the portion which extended up the side of the heel. The inferior surface of the cuticle presents some small wart-like elevations, which were imbedded in the surface of the cutis. 27. 19

1094. Portion of the Skin of a Negro, with the cuticle reflected in two layers; but both layers are completely decolorized by the long action of light and the products of decomposed spirit. 27. 20

1095. Portion of Cuticle reflected with the Nail from a Great Toe. The cuticle is firmly attached to all the borders of the nail, and from the borders is reflected for a short distance upon each of the free surfaces. The inferior surface of the nail has, on its anterior three-fourths, a laminated structure, with thin lamella-like ridges, arranged in parallel longitudinal lines; the corresponding surface of the posterior fourth presents a similar, but less distinct and less orderly, structure. 27. 22

1096. Sections of the end of a Great Toe, with an old Nail nearly exfoliated, and a new one formed in its place. In the upper specimen, the old nail is completely separated; in the lower, it remains attached (as it was during life) to the anterior half of the new one, their opposed surfaces exactly fitting to each other. From this specimen an outer layer of cuticle was removed; an inner layer, corresponding with the rete mucosum of the Negro, remains attached to the cutis, and has the characteristic reticulated surface. 27. 23

1097. Part of the Great Toe of an old bed-ridden person, in whom the nail, allowed to grow unrestrained, forms a thick, curved, horny appendage, like a claw. It is composed of numerous lamellæ, being probably formed of a succession of nails, growing one under another, like those shown in the preceding specimen. **27. 24**

1098. Section of a Middle Toe, with a similar out-grown Nail. A single, long and narrow, nail projects beyond the end of the toe, having layers of hardened cuticle attached to its inferior free surface. **27. 25**

1099. The Great Toe Nail of an aged person, which had been allowed to grow unrestrained. A spiculum of bone projecting from the last phalanx gave a firm support to the horn-shaped appendage. **27. 31**

1100. Great Toe Nail of an old Woman who had been bedridden 22 years.

Presented by Mr. J. O'Brian Keogh, of Wolverhampton.

1101. Portion of Skin exhibiting an ordinary Mole of a brownish colour, slightly raised above the neighbouring surface, and covered with hair. **27. 29**

1102. The entire Scaly Covering of a Snake, spontaneously separated from the cutis in the periodical "moult" or exuviation. **27. 21**

Presented by the Rev. P. Roupell.

1103. Feathers of a Jungle Fowl (Megapodius Tumulus). The tips show the gradations from the characters of scales to those of feathers, produced by the splitting of hard scale-like layers into fine parallel lamellæ. **27. 28**

1104. The Foot of a Horse, the hoof being removed so as to show the lamellæ, formed of highly vascular papillæ, to which the hoof is adapted, and by materials from whose blood vessels its structure is maintained. **27. 26**

1105. Section of the Skin of a Porpoise (Phocæna communis). It presents, in distinct layers, (1) a thick dark grey layer of epidermis; (2) a thinner black layer; (3) a very thin layer of cutis bearing papillæ; (4) a layer, half an inch thick, of subcutaneous fat or blubber; (5) a muscular layer or panniculus carnosus. **27. 12**

1106. Portion of Skin from the Lip of a Tiger (Felis Tigris). Branches of the superior maxillary nerve are traced to the large bulb-like follicles of the whiskers. **27. 27**

1107. The Marsupium, or Pouch, of a Kangaroo Rat (Macropus Minor). **27. 30**

SERIES XXIX.

ORGANS OF GENERATION IN THE MALE: THE TESTICLE, AND ITS COVERINGS AND DUCT.

1108. A Testicle and Spermatic Cord, to show their external form and relations, together with the arrangement of the tunica vaginalis testis and the deep pouch into which it is reflected between the body of the testicle and the epididymis. 30. 1

1109. A Testicle, with the spermatic and surrounding tissues. A layer of fibro-cellular tissue is opened and turned aside, which invests or forms the "cellular sheath" of the whole length of the spermatic cord and the tunica vaginalis testis. The tunica vaginalis is laid open, and the constituents of the spermatic cord are set apart. 30. 2

1110. A Testicle, of which (after cutting open the tunica albuginea) the secreting tubules have been unfolded and separated. Many of the tubules are thus shown, singly and in bundles, extending through long distances, finely undulating, of uniform diameter, and without branching or anastomosis. At the lower part of the preparation many of the tubules appear to form loops. 30. 3

1111. A Testicle, dried after the injection of mercury through the vas deferens. The mercury passing through the vas deferens has filled nearly the whole of the fine convoluted tube forming the epididymis, and a portion of the tubules in the body of the testicle. 30. 4

1112. A similar specimen, showing more plainly the tubules in the rete testis. 30. 5

Prepared and presented by Holmes Coote, Esq.

1113. A similar specimen. 30. 6

1114. A similar specimen. The spermatic veins are injected with wax. 30. 7

1115. A similar specimen. 30. 8

1116. A Testicle, dried after injecting with mercury the vas deferens and tubules of the epididymis, and the spermatic artery, veins, and lymphatics. 30. 9

Prepared and presented by John Havers, Esq.

1117. A similar specimen. 30. 10

1118. Vas Deferens and Tubuli Seminiferi of a Testicle injected with mercury.

From the Collection of J. R. Farre, Esq., M.D.

1119. A Vas Deferens, with its fine tubular continuation in the epididymis filled with mercury, unravelled and dried. 30. 11

1120. A similar specimen. 30. 12

1121. Spermatic Plexus of Veins injected with wax and dried. 30. 13

1122. Spermatic, Deferential, and Cremasteric Arteries, injected and dried with the parts in which their chief branches are distributed. 30. 14

1123. Two similar preparations of Spermatic Arteries. 30. 15

1124. A Spermatic Cord, Epididymis, and Testis, dissected so as to show their constituent parts.

Prepared and presented by R. H. Coombes, Esq.

1125. The Testicles and Penis of a Dog. The open tubular communications between the cavities of the tunicæ vaginales and that of the peritoneum are displayed. 30. 16

SERIES XXX.

ACCESSORY ORGANS OF GENERATION IN THE MALE.

1126. Vesiculæ Seminales, with the terminations of the Vasa Deferentia, dried after being filled with mercury. The preparation shows, especially, the outer form of the vesiculæ, the acutely angular junction of their ducts with the vasa deferentia, the small and gradually decreasing size of the common or ejaculatory ducts, and the minutely reticular or saccular construction of the walls of the vesiculæ. **31.** 1

1127. A vertical section of a similar preparation. The closely convoluted and branching tube of which each vesicula is formed appears in section like a many chambered and saccular pouch. **31.** 2

1128. Sections of Vesiculæ Seminales and Vasa Deferentia. The mucous membrane of the vasa deferentia has a saccular arrangement, and leaves only a very fine canal within its projecting folds. A similar structure, with apparently finer reticulations, exists in the mucous membrane of the vesiculæ seminales. **31.** 3

1129. Vesicula Seminalis and the termination of the Vas Deferens, dried after injection with wax. **31.** 4

1130. A Prostate Gland, with the adjacent parts. The vesiculæ seminales and vasa deferentia are dissected from the posterior part of the urinary bladder, and turned downwards, so as to show the posterior or middle lobe of the prostate gland. **31.** 6

1131. A vertical antero-posterior section of a Prostate Gland, showing its relations to the portion of the urethra round which it is placed, and the gradual decrease of the thickness of the layer of muscular fibres as one traces it from the neck of the bladder along the prostatic part of the urethra. **31.** 7

1132. Prostate Glands from children of the ages of 4 and 10 years. **31.** 8

1133. A Penis, with the Prostate and Cowper's Glands. The three lobes of the prostate gland are shown from behind, and bristles are passed along the ejaculatory ducts, traversing the prostate into the urethra at the sides of the caput gallinaginis. Other bristles are passed into the urethra through the long ducts of Cowper's glands. **31.** 9

1134. An Urethra laid open, and with bristles passed into the lacunæ or orifices of gland ducts on its walls. Fifty-three lacunæ are thus indicated; the greater part of them being on the superior wall of the spongy portion of the urethra, and on the inferior wall of its bulbous and membranous portions. **31.** 10

1135. Cast in wax of an Urethra, to show its average length, and the proportionate sizes of its several parts. **31.** 11

1136. An Urethra, with the blood vessels of its corpus spongiosum injected, and its canal laid open from below. 31. 12

1137. Transverse section of a Penis, after minute injection of its blood vessels. The preparation shows especially the forms and relative sizes of the corpora cavernosa penis separated by the fibrous septum, and of the corpus spongiosum surrounding the urethra; the large vessels beneath the integuments on the dorsum of the penis, and the general characters of the erectile tissue and its fibrous covering, are also shown. 31. 13

1138. Vertical section through a Glans Penis, showing the continuity of its spongy or erectile tissue with that of the anterior part of the corpus spongiosum urethrae, the strong fibrous covering that separates these from the corpus cavernosum, and the general form of the anterior part of the urethra. 31. 14

1139. A Penis, dried after injecting the veins of the glans and corpus spongiosum urethra with yellow wax, and those of the corpora cavernosa with red wax. In both parts the structure of the erectile tissue appears almost entirely composed of tortuous, branching, and freely communicating veins. The veins of the glans and of the anterior part of the corpus spongiosum are collected in a close plexus of large branches, which lie on the dorsum of the penis behind the glans, and which converge and open into the great dorsal vein. A few smaller veins also pass from the median portion of the corpus cavernosum into this great dorsal vein, and into a smaller which lies by its side and parallel with it. 31. 15

Prepared and presented by Thomas Wormald, Esq.

1140. A similar preparation. 31. 16

1141. A corroded injection of the Veins of the Glans Penis, and of the adjacent portion of the corpus spongiosum urethræ. 31. 17

Prepared and presented by Thomas Wormald, Esq.

1142. Sections of Corpora Cavernosa Penis, inflated and dried. 31. 18

1143. A Penis, from which, on one side, the erectile tissue of the corpus cavernosum is removed, and the internal surface of its fibrous sheath or investment is displayed. 31. 19

1144. A Penis, in which, by similar removal of the erectile tissue on both sides, the fibrous septum (septum pectiniforme) of the corpora cavernosa is shown. It is chiefly constructed of strong vertical bands of fibrous tissue, the apertures between which permit the passage of only small blood vessels from one corpus cavernosum to the other. 31. 20

1144a. A preparation of a Penis, and of the plexus of great veins at the sides of the prostate gland, injected with wax. The structure of the corpora cavernosa and the arrangement of their arteries are also shown. 31. 36

1145. A similar preparation of the Penis, vesiculæ seminales, vasa deferentia, and urinary bladder. 31. 27

1146. The anterior part of a Penis, with the bulbous and membranous portions of the urethra shown in their relations to the triangular or subpubic ligament. 31. 30

1147. A preparation of the triangular or subpubic ligament. **31.** 31

1148. A similar preparation dried. **31.** 32

1149. Portions of the Penis of a Horse, dried after injection of its arteries and veins with wax. The injection passed from the arteries into the veins, which, thus filled, appear to compose nearly the whole of the erectile tissue. **31.** 22

1150. Transverse section of the Penis of a Horse, displaying (from above downwards) the orifices of the divided dorsal veins; the corpus cavernosum invested with a thick fibrous sheath, and intersected with fibrous branching bands; the corpus spongiosum surrounding the urethra; the retractor muscle. **31.** 23

1151. Section of the Penis of a Horse, showing the interlacing fibrous and muscular bands in the interior of the corpus cavernosum. **31.** 24

1152. Two specimens of the Penis of the Dog. In one, the veins of the glans and corpus spongiosum are injected; in the other, a portion of the glans is removed to show its interior spongy tissue. **31.** 21

1153. The Genital Organs, together with the Bladder, Kidneys, and other adjacent parts, of a male Hedgehog (Erinaceus Europæus). The vesiculæ seminales are of large size, larger than those of man; and their ducts open into the urethra separate from those of the testicles. The large prostate and Cowperian glands are also shown. **31.** 5

SERIES XXXI.

ORGANS OF GENERATION IN THE FEMALE IN AN UNIMPREGNATED CONDITION.

1154. An Ovary, of which the blood vessels are minutely injected. Its fibrous covering or tunica albuginea presents numerous depressions or cicatrices indicating the former discharge of ova. On section its interior substance or stroma appears highly vascular; and the cavities of many Graafian vesicles or ovisacs are imbedded in it. **32. 1**

1155. An Ovary bisected and showing Graafian follicles.

Presented by Dr. Matthews Duncan.

1156. Two Ovaries, in which the Graafian vesicles, without any apparent change of texture, are large beyond the ordinary limits of health. **32. 2**

1157. Ovaries, with the Fallopian Tubes or Oviducts. Bristles are passed through the tubes, and their fimbriated extremities are displayed in their ordinary relation to the ovaries. **32. 3**

1158. A Fallopian Tube, of which the blood vessels are minutely injected; the canal is laid open, and the fimbriæ are displayed. **32. 4**

1159. The Internal Organs of Generation of a Girl aged 10 years. The length of the neck of the uterus in proportion to its body may be observed. The slight anteflexion which is present is not in excess of that which is frequently noticed in a majority of normal uteri. The vagina is rugose, the ovaries smooth, and the Graafian vesicles filled with a substance which, in the recent state, appeared gelatinous. **32. 12**

1160. Internal Organs of Generation from a Girl 13 years old. **32. 11**

1161. A similar specimen from a Girl 17 years old, who had menstruated only once. The uterus is imperfectly developed. **32. 10**

1162. The Uterus of a Virgin, with the pampiniform plexus of veins injected, showing the large sinus at the junction of the cervix and body.

Presented by Dr. Matthews Duncan, and injected by Professor Cleland.

1163. The Internal Organs of Generation in a Virgin, showing the rugæ of the vagina. The left Fallopian tube has attached to it an hydatid of Morgagni. The right ovary has a simple cyst.

Presented by Dr. Matthews Duncan.

1164. A healthy Uterus, showing the cavities of the body and cervix, and the arbor-vitæ of the latter.

Presented by Dr. Matthews Duncan.

1165. A Uterus with the Fallopian Tubes, Ovaries, and Round Ligaments. The lines of reflection of the peritoneum from the surfaces of the uterus are shown. 32. 9

1166. Sections of a Uterus, showing its outer form, the shape of its cavity, and the mingled muscular and fibrous tissues of its walls. Fine injection impelled into one of the uterine arteries has filled the small vessels of only the corresponding half of the walls and lining of the uterus; the injection has stopped abruptly at the middle line. 32. 6

1167. The Internal Organs of Generation in a Multipara, who had borne seven children. The vagina has only a small part rugous.

Presented by Dr. Matthews Duncan.

1167a. The Internal Genital Organs of a Woman who had borne children.

Presented by Dr. Matthews Duncan.

1168. A Uterus from a Woman who died during menstruation. It appears rather larger than usual; its mucous membrane is finely flocculent, and its vascularity is shown by minute injection. 32. 5

1169. External Organs of Generation in a Virgin, displaying the nymphæ, hymen, clitoris, and its prepuce; and, at the back of the preparation, the body and crura of the clitoris and part of the vagina. 32. 13

1170. The External Organ of Generation in a Virgin, showing the crescentic hymen, fossa navicularis, and fourchette.

Presented by Dr. Matthews Duncan.

1171. The External Organs of Generation in a Virgin, showing a circular and unusually thick hymen.

Presented by Dr. Matthews Duncan.

1172. The External Organs of Generation in a Virgin, showing a circular, thick frill-like hymen.

Presented by Dr. Matthews Duncan.

1173. The Ovaries, with their clustered distinct Ovisacs, the Oviducts, and the Cloaca of a Turtle. 32. 17

Presented by George Langstaff, Esq.

1174. The Ovaries of a Sow. 32. 14

1175. One of the Ovaries and a portion of one of the Horns of the Uterus of a Sow, with their blood vessels minutely injected. Several of the lobes of the ovary are laid open. 32. 15

1176. The Ovaries and Uterus of a Sheep; the uterus is an example of the Uterus bicornis. 32. 16

The three preceding specimens were presented by Dr. Conquest.

1177. The Organs of Generation of a Female Hedgehog (Erinaceus Europæus). 32. 13A

SERIES XXXII.

ORGANS OF GENERATION IN THE FEMALE DURING, OR SHORTLY AFTER, PREGNANCY, WITH SPECIMENS ILLUSTRATING THE DEVELOPMENT OF THE OVUM.

1178. An Ovary, divided longitudinally, showing a corpus luteum. From a woman at the commencement of the second month of pregnancy. **33.** 40

1179. An Ovary, from a woman who died in the fifth month of pregnancy. It shows a true corpus luteum. **33.** 41

1180. An Ovary, from a woman who died in the eighth month of gestation. A bristle is passed through an aperture in its fibrous covering, into the cavity of a corpus luteum. The cavity is oval, and has two or three short processes extending from it in a stellate manner: it measures nearly three lines in its chief diameter, and is bounded by a very thin white layer. The substance of the corpus luteum surrounding this cavity forms a nearly uniform layer about a line in thickness. The minute injection of the blood vessels show that this layer is much more vascular than any part of the ovary, and its principal vessels appear to pass in lines converging from its circumference towards its centre. **33.** 19

1181. An Ovary, in which is a well-formed corpus luteum. **33.** 21

1182. An Ovary, with a corpus luteum of unusually large size. It is of broadly oval form, measuring about three-fifths of an inch in its chief diameter, and projecting on the surface of the ovary. Its outer surface is lobed and crenate: its layer of yellow substance is about two lines thick; and its cavity is large, flattened, and bounded by a thin, but apparently distinct layer of soft substance of a yellow-ochre colour. No external aperture is visible on the surface of the ovary. **33.** 22

1183. Ovaries containing Corpora Lutea of doubtful age, the lower being evidently the more recent.

1184. A large Corpus Luteum, which has become decolorised in the spirit.

Presented by Dr. Matthews Duncan.

1185. An Ovary containing a Corpus Luteum, the centre of which is cystic. The surface of the organ is covered by ragged adhesions. **32.** 24

1186. An Ovary containing two Corpora Lutea, both of considerable size and cystic in the centre. Only one fœtus was in the uterus. **32.** 25

1187. An Ovary, in part of which the blood vessels are minutely injected. It contains a circumscribed mass of ochre-yellow colour, and a small nearly closed cavity bounded by a material of nearly similar colour. 33. 27

1188. A Uterus, with the ovaries and other adjacent parts, from a woman who was supposed to have been impregnated a short time before death. The interior of the uterus is rough from the discharge of the decidua. A bristle is passed through an aperture on the surface of the left ovary, into a cavity from which it was presumed the ovum was discharged, but which has the characters of a complete corpus luteum. 33. 18

1189. An Ovum at about the fourteenth day after impregnation. 35. 1

Presented by Dr. Conquest.

1190. An Ovum at about the third week of pregnancy. As in the preceding specimen, only the exterior of the ovum, with its uniformly flocculent or villous chorion, is shown. 35. 2

1191. An Ovum at about the third week. The embryo is injured; its posterior half, with the umbilical vesicle, remaining connected with the interior of the chorion. 35. 3

1192. An Ovum about two weeks after impregnation. Immediately beneath the villous chorion may be seen the outer layer of the amnion, separated by a small space from the true amniotic sac. The latter is very small, being no more than one-sixth of the whole bulk of the specimen.

Presented by Dr. Matthews Duncan.

1193. Decidua and part of the Membranes about twenty-one days from the cessation of menstruation. 35. 79

1194. An Ovum at about the third week. The chorion has been slit open and the amniotic bag turned out. The fœtus, about one-eighth of an inch in length, can be seen lying close to the chorion.

Presented by Dr. Gibson.

1195. An Ovum in its membranes at the fourth week of pregnancy, showing the shaggy chorion separated from the decidua.

1196. An Ovum about one month after impregnation. 35. 91

1197. An Ovum between the third and fourth week; the fœtus measures a quarter of an inch in length.

Presented by Dr. Gibson.

1198. An Ovum at about the fifth week, without the maternal decidua. 35. 5

1199. An Ovum at about the fifth week, showing the embryo, membranes, and a shred of decidua. 35. 6

1200. The Membranes of an Ovum at about the sixth week, showing the cavity lined by the amnion and surrounded by the decidua vera, reflexa, and serotina. The decidua vera is partly turned back so as to show the line of junction with the decidua reflexa and its continuity above with the decidua serotina.

Presented by Dr. Matthews Duncan.

1201. An Ovum of about the sixth week. The cavity of the ovum is laid open, and the embryo suspended in the liquor amnii by a short, thick, umbilical cord. The amnion, nearly pellucid, is detached from the interior of the chorion. It bears a few very delicate filamentous processes on its external surface, which are probably remains of the "Corps reticulé." The outer surface of the chorion is not flocculent; its substance is thicker and firmer, and in a large portion of its extent a placenta is developed. Parts of the maternal decidua remain attached to the exterior of the chorion. 35. 4

Presented and described by Dr. Conquest.

1202. An Embryo in its Membranes two months old. 35. 77

1203. A Fœtus and its Membranes about two months after conception, showing the villi of the chorion before they have become vascularised. 35. 78

1204. The Membranes of an Ovum at about the eighth week of gestation. The umbilical vesicle, with its vitellus, is seen at the upper part, and a portion of the umbilical cord below. 35. 93

1205. A Fœtus, one inch in length, in its Membranes, at the second month of pregnancy. The amnion, chorion, decidua vera, and part of the decidua reflexa can be distinguished; the umbilical cord measures half an inch. The arms and forearms, the thighs and legs, are differentiated, and the first stage of development of the eyes and ears may be seen.

Presented by Dr. Matthews Duncan.

1206. An Ovum about the eighth week of pregnancy, showing the membranes and part of the decidua reflexa.

1207. An Ovum at about the eighth week. The amnion is not opened; its outer surface is exposed by the reflection of the chorion and part of the decidua vera and reflexa, and is opaque. 35. 8

1208. A Uterus, with the Fœtus enclosed in its Membranes, in the second month of gestation. It measures four inches and three-quarters in length, of which the cervix comprises an inch and a quarter. The front wall has been laid open, and its inner surface can be seen lined by the decidua vera, which is slightly separated at the internal os. Within this the ovum is surrounded by the villous chorion and the decidua reflexa, the decidua serotina being attached at the fundus uteri. The fœtus itself may be seen enclosed in its amniotic sac. 33. 39

1209. A Uterus at about the second month of pregnancy. It measures five inches in length, the cervix being one inch and a quarter. The uterine cavity, which is opened from the anterior surface, is globular, and lined by a thick decidua vera, terminating below at the internal os, and partly peeled up from the uterine wall, a piece of glass rod being placed in the interval. Immediately within the decidua vera is the decidual cavity, which is entirely obliterated at the posterior surface by the union of the decidua serotina and reflexa marking the site of the developing placenta. In the centre is the fœtus, nearly two inches long, connected to the maternal structures by an umbilical cord two inches in length, and enclosed in the amniotic bag, which is here seen as a fine transparent membrane.

Presented by Dr. Matthews Duncan.

1210. An Ovum at the beginning of the third month. The amnion, chorion, and decidua are separated, and the external surface of the placenta is exposed. 35. 9

1211. An Ovum in the third month. The decidua is inverted, so as to show on its inner surface the numerous orifices of tubules. The umbilical cord is coiled thrice round the neck of the fœtus. 35. 10

Presented by Dr. Conquest.

1212. An Ovum at about the same date, with the umbilical cord coiled four times round the neck of the fœtus. 35. 11

Presented by Dr. Conquest.

1213. Section of a Uterus early in the third month of pregnancy. 33. 10

1214. Section of a Uterus in about the third month of gestation. The two layers of the membrana decidua are separated, and a part of the amnion is reflected from the surface of the placenta. 33. 9

1215. The Membranes of an Ovum at about the end of the third month. The amnion, chorion, and decidua are separated. 35. 12

1216. The Uterus at about the end of the fourth month of pregnancy, opened from behind, and showing its flattened globular form. There is a corpus luteum in the left ovary.

Presented by Dr. Matthews Duncan.

1217. A Fœtus in the fourth month, with its amnion and placenta. 35. 13

1218. A Uterus, with the Fœtus and its Membranes, in the fourth month of gestation. The decidua is separated from the interior surface of the uterus, whose laminated muscular structure is shown in the section through its walls. The ovula Nabothi are large and numerous. The left ovary contains a corpus luteum, with a large central cavity bounded by a thin opaque white membrane, around which is a layer of yellow substance, nearly a line in thickness. 33. 1

1219. A similar specimen; the fœtus is in its natural position, with the umbilical cord twisted round its arm. 33. 2

1220. A Uterus at the end of the fourth month of pregnancy. It measures seven and a quarter inches in length, the cervix being an inch and a half. The cord, eight and a half inches long, is attached to the margin of the placenta, near the left Fallopian tube. The fœtus measures nine inches. 33. 49

1221. A Uterus, with the Fœtus and its Membranes, between the fourth and fifth months of gestation. The neck of the uterus is laid open to show the mucous plug which occludes its canal. 33. 37

1222. A Uterus, with the Fœtus and its Membranes, *in situ*, at about the fifth month of gestation. The neck of the uterus, its globular body, and its transversely wide external orifice, are here shown. The umbilical cord is twisted round the neck of the fœtus. 33. 3

Presented, with the preceding specimen, by Dr. Conquest.

1223. A Fœtus in the fifth month, with its amnion, chorion, and placenta. The natural position of the child, with its several parts close-packed, may be observed. 33. 14

1224. A Uterus, with the Fœtus and its Membranes, at about the sixth month of gestation. A portion of the posterior wall of the uterus being removed, the uterine surface of the placenta is exposed. The head of the fœtus is uppermost. **33. 4**

1225. A Fœtus expelled at the seventh month with the amnion entire (*i.e.*, in a caul).

Presented by Dr. Matthews Duncan.

1226. A Uterus, with the fœtus in the normal position, at about the seventh month of gestation. The greater part of the uterine surface of the placenta is shown. **33. 5**

1227. A Uterus in advanced pregnancy. Its posterior wall is laid open to show the fœtus contained in the membranes.

Presented by Dr. Matthews Duncan.

1228. The Uterus distended in pregnancy at the ninth month. **33. 51**

Presented by Dr. Matthews Duncan.

1229. A similar specimen of a pregnant uterus at the end of the ninth month. **33. 6**

1230. Section of a Uterus at full term with the placenta adherent. The uterine sinuses are well shown.

The woman died in difficult labour three hours after decapitation of the fœtus.

Presented by Dr. Matthews Duncan.

1231. An Impregnated Uterus, dried after the injection of its principal arteries, whose extremely tortuous course is thus shown; the "puerperal" artery may be seen running along the lateral margins of the organ. **33. 12**

1232. An Impregnated Uterus inverted, and showing the arrangement of some of its interior muscular fibres; especially of those that form circles around the entrances of the Fallopian tubes. **33. 7**

Presented by Dr. Conquest.

1233. The Cervix Uteri, in the eighth month of pregnancy.

Taken from a woman who died of typhus in the Royal Infirmary of Edinburgh, and on whom Cæsarian section was performed immediately after death. The child lived five hours.

Presented by Dr. Matthews Duncan.

1234. A section of the wall of a parturient Uterus from the Vagina to the Fundus, showing the difference in the thickness between the cervix and the body. The black piece of whalebone is placed at the internal os uteri, opposite the large circular sinus.

Taken from a woman who died of hæmorrhage when the head only of the child was born.

Presented by Dr. Matthews Duncan.

1235. The Uterus of a Woman who died a few hours after parturition at the full period. Its interior surface is very rough, especially at the part from which the placenta separated. **33. 13**

Presented by Dr. Conquest.

1236. Section of a similar specimen.

Presented by Dr. Matthews Duncan.

1237. Uterus shortly after delivery.

Presented by Dr. Matthews Duncan.

1238. A Uterus ten days after delivery. A part of the site of the placenta is marked by a raised and ragged patch of mucous membrane.

1239. The Uterus of a Woman who died nearly a fortnight after parturition at the full period. 33. 14

Presented by Dr. Conquest.

1240. A Uterus of about a fortnight after delivery.

Presented by Dr. Matthews Duncan.

1241. The Uterus of a Woman who died shortly after parturition. It has been dried after the injection of its principal blood vessels. 33. 15

1242. A similar preparation. 33. 16

1243. A similar preparation of a Uterus, with its veins injected, six weeks after parturition. The uterus appears to have nearly recovered its natural size, but its veins remain, proportionally, very large. 33. 17

1244. A Fœtus aged about 4 weeks.

Presented by Dr. Gibson.

1245. A Fœtus about 6 weeks old. 35. 84

1246. A Cingalese Fœtus of about 6 weeks. 35. 92

1247. A Fœtus between 2 and 3 months old. 35. 85

1248. A Fœtus nearly 3 months old. 35. 86

1249. A Fœtus about 4 months old. 35. 87

1250. A Male Fœtus of 7 months with the placenta and membranes.

Presented by Dr. Matthews Duncan.

1251. A Male Fœtus at full term with the placenta and membranes. There is a knot in the cord.

Presented by Dr. Matthews Duncan.

1252. A Fœtal Skeleton at the fourth month.

Presented by Dr. Matthews Duncan.

1253. A Fœtal Skeleton at the fourth month.

Presented by Dr. Matthews Duncan.

1254. A Fœtal Skeleton at the fifth month.

1255. The Skeleton of a Fœtus of 7 months preserved in turpentine.

Presented by Dr. Matthews Duncan.

1256. A Fœtal Skeleton at the sixth month.

1257. A Fœtal Skeleton at the seventh month.

1258. A Skeleton of a Child born at full term.

1259. A similar specimen.

1260. A similar specimen.

1261. A similar specimen.

1262. Spinal column with Pelvis of a Fœtus about 4 months old, showing its natural lordosis. 35. 89

1263. A Fœtus in the fifth month of gestation. The thorax and abdomen are opened from the front, showing the highly arched diaphragm, the position of the small undistended lungs, and the heart with the thymus gland. The left testicle is seen at the internal inguinal ring.

Presented by Dr. Matthews Duncan.

1264. A Fœtus, with the thoracic and abdominal organs displayed *in situ*. The large thymus gland and the central position of the liver are to be noted. 35. 65

1265. Heart and Lungs of a Fœtus. 35. 90

1266. The Heart, Lungs, and Thymus Gland of a mature Fœtus. 35. 52

1267. The Heart of a mature Fœtus, displaying the nearly equal thickness of the walls of both ventricles. 35. 43

1268a. 1268b. Parts of Fœtuses of different ages, dried after the injection of the principal blood vessels, illustrating especially the course and relations of the ductus arteriosus, and of the umbilical arteries and vein, the communications of the umbilical and portal veins, and the course and relation of the ductus venosus. 35. 50

1269. A Fœtal Heart at about the seventh month, showing the foramen ovale and its valve. 35. 44

1270. A similar specimen from a mature Fœtus. 35. 45

1271. A Fœtal Heart at about the sixth month. An opening into the right auricle displays the large Eustachian valve. 35. 46

1272. A similar specimen from a mature Fœtus. The Eustachian valve is much smaller. 35. 47

1273. The Heart of a healthy Fœtus at full term. It shows the foramen ovale partially closed.

Presented by Dr. Matthews Duncan.

1274. The Heart of a Fœtus at full term, showing the foramen ovale nearly closed.

Presented by Dr. Matthews Duncan.

