Illustrated guide to the museum of the Royal College of Surgeons, England / by Arthur Keith.

ILLUSTRATED · GUIDE TO · THE · MUSEUM ROYAL · COLLEGE · OF SURGEONS · OF · ENGLAND.

PRICE 6D.

FORMER GUIDES OR SYNOPSES FOR VISITORS.

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1. *Summary of the arrangement of the Hunterian Collection of the Royal College of Surgeons. For the use of visitors. 14 pp., 8vo. 1813. (Prepared by Sir Everard Home and Sir William Blizzard.)*

2. *Synopsis of the arrangement of the preparations in the Gallery of the Museum of the Royal College of Surgeons. For the use of visitors. 24 pp., 8vo. 1818.*

3. *Synopsis. 84 pp., 8vo. 1845. (Prepared by Richard Owen.)*

4. *Synopsis. 102 pp., 8vo. 1850. (Prepared by Richard Owen.)*

5. *Synopsis. With index and ground-plan. 112 pp., 8vo. 1862. (Prepared by William Flower.)*

6. *Synopsis. 103 pp., 8vo. 1880. (Prepared by William Flower.)*

The Conservator begs to acknowledge his indebtedness to his colleagues, Mr. S. G. Shattock, Pathological Curator, and Mr. R. H. Burne, Assistant Conservator, for assistance in the preparation of the text of the present Guide; and to Mr. Frank Butterworth and Dr. Stanley Beale for help in preparing illustrations.

June 1910.

Albert Wm Gregorson.

Aug. 10.

Frontispiece.

JOHN HUNTER.

From the statue by Weekes in Room III.

ILLUSTRATED

GUIDE TO THE MUSEUM

OF

THE ROYAL COLLEGE OF SURGEONS, ENGLAND.

BY

ARTHUR KEITH, M.D., F.R.C.S.,

CONSERVATOR OF THE MUSEUM.

Issued by Order of the Council of the College.

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LIST OF CONTENTS.

The several Parts of the Catalogue of the Collection may be obtained on application to the Secretary at the College or to Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C., at the following prices, viz.:—

A.—NORMAL ANATOMY AND NATURAL HISTORY.

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Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy, comprising: (D) Nervous System—Invertebrata—Brain and Spinal Cord of Vertebrata. Edited by Professor Charles Stewart, LL.D., F.R.S. 2nd edit., vol. ii. 8vo, pp. 518, 254 text-figures: 1902	12	0
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GUIDE TO THE MUSEUM

OF THE

ROYAL COLLEGE OF SURGEONS, ENGLAND.

Introductory.

THIS little book is written for the use of those who make their first visit to the Museum of the Royal College of Surgeons. The visitor will find here a guide to the arrrangement of the six great rooms into which the Museum is divided and to the specimens and preparations exhibited in each of them. If it should so happen that it is not a general survey of the Museum which is desired, but an inspection of some particular part of it, such as the section which illustrates the Diseases or Pathology of the Body, or its Structure and Mechanism, then the visitor, by consulting the table of contents at the commencement, or the index at the end, will easily discover the parts of the book in which these sections are described. The whole Museum may be regarded as a discourse on the human body; the Animal Kingdom has been ransacked to show the meaning of its structure and the manner of its working. Much as the writer would like to introduce at this point an account of John Hunter, the remarkable man who laid the foundation of the Collection, and of the

distinguished men who have helped in its growth, he deems it better to relegate the historical part of his narrative to the final pages, in the hope that the visitor, when he has made his round, will be moved to ask how such a collection has been built up, and how it is now preserved and increased.

The visitor, if a difficulty is met with in finding a specimen or its history, should ask the assistance of the attendants or members of the Museum staff, whose services are freely at the disposal of all who desire to examine and study the collection.

SECTION I.

Museum Hall and Contents.

Hall of the Museum.

On entering the Hall or Vestibule of the Museum, the visitor will find a plan giving the arrangement of the six large rooms—Numbered I, II, III, IV, V, and VI,—in which the collection is arranged. A reduced copy on page 28, will prove helpful to the visitor in making a preliminary survey. The door which faces the visitor as he enters the hall leads into Room I.

Catalogue Cabinets.

Before leaving the hall to commence an examination of the contents of Room I, attention, especially of those interested in Museum organisation, may be directed to four cabinets placed there. They form part of a system of card-cataloguing which is being introduced into the Museum. The two cabinets, one on the right, the other on the left as the visitor passes to Room I, are for the Museum catalogue. Each specimen in the Museum is represented in the drawers of these two cabinets by a card giving its history and its description. In one drawer, for example, will be found cards of all the specimens representing diseases of the kidneys ; in

another diseases of the liver; in a third, preparations illustrating the structure and mechanism of the lungs. The cards in each drawer correspond to preparations in a definite section of the Museum. The visitor can thus readily learn, before entering the Museum, the number and kind of specimens which represent any particular organ or diseases of that organ, and in which part of the museum they may be found.

Index Cabinets.

The two other cabinets, those which confront the visitor as he enters Room I, are for index cards arranged alphabetically—cards which serve the same purpose for the Museum as an alphabetical index does for a book. Thus, the visitor may wish to see the various lesions of Tuberculosis; under tuberculosis he will find a complete list of the specimens—in various parts of the Museum—which illustrate this lesion. So with Cancer or any other recognised disease. Or he may wish to know what specimens there are illustrating the diseases or structure of the horse or tiger: under their names he will find a reference to all available illustrations.

Owen, Huxley, Banks, Brodie.

On the catalogue cabinets are placed the busts of four distinguished men who have taken a part in the foundation or development of the Museum. *Sir Richard Owen* became a member of the Museum staff when quite a young man. He was Assistant Conservator from 1827 to 1842 and Conservator (succeeding his father-in-law Wm. Clift) from 1843 to 1856 when he transferred his services to the British Museum. *The Rt. Hon. Thomas Henry Huxley*, a member of the College, held the office of Hunterian Professor from 1863 to 1870, and drew crowded audiences to the lecture theatre of the College. *Sir Benjamin C. Brodie, Bart.*, held the office of Hunterian Professor from 1819 to 1823, and became President of the College in 1844. *Sir Joseph Banks*, President of the Royal Society from

1778 to 1820, was a friend of Hunter, the founder of the Collection, and presented him with many of the

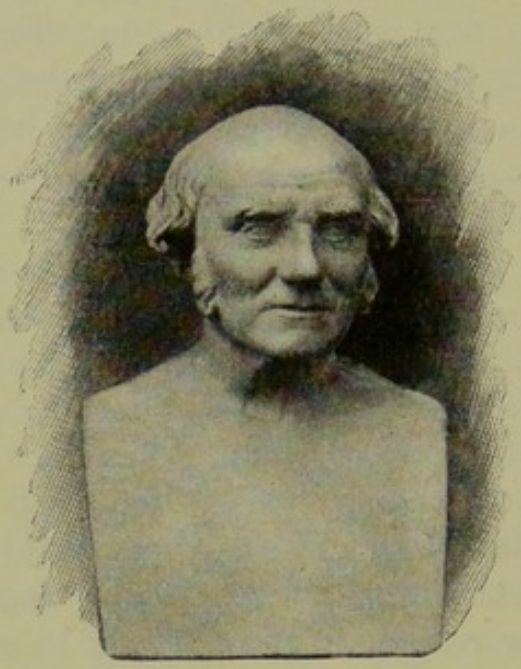


Fig. 1.—Wm. Clift, F.R.S. First Conservator of the Museum (1800–1849).

historic specimens which Captain Cook and he brought home from Australia.

SECTION II.

Room I.

Survey of Room I.

On entering Room I the visitor's attention is directed first to the specimens placed on ten tables arranged in a double series along the floor space. These specimens

Dissections of the Human Body.

show the structure of the human body. All are of excellent workmanship, and the majority have been prepared by William Pearson, prosector to the College. On the nearer tables are shown preparations of the limbs, with the muscles which execute their movements, and the blood-vessels which nourish them and the nerves

which supply them with sensation, carefully and truthfully exposed. The prepartions are preserved by being kept suspended in spirit within sealed glass jars. As the visitor passes down the middle of Room I, he will observe, on the first table to his left, preparations showing the anatomy of the shoulder, while on the opposite table, to his right, are placed preparations of the corresponding parts of the lower extremity. On the second table on the left are exhibited dissections of the arm and hand, No. 81, showing the valves of the veins, and No. 77, showing the fascia or enveloping fibrous sheath of the arm, being particularly worthy of attention. So are the specimens which show the muscles of the thumb. The second table on the right is devoted to preparations of the thigh and to the joint at the knee. On the third table on the left are continued the preparations illustrating the anatomy of the hand and forearm, while on the corresponding table on the right are shown dissections of the calf of the leg, of the ankle joint and of the foot. The fourth pair of tables are occupied by dissections of the face, head, and neck. The preparations showing the muscles of expression on the left and those showing the structure of the tongue and throat on the right, are specially worthy of note. The fifth and last pair of tables on the floor space of Room I are devoted to preparations of the brain, the eye, the nose, ear, and air cavities in the skull. Visitors who wish further explanation of the anatomical preparations should refer to the "List of Dissections and Models Illustrating Human Anatomy"—copies of which are placed on the tables with the preparations.

The Shoulder and Thigh.

Arm and Hand.

The Thigh and Knee.

The Calf, Ankle and Foot.

Face, Neck, and Throat.

Brain, Eye, Nose.