1275. The Heart of a healthy Fœtus at full term, injected to show the ductus arteriosus, which is coloured blue.

Presented by Dr. Matthews Duncan.

1276. Part of the Internal Organs of a premature Fœtus, showing the ductus venosus, umbilical arteries, urachus, and cord.

Presented by Dr. Matthews Duncan.

1277. Part of the Internal Organs of a Fœtus at full term, showing the ductus venosus, umbilical arteries, urachus, and cord.

Presented by Dr. Matthews Duncan.

1278. The Heart of a Fœtal Calf, with its right auricle laid open. The vena cava inferior opens immediately behind the foramen ovale, so that their passages are directly continuous, and there is no Eustachian valve. Below the foramen ovale is the large orifice of the coronary vein. 35. 48

1279. Portion of a Fœtus in the sixth month, showing the nearly vertical position of the stomach. The lobed form of the kidneys, the large size of the supra-renal capsules, and the position of the testes, immediately above the inguinal rings, are also shown. 35. 38

SPECIMENS ILLUSTRATING THE DEVELOPMENT OF THE GREAT OMENTUM AND TRANSVERSE COLON.

1280. *Embryo* 1. Embryo about an inch long. The stomach is almost vertical, and attached to the posterior wall of the abdomen by a meso-gastrium. The meso-gastrium is fastened to the greater curve of the stomach. The intestines form a simple short loop of the same calibre throughout.

Embryos 2 and 3. Embryos, of the same size, about two inches long. In one embryo the small intestines have been torn off. The stomach is less vertical, and the great omentum can be seen as a delicate streak along the greater curve. The left and transverse portions of the colon are attached to the back of the abdomen by a considerable mesentery. The left colon is almost in the middle line of the body; the transverse colon is beneath the stomach, quite free, and separated from the great omentum by a wide interval or fossa: the peritoneum which belongs to the under surface of the omentum being continuous with the peritoneum of the upper surface of the meso-colon. The small intestines occupy the right side of the abdomen, the large the left side and upper part. There is no right colon.

1281. Two Embryos about three inches long. The great omentum has increased in length, and the transverse colon is beneath it, attached to the posterior wall of the abdomen by a mesentery. There is no trace of any adhesion between the transverse meso-colon and the great omentum, but the fossa between them seen in the preceding specimens is not so deep.

1282. *Embryo* 1. About four inches long. The fossa between the great omentum and transverse meso-colon has almost disappeared, but is still well marked towards the left. Owing to the disappearance of the fossa the colon no longer has a mesentery when viewed from above, but is almost between the layers of the great omentum.

Embryo 2. Five inches long. The fossa between the transverse meso-colon and the omentum has almost disappeared; there is still a trace of it towards the left end of the stomach. There is no transverse meso-colon, and the colon is between layers of the great omentum. The cæcum has travelled further round the abdomen, and there is a partial right colon.

Presented by C. B. Lockwood, Esq. See *Journal of Anatomy and Physiology*, vol. xviii, p. 1.

1283. Part of a Fœtus, showing especially the deeply lobed surface of the kidneys, the comparatively large size of the supra-renal capsules, and the position of the testicles. 35. 57

1284. Part of a Fœtus. The testicles are attached by triangular peritoneal folds extending to the posterior wall of the abdomen, in front of the psoas muscles, and just below the kidneys. A bristle is placed under the right gubernaculum testis. 35. 58

1285. A similar specimen, showing in addition the abdominal position of the bladder. 35. 59

1286. Part of a Fœtus, with the testicles, in the course of their descent, lying immediately above the internal inguinal rings. 35. 61

1287. Part of a Fœtus, with the testicles in the scrotum. Bristles are passed through the canals of communication between the cavities of the tunicæ vaginales and the peritoneum. 35. 62

1288. The lower part of a Fœtus, with the right testicle in the abdomen, and the left in the scrotum. 35. 63

1289. Portion of a Fœtal Small Intestine, with largely developed villi, but no valvulæ conniventes. 35. 39

1290. Portion of Fœtal Ileum, with the cæcum and its appendix turned inside out. The appendix is of proportionally large diameter, and enlarges into its continuity with the cæcum much more gradually than in the perfect state. 35. 40

1291. The lower end of the Ileum, with the Cæcum, Colon, and Rectum of a Fœtus, inflated and dried after injection of their blood vessels. 35. 41

1292. A Fœtal Thymus Gland. 35. 42

1293. Placenta, with part of the Umbilical Cord. The fœtal blood vessels are injected. 35. 17

1294. Placenta, from which, by maceration and washing, nearly all the blood was removed. The finely flocculent structure is thus shown which is formed by the growth of the villi of the chorion and their enclosed fœtal blood vessels. 35. 18

1295. A similar specimen. 35. 19

Presented by Dr. Conquest.

1296. A similar specimen, prepared after injection of the fœtal blood vessels. 35. 20

1297. Placenta and Cord, dried after the injection of their principal blood vessels, so as to show the mutually entwining spiral course of the umbilical arteries and vein within the cord, and their large diverging branches on the fœtal surface of the placenta. 35. 21

1298. A similar specimen, with the cord attached to the edge of the placenta. (Battledore placenta.) 35. 22

Presented, with the preceding, by Dr. Conquest.

1299. A Battledore Placenta.

1300. Triplets at about the fourth month of pregnancy. Each fœtus is provided with a separate amnion, no two of the amnia being in any way fused, although in very close contact. There is one chorion into which the umbilical cords are inserted.

Presented by Dr. Matthews Duncan.

1301. The Placentæ of three Children born at one birth. 35. 29

1302. A Quadruplet Placenta.

1303. A Triplet Placenta.

1304. A Double Placenta, showing the irregular dilatations of the arteries on the surface.

1305. A Double Placenta, showing the anastomoses of the arteries and of the veins, and of considerable arterial branches with veins.

Presented, with the three preceding specimens, by Dr. Matthews Duncan.

1306. An Umbilical Cord injected, showing the left-handed spiral arrangement (sinistrorse) of the vessels.

Presented by Dr. Matthews Duncan.

1307. Portion of an Umbilical Cord which was found tied into a knot. 35. 26

1308. Nidamental Capsule of a Shark, laid open, showing two embryos in its interior.

1309. An Embryo Skate (Raia Batis), with its large umbilical vesicle. 35. 36

1310. The Ovary and adjacent parts of a common Fowl, showing the clustered ovisacs filled with ova in successive stages of development. One ovum, exposed at the lower part of the oviduct, has acquired all its coverings and a perfect shell. In the upper and front part of the preparation the commencement of the oviduct is shown, and in the lower part the cloaca, with the terminations of the oviduct and the rectum. 33. 35

1311. A similar specimen. 33. 36

1312. Portion of one of the horns of the pregnant Uterus of a Sow. Its blood vessels are minutely injected, and its cavity laid open, showing the transverse undulating folds of its mucous membrane. 33. 29

1313. Portion of the pregnant Uterus of a Sheep, having numerous small and highly vascular elevations, or cotyledons, on its inner surface. 33. 30

1314. Part of Cotyledonary Placenta of a Sheep.

Presented by Dr. Gibson.

1315. Part of Cotyledonary Placenta of a Cow, injected.

Presented by Dr. Matthews Duncan.

1316. Portion of the pregnant Uterus of a Cow, with three cotyledons on its inner surface. The lowest of these is still covered with the fœtal amnion and chorion fitted to its surface. From the middle one these membranes are reflected, and the villi of the chorion are shown, which filled the tubular depressions or inflections from the surface of the cotyledon. The upper one is similarly exposed by the reflection of the chorion and amnion. 33. 31

The four preceding specimens were presented by Dr. Conquest.

1317. An Embryo Calf, in its Amnion. 35. 35A

1318. A Fœtal Calf, in its Amnion. 35. 74

1319. The diffused Placenta of a Mare, injected. One part is fœtal, the other maternal.

Presented by Dr. Matthews Duncan.

1320. Portion of a Chorion of a Fœtal Horse. The injection of its blood vessels shows the numerous minute and close-set vascular eminences which were adapted to the inner surface of the uterus preserved in No. 1322. **35.** 33

1321. Portion of the Chorion of a Fœtal Horse, dried after the injection of its arteries with mercury, and of its veins with yellow wax. **35.** 34

1322. Portion of the pregnant Uterus of a Mare. Its inner surface is beset with minute vascular elevations very closely arranged. **33.** 32

1323. A Kitten enclosed in its amnion and chorion, and encircled by its annular placenta. **35.** 30

1324. A Kitten, with its membranes. **35.** 32

1325. The Placenta of a Kitten. **35.** 31

Presented, with the preceding, by Dr. Conquest.

1326. A Pregnant Mouse, with two Fœtuses in each horn of its uterus. The large size of the arteries supplying the uterus is shown by injection. **33.** 28

1327. The Pelves of three Guinea Pigs (Cavia aperea), and the skull of one just born, showing the adaptations of the pelvis to parturition. Above, the pelvis is shown in its ordinary state, with close approximation of the pubic bones. Below this, is a pelvis taken at the time of parturition, with the pubic bones separated nearly an inch and a half: the ligament of the symphysis being elongated to the same extent, and the expanded portions of the ilia being carried outwards and upwards with slight elongation of the sacro-iliac ligaments. The lowest of the three pelves was taken seventy-two hours after parturition: and there remains only a very slight separation of the ossa pubis. **33.** 33

Presented by Thomas Wilson, Esq.

1328. Pelvis of a Guinea Pig at the time of parturition, with separation of the pubic bones and elongation of their ligament. **33.** 34

Presented by Dr. Conquest.

SERIES XXXIII.

THE MAMMARY GLANDS.

1329. A Mammary Gland, in the inactive state. 34. 1

1330. A Mammary Gland from a Woman who died shortly after parturition. In comparison with the preceding specimen it shows the great increase in the size of the gland during its period of active function, the enlargement and prominence of the nipple, and the distension of the principal lactiferous ducts. 34. 2

1331. A similar specimen.

1332. Nipple and surrounding Areola from a Mammary Gland at about the fifth month of pregnancy. 34. 3

SERIES XXXIV.

DISSECTIONS OF VARIOUS REGIONS OF THE HUMAN BODY.

1333, 1334. Vertical sections of a Head, displaying the parts concerned in deglutition, and the nasal cavities. The left half exhibits the following parts, tracing them from below upwards, and from before backwards: The cavity of the mouth, with the median sections of the lower and upper jaw bones, the left submaxillary duct, part of the tongue, the halves of the epiglottis, larynx and pharynx, and of the soft palate and uvula, and the left arches of the palate, the anterior or palato-glossal, and the posterior or palato-pharyngeal arch, between which a part of the left tonsil may be seen. Above the palate, the left nasal fossæ are shown, and portions of bougie are introduced into the nasal duct under the anterior part of the inferior turbinated bone, and into the orifice of the antrum under the middle turbinated bone. The orifice of the Eustachian tube is shown behind, and on a level with, the end of the inferior turbinated bone; the frontal, ethmoidal, and sphenoidal sinuses are laid open, and the cerebral nerves are dissected at the foramina, whence they pass through the base of the skull. The right half of the head exhibits, together with the sections of the tongue, larynx, pharynx, and palate, the whole nasal septum, and a more complete view of the frontal and sphenoidal sinuses, into which portions of bougie are passed from the nasal cavities. **10. 2**

1335. A section similar to the previous specimens.

1336. The external surface of a Brain, with the convolutions painted in different colours.

1337. Longitudinal section through the Encephalon.

1338. Sections through the various parts of the Encephalon.

1339. A Brain, with the lateral ventricles exposed.

1340. A similar specimen.

1341. Dissection of the Encephalon, displaying the cavities of the third and fourth ventricles.

1342. The Base of a Brain, with its vessels and nerves.

1343. Base of a Skull, with its vessels and nerves.

1344. A Dissection of the Contents of the Orbit.

1345. The Pterygoid Region and Nasal Fossæ from within.

1346. The Pharynx and Nasal Cavities, with the internal and carotid artery, the eighth pair of nerves, and the surrounding parts, viewed from behind.

1347. The Submaxillary Region dissected from below.

1348. Portion of a Spinal Cord, from the cervical and dorsal regions, together with the several nerves connected with it. The principal things shown are: 1. The mode of origin of the spinal nerves, by anterior and posterior roots, each of which is composed of many fasciculi; 2. On the right side, the ligamentum dentatum, and its pointed attachments, between the roots of the nerves, to the inner surface of the dura mater; 3. The ganglia formed on the posterior roots of the nerves, and having the anterior roots in contact with their anterior surfaces; 4. The formation of the axillary or brachial plexus, by the commingling of the filaments of the last four cervical and the first dorsal nerves; 5. The distribution of the principal branches of the same plexus; 6. The arrangement of the intercostal nerves derived from the first five dorsal nerves. The specimen is described and represented in the "Anatomical Sketches and Diagrams" by Mr. Wormald and Mr. McWhinnie. 22. 10

1349. A Dissection of the Spinal Cord, with its nerves, from behind.

Dissected by S. H. Habershon, Esq.

1350. A Dissection of the Face and Neck, showing especially the divisions of the external carotid artery and external jugular vein, together with the branches of the cervical plexus and of the facial nerve.

1351. A deep Dissection of the right side of the Neck.

1352. The Root of the Neck, with the Lungs, from the front.

1353. The Arm, Axilla, and Neck of a Fœtus, dissected upon the right side.

1354. The Muscles of the Tongue, dissected, with the laryngeal cartilages.

1355. Preparations of the Larynx, Trachea, Tongue, and Thyroid Gland.

1356. A Dissection of the Suboccipital Triangle.

1357. The Abdominal Aorta, the Vena Cava, the Kidneys with their Vessels, and the Ureter, from the front.

1358. The Thoracic and Abdominal Viscera of a Fœtus displayed from the front.

1359. Stomach, Liver, and Duodenum of a Fœtus.

1360. The Ascending and Descending Colon, the Kidneys, and the Spine, from behind.

1361. The Posterior Mediastinum and its contents; the azygos veins are injected.

1362. The Posterior Mediastinum and its contents, showing the position of the Thoracic Aorta, the Œsophagus, Roots of the Lungs, &c.

1363. The Heart, Lungs, and Arch of the Aorta, from the front.

1364. Sections displaying the Cavities of the human Heart in the Fœtus, in the Child, and in the Adult.

1365. A Penis and Urinary Bladder. The urethra is laid open along its dorsal surface, and bristles are placed in the common ejaculatory ducts. In another part of the specimen are transverse sections of a penis at different levels.

1366. Sections of the Pelvic Organs and Perineum of a Woman 25 years old, giving a side view of the organs of generation, and of the rectum and urinary bladder, with their peritoneal coverings. 32. 8

1367. Female Genital Organs. The ovaries, Fallopian tubes, uterus, and vagina are suspended in their natural positions, with their blood vessels injected, and their cavities laid open. 32. 7

1368. A Fœtus with its membranes in the Uterus, at the sixth month of pregnancy.

1369. The Scapular and Humeral Muscles, with their arteries and nerves, from behind.

1370. A dissection of the Axilla.

1371. A dissection of the outer side of the Forearm.

1372. Transverse sections through the Arm and Forearm.

1373. A superficial dissection of the front of the Elbow.

1374. A deep dissection of the front of the Elbow.

1375. A dissection of the Palm of the Hand.

1376. A dissection of the Dorsal and Palmar Interosseous Muscles of the Hand.

1377. A dissection of the Palm of the Hand. The arteria superficialis volæ is abnormally large, and forms with the ulnar the superficial palmar arch.

1378. A dissection of the Glutæal Region; the glutæus maximus has been removed.

1379. A deep dissection of the Inguinal Region, showing the iliac fossa, the bladder, the iliac and femoral vessels, and the obturator vessels and nerves; Poupart's ligament has been divided, and the superficial muscles cut and turned aside.

1380. Scarpa's Triangle and its contents.

1381. A dissection of the Popliteal Space and its contents.

1382. A dissection of the Tendons, Vessels, and Nerves passing behind the Internal and External Malleoli.

1383. Longitudinal sections of a Foot, and of the Ankle Joint, together with transverse sections of the Bones of the Leg.

1384. A superficial dissection of the Sole of the Foot.

1385. A dissection of the Sole of the Foot.

1386. A deep dissection of the Sole of the Foot.

1387. A dissection of the Sole of the Foot; the plantar fascia has been removed.

SERIES XXXV.

MISCELLANEA.

1388. Several specimens of Amphioxus Lanceolatus.

Presented by H. L. Jones, Esq.

1389. Proteus Anguinus. c. 10

Presented by Dr. Roupell.

1390. Sucking Fish (Echeneis Remora). c. 11

Presented by W. Rowland, Esq.

1391. Sucker of a Remora. c. 12

1392. Blind Fish (Amblyopsis Spelæus) from the caves of Kentucky. c. 60

1393. Dog Fish.

Presented by H. L. Jones, Esq.

1394. Sections through a Lamprey, showing the vertebral column and the several cavities.

1395. Anterior end of a Lamprey, showing the seven pairs of gill-pouches and the dorsal opening of the mouth.

1396. Stomach, Liver, and Pyloric Cæca of Cottus Scorpio.

Presented by Dr. Norman Moore.

1397. Cottus Scorpio. The pigmented pericardial membrane crosses the body cavity, and at its back is perforated by the short, ridged pharynx. Upon it rests the heart, the ventricle in front, the auricle behind, and the aortic bulb above.

Presented by Dr. Norman Moore.

1398. Poison Spine of Weeve.

Presented by Dr. Norman Moore.

1399. Heart of Lophius Piscatorius, showing the large globular ventricle, the auricle with scalloped edge, and the issuing vessels.

Presented by Dr. Norman Moore.

1400. Alimentary Canal of Wrasse, showing the absence of any definite stomach.

Presented by Dr. Norman Moore.

1401. Anarrhichas Lupus. Dissection showing the rectum opening in front of the urinary bladder. A silver wire is passed round the kidney, and above this is the ovary.

Presented by Dr. Norman Moore.

1402. Fish dissected to show the air bladder attached to the vertebræ.

1403. Head of Fish.

1404. Small Flying Fish. c. 67

1405. Chamæleons (Chamæleon vulgaris). c. 57, 57A

1406. A Chamæleon dissected to show the internal organs.

1407. Lizard from Guernsey. c. 5

Presented by W. S. Ward, Esq.

1408. Gecko (Stellio Gecko). c. 6

Presented, with the following specimen, by Dr. Arthur Farre.

1409. Skink (Scincus officinalis). c. 7

1410. A Green Lizard.

1411. Lizard, showing the External Tympanum.

1412. Draco Volans.

1413. Draco Volans, showing the internal organs.

1414. A young Crocodile.

1415. Feet of a Kingfisher (Alcedo Ispida). c. 65

1416. A Fœtal Kangaroo.

1417. A young Opossum (Didelphis Marsupialis). c. 3

Presented by Dr. Arthur Farre.

1418. A Fœtal Porpoise.

1419. A Fœtal Seal.

1420. Four Ermine Weasels or Stoats (Mustela erminea), showing the changes of colour of their hair in the transition from summer to winter. c. 1

1421. Anal Sacs or Glands of a Badger (Meles vulgaris). **21.** 1

1422. Anal Sacs or Glands of a Cat. **21.** 2

1423. The ink-bag of a Calamary (Loligo vulgaris). **21.** 3

1424. Natural Mummy of a Child buried in the year 1777. c. 46

1425. Mummy of a Cat. c. 44 A

Presented by Dr. Hogg.

1426, 1427. Portions of Human Skin converted into Adipocere. c. 47, c. 48

Presented by Dr. Kidd.

1428. Portion of Muscle and Fat converted into Adipocere. c. 49

SERIES XXXVI.

CATALOGUE OF INVERTEBRATA.

Sub-Kingdom I.—PROTOZOA.

1429. Nummulites.

1430. Foraminifera, Fossil.

1431. Foraminifera from the Mediterranean Sea (recent).

1432. Foraminifera from the Australian Sea (recent).

Sub-Kingdom II.—CŒLENTERATA.

Class I.—SPONGIDA.

1433. Spongia Officinalis, Common Sponge, attached to the rock on which it grew.

1434. A specimen of Sponge of a coarser and harder texture, to which one of finer grain and looser texture is attached. The larger sponge appears to have originally grown on the spiral case of a Tubicolar Annelid.

1435. A portion of Sponge of similar texture to the smaller portion in the last preparation.

1436. A Sponge deeply concave in its centre.

1437. Section of Sponge (Spongia Officinalis).

1438. Siliceous Granules of Sponge.

1439. Euplectella Spcciosa.

Class II.—HYDROZOA.

1440. A group of Scrtularia, suspcnded in spirit. It consists of a number of regularly branched trcc-like stems which arise from a common "stolon" fixed to thc shell. The branchcs arc scrrated. This appcarance is duc to thc prcscncc on thcm of hydrothecæ or cells, in which thc polypitcs during lifc wcrc situated. The branchcd stcm as a whole is known undcr thc tcrm "polypary,"

and consists in this case of horny, and not of calcareous material. The small white bodies attached are for the most part the calcareous cases of a tubicolar annelid.

1441. A portion of Sertularia, mounted as a microscopical object.

1442. Sertularia Abutina, on Pecten.

1443. Sertularia, taken from Pecten.

Presented by Mr. Gaze.

1444. Velella. The preparation is suspended by a thread passed through the thin upright and crest-like "pneumatophore," not far from the junction of the pneumatophore with the disc. On the under surface the disc is seen covered by the polypite-like "gonoblastidia."

Class III.—ACTINOZOA.

ZOANTHARIA.

1445. Actinia (Sea Anemone), attached to the shell of a whelk. The tentacles are almost completely retracted, two or three just protruding from the puckered and contracted oval ring. The actinidæ have no corallum.

1446. Madrepora (Brain Coral).

1447. Sclerodermic White Coral.

ALCYONARIA.

1448. Tubipora Musica (Organ Pipe Coral). The corallum ceases to have traces of the thecæ or septa, the corallites being simple tubes connected together by horizontal plates.

Sub-Kingdom III.—ANNULOIDA.

Class I.—ECHINODERMATA.

(A.) CRINOIDEA.

1449. Three dried specimens of Antedon Rosaceus or Comatula Rosacea (Rosy Feather Star). The specimens are attached to the glass, so that the side opposite to the mouth or oral aperture is uppermost. In the specimen nearest the right hand corner of the glass, the jointed appendages or filaments have been removed from the convexity of the base, in order that the structure of the arms or rays may be better seen. Five rays are articulated to the central disc; each

ray almost at onee subdivides, so that the animal appears to be provided with ten arms or rays. Along the sides of the arms are situated the jointed lateral processes or "pinnules," which in the recent state are clothed with and supported by a broad membrane. The mouth and principal part of the soft structures of the animal are situated in the cup-shaped cavity in the disc opposite the convexity shown in these specimens.

(B.) OPHIURIDEA.

1450. Ophiocoma Granulata (Granulated Sandstars). On the dorsal surface the disc is round and flattened. No madreporic tubercle or anus exists in the Ophiuridea. The under surface shows the quinpartite arrangement of the disc, and the oral aperture. The dorsal and ventral plates of the rays are smooth, whilst the lateral ones are symmetrically fringed with spines.

(C.) ASTERIDEA.

1451. Uraster Rubens (common Crossfish; common Starfish). The specimen in drying has assumed a much flatter form than is natural in the recent state. The animal consists of a central disc, prolonged into five rays of nearly equal size. Situated nearly in the centre of the disc may be seen the anus, and nearer the circumference of the disc, between two of the rays, is secn the "madreporic tubercle or plate," which communicates with the water vascular systcm. The two arms or rays between which the madreporic plate is situated are known as the "bivium," the remaining three as the "trivium."

1452. A smaller specimen of the same species, in which two of the arms, one of the bivium, and one of the trivium, are in a rudimentary condition. The rudimentary rays are in process of growth, to replace arms probably lost by accidental violence.

1453. A specimen of the same species in spirit, showing on the under surface the numerous rows of ambulacra, with their globose ends.

1454. Uraster Glacialis (Spiny Crossfish). The specimen is placed on a sheet of talc, with dorsal surface outwards, and in such a position that the median ray and the next to the left form the "bivium," the remaining three the "trivium." On the dorsum of the disc a small pit is visible, marking the situation of the anus; and above it, and a little to the left, is situated the "madreporic plate or tubercle." The rays are long, rounded, and spinous; on the under surface the mesially placed mouth, or oral aperture, can be seen, with the rows of suckers along the arms. These suckers are placed in four rows along the middle of each arm: the rows are technically called "avenues."

1455. Cribella Oculata.

1456. Cribella Oculata. The number is placed on the central ray of the "trivium." The amount of calcareous matter present in the integument is much greater than in the preceding specimens. On the under surface the grooves through which the ambulacra project are very narrow. Situated between the two rays of the "bivium" the madreporic tubercle is very visible, and above it, and a little to the left of the line drawn from the madreporic tubercle through the axis of the central ray of the trivium, is the anus.

1457. Solaster Papposa (common Sun Star).

1458. Palmipes Membranaceus.

1459. Goniaster Templetoni.

1460. Asterias Aurantiaca.

(E.) ECHINIDEA.

1461. Echinus Sphæra (common Egg or Sea Urchin). In the Echinidea the integument contains so much calcareous material that it forms a complete box. In this specimen the oral apparatus with the muscular integument surrounding it has been lost, as have also been the small plates surrounding the anal opening. The rounded tubercles to which the spines are attached and the rows of pores for the passage of the ambulacra are well marked, but the structure of the shell is better seen in the succeeding preparations.

1462. The anterior or oral portion of an Egg Urchin, to which some of the spines are still adherent. In the centre is seen a whitish cone formed by the ends of the five pointed and enamel-like teeth, and immediately surrounding them is a ring of muscular integuments, only sparingly scattered with calcareous plates.

1463 and **1464.** Apical and oral portions of the shell of the common Echinus. In this specimen, as in the former ones, the quinpartite arrangement of the shell is obvious. The rows of pores, obliquely parallel, through which the ambulacra pass, correspond with the "avenues" of the starfishes. The "avenues" are separated by a double row of "interambulacral plates," which are not perforated. Both sorts of plates, the perforated and imperforate alike, give attachment to the movable spines which have been removed in No. 1461, leaving the rounded tubercles to which they are attached visible. In the oral half, No. 1464, the arrangement of the rows of pores is seen from the inside, and the complicated oral apparatus known as the "lantern of Aristotle" can be seen. The five parts of which it is made up, and the muscles which move them, are shown. In the apical portion, No. 1463 (at the apex), are situated five perforated and somewhat heart-shaped plates surrounding the anus, and between them five smaller plates of somewhat similar appearance. The largest of the five plates in the first row differs in appearance from the rest, and is the "madreporic plate;" by means of it the water vascular system is brought into communication with the external water. The apertures in the other plates of the first row give exit to the genital products, and hence they are known as the "genital plates." The second row of smaller plates are known as the inter-genital plates.

1465. Echinus Miliaris (purple Tipped Egg Urchin). Four specimens of various sizes, from one of which the spines have been rubbed off, showing that the tubercles to which they are attached are large and prominent in this small species.

1466. Spatangus Purpureus (purple Heart Urchin). The animal is suspended with the anus upwards. In the Spatangidæ the body is not so symmetrical as in the Echinidæ proper. The anal orifice is terminal, but the mouth is situated in a somewhat deep depression, shielded by a projecting plate. The ambulacra on the dorsal surface are arranged in a star shape, and those surrounding the mouth have a similar disposition.

1467. The dried shell of Spatangus Purpureus. Many of the spines have become broken or rubbed off.

1468. Acrocladia Mammillata. The massive spines of this species give the animal a curious appearance. Many of the spines have become detached, and some are fastened on the glass.

Class II.—SCOLECIDA.

TREMATODA.

1469. Distoma Hepaticum. Common Liver Fluke from the sheep.

1470. Distoma Hepaticum. Fluke from liver of sheep.

1471. Single specimens of the same mounted on glass slides.

CESTODA.

1472. Tænia Mediocanellata. The head is seen supported by the loops of wire. No ripe proglottides similar to those in No. 1474 remain attached to the distal end.

1473. Head and proximal segments of Tænia Mediocanellata.

1474. Tænia Solium (common Tape Worm). The head and proximal part of the animal is not shown, the preparation consisting of numerous joints nearly mature. This species is not so common in London as Tænia Mediocanellata.

1475. Another specimen of Tænia Solium.

1476. A portion of Tænia Solium. The generative organs are shown, the ovary being injected with mercury.

1477. Cysticercus Cellulosæ. From a portion of measly pork. The cystic or scolex form of Tænia Solium.

1478. Tænia Serrata. Head and proximal joints, from a cat.

1479. Bothriocephalus Latus. The head and finer portions, or proximal end, of the worm were not obtained. The position of the outlets of the generative organs at once enables one to separate this animal from the common tape worm. The worm is comparatively rare in England. The specimen was expelled from the intestines of a dock labourer at the East India Docks.

1480. Portion of Bothriocephalus latus passed from the intestines of a young woman, born of Swiss parents, but living in Scotland.

1481. Tænia Serrata from small intestines of dog.

1482. Tænia Echinococcus Veterinorum (pill box Hydatid). In the upper part of the preparation is suspended the maternal cyst, which has ruptured and given exit to the daughter cysts, which lie at the bottom of the jar. Some of the larger daughter cysts may be seen to contain secondary

daughter cysts within them. The common hydatid is the immature or cystic form of tape worm, "Tænia Echinococcus," which in the adult stage inhabits the intestines of dogs, wolves, and foxes.

1483. Acephalocyst Hydatids from the human liver. In the internal surface of one, which is suspended and everted, there is an appearance of clusters of small opaque vesicles; these are probably clusters of Echinococci.

1484. Similar Acephalocysts.

1485. An Hydatid Cyst which occupied the pelvis of an infant, and produced fatal retention of urine.

1486. Portions of an Hydatid, the walls of which are separated into several layers.

1487. Hydatid from liver of pig. It is opened and everted to show the groups of endogenous acephalocysts attached to its internal surface.

NEMATOIDEA.

1488. Ascaris Lumbricoides (common Round Worm). Female. It closely resembles an earth worm in appearance.

1489. Ascaris Lumbricoides from the human small intestine. The intestinal canal and long oviducts are displayed.

1490. Ascaris Lumbricoides (common Round Worm). Female. Dissected so as to show the tubular ovary and uterus, and the nearly straight, simple intestine.

1490a. Round worms from the intestine of a red mullet.

1491. Trichocephalus Dispar. Female. From the cæcum of man.

1492. Filaria Medinensis (Guinea Worm). From the human subcutaneous tissue.

1493. Dracunculus. Filaria Medinensis (Guinea Worm). The guinea worm during the stage in which it is parasitic in man is not adult, the sexual organs being undeveloped, but the animal multiplies its species by a kind of internal gemmation.

1493a. A similar specimen.

1494. Spiroptera Hominis, from the urinary bladder of a woman.

The case is described by Mr. Lawrence in the *Medico-Chirurgical Transactions*, vol. ii, p. 355.

Sub-Kingdom IV.—ANNULOSA.

(A.) ANNELIDA.

HIRUDINEA.

1495. Hirudo Medicinalis (Officinal Leech).

1496. Hirudo Medicinalis. The alimentary canal is injected with red size: showing the various diverticula of the canal, and the two cæca, one on each side of the rectum.

1497. Hirudo Medicinalis. Dissected to show the nervous system. The skin of the animal has been opened down the centre of the back, and is fastened to the talc at the sides. The whole of the digestive canal has been removed, and most of the vascular system has also been cut away, together with the segmental organs. A glass probe is passed through the mouth, and lying upon it is the supræsophageal ganglion; from this ganglion can be traced the double gangliated nerve cord. The mesially placed white mass is the muscular "ductus ejaculatorius" connected with the penis, which is visible below it; on either side are situated two white masses—the "vesiculæ seminales"—and the ducts connecting them with the muscular "ductus ejaculatorius." On the right side the fine convoluted duct leading from the "vesicula seminalis" to the first testicle on the same side can be seen. There are eight pairs of testicles; the right hand one of the last pair is partially destroyed. Situated in the middle line below the penis is the muscular vagina, having the ovaries attached to its upper portion, forming two small club-shaped masses placed one on either side of the nerve chain. Here and there in the lower part of the preparation remnants of the vascular system can be seen.

1498. Hirudo Medicinalis. Alimentary canal, showing the several digestive cæca, and the great length of the terminal pair.

1499. Dissection showing reproductive and nervous system of same. The minute ganglia and nerve cord may be seen down the middle of the specimen, while the nine pair of testes, with their ducts, are on each side, terminating above in the spermatheca and penis.

1500. Lumbricus terrestris dissected to show the chief features of its anatomy. Compare the conical upper lip or prostomium with the blunt, posterior extremity. The anus is terminal. The thickened clitellus is seen extending from the thirty-second to the thirty-eighth segment. The pharynx, œsophagus, and gizzard are seen at the upper part of the dissection. The sacculated intestine has been in part drawn out to show the nervous and excretory systems. Upon the intestine is the delicate dorsal blood vessel. Lying on each side of the œsophagus are the three pairs of œsophageal glands; one of the large testicular sacs in the eleventh segment has been uncoiled. Along the centre of the ventral surface runs the gangliated nerve cord: a pair of segmental organs or nephridia lying upon each side of it in every segment.

TUBICOLÆ.

1501. Serpula. Affixed to the valve of an oyster. The animal is retracted within its tube, but the operculum is not quite drawn home, allowing a small portion of the branchiæ to be seen.

1502. Spiral tube formed by a tubicolar annelid.

1503. Calcareous tube formed by annelids on a valve of a peeten.

1504. Tubes of spirorbis, a small tubieolar annelid, on a piece of seaweed.

1505. Arenieola Piseatorum.

ERRANTIA.

1506. A group of tubes belonging to annelids of the preeeding orders. Projecting from the end of one of the tubes ean be seen a portion of a Nereian annelid belonging to the order Errantia.

1507. Nereis.

1508. Aphrodite Hispida (Sea Mouse).

1508a. A similar speeimen.

1509. A similar speeimen disseeted so as to show the strong museular gizzard. A blaek bristle is passed into the mouth, and a similar one into the anus.

(B.) ARTHROPODA.

Class I.—CRUSTACEA.

(A.) EPIZOA.

1510. Nieothoë Astaei. Female. From the gills of the eommon lobster. The large lateral lobes of the ovaries and the elongated ovisaes below them are seen, eausing the little erustaeean to look as if it possessed wings.

(B.) EDRIOPHTHALMIA.

1511. Gammarus Pulex (Fresh water Shrimp or Flea). The sessile eye eharaeteristie of the order is very visible. The absence of earapaee, and the mobility of the two posterior thoraeie segments whieh also eharaeterise the order, can be recognized.

(C.) STOMAPODA.

1512. Phyllosoma. The body eonsists of two portions, both remarkably flattened. The eephalo-thorax, whieh earries the two elongated pedunеles of the eyes, is large and oval. The posterior smaller portion bears eight legs, and the caudal region is quite rudimentary.

1513. Squilla Maritima (Common Squill). The antennæ are small, the axis of the ophthalmie and antennatory somites is parallel to that of the body, and each is movable on the other. The earapace is short, but broad transversely, and the thorax bears variously shaped limbs, one pair forming formidable elaws with toothed nippers. Attaehed to the abdominal appendages are the braneliiæ.

(D.) CIRRHIPEDIA.

1514. Balanus (Aeorn Shell).

1514a. Balanus (Common Acorn Shell). A group attaehed to a piece of rock.

1515. Lepas Anatifera (Common Barnacle).

1516. Specimen showing the anatomy of Lepas Anatifera.

1517. Two similar specimens prescrved in spirit.

1518. A group of smaller specimens in their natural position.

1519. A larger specimen of a single barnacle.

(E.) PODOPHTHALMIA.

1520. Pagurus Bernhardus (Hermit Crab). The abdomen in the hermit crab is covered by membranous walls, and its upper surface is somewhat strengthened by calcareous matter. The anterior feet and legs are of very unequal size: the large claws not only acting as weapons of offence, but helping to close the orifice of the shell it inhabits, as is seen in the following specimen.

1521. Pagurus Bernhardus (Hermit Crab). In its shell.

1522. Astacus fluviatilis (Common Fresh-water Cray-fish). In this and in the following specimens the external anatomy of the Podophthalmic crustaceans can be studied.

1523. Astacus fluviatilis (Common Fresh-water Crayfish); female; having the ova attached to the abdominal appendages.

1524. Astacus fluviatilis. Dissected so as to show the nervous system.

1525. Balanops Norwegicus, from Ireland. The two pairs of antennæ and the other appendages of the segments are to be noticed. The hinge in the last exopodite is flexed on one side.

Presented by Dr. Norman Moore.

1526. Monster Crab.

1527. Monster Lobster.

1528. Crab (Cancer).

1529. Maia Squinado (Spinous Spider Crab). Female.

1530. Maia Squinado (Spinous Spider Crab). Male.

1531. Crangon vulgaris (Common Shrimp). A portion of the carapace has been cut away, to show the gills injected with red. To the abdominal legs of each numerous ova are affixed. Between the two shrimps a small crab, with the carapace removed and gills injected, is suspended.

Class II.—ARACHNIDA.

1532. Tarantula.

1533. Scorpio Funestus. The external anatomy is well shown in this and the following specimens. The head and thorax are fused together, forming a cephalo-thorax, whilst the tail is distinctly jointed. There is only a single pair of antennæ, which are modified to assist in the prehension of food. The large

claws are not the homologues of the similarly developed pair of thoracic appendages in the Crustacea, but are homologous with the mandible of the other Arthropoda. The aperture of the mouth is small; the legs, eight in number, consist of seven joints, and terminate in an unguiculate claw. Behind the last pair of legs are two pectinate appendages. Situated on the 2nd, 3rd, 4th and 5th ventral segments are the slit-like openings of the air sacs. The terminal abdominal segment is vesicular in shape, and carries the sting.

1534. Scorpio Funestus. Dissected so as to show the nervous system.

1535. Scorpio Europæus.

1535a. Scarcoptes Scabiæi (the Itch Insect).

Class III.—MYRIAPODA.

1536. Scolopendra gigantea, from the West Indies. (Koch, Die Myriapoden, Bd. ii, 9, Table lxv, 132.) The flattened form of the body, together with the single pair of limbs on each segment, distinguish the Chilopoda from the Chilognatha. The long antennæ consist in this specimen of more than fourteen joints, the minimum number in this order. The two anterior post-cephalic segments have their appendages modified to form foot-jaws, the second being pointed with large sickle-shaped claws, which are in connection with the poison gland.

1537. Scolopendra horrida (Koch), from Java. (See *ibid.*, Bd. i, 77, Table xxxiv, 67.) A very large species, but imperfect, the antennæ being broken off short.

Class IV.—INSECTA.

ORTHOPTERA.

1538. Locusta Dux. In this and the following preparations the characters of the Orthoptera are well shown.

1539. Locusta Migratorius.

1540. Locusta Migratorius. Dissected. Portions of two separate individuals have been used.

1541. Locusta Migratorius.

1542. Gryllotalpa vulgaris (Mole Cricket). One of the most modified forms of the Orthoptera. The first pair of legs very short and of enormous stoutness, the second pair are short, but not so stout.

1543. Mantis Religiosa (Praying Mantis).

1544. Phyllium Siccifolium (Leaf Insect).

HEMIPTERA.

1545. Pediculus Pubis (Crab Louse). Attached to the hairs are some of their egg-cases.

1546. Pediculus Corporis.

DIPTERA.

1547. Larvæ of Gasterophilus Equi, or Common Bott, attached to the mucous membrane of the stomach of a horse.

LEPIDOPTERA.

A Collection of Butterflies, presented by Mr. Foster White, is preserved in the Museum, together with a manuscript catalogue.

1548. Papilio Eryethens, male and female, from Australia.

1549. Chrysalis of Lepidopterous Insect.

1550. Larva or Caterpillar of a large Lepidopterous Insect.

1551. Bombyx Cynthia.

1552. Chrysalis of Japanese Moth.

HYMENOPTERA.

1553. Scolia flavicincta.

COLEOPTERA.

1554. Lucanus Corvus. Dissected portions of two individuals are made use of in this preparation.

1555. Scarabæus sacer (Sacred Beetle of the Egyptians).

1556. Dynastes.

1557. Dynastes Hercules.

1558. Anoplognathus Viriditarsus. Dissected portions of more than one individual are used in the preparation.

1559. Buprestis. Dissected.

1560. Buprestis. Two specimens preserved in spirit.

1561. Goliath Cacicus.

1562. Marmolyce Phylloides.

Sub-Kingdom V.—MOLLUSCA.

(A.) MOLLUSCOIDA.

(I.) POLYZOA.

1563. Flustra foliacea.

1564. Terebratula.

(II.) TUNICATA.

BRANCHIALIA.

1565. Ascidium Mammillatum. A large solitary Ascidian attached to an old shell. The mammillated condition of the external coriaceous test is very evident, together with the two orifices, of which the upper is the branchial or inhalant, the lower the atrial or exhalant.

1566. A similar specimen, from which the upper portion of the test has been removed, and the animal has become detached from the test, and has fallen to the bottom of the bottle. The delicate structure of the inner membrane is visible, and the nucleus or abdominal viscera of the Ascidian is seen through its delicate walls.

1567. Boltenia Pedunculata (a fixed simple Ascidian). The outer test is produced into a long pedicle by which the animal is affixed to stones; occasionally young individuals are found attached to the stem of an older one, giving rise to the idea that the group formed a compound Ascidian. The orifice nearest the stem is the branchial, but as the whole body is pendulous during life, the branchial orifice has the usual position of being above the atrial.

1568. Pyrosoma Atlanticum (a compound free Ascidian). The whole society forms a hollow tube closed at one end. The tube consists of the cartilage-like test, in which the separate individuals or zooids are lodged. The inhalant orifice of each zooid is directed towards the outer surface of the tube, and the exhalant towards the inner surface. Constant currents of water passing in to the hollow portion of the tube and escaping at its open end cause the group of zooids to progress slowly through the water with the closed end of the tube foremost. Each individual zooid can be seen, owing to its whiter colour than the general hue of the compound test.

(B.) MOLLUSCA.

(I.) ACEPHALA.

Class I.—LAMELLIBRANCHIATA.

OSTREIDÆ.

1569. The valves of a young specimen of the Common Oyster (Ostræa Edulis).

1570. Left or upper valve of Anomia Aculeata. It is translucent or nacreous; the inter-articular cartilage remains attached to it.

Lower or right valve of the same. It is nearly flat, and deeply notched immediately in front of the articular process. Through this notch passes out the plug by which the animal is attached.

1571. Placunanomia Patelliformis. The right valve is broken away from the articulating process.

1572. Right or Lower Valve of Pecten Maximus.
Left or Upper Valve of the same. The animal rests on the right valve, which is more curved than the left or upper.

1573. The Valves of Pecten.

AVICULIDÆ.

1574. Pinna Squamosa.

MYTILIDÆ.

1575. Mytilus Megallanicus.

1576. Mytilus Chilensis.

1577. Dreissena Polymorpha (from Lancashire).

UNIONIDÆ.

1578. Unio Margaritifera (Pearl Mussel). The specimen is suspended by its posterior end.

1579. Unio Margaritifera. Dried valves, showing near the hinge the corrosive action of the water in which the animal lived.

1580. Valves of Unio Margaritifera. They show the thick epidermis over the shell. The deep scar of the anterior adductor is seen, and the large tooth at the hinge.

1581. Anodonta Cygnea. The right valve has been removed, to show the animal in position in the left valve, and covered by the mantle, which completely envelopes the body.

1582. Specimen showing foot (F), and adductor muscles (AA). A red pin is inserted into the mouth, just beneath the anterior adductor, and a silver wire into the anus, just beneath the posterior adductor. The alimentary canal is coloured red, the liver blue, and the organ of Bojanus speckled.

1583a. Right valve of Anodonta Cygnea.

1583b. Left valve of the same. The absence of tooth at the hinge is shown. The animal at some time has met with an injury which has been repaired by the deposition of irregular nacreous material by the mantle.

1584. Anodonta Cygnea. Dissected so as to show the cephalic and the parieto splanchnic ganglia. The nerve cord of communication between them is broken.

CARDIADÆ.

1585. Cardium Norwegicum (from Sheep Haven, co. Donegal).

VENERIDÆ.

1586. Venus.

1587. Right and left Valves of the same.

1588. Right Valve of Chione Cytherea.

1588a. Left Valve of the same, showing the marks of the adductor muscles and the sinus occupied by the retraction of the syphons, and at the hinge, the cardinal tooth with the smaller lateral teeth on each side of it.

SOLENIDÆ.

1589. Solen Siliqua; showing one valve, the mantle cavity, and the muscular foot.

1590. Dried Valves of Solen Siliqua. The hinge is placed close to the anterior end of the shell.

1591. Separated Valves of a similar specimen; showing the large teeth at the hinge on the left valve.

MYACIDÆ.

1592. Valves of Mya Arenaria.

PHOLADIDÆ.

1593. A lump of clay containing a Pholas *in situ* in its box. On the black cloth above are seen the separated valves of a small specimen.

1594. Pholas suspended by the posterior end. The umbonal muscle is shown exposed, but a dorsal plate partly broken is present at the lower or anterior end. Between the widely gaping valves can be seen the large truncated foot.

1595. Right Valve of Pholas Dactylus, showing the rasp-like imbrications on the shell, most marked at the anterior end. The shell is destitute of an hinge or ligament, the valves being joined by muscular development.

1596. Teredo removed from its tube, and suspended by the siphonal end.

(II.) CEPHALOPHORA.

Class I.—GASTEROPODA.

Sub-Class A.—Branchio Gasteropoda.

STROMBIDÆ.

1597. Strombus.

BUCCINIDÆ.

1598. Fusus. 196

1599. Fusus Contrarius (Crag).

1600. Buccinum Undatum; cut so as to show the structure of an univalve shell. The number is put upon the axis of the shell round which the whorls are disposed.

1601. Buccinum Undatum (Common Whelk).

1602. Ebura Spirata.

1603. Cassis.

1604. Oliva.

CYPRÆIDÆ.

1605. Cypris.

1606. A similar specimen, cut so as to show the structure, which is fundamentally similar to that of Buccinum. The young shell has a prominent spine, and a thin and sharp outer lip.

NATIIDÆ.

1607. Natica Monilifera.

TURRITELLIDÆ.

1608. Turritella.

LITORINIDÆ.

1609. Solarium Perspectiorum.

NERITIDÆ.

1610. Nerites.

TURBINIDÆ.

1611. Turbo littoreus.

HALIOTIDÆ.

1612. Haliotis Tuberculata (Earshell). Showing the inner surface.

1613. The external surface of a similar specimen. At first sight it looks like a univalve shell, the spiril is so small and flat, and the aperture so large. The surface is striated, and near its margin perforated by a series of apertures which become closed as they approach the spiril.

1614. Ianthina Violacea. The body of the animal is so retracted within the shell that no part of it is visible. (From Glen Columbeille.)

FISSURELLIDÆ.

1615. Parmophorus Australis. The shell has become detached from the back of the animal, displaying the lining membranes of the shell or mantle of the animal, through which the viscera are visible. The foot is rough and coriaceous, being rounded at the margins of the mantle. The shell is smooth, and the edges are permanently covered by the reflected mantle. The apex of the shell is situated somewhat posterior to its centre.

PATELLIDÆ.

1616. Patella Vulgata (Common Limpet). The apex of the cone is turned forwards over the animal's head. Within the shell is seen the body of the animal, much contracted. The foot, in the recent stage, is as large as the margin of the shell. The tentacles are seen on each side of the head. The inner surface of the mantle margin is fringed.

1617. Patella Vulgata (Common Limpet).

1618. Patella Pellucida.

VOLUTIDÆ.

1619. Voluta Magellanica.

CHITONIDÆ.

1620. Chiton. The shell is composed of eight imbricating plates, which causes the animal to resemble somewhat a crustacean in appearance. The coriaceous mantle forms an expanded margin round the body. Remnants of the branchiæ which are disposed round the posterior portion of the body, can be seen between the foot and the mantle.

TORNATELLIDÆ.

1621. Three specimens of Tornatella Tomatilis on glass.

BULLIDÆ.

1622. Scaphanda.

DORIDÆ.

1623. Doris. The animal is suspended by the posterior portion of the body. In the Doridæ the mantle is wanting. On the dorsal surface is seen the tuft of gill plumes surrounding the anus; further forward are two papilliform elevations, each having a central orifice, which mark the place where the tentacles are situated, which in these sea slugs are completely retractile.

Sub-Class B.—PULMOGASTEROPODA.

HELICIDÆ.

1624. Helix Aspera (Garden Snail). The shell is cut so as to show the structure of the whorls.

1625. Two specimens of Helix Aspera. The lower specimen shows the way in which the animal has repaired a comminuted fracture of its shell. The fresh calcareous material is white, not marked like the older portions of the shell.

1626. Helix Aspera and Helix Pomatia. The animals are much retracted, and nearly hidden in their shells.

1627. Helix Pomatia (Edible Snail), removed from its shell. This specimen shows well the foot whence the Gasteropoda obtain their names.

1628. Helix Pomatia (Edible Snail). Dissected. The mantle had been cut, and is turned back at the lower part of the preparation. The integument of the head and anterior part of the body has been divided, and turned back to either side. Beneath the supra-œsophageal nerve mass a piece of black paper is passed, and from it the nerve trunks can be seen passing to the pedal and parietosplanchnic ganglia. Situated on the anterior portion of the stomach are the large, white-looking, salivary glands. The intestine is seen to enter and make several convolutions in the brown-looking liver mass. Just between the whorls of liver matter is the hermaphrodite gland and its duct passing down to the uterine cavity, which is elongated and has a crenated border. The white looking albumen gland hides the juncture of the duct and the uterine cavity. At the lower end of the latter a long duct, coming from a globular mass (the receptaculum seminis), joins the other generative organs; and below this again are situated the dendritic cæca of the accessory glands, and the dart sac, and beneath these the long whip-like penis. The plication of the wall of the pulmoniferous cavity is well seen, and through the thin transparent wall, the heart *in situ*.

1629. Bulimus.

CLASS II.—PTEROPODA.

1630. Clio Borealis. The little rounded masses at the anterior end of the specimen on either side are the expanded portions of the foot, known technically under the name of Epipodia. This little animal forms one of the principal sources of food for the Right or Greenland Whale.

DENTALIDÆ.

1631. Dentalium Ensiforme.

CLASS III.—CEPHALOPODA.

(A.) TETRABRANCHIATA.

1632. Shell of Nautilus Pompilius (Common Nautilus). The only living representative of the Order. The shell is broken, and near the apex the septa dividing it into chambers can be seen. The animal lives in the terminal chamber.

(B.) DIBRANCHIATA.

Decapoda.

1633. Sepia Officinalis (Common Cuttle Fish). Typical of the Family Sepiadæ. The animal is suspended by a string passed through the dorsal surface of the mantle, in which is imbedded the rudimentary shell, consisting of numerous calcareous plates separated by vertical fibres. The expansions of the mantle along the sides of the body are as long as the body itself, forming the so-called lateral fins. Projecting beyond the anterior edges of the mantle is the head, furnished on each side with large, well-developed eyes. The arms, ten in number, surround the mouth, two of them, answering to the epipodia, are elongated into tentacular organs having expanded ends, furnished like the other divisions of the foot or arms with four rows of suckers. The remainder of

the arms closely surround the mouth, the two largest being situated towards the ventral, the two smallest towards the dorsal aspect of the body of the animal. In the centre of the oral aperture can be seen the hard horny parrot-like beak, surrounded by fleshy and somewhat fringed lips.

1634. Stomach, with Pancreatic Sac, of Sepia Officinalis. A black rod is passed through the communicating passage. Another black rod is passed down the œsophagus, and is seen protruding into the stomach. The whole length of the intestine with the anus is shown, but the lower third only of the œsophagus remains.

Presented by Dr. Norman Moore.

1635. Loligo vulgaris (Common Calamary). Female. The animal is suspended from the caudal extremity. The whole body is more elongated than in Sepia. The head projects considerably beyond the mantle, and on the ventral surface the orifice of the funnel is seen projecting beyond the edge of the mantle. Of the arms two are more elongated than the rest, becoming tentacular organs. The suckers on the arms are arranged in a double row.

1636. Loligo vulgaris (Common Calamary). Male. Very similar to the preceding specimen, differing only in having the caudal portion of the body more elongated and finer.

1637. Loligo vulgaris. Partially dissected, so as to show the horny pen *in situ*, imbedded in the mantle on the dorsal surface of the body. This may be regarded as a rudimentary shell. A black bristle is passed into the funnel on the ventral aspect. The elongated tentacular arms, with their club-shaped extremities covered with four rows of suckers, are shown.

1638. Pen of Loligo vulgaris.

OCTOPODA.

1639. Eledone cirrhosa. Young female. The eight arms, each with a single row of suckers, the head with the eyes, the free edge of the mantle, and the funnel, are to be noticed.

Presented by Dr. Norman Moore.

1640. Eledone cirrhosa. Dissected, to show the whole length of the alimentary canal from the beak to the anus. Close beneath the bulb in which the beak is bedded are two small salivary glands. Lower down are two larger ones with their ducts. The first dilatation of the alimentary canal is the crop. It has been filled with size, and is globular. At the lowest part of the specimen is the gizzard, and immediately beyond a smaller, rounded mass, the pancreatic sac. Beyond this the intestine proceeds to the anus, into which a bristle is inserted. The mass upon which the crop lies is the largest of the animal's viscera, the liver. On one side a piece of the lateral wall of the body is left to show the relative position of parts.

Presented by Dr. Norman Moore.

1641. Ovisac of Eledone cirrhosa. From each side of the sac comes an oviduct, the whole length of which is shown. On each oviduct is a dark coloured globular mass, the nidamental gland.

Presented by Dr. Norman Moore.

1642. Eledone cirrhosa. Dissected, to show the general features of its structure. The arms have been removed, and the specimen is hung by the funnel. The

mantle has been divided to display the organs within it, but its free edge is left entire. On the dorsal aspect, from above downwards, are seen the liver, the heart, and the ovisac. The outer capsule of the liver has been cut open to show the œsophagus and the aorta (blue). The bulging on the left hand at the lower edge of the liver is caused by the stomach, which lies within the outer capsule. A silk thread is tied round the origin of the aorta. The shaggy structures seen at the upper edge of the heart are the organs called by Cuvier kidneys. One oviduct with nidamental gland is visible. On the ventral aspect a gill is seen on each side with a branchial heart at its root. The branched structure visible at the lowest part of the mantle cavity is the ovary. The ovisac has been opened on this aspect.

Presented by Dr. Norman Moore.

1643. Portion of an Arm of Octopus vulgaris, showing the suckers.

1644. Argonauta Argo (Paper Nautilus). The animal is suspended by its shell, with the keel downwards. The shell, thin and transparent, is broken near the apex. The shell in the Argonauts is not secreted by the mantle, nor is the animal connected with its shell. The shell is secreted by the two epipodia, one of which, much shrivelled, can be seen near the left border of the opening of the shell. The epipodia are kept during life closely applied to the sides of the shell, and are never kept, as so frequently depicted, like sails. At the anterior end of the shell immediately above the keel is seen the siphon. The body of the animal and the arms, greatly retracted, are shrunk by the spirit, and are contracted within the hollow of the shell. The arms are elongated and slender, and furnished with two rows of suckers.

The male Argonaut is unprovided with a shell, and is only about one-fifth the size of the female.

SERIES XXXVII.

CATALOGUE OF CASTS AND MODELS.

CLASS I.

NORMAL STRUCTURES.

1. Model of a Man, showing the Muscles, Vessels, and Nerves.
Presented by Dr. Taylor, of Trowbridge.

2. Model of a Vertical Section through the Head of an Adult.

3. Models of Two Sphenoid Bones.

4. Plaster model of a Lachrymal Bone.

5. Plaster model of a Palate Bone.

6. Plaster models of an Inferior Turbinate Bone.

7. Model of a Fibula.

230 to 235. Casts of the Heads of notorious Murderers:—8. 230. Thurtell; 9. 231. Bishop; 10. 232. Williams; 11. 233. Eliza Ross; 12. 234. Greenacre; 13. 235. Rush.

14. Plaster cast of the Cerebral Convolutions.

15. Wax model of one of the Cerebral Hemispheres.

16. A similar specimen.

17. Model of the Base of the Brain.

18. Model of the Ventricles of the Brain.

19. Model of the Otic Ganglion and its branches.

20. Wax models of sections of the Eyeball.

21. Wax model of Vessels and Nerves of the Eyeball.

22. Wax model of the External, Middle, and Internal Ear, with the Vessels and Nerves.

23. A similar specimen.

24. A similar specimen.

25. Wax model of the Cochlea and Semicircular Canals.

26. A similar specimen.

27. Plaster model of the Semicircular Canals.

28. Plaster model of the Cochlea.

29. Wax models, showing four different stages of development of the Fœtus.

30. Wax models, showing nine different stages of development of the Fœtal Head.

31. Model of a section of the Pelvis with the contained Viscera.

32. A similar specimen.

33. A similar specimen.

34. Model of the Muscles of the Male Perineum.

35. A similar specimen.

36. Model of the external Organs of Generation in a Virgin.

37. Model of the Mammary Gland.

38. Plaster cast of a Woman in the ninth month of gestation.

39. Plaster cast of the Abdomen of a Woman in the ninth month of pregnancy, laid open to show the position of the Fœtus.

40. A similar specimen.

Presented by Dr. Matthews Duncan.

41. A similar specimen.

42. Model of a Horse's Hoof.

CLASS II.

MALFORMATIONS.

43. Cast of a Double Fœtus. The Skeletons are preserved in the Series of Congenital Malformations, No. 3414, and described at p. 4 of this volume.

44. Model of the Siamese Twins.

45. Model of a Chinese, to whose body that of a Male Child is attached.

"A-Ke was born sixteen years ago, with another male child of nearly the same size united to the pit of his stomach by the neck, as if his brother had plunged its head into his breast. The skin of the principal here joins that of the upper part of the neck of the parasite quite regularly and smoothly,

exeepting the superfieial blood vessels, whieh appear somewhat turgid. The sufferings of the mother were so great, that she survived the birth of this monster only two days. Sinee that time, the parasite has not much increased in size, and, at present, is not mueh larger than new-born infants usually are; but the bones are completely formed.—*Edinburgh Philosophical Journal*, vols. v and vii.

Presented by Henry Earle, Esq.

45a. Model of a Human Fœtus, apparently aeephalous, and in every internal part mis-shapen. This fœtus was born with one that was well formed. A. 33

46. A similar specimen.

47. Casts of cases of Cleft Palate and Hare Lip.

48. Cast of an Upper Jaw, showing an anterior median cleft of the palate, whieh was assoeiated with hair lip.

49. A similar speeimen, showing a left anterior median eleft.

50. A similar speeimen, showing a eleft extending through the hard and soft palate.

51. Cast of an Upper Jaw with a eleft of the palate, upon whieh the operation for its elosure had been performed. Owing to the drawing together and subsequent eontraetion of the palate, the anterior pillars of the fauces are drawn forward to a level with the posterior molar teeth.

52. Cast of the head of an Idiot Girl, whose skull is preserved in vol. ii, Series I, No. 3440, and deseribed at p. 9.

53. Model of the Brain of the same Idiot. See p. 9.

54. Cast of the Head of the Idiot whose skull is preserved in vol. ii, Series I, No. 3441, and deseribed at p. 9.

55. Cast of the Brain of the same Idiot. See p. 9.

56. Cast of the Head of an Idiot 26 years old, with defeetive size of brain and skull.

57. Cast of the Brain of an Idiot 20 years old. A large part of the posterior lobe of eaeh eerebral hemisphere is replaeed by a cavity filled with fluid. A. 12

58. Cast of the same Brain, with the posterior lobe of the cerebral hemisphcres deeply sunken after the evaeuation of the fluid. A. 13

Presented, with the preceding, by Haly Holme, Esq.

59. Cast of the Fœtus, with 'Sireniform' monstrosity, whieh is dcscribed at p. 10 of this volume, No. 3447. The defeetivcly formed lowcr limbs are united in a single eonieal stump, proeeeding from a narrow pelvis. The hands also are at right angles with the fore-arms. A. 17

60. Cast of the same Fœtus, with the conieal stump laid flatly on the antcrior surface of the abdomen, in the position in whieh it seemed to have lain in the uterus. A. 18

61. Cast of part of a Child which lived several weeks with a tumour nearly as large as its head projecting from its occiput. The tumour contained the greater part of the cerebrum, covered with dura mater, and continuous with the rest of the brain through a fissure in the median line of the occipital bone. A. 15

Presented by — Forster, Esq.

62. Cast of a Child's Head, with a sphcrieal Tumour larger than itself, united by a kind of stem to its occiput. The tumour contained fluid, which communicated with that within the child's head. A. 15A

63. Cast of the Head of an Infant with a large Encephalocele projecting from the vertex.

For full description see A. 270.

64. Cast of a Head with Meningocele.

65. Cast of the Back of a Child 3 years old, with a large Spina bifida, in the sacral and lower lumbar region. A. 16

Presented by Dr. Cape.

66. Cast of a Fœtus, with hydrocephalus. A. 14

Presented by Dr. Hugh Ley.

67. Casts of the Trunk of a Woman in whom there was congenital absence of some of the dorsal vertebræ and ribs. The left scapula was united by a plate of bone to the cervical vertebræ. See vol. ii, Series III, No. 3523.

68. Cast of the Thorax of a Child, aged 8 years. The left scapula is raised and fixed to the spines of some of the upper dorsal vertebræ by a plate of bone. The superior angle of the scapula is prominent, and higher than that on the opposite side. The posterior dorsal curvature is diminished, and in the lower dorsal region the spine is slightly curved to the right side. The child was 3 feet 7 inches in height. The plate of bone was successfully removed by operation, and is preserved in Specimen, No. 3524, vol. ii, Series III.

See *Sitwell Ward Book*, vol. vi, p. 399.

69. A Cast taken from the trunk of a Lady who was born without arms. There is a well-marked lateral curvature of the dorsal spine.