The floor space of Room I is surrounded by a series of wall cases—thirty-nine in number. They are filled with serried rows of skulls and other bones of the Human body which form the first part of the series of

Room I. The Wall-Cases.

Anthropological Collection.

"Human Osteology," but which, if a more modern term may be used, may be described as an Anthropological Collection. In these wall-cases are illustrated the physical characters of the various Races of Mankind, so far as such characters can be represented by the bony parts of the body. In the wall cases of Room I the visitor will find representatives of the past and present races of Europe, Egypt, Asia Minor, and India, races of other parts of the world being continued into the wall cases of Rooms II and III.

The need for many representatives of one race.

To the casual visitor one skull may appear so like another that he may ask: Why is it necessary to have more than one specimen of each race? The answer is that skulls vary quite as much as the faces of living individuals of one race, and therefore to represent that race it is needful to have a considerable number, for human races are characterised not only by their typical features, but also by the degree and manner in which they differ from that type. The variations in structure form the material out of which new races may be evolved. Hence the prime necessity of having each race illustrated by as many specimens as is possible.

Introduction to Human Osteology.

To examine the Anthropological series the visitor must return to the door of Room I by which he entered. The series commences in wall-case 1, by preparations to show the growth of the human skeleton from an early stage of fœtal development until childhood. Skeletons of English and French adult men and women are shown in the two succeeding cases—2 and 3.

Jonathan Wilde.

Amongst them is shown the skeleton of Jonathan Wilde (No. 336), a notorious criminal who was executed at Tyburn, 24th of May, 1725, in the 42nd year of his life. Such skeletons, originally preserved to satisfy a morbid curiosity, are now of real scientific worth, because it is widely believed, especially by Italian

anthropologists, that certain bodily features are peculiarly apt to occur in habitual criminals. It may be said in passing that such features are not apparent in the skeleton of Jonathan Wilde.

O'Brian the Giant, and Crachami, the Dwarf.

In case 4 are placed the skeletons of Charles Byrne (or O'Brian), the Irish Giant, and of Caroline Crachami,

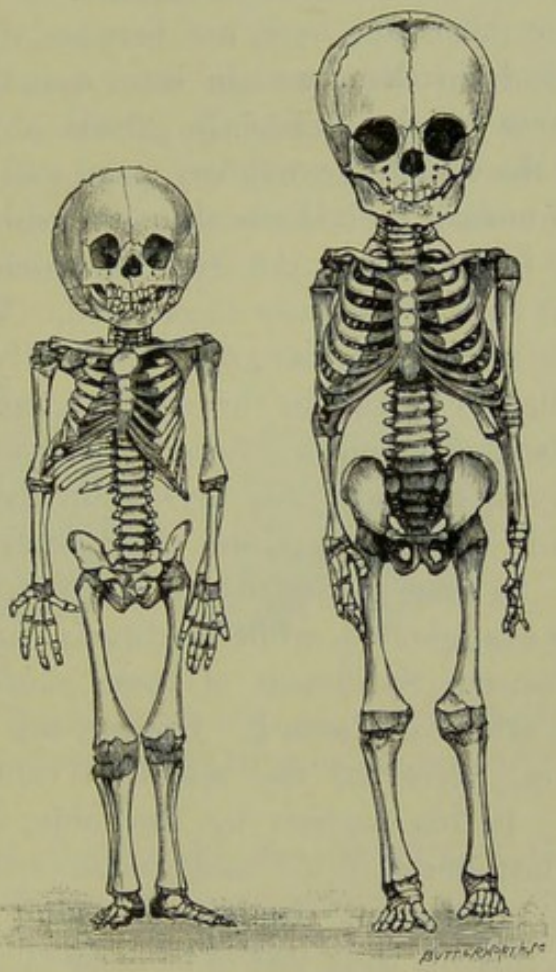


Fig. 2.—Caroline Crachami, the Dwarf, aged 9 years, compared with a European child aged 1 year. The skeleton of the dwarf is the smaller.

the Sicilian Dwarf. They show the extremes of human growth: the giant measures 7 feet 8·4 inches (in life he is said to have been a foot higher—a customary exaggeration of the showman); the dwarf is only

20 inches. The giant, who died in 1783, when 22 years of age, was not fully grown as may be seen from the fact that the ends of his long bones (epiphyses) are not quite fused with the shafts. The little dwarf died in 1824, when she was being exhibited in Bond Street. She was then 9 years old, but the size and condition of her skeleton is that of a child of 12 months.

Laws of Growth.

These specimens are here, not because of their size, but because from them we can learn something of the circumstances which regulate the growth of the human body. In the dwarf, growth has stood still at a point reached by normal individuals about the end of the first year, while in the giant, the growth which occurs at puberty has been enormously accelerated. We are just beginning to understand that growth is greatly influenced and controlled by secretions thrown into the circulation by small glands situated in different parts of the body—the pituitary in the head, the thyroid in the neck, the supra-renal in the abdomen, and the genital organs in the pelvis. In some giants the normal function of the pituitary is exaggerated, while in dwarfs the thyroid is usually affected. Specimens of these glands may be seen on the tables of Room I. Hunter, the founder of the Museum, perceived the scientific value of such specimens. In his portrait by Reynolds, the giant's skeleton is introduced in the background of the picture. In order to circumvent Hunter, the dying giant left instructions that his body was to be encased in a leaden coffin and buried at sea. At a great pecuniary sacrifice, Hunter obtained his body ; it is said that he borrowed £500 for this purpose. Byrne was "lionized" during his stay in London. A drawing by Rowlandson, now preserved in the College Collection (Conservator's Office), gives us a glimpse of this aspect of the giant's life.

Internal Structure of Bone.

In wall-case No. 5 there are a number of preparations to illustrate the internal structure of bones. Sections of the thigh and heel bones show how wonderfully the osseous matter is laid down in minute rods and cross bars to meet the lines of stress to which bones are subjected in life. A section of the skull in this case shows the more important measurements made by craniologists.

Peculiar Skulls.

In cases 6 and 7 are shown various forms assumed by the human skull. Extreme degrees of short and wide (brachycephalic) and long and narrow (dolichocephalic) skulls are shown; also of high and of low skulls—the English skull being usually of the latter

A. B. C.

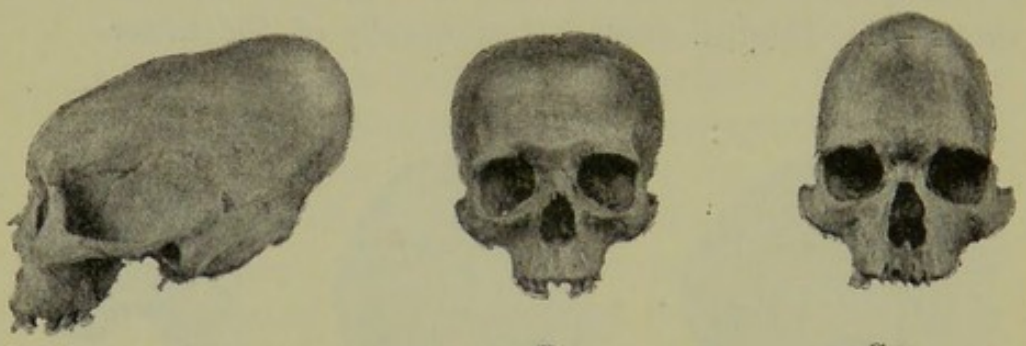
Fig. 3.—Peculiar Types of Crania. A, Scaphocephaly; B, Acrocephaly; C, Microcephaly (see case 6.)

type. While these mark the extremes of the normal form, other shapes are shown which result from a disturbance in the growth of the skull. The commoner of these is the scaphocephalic or boat-shaped skull; the roof or calvaria is narrow, long and low, like the upturned bottom of a boat (see figure on this page). The acrocephalic or steeple-head, the roof rising almost to a point, is also an uncommon departure from the normal. The wedge-shaped skull (trigonocephaly), in which the

forehead contracts to an apex, is represented by several specimens.

Just as a study of giants and dwarfs throws light on the laws of growth, so it is hoped that an investigation of the abnormal forms of skulls may lead to the discovery of the laws which determine the shape of head. In the pathological forms just enumerated there is an irregular fusion of certain sutures between the constituent bones of the skull, but this is only the proximate not the ultimate cause. Special bones—known as Wormian bones—named after Wormius the Danish Anatomist

Wormian Bones.



A. B. C.

Fig. 4.—The Skulls showing the effects of Artificial Deformation (see case 7.)

who described them—may be formed in the sutures or joints between the bones which form the roof and sides of the skull. Numerous varieties of such bones are shown in case 6. In contrast to the skulls which show peculiarities of form because of a pathological growth, are several in case 7 which have been designedly deformed by compression during the earlier years of life. Fashion may not only influence the cut of clothes but also the shape of the body—the feet amongst Chinese, the lips, ears, and teeth amongst Negroes, the waist and chest among Europeans, and the head amongst the native races of North and South America. Besides

the three specimens shown in case 7, many other specimens of artificial deformation of the head will be seen in various parts of the museum. Before leaving case 7, attention may be drawn to the variations in the shape of the face and especially to those which show how much the hard palate varies in shape and size. In the European the palate tends to become narrow and contracted, but the cause of this tendency is not yet fully known.

Catalogue Boxes.