70. Cast of a Hand with congenital absence of the third and fourth fingers, and union of the first and second fingers in their whole length. A. 19

71. Cast of a Hand, in which the third metacarpal bone with its phalanges are congenitally absent. 73B

See also No. 88.

72. Cast of a Hand, in which the thumb is bifid and two of the digits are absent.

73, 74. Casts of a Man's Hands. On each hand there are two thumbs of unequal size; on each, a scar at the base of the little finger marks the place from which a supernumerary finger was removed; on each, the first, second, and third fingers are united in their whole length, and the third and fourth fingers are partially united. A. 21. 22

75, 76. Cast of the Feet of the same Man. On each foot there is, on the inner side, a supernumerary metatarsal bone, at the end of which is a cicatrix remaining after the removal of a supernumerary great toe. On each foot, also, the first four toes are united in their whole length. A. 23, 24

77. Cast of the Leg and Foot of one of the daughters of the same man. It shows exactly the same deformities as the last, except in that only two of the toes are united. A. 26

78. Cast of the Hand of the Child from whom the preceding cast was taken. It has a supernumerary little finger; the first three fingers are united in their whole length, and the third and fourth as far as the ends of their first phalanges.

The father of the man from whom the casts 73—76 were taken had double thumbs, and six toes on each foot. His wife had no malformation. They had eight children, of whom five were well-formed; but three had supernumerary thumbs, fingers, and toes, and unnatural union of the latter. The man from whom the casts were taken had four sons well-formed and two sons and two daughters with malformations more or less similar to his own, and combined with club foot. The casts 77 and 78 were taken from two of these children. A. 27

The series of casts were presented by Dr. Baly.

79. Cast of a Hand, with a supernumerary thumb. A. 20

Presented by B. Barrow, Esq.

80. Model of a Hand in Wax, with a bifid thumb.

81. Cast of a Man's Hand, in which the first and second fingers are of immense size, and are united to the ends of their first phalanges. The second finger is six inches long, and at its last phalanx is six and a half inches in circumference. It is curved towards the radial side, and nearly covers the third and fourth fingers. A. 28

Presented by T. B. Curling, Esq.

82. Casts of the Forearms and Hands of a Man, aged 22 years, a French polisher. The left arm and hand, with the exception of the little finger, is normal in size, and was in due proportion to the rest of the body. The right arm and hand were greatly hypertrophied: the forearm measuring $1\frac{7}{8}$ inches more in its greatest circumference than the left, and $1\frac{6}{8}$ inches more in length from the olecranon to the end of the middle finger. The man had a similar disproportion of the lower extremities, but the right leg and foot were not so markedly larger than the left, as was the case in the upper extremities. His eyes were not of the same colour; the right having a yellowish-brown iris, while the left was destitute of pigment, except over a small wedge-shaped piece on the outer side of the eye. His left ear was somewhat larger than the right, and the left side of the tongue was very considerably larger than the right. A. 46

83. Casts of the Feet of a Girl. In the right foot the second toe, and in the left foot the third toe is hypertrophied. The feet themselves are large.

84. Casts of the Hands of the same Girl. In the right, the middle finger is hypertrophied and the growth of the thumb has been arrested; whilst in the left hand the thumb has become hypertrophied, the fingers being of normal size and shape.

85. Cast of the Foot of a Child; the second toe is hypertrophied.

86. Hand of a Woman, in which there was arrested growth of the third and fourth digits.

87. Casts of two Hands and a Foot, the digits of which are ill-developed. The fingers and thumbs of each hand are welded together, and the separation between them is indicated only by grooves; the extremity of the limb is covered by a single nail having the appearance of a hoof. The metacarpal bones and first phalanges could be distinctly made out through the integuments, but the distal bones of the digits did not appear to have been developed. The digits of the foot are only indicated by small separate nails attached to the upturned extremity of the limb; the other foot presented the same appearances. A. 37

The subject of the malformation was an infant, aged 3 months, having a too prominent forehead, but otherwise healthy looking. The mother had given birth to ten healthy children, all of whom were at the time living; but she had felt weak and unwell during the last pregnancy.

See *Sitwell Ward Book*, vol. vii, p. 261.

88. Cast of a Leg and Foot. The condyles of the femur are widely separated. The tibia is absent, and the leg is curiously bent upon the thigh. The foot is deformed, and bent upon the fibula, so that the external malleolus forms a projection. The phalanges of the first and second toes are absent, though the corresponding metatarsals are present. The fifth metatarsal with its phalanges is entirely absent. The leg itself is preserved. A. 73

See *Teratological Catalogue*, Series II, No. 3508; a cast of the hand of the same patient is preserved in No. 71.

89. Casts of Two Hands with extreme deformity of the fingers. Of the right hand the thumb and index finger only are normal. The second finger has the appearance of having been amputated through the third phalanx; the third is short, ill-developed, and presents a median constriction, and the little finger is represented only by a stump. The fingers of the left hand are in a somewhat similar condition, except that the index finger is here absent, and the third is longer and more shapely.

Taken from an otherwise well-formed woman. Her feet were short, and the web between the second and third toes extended nearly up to the distal end of the first phalanges; they were otherwise normal.

Presented by Dr. Roper, through Dr. Matthews Duncan.

90. Cast of the Leg of a Child 12 years old, with a deep circular constriction at the lower part of the calf. This constriction existed at the time of birth, and the surface of the skin over it was like that of a cicatrix.

It is probable that the constriction was caused by the umbilical cord, or a band of false membrane, drawn tightly round the leg, as in the cases of intra-uterine amputation of the limbs. The parts above and below the constriction were natural, and all the movements of the foot were perfect. A. 35

91. Cast of parts connected with the malformation named Ectopia Vesicæ and Epispadias in a male child.

92. Model of a similar defect of the Anterior Walls of the Abdomen and of the Urinary Bladder, with protrusion of the posterior wall of the bladder, in a girl 15 years old. A. 6

93. Fissure and Extroversion of the Urinary Bladder. The urinary bladder is open anteriorly, and its mucous membrane is protruded through an aperture in the middle line of the abdomen near the symphysis pubis.

94. Cast of the external Genital Organs of an imperfectly formed Male. The scrotum is divided into two portions, each of which contained a testicle. The urethra is incomplete, and opens in the perineum. The penis is small and recurved. A. 29

Presented by George Macilwain, Esq.

95. Model of a similar malformation. It presents a more feminine appearance of the male organs; the halves of the scrotum being smaller, and more wide apart, look like labia; the wide perineal orifice of the urethra looks like a narrow opening into a vagina; and the very small penis might be mistaken for a large clitoris. The testicles, with spermatic cords, were distinctly felt in the two portions of the scrotum.

The person from whom this model was taken wore the dress of a woman. A. 30

96. Cast of the Face of the person from whom the preceding model was taken. A. 31

97. Model of a Double or Bifid Uterus, described by Dr. Robert Lee in the seventeenth volume of the *Medico-Chirurgical Transactions.* A. 32

SERIES XXXVIII.

DRAWINGS OF CONGENITAL MALFORMATIONS.

1. Drawing of a case of complete transposition of the Viscera.

2. The fused Hearts of the two-headed (Dicephalus Dibrachius) Monster in Series I, Class II, of the Teratological Catalogue, No. 3418. The left heart is normal. The right heart retains the tubular form; it consists of an auricle, which is also common to the left heart, and a single ventricular cavity from which a muscular tube (bulbus aortæ) passes, and gives off the aorta and pulmonary artery.

Photograph of a Child with a second Fœtus attached to it.

3a. Head of a Boy, in whom, in addition to a cleft palate and hare-lip, the right eye was absent, and the bones forming the socket were much smaller than those of the opposite side. A tooth protrudes from under the right nostril, above a portion of lip which had been united by a previous operation. (T. Godart.)

4. Head of a Lamb, in which there was complete absence of the right half of the lower jaw. All the parts developed from the first visceral arch were absent, and the first visceral cleft remained open, so that there was neither external auditory meatus nor Eustachian tube.

5. Congenital imperfection of Corpus Callosum, Septum Lucidum and Fornix. (J. Paget.) The case is related by Mr. Mitchell Henry, in the *Medico-Chirurgical Transactions*, vol. xxxi, p. 239. 193

5a. Large pendulous Spina Bifida in the lumbo-sacral region. (T. Godart.)

6. Cervical Ribs, distinct and of unusually large size, on a seventh cervical vertebra. 194

Presented by Professor Clark, and drawn by him from a specimen in the Museum of the University of Cambridge.

7. Tricœlian Heart.

For details of the case, see *Quarterly Journal of Anatomy and Physiology*, vol. xi, 1877.

8. Congenital malformation of the Heart, from a Woman, aged 35.

For details of the case, see *Pathological Society's Transactions*, vol. xix, p. 188.

9. A Jugular Vein of great size, in the place of the internal jugular, passing over the omo-hyoid muscle. It received the jugulo-cephalic vein. 198

10. The great vessels at the base of the neck, showing an irregular course of the innominate artery. 347

11. Similar specimen.

12. A right Kidney, situated at the brim of the Pelvis on the common iliac vessels. It received two arteries from the lower part of the abdominal aorta, and one from the left common iliac artery. (W. J. Bayntin, Esq.) 195

13. Kidneys situated at the brim of the Pelvis, and receiving their arteries from the common iliac. (A. M. McWhinnie, Esq.) 196

14. Portion of one of the Kidneys last mentioned, and of a firm, obscurely fibrous, greenish tumour, which was connected with it, and filled the hollow of the sacrum. (Eyre de Crespigny, Esq.) 197

15. Ectopion Vesicæ.

For details of the case, see *St. Bartholomew's Hospital Reports*, vol. xiii, by F. Champneys, Esq., M.D. The specimen is preserved and described in the *Teratological Catalogue*, Series VII, Class V. No. 3667.

16. Dissection of the Bladder and Pelvis from the case of ectopia vesicæ depicted in the preceding drawing.

17. Similar specimen.

18. Drawing of the Chest of a Man with two supplementary nipples.

19. Organs of Generation of an hermaphrodite Sheep. 362, 363

The specimen is preserved and described in the *Teratological Catalogue*, Series VIII, No. 3682.

20. Photographs of hairy Men and hairy Women.

21. Photograph of a Child with a hairy Mole on the cheek.

22. Drawing of a Girl whose body is thickly covered with hair.

23. Tattoed Skin.

SERIES XXXIX.

CATALOGUE OF MIDWIFERY INSTRUMENTS.

1. Curved short forceps (probably of Smellie).
2. Straight short forceps of Smellie.
3. Davis's forceps.
4. Short forceps, curved, with joint in handle.
5. Long forceps.
6. Long forceps.
7. Matthews Duncan's long forceps.
8. Misdach of Arabian School.
9. Almisdach of Arabian School.
10. Long forceps.
11. Long forceps.
12. Ziegler's long forceps.
13. Denman's short forceps.
14. Short forceps.
15. Ziegler's short forceps.
16. Model of Chamberlen's forceps.
17. Models of Chamberlen's forceps, from the originals in the possession of the Royal Medical and Chirurgical Society.

    Presented by Dr. C. West.
18. Bang's forceps.

19. Bang's forceps.

20. Burton's forceps.

21. French forceps.

22. French forceps.

23. Modern French forceps, with blunt hook and crotchet on handles.

24. French forceps.

25. French forceps, Levret (?).

26. Roönhysen's lever.

27. Aitken's living lever.

28. Lowder's lever.

29. Lowder's lever.

30. Lowder's lever with jointed handle.

31. Lowder's lever with jointed handle.

32. French cephalotribe.

33. Matthews Duncan's cephalotribe.

34. Simpson's cephalotribe.

35. Perforator, Wild (?).

36. Perforator.

37. Smellie's perforating scissors.

38. Brain spoon.

39. Tire-tête of Gregoire.

40. Crotchet.

41. Crotchet and blunt hook.

42. Blunt hook.

43. Crotchet and blunt hook.

44. Crotchet.

45. Crotchet.

46. Smellie's double crotchet.

47. Smellie's double crotchet.

48. Davis's guarded crotchet.

49. Guarded crotchet.

50. Pajot's instrument for decapitation.

51. Davis's cephalepsalis.

52. Whalebone fillet.

53. Obstetric scissors.

54. Lyon's forceps.

55. Instrument for dilating the womb.

56. Instrument for dilating the womb.

57. Instrument for dilating the womb.

58. Repositor of cord.

59. Baudelocque's callipers.

60. Ancient speculum matricis.

SERIES XL.

CATALOGUE OF BOTANICAL SPECIMENS.

MISCELLANEOUS COLLECTION OF BOTANICAL SPECIMENS, CHIEFLY ILLUSTRATIVE OF PHYSIOLOGICAL AND ECONOMIC BOTANY.

Note.—The floral formulæ adopted express the structure of the flowers as follows, viz.: the number of parts of each whorl, or the sepals of the calyx, the petals of the corolla, the stamens and the carpels of the pistil, are indicated successively by the numerals followed by points. The cohesion ( ) and adhesion [ ], as well as the "inferior" ovary { } will be recognized by the corresponding brackets.

EXAMPLE.—The floral formula of *Pisum*, or Pea, is [(5). 3 + (2). (9*f*) + 1.] 1. In this flower the calyx has five *coherent* sepals; the corolla is composed of three free and two (the "keel" petals) united; the stamens are diadelphous in that nine are coherent by the filaments (9*f*), while one is free; both corolla and stamens being perigynous or *adherent* to the calyx [ ]. Lastly the pistil consists of one free "superior" carpel.

The paragraphs followed by [C. P. S.] are quoted from the catalogue of the Museum of the Pharmaceutical Society. Further information, if required, will be found in Drury's *Useful Plants of India*, Christy's *New Commercial Plants and Drugs*, *Treasury of Botany;* and for details of floral structure, Henslow's *Floral Dissections*.

CLASS I.—DICOTYLEDONS.

ANGIOSPERMS.

RANUNCULACEÆ.

RANUNCULUS FICARIA, *L.* (*Pilewort, Lesser Celandine.*)

Fascicled tuberous roots and aërial corms.

Note.—Floral Formula, 3. ±* 8. ∞. ∞. The club-shaped roots emanate with a bud from the rootstock, and together are propagative. They thus resemble the conical roots of Aconite (which see) and of Orchids (see Eulophia), both of which carry buds above. The aërial axillary corms are usually produced in the absence of flowers, especially in shady places; in which case the pollen is often arrested. The first English name is in allusion to the supposed virtues of the juice in relieving pain. Gerarde's *Herball*, p. 669. A.D. 1597.

* ± signifies that the number varies, and is *more* or *less* than 8 in this instance.

ACONITUM NAPELLUS, *L.* (*Aconite, Monkshood, Wolfsbane.*)

Root, Foliage and Flowers (in lower case), section of Flower, Fruit (Follicles).

Note.—Floral formula, 5. 2. ∞. 3. *Obs.* sepals are petaloid, the posterior one being "galeate." The petals are converted into honey bearing nectaries. The fresh root has often been eaten for horseradish. *P. J.* [1], vol. xv, p. 449. It is smaller than that root, dark brown, conical, and has a numbing taste without the pungency of horseradish. For microscopical section of root, see Berg, *Anat. Atlas*, taf. 24. [C. P. S.]

ACONITUM FEROX, *Wall.* (*Nepaul Aconite, Bish or Bikh.*)

Root and Tincture.

Note.—Root off. in *I. P.* In appearance it resembles Tampico Jalap, but it is more conical, is marked with the scars of rootlets, and of the base of the stem, and is paler internally. The principal alkaloid yielded by this root is pseudaconitine. [C. P. S.]

ACONITUM HETEROPHYLLUM, *Wall.* (*Atees.*)

Root.

Note.—The root of this drug, owing to its tonic and antiperiodic properties, and also to the absence of aconitia or a poisonous principle, is of great value in convalescence after debilitating diseases, as in intermittent and other paroxysmal fevers (see *Indian Pharmacopœia*, p. 4). Prep.: Powdered root.

Doses: As a tonic, 5 to 10 grains, three times a day; as an antiperiodic, 20 to 30 grains every three or four hours, irrespective of the presence of pyrexia. (Christy, *New Com. Plants and Drugs*, v, 68, vi, 88.)

HYDRASTIS CANADENSIS, *L.* (*Yellow root.*)

Rhizome and rootlets.

Note.—It contains two principles, *berberia*, 4 per cent.; and *hydrastia*, 1·5 per cent. It possesses well-marked tonic properties. Off. in the *U. S. P.* (Bentley and Trimen, *Med. Plants*, 1.)

COPTIS TEETA, *Wall.* (*Tita, Mishmi Bitter.*)

Rhizome.

Note.—This is imported into Bengal from Assam. The properties are due to *berberia*, the rhizome containing 8½ per cent. Tita is a pure bitter tonic, and is much used in India and China.

HELLEBORUS NIGER, *L.* (*Black Hellebore, Christmas Rose.*)

Rhizome.

Note.—Floral formula, 5. ∞. ∞. ∞. *Obs.* the sepals are white when expanded, but turn green subsequently. The petals are tubular and converted into nectaries.

MAGNOLIACEÆ.

MICHELIA CHAMPACA, *L.* (*Chumpaka.*)

Bark.

Note.—The root, like all parts of the tree, has bitter properties, and is used medicinally in India as an emmenagogue. The tree is highly venerated by the Hindoos, and is dedicated to Vishnoo.

ILLICIUM ANISATUM, *Loureiro.* (*Star Anise.*)

Fruit.

Note.—The essential oil resides in the pericarp only. It is distinguished from that of aniseed by not congealing at 50° F., but at 34° F. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 10. It is an evergreen tree, native of Japan and Cochin-China. [C. P. S.]

ANONACEÆ.

ANONA SQUAMOSA, *L.* (*Sweet-sop.*)

Fruit.

Note.—Several species of this genus are cultivated for their fruits. The Sour-sop of the West Indies is that of *A. muricata.* The Sweet-sop is a native of the Malay Islands, but is extensively cultivated in the East and West Indies. The fruit consists of the agglomeration of many originally free carpels.

MENISPERMACEÆ.

ANAMIRTA COCCULUS, *Wight* and *Arnott.* (*Cocculus Indicus.*)

Fruit. (*Levant Nut.*)

Note.—Picrotoxin is contained in the kernel; menispermia in the shell. The greater part of the importation of the fruit is used for the illegal purposes of adulterating beer and ale.

CHONDRODENRON TOMENTOSUM, *R. et P.* (*Pareira Brava, Butua.*)

Root. (In lower case, "Anomalous Woods.")

Note.—For fig. of fruit, see *P.J.*, [3], vol. iv, p. 83. For fig. of plant, see Bentley and Trimen, *Medical Plants*, tab. 11; who state that the true Pareira Brava is derived from this plant, as proved by Hanbury; the Pareira Brava of commerce, or "velvet leaf," being the root of Cissampelos Pareira, *L.*

BERBERIDACEÆ.

BERBERIS LYCIUM, *Royle.*

Extract of the bark. (*Rusot.*) Fruit.

Note.—The extract has been long used in India for ophthalmia. The fruit, "zariçka" of Persia, is used like raisins.

BERBERIS VULGARIS, *L.* (*Barberry.*)

Root and stem.

Note.—The inner bark as well as the roots boiled in an alkaline ley yield a bright yellow dye, used in Poland for colouring leather. It was formerly supposed to cure jaundice, from the imagined virtues of similitude in colour.

BERBERIS ARISTATA, *D.C.*

Root.

Note.—This species is common in North India, and possesses similar properties to the last.

PAPAVERACEÆ.

PAPAVER SOMNIFERUM, *L.* (*Poppy.*)

Flower and fruit in section; capsules showing incisions as made for opium in India; capsules attacked by the Blue Titmouse for the seeds. Seeds, two vars.

Note.—Floral formula, 2. 4. ∞ . (±10). The incisions in the unripe ovaries for opium are made by three or six pieces of flattened wire tied together into a kind of scarificator.

CRUCIFERÆ.

CHEIRANTHUS CHEIRI, *L.* (*Wallflower.*)

Section of Flower.

Note.—Floral Formula, 4. 4. 2. 4. (2). *Obs.* 2, 4., signifies two whorls of stamens, which make them "tetradynamous," the two (outer) being shorter than the other four. No member of this family is poisonous. Another member is Cochlearia officinalis, *L.*, "Scurvy-grass."

ISATIS TINCTORIA, *L.* (*Dyer's Woad.*)

Woad in balls, Indigo.

Note.—The leaves are ground into a paste, which is then fermented in heaps, and afterwards made into balls for sale. Its use as a dye is mentioned by Dioscorides and Pliny. Cæsar says the ancient Britons dyed their bodies with it. The use was superseded by the introduction of Indigo, from a species of Indigofera. A sprig of woad is the emblem of the Dyers' Company.

CAMELINA SATIVA, *L.* (*Gold of Pleasure.*)

Oil.

Note.—This plant is cultivated on the Continent, both for its fibre for making brooms, and the oil from the seed. *Treas. of Bot.*, s.v. "In excavating for the railway at Steyning, in Sussex, in 1859, this plant suddenly appeared in great quantities on the embankment. I had not known it in the neighbourhood previously, and it has long since disappeared from the spot." [Geo. Henslow.]

BRASSICA RAPA, *L.* (*Turnip.*)

Note.—The specimen (in spirits, in lower case) is remarkable for developing a number of adventitious buds. Such large tap roots, as of turnip, radish, &c., are developed from the radicle, root, and part of the axis of the plumule; hence the buds at the upper part would issue from the stem, but those at the base from the true root.

VIOLACEÆ.

IONIDIUM, sp. *Vent.* (*False Ipecacuanha.*)

Rhizome or root?

Note.—The roots of some of the species contain emetin, and may be used instead of Ipecacuanha. White Ipecacuanha consists of the roots of *I. Ipecacuanha.*

Another species is *I. microphyllum*, the roots of which act powerfully as emetics and purgatives. The root of *I. suffruticosum* is used in India for diseases of the urinary organs, and the leaves as external applications.

BIXACEÆ.

BIXA ORELLANA, *L.* (*Annatto.*)

Fruit and seeds.

Note.—Annatto is made from the coating of reddish pulp which surrounds the seeds. In South America the Caribs paint themselves with it. It is used here for colouring cheese, chocolate, &c., and by the Dutch for colouring butter.

GYNOCARDIA ODORATA, *R. Br.* (*Chaulmugra Oil Tree.*)

Seed and oil.

Note.—Prep.: Oil, capsules, and gynocardic acid. *See* Christy, *l.c.*, vi, 90, 94. Doses: Oil in capsules, 3 to 10 minims, taken after meals.

It is official in the *I. P.*, and used in India as a remedy for leprosy.

TAMARISCINEÆ.

TAMARIX GALLICA, *L.* (*Tamarisk Galls.*)

Galls.

Note.—This small gall grows in great profusion in certain districts in India and in the Mediterranean, and on the northern coast of Africa. It yields a very large percentage of tannic acid. Christy, *New Com. Plants and Drugs*, v, 27.

GUTTIFERÆ.

GARCINIA MANGOSTANA, *L.* (*Mangosteen.*)

Fruit.

Note.—This tree is found in the Malay Islands. The succulent rind is nearly a quarter of an inch thick. It contains a very powerful astringent juice, and in wet weather exudes a yellow gum which is a variety of gamboge. The internal white and juicy pulp has a refreshing and delicious flavour. The Chinese use the bark as a basis for a black dye and for dysentery.

GARCINIA MORELLA, *var.* PEDICELLATA, *Desrous.*

Roll and pipe gamboge.

CLUSIASEÆ.

MESUA FERREA, *L.*

Flowers.

Note.—They are mixed with aromatics, as white sandal wood, and used for a perfuming ointment. The expressed oil of the seeds is used as an embrocation in rheumatism in India.

TERNSTRŒMIACEÆ.

THEA SINENSIS, *Sims;* CAMELLIA THEA, *Link.* (*Tea.*)

Tea in balls and twists for presents; tea seeds; Brick Tea; Lie Tea.

Note.—Black and green tea are derived from the same plant. Assam tea is the product of Thea Assamica. (Bentley and Trimen, *Med. Plants*, 34.) "But it is the same plant as that obtained from China." Smith, *Foods*, 348. "Tea is a most powerful respiratory excitant." Brick Tea is from Tibet; for cup, see BALANOPHORA. *British leaf* (*Lie*) *Tea*, Patented 1831, confiscated October 11, 1833, consists of Sloe, Willow, Elm, Apple, and Poplar leaves.

MALVACEÆ.

MALVA SYLVESTRIS, *L.* (*Common Mallow.*)

Flowers in section, fruit.

Note.—Floral formula, [3. (5)]. [5. $(5 \times \infty f)$]. ($\pm$ 10). There is an "epicalyx" of three stipular bracts adherent to the calyx (compare the Abutilon, *s.* TERATOLOGY). The petals adhere to the monadelphous stamens. The latter originate from five papillæ, which subdivide into numerous filaments bearing unilocular anthers. This species is strongly protandrous, as shown by the three stages. M. rotundifolia is self-fertilizing.

The tincture or infusion of the flowers serves as a test for acids and alkalies like Litmus. The root and herb are sometimes substituted for those of Althæa officinalis. This species, as well as M. rotundifolia, are sometimes used in the form of a decoction in catarrhal and dysenteric complaints, and as poultices or fomentations. (Pereira.)

ALTHÆA OFFICINALIS, *L.* (*Marsh Mallow; Guimauve, F.*)

Root (decorticated), syrup of the fruit.

Note.—The plant may be distinguished from Malva sylvestris by its pale pink flowers and downy leaves, not cordate at the base. The root resembles Elecampane, but may be readily distinguished by the transverse marks and fibrous structure. For microscopical section of root, see Berg, *Anat. Atlas*, taf. ii. Its fibrous structure also distinguishes it from Belladonna, with which it has been found mixed. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 35.

The root contains mucilage, starch, sugar, and asparagin.

ALTHÆA ROSEA, L. (*Hollyhock.*)

Fruit.

Note.—This plant possesses mucilaginous properties like all the Malvaceæ. The leaves furnish a blue dye.

HIBISCUS (ABELMOSCHUS) ESCULENTUS, *L.* (*Okra, Gombo.*)

Fruit and seeds.

Note.—A large annual herb with yellow flowers; probably a native of Africa, but grown in the tropics of both hemispheres, as well as in the Mediterranean regions. Off. part., HIBISCI CAPSULÆ. The fresh immature capsules (*I. P.*). The leaves, roots, and capsules all yield mucilage, termed Gombine.

GOSSYPIUM HERBACEUM, *L.* (*Cotton Tree.*)

Capsules, seeds with cotton, oil expressed from the seeds.

Note.—The root bark is off. in the *U. S. P.*, and is used as a safe parturient and emmenagogue. (*Wood* and *Bache*, p. 432, 12th ed.) The oil of the seeds is used to adulterate olive oil, to which it imparts its drying quality. (*P. J.* [2], vol. vii, p. 226.) For difference between cotton and linen fibre, see below and *s.* LINUM.

For fig. of cotton plant, see Bentley and Trimen, *Med. Plants*, tab. 37. [C. P. S.] Pereira, *Mat. Med.*, II, pt. II, 556.

This species yields Dacca and Nankin cotton.

Cotton seed oil. This is used for machinery, and in the preparation of woollen cloth and Morocco leather, and also as a substitute for olive and almond oils in pharmacy, culinary purposes, and soap. The oil cake, after expression, is used for feeding cattle. (*P. J.* [2], vol. iii, p. 30; [3], vol. ii, p. 867.)

Cotton was unknown to the ancient Egyptians, if negative evidence of the mummy cloth being always of flax is trustworthy. In Peru such cloth is always of cotton. The earliest mention of cotton appears to be in the Book of Esther (ch. i, 6), where the word "green" in E.V. is translated "carbason" in the LXX version.

A cotton fibre is twisted and ribbon-like, but with thickened ridges, and flattened down the middle.

THESPESIA POPULNEA, *Corr.* (*Umbrella Tree.*)

Note.—A tree fifty feet high, growing on the sea shores of both hemispheres. It bears a dense head of foliage, and is hence called the Umbrella tree. The flowers are at first yellow, then purple. The liber-fibre is used for cordage and coffee bags in Demerara, and for cigar envelopes. The wood is used for boats, as being very indestructible, and for gun stocks in Ceylon. The flower buds and unripe fruits yield a yellow dye, and a red oil is expressed from the seeds.

STERCULIACEÆ.

STERCULIA ACUMINATA, *Beauv.* (*Kola-nut tree.*)

Seeds.

Note.—This tree is a native of tropical Africa, where the "nuts" are highly valued. In Congo (W. Africa) it is known under the name of Makasso. It is the Guru nut of Soudan. It is also used by the natives in diarrhœa and affections of the liver, as well as a beverage.

TILIACEÆ.

TILIA EUROPÆA, *L.* (*Linden or Lime Tree.*)

Flowers.

Note.—The flowers are still used in France in the form of Tisane and distilled water, as an antispasmodic, and for sick-headaches. The flowers, as well as the leaves and bark, were formerly off. in this country. *Ph. Lond.*, A.D. 1724, p. 159. Gerarde, *Herball*, p. 1299, A.D. 1597, says the flowers were used for pains in the head produced by cold.

BYTTNERIACEÆ.

THEOBROMA CACAO, *L.* (*Cocoa or Chocolate.*)

Fruit and seeds.

Note.—This tree is a native of Brazil, and as far north as Mexico; but is much cultivated in the tropics of both hemispheres. The cocoa seeds are used for the preparation of chocolate and cocoa, and are principally imported from Trinidad and Grenada. Cocoa-nibs are the roasted embryos; the seeds having been divested of their skins, and broken into small fragments, they constitute the purest kind of cocoa. Cacao butter is the concrete oil expressed from the seeds, which yield about half their weight of oil. It is chiefly composed of stearine. The alkaloid theobromine is identically the same as theine and caffeine.

LINACEÆ.

LINUM USITATISSIMUM, *L.* (*Flax.*)

Mummy cloth, seed, (Linseed.)

Note.—The mummy cloth of Egypt is invariably of flax, and not of cotton as in Peru. That flax was early cultivated in Egypt we learn from Ex. ix, 31. A flax fibre is cylindrical with tapering ends; a dark line runs down the centre with occasional transverse lines, corresponding to the internal cavity. The cell wall is greatly thickened as seen in a transverse section.

Linseed. The seeds have a mucilaginous oily taste, but no odour. "They contain a *fixed oil* (*Oleum Lini*), and a peculiar *mucilage*, which appears to be a product of the transformation of starch." Linseed, with the oil expressed, is called *oil-cake;* this ground to powder forms *linseed meal.*

LINUM CATHARTICUM, *L.* (*Purging Flax.*)

Herb.

Note.—Formerly off. in the *Ph.E.* and *Ph.D.*, and is still used in country districts as a domestic medicine. It is bitter and cathartic.

ERYTHROXYLON COCA, *Lam.* (*Coca.*)

Leaves (dried and in spirits), Coca wine.

Note.—The parts used are the leaves, the extract from the green leaves, and the elixirs. The preparations made from the green leaves are much superior to those obtained from the dried leaves as imported.

Prep.: Extract from green leaves, elixirs, tincture, and wine. Doses: Solid extract, 6–12 grains; fluid extract, 20–30 minims; elixir, 1–2 fluid ounces; tincture, 1–2 fluid drachms.

Wine is made thus: Coca leaves 30 parts; alcohol (60°) 60 parts; macerate twenty-four hours and add white wine 1,000 parts; macerate ten hours longer, and then strain. It is used by singers, &c. (Christy, *l.c.*, vi, p. 91.)

ZYGOPHYLLACEÆ.

GUAIACUM OFFICINALE, *L.* (*Lignum vitæ.*)

Section of stem, polished (below), sawdust.

Note.—Guaiacum shavings are sometimes adulterated with shavings of boxwood. This admixture may be detected by nitric acid, chloride of lime, or other oxidising agents, which will colour Guaiacum wood greenish-blue, but not boxwood. Observe the radiating character of the fibres of the wood, with light alburnum and dark duramen. For microscopic section of wood, see Berg., *Anat. Atlas*, taf. 27.

GERANIACEÆ (Oxalideæ).

AVERRHOA BILIMBI, *L.* (*Blimbing.*)

Fruit.

Note.—Cultivated in India. The fruit is very acid, but very pleasant when made into syrup, candied, or pickled. It is a native of the Moluccas.

RUTACEÆ.

PTELEA TRIFOLIATA, *L.* (*Shrubby Trefoil.*)

Fruit.

Note.—A tree from North America, often grown in our shrubberies. The fruits are winged. In Canada the young green shoots are used as an anthelmintic in the form of an infusion. The fruits are bitter and aromatic, and have been used as a substitute for hops.

AMPELIDEÆ.

VITIS VINIFERA, *L.* (*Vine.*)

Grapes and grape-sugar.

Note.—The specimen is remarkable as being an instance of a bunch of grapes which has sprung from the old wood and low down on main stem. They normally appear on shoots which arise from the previous year's growth. Grape-sugar or glucose separates from the juice of the grape in drying, as may be seen in "candied" raisins. The granulation in honey is from the crystallisation of a part of its glucose. It is about half as sweet as cane-sugar (saccharose) or fruit-sugar (lævulose).

VITIS GONGYLODES, *Baker.*

Branches.

Note.—On the onward growth of the axis being arrested, two or three internodes commence to swell from about the last unfolded leaf, backwards. They then disarticulate, fall, and germinate into new plants.

SAPINDACEÆ.

ACER SACCHARINUM, *L.* (*Sugar* or *Bird's Eye Maple.*)

Maple sugar.

Note.—It is a native of North America, introduced here in 1735. The wood is white, but acquires a rosy tinge by exposure to light. The timber can replace oak. The wood often has spots, whence the name of bird's eye. Sugar is extracted from the sap, which is boiled and the syrup is run into moulds to form cakes.

ILICINEÆ.

ILEX PARAGUAYENSIS, *St. Hil.* (*Maté* or *Paraguay Tea.*)

Leaves and twigs in powder.

Note.—Mr. George Fielding states that maté is used in Brazil in the powdered state as of these specimens, only, but in Paraguay the leaves are employed. It is remarkable for containing theine. Maté is used medicinally as a diuretic and diaphoretic, but its chief use is as a refreshing beverage like tea. The tea is prepared for drinking by putting about a teaspoonful into a gourd with a little sugar; the drinking tube (bombilla) is then inserted, and boiling water poured on the maté. It is rather bitter, but slightly aromatic and restorative. It acts in some degree as an aperient and diuretic. It contains the same alkaloid as tea and coffee, but not their volatile and empyreumatic oils. [C. P. S.]

RHAMNACEÆ.

RHAMNUS INFECTORIUS, *L.* (*Graines d'Avignon, French* or *Persian Berries.*)

Fruit.

Note.—These berries are used as well as those of R. amygdalinus, and probably other species, to dye morocco leather yellow.

R. CATHARTICUS, *L.* (*Purging Buckthorn.*)

Fruit.

Note.—The fruits were formerly in demand as a purgative medicine, and are still employed by rustic practitioners; but on account of the violence of their action they have fallen into disrepute, although Syrup of Buckthorn is included in our Pharmacopœias. The pigment known as sap-green is prepared from the juice of fresh berries with lime. The bark also possesses active purgative properties.

ZIZYPHUS JUJUBA, *L.* (*Jujube Fruit.*)

Fruit.

Note.—The fruits of several species of this genus have an agreeable flavour. Those of *Z. vulgaris* are commonly eaten both in a fresh and dried state in the Mediterranean regions. *Z. Jujuba*, an Indian species, yields an excellent dessert fruit.

BURSERACEÆ.

BOSWELLIA CARTERII, *Birdwood.* (*Lubân Tree.*)

Gum resin (*Olibanum*).

Note.—This is the true Frankincense or Lubân tree of limited districts in tropical Arabia and East Africa. During the flowering season the delightful fragrance of the Lubân trees is wonderfully powerful. For fig. and descriptions see Bentley and Trimen, *Med. Plants*, 58 (*reffs.*). For figs. of olibanum trees, see *Linn. Trans.*, xxvii, p. 111. [C. P. S.]

BALSAMODENDRON, *sp. Kunth.* (*Myrrh.*)

Gum-resin.

Note.—Various gum-resins called Myrrh are yielded by species of this genus, and known as Turkey, White, E. Indian, African, &c., as well as various sorts of Bdellium.

ANACARDIACEÆ.

ANACARDIUM OCCIDENTALE, *L.* (*Cashew Nut Tree.*)

Fruit (Cashew nuts).

Note.—The bark and pericarp of the fruit contain an acid vesicant liquid which forms a durable marking ink. The gum possesses the same properties as Gum Arabic; but is also slightly astringent.

RHUS SUCCEDANEA, *L.* (*Japan Wax.*)

Wax.

Note.—This wax is the produce of the fruits, and called Japan wax. R. vernicifera is another small Japanese tree, and yields the famous lacquer used for furniture, &c. It exudes from wounds made in the tree, and is at first milky-white, but ultimately black on exposure.

PISTACIA VERA, *L.* (*Pistachio Nuts.*)

Kernels.

Note.—This is a native of West Asia. The nuts are greatly eaten by Turks and Greeks, and in South Europe, either dried like almonds or made into articles of confectionery. (See Bentley, *Man. Bot.*, p. 492.)

MANGIFERA INDICA, *L.* (*Mango.*)

Fruit.

Note.—This grows abundantly in India, where numerous varieties are cultivated. Most of them have more or less of a turpentine flavour, though the best are said to be delicious. The unripe fruits are used as pickles, for tarts, &c. The fruit contains gallic and citric acids. The seeds of the Mango sometimes possess more than one embryo.

SEMECARPUS ANACARDIUM, *L.*

Seeds.

Note.—This is called the Marking-nut tree of India, the unripe fruit being used for a kind of ink. The seeds, called Mallaca beans or Marsh-nuts, are eaten. An oil is prepared from them and used in painting.

LEGUMINOSÆ.

CYTISUS SCOPARIUS, *Link.* (*Broom.*)

Flowers (sections).

Note.—Floral Formula, [(5). 3 + (2). (5 + 5 *f*)]. 1. *Obs.*, the style curves in growth, so as to bring the stigma first in contact with the uppermost anthers; then by completing an entire circle touches those of the five shorter stamens. For fig., see Bentley and Trimen, *Med. Plants*, No. 70.

GLYCYRRHIZA GLABRA, *L.*, and G. ECHINATA, *L.* (*Liquorice.*)

Root.

Note.—The Russian liquorice root, stated by Hanbury to be the produce of G. glabra (G. glandulifera, *W. K.*), may be known by its bitterish taste and longitudinally exfoliated root bark. (See Bentley and Trimen, *Med. Plants*, tab. 74.)

PHYSOSTIGMA VENENOSUM, *Balf.* (*Calabar Bean.*)

Seeds.

Note.—For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 80. [C. P. S.] These seeds are very poisonous, and were employed at Old Calabar as an ordeal; if they produced vomiting only, it established innocence; if the suspected person died, they were guilty.

ANDIRA ARAROBA. (*Goa.*)

Bark, powdered.

Note.—Chrysophanic acid obtained from this drug is now used most successfully in psoriasis, ringworm, and various skin diseases

Prep.: Chrysophanic acid and its ointment. *See* Christy, *l.c.*

ERVUM LENS, *L.*; LENS ESCULENTA, *Moench.*

Seeds entire (*European Lentils*) and split.

Note.—The meal constitutes *Revalenta Arabica.* It is one of the most highly nitrogenous of vegetable foods, containing 25 per cent. of nitrogen. It has been long cultivated in the East. It constituted Esau's red pottage. For fig., &c., see Bentley and Trimen, *Med. Plants*, tab. 76.

DOLICHOS, SP., *L.* (*Increase Meal* of Jamaica.)

Meal.

Note.—Several species of Dolichos are distributed over tropical and temperate regions of both hemispheres, and produce edible legumes and pulses. *Treas. of Bot.* s. v.

ARACHIS HYPOGEA, *L.* (*Ground Nut, Monkey Nut, Pea Nut.*)

Legumes.

Note.—This plant, like Trifolium subterraneum, thrusts its fruit underground. The seeds are edible, but chiefly used for their oil, called Katchung or Nut Oil. For fig., see Bentley and Trimen, *Med. Plants*, tab. 75. [C. P. S.]

CAJANUS INDICUS, *Spreng.* (*Dal.*)

Seeds, "split."

Note.—The seeds are much esteemed by the natives of India, who hold them third in rank among leguminous seeds. The leaves rubbed with pepper cleanse the gums, and are also given in toothache. A drink moreover is prepared from them, and administered to patients with the smallpox.

COLUTEA ARBORESCENS, *L.* (*Bladder Senna.*)

Legumes.

The leaflets have been occasionally found mixed with senna on the continent, but not in this country. They resemble those of Cassia obovata, but are equal at the base, and not oblique. They are purgative.

INDIGOFERA TINCTORIA, *L.* (*Indigo.*)

Indigo.

Note.—Indigo was known to the ancients, though the use was lost to Europe until the sixteenth century. It was prohibited in England by an edict in Elizabeth's reign, as it could not be fixed. The edict was repealed in the reign of Charles II. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 72.

INDIGOFERA ANIL, *L.* (*W. I. Indigo.*)

Legumes.

Note.—This species is larger than *I. tinctoria*, attaining a height of five or six feet. It is naturalised in Asia and Africa.

PTEROCARPUS SANTALINUS, *L.* (*Red sandal wood.*)

Wood.

Note.—The wood is dark red, with black veins, close, and takes a good polish. It is chiefly used by dyers and colour manufacturers. The colour is apparently of a resinous nature.

ABRUS PRECATORIUS, *L.* (*Indian Liquorice.*)

Pods and seeds.

Note.—These seeds are used as a standard of weight in India, called Rati. The weight of the Koh-i-noor diamond was ascertained in this way. The roots are official in the Indian Pharmacopœia as a substitute for liquorice root. (Bentley and Trimen, *Med. Plants*, tab. 77.)

MYROXYLON PEREIRÆ, *Klotzsch.* (Balsam of Peru.)

Fruit.

Note.—Professor Baillon thinks that both balsam of Tolu and balsam of Peru are yielded by the same plant.

BUTEA FRONDOSA, *Roxb.* (*Dhak or Pulas tree.*)

Gum (*Butea*).

Note.—The flowers yield a yellow dye. The exudation is official in the *Indian Pharmacopœia.* It is known as butea gum, Bengal kino, dhak tree gum, and pulas kino. (Bentley and Trimen, *Med. Plants*, tab. 79.) The gum or lac is the produce of Coccus lacca. When the bark is wounded a red juice exudes, which hardens into a brittle astringent gum.

ASTRAGALUS GUMMIFER, *Labill.* (*Milk Vetch.*)

Wood, and gum tragacanth.

Note.—A gummy exudation from the stems of this and several other species. Its formation is owing to a more or less complete transformation of the cells of the pith and medullary rays of the stem into a mucilaginous mass. It is produced in various parts of Asia Minor, Syria, Armenia, Kurdistan, and Persia. (Bentley and Trimen, *Med. Plants*, tab. 73.)

PONGAMIA GLABRA, *Vent.* (DALBERGIA ARBOREA, *Willd.*)

Seeds.

Note.—The oil (Poonga oil) is highly esteemed by the natives of India as a remedy in skin diseases.

MUCUNA PRURIENS, *D. C.* (*Cowhage.*)

Legumes.

Note.—Official in the *Indian Pharmacopœia*, page 73 ; formerly official in the *P.L.* Cowhage consists of the hairs covering the legumes. (Bentley and Trimen, *Med. Plants*, tab. 78.)

DIPTERYX ODORATA, *Willd.*

Legumes, seeds. (*Tonka* or *Tonquin Bean.*)

Note.—The leaves have been occasionally found mixed with senna on the Continent, but not in this country. The leaflets resemble those of Cassia obovata, but are equal at the base. They are purgative. [C. P. S.] The Tonga or Tonka bean is used for scenting snuff and perfumery. The odour is due to *Coumarine*, a principle common to Melilotus and some grasses, *e.g.*, Anthoxanthum odoratum.

DIPTERYX EBÖENSIS, *Hook.* (*Ebor Tree.*)

Oil.

Note.—The fruit and seed resemble that of the Tonga bean, but are entirely destitute of the odoriferous principle. The seeds contain much fatty oil, which the natives of the Mosquito country use for the hair.

CERATONIA SILIQUA, *L.* (*Kharoub.*)

Fruit. (*Carob beans, Locust beans, St. John's bread.*)

Note.—They have been imported from Spain under the name of Algarobo beans ; they are called Kharoub (whence Carob) by the Arabs. The pods contain much mucilaginous and saccharine matter, and are used for feeding cattle, pigs, &c., in South Europe. The name St. John's bread is a misnomer, as the locusts he ate were the animals ; though the "husks" mentioned in the parable of the Prodigal Son were probably these.

ERYTHROPHLÆUM GUINEENSE, *Don.* (*Sassy* or *Casca bark.*)

Bark.

Note.—Dr. Lauder Brunton, in the *British Med. Journ.*, March 29th and 31st, 1877, described this bark as " a drug which strengthens and slows the heart, contracts the arterioles and increases the urine." MM. Lée and Bochefontaine found that Sassy possesses a remarkable action on the heart, almost identical with that of Homolle and Quevenne's Digitaline. Christy (*New Com. Plants and Drugs*, vi, p. 101, and *Lancet*, June 17th, 1882.) Prep. : The alkaloid Erythrophleïne. The bark is used as an ordeal poison in West Africa.

Cæsalpinia brevifolia, (*Balsamocarpon.*)

Pods.

Note.—In this pod there are seeds and a thin web-like husk ; the rest contains at least 80 p.c. of tannic acid, so that it is nearly pure tannin. It appears to differ from other agents in its great strength and rapid action. It changes very rapidly into gallic acid, hence to gain its full action the infusion has to be applied at once to the skin. Its native *habitat* is on the top of the mountains of Chili. *See* Christy.

Cæsalpinia bondicella, *Roxb.* (*Bonduc* or *Nicker Nuts.*)

Legume and seeds.

Note.—The white starchy embryo contains a fixed oil, resin, and a bitter principle. Compound powder of Bondue (Bondue and Black Pepper), and the seeds. *Doses* : Powder, 15 to 30 grains, three times a day. Seeds : 10 to 15 grains, twice daily.

Cæsalpinia echinata, *Lam.* (*Peach wood.*)

Chips.

Note.—This wood is sometimes called Brésil de St. Martha. It dyes red and peach-colour. It is imported from Lima, Realizo, &c.

Cæsalpinia coriaria, *Willd.*

Legumes. (*Divi-divi.*)

Note.—The pericaps are said to contain 60 to 65 p.c. of tannin, and are used as an astringent in India ; in this country for tanning. For fig. see *Hist. des Drog.*, vol. iii, p. 398.

Hæmatoxylon Campechianum, *L.* (*Logwood.*)

Chips, extract of.

Note.—With acids, a bright red colour (*e.g.*, red ink) is obtained, but with alkalies, a purple or violet, and with salts of iron, a dark violet, or nearly black. (Bentley and Trimen, *Med. Plants*, tab. 86.)

Acacia Farnesiana, *L.*

Legumes.

Note.—From the flowers is made the essence and *pommade de fleurs de cassie* of French perfumes ; and the bark yields a gum. The pods were imported into France at one time from the Island of Mauritius under the name of *Balibabulah.* They were used for tanning and to dye black.

Acacia Catechu, *Willd.* (*Catechu Acacia.*)

Square cakes.

Acacia Senegal, *Willd.* (A. Verek, *Guill. et Pere.*)

Gum (Arabic).

Note.—The best Gum arabic is characterized by its opacity, its brittleness and whiteness. Pereira states that it is known in Paris as *gomme Turique*, and the inferior qualities as *gomme Geddah*, so named from the ports from which they are shipped. For fig. of plants, see Bentley and Trimen, *Med. Plants*, 95. [C. P. S.]

ROSACEÆ.

Amygdalus communis, *var. a* amara (Prunus Amygdalus, *Stokes*). (*Almond.*)

Oil.

Note.—Bitter almonds frequently occur mixed with all varieties of the sweet almond, except the Jordan almonds. Valencia almonds may generally be recognized by their greater comparative breadth and by their flatness ; the Barbary by their being smaller and very variable in size and shape. For fig. of several varieties, see *P. J.* [1], vol. vi, p. 222.

Prunus Cerasus, L. (*Cherry.*)

Gum.

Note.—The gum which exudes from the bark of species of Prunus is a mixture of Arabine ($C_{12}H_{22}O_{11}$) with Cerasine ($C_{12}H_{20}O_{10}$), which is insoluble in cold water.

GEUM URBANUM, *L.* (*Avens, Herb Bennet.*)

Root. (*Clove Root, Radix Caryophyllata.*)

Note.—This root has been found in large proportion with arnica as an adulterant. It is distinguished from Arnica by its astringent taste, larger size, and by being a true vertical root, not a rhizome. For fig. of root, see *Goebel und Kunze*, pt. ii, taf. xxv, fig. 2. [C. P. S.]

FRAGARIA, *L.* (*Strawberry.*)

Flower (section).

Note.—Floral formula, [5. (5). 5. ∞.] ∞ ; the epicalyx of five bracts adherent to the calyx is of stipular origin ; each apparently consists of two confluent stipules.

ROSA DAMASCENA, *Miller.* (*Damask Rose.*)

Petals.

Note.—Otto of rose is largely adulterated with Turkish oil of geranium, or oil of gingergrass, (Andropogon nardus, *L.*) The purest otto is imported in bottles called "cappers." The oil imported in gilt bottles is generally much adulterated. [C. P. S.]

ROSA CANINA, *L.* (*Dog Rose.*)

Flower (section).

Note.—Floral formula, 5. 5. ∞. ∞. *Obs.* the sepals are not coherent as in other genera of Rosaceæ, the floral whorls being inserted on a hollow receptacular tube (the *hip*), within which the achenes are situated.

CYDONIA VULGARIS, *Pers.* PYRUS CYDONIA, *L.* (*Quince.*)

Seeds.

Note.—These seeds are readily distinguished from similar seeds of other fruits by the fact that they always adhere together in small groups. They are used as an emollient application to the skin. [C. P. S.]

PYRUS MALUS, *L.* (APPLE.)

Flower (section).

Note. — Floral formula, {[(5). 5. ∞.] ± (5)}. *Obs.* the 5 carpels are "falsely syncarpous," more or less coherent, ± ( ), by accidental cohesion only in consequence of the fleshy nature of the receptacular tube. (See preparations of abnormal and proliferous pears, s. TERATOLOGY).

HALORAGEÆ.

TRAPA NATANS, *L.* (*Water Caltrops.*)

Note.—The fruit is remarkable for its four horns produced from the receptacular tube surrounding the ovary. It is a native of Europe. The seeds of this and other species of India, China, and Japan, abound with starch ; and those of *T. natans* are called Jesuit's nuts and Chataigne d'Eau, and are ground into flour for bread. Those of *T. bispinosa*, the *Singhara* of Kashmir, feed 30,000 persons for five months in the year. *T. bicornis* is the Ling of the Chinese.

MYRTACEÆ.

EUCALYPTUS GLOBULUS, *Labill.* (*Blue Gum Tree.*)

Tar, Vinegar, Acetic Acid.

Note.—The gum is very astringent, and soluble in water, but the solution is turbid when cold. Eucalyptol is that portion of the volatile oil which boils regularly at 175° F. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 109. [C. P. S.]

EUCALYPTUS MANNIFERA, *A Cunn.*

Saccharine exudation. (*Australian Manna.*)

Note.—E. viminalis, *Labill* (stringy bark), yields a similar substance.

LYTHRACEÆ.

AMMANNIA VESICATORIA, *Roxb.*

Note.—The leaves of this plant are acrid when bruised, and are used by the native practitioners of India to raise blisters in rheumatism.

LAWSONIA ALBA (INERMIS), *Lam.* (*Henna.*)

Leaves, fruit.

Note.—This shrub is grown throughout India and the East, as well as North Africa, where the leaves are used as a cosmetic. The nails and finger-tips are dyed with a reddish-orange colour. The plant is also supposed to possess vulnerary and astringent properties.

PUNICA GRANATUM, *L.* (*Pomegranate.*)

Seeds.

Note.—The seeds as well as the leaves and flowers possess astringent properties.

CUCURBITACEÆ.

BRYONIA DIOICA, *Jacq.* (*White Bryony, false Mandrake Root.*)

Starch. Flowers (section).

Note.—Floral formula, *Male flower*, $[(5).(5).(2)+(2)+1.]O$; *Female flower*, $\{[(5).(5)].O.(3).\}$ See *Floral Dissections*, *Pref.* and s. v. The root is sometimes used as an application to discoloured bruises. It must not be confounded with Black Bryony, *Tamus communis*, *L.*, an endogenous plant, which has dark shining heart-shaped entire leaves; nor with the true Mandrake, *Atropa Mandragora*, *L.* White Bryony root is said to have been substituted for Calumba. It may be distinguished by the action of Iodine upon the starch of the root. *Hist. des Drog.*, vol. iii, p. 258. *Treas. of Bot.*, s. v.

BRYONIA EPIGŒA, *Rottl.* (*Rakus.*)

Root, slices of.

Note.—The root resembles Calumba root in medicinal properties. It has a bitter subacid taste.

LAGENARIA VULGARIS, *L.* (*Bottle Gourd.*)

Fruit.

Note.—The pulp possesses cathartic properties ["and is often used for poultices," Drury], and is commonly used as such. [See also specimen used for Paraguay tea.] [C. P. S.]

PASSIFLORACEÆ.

CARICA PAPAYA, *L.* (*Papaw.*)

Fruit, Papaine, Milk.

Note.—Tough meat wrapped up in the fresh leaves becomes tender by incipient digestion. For uses, see Christy, *l.c.*

UMBELLIFERÆ.

HERMAS GIGANTEA, *L.*

Leaves.

Note.—A genus of South Africa, the leaves of which are used as tinder by the Hottentots.

ANETHUM GRAVEOLENS, *L.*; PEUCEDANUM GR., *Benth.*

Fruit. (*Dill Seed.*)

Note.—Dill is known in India under the name of *Surá* or *Sóyah*. It is said to be the anise of St. Matt. xxiii, 23. It yields 2·8 per cent. of volatile oil. See Bentley and Trimen, *Med. Plants*, tab. 132. [C. P. S.]

PTYCHOTIS AJOWAN, *D. C.* (*Ajowan Seeds.*)

Seeds.

Note.—For uses, see *Christy*.

PIMPINELLA ANISUM, *L.* (*Aniseed.*)

Fruit.

Note.—Russian Aniseed is much smaller than the other varieties, being about the size of hemlock fruit, from which it may be distinguished at sight by the persistent fruit stalks and mericarps remaining united. The Alicant variety is the best.

CORIANDRUM SATIVUM, *L.*

Fruit. (*Coriander Seed.*)

Note.—The fruits yields one-half per cent. of volatile oil. The fresh plant has an odour like that of bugs.

CUMINUM CYMINUM, *L.*

Fruit. (*Cummin Seed.*)

Note.—Cummin fruits somewhat resemble in size and shape those of fennel, but usually have the ridges finer, more numerous, and covered with minute bristles. They yield about one-half per cent. of volatile oil. [C. P. S.] For fig., see *Hist. des Drog.*, vol. iii, p. 227.

CONIUM MACULATUM, *L.* (*Hemlock.*)

Stem, succus conii, flowers, and fruit.

Note.—Floral formula, {obsol. 5. 5. [D (2)]}, *Obs.*, calyx is "obsolete," and the disk, D, epigynous. Conium fruits resemble in size and shape those of Russian anise; but the latter usually have the stalks attached, and covered with minute hairs. Conium fruits have the vittæ obliterated when dry. Rough chervil (Chærophyllum temulum, *L.*) has a *rough* spotted stem with swollen joints, that of hemlock being *smooth*.

EURYANGIUM SUMBUL, *Kauffman.*

Root. (*Sumbul Root, Musk Root.*)

Note.—Sumbul appears to be a generic name in India for perfumed roots. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 131. [C. P. S.] *The Sumbul, a new Asiatic Remedy*: A. B. Granville (1850).

HERACLEUM GIGANTEUM, *L.*

Fruit.

Note.—This fruit, like that of the indigenous H. spondylium, *L.*, the Hog-weed, shows the usual shape and distribution of the vittæ, *i.e.*, *three* on the outer surface, and *two* on the commissural surface of each mericarp.

OPOPONAX CHIRONIUM, *Koch.*

Gum resin.

Note.—The lump opoponax has a slight resemblance externally to myrrh, but the odour is very different, and has been compared to that of bruised ivy leaves. [C. P. S.]

FERULA GALBANIFLUA, *Boiss.*

Gum resin. (*Galbanum.*)

Note.—This gum possesses properties intermediate between assafœtida and ammoniacum, and was supposed to be derived from Opoidia galbanifera, L., of Persia. It is now considered to be the product of Ferula galbanifera, *Boiss.*, and of F. rubricantis, *Boiss.*, as well as of unknown plants. For fig. and desc., see Bentley and Trimen, *Med. Plants*, tab. 128. [C. P. S.]

NARTHEX ASSAFŒTIDA, *Falconer;* FERULA NARTHEX, *Boiss.*

Gum resin, in lumps, and tears, (*Assafœtida*).

Note.—Pereira, *Mat. Med.*, vol. ii, pt. ii, p. 177. Scorodosma fœtidum, *Bunge*, is also supposed to yield some of the assafœtida of commerce. Pure assafœtida is known under the name of *hing* in Bombay, the impure drug being called *hingra*. [C. P. S.]

DOREMA AMMONIACUM, *Don.*

Fruits, gum resin. (*Ammoniacum.*)

Note.—A native of South West Persia. The ammoniacum of commerce is derived from the stem, its exudation being caused by the puncture of beetles. It is in two forms, in separate tears, or in compact masses of agglutinated tears. A good ammoniacum is also yielded by Dorema aucheri, *Boiss.*, of West Persia, but it is not the off. plant. Ammoniacum in tears somewhat resembles olibanum externally, but has a smooth outside and an opaque fracture; while olibanum is powdery externally, and has a translucent fracture and different odour. Lump ammoniacum resembles galbanum; but, unlike the latter, it cannot be indented by the finger nail. African ammoniacum is very similar in appearance, but has an odour resembling that of apples. [C. P. S.]

SAGAPENUM.

Gum resin.

Note.—The botanical source of this drug is unknown; it smells like assafœtida, but less strongly, and differs in the tears not becoming pink when broken and exposed to the air. [C. P. S.]

ARALIACEÆ.

ARALIA NUDICAULIS, *L.*

Root. *American Sarsaparilla, Small Spikenard.*

Note.—Official in secondary list of the U. S. P. It is used like sarsaparilla.

PANAX QUINQUEFOLIUM, *L.*

Root. (*American Ginseng.*)

Note.—This root is occasionally found mixed accidentally with senega and serpentary roots.

CAPRIFOLIACEÆ.

LONICERA PERICLYMENUM, *L.* (*Honeysuckle.*)

Flower (section).

Note.—Floral formula, {5. [(5). 5]. (3) }. *Obs.*, corolla slightly irregular.

SAMBUCUS NIGRA, *L.* (*Elder.*)

Section of trunk, flowers. Unguentum Sambuci viride.

Note.—Floral formula, {5. [(5). 5]. (3)}. *Obs.*, corolla regular, stamens extrorse. Fresh elder flowers, separated from the stalks or preserved with salt, are used in making elder flower water. The bark is purgative. S. canadensis, *L.*, is official in the U. S. P.

RUBIACEÆ (Cinchonaceæ).

COFFEA ARABICA, *L.*

Berries (dried naturally).

Seeds. (Mocha) before "garbling," and with "parchment."

Ditto. after being garbled.

Leaves. (*Coffee leaf Tea.*)

Note.—Mocha coffee "berries" are small and dark yellow; Java and East India, larger and pale yellow. The Ceylon and West India kinds have a bluish or greenish-grey tint. The commercial "berry" is really the convoluted albumen of the seed, the minute embryo being concealed within it at one end. The leaves have analogous properties to coffee; Stenhouse found them to contain both caffein and caffeo-tannic acid, but in larger proportions than in the roasted seeds.

COFFEA LIBERICA, *Hiern.* (*Liberian Giant Coffee.*)

Berries (dried naturally).

Seeds, roasted.

Note.—In consequence of the ravages of the coffee-leaf disease, the Liberian coffee has been eagerly sought after, as being at present less liable to be attacked by the Hemileia vastatrix. It is being cultivated in Ceylon, Brazil, Java, &c. The so-called "Liberian Giant Coffee" is adapted to low-lying lands. It grows well near the sea or in moist places. It yields an exceedingly heavy crop of berries of fine flavour and large size; as much as four tons to the acre have already been obtained from this species of coffee trees in Ceylon. The "Liberian Prolific Coffee" is suitable for higher elevations. It is of very quick growth, producing berries in eighteen months. The Liberian coffee is hardier in Ceylon in every respect than Coffea arabica, bearing full exposure to the sun much better, and growing more luxuriantly. (Christy.)

CINCHONA CALISAYA, *Weddell.*

Bark. (*Calisaya Bark, Yellow Cinchona Bark.*)

Note.—This species grows in the valley forests on the borders of Bolivia and South Peru. This bark is remarkable for the large amount (5–6 per cent.) of quinine which it contains.

CINCHONA OFFICINALIS, *L.*

Bark. (*Pale Cinchona Bark; Peruvian or Loxa Bark.*)

Note.—C. condaminea, *Humb. and Boupl.*; C. crispa, *Taf.*; C. uritusinga, *Pav.*; Bonplandiana, *How.* This tree, under several varieties, is a native of Andes (6,000 to 7,500 feet), but is there nearly extinct. Immense plantations exist in Nilgiri Hills, Sikkim, &c., and in Ceylon, Java, and Jamaica.

UNCARIA GAMBIER, *Roxb.* (*Gambier, Terra Japonica.*)

Extract of leaves, and roots.

Note.—This drug is obtained principally from Malacca, the port of Rhio, on the Island Bintang, about thirty miles from Singapore. The extract is obtained by boiling the leaves, small branches, and pieces of wood in water, evaporating the liquid to an extract. It contains 44·88 per cent. of tannin according to Esenbeik.