Attached to each pair of cases is a small catalogue box containing explanatory cards. Each specimen has its own card. If further information is desired of any particular specimen its number should be noted. In the box attached to the case, which is opened by turning its lid or door downwards, will be found cards corresponding to the specimens of the case arranged in numerical order. The desired card can be exposed by turning the front cards downwards. The visitor is especially requested to carefully return the cards, when he has consulted them, within the box and to shut the lid. At the time of writing, this form of catalogue is being introduced and some time may elapse before it is perfected. The visitor may also gain much assistance from the book catalogue—" Human Osteology "—of which an edition (the third) was published in 1907.

The Neanderthal Race.

The contents of cases 1 to 7 form a brief introduction to the study of the Osteology of the various races of Mankind. In case 8 the anthropological series really commences by a collection of specimens, brought together and arranged by Mr. Macnamara in 1905, to exemplify the features of the earliest European race yet known—usually named the Neanderthal race, from the fact that the first specimen was discovered in the floor of a cave at Neanderthal, near Dusseldorf, in 1857. So different are they from modern men that Professor

Schwalbe has given them a separate specific name, *Homo primigenius,* retaining the name of *Homo sapiens* for modern human races. In size of brain, however, these very ancient men who lived in Europe with the rhinoceros, the mammoth, and the reindeer, and soon after, if not during, the glacial period, were above the average of modern man. Their race is represented in the Museum Collection by one of the most valuable specimens yet discovered (No. 278[7]). It is usually known as the Gibraltar skull, because it was hewn out of a terrace of conglomerate limestone under the North face of the Rock of Gibraltar about the year 1848, and long afterwards presented to the Museum by a president of the College, George Busk, Esq. The outstanding features of this skull are (1) its small brain capacity (1060 cc.) whereas in the other skulls of this race—the Neanderthal, Spy, La Chapelle, and Mousterien—the capacity varies from 1500 to 1700 cc.; (2) the great supra-orbital ridge of bone and the low receding forehead; (3) the great orbits and nose, larger than those of modern races; (4) the blown out appearance of the face due to the great development of the air spaces of the upper jaw; (5) the very slight development of the mastoid process. The beetling eyebrows and low forehead are well seen in the casts of the fragmentary Neanderthal and Spy skulls. The earliest human form yet known, perhaps it would be more correct to say pre-human, is represented by a cast of the roof of the skull of Pithecanthropus, a fossil form discovered in Java by Eugene Dubois in 1892. The thigh bones of the Neanderthal race, as may be seen from their casts, were short and thick with very large articular extremities.

The Gibraltar Skull.

Pithecanthropus.

In cases 9, 10, and 11, are placed the cranial and other bones of prehistoric inhabitants of England. In

Prehistoric Inhabitants of England.

acquiring and preserving every properly authenticated discovery of early human remains, the Council of the College hope to accumulate sufficient material to form a history of the various racial forms which have inhabited Britain from the earliest times. The oldest forms yet discovered are quite modern in size and features when compared with the Neanderthal race. The earliest human form yet discovered in England is represented by the Galley Hill Man. Casts * of the skull and thigh bone of this individual are shown in case 8, with the Neanderthal race. The remains of this individual were discovered in 1888, at Galley Hill near Dartford, by Mr. Robert Elliot, 8 feet down in a bank of gravel which showed an undisturbed stratification. That bank of gravel, which at one time formed part of the bed of the Thames, is 90 feet above the present bed. It may be justly presumed that the Thames has worn its valley 90 feet down since the Galley Hill man lived. The skull of this individual is remarkably long and narrow and the thigh bone is peculiarly flattened. The cast of the Tilbury skull, the original of which is in the British Museum, South Kensington, belongs to a much later race than the Galley Hill, but still very old, for the remains were found during excavations at Tilbury, lying under the remains of a peat-moss and 25 feet of Thames clay. The Sligo skull fragment represents the earliest type of man yet found in Ireland.

Neolithic.
Bronze Period.
Ancient British.
Roman.
Anglo-Saxon.

Between the Period of the earliest British inhabitants and modern or historic times, a long interval elapsed in which an orderly sequence of races is hard to discover. Huxley regarded the two skulls in case 9, the Trent skull, No. 279·5, excavated in the valley of the

* The originals are in the possession of Mr. Frank Corner, M.R.C.S., who kindly permitted these casts to be made.

Trent, and the Towyn-y-Capel skull, No. 339, from a tumulus in Anglesea, as typical of a long-headed race which occupied the North-Western part of Europe at a very early date. They have many points in common with modern Welsh skulls. The race which built the "long barrows" were probably of this type. On the other hand, the skulls assigned to the Bronze period are inclined to be round—brachycephalic; the "round barrows" are assigned to this race. Looking over the contents of these three cases 9, 10, 11, the visitor will see that in each of the periods represented in them—"Neolithic," "Bronze," "Ancient British," "Roman," and "Anglo-Saxon," skulls of the same type occur, but in different proportions, and that it is impossible to assign a skull to any period except by the surroundings in which it is found and the accessories by which it may be accompanied.

Barnard Davis Collection.

The visitor has probably observed that a number of the skulls in cases 9, 10, and 11 are numbered in red figures and are not yet included in the card form of catalogue. These skulls form part of the famous collection formed by the renowned anthropologist Dr. Barnard Davis, F.R.S., of Shelton, Staffordshire, which was purchased by the Council of the College in 1879 for the nominal sum of £1000. The collection contains over 1600 skulls and skeletons of many races and periods, all of which are fully described by Dr. Barnard Davis in his "Thesaurus Craniorum." For details relating to crania marked in red numbers the visitor must refer to copies of the Thesaurus in the Museum, but it is hoped that, without disturbing its individuality, the Barnard Davis collection may be yet catalogued systematically with the other specimens.

Modern EnglishSkulls.

Cases 12 and 13 are occupied by crania of modern inhabitants of England, or comparatively modern, for

some from the bed of the Thames are of most uncertain date. The representation of modern English skulls is altogether inadequate, and it is hoped that visitors interested in the problems relating to the degeneration of our bodily strength and stature may assist the College authorities in making good this blank.

Eugene Aram.

The skull of Eugene Aram (No. 337), "who was executed at York in 1759 and gibbeted in Knaresborough Forest," will be seen in the series of modern crania (case 12). The full story of this innocent-looking school-usher of Lynn is told in the catalogue. The cranium is that of a moderately long-headed individual with a mediocre cranial capacity and woman-like cast of countenance. Near this skull is that of another Englishman, Charles Nichols — "a comic lecturer," who died in 1877 and bequeathed this specimen (No. 335) to the Museum. The skull is shorter and higher than that of Eugene Aram, and has a much greater cranial capacity. No. 338 is the skull of John Thurtell, a London solicitor, who was executed in 1824 for the murder of Mr. Weare.

Scottish and Welsh Crania.

In cases 14 and 15 there is a representation of the crania of modern and ancient inhabitants of Scotland and Wales, but the present collection must be regarded as merely a nucleus. In this series is placed a cast of the skull of Robert Bruce, King of Scotland, which was made when his skeleton was disinterred at Dunfermline in 1819. The cast shows a finely modelled cranium of large dimensions, rounded in form, and provided with a long well-formed face.

Ancient and Modern French.

At case 15, which is situated at the south end of Room I—it is important to notice the orientation of the Rooms—we pass outside the limits of our own country to examine the cranial forms of our neighbours in France. The same cranial types occur in France as in ancient

and modern Britain, but in France the round skull is the more common form.

Ancient and Modern Spanish.

Passing the doorway leading to Room II, the visitor reaches case 17 containing crania of ancient and modern inhabitants of Spain. Amongst the more remarkable crania of this case are four which were found imbedded in the floor-deposit of caves at Gibraltar (Nos. 372, 373, 373[1], 374). These specimens show that the ancient inhabitants of the Rock were Basques or a race closely allied to the modern Basques.

Ancient and Modern Italians.

In 1870 the Council of the College purchased a valuable collection of Italian crania which had been built up by Guistiniano Nicolucci. The Nicolucci collection contained 166 crania of inhabitants of ancient and modern Italy. A considerable number are ascribed to Rome and to early Christian centuries (case 18). A modern skull from Naples (No. 419) shows a pathological deformation of its base. The Italian series is continued in cases 19, 20, and 21, the two latter cases being placed on the western wall of Room I.

Greece, Austria, Holland, and Germany.

In cases 22, 23, and 24 are shown the crania of modern inhabitants of Central Europe. In case 24 is shown a cast of the face of Frederick the Great of Prussia (No. 391 A). Skulls of ancient Greeks are placed in case 23, while on the lower shelves of case 24 is a representation of Dutch Jews.

Scandinavians, Lapps, Russians, Turks.

In case 26 the extremes of cranial forms are assembled. While the skulls of the Scandinavians are narrow and long (dolichocephalic), those of the Lapps, Poles, and Turks are short and wide (brachycephalic). The series is continued in case 27, where two remarkable skeletons of ancient Lapps are shown—diminutive people showing remarkable skeletal characters.

A Georgian Skull.

In case 27 is shown a very remarkable skull discovered in 1873 by Captain Buchan Telfer, R.N., in an

ancient tomb in Georgia—a Russian province lying between the Black Sea and the Caspian. The peculiar form of the skull is due to artificial pressure applied during infancy in an ancient race which Hippocrates named the "Macrocephali" or "Big-heads." The skull which Blumenbach selected as a type of the European race—or, as he named it, the Caucasian—was that of a Georgian woman.

North Africa and Egypt.

At the lower part of case 28 the European series ends and we pass to the inhabitants of North Africa. Although the races of this part of the world are related to the European races, yet they also show certain features which are intermediate between the European and Negroid races of Africa. The series commences with a good representation of ancient and modern inhabitants of the Canary Islands, and passes on, in case 29, to the Berbers, Kabyle, Moors and Arabs of North Africa.