RANDIA DUMETORUM, *Lam.*

Note.—This is a hedge plant of India. The fruit is emetic, and used to stupefy fish.

RUBIA TINCTORUM, *L.* (*Madder.*)

Root, whole and ground.

Note.—Madder is obtained from the root of this species, as well as of R. peregrina, indigenous to Britain, and from R. Mungista (Munjeet) of Nepal. The cultivation has decreased since alizarine, the red colouring principle, can be made artificially. Its most remarkable physiological effect is that of colouring red the bones of animals fed upon it.

Alizarin, comp. $C_{14}H_8O_4$, consists of bright red acicular crystals. It is prepared from madder. See Ure's *Dict. of Arts*, s. MADDER; Perkin, *Jl. of Soc. of Arts*, May 30, 1879.

Garancin. This is produced by the action of sulphuric acid upon madder. It possesses a greater tinctorial power than the original material, and also dyes much brighter colours. See Ure's *Dict. of Arts*, s. MADDER.

GALIUM, *L.*

Note.—Floral formula, {obsolete. [(4). 4]. (2).}. *Obs.*, Rubia only differs from Galium in being pentamerous.

VALERIANEÆ.

NARDOSTACHYS JATAMANSI, *D.C.* (*Spikenard.*)

Root. "Sumbul-al-teeb."

Note.—This root has an odour like patchouli. It is supposed to be the spikenard of Scripture. In appearance it much resembles the root of Allium victoriale. In India it is considered of much value in epilepsy and hysteria. The tincture is made in the proportion of 5 oz. of the root to 2 pints of proof spirit. For fig. see *Hist. des Drog.*, t. iii, pp. 79–82; Royle, *Mat. Med.*, p. 480. [C. P. S.]

VALERIANA OFFICINALIS, *L.* (*Lesser Valerian.*)

Root.

Note.—This root somewhat resembles serpentary root, but may be distinguished by its odour and by the rootlets being larger and less brittle. For fig. see Goebel und Kunze, pt. ii, taf. xxxvi, fig 1. For micr. section, see Berg., *Anat. Atlas*, taf. xvi, fig. 41.

Valeriana Phu is known as the greater valerian. [C. P. S.]

COMPOSITÆ.

HELICHRYSUM, SP, *Gærtn.* (*Everlastings.*)

Note.—These are the flower heads of several species of this and other genera from South Africa and Australia. The heads of *H. orientale*, from South Europe, are largely used for immortelles. *Obs.*, the bracts of the involucre being coloured and scarious are persistent, and give the characteristic feature. For details of the structure of Compositæ, see *Floral Dissections, pl.* v, p. 9.

INULA HELENIUM, *L.* (*Elecampane.*)

Root.

Note.—This root has a peculiar violet-like odour, by which it may readily be distinguished. It is official in the secondary list of the *U. S. Pharm.* It is an aromatic tonic. In this country it is used chiefly as an ingredient in Diapente and other veterinary powders. Inulin replaces starch in the root of this plant and other Compositæ. [C. P. S.]

HELIANTHUS ANNUUS, *L.* (*Sunflower.*)

Fruit.

Note.—The seeds yield oil. The pith contains nitrate of potash. The oil has also been used to make a kind of soap, called Sunflower Soap. [C. P. S.]

ANTHEMIS NOBILIS, *L.* (*Roman Chamomile.*)

Flowerheads. (*Single Chamomiles.*) Ditto. (*Double Chamomiles.*)

Note.—The single chamomiles of commerce are always more or less double, but that may be recognised by the florets being narrower than those of the wholly double variety. The true single or wild chamomiles are known in commerce as Scotch chamomiles. German chamomiles are the flowerheads of Matricaria Chamomilla, *L.*; they are distinguished from true chamomiles by having a *hollow* conical receptacle and no paleæ. The flowering stem of chamomile bears only one flower; that of Matricaria Chamomilla bears several. The double flowers of Pyrethrum Parthenium, *Smith*, are very like those of the chamomile, but may be distinguished by having a nearly flat receptacle. See *P. J.* [2], vol. i, p. 447, for fig., etc. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 154, 155. [C. P. S.]

MATRICARIA CHAMOMILLA, *L.* (*Wild Chamomile.*)

Flowerheads.

Note.—This plant is used in Germany as the commercial plant, while Anthemis nobilis is the British drug. It is abundant in all waste places about London and elsewhere, the true chamomile being much less common.

M. GLABRATA.—This species is used in South Africa.

ARNICA MONTANA, *L.*

Rhizome.

Note.—Arnica "root" may be distinguished from serpentary and spigelia roots, &c., by having the rootlets attached only on the under side, and rather distant from each other; also by its peculiar odour. It has been found to be adulterated largely with the root of Geum urbanum, or avens root, which may be distinguished by its pale purple meditullium, by the rootlets proceeding from all sides of the root, and by its astringent, not acid, taste. See Bentley and Trimen, *Med. Plants*, tab. 158. [C. P. S.]

CICHORUM INTYBUS, *L.* (*Chicory.*)

Root, unroasted. Root, roasted, ground.

Note.—Chicory may be detected by its readily colouring cold water, and sinking speedily in it. Under the microscope chicory is known by the numerous pitted and spiral vessels of its tissue, and coffee by the absence of these vessels, and the peculiar obliquely marked elongated cells found in its outer coat. For fig. of these see *Lancet*, January 6th, 1851, p. 22, fig. 2. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 144. [C. P. S.]

ASPILIA LATIFOLIA. *Oliv. and Hiern.* (*Hæmorrhage plant.*)

Note.—Used in West Africa to stop bleeding both from veins and arteries, by Dr. Roberts, late President of Liberia. This remarkable drug has not yet been used in this country.

VERNONIA ANTHELMINTICA, *Willd.* (*Purple Flea-bane.*)

Note.—The seeds are very bitter, and are considered powerfully anthelmintic and diuretic. An infusion is given for coughs, and in cases of flatulency, &c. Drury, *Useful Plants of India*, s.v.

CARTHAMUS TINCTORIUS, *L.*

Florets. (*Safflower, Bastard Saffron.*)

Ditto. (*Cake Saffron.*)

Fruit.

Note.—Cake saffron is made of the florets pressed together with mucilage. Carthamus florets may be known from saffron by having syngenesious anthers, and by consisting of corollas, not of styles and stigmas only (of the Crocus). Pink saucers are coloured by this drug, and with powdered talc it constitutes a rouge.

CAMPANULACEÆ.

CAMPANULA LATIFOLIA, *L.*

Flowers (sections).

Note.—Floral formula, { (5). (5). 5. (3.) }. The flower is protandrous, the pollen grains being caught by the "retractile" hairs on the style before the stigmas are mature. The broad bases of the filaments form a dome-like chamber, protecting the honey from "unwelcome guests." (Kerner.)

LOBELIA INFLATA, *L.*

Herb.

Note.—Floral formula, { (5). [(5). (5*a*).] (2) }. The herb, and more especially the seeds, of Lobelia inflata are largely used by the Eclectics in America and by herbalists in this country as an emetic and expectorant. The flat capsules readily distinguish it from other drugs similar in appearance. (Bentley and Redwood.) Caustic alkalies decompose Lobelina. (Bentley and Trimen.) [C. P. S.]

ERICACEÆ.

ARCTOSTAPHYLOS UVA-URSI, *Spreng.* (*Bearberry, Upland Cranberry.*)

Leaves.

Note.—The leaves of Vaccinium Vitis Idæa are sometimes mixed with Bearberry leaves, but are distinguished by having crenated revolute margins and by being dotted underneath. Bearberry leaves are obovate; box leaves are oval, and have the epidermis loose and separable on the underside of the leaf. [C. P. S.]

GAULTHERIA PROCUMBENS, *L.* (*Wintergreen, Partridge Berry, Checkerberry, Deerberry, Teaberry, Mountain Tea.*)

Leaves.

Note.—The leaves are used as an astringent in mucous discharges. The volatile oil is remarkable for being a natural salicylate of methyl. The same compound occurs in the bark of Betula lenta, *L.*, and the leaves, &c., of Andromeda Leschenaultii. In American commerce the oil has been found adulterated with chloroform and oil of sassafras. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 164. [C. P. S.]

CHIMAPHILA UMBELLATA, *Pursh.*; CHIMAPHILA CORYMBOSA, *Pursh.* (*Pipsissewa, Wintergreen, Prince's Pine, Ground Holly.*)

Leaves and shoots.

Note.—The leaves were official in the *Ph. L.* of 1836 and 1851, and are still official in the United States Pharmacopœia. They possess diuretic and tonic properties. See Bentley and Trimen, *Med. Plants*, tab. 165. [C. P. S.]

MYRSINEÆ.

EMBELIA (SAMARA, *L.*) RIBES, *Burm.*

Fruit.

Note.—The berries of this, one of the common Indian species, are sold to traders, who use them for adulterating black pepper, which they somewhat resemble, and have, moreover, a slight pungency, owing to a resinous substance contained in them.

SAPOTACEÆ.

ARGANIA SIDEROXYLON, *R. et Sch.* (*Argan tree.*)

Fruit.

Note.—A native of Morocco. The fruit is an egg-shaped or roundish drupe, dotted with white. They are much relished by all ruminating animals, who in chewing the cud eject the hard seeds, from which a valuable oil is extracted, which in Morocco is used as a substitute for olive oil. The wood is very hard, and so heavy as to sink in water. [C. P. S.]

ISONANDRA GUTTA, *Hook.*

Gutta percha, raw, and in shreds, (*Treas. of Bot.*)

MIMUSOPS KANKI, *L.* (*Buah Sow.*)

Fruit.

Note.—The tree is extensively cultivated in China and Malabar on account of its acid and esculent fruit.

SAPOTA ACHRAS, *Mill.* (*Sapodilla plum.*)

Fruit.

Note.—A plant of the West Indies. The bark is astringent and febrifugal; the seeds also are aperient and diuretic. The fruit of this species, as of S. (Lucuma) mammosa, which yields the marmalade fruit, are highly esteemed.

BASSIA PARKII, *Don.* (*Shea* or *Butter tree.*)

Butter.

Note.—A native of Africa. The seeds produce Galam butter. The seeds are boiled in water to extract the butter from them. The fatty substance is of a white colour, and agreeable taste, and keeps well, hence it is an important article of commerce in Sierra Leone.

STYRACACEÆ.

STYRAX BENZOIN, *Dryand.* (*Benzoin.*)

Resin.

Note.—This plant is a native of Sumatra, Borneo, &c. Incisions are made into the tree, the juice exudes, dries, and the dried mass is removed by a knife. Each tree yields annually about three pounds of benzoin. Benzoin is employed medicinally in chronic pulmonary disorders, and by perfumers, and in incense.

OLEACEÆ.

FRAXINUS ORNUS, *L.* (*Manna Ash.*)

Flaky manna.

Note.—Manna is not now produced in Calabria as an article of commerce. Artificial manna either contains no mannite at all, or not more than 40 per cent., while true manna contains 70–80 per cent. Spurious manna is known by its uniform colour, and freedom from the slight impurities, as well as from the peculiar odour and slight bitterness of manna. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 170. [C. P. S.]

OLEA EUROPÆA, *L.* (*Olive Tree.*)

Drupes, preserved wet.

Olive oil.

Note.—Castile soap is a compound of olive oil and soda. It owes its colour to the decomposition of ferrous sulphate, stirred into the soap during its manufacture. Pure soft soap is a compound of olive oil and potash. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 172. [C. P. S.]

JASMINUM OFFICINALE, *L.* (*Jasmine.*)

Flowers.

Note.—Floral formula, (5). [(5). 2]. (2). *Obs.*, the number of petals of this species, as of others, varies very much. The fragrant essential oil is obtained from the corollas of this species and of J. grandiflorum. The dried flowers are used in China for scenting tea.

APOCYNACEÆ.

ALSTONIA CONSTRICTA, *F. Müll.* (*Australian Fever Bark.*)

Bark.

Note.—This has been found to contain some important alkaloids, one of which, alstonidine, has been offered in the London market as Bebeeru bark. The bark is yellow, and fibrous internally and rough and corky externally. [C. P. S.]

HOLARRHENA ANTIDYSENTERICA, *Wall.* (*Conessi Bark.*)

Bark and seeds.

Note.—The bark and seeds of this shrub or small tree have long enjoyed considerable repute in India as remedies for dysentery and as a tonic febrifuge. Prep.: decoction of the bark, or, preferably, infusion of the seeds. Doses: 2 to 5 grains of the seeds.

ASCLEPIADACEÆ.

ASCLEPIAS TUBEROSA, *L.* (*Butterfly Weed, Pleurisy Root, Wind Root, Tuber Root.*)

Root.

Note.—The root is used as an expectorant and diaphoretic in pleurisy and other catarrhal affections. Administered with Aletris farinosa, it is said to have cured many cases of prolapsus uteri. (Wood and Bache, p. 143.) Asclepidin and ascletin are prepared from this root. The former is a kind of resinous extract, and the latter a crystalline principle. [C. P. S.]

ASCLEPIAS, sp., *L.*

Flowers.

Note.—Floral formula, (5). [(5). (5)]. (2). *Obs.*, stamens have flattened filaments, usually united in a tubular column surrounding the ovary, and furnished behind the anther with a crown with various appendages; the pollen is agglutinated into a mass; the pollinia are pendulous, and adherent to the glandular processes on the stigma.

HEMIDESMUS INDICUS, *R. Br.* (*Indian Sarsaparilla, Nannárí Root, Ananto-múl.*)

Root.

Note.—It is known from other roots by its odour, resembling that of melilot, and by its transversely cracked, easily separable bark. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 174. [C. P. S.]

CALOTROPIS GIGANTEA, *R. B.* (*Mudar Bark.*)

Fibre.

Note.—The fibre of this plant presents all the qualities of the finest flax.

LOGANACEÆ.

STRYCHNOS TOXIFERA, *Benth.* (*Wourari, Curari, Woorali.*)

Prepared poison.

Note.—The poison is used by the natives of Guiana to tip their arrows and darts for killing game. Strychnia is said to be an antidote to Woorari poison. [C. P. S.]

STRYCHNOS IGNATII, *Bergius.*

Seeds. (*St. Ignatius Beans.*)

Note.—These seeds contain three times as much strychnia as nux vomica seeds. Very little is known concerning the plant itself. See Leu-sung-kwo, in the collection of Chinese Materia Medica. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 179. [C. P. S.]

STRYCHNOS NUX VOMICA, *L.*

Bark (*False Angustura Bark*); Seeds.

Note.—The bark of the tree possesses similar properties to the seeds, but in less degree. Serious consequences ensued in the early part of the present century from this bark having been imported and used as Angostura bark (Galipea).

GELSEMIUM NITIDUM, *Mich.* (*Yellow Jasmine, Wild Jessamine, Woodbine, Carolina Jessamine.*)

Root.

Note.—This drug consists partly of root, and partly of stem. It is official in the U. S. Pharm. For fig. of root, see *P. J.* [3], vol. vi, p. 521. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 181. [C. P. S.]

CERBERA (TANGHINIA) VENENIFERA, *Boj.* (*Tanghin.*)

Fruit.

Note.—In Madagascar the natives formerly placed unlimited confidence in the trial by ordeal with the poisonous seed of this plant. It was believed to be an infallible detector of guilt; the seed is pounded, and a small piece swallowed by each person to be tried; those in whom it causes vomiting only, escape; but to those who retain it, it is quickly fatal.

GENTIANACEÆ.

GENTIANA LUTEA, *L.*

Root. (*Gentian Root.*) Flower (section). Fruit, (From Tête Noire.)

Note.—Floral formula, (5).[(5). 5].(2). The filaments form buttresses in the corolla, contracting the tube and preventing the ingress of "unwelcome guests." The roots of other species of Gentian, viz., G. purpurea, G. pannonica, and G. punctata are sometimes mixed with gentian root. G. purpurea and G. pannonica are known by being of a darker brown internally, and having strong longitudinal furrows, but no transverse wrinkles externally. The roots of G. punctata are of a yellowish, nut-brown, colour. For fig. of root, see Bentley and Trimen, *Med. Plants*, tab. 182. [C. P. S.]

OPHELIA CHIRATA, *Grisebach.* (*Chiretta, Dukhani Chiretta.*)

Herb.

Note.—For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 183. Several species of this genus and some of other genera are used in other parts of India as substitutes for chiretta. The infusion of chirata, according to Mr. Squire, is more agreeable if made at a temperature below 180° F.

BORAGINACEÆ.

ALKANNA (ANCHUSA) TINCTORIA, *L.* (*Alkanet.*)

Root.

Note.—The red colouring matter of this root is soluble in oil, turpentine, and spirit, but not in water. It is employed in pharmacy to give a red colour to salves, &c., and for colouring wines.

BORAGO OFFICINALIS, *L.* (*Borage.*)

Flower in section.

Note.—Flora formula, (5). [(5). 5]. (2). *Obs.*, stamens provided with an obtuse tooth. The pistil resembles that of the Labiatæ in having the ovary deeply four-lobed, with a gynobasic style. The common borage when steeped in water imparts coolness to it, and is used in the beverage called cold tankard.

LITHOSPERMUM OFFICINALE, *L.* (*Gromwell.*)

Fruit (Nutlets).

Note.—The lobes of the ovary which separate as nutlets have a siliceous and calcareous pericarp.

CONVOLVULACEÆ.

EXOGONIUM PURGA, *Benth;* IPOMŒA PURGA, *Hayne.* (*Vera Cruz Jalap.*)

Root. Also of I. SIMULANS, *Hanb.*, (*Tampico Jalap.*)

Note.—True jalap is distinguished from Tampico by being usually turnip-shaped or pear-shaped, by its density, by not being shrunken, and by being marked with numerous little transverse scars, which are absent in Tampico Jalap. The root contains 15 per cent. of resin, about 5 per cent. of which is soluble in ether, the rest insoluble. [C. P. S.]

BATATAS EDULIS, *Choisy.*

Root; specimens preserved wet. (*Sweet Potato.*)

Dried slices as "biscuit."

Starch from root.

Note.—The tubercular root is used as a substitute for potatoes in warm countries.

IPOMÆA (PHARBITIS), Nil, *Choisy.*

Seeds. (*Kaladana.*)

Note.—The resin (Kaladana resin) contained in the seeds is probably identical with that of true jalap, being insoluble in ether. It is official in the Pharm. Ind., as well as an extract, tincture, and compound powder. The specific name Nil, is a Hindustanee word, signifying blue, the flowers being of that colour. The seeds are a safe and efficient purgative, and are used in a roasted state by the natives. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 185. [C. P. S.]

CONVOLVULUS SCAMMONIA, *L.* (*Scammony.*)

Resin.

Note.—For fig. see *P. J.* [1], vol. xiii, p. 268.

CONVOLVULUS SEPIUM, *L.* (*Hedge Convolvulus*).

Flower (section).

Note.—Floral formula, (5). [(5). 5]. (2). *Floral Dissections*, s.v.

SOLANACEÆ.

CAPSICUM ANNUUM, *L. Var.*

Fruit. (*Sweet Cayenne Pepper.*) Nepal, a yellow variety of pepper.

Note.—This fruit has no pungency, and is largely used in South Europe as a flavouring agent, and as a salad in a ripe state. For figs. see Pereira, *Mat. Med.*, ii, pt. i, p. 593.

SOLANUM DULCAMARA, *L.* (*Bittersweet* or *Woody Nightshade.*)

Flower and fruit.

Note.—Floral formula, (5). [(5). 5]. (2). *Obs.*, the connivent stamens are subsyngenesious, the anthers dehiscing by pores at the apex. This plant is known from Solanum nigrum by having purple flowers and red berries. S. nigrum has white flowers and black berries. Plants of S. Dulcamara are sometimes found with the leaves not auriculate. For fig. of plant see Bentley and Trimen, *Med. Plants*, tab. 190.

SOLANUM TUBEROSUM, *L.* (*Potato.*)

Analysis of 1 lb. of potatoes.

Starch from potatoes, in form of Tapioca, of Sago, and "Bullet;" Dextrine, two varieties, and Sugar from the starch. Casein from diseased tubers.

Aërial tubers.

Note.—One pound of potatoes contains of *non-nitrogenous* ingredients: Tissue, 3·2 p.c.; starch, 15·5 p.c.; sugar, 3·2 p.c.; fat, 0·2 p.c.; dextrin, 0·4 p.c.; of *nitrogenous*, casein, &c., 1·4 p.c.; *mineral*: Water, 75·2 p.c.; ash, 0·9 p.c. A portion of the whiter varieties of sago of commerce, and the substance known as pearl tapioca, are made of potato starch. Potato starch may be known under the microscope by its large size, and by the granules being irregularly ovate in shape, and sometimes with more than one hilum in each.

ATROPA BELLADONNA, *L.* (*Deadly Nightshade.*)

Roots and leaves. Flower (section).

Note.—Floral formula, (5). [(5). 5]. (2). This root has been found mixed with mallow root. It may be distinguished by not being fibrous, like that of the Mallow, and by its large meditullium. The roots usually have a portion of the base of the stem attached to them. The leaves may be distinguished from those of Stramonium by not being toothed in the margin. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 193. [C. P. S.]

HYOSCYAMUS NIGER, *L.* (*Henbane.*)

Entire plant (lower case); Flower (section); Fruit and seeds.

Note.—Floral formula, (5). [(5). 5]. (2). The fruit is a pyxis dehiscing by a circumscissile fissure. The radical stalked leaves of the biennial plant are often sold as annual Henbane. In the annual Henbane plants the small radical leaves are withered before the plant blossoms, therefore all the leaves in the annual drug should be without stalks. Henbane leaves may be known in the dried state from Stramonium by the leaves being hairy, not smooth, and from Belladonna by the leaves being toothed in the margin. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 194. [C. P. S.]

SCOPOLIA JAPONICA, *Max.* (*Japanese Belladonna.*)

Root.

Note.—Dr. A. Langgaard extracted two alkaloids from this root, one of which he called "Rotoïne," the other "Scopoleïne." (*See* Christy, *l.c.*)

SCROPHULARIACEÆ.

DIGITALIS PURPUREA, *L.* (*Foxglove.*)

Herb. Seeds.

Note.—Floral formula, 5. [(5). 4.] (2). The flower is protandrous in two stages; the longer stamens maturing the anthers first; then the shorter; lastly the stigmas mature. The leaves which most resemble those of digitalis, and which frequently grow in the same neighbourhood, are those of Verbascum nigrum, *L.*, and Inula Conyza, *D.C.* The leaves of digitalis may be distinguished from those of both these plants by the smaller veins extending into the wing of the petiole. Verbascum thapsus, *L.*, has leaves which are too woolly to be easily mistaken for those of foxglove. The seeds have been recommended as a substitute for the leaves, as being more reliable in their action, and less likely to be adulterated than the leaves. The leaves are said to be more active in early autumn than when the plant is in flower. [C. P. S.]

LINARIA VULGARIS, *Mill.* (*Toad-flax.*)

Flower (section).

Note.—Floral formula, 5. [(5.) 4.](2). This differs from Antirrhinum in having the corolla spurred and not saccate; it is saccate in the incipient state of the flower.

ANTIRRHINUM MAJUS, *L.* (*Snapdragon.*)

Flower (section).

Monstrous forms (see TERATOLOGY.)

Note.—Floral formula, (5). [(5). 4.] (2). This differs from Linaria in having the corolla saccate and not spurred.

BIGNONIACEÆ.

CYBISTAX ANTISYPHILITICA, *Bur.* (*Caroba.*)

Leaves.

Note.—(For uses, see Christy, *l.c.*)

ACANTHACEÆ.

ASTERACANTHA LONGIFOLIA, *Nees.*

Root.

Note.—This plant is commonly met with by the side of paddy-fields, &c. (For uses, see Drury, *l.c.*)

LABIATÆ.

MENTHA PIPERASCENS, *Holmes.* (*Menthol.*)

Crystals.

Note.—(*See* Christy, *l.c.*)

MENTHA PIPERITA, *L.* (*Peppermint.*)

Herb. Essential oil.

Note.—Peppermint is known from Spearmint by its purple tint, by the leaves being stalked, and by the terminal spike-like inflorescence being obtuse. See Bentley and Trimen, *Med. Plants*, tab. 203. The oil has been found adulterated with castor oil, spirit of wine, and turpentine. Hotchkiss' oil of peppermint is known by giving an opalescent solution with rectified spirit of wine. The dried herb yields from three to four times more volatile oil than in the green state. [C. P. S.]

MENTHA VIRIDIS, *L.* (*Spear-mint, Garden Mint.*)

Essential oil.

Note.—The oil of spear-mint of commerce is chiefly derived from Mentha aquatica, *L.*, var. γ crispa, *Benth.* Bentley and Trimen, *Med. Plants*, tab. 202.

ROSMARINUS OFFICINALIS, *L.* (*Rosemary.*)

Flowering tops. Essential oil.

Note.—The oil is often adulterated with turpentine. "Camphine," or highly rectified oil of turpentine, is the kind often used in adulterating volatile oils. [C. P. S.]

SALVIA, sp., *L.*

Note.—Floral formula, (5). [(5). 2]. (2). *Obs.*, two stamens are rudimentary. The two anther cells of the fertile stamens are separated by elongated connectives. They constitute a pair of levers of the "first kind," oscillating in a vertical plane. Hence they differ from the two stamens in Rosemary, which are fixed. Garden Sage is Salvia officinalis.

LAVANDULA SPICA, *D. C.*

Essential oil. (*Oil of Spike.*)

Note.—This oil is darker and of a less agreeable perfume than that of lavender. This oil, together with that obtained from L. Stœchas, is used by painters on porcelain, and by artists in the preparation of varnish. *Treas. of Bot.*, s.v.

LAVANDULA VERA, *D. C.* (*Lavender.*)

Essential oil.

Note.—Lavandula vera may be distinguished from L. Spica by having rhomboidal bracts, those of L. Spica being linear. Turpentine may be detected by its insolubility in spirit; alcohol may be removed, if present, by anhydrous chloride of calcium or glycerin. [C. P. S.]

LAMIUM ALBUM, *L.* (*Dead Nettle.*)

Flower (section).

Note.—Floral formula, (5). [(5). 4.] (2). *Obs.*, the "lip" is of one petal, the "hood" of two.

PLANTAGINACEÆ.

PLANTAGO ISPAGHULA, *Roxb.*

Seed. (*Spogel seeds, Isphagûl.*)

Note.—These seeds contain a quantity of mucilage, and are official in the *Pharm. Ind.* as a remedy for diarrhœa and dysentery, as well as for catarrhal and renal affections. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 211. [C. P. S.] Christy, *New Com. Plants, &c.*, vi, 99. *Dose* for an adult 2½ drachms, mixed with water and sugar, and swallowed whole. Drury, *Useful Plants of India*, s. v.

POLYGONACEÆ.

COCCOLOBA UVIFERA, *L.* (*Seaside Grape.*)

Fruit.

Note.—Jamaica kino is made by evaporating a decoction of leaves, wood, and bark of the tree. The wood yields a red dye. The pulpy fruit consists of the fleshy perianth which surrounds the fruit. It has an agreeably acid flavour.

POLYGONUM FAGOPYRUM, *L.* (*Buckwheat.*)

Fruit. Rutine.

Note.—This species is dimorphic, having long and short styled forms. This plant is a native of Central Asia, but long and much cultivated in Europe, where it is employed as human food, being made into thin cakes. The nutritious qualities are between rice and wheat. In France it is called Sarrasin and Blè noir, "black wheat," possibly corrupted into buckwheat. The plant contains a yellow colouring matter, crystallising in primrose-yellow needles. It is identical with *Rutine* obtained from Rue, *Ruta graveolens*, and from Capers. Ure's *Dict. of Arts, Manufactures, and Mines*, s. "Buckwheat."

POLYGONUM BISTORTA, *L.* (*Bistort or Snakeweed.*)

Root.

Note.—The flowers are strongly protandrous and dichogamous. The root is twisted upon itself, whence its name. It contains tannin and starch, and was formerly used for making an astringent gargle and injection. See Bentley and Trimen, *Med. Plants*, tab. 212. The green tops are eaten in Cumberland under the name of Easter Man Giants (? Easter-eating—Fr. *mangeant*).

RHEUM OFFICINALE, *Baill.*

Rootstock. (*Russian Rhubarb, Turkey Rhubarb, Russia Brown Rhubarb.*)

Note.—This kind of rhubarb has not been exported from Russia since 1860. See *P. J.* [3], vol. vi, p. 861. Russian rhubarb is distinguished by the large size of the holes made in it, which are large enough to admit the end of the little finger, by its surface having been sliced off, and by its structure resembling that of East Indian Rhubarb. [C. P. S.]

RHEUM PALMATUM, *L.* (*Kiachta Rhubarb.*)

Root.

Note.—Seeds of this species were first brought over in 1750. It was first found wild by Colonel Prejevalsky in 1872, in the Tangut division of Kansu, North West of China. (Bentley and Trimen, *Med. Plants*, tab. 214.)

RHEUM RHAPONTICUM, *L.* (*English Rhubarb.*)

Root.

Note.—This was the first species of Rhubarb known. It is a native of South Siberia. It was cultivated in the 17th century at Padua, and in England since 1777.

RHEUM UNDULATUM, *L.*

Fruit. (*Bucharian Rhubarb.*)

Note.—This rhubarb is an inferior kind, which does not appear at the present time in English commerce. It is described by Guibourt under the name of Rhubarb de Perse, as it was imported through Persia and Turkey. [C. P. S.] This species supplies the edible leaf-stalks of the common garden of Europe. The root is inferior to others medicinally.

ARISTOLOCHIACEÆ.

ARISTOLOCHIA SERPENTARIA, *L.*

Root. (*Virginian Snakeroot.*)

Note.—This root somewhat resembles in appearance Valerian and Indian pink roots, but may be distinguished from both by its odour and the brittleness of its rootlets. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 264.

ARISTOLOCHIA, SP., *L.*

Flower (section).

Note.—Floral formula, {(3). 0. [6. (6).]} See *Floral Diss.*, p. 13, pl. vii, lv.

PIPERACEÆ.

ARTANTHE ELONGATA, *Miq.*; PIPER ANGUSTIFOLIUM, *R. et P.*

Leaves. (*Matico.*)

Note.—A native of moist forest-land of tropical America. The leaves are from two to eight inches long, veined and tessellated on the upper surface, downy beneath, with an aromatic slightly astringent warm taste, and an agreeable aromatic odour. The term matico is applied to several plants in different parts of South America. A. adunca is distinguished by the leaves not being strongly reticulated, and nearly glabrous beneath. [C. P. S.]

MACROPIPER (PIPER) METHYSTICUM, *Forst.* (*Kava-kava.*)

Root.

Note.—The root is called Kava-kava by the Polynesians. It has narcotic properties. They prepare an intoxicating drink by chewing the root, which is first steeped in water, and then allowed to ferment.

MONIMIACEÆ.

PEUMUS BOLDUS, *Mol.* (*Boldo.*)

Leaves.

Note.—For uses, &c., see *Christy*.

LAURACEÆ.

PERSEA GRATISSIMA, *Gaertn. f.*

Fruit. (*Avocado*, or *Alligator Pear.*)

Note.—This fruit is eaten in the West Indies. The seeds yield an indelible black stain, and are used for marking linen.

CASSYTHA FILIFORMIS, *L.*

Branches.