Ancient Egypt.

Skulls, skeletons, and mummies of the ancient inhabitants of Egypt are placed in cases 29, 30, 31, 32, and 33. They represent the cranial form of that ancient race over a period commencing more than 4000 years B.C. to modern times. The same types of skull are found throughout that long period differing in detail of form and in the predominance of certain shapes.

The oldest known mummy.

The skeleton (No. 583) was prepared from a mummy of the XXVIIIth Dynasty (4th century B.C.) and presented to the Museum by the Duke of Sutherland in 1875. The mummy placed on the floor of case 30 was presented by Dr. Flinders Petrie in 1892, who found it at Medum, Egypt, and ascribed it to the IVth Dynasty (4000 B.C.). Professor Elliot Smith found it to be at least eleven hundred years older than any other mummy yet discovered, its wonderful preservation being due to the thick covering of rezin-paste in which it is wrapped.

This covering has been moulded to simulate the living form. The individual so wonderfully preserved for us was Ra-Nefer, a high official under Seneferu. He was evidently of a corpulent habit of body. In the same case is a series of skulls and bones of the people of the IVth Dynasty, also presented by Dr. Flinders Petrie. In 1909 the Egyptian Exploration Fund presented a series of 83 crania of people of the VIIth Dynasty. Other donors to this collection are Sir David Dundas, Sir Richard Burton, Sir William Flower, Sir John Bowring, and J. Willoughby Fraser, Esq. The skull, numbered 594, was purchased from Dr. Vesalius Pettigrew, whose early researches on mummification are now classical. In case 30 is shown the unwrapped mummy of Horsiesi, son of Naspihiniegori, an incense-bearing priest in the Temple of Ammon at Thebes. Placed near is the beautifully decorated case in which the mummy was found.

Asia Minor.

In case 34 are placed a somewhat slight representation of the mixed but interesting races of Syria, Palestine, Arabia, and Persia. Donations to this part of the Museum Collection would help in determining the relationship of the races of Asia Minor to the better known races of mankind.

India and Afghanistan.

In the cases (Nos. 34, 35, 36, 37, 38, 39) along the North wall of Room I are placed the skulls and skeletons of the inhabitants of India and Afghanistan. By far the largest part of the Indian series and one of the most valuable parts of the anthropological collection, was presented to the College by Lt.-Col. Sir R. Havelock Charles, I.M.S., K.C.V.O. During his long sojourn in India, at great cost and trouble he collected 248 skulls and 16 skeletons of Natives of the Northern part of India, every one of his specimens being properly authenticated and described. This collection he presented to the College in 1905 ; the specimens belonging

to it are distinguished by a black star placed above the number on the preparation. In this collection are represented the cranial and facial features of the Afghan, Pathan, Punjabi, Sikh, Hindu, and natives of the North-West Provinces. Surg.-Major S. Coull Mackenzie and Surg.-Major John Shortt have also contributed largely to this part of the Museum collection.

Room I, Lower and Upper Galleries.

The upper and lower galleries of Room I are occupied by sections of the Pathological Collection and may be entered either by a staircase leading from the Hall of the Museum or by one leading from the South end of Room III. The examination of the gallery specimens is best postponed until the Pathological Collection is reached. Meantime it may be mentioned that the preparations in the lower gallery illustrate diseases of muscles, bones and joints, while in the upper gallery are found specimens showing the diseases of the blood-vessels, lungs, kidneys, bladder, brain, nerves, and male genital organs.

SECTION III.

Survey of Room II.

Main Contents of Room II.

A doorway leads from the South end of Room I. to Room II. On the floor space of this room are continued the anatomical and anthropological collections already seen in Room I. The lower gallery is occupied by the Teratological Collection, while in the upper gallery are exhibited a series of drawings, illustrating various kinds and phases of disease. In the upper gallery, too, will be found the collection of parasitic worms.

Human Anatomy (*cont.*).

Muscles of the Body-wall.

On entering Room II, the visitor will find on his left hand a table on which preparations are placed to show the structure of the body-wall, especially of ribs and muscles concerned in the act of respiration. Special

attention may be drawn to the preparations numbered 245, 246, which show the formation of the canal by which the testicle escapes from the body in fœtal life and by which hernia of the viscera are apt to pass down. No. 242·2 illustrates well the muscles concerned in moving the spinal column and in keeping it erect.

Heart, Lungs, and Brain.

On the opposite table—the first on the visitor's right as Room II is entered from Room I—is devoted to preparations illustrating the form and structure of the heart, the lungs, and the trachea, œsophagus and brain. A dissection of the human heart (No 262·2) shows the remarkable strand of muscle which passes from the auricles to the ventricles and is believed to conduct contraction impulses from the auricular to the ventricular chambers.

Organs of Generation.

On the second table on the right—there are only four tables in this room—are shown preparations of the pelvic and generative organs of both men and women. A well-executed dissection shows a fœtus, about $3\frac{1}{2}$ months old, within the womb.

Organs of Digestion.

On the second table on the left are displayed dissections of the great blood-vessels of the thorax and abdomen, preparations of the stomach and pylorus, of the pancreas, liver, cæcum, appendix, spleen and kidneys. One preparation especially demands attention because of its delicate workmanship. It is numbered 270 and shows especially the abdominal sympathetic plexuses of nerves.

The preparations on the tables of Rooms I and II form only part of the great collection which illustrates the structure of the human body. Each section of organs in the Physiological Series of Rooms IV and V terminates with preparations from the human body—many of them the workmanship of John Hunter or of his assistants.

Towne's Wax Models.

Perfection in the art of modelling in wax has not hitherto been regarded as a gift of English workmen, but the two models in the South end of Room II—the end most distant to Room I—may serve to alter this opinion. The model in the South-west corner shows the nerves of the trunk—especially the sympathetic nerves—distributed to the heart and to the abdominal viscera. In the South-east corner is a model of the upper left extremity, showing the lymphatic vessels and glands—manifestly a faithful copy in wax of an arm in which these vessels had been successfully injected.

Flaxman's Bust of Hunter.

On a cabinet at the South end of Room II is placed Flaxman's bust of John Hunter. Near by is a mask of Hunter's face—not a death-mask as is so often supposed—taken about the same time as Reynolds painted his portrait—probably 1785—when he was 57 years of age and eight years before his death. It is clear that Flaxman utilised this mask in preparing the bust. The bust was made in 1800 at the request of the first Board of Conservators, who paid a fee of £60 to the sculptor for his work.

Sir Henry Thompson's Collection of Calculi.

Within the cabinet on which Hunter's bust stands is kept the great collection of calculi (over 1000 in number) presented by the famous surgeon, artist, and raconteur, Sir Henry Thompson, in 1892. All the specimens were obtained from his own patients, amongst them being the calculi he removed from Leopold, King of the Belgians, and Napoleon III. of France.

Evelyn Plates.

Those who know John Evelyn's diary and his zest for all forms of knowledge, will not be surprised to find that he took an interest in the structure of the human body. In 1646, while staying and studying at Padua, where Harvey began his observations on the circulation some fifty years previously, he caused to be made the preparations of the human body now shown in a stand

in this room. Extracts from his diary are attached to the stand giving the full history of these ancient anatomical preparations of the human body. One plate (No. I) shows the spinal cord and nerves drawn out of the body, stretched on pine-board, dried and varnished. Plate II shows the arteries of the body, while Plate III, one specially designed by Evelyn, shows the portal system of veins ending in the liver, the veins of the two lungs and the sympathetic system of nerves in which the vagus nerves are included, the combined system of nerves being named the *sexti par*. No. IV shows the veins of the body. It is a remarkable fact, as may be seen by examining this plate, that here in Padua, some twenty years after Harvey had published the description of the circulation of the blood, the veins of the liver are shown in direct communication with the veins of the head by means of an artificial union of the two venæ cavæ. The history of the plates is also remarkable. Evelyn brought them to England ; in 1667 he presented them to the Royal Society, of which he was a Fellow ; in 1782 the Royal Society, in moving its quarters, transferred them to the British Museum. In 1809 that institution rightly handed them over to the care of the Royal College of Surgeons. With the possible exception of the Harvey plates in the College of Physicians, these are the oldest anatomical preparations in England.

The Anthropological Collection (*cont.*).

Southern India.

If the visitor will return to the doorway leading from Room I to Room II, he will find at his left hand on entering, a continuation of the series of skulls illustrating some of the physical characters of the natives of India—continuing the series which ended in the last wall-case of Room I (see page 19). Cases 1, 2, 3, at the North end of Room II, and 4, 5, and 6, on the East side, contain the crania of natives of Madras, Mysore, and Southern India—rather small skulls, with regular

features and well developed jaws and teeth. In case 3 skeletons of a Sikh sergeant and of a male Punjabi will compel attention because of the stature and massive build.

Veddahs and Singhalese.

In the lower shelf of case 6 and in case 7 there are several skulls (Nos. 675–686) illustrating the cranial features of the primitive race of South India—the Veddahs. The natives of Ceylon—Singhalese—occupy case 7. Between cases 7 and 8 a doorway leads to Room III. Crania of the Hill Tribes on the N.E. frontier of India are placed in case 8. In case 9 commence the series of skulls belonging to the Mongolian Race of Mankind. They are characterised by their widely set and prominent cheek-bones, flat noses and prominent jaws. In cases 9 and 10 are placed skulls of inhabitants of various parts of China, a number of them being the skulls of pirates (Nos. 703–708 and 831–837). Crania from Japan, some of them being those of the Ainos—a primitive race, from Burmah, and from Siam, occupy case 11. A series of Malay skulls, some of them of Malay pirates, occupy the upper shelves of case 12, the lower part giving space for three skeletons. One is that of an Aino, another is of a male Japanese, showing the characteristically short lower limbs of that race. This feature they share with the ancient Neanderthal race of Europe. The Malay series extends into case 13—the second case on the South wall—where two skeletons of Malays from Java are exhibited. Some of the Dyak skulls from Borneo in this case are curiously carved ; others, the trophies of head-hunters, are blackened by being suspended from the rafters of the native huts. The Malay series is continued in cases 14, 15, 16, and 17. In case 14 are placed skulls from the Philippine Islands, some of which show the effects of gunshot wounds (see 749^{9}–749^{14}).

Hill Tribes of N.E. India.

Mongols.

Japanese, Burmese, Siamese, Malays.

Dyaks.

These were presented in 1904 by Staff-Surgeon C March, R.N., who obtained them from a battlefield in Luzon. In the Malay series in this case are also included the crania of natives of the Gilbert Islands (749^{1-7}), far out in the Pacific Ocean. These skulls were presented by Sir Erasmus Wilson and by Mr. Glanvill Corney. The Malay series, continued in cases 15, 16, and 17, are from Java, Sumatra, Timor, Celebes, and Borneo. The teeth are blackened and the upper incisors often protuberant, a result of the habit of "Betel" chewing, to which the Malay race is addicted. The teeth are sometimes artificially deformed by filing and drilling the front or incisor teeth. The skull of a Bornean native (No. 965 in case 16) shows an extreme example of this custom. Amongst the crania from Africa and the Islands of the Pacific examples of "fashionable" deformities of the teeth will be seen frequently. The Malay series, continued in case 17, includes crania from Islands in the Pacific—Samoa, Tonga, and also of the Moriori from the Chatham Islands, which lie to the east of New Zealand. The South Sea Islanders are provisionally bracketed with the Malay race, but an examination of the specimens in the Museum will convince the visitor that this is not their true place. Case 18 is also assigned to the Chatham Islanders.

Borneo, Celebes, Timor.

Artificial Deformation of the Teeth.

Morioris.

Case 19, the last in the South wall, and case 21, the second on the West wall, are occupied by the crania of Maoris, the natives of New Zealand. There are six specimens to show the elaborate method of tatooing the face and the very remarkable custom of preserving the heads of the dead in a dried condition. In case 20, the first on the West wall, are three skeletons of Polynesians, one of a native of Savage Island (one of the Friendly Islands), a Tahitian, who died in the London Hospital of phthisis in 1816, and a native of the Chatham

Maoris.

Marquesas, Sandwich Is.

Islands. The skulls in this case (No. 20) are also from the Polynesian Islands and from New Zealand. The series of Polynesian skulls extends into cases 22 and 23. There is a full representation of natives of the Sandwich Islands, which the Museum obtained from Dr. Barnard Davis's collection. Sandwich Islands.

At case 24 there is a sharp break in the anthropological series. By grouping the races of the Pacific Islands with the Malays and seeking to assign them to the Mongolian stock, the visitor has been led away from the direct track. There can be no doubt that in case 24 he comes back to a pure and primitive Mongolian type, the Esquimaux of the Northern Arctic Zone. In no living races are there so marked cranial features. The narrow long skull, the wide cheeks, and great span of the lower jaw give Esquimaux skulls an unmistakable appearance. Their arms are long and legs peculiarly short, as may be seen in the skeletons shown in case 24. The series is continued in cases 25 and 26, where in the latter case the races of North America commence. Esquimaux.

The North American Indians commence in case 26 by a representation of the "flat-heads"—a tribe living in the North-West corner of the United States, who artificially compressed the head during the earlier years of life. The "Red Indian" series is continued in cases 27 and also 29, the last case on the West wall. North American Indians.

In cases 28 and 29 are placed the skulls of Indian natives occupying the Caribbean Coast and neighbouring Islands. This series extends into South America and Mexico and includes a medley of races not easily separated as yet. Mexico and West Indies.

In the lower shelves of case 29 (the last on the West wall) commence a long series of crania which illustrate the "head" features of the ancient inhabitants of Peru. Peruvians, Incas.

This series occupies the three cases (30, 31, and 32) on the North wall of Room II. A large part of the Peruvian Collection is owing to the generosity and scientific foresight of T. J. Hutchinson, Esq., H.M. Consul at Callao, in 1873. The Peruvian series extends into Room III, where its description will be taken up in making a survey of the contents of that room.

Collections of Drawings and of Teratology.

In the upper gallery of this room is placed a collection of drawings illustrating various phases of disease and a collection of Entozoa. The lower gallery is occupied by specimens which exemplify the various irregularities of development to which the human body in particular, and the animal body in general, are liable.

SECTION IV.

Survey of the Contents of Room III.

Arrangement of Room III.

A doorway on the East wall of Room II leads into Room III. The floor space at the south end of this Room is occupied by a statue of Hunter; at the north end a door leads to the Hall of the Museum ; a doorway on the East wall leads into Room IV. A doorway behind Hunter's statue leads to Room VI (the Odontological Collection) and to the galleries of the Museum.

History of Room III.

Room III occupies the position of the Museum which was built to receive the Hunterian Collection when it was purchased by the Government in 1800 (seven years after Hunter's death) and handed over to the care and keeping of the Corporation (now the Royal College) of Surgeons. The original Museum, which was finished in 1813, was replaced by the present room in 1835. Round this room the first conservator, Wm. Clift.

Wm. Clift, Hunter's last pupil, conducted parties two days a week and dilated on the marvels of the Hunterian specimens. His bust is now placed over the doorway

leading to the Hall of the Museum. Richard Owen, a young surgeon waiting for practice in a neighbouring street, joined Clift in 1827, to help him in arranging and cataloguing the specimens. He became Clift's son-in-law and, in 1842, his colleague and successor. Here, too, the great surgeons of the earlier decades of the 19th century—Sir Everard Home—Hunter's brother-in-law, Sir Wm. Blizard, Sir Astley Cooper, Abernethy, Sir Wm. Lawrence, and Sir Benjamin Brodie came to consult the specimens and superintend the progress of Museum affairs.

Richard Owen.

The arrangement of the Rooms and of their contents will puzzle the visitor unless their history is already known. By 1835 the collection had become too large for the original Museum, so it was rebuilt, extended and opened at a cost (including alteration to the College) of £40,000. A second room was then added, now known as Room IV (see plan, p. 28). A large addition was made in 1852, the extension being carried Eastwards as in 1835. The Room opened in 1852, when Owen was conservator, at a cost of £25,000, is now known as Room V. Rooms I and II were finished in 1892, at an approximate cost of £18,000, the extension on this occasion being to the West of the original Museum. The Instrument room (see plan) was opened at the East end of Room V in 1872; Room VI was provided in 1909 for the Odontological Collection by extending the Museum under Room II. At the same time three small annexes to Room V were set aside for special collections (vegetable preparations, specimens of Historical Interest and for accessory Hunterian specimens) (see plan, p. 28).

The manner in which the Museum was extended.

The various extensions of the Museum disturbed the orderly arrangement adopted in the original collection. In Room III, the visitor will find parts of five different

The Contents of Room III.