Note.—This is a parasitic leafless plant, found twisting round the branches of trees in most parts of the peninsula of India. It is put as a seasoning into butter-milk, and is much used by the Brahmins in South India. The whole plant pulverised and mixed with dry ginger and butter is used in the cleaning of inveterate ulcers. Mixed with gingely oil it is employed in strengthening the roots of the hair. The juice of the plant mixed with sugar is occasionally applied to inflamed eyes. (Drury, &c.)

LAURUS NOBILIS, *L.* (*Sweet Bay*, *True Bay*, or *Noble Laurel.*)

Fruit. (*Bay Berries.*) Concrete oil. (*Oil of Bays*), and distilled oil.

Note.—The leaves possess tonic and febrifuge properties. See *P. J.* [3], vol. iii, p. 448. The fruit somewhat resembles Cocculus indicus in appearance, but is perfectly oval, and contains two loose cotyledons. The bayberry powder, which appears in the eclectic recipes for "composition powder," is not the powder of these berries, but of the root-bark of Myrica cerifera, which is known in North America under the name of bayberry. The common or cherry laurel of the gardens is Prunus Lauro-Cerasus. The leaves may be distinguished from those of the true laurel by the difference in odour when bruised, and by the garden laurel having serrate leaves, while those of the bay laurel are entire and undulate. The leaves in which Solazzi juice is packed are those of bay laurel. [C. P. S.]

LAURUS TAWA, *Cunn.*

Cotyledons.

Note.—A native of New Zealand. The cotyledons are boiled in the water of hot springs and eaten by the natives.

THYMELACEÆ.

AQUILARIA AGALLOCHA, *Roxb.*

Wood. (*Lign Aloes Wood.*)

Note.—This wood is supposed to be the aloes of Scripture. It has an odour faintly resembling that of patchouli. [C. P. S.]

PENÆACEÆ.

PENÆA SARCOCOLLA, *L.*

Gum. (*Gum Sarcocol.*)

Note.—This substance was formerly used for healing wounds, hence its name. The taste is sweet, with a decided bitterness. It is said to have been brought from Arabia. Sarcocolline is a substance *sui generis*, intermediate between sugar and gum. [C. P. S.]

Dr. Dymock in his *Veg. Met. Med. of Western India* believes this plant to be leguminous, and allied to Astragalus. Dioscorides describes Sarcocolla as a tear of a Persian tree, with a bitterish taste and a reddish colour. "It is used internally as an antirheumatic and anthelmintic, and the Egyptian women eat it on account of its fattening properties."

BALANOPHOREÆ.

BALANOPHORA ELONGATA, *Bl.*

Note.—The species are leafless parasitical plants, found on the roots of oaks, maples, vines, &c., in tropical countries. Some of the Himalayan species cause the formation of large knots on the roots of these trees, which are used for the manufacture of cups in Thibet. This species furnishes wax in great abundance, used for making candles in Java. Species of Balanophora attack the roots of maples in Thibet, causing knots, from which they make tea-cups for drinking brick-tea (see specimen).

EUPHORBIACEÆ.

EUPHORBIA RESINIFERA, *Berg.*

Gum resin. (*Euphorbium.*)

Note.—This drug is chiefly used as a vesicant in veterinary medicine. It causes considerable irritation of the nostrils and eyes when powdered. It is said to be used as an ingredient in paint for ships' bottoms.

CURCAS PURGANS, *L.* (*English Physic Nuts.*)

Seeds. (*Physic Nuts, Polga Nuts, Pinheiro de Purga, Pinhao Paraguay.*)

Oil expressed from the seeds. (*Oil of Wild Castor Seeds, Jatropha Oil.*)

Note.—These seeds are in size and shape like those of the castor oil plant, but have a dull, black, cracked surface. Christison states that twelve to fifteen drops of the oil are equal to one ounce of castor oil, but the action of the drug is uncertain. The oil is only sparingly soluble in alcohol. [C. P. S.]

CROTON ELUTERIA, *Bennett.*

Bark. (*Sweet* or *Cascarilla.*)

Note.—The barks of other species of croton have sometimes been found mixed with Cascarilla bark in the bales as imported. See *P. J.* [1], vol. vii, p. 35.

For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 238. [C. P. S.]

CROTON TIGLIUM, *L.*. (*Purging Croton.*)

Seed.

Fixed oil, obtainable from the seeds in England. (*Croton Oil.*)

Note.—The tree is a native of Coromandel, the Indian Archipelago, &c. The principal constituents of croton seeds are a fatty fixed oil, tiglinic acid, crotonic or quartenylic acid, and crotonol. The latter is the drastic principle. The oil expressed in England is more esteemed than that imported from India. The English oil is darker in colour than the Indian. Hypercatharsis produced by croton oil may be controlled by copious draughts of diluted lemon or lime juice or vinegar. East Indian oil forms a milky mixture with its own weight of alcohol (0·796), which ultimately separates; but English oil dissolves, and forms a clear solution under the same circumstances. Pereira suggests that the East Indian oil may be adulterated with jatropha oil, which is not soluble in twenty-four parts of alcohol. [C. P. S.]

MANIHOT UTILLISSIMA, *Pohl.*

Cassava meal, coarse and fine. Cassava bread. (*Tapioca Meal*, *Moussache*, or *Cipipa.*) Cassava starch. (*Brazilian Arrowroot.*)

Note.—The root is grated and pressed in a matapi, or cylindrical bag, made of Ita palm (Mauritia flexuosa, *L.*); and after being pressed and dried, is sifted through an etami, or sifter, made of the same material, and then forms cassava meal. Cassava bread occurs in thin round cakes, and is made from the meal in a moist state by gently heating it, and then drying it in the sun. Cassareep, which is now an article of commerce in London, is the concentrated juice of the bitter cassava, which loses its poisonous properties by heat. It is said, but wrongly, to preserve meat boiled in it longer than any other substance which can be used. Cassareep, mixed with peppers and meat, forms the West Indian "pepper-pot." Tapioca is made by heating and stirring the starch in a moist state until it agglomerates. Rio tapioca is whiter than that from Bahia. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 235. [C. P. S.]

HURA CREPITANS, *L.* (*Sandbox Tree*, *Monkey's Dinner Bell.*)

Fruit.

Note.—The seeds possess purgative and emetic properties, the emetic property being said to reside in the embryo only. The seeds lose their properties by age. The fruit affords an instance of the regma, and it is from the noise caused by the bursting of the fruit that the plant gets its curious name. [C. P. S.]

CICCA DISTICHA, *L.*

Fruit. (*Otaheite Gooseberry.*)

Note.—This is a small tree, and native of India, where it is cultivated for its fruit. They are used as an article of food, either raw or cooked. Europeans pickle and preserve them, or use them in tarts. A decoction of the leaves is used to cause perspiration, and the roots are emetic, but violent.

RICINUS COMMUNIS, *L.*

Seeds. (*Castor Oil Seeds*, *Semina Cataputiæ majoris.*)

Note.—A small variety of the seed is cultivated in India, where the large variety is expressed for lamp oil, and the small variety for medicinal oil. The American variety, with reddish seeds, is said to yield more oil than the Egyptian black seed, but the oil obtained from the Egyptian seed is paler in colour. [C. P. S.]

ROTTLERA TINCTORIA, *Roxb.*; MALLOTUS PHILIPPENSIS, *Müll. Arg.*

Glands covering the fruit. (*Kamala*, *Kapila*, *Kapilapodi*, *Wars*, *Wurrus*, *Wassunta gunda.*)

Note.—Wurrus is used in India very extensively as a rich orange-brown dye for silk. It is a less pure form of the drug than kamala. Kamala is used as a vermifuge, and sometimes in cutaneous diseases. [C. P. S.]

EMBLICA OFFICINALIS, *Gærtn.* (*Emblic Myrobalans.*)

Fruit.

Note.—This is found wild, and cultivated in various parts of India and the Indian Archipelago, and is a tree of 20 to 30 feet in height. In Borneo the bark and young shoots are used to dye cotton black, for which purpose they are boiled in alum. The fruits are often made into a sweetmeat, but are very acid. The wood is hard, and resists damp. In India the bark is used for tanning, and the root-bark mixed with honey is applied to inflammation of the mouth. The fruits when ripe and dry are given in cholera, diarrhœa, &c. The seeds are used in nausea and bilious affections, &c.

BUXUS SEMPERVIRENS, *L.* (*Box.*)

Wood. Leaves from a Roman tumulus, fruit.

Note.—This is a native of Europe and Asia. It is only indigenous at Box Hill in Surrey, in England. It occurs plentifully by the Black Sea, whence the wood is imported for wood-engraving, and for mathematical and musical instruments. The specimen of leaves was obtained from a Roman barrow at Bartlow, within which a sprig was placed probably in lieu of myrtle. The leaf is remarkable for its epidermis being separate from the underlying tissue.

SIPHONIA ELASTICA, *Rich.*

Fruit and seeds, India-rubber as "bottle."

Note.—From this genus a considerable quantity of caoutchouc has been obtained. It is a native of French Guiana and elsewhere in South America. The bulk of caoutchuc exported from Pará is obtained from S. Braziliensis, common in the forests of Pará. It exists in the tree as a thin white milk, and is obtained by making incisions in the trunk. The milk dries over clay balls in successive coats; the clay being removed, the rubber takes the form of a bottle.

STILLINGIA SEBIFERA, *Mich.* (*Tallow Tree, Wu-k'iu muh, Yah-k'iu.*)

Seeds, solid fat.

Note.—This fat consists of tripalmitin. It forms a coating on the outside of the seed. It is used extensively in China for making candles, and to a small extent as an emetic purgative, and antidote to poisons. It has also been recommended for use as an ingredient in ointments and suppositories. [C. P. S.]

URTICACEÆ (Cannabineæ).

CANNABIS (INDICA), SATIVA, *L.* (*Indian Hemp.*)

Leaves powdered, Bangh, Gudak (Smoking-paste).

Churrus (resinous extract); Fruit (*Hemp seed*).

Note.—Herodotus mentions the use of the fibre of hemp, from which the Thracians made garments, "very like flax:" as also of its intoxicating qualities; saying that the Scythians, instead of washing, "purified themselves with an intoxicating kind of smoke;" this was obtained by throwing hemp seeds on red hot stones. *Gunja* has a strong aromatic and heavy odour, abounds in resin, and is sold in the form of flowering stalks. *Bhang* is in the form of dried leaves, without stalk, has not much odour, and is only slightly resinous. Gunja is smoked like tobacco, but bhang is not smoked, but pounded up with water into pulp so as to make a drink highly conducive to health. *Gudak* is made with some oily substance. *Churrus* is the resin which exudes in minute drops from the stems and leaves. It is very impure, and is chiefly consumed in smoking. *Hashish* is the Arabic term for hemp. The word "assassin" is derived from it. The name "Hashish" appears to be applied in Arabic to that which is called Bhang in Hindustanee.

"Hemp seed" is the fruit. Each contains an oily seed; when ripe they appear to have no narcotic properties; they yield by pressure about 25 per cent. of fixed oil, used for varnish, &c.

HUMULUS LUPULUS, *L.* (*Hop.*)

Strobiles, fruits, lupuline, or lupulinic glands.

Note.—Lupuline consists of the glands which cover the fruit, &c. It must not be confounded with lupulite, the bitter principle of the hop, contained in the glands.

(Moreæ.)

MACLURA TINCTORIA, *Endl.* (*Young Fustic.*)

Wood, sawdust of wood.

Note.—A large tree, native of W. Indies and tropical America. The wood is used by dyers, who obtain from it shades of yellow, brown, olive, and green. "Old Fustie" is the wood of *Rhus Cotinus.*

(Artocarpeæ.)

FICUS REPENS, *Roxb.* (*Creeping Fig.*)

Dimorphic foliage and fruit.

Note.—This plant is much used for covering damp walls in hot-houses, over which it creeps, forming a dense mass of foliage. The leaves in this condition are very small. The flowering shoots are much thicker, and bear larger leaves. A similar dimorphism is in the common ivy.

FICUS SYCOMORUS, *L.* (*Sycomore Fig.*)

Wood and Egyptian figure.

Note.—This is a large tree of Egypt, much grown for the sake of shelter. The head is often forty yards in diameter. The fruit is sweet and delicate, and eaten by the Egyptians. It is supposed to furnish wood for mummy cases, but it is of inferior quality. It is the Syeamine tree of the New Testament.

ARTOCARPUS INCISA, *L.* (*Bread-fruit.*)

Fruit.

Note.—The fruit is a *sorosis* or aggregate of several separate fruits, like the pineapple. The tissue is roasted before eaten. The best varieties have no seeds. The tree contains a viscid milky juice, used instead of glue, and for caulking the canoes of the South Sea Islanders, with whom the bread-fruit constitutes the principal article of diet. The history of its introduction into the West Indies is associated with the well known incidents of the mutiny of the "Bounty," under Lieutenant Bligh, who was instructed to procure trees for those Islands.

ARTOCARPUS INTEGRIFOLIA, *L.* (*Jack-fruit.*)

Note.—This is a native of the Indian Archipelago. It is cultivated in Southern India and all the warmer parts of Asia. Both the fruit and the roasted seeds are favourite articles of food. The timber makes good furniture.

MYRICACEÆ.

MYRICA CERIFERA, *L.* (*Virginia Candleberry, Wax Myrtle, Waxberry, Bayberry.*)

Wax.

Note.—The powder of the root bark forms a principal ingredient in the favourite powder of the medical botanists or Eclectics of America, viz., composition powder. It is used as a stimulant and astringent for the mucous membrane when in an atonic state. Its powder is excessively irritating to the nostrils, exciting coughing and sneezing, but only for a short time. The wax is used in making ointments. [C. P. S.]

CUPULIFERÆ.

QUERCUS ÆGILOPS, *L.*

Acorn cups.

Note.—The cupules are used in commerce for tanning, under the name of "Valonia."

QUERCUS ROBUR, *L.*; QUERCUS PEDUNCULATA, *Willd.* (*The Common Oak.*)

Fruit, Bark.

Note.—Oak bark is somewhat similar in appearance to large specimens of the bark of Rhamnus Frangula; the latter, however, may be distinguished by its bright reddish colour when the surface is scraped. Quercus pedunculata may be easily distinguished from Q. sessiliflora by its elongated pedicels and sessile leaves, those of Q. sessiliflora being much abreviated, but accompanied by leaves with petioles. [C. P. S.] For fig., see Goebel and Kunze, pt. i, taf. xxix, figs. 1–4.

QUERCUS TINCTORIA, *Willd.* (*Quercitron*, or *Black Oak.*)

Inner bark. (*Black Oak Bark.*)

Note.—The bark is known in commerce as quercitron bark, and is used as a yellow dye. It is official in the U. S. Pharmacopœia, and is used externally as an astringent. White oak bark (Q. alba) is the kind chiefly used in medicine. Both are official in the U. S. Pharmacopœia. [C. P. S.]

QUERCUS SUBER, *L.* (*Cork Oak.*)

Wood and bark.

Note.—Cork is the much developed epiphlœum of this tree. The younger bark of the tree is known under the name of European alcornoque bark, and is used in tanning. American alcornoque bark is *Byrsonima laurifolia.* [C. P. S.]

QUERCUS INFECTORIA, *Cliv.*

Galls.

Note.—This species is a small shrub about six feet high. The galls are produced by the puncture of an insect, *Cynips gallæ-tinctoria*, and are imported from the Levant. They are largely used for the manufacture of ink, and for the preparation of tannic and gallic acids.

GYMNOSPERMS.

CONIFERÆ.

PINUS SYLVESTRIS, *L.* (*Scotch Fir.*)

Cones, Pitch, Oil of Turpentine, Libre-fibre.

Note.—Pitch is a bituminous fluid obtained from the roots and branches of this and other species by destructive distillation, the trunks being used as timber. It is chiefly prepared in Finland, Sweden, and Northern Russia. (Bentley and Trimen, *Med. Plants*, 257 ; *Treasury of Botany*, s. v.) Archangel pitch is also produced by Larix Sibircia, *Ledeb.* Pitch has been used, made into pills with flour, in skin diseases and languid circulation. (Pereira, *Mat. Med.*, vol. ii, pl. i, p. 324). Pitch is the residue in the still after the distillation of wood tar. [C. P. S.] Oil of turpentine is obtained by distilling turpentine with water. Rectified oil of turpentine is known as spirits of turpentine.

Libre-fibre. This is used, mixed with cotton wool coloured brown, for underclothing. It is sent from the Hartz Mountains, and obtained from the leaves.

PINUS SUCCINIFER.

Resin. (*Amber.*)

Note.—This is fossil resin from extinct pine trees, the forests of which were located in the site of the Baltic Sea and North Prussia. It was a sub-tropical period, and the insects, &c., often found in amber are all of extinct species, though many of the genera are still living.

ABIES EXCELSA, *D.C.*; PINUS ABIES, *L.* (*Norway Spruce, White Deal.*)

Cone, Oleoresin, (*Burgundy Pitch.*) Spruce bark, Essence of Spruce, Oil of Spruce, pure Cellulose.

Note.—Most of the Burgundy pitch found in commerce is a fictitious article made by melting resin with linseed oil, and colouring with arnatto or palm oil. The genuine article is much more irritating than the fictitious one. Any fat oil may be detected by treating the Burgundy pitch with twice its weight of glacial acetic acid, when it forms a turbid mixture. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 262. From the trunk exudes a resin called Frankincence, which, when melted in water and strained, constitutes Burgundy pitch. Thus is concrete American turpentine ; Thus Americanum, from Pinus Australis, formerly described as from Abies excelsa. [C. P. S.]

Pure cellulose is the woody fibre as prepared by the Ekman process for paper. The price is one-fourth that of Esparto grass.

JUNIPERUS COMMUNIS, *L.* (*Common Juniper.*)

Berries. Wood diseased by *Podisoma.*

Note.—The fruit is a fleshy galbulus. When first formed, it consists of three fleshy bracts nearly separate from each other, with an ovule at the base of each. These bracts afterwards grow together to form the so-called juniper berry. For fig., see Bentley and Trimen, *Med. Plants*, p. 255. The small catkins of male flowers occur on separate plants. The oil is often adulterated with turpentine, and is then less viscid, and not entirely soluble in alcohol. The pure oil is soluble in that fluid. The common juniper is a native of England, forming low tufts on the South Downs, but shrubby trees on the moors of York and Durham. The wood is liable to the attacks of a dimorphic fungus (*Podisoma Juniperi*), which forms orange-coloured "horns" issuing from the branches; the spores from this subsequently attack the Hawthorn, especially the fruits, giving rise to the so-called (*Ræstelia lacerata*) (see the specimens of these FUNGI.) The berries are a good stomachic.

JUNIPERUS SABINA, *L.* (*Savin.*)

Powdered Savin, Volatile oil. (*Oil of Savin.*)

Note.—Savin differs from juniper in having leaves only half as long, and more spreading than in that plant, and in its different odour. It may be distinguished by its tufted branchlets from the common species of Thuja, which have fan-like, flattened branches. [C. P. S.]

JUNIPERUS VIRGINIANA, *L.* (*Red Cedar, American Savine.*)

Wood.

Note.—This plant closely resembles savine in appearance and odour, but yields less volatile oil. It appears to differ from savine only in its larger size and more diffuse habit. The wood is the so-called "cedar" commonly used for lead pencils. It has the advantage over common cedar of not being attacked by insects.

AGATHIS (DAMMARA) AUSTRALIS, *Don.* (*Kauri Pine.*)

Resin. (*Australian Copal, Australian Dammar, Coire Gum, Kawrie Gum.*)

Note.—Kauri or cowdie gum is a fossil resin, used as a substitute for copal in making varnishes. It is readily soluble in eucalyptus oils. It is largely imported into this country from New Zealand, where it is dug up, by the Maories, in the North Island, where it is found beneath the turf, by "spearing" for it in places where there are no forests at the present time. In the year 1866, no less than 41,428 cwts. were imported, a large proportion of which was probably again exported to America. It has fetched as much as £120 a ton in London. Common dammar resin is produced in India by Dammara orientalis. [C. P. S.]

TORREYA, sp., *Arn.* (*Stinking Yew.*)

Fruit.

Note.—This genus belongs to the Taxaceæ or Yew-tree family, and are small evergreen trees of North America, China, and Japan. They are diœcious. The fruits are drupaceous, one-seeded, with a ruminated albumen. The kernels yield an oil, for culinary purposes.

CYCADACEÆ.

CYCAS REVOLUTA, *Thunb.*

Antheriferous and ovuliferous scales. Seeds.

Note.—Japan sago is said to be made of the starch obtained from the stem of this plant: but it is not imported into England.

MONOCOTYLEDONS.

ORCHIDACEÆ.

ORCHIS LATIFOLIA, *L.* (*Marsh Orchis.*)

Plant.

Note.—Floral formula, {3 + 3. [1. (3)].} A fine cultivated specimen (in lower case).

CATASETUM TRIDENTATUM, and other sp.

Flower (male).

Note.—This plant is trimorphie; the female was called *Monachanthus viridis;* while a hermaphrodite form is *Myanthus barbatus.*

CYCNOCHES WARCZEWICHZI.

Note.—This is dimorphie, the male flowers (small) form a raceme, but the (larger) female flowers occur singly on the same plant.

VANILLA PLANIFOLIA, *Andr.*

Fruit. (*Vanilla Pods.*)

Note.—Mexican vanilla is most esteemed. The odorous principle, vanillin, can be made artificially. It is the methylic aldehyde of pyrocatechuic acid. On the Continent vanilla has been used in hysteria, &c.; but its chief use in this country is to flavour chocolate and confectionery. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 272. [C. P. S.]

ANGRÆCUM FRAGRANS, *Aub. Th.* (*Fahan.*)

Leaves.

Note.—The leaves are used for making tea in Mauritius, &c. It is imported into France from Réunion, and used for pulmonary complaints. The perfume resembles that of the Tonquin bean.

EULOPHIA CAMPESTRIS, *Lindl.*

Roots. (*Sálib misri.*)

Note.—The tubercular roots of several species of Eulophia furnish salep. Royal salep is supposed to be the bulb of a liliaceous plant. For fig., see *P. J.* [1], vol. xvii, pp. 500, 501. Salep is esteemed in the East as an aphrodisiac, but in this country it is simply used as a demulcent and emollient drink. It is best prepared by mixing 1 drachm of powdered salep with 1½ drachms of spirits of wine, then adding ½ pint of water suddenly, and boiling the mixture. [C. P. S.]

SCITAMINEÆ (Zingibereæ).

CURCUMA LONGA, *L.* (*Turmeric.*)

Rhizome.

Note.—The Chinese is most esteemed, but is seldom met with in the European markets. Madras turmeric frequently consists entirely of round rhizomes. It is a large kind. Bengal turmeric is of a deeper tint, and is preferred for dyeing. Java turmeric is usually dusted with its own powder, and is not of a very brilliant colour when broken. The round rhizomes are the central portion or first year's growth, the long rhizomes are the lateral rhizomes developed afterwards from the central one. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 269. [C. P. S.]

"The substance called Turmeric consists of the old tubers of *C. longa*, and perhaps of some other species. The powder is used as a mild aromatic, and for other medicinal purposes in India. It enters into the composition of curry powder, and is used as a chemical test for the presence of alkalies, which change its yellow colour to a reddish-brown." (*Treas. of Bot.*)

CURCUMA ANGUSTIFOLIA, *Roxb.*

Starch. (*Curcuma Starch, East Indian Arrowroot, Tikor* or *Tikhar.*)

Note.—According to Hanbury this starch is not known as a special kind in the English market, the East Indian arrowroot of the London drug sales being the starch of a Maranta. Curcuma starch is figured in Pereira, *Mat. Med.*, vol. ii, pt. ii, frontispiece, fig. 12. It is distinguished from all other starches (except plantain starch, fig. 2, *l. c.*, which is rarely quite white) by its flatness, and by having the hilum at the small end. [C. P. S.]

AMOMUM GRANA PARADISI, *L.*

Seeds. (*Attare, Malaguetta Pepper* or *Grains of Paradise.*)

Note.—"They are imported from Guinea, and have a warm, slightly camphor-like taste, and are used illegally to give a fictitious strength to spirits and beer." (*Treas. of Bot.*)

A. Longum. (*Ceylon Cardamoms.*)

Pods and seeds.

A. Korarima. (*K. Cardamoms.*)

Alpinia Galanga, *Willd.*

Rhizome. (*Java*, or *Greater Galangal Root*, *Galanga de l'Inde.*)

Note.—The rhizome has a much feebler odour than the Chinese kind. It is not a regular article of commerce. For fig., see *Hist. des Drog.*, vol. ii, p. 204.

Zingiber officinale, *Roscoe.*

Rhizome, young, for conserve. (*Green Ginger.*)

Note.—The dried rhizomes are called by the dealers "races," or "hands." The younger portions are amylaceous, and the older hard and resinous. The Jamaica is the best, and is pale and uncoated. Cochin ginger resembles it, but is of a pale brownish tint externally. The Calicut variety of Bengal ginger is like Cochin ginger, but darker and harder. The Barbados, Bengal, and African, are coated gingers. For fig. of ginger starch, see Berg., *Anat. Atlas*, taf. xx. Bleached ginger is sometimes coated with sulphate and carbonate of lime. [C. P. S.]

(Maranteæ.)

Maranta arundinacea, *L.*

Plant, preserved wet. Starch. (*Arrowroot.*)

Note.—For fig. of starch, see Pereira, *Mat. Med.*, vol. ii, pt. ii, frontispiece, fig. 10; and also pt. i, p. 224. For African arrowroot, see *P. J.* [1], vol. x, p. 272.

(Canneæ.)

Canna Indica, *L.*

Fruit and seed (*Indian shot*).

Note.—This plant is common all over India; the seeds resemble shot, and are sometimes used as such. Necklaces, &c., are made of them by the natives. The root-stock contains starch.

Canna edulis, *Ker.*

Starch. (*Tous les Mois.*)

Note.—Tous les mois is prepared from the rhizome, and is peculiarly fitted for invalids, not being liable to turn acid.

(Museæ.)

Musa paradisaica, *L.* (*Plantain.*)

Fruit. (*Plantain core sliced.*)

Ditto. (*Ditto, powdered; Plantain Meal, Conquin Tay.*)

Starch.

Note.—Plantain starch closely resembles that of East Indian arrowroot in appearance. The fruits yield about 17 per cent. of it. For fig., see Pereira, *Mat. Med.*, vol. ii, pt. ii; frontispiece, No. 21. [C. P. S.]

IRIDACEÆ.

Iris Florentina, *L.*

Rhizome. (*Orris Root.*)

Note.—Orris root is also derived from Iris Germanica, *L.*, and Iris pallida, *Lam.* The essential oil, which is semi-solid like that obtained from elder blossom, is sold when dissolved in about 15 parts of spirit as oil or essence of orris root. For micr. section and starch, see Berg., *Anat. Atlas*, taf. xxi. The rhizome yields $\frac{1}{12}$ per cent. of the oil. See *P. J.* [3], vol. iii, p. 230. It consists chiefly of what is supposed to be myristic acid. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 273. [C. P. S.]

IRIS GERMANICA. (*Garden Flag.*)

Starch from rhizome.

IRIS PSEUDACORUS, *L.* (*Yellow Flag.*)

Flower (section).

Note.—Floral formula, $\{[(3 + 3).\ 3].\ (3)\}$.

CROCUS SATIVUS, *L.* (*Crocus.*)

Stigmata. (*Hay Saffron.*) Two specimens. Flower (section).

Note.—Floral formula, $\{[(3 + 3).\ 3].\ (3)\}$. Compare the floral formula for *Colchicum*, $[(3+3).\ 6].\ (3)$. Styles are coherent in crocus, with petaloid stigmas; styles are free in colchicum, with simple stigmas. Fruit, a diplotegia in crocus, dehiscing loculicidally; a capsule in colchicum dehiscing septicidally. The corms of crocus develop new corms on the upper part; while that of colchicum is produced at the base of the old one. Saffron is sometimes adulterated with safflower, marigold florets, or crocus stamens, carbonate of calcium, and sulphate of barium. Safflower, if present, may be recognised when the saffron is put into warm water, by its tubular corolla with syngenesious anthers: marigold petals and crocus stamens by not being tripartite as in the saffron. Carbonate of calcium, if present, may be detected by its effervescence with hydrochloric acid; and oil, which is sometimes used to freshen the colour of saffron, by pressure between blotting-paper. (See Pereira, *Mat. Med.*) Cake saffron consists of the florets of safflower made into thin cakes with gum-water. Cape saffron is Lyperia crocea. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 274. [C. P. S.]

DIOSCOREACEÆ.

TAMUS COMMUNIS, *L.* (*Black Bryony.*)

Root, preserved wet.

Note.—This plant must not be confounded with white Bryony, which belongs to the Cucurbitaceæ. White bryony has rough palmate leaves and greenish-white flowers. Black bryony has glossy, smooth, heart-shaped leaves, and minute green flowers. The fresh root, which is very large, is used for black eyes and bruises. It is used in the form of pulp, made by scraping the root. It is apt to cause irritation if allowed to get into the eyes. [C. P. S.]

The name of the order is derived from the genus Dioscorea, of which D. sativa supplies the well-known tubers called Yams of tropical countries.

LILIACEÆ.

URGINEA SCILLA, *Steinheil.* (*Medicinal Squill.*)

Bulb.

Note.—The bitter principle of squill is precipitated by tannin. According to Quekett, powdered squill contains 10 per cent. of raphides. [C. P. S.]

SCILLA NUTANS, SM. (*Blue-bell.*)

Flower (section).

Note.—Floral formula, $[3 + 3.\ 3 + 3].\ (3)$.

TULIPA, *L.* (*Tulip.*)

Flower (section).

Note.—Floral formula, $3 + 3.\ 3 + 3.\ (3)$.

DRACÆNA DRACO, *L.*

Portion of stem. Resin (*Dragon's blood*).

Note.—The stem of arborescent *Liliaceæ* is remarkable for a ring of meristem in which new fibro-vascular bundles are formed. The resinous exudation called dragon's blood appears at one time to have been regularly exported from the Canaries. A gigantic tree has long been known in Teneriffe; it is hollow, and may be ascended by a staircase; near the ground it was seventy-nine feet in circumference.

Fictitious ditto, in globose pieces.

Note.—The Sumatran dragon's blood, produced by Calamus draco, may be distinguished from the other kinds by containing little shell-like scales, and by giving off, when heated on the point of a knife, irritating fumes of benzoic acid. Fictitious dragon's blood differs in shape, and in its resin-like odour when broken. [C. P. S.]

ALLIUM SATIVUM, *L.*

Bulb, preserved wet. (*Garlic.*)

Note.—Garlic consists of a bulb in which all the scales are membranous, but a number of buds or small bulbs, which are called "cloves," are developed in the axils of the membranous scales. It keeps best when hung up in a dry place, so that the bulbs do not come in contact with anything. [C. P. S.]

ALLIUM AMPELOPRASUM, *L.* (*Leek.*)

Bulbs.

Note.—Ordinary leeks have no bulbs. The specimen is an accidental reversion to the original form.

HYACINTHUS ORIENTALE, *L.* (*Garden Hyacinth.*)

Plant in spirits.