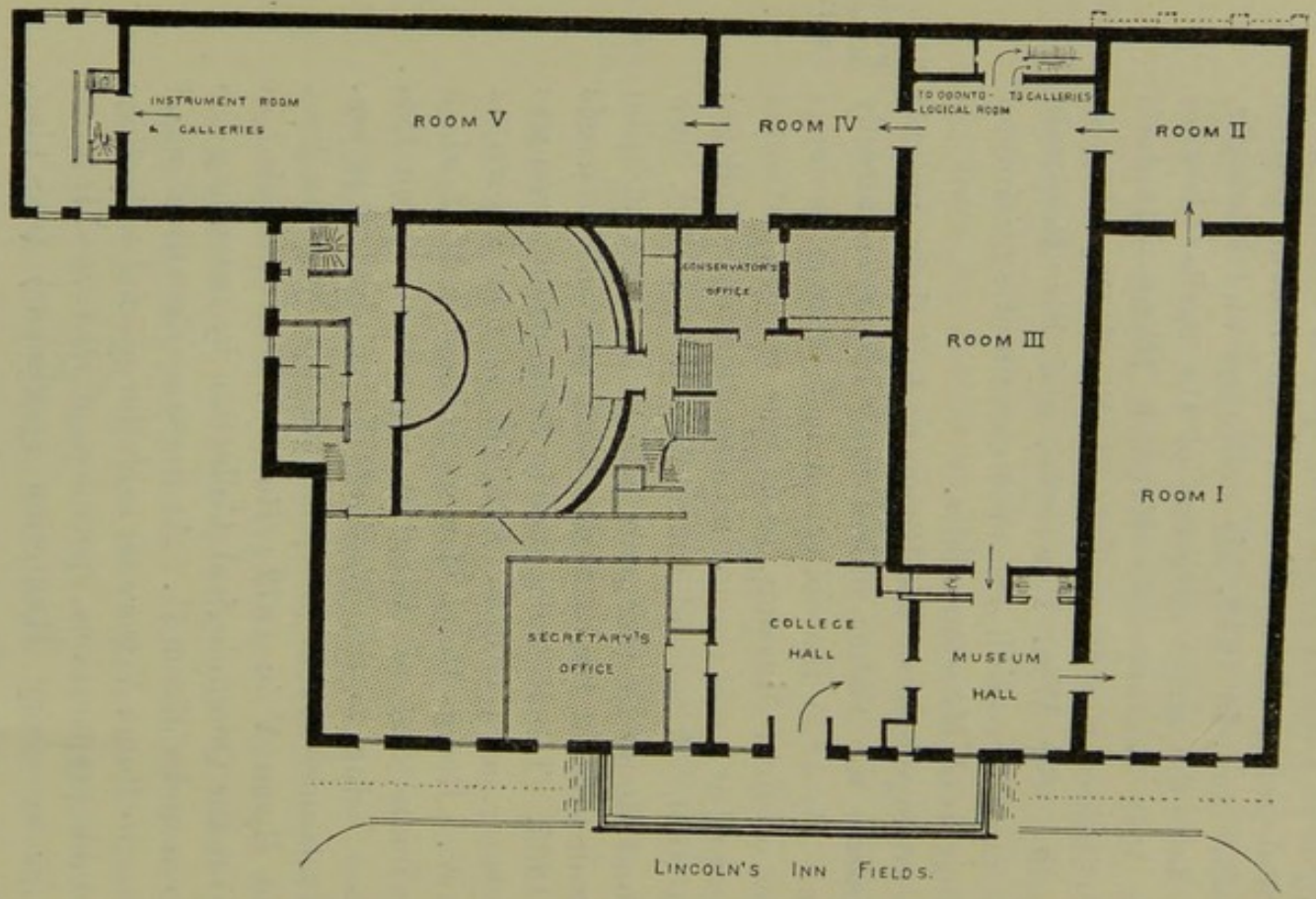


FIG. 5.—Plan of the Museum.

series of preparations. The upper and lower galleries are occupied by specimens shewing the effect of disease —pathological preparations—and this series extends into the floor cabinets on each side of Hunter's statue at the South end of Room III. In the floor cabinets adjoining the two just mentioned, are shown human skeletons and bones at various stages of development and growth. Along the wall-cases on the South and West is placed the Anthropological Collection—a continuation of the series shown in Room II. The cases in the Eastern wall contain skeletons of the various families of Fishes—the beginning of the series of Comparative Osteology. The wall-cases at the North end are devoted to the exhibition of animal forms belonging to the Invertebrata ; so are the adjacent six floor cases. The Invertebrata, which include the very simplest forms of life, are placed at the entrance of Room III—the situation they occupied when the whole collection was contained in the Room. Hunter's great scheme was to demonstrate that the very simplest and the most complicated animal forms were linked together by a long series of intermediate forms—gaining in complexity as the human form was approached. The various extensions of the Museum have disturbed the original arrangement, but the Invertebrate series by the Hall door of Room III still forms the real commencement of the Collection, and the series of fish-skeletons along the wall-cases on the Eastern side of Room III its continuation. In this Guide the Hunterian order is reversed ; we have commenced with the human form—its structure, its varieties, and its diseases—and will end our survey with the Invertebrate or most simple forms. Those who wish to examine the Invertebrate series now will find a guide to its arrangement at p. 114, and they will also find in p. 70 an introduction to the contents of the Eastern wall-cases (Fishes).

Pathological specimens.

Development of the skeleton.

Anthropological specimens.

Comparative Osteology.

Invertebrate Series.

Statue of John Hunter.

At the South end of Room III is placed a statue of John Hunter by H. Weekes, R.A. The sculptor has in reality rendered Reynolds' famous portrait in marble: Hunter is represented seated and meditative. The statue was erected in 1864 by public subscription.

The Greenland Right-Whale.

Owing to a lack of space—wholly out of their proper position—a series of skeletons of whales is suspended in the middle of Room III. The central skeleton is a fine specimen of the Greenland Right-Whale (*Balæna mysticetus*)—a species now threatened with extinction owing to the commercial value of the oil and the whale-bone plates obtained from it. The whale-bone plates fringe the great jaws and sift from the water a diet of small molluscs and crustaceans. Near the great skeleton is suspended one of a young female Small Fin Whale (No. 2758) which was taken in the Dogger Bank, bought by Hunter and described by him in the Philosophical Transactions of 1787. No. 2757 is a male adult of the same species presented by Mr. John Gurney in 1860. No. 2749 is the skeleton of a fœtus of the Southern Right-Whale—the species found in the Southern Seas (*Balæna australis*).

Anthropological Collection (*cont.*).

The visitor on entering Room III from Room II, will find the continuation of the Anthropological series on the opposite or Eastern wall. The series commences in the wall-case (No. 1) to the right of the door leading to Room IV. The case contains a continuation of the

Peruvians.

Peruvian series. There are five skeletons prepared from

Peruvian Mummies.

the mummies of ancient inhabitants of Peru. An intact mummy is preserved in the Historical series placed in an annex of Room V (see plan, p. 28). Many of the skulls in case 1 show the peculiar deformation caused by artificial compression of the skull. The shape of the brain is altered but its function seems unimpaired (see p. 90 of this Guide).

Patagonians, Fuegians, and other American Races.

In the following case (No. 2), on the South wall of Room III. the Peruvian series is continued in the upper shelves. Specimens from the neighbouring countries—Chile, Bolivia, Argentina—follow ; they do not differ markedly from the Peruvian skulls. On the lower shelves are placed skulls of Fuegians and Patagonians ; it is at once seen, from their form and shape, that we have to deal with a very different race—one that seems to find its nearest allies in the more barbaric natives of the South Sea.

The skeleton of a Fuegian woman is shown in this case. So are a number of pelves and facial casts of this race.

Australian Aborigines.

Crossing behind Hunter's statue the visitor comes to case 3, where one of the largest and best collections of the skulls and skeletons of Australian Aborigines is preserved. Anthropologists are now generally agreed that in this race and also in the Tasmanians shown in the next case, we have the most primitive of all existing forms of Mankind. They have certain points in common with those most ancient inhabitants of Europe—the Neanderthal race—viz., receding foreheads, prominent brow-ridges overhanging the orbits, massive jaws and large fine sets of teeth, with small brain capacities. The tops of some skulls near the middle of the case are polished and decorated. They are utilized by the natives as water-vessels.

Native Tasmanians.

An extinct race—the native Tasmanians—occupy case 3, the first on the Western wall. In no museum in the world is there such a complete representation of this remarkable people as the visitor now sees before him. The teeth and jaw development are altogether remarkable for their size and strength. In the centre of the case are two busts—modelled by Mr. Murray—of

Wouraddi and his wife Truganini. The latter died in 1876—the last representative of her race. They were distinctly a negroid people, with deeply pigmented skins, woolly hair and wide nostrils.

Negroid Races of the Pacific.

Passing the doorway leading back to Room II, the visitor reaches a case representing the Negroes of the Pacific Islands—Melanesians they are sometimes called. In cases 4 and 5 will be seen crania and skeletons from the Loyalty Islands, New Hebrides, Fijian Islands—many of them gifts of Mr. Glanvill Corney—and Papuans from New Guinea and the neighbouring islands. Like the Tasmanians and Australians, with whom they are nearly allied, many show massive jaws and fine dentitions. Some of the skulls are deformed: No. 1161[1] on the floor-shelf of this case represents the deformed skull with the face artificially modelled in clay of a chief of the New Hebrides Islands—a group lying out in the Pacific to the North-east of Australia. No. 1161[2] is a somewhat similar specimen.

Andamanese.

On the upper shelves of case 6 may be seen the skulls of the small negroids which inhabit the Andaman Islands, situated in the Indian Ocean between India and the Malay Peninsula—pigmy survivals of an almost extinct Asiatic race of negroes.

African Negroes.

A collection of Crania from various parts of West Africa, in the lower shelves of case 6, forms the commencement of the Negro series. The collection of negro crania continues in case 7, which is also occupied by fine skeletons to show the skeletal characters of this race. The finely modelled young male negro, shown in the case, was prepared for Hunter by Sartini, the sculptor. Crania from the Congo Free State—especially

Congo Tribes.

a collection of skulls of the Batetela, a cannibal tribe towards the eastern boundaries of the Congo watershed—are exhibited in case 8. They were brought home by

Mr. E. Torday in 1909. In many the upper incisors have been extracted as part of a ritual at puberty; in others, these teeth are filed down to a peg-shape. In the lower shelves of case 8, and in the upper shelves of the following case, the crania of Negroes of East and South Africa are shown, including Matabele and Zulus. In this case, too, are exhibited the most remarkable of all African natives, the Hottentots and Bushmen of South Africa. The casts in case 9 are those of a Bushman and Bushwoman who were exhibited in the great exhibition of 1851. They show the small stature, prominent buttocks, wide cheek-bones, small hands and feet, of this race. Preparations of the peculiar genitalia may be seen in the Physiological series. Side by side with the casts are skeletons of the Bushman race. In many characters, especially those of the crania, the Bushmen and also Negroes show very highly evolved traits.

Zulus.

Hottentots and Bushmen.

A few crania from Madagascar conclude the Anthropological Collection.

Madagascar.

The remaining wall-cases along the Eastern side of the Museum contain preparations illustrating the osteology of fishes (see p. 70).

Osteology of Fishes.

Bones of the Human Skeleton.