Note.—This specimen produced its spike of *dark purple flowers* entirely underground, having been accidentally prevented from rising above it by a heavy tile. It shows that colour is not dependent so much upon light as on the amount of nutriment held in reserve by the plant. It was introduced from South-East Europe about 1580, as Turner (1548) does not mention it, but Gerarde (*Herball*, 1597) grew both the single and double forms.

ORNITHOGALUM PYRENAICUM, *L.*

Young shoots (inflorescence). (*French Asparagus.*)

Note.—This is indigenous to southern counties of England, and is collected and sold in Bath under the name of French asparagus.

LILIUM BULBIFERUM, *L.*

Aërial bulbs.

Note.—These bulbs are very large, and had grown at the expense of the flowers, which never came to maturity.

LILIUM KAMSCHATENSE, *Fisch.*

Bulbs, bread made of bulbs.

Note.—These bulbs are used in times of scarcity for food in Siberia and Kamschatka.

FRITILLARIA THUNBERGII, *Miq.*

Bulbs.

Note.—These bulbs are used for food in times of scarcity in Siberia.

PHORMIUM TENAX, *L.* (*New Zealand Flax.*)

Gum; Fibre.

Note.—The fibre of the leaves of this plant is used for many kinds of textile fabrics, but there is great difficulty in freeing it from the gum which is found in the leaf. See an account in *Brighter Britain.*

COLCHICUM AUTUMNALE, *L.*

The corm, preserved wet. The corm, dried and sliced. Seed.

Note.—Floral formula, [(3 + 3). 3 + 3]. (3). See floral formula of Crocus for comparison. The capsule differs from that of crocus in being superior and septicidal; the latter is inferior and loculicidal. Colchicum blossoms in September, about the same time as Crocus sativus, the flower of which it resembles; but it is distinguished from the crocus by the leaves not appearing with the flower, and by the flower having six stamens, the crocus having three stamens only. The seeds appear in spring with the leaves. The seed slightly resembles black mustard seed; but is distinguished from it by its larger size, by not being pungent, and by being very hard. For micr. section of the corm and fig. of starch, see Berg., *Anat. Atlas*, taf. xxiv, fig. 59. The corms lose nearly three-fourths of their weight in drying. They are said to be most active in autumn, and to preserve their qualities better if dried than if sliced. [C. P. S.]

ASAGRÆA OFFICINALIS, *Lindl.*; SCHŒNOCAULON OFFICINALE, *A. Gray.*

Fruit. (*Cevadilla Seeds, Sabadilla.*)

Note.—The seeds are used chiefly for the preparation of veratria. For fig. of plant, see Bentley and Trimen, *Med. Plants*, tab. 287.

JUNCACEÆ.

XANTHORRHÆA ARBOREA, *B. Br.* (*Grass Tree.*) Lozenges.

Balsamic resin. (*Gum Acroides, Botany Bay Resin.*)

Note.—The resin is of a bright yellow colour, becoming redder, externally, on exposure to air and light, and is known in commerce under the name of gum acroides. It has a fragrant odour when burned, and contains cinnamic acid, together with a little benzoic acid. It is remarkable for the large quantity of picric acid it yields when treated with nitric acid. The name acroides is derived from Acroides resinifera, the name given by Sprengel to the plant yielding the resin. [C. P. S.] Astringent lozenges are made with this substance.

PALMACEÆ.

ELÆIS GUINEENSIS, *Jacq.* (*Guinea Oil Palm.*)

Fruit.

Oil. (*Palm Oil.*) Two specimens.

Note.—The oil is obtained from the mesocarp, or fibrous yellow portion, of the fruit by boiling in water. Palm oil melts at about 98½° F. It is used in the manufacture of soap, candles, and glycerine, and also forms an ingredient in the grease used for railway axles. [C. P. S.]

Specimens from Messrs. Price and Co's. Candle and Soap Manufactory. Palm oil as imported, oil acidulated; palm oil after distillation, the process being to separate the acid from the glycerine; palmitic acid, crystalline and in powder, showing the entire freedom from glycerine; glycerine, rough as first obtained, the same pure. Sperm cake, obtained by hot-pressing the distilled palm oil.

ARECA CATECHU, *L.*

Fruit. For fig., see *Hist. des Drog.*, vol. ii, p. 132.

Seeds. (*Areca*, or *Betel Nut.*)

Note.—The seeds sliced are used as a masticatory in India; for this purpose a slice is powdered over with lime, and wrapped in a leaf of Piper Betle, *L.* The grated seeds are used as a remedy for tapeworm in dogs, and are given to human beings for the same purpose in India and China, and now in Britain also. According to Hanbury, areca nuts do not contain any catechin or crystalline matter. Pereira, however, states that areca nut catechu contains numerous large crystals. Hence it appears doubtful if the areca nut catechu of Pereira is really obtained from areca catechu. Areca nut catechu of Pereira is distinguished by occurring in flat circular cakes, two or three inches in diameter, and about two-thirds of an inch thick, and is usually covered with glumes of rice, which are called paddy husks. [C. P. S.]

COCOS NUCIFERA, *L.* (*Cocoa Nut Palm.*)

Fruit, germinating.

Oil. (*Cocoa Nut Oil.*)

Note.—The fruit is a tryma, the fibrous outer portion of which is used for making matting, &c., and is known under the name of coir. What is commonly called the cocoa-nut is the endocarp of the fruit, the edible portion is the albumen, and the cocoa-nut milk is the liquor amnios. The embryo is lodged in a small cavity in the albumen near the soft hole in the shell. Cocoa-nut oil fuses at 70° F. It is used for making floating and marine soaps, which form a lather with salt water. [C. P. S.]

CORYPHA CERIFERA, *Arrud.*; COPERNICIA CERIFERA, *Mart.*

Wood. Wax. (*Carnaüba Wax, Brazilian Wax, Palm Wax.*)

Note.—The root possesses diuretic properties, and has lately been introduced into this country as a substitute for sarsaparilla. The wax has been used in this country for making candles. Each tree yields about 4½ lbs. of wax. The wax is obtained from the leaves, which are coated with it, by shaking them. The wax is said to approach very nearly to bees-wax in its chemical constitution. It melts at 180° F. [C. P. S.]

PHŒNIX DACTYLIFERA, *L.* (*Date Palm.*)

Sugar obtained from the fruit.

Note.—The crude sugar obtained from this and other palms is known under the name of jaggery. The long leaves of this palm are probably the "branches of palm-trees" mentioned in John xii, 13. [C. P. S.] The dwarf date palm is *P. farinifera, Rosch.*; *P. sylvestris, Roxb.*

HYPHENE THEBAICA. (*Doum Palm, Gingerbread Tree.*)

Fruit.

Note.—This palm is remarkable for having a repeatedly forked stem. Its fruit is said to resemble gingerbread in taste, and the outer portion is eaten by the poorer classes in Egypt. [C. P. S.]

PHYTELEPHAS MACROCARPA, *R. et P.* (*Ivory Plant.*)

Seeds. (*Vegetable Ivory.*) Do. carved.

Note.—The seeds consist in large proportion of a white hard albumen, which, when the fruit is young, forms a clear insipid fluid, which soon becomes milky and sweet, and then hardens into the substance known as vegetable ivory. Vegetable ivory is used for tops of smelling bottles, &c. [C. P. S.]

SAGUS LÆVIS, *Rumph*, and other species. (*Spineless Sago Palm.*)

Fruit, sago starch.

Sago, prepared.

Note.—This species is said to yield most of the sago imported into Europe. Some is, however, obtained from S. Rumphii, *Roxb.*, the prickly sago palm, or malay. The greatest quantity is procured by cutting down the tree as soon as the flower spike appears: a single tree often yielding 600 lbs. Sago is apparently made by two different processes, the starch grains being burst in some samples and not in others. Fictitious sago, sold by grocers under the name of pearl tapioca, is made from potato starch. For fig. of sago starch, see *Per. Mat. Med.*, vol. ii, pt. i, frontispiece, figs. 7, 8, 9. It much resembles Tacca starch, but the truncated grains are rather longer than in that starch. [C. P. S.]

CEROXYLON ANDICOLA, *H. B.* (*Wax Palm.*)

Wax, as scraped from the trunk.

Note.—The wax forms a white marble-like coating on the trunk of the tree. The tree, when cut down and scraped, yields usually about 25 lbs. The wax is hard and somewhat resinous, and does not seem to become rancid by keeping. It is used in New Granada for making candles. [C. P. S.]

ATTALEA FUNIFERA, *Mart.*

Fruit, entire and polished. (*Coquilla Nut.*)

Fibre of petiole (*Piaçaba fibre*, in part).

Note.—This palm has a wide distribution on the eastern side of S. America. The dilated base of the petioles separates into a coarse fringe. It makes excellent cables, and is used for scavangers' brushes, &c. The fruit is used for knobs of sticks, &c.

ATTALEA COHUNE, *Mart.*

Oil.

Note.—A native of Honduras. The oil does not appear preferable to cocoa-nut oil for soap, candles, &c.

BORASSUS FLABELLIFORMIS, *L.* (*Palmyra Palm.*)

Hindoo Book.

Note.—This is one of the most useful of palms, and is a native of India and elsewhere. The leaves of this, as of the cocoa-nut and corypha, or talipot palm, are also used for writing. Pliny says that the most ancient way of writing was upon the leaves of palms (lib. xiii, cap. 2). They are called *Ollahs* when prepared for the stylus.

AROIDEÆ.

ARUM MACULATUM, *L.* (*Lords and Ladies, Cuckoopint, Wake Robin.*)

Corms, starch prepared from the rhizome. (*Portland Arrowroot.*)

Note.—The rhizome, dried and grated, is used by herbalists as a remedy for gout. It formerly held a place in the Dublin Pharmacopœia. The starch was formerly manufactured at Portland, and is still made there in small quantity, but is not an article of commerce. A peck of roots yields about 3 lbs. of starch. For fig. of the starch, see Pereira, *Mat. Med.*, vol. ii, pt. ii, frontispiece, fig. 11. [C. P. S.]

AMORPHOPHALLUS, sp., *Bl.*

Roots.

Note.—The acrid roots of A. campanulatus are used medicinally in boils and ophthalmia. They are caustic, and abound in starch, hence they are nutritious and eaten as food.

CYPERACEÆ.

CYPERUS ROTUNDUS, *L.* (*Moothoo.*)

Rhizome.

Note.—The tubers are used by perfumers on account of their fragrance. In medicine they are used as tonic and stimulant, and in the treatment of cholera. In the fresh state they are given in infusion as a demulcent in fevers, and in cases of dysentery and diarrhœa.

GRAMINACEÆ.

ANDROPOGON CITRATUS, *D.C.*; ANDROPOGON SCHŒNANTHUS, *Wall.* (*Lemon Grass, Sireh of Java.*)

Volatile oil. (*Oil of Verbena, Lemon Grass Oil, Indian Melissa Oil.*)

Note.—The oil receives its name of oil of verbena from its similarity in odour to the lemon plant, or sweet-scented verbena of the gardens (Lippia citriodora, *H. B. K.*). It is imported from Ceylon and Singapore. The oil made by Winter, of Ceylon, and Fisher, of Singapore, being esteemed the best. [C. P. S.]

An infusion of the fragrant leaves, which are bitter and aromatic, is given to children as an excellent stomachic. (Drury.)

TRITICUM SATIVUM, *L.* (*Wheat.*)

Wheat from Hobart Town, English Revett's, hard Russian, grain decorticated, finest and whitest flour, wheat starch and British gum, granular whole wheat meal. Wheat and barley from the Catacombs of Thebes.

Note.—The origin of wheat is unknown, though M. Fabre thinks it may have been produced from *Ægilops*, a grass of S. Europe. The varieties are innumerable. Revett's contains the least amount of gluten, and hard Russian the most. The grain is decorticated by the removal of the outermost coat of the pericarp, which (contrary to the usual idea) contains *no* silica, according to Prof. Church. The gluten is chiefly contained in large cells beneath the surface, and which are removed with the bran: the central cells containing mostly starch alone (see fig.). The sample of whole wheat meal is obtained by Dr. Morfit's process, by which the entire grain is finely ground. The finest and whitest flour, having the greatest percentage of starch, is of *least* nutritive value.

Wheat starch and British gum. The latter is prepared from the former by carefully roasting it at a temperature of 300° F., it then becomes dextrine. It resembles ordinary gum, but is distinguishable from it by its right-handed rotation of a ray of plain polarised light, hence its name, and by its yielding oxalic, not mucic acid, when heated with nitric acid.

Semolina, Manna croup.

Note.—Semolina and manna croup are granular preparations of wheat deprived of bran. Wheat yields about 70 per cent. of starch. For fig. of the starch, see Pereira, *Mat. Med.*, vol. ii, pt. i, frontispiece, fig. 1. Wheat starch is remarkable for the number of small grains found in it. The larger grains are round and lenticular, and appear elliptical when seen sideways. Triticum durum, *Kunth*, is said to be the species preferred for making macaroni. [C. P. S.]

SECALE CEREALE, *L.*

Grass. (*Rye.*)

Note.—The black bread of Russia and Germany is made from this grain. Its use is said to cause ergotism, on account of the occurrence of ergot more frequently in this grain than in others. It yields about 65 per cent. of starch. For fig. of starch, see Pereira, *Mat. Med.*, vol. ii, pt. i, frontispiece, fig. 4. [C. P. S.]

HOLCUS SORGHUM, *Pers.*

Grain. (*Indian Millet, Guinea Corn, Durra, Jaar, Turkish Millet.*)

Note.—This grain is used in this country for feeding poultry. The stems are used in the manufacture of carpet brooms, &c. In many warm countries this grain replaces oats. For fig. of plant, see *P. J.* [1], vol. xi, p. 350. [C. P. S.]

ORYZA SATIVA, *L.* (*Rice.*)

Grain in husk. (*Paddy.*) Rice Starch.

Note.—The rice plant is extensively cultivated in almost all countries of the East, requiring a summer temp. of at least 73°, humidity and heat being necessities. Wild rice is found on the lakes in the Circars and in Travancore, &c. It is boiled in steam, and considered a delicacy. The value of rice as a dietetic depends upon the relatively large amount of starch, that of albuminoids being small.

SACCHARUM OFFICINARUM, *L.*

Culm or stem. (*Sugar Cane.*)

Silicious slag.

Note.—A kind of wax appears to be detached from the canes when crushed in the mill. It occurs as a glaucous powder coating the canes, chiefly those of the violet variety. It is fusible at 180° F., dissolves in boiling alcohol, and gelatinizes on cooling. Cane juice contains about 20 per cent. of sugar. "Muscovado" is a term often applied to raw sugar. "Bastards" is prepared from molasses and the green syrups. The coarser brown sugars often contain mites in large numbers. Molasses is the term applied in commerce to the drainings from raw sugar, and treacle to the thicker syrup which has drained from refined sugar in the moulds. [C. P. S.]

ZEA MAYS, *L.*

Spikes of fruit, in spirit, and dried.

Grain. (*Indian Corn, Maize.*) Hominy, (*Prepared meal.*)

Starch. Oswego.

Note.—Maize contains about 67 per cent. of starch. Maize meal has been known under the name of polenta. Most of the "Indian corn flours" are composed entirely of maize starch. The starch is distinguished from others by being thick and angular. For fig., see Pereira, *Mat. Med.*, vol. ii, pt. i, frontispiece, No. 5. [C. P. S.]

BAMBUSA ARUNDINACEA, *L.* (*Bamboo.*)

Portion of stem; do. carved, as also small dirk case from China, and tea pot from Japan, made from the rhizome.

Note.—With the exception of the cocoa-nut and some other palms, the bamboo is the most useful of all the vegetable products of the East. Its strength and lightness render it invaluable for building houses, rafts, &c.

COIX LACHRYMA, *L.*

Grain enveloped in the bony involucre. (*Job's Tears.*)

Note.—The grain is surrounded by a bony "outer glume." This contains the female flower within it. It is a native of East Indies and Japan. The grains are said to possess diuretic and tonic properties. They are also used as beads, and as a substitute for pearl barley.

ACOTYLEDONS.

FILICES.

LASTRÆA (NEPHRODIUM) FILIX-MAS, *Presl.*; ASPIDIUM FILIX-MAS, *Swartz.* (*Male Fern.*)

Rhizome (lower case.)

Ethereal extract. (*Oil of Male Fern.*)

Note.—The rhizomes are distinguished from the similar ones of Athyrium, Filix fœmina, Lastræa Oreopteris and Lastræa spinulosa, by the section of the leaf-base showing eight vascular bundles, while in the other ferns named there are only two. The rhizome yields about 8 per cent. of ethereal extract. [C. P. S.]

LYCOPODIACEÆ.

LYCOPODIUM CLAVATUM, *L.* (*Club-Moss*).

Spores. (*Lycopodium, Vegetable Sulphur.*)

Note.—The spores are used for rolling pills in; as a dusting powder for infants' sores; for imitation of lightning in theatres, by blowing the powder across a jet of flame, and also in fireworks. The spores have a peculiar structure, by which they can be easily distinguished under the microscope from all other substances. For fig. of spores, see Berg., *Anat. Atlas*, taf. xlix, fig. 132. [C. P. S.]

ALGÆ.

SARGASSUM BACCIFER, *L.* (*Gulf Weed.*)

Note.—This alga forms large floating masses in the centre of the Atlantic, the "Sargasso Sea." The air-vessels are globular, and consist of transformed leaves.

EUCHEUMA SPINOSA, *J. Ag.*

Thallus. (*Agar Agar.*)

Note.—This seaweed has been imported into this country under the name of *Agar Agar*, and has been used in the form of gelatine, for dressing silks and other textile fabrics. According to Professor Archer, it has also been imported under the name of Ceylon Moss. It belongs to the natural order Sphærococcoidcæ. [C. P. S.]

PORPHYRA LACINIATA, *Agardh.*

Fronds.

Note.—This species, as also P. vulgaris, is brought to table in England and Scotland under the name of *laver*. In Ireland it is called *stoke*. It is said that the inhabitants of the Western Islands gather it in March, and after pounding and stewing it with water, eat it with pepper, vinegar, and butter; others stew it with leeks or onions.

CHONDRUS CRISPUS, *Lyngb.*

Thallus. (*Carragheen Moss, Irish Moss.*)

Note.—Irish moss is often mixed with other species of algæ, of which the most frequent are Gigartina mamillosa, *J. A.*, and G. acicularis, *Lamour.* G. mamillosa is distinguished by being slightly channelled towards the base, and by having the fructification in little elevated or stalked tubercles—that of C. crispus being immersed in the frond, or scarcely raised above it. G. acicularis has a filiform thallus with divaricate branches. All, when growing, are of a purplish colour, which changes during drying into a yellowish-green or white. For fig., see Pereira, *Mat. Med.*, vol. ii, pt. i, pp. 10, 11; and Bentley and Trimen, *Med. Plants*, tab. 305. [C. P. S.]

FUNGI.

AGARICUS CAMPESTRIS, *L.* (*Common Mushroom.*)

Confluent specimens.

Note.—(*a*) The pileus of one becomes grafted on to that of an adjacent one when very young. If one of them grow more rapidly than the other, it detaches the latter from the soil, then bears it up inverted on its own summit, nourishing it at the same time. (*b*) A spore, in this case, has probably fallen on the pileus of another and germinated upon it.

POLYPORUS IGNIARIUS, *Fr.* (*Rusty-hoop Polyporus.*)

Note.—The hymeniuum lines the tubes which form the under side of the fungus.

CLAVARIA FUSIFORMIS, *Sow.* (*Spindle-shaped Clavaria.*)

Note.—The hymenium clothes the entire surface of the clubs. This species is common in woods. *C. amethystina* is esculent.

GEASTER FORNICATUS, *Fr.* (*Vaulting Geaster.*)

Note.—The peridium is double, the outer sub-quadrifid, separating into two coats, connected at the lips of the divisions; mouth conical, plicato-sulcate.

MORCHELLA ESCULENTA, *L.* (*Morel.*)

Note.—The morel is a native of Britain, occurring in shady woods, but is imported from the Continent for sale in Covent Garden Market, &c. It is chiefly used as a flavouring ingredient in cookery. For fig., see Pereira, vol. ii, pt. 1, p. 54, fig. 45. This fungus belongs to the natural order Helvellacei. The deeply folded and pitted surface is clothed with the ascigerous hymenium. Cooke's *Handbook of British Fungi*, p. 655. [C. P. S.]

PEZIZA VESICULOSA, *Bull.* (*Bladdery Peziza.*)

Note.—The interior surface of the "cup" is clothed with the ascigerous hymenium Common on dung-hills, manure beds, &c.

TUBER ÆSTIVUM, *Sibth.*; TUBER CIBARIUM, *Sow.* (*Truffle.*)

Note.—Truffles are chiefly used as a flavouring agent for culinary purposes. Truffles grow beneath the surface of the ground in beechwood or chalky downs, and are hunted for by dogs or pigs trained for the purpose, which find them by the peculiar odour of the fungus. Like many other fungi they have been stated to possess aphrodisiac properties. They belong to the natural order Tuberacei. [C. P. S.] The asci are short, saccate, and disposed in sinuous veins; the sporidia are elliptic and reticulated. It occurs in woods, especially of beech.

CLAVICEPS PURPUREA, *Tulasne.*

Sclerotium. (*Ergot of Rye.*) Entire and powdered. Ditto in PSAMMA ARUNDINACEA and LOLIUM PERENNE.

Note.—Sclerotium is the name given to a mycelium when hard and compact. It consists of minute jointed threads compacted together. These threads are called hyphæ. The sclerotium is the vegetative organ of the fungus, the reproductive organ of the fungus not being developed until the succeeding spring. For fig. of the fungus, see Pereira, *Mat. Med.*, vol. ii, pt. i, p 105, fig. 68; *Cooke. British Fungi*, p. 772, fig. 369. This fungus belongs to the natural order Sphæriacei. [C. P. S.]

SPHÆRIA SINENSIS, *Berk.*

Fungus and caterpillar.

Note.—This curious fungus is figured in Pereira, *Mat. Med.*, vol. ii, pt. i, p. 52. It is a fungus which grows upon the larva of a moth, and is said to possess cordial and restorative properties. It is very scarce: old and rotten specimens being worth four times their weight in silver. A similar fungus is found in New Zealand on the larva of Hepiolus virescens. [C. P. S.]

PODISOMA JUNIPERI and RŒSTELIA LACERATA.

Note.—The first named constitutes the "Teleutospores;" the sporidia of which attack the Hawthorn and give rise to the latter form of the fungus. *See* s. *Juniperus communis.*

LICHENES.

CETRARIA ISLANDICA, *L.*

Thallus. (*Iceland Moss.*)

Note.—This foliaceous lichen is indigenous in the north of Britain, and is easily distinguished by its fronds being minutely fringed. None is exported from Iceland. It yields 70 per cent. of lichenin—a substance resembling starch—which swells up in cold water, and turns blue with iodine. Its bitterness may be removed by a solution of carbonate of soda. Treated with sulphuric acid, Iceland moss yields 72 per cent. of glucose. [C. P. S.]

CLADONIA RANGIFERINA, *Hoffm.* (*Reindeer moss.*)

Note.—This fruticulose lichen is common in heathy places. It is used in this country chiefly by bird-stuffers for ornamenting the inside of cases. For fig. of plant, see Pereira, *Mat. Med.*, vol. ii, pt. i, p. 21. [C. P. S.]

It frequently forms the principal winter food of the reindeer in Lapland. It is nutrient and demulcent.

CLADONIA PYXIDATA, (*Cup Moss.*)

Note.—The fruit-bearing "Podetia" form turbinate structures carrying the apothecia in the margin. It contains a considerable amount of gummy or starchy matter, and has been much used as a demulcent in various chest affections, as whooping cough.

CLADONIA EXTENSA,

Note.—Characterised by its bright vermilion-red apotheeia. It has been used like the last species.

STICTA PULMONARIA, *Ach.* (*Lungwort, Oak Lungs, Hazel Rag, Hazel Crottles.*)

Thallus.

Note.—This foliaceous lichen is common in this country on trees in damp subalpine woods, and is readily recognised by its reticulated thallus. In Siberia, in which country it appears to be more bitter, it is used as a substitute for hops in brewing. [C. P. S.]

ROCCELLA FUCIFORMIS, *Ach*, and R. TINCTORIA, *D. C.*

Thallus. *Orchella Weed.* Litmus, orchil.

Note.—Roccella fueiformis occurs in this country only in the extreme south of England, as in Devon, Cornwall, Isle of Wight, and Jersey; but not in sufficient quantity for commercial purposes. Roccella tinctoria does not occur in Britain; R. phycopsis has usually been mistaken for it. Specimens *b*, *c*, and *d* consist chiefly of R. Montagnei, which differs from R. fueiformis in being flaccid. R. phycopsis is readily distinguished by its cylindrical branches, dense habit, and the yellow colour of its point of attachment to the rock. For fig., see Bentley and Trimen, *Med. Plants*, tab. 301. Orchil is made by mixing the powdered orchella weed with urine, and exposing it to the air. To make litmus, potash, soda, or lime is added. [C. P. S.]

URCEOLARIA CALCAREA.

Note.—This species is not uncommon on rocks, especially calcareous ones, in lowland and subalpine districts. In Wales, Shetland, &c., it is used by the peasantry to yield a scarlet dye.

LECANORA TARTAREA. (*Om-mâssa.*)

Note.—This is a common Alpine species, growing on rocks in the Highlands. It yields a beautiful kind of "Orchil," and under the name of "Swedish" or "Tartareous Moss" is largely imported from Norway and Sweden. "Cudbear" was at one time largely made from it in Scotland, and "Litmus" in Holland. Archil is the name of the colouring matter obtained by treatment with ammonia in the form of a liquid or pasty matter. As a powder it is called *Cudbear*.

PARMELIA SAXATILIS. (*Steu-laf, &c.*)

Note.—A common lichen, from Spitzbergen to antarctic regions. It is called "Staue-raw" in Scotland, and "Steu-laf" in Norway and Sweden. It furnishes a dye to peasants of Shetland, and was once used in medicine as an astringent.

APPENDIX TO BOTANICAL CATALOGUE.

TERATOLOGY.

Bracts, foliaceous.—Acorn cups; Plantago lanceolata.

Flowers:—

(a.) *With Calyx virescent.*—Rose and Primrose.

(b.) *Ditto, with epicalyx of slender stipules.*—Abutilon.

(N.B.—One flower is normal for comparison.)

(c.) *With corolla "double" and virescent.*—Rose, Primula Sinensis, and Hyacinth.

(d.) *With stamens partly converted into carpels.*—Welsh Poppy and Wallflower.

(e.) Begonia, *with ovuliferous petals; with styles, but wanting ovaries; and with antheriferous styles.*

(f.) Antirrhinum ("*Snapdragon*"), *with sub-peloric flowers; ditto semi-double.*

(g.) Digitalis, *synanthic, &c.*

(h.) *Proliferous Flowers* (1), *prolongation of axis through the flower.*— Ranunculus orientalis, Geum rivale, Verbascum nigrum. (N.B.—This specimen is figured and described in *Jl. of Linn. Soc.*, xviii, 456.)—Pear and Rose.

" " (2), *with flower buds proceeding from the thalamus within the calyx.*—Carnation and Double Cherry.

" " (3), *with buds instead of ovules.*—Rhododendron (N.B.—In this specimen there are two corollas, and the stamens are petaloid.)

" " (4), *Plantago major and "Egyptian" Wheat.*

Fruit:—

Pear, normal; and without carpels, showing the receptacular tube as a cylindrical fleshy floral axis or pedicel.

WOODS.

(*Illustrative of the three Classes.*)

Exogenous.—Alder, *Banksia*, Box, Camphor, *Castanea*, *Casuarina*, Elder, Elm, *Eucalyptus*, Holly, Lilac, *Maclura*, Maple, Mulberry, *Quercus robur* ("Bog" and English Oak), *Q. suber* (Cork Oak), *Q. infectoria* (Gall Oak), Olive, *Protea*, Sandal, *Sassafras*, Teak, *Theobroma*, Willow, Zebra-wood.

GYMNOSPERMOUS—Cypress, *Salisburia* (Gingko), *Thuja*, Yew.

ENDOGENOUS.—*Ceroxylon* and other palms. The young undergrowth of various palms is largely imported for umbrella sticks, &c. *Dracœna*, showing the corky tissue and woody f.v. bundles. (Sach's *Text Book*, 2nd Ed., fig. 104, p. 128.)

ACROGENOUS.—Stems of Tree-ferns. Rhizome of male fern, *Nephrodium Filix-mas*.

(*Anomalous Woods.*)

These are chiefly characteristic of woody climbers, *e.g.*, the British Clematis vitalba, and the lianas of tropical forests, illustrative of the following natural orders :—

RANUNCULACEÆ.—*Clematis vitalba*, Traveller's Joy, or Old Man's Beard. The liber is the only element of the bark developed ; the medullary rays are large and the vessels numerous.

MENISPERMACEÆ.—*Chondrodendron tomentosum* (true Pereira Brava). The wood is of a loose fibrous texture, in concentric or excentric circles, and divided into wedges by large medullary rays. The zones of wood are separated by wavy rings of a waxy substance.

"False Pereira Brava;" is of unknown origin. This is remarkable for the extreme excentricity of the layers.

Coscinium fenestratum (false Columba Root). It is characterised by large wedge-like medullary rays, as in Clematis and Aristolochia, with large vessels.

MALPIGHIACEÆ.—The wood of members of this order is characterised by having one or two rings only, with great irregularities of development in a radial direction. The bark follows the sinuosities (like the skin in the ruminated albumen of the Nutmeg).

SAPINDACEÆ.—*Paullinia sp.* Besides the primary wood, secondary and tertiary axes are produced in the bark. *Wistaria*, a genus of Leguminosæ, has wood of a similar type.

NYCTAGINEÆ.—*Pisonia sp.* The annual rings are very obscure, but the vessels are numerous.

ARISTOLOCHIACEÆ.—*Aristolochia sipho.* The wood is characterised by having numerous medullary rays, the wood being without annual zones. The liber is in minute bundles, but the suber occurs in large lobes.

(*Injured Woods, &c.*)

These specimens illustrate the exogenous growth of young wood over injured surfaces where the wood has died. They show how the new wood gradually conceals, but forms no organic union with the injured part.

Branch of Elm in which a mahogany pulley in an iron staple is completely embedded. The wood has taken thirteen years to cover it, by growing excentrically over it. The pulley probably being from the underside of the bough, gravity thus caused the excess of growth on that side.

Embryo-buds.—These are the result of the arrest of growth of a branch in a longitudinal direction, but radial growth continues, producing the usual concentric structure.

Grafts.—Section of Rose graft to show how the cambium of the scion unites with that of the stock. Old graft of a Conifer.

Stem of Kohl-rabbi, showing a union after incision in the cellular tissue, resembling "primary adhesion."

Duramen and *alburnum.*—Specimens illustrating the difference between the heart wood (*duramen*) and the young wood (*alburnum*). The former is often dark coloured by the deposition of resinous and other matters, as Guaiacum, Laburnum, Zebra Wood, Ebony, &c. They are much used for ornamental cabinet work; they sometimes yield dyes, as Peach Wood (see *Leguminosæ.*)

INDEX TO BOTANICAL CATALOGUE.

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