The series illustrating the structure of the Human Body, which has been traced along the floor-space of Rooms I and II, also extends into Room III. Here a series of preparations illustrates the form and growth of the individual bones of the body. They are displayed in several of the twelve floor-cabinets which extend in a double row along the Room. The visitor on passing from the Museum hall towards Hunter's statue, should commence at the fourth cabinet on the

Growth of the human skeleton.

right, where the skeletons of fœtuses of various ages are shown. In the youngest stage, the ossific centres are just visible to the naked eye. These fœtal skeletons occupy only one side of the cabinet, the side next to the wall-cases. In the same side of the next cabinet (fifth on the West side of the Room) the series is continued from birth to the 9th year. On the opposite side of cabinet 5 the condition of all the bones of the body of the 12th and 14th years are shown. It will be observed that most of the bones are formed not in one piece but by a main centre of formation which appears very early, and by subsidiary centres which appear at the ends next to joints or along the margins of flat bones. Growth takes place at the lines (epiphyseal lines) where the main and subsidiary centres come in contact. When these lines are obliterated by the fusion of the various parts, growth in that bone ceases. Growth does not cease in all bones at the same time, as may be seen from the preparations illustrating the condition at the 15th and 16th year (exhibited in one side of case 4). The thigh-bones are the last to reach maturity. The visitor should then cross the floor of Room III to case 5 on the left, or East side, where finely-formed bones of the adult skeleton are shown. On the opposite side of case 5, the side directed towards the wall-cases, there are set out a number of preparations to show the structure of the skull, its form at various stages of growth, as well as similar aspects of the pelvis and other bones. This osteological series ends in the corresponding side of the 6th floor-cabinet, on the right of Hunter's statue. Here are shown sections to illustrate the wonderful manner in which the lamellæ and lines of bone are laid down so as to give the greatest degree of strength with the least expenditure of material. Here, too, are shown sections of the inner ear and of the air-cavities which expand the facial parts of the skull.

Centres of bone formation.

Cabinet 5, on the left or East side of Room V.

Bones of the face and ear-cavities of the skull.

SECTION V.

Pathological Collection.

The aim of the Collection.

We now come to one of the most important parts of the Museum, the part in which the various injuries and diseases of the human body are represented. The pathological preparations are intended to throw light on the *processes* of disease rather than merely to exemplify the effects and appearances of disease. This part of the collection is also represented in the floor-space of Room III.

Nubian Pathological Collection.

The collection exhibited in the cabinet on the right of Hunter's statue makes a suitable introduction to the Pathological series. Here are displayed a series of preparations which show the diseases of the ancient inhabitants of Nubia. The men and women, whose bones have been so wonderfully preserved by the dryness of the Egyptian climate that the nature of their injuries and diseases can be now diagnosed with accuracy, lived at various periods between 5000 B.C. and an early century of our era, in that part of the Nile Valley which is indicated on the map attached to the case. These specimens were collected by Professor Elliot Smith and Dr. Wood-Jones from numerous ancient cemeteries that were explored in 1907–1908 by the Survey Department of the Egyptian Government (Capt. H. E. Lyons, F.R.S., being the Director) before the country was flooded by the dam at Assuan. Here are to be seen the first examples yet discovered of tubercular disease of the spine (182 B, 182 C) of middle-ear disease (182 A), of gout (209—from the body of an early Christian man), of cleft palate (No. 210), and very early forms of splints applied to the fractured forearm of a mummy (Nos. 115, 116). There are 400 specimens in this collection, classified

and arranged in the drawers of the cabinet and provided with a card catalogue, which will supply the visitor with further details. The collection forms the most extensive and valuable historical representation of disease yet made.

Pathology of Bones.

The cabinet on the left of Hunter's statue is occupied by crania and other bones which illustrate the severer lesions to which bones are liable. At the time of writing, many of these specimens, which show the ravages of syphilis in the skull and in other bones, the union or anchylosis at the hip, knee, and other joints as a result of disease, the effects of injuries and fracture of bones, are being placed in more suitable positions in the Pathological collection. Their place will be taken by a series of long bones to show how these vary according to the sex and race of mankind.

Effects of Lightning.

The visitor, if he wishes to continue an inspection of the Pathological series, should pass behind Hunter's statue and ascend the staircase to the lower gallery of Room III. In each side of the doorway leading into the gallery will be seen the clothes of a farm-labourer struck by lightning—a gift to the Museum by Dr. Wilks of Ashford. The torn and tattered condition of the clothes demonstrate the remarkable effects, apparently explosive in character, seen in objects struck by lightning. The labourer was very slightly injured.

General Pathology.

The lower gallery of Room III is occupied by preparations to demonstrate the general processes of disease, with no reference to the organ or part of the body affected. This forms the series of *General Pathology*; the remainder of the Pathological collection illustrates the diseases of special organs, and is known as the series of *Special Pathology*.*

Special Pathology.

* Specimens belonging to the Hunterian Collection will be recognised by their numbers being painted in black figures; later additions have their numbers painted in red.

At the time of writing, the series of General Pathology is being extended and rearranged. Hence it is impossible to state the nature of the contents of each case, but the system of labelling the contents of each shelf and case will save the visitor from inconvenience. The General Series commences in case 1, the first to the visitor's left as he enters the South end of the gallery—the end at which Hunter's statue is placed. In the opening cases will be found a series of organs illustrating hypertrophy—abnormal overgrowth of organs or parts of the body which will be seen to result from many causes, some of them very obscure. The opposite condition is then illustrated by numerous organs and parts—heart, muscles, and bones. A most remarkable series show the atrophy and other changes which result from the removal of the sexual glands. The pelvic parts of a member of a Russian sect which mutilate their bodies is shown in this series.

Hypertrophy.

Atrophy.

Then follows a series to show the process known as degeneration, where healthy tissue becomes altered to form matter of a waxy-looking, fatty, mucoid or calcareous nature.

Degeneration.

The series showing degeneration is followed by one showing the processes which take place when a part of the body undergoes necrosis or death. The dilatation of the blood-vessels which follows on freezing is shown by Hunter's preparations of the ears of a rabbit. Other preparations show the death of various parts of the body and the manner in which dead parts are cast off, including the process as it affects the bones. Preparations illustrate also the detachment of dead parts in plants.

Necrosis or Local Death of Tissues.

The series which follows that of Necrosis is one of the most interesting, and from a surgeon's point of view one of the most important in the Museum, for it illus-

Repair.

trates the manner in which wounds are healed and the processes which repair breaches in the body. If the great founder of the Museum had a special predilection for any part of his collection, it was to the section which illustrated the process of Repair. Healing wounds of the skin, of muscles, of tendons, and of the bowel are shown. The section also illustrates all that occurs in the Repair of fractures of the bones, including every kind of deviation from the normal. One of the specimens is of particular interest; it illustrates the repair of the tendo Achillis of a deer, and was produced and studied by Hunter to elucidate an accident which happened to himself when dancing. This is an extensive series and occupies several cases along the West side of the Gallery.

Cicatrices

The results of healing are then shown : the healed stumps that follow amputation, and the extensive cicatrices which result from ulceration. The processes of repair in lower animals are also illustrated—in the lobster, oyster, lizard, etc.—and attempts made in these lower animals, with some degree of success, to reproduce amputated parts.

Grafting and Transplanting

Hunter was particularly interested not only in the possibility of replacing or grafting parts of the living body, but in the effects produced by such transplantations. One preparation shows the successful manner in which he implanted a human tooth in the comb of a cock ; others the implantation of spurs on the comb, and the increased growth which resulted in their unnatural position. In the preparation showing transplantation of a testis of a cock to the body of a hen his aim was to see, not if the graft would live, but if the testis would indirectly produce by its function the external characters of the cock—the plumage, the comb, the spurs—in the hen thus engrafted. He concluded,

from his many experiments, that the conditions which determine the male and female characters were inherent to the sexual glands. Grafting and repair of vegetable tissue are also illustrated.

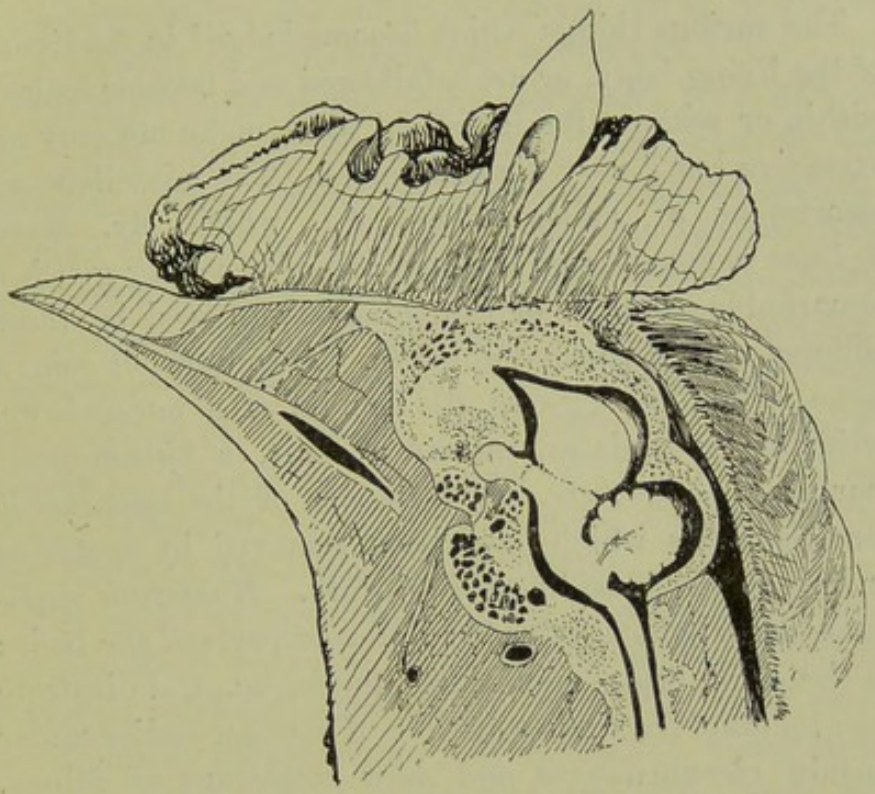


Fig. 6.—Section of Head and Comb of a Cock in which Hunter successfully engrafted a Human Tooth.

Inflammation.

When living tissues are injured they become inflamed; the appearances and diverse results of inflammation are shown in the series of preparations which follow those of grafting. The engorgement and dilatation of the blood-vessels are demonstrated by preparations injected with a vermilion mass. The exudation of "coagulable lymph," as Hunter named the material which is formed on the surface of inflamed membranes such as the pleura and peritoneum, and the organisation of this to form adhesive bands, are shown by many

preparations, the best being those made by Hunter himself about 130 years ago. Other effects of inflammation—suppuration, abscess-formation, ulceration, and death of the inflamed parts—help to complete this series.

Foreign Bodies.

The various things which become lodged in the tissue of the living body, or are swallowed and become lodged within or without the intestinal tract, make not only an extensive but a very diverse series. The miscellaneous assortment of nails, screws, &c. which Mr. Mayo Robson removed from the stomach of a young girl is a remarkable example of the things swallowed by those afflicted with a morbid appetite. A counterfeit coin, a large spoon, an egg-cup, the handle of a punch-ladle, artificial tooth-plates, masses of hair, a button-hook, marbles, needles, etc. are instances of the remarkable foreign bodies which have been removed by operation or have been passed by the intestines. Numerous specimens show bullets lodged in different parts of the body: in the skull, brain, spine, knee, thigh, etc., and illustrate how tolerant the tissues may be of foreign bodies under certain circumstances and how intolerant at others. Some of the injuries shown were produced by round bullets (as used in the Crimean War), others by the modern conical bullets used in the South African War. A series of foreign bodies which surgeons designedly implant in the tissues of the body to secure certain effects, form a part of this series.

Lodged Bullets.

Remarkable Wounds and Recoveries.

Some of the foreign bodies are remarkable for their size. The shaft of a chaise is shown which penetrated a man's chest behind the breast-bone and emerged at the side opposite to which it entered. The man recovered and lived for years afterwards, part of his thorax with the marks of the wound being shown near the shaft. The top of an iron railing is shown : a man

working on a scaffolding, stumbled and fell on an iron railing beneath. The specimen shown entered his face, from which it was extracted by the donor, Sir Frederick Treves, Bart. The pivot of a try-sail is also a remarkably large body: the sailor transfixed by it recovered (see drawing accompanying this specimen).

Bacteria and Infectious Diseases.

Passing further to the right along the West side of the gallery, one of the most recent additions to the Museum is seen. Here are exhibited artificial cultures in glass tubes of the micro-organism causing the chief infective diseases of man. With each culture is shown an accurate coloured drawing of the microscopical appearance of the micro-organism contained in it—of the bacillus of tubercle, the cause of phthisis, of glanders, of anthrax, typhoid fever, and many more. These preparations were made and put up by Mr. Shattock, the Pathological Curator.

Lesions of Infectious Diseases.

The actual cultures are followed by specimens showing the effects produced by the various organisms when they find entrance to the living body. In many cases the organs or parts shown are from human beings who have died from infective diseases; in other cases the parts are from animals which have been experimentally inoculated. The diseases are illustrated in the following order, some such as Typhoid and Tuberculosis being much more extensively represented than others such as Plague and Leprosy :—

(1) Gonorrhea.
(2) Glanders.
(3) Plague.
(4) Acute Pneumonia.
(5) Acute Endocarditis (the commonest cause of valvular disease of the Heart).
(6) Cerebro-spinal Meningitis (a formation of pus is seen to have occurred beneath the membranes of the base of the brain).

(7) Anthrax.
(8) Dysentery (the form due to the Dysentery Bacillus).
(9) Hydrophobia.
(10) Typhoid.
(11) Diphtheria.
(12) Rhinoscleroma.
(13) Madura-foot.
(14) Actinomycosis.
(15) Leprosy.
(16) Tuberculosis.

Protozoal Diseases.

The diseases caused by Protozoa—the lowest of all animal forms—form a separate group. Syphilis is the commonest disease of this group; all the different lesions caused by it are illustrated—those of the skull, of the face, of the long bones, and of various organs. It will be seen that the child itself yet in the uterus may be infected. Many of the specimens of bone disease illustrating this fact were presented by M. Jules Parrot, the French physician who first drew attention to them.

Syphilis.

Jules Parrot.

Cysts.

The series of infective lesions extend a considerable way along the lower gallery of Room III, filling the North wall and several cases in the East wall. Then commence a series illustrating the various kinds of cysts which may form in the human body. Those of the neck are interesting because many of them are formed at the sites where gill-clefts are represented in the human embryo. The dermoid cysts are also worthy of note; their wall is formed by a skin-like membrane from which hair may grow. In some cases, in those found in connection with the ovary, they appear to represent the parts of an embryo.

Cervical Cysts.

Dermoid Cysts.

Benign Tumours.

Tumours of the body may be composed of bone, cartilage, fibrous tissue, fatty tissue, glandular tissue (adenoma), or of other normal structural elements of

the human system, and show no tendency to invade and replace surrounding tissue; malignant forms of tumour, such as cancer and sarcoma, on the other hand, invade and destroy neighbouring parts. Several cases along the East wall of the lower gallery of Room III are occupied by innocent tumours. Amongst such tumours are grouped warts, polypi of the nose and bladder, and certain gland-like tumours of the breast.

Cancer-Grafting.

In recent years much light has been thrown on the nature of malignant tumours, and the circumstances which increase or diminish their malignancy, by the experimental grafting of cancerous growths in mice and allied animals. Hence this section of the Museum commences with a large group of specimens which illustrate the results of experimental inoculation of cancer under various conditions. The destructive malignant growths set up by prolonged exposure to X-rays may also be seen in this group. The various forms of cancer and sarcoma, from which no part of the body is exempt, although certain parts and tissues are less liable than others, are extensively represented. The manner in which such tumours grow and spread and ultimately cause the death of the individual, the influence which their invasion has on neighbouring tissues, the diseases and degenerations to which they are liable, can only be mentioned here; for further information the visitor must consult the descriptive catalogue in the boxes attached to the gallery-cases.

Sarcoma and Cancer.

Calculi.

The various forms of calculi or stones which may be formed in the human body—in the bladder, kidney, gall-bladder, stomach, intestine, and appendix—are represented by a selected group in the section of General Pathology which has just been described. If the visitor wishes to examine further these remarkable morbid products of the animal body, he will find in the rail-cases

of the lower gallery of Room III, and in Sir Henry Thompson's cabinet mentioned when surveying Room II (see p. 21), the most extensive and varied collection ever brought together. A history and description of each specimen will be found in the "Catalogue of Calculi." There is a separate catalogue for Sir Henry Thompson's Collection.

Vesical Calculi.

At the present time calculi formed in the bladder, unless they are unusually large, are crushed and washed out, but at the time when the greater part of this collection was formed it was usual to remove them through an incision in the perineum, and, seeing that the use of anesthetics was then unknown, as rapidly as possible. The visitor, if he follows the arrangement in the rail-cases, and begins at the first case situated behind and to the left of Hunter's statue (the south-west corner of the gallery) will find in the second case (to the right of the first) a vesical calculus weighing 6½ ounces which was removed in 1737 by Cheselden (the leading London surgeon of his time) in thirty seconds. With the stone is placed a small case for it on which the grateful patient had the full history of Mr. Cheselden's feat engraved. Still passing to the right, the visitor will see a calculus which has been polished, set in gold, and worn as a brooch. The specimens in the first five cases—in the south end of the gallery—have a nucleus of uric acid. But in the fifth and succeeding cases calculi of varying composition and with diverse forms and often of great size are shown. In case 10, stones showing concentric strata of four different materials are exhibited. Oxalate of lime forms the nucleus of the tuberculated stones shown in cases 11, 12, and 13, on the eastern side of the gallery. In case 14 the rare calculi formed of Cystine and of Xanthine are shown. In cases 15, 16, and 17 are large calculi composed of phosphate of lime

Cheselden's Case.

Uric Acid Calculi.

and magnesium; others are composed of carbonate of lime. In Case 18 are exhibited large vesical calculi from the horse.

Gall-stones.

The calculi formed in the gall-bladder are shown in cases 19, 20, and 21, with dried specimens of the gall-bladder distended by calculous masses.

Salivary Calculi.

The calculi formed in the ducts of the salivary glands are shown in case 21.

Hair-Balls.

Hair, being indigestible, is apt to collect in the stomach if it swallowed in quantity—the movement of the stomach during digestion rolling it into balls. Ruminant animals which lick their skins are specially liable to be the subjects of such concretions. Cases 22 and 23 of of the rail-cases near the North-east corner of Room III, contain many varieties of hair-balls, several examples being formed in the human stomach. These concretions may reach a large size, one from the stomach of an ox being over one foot in diameter. Similar balls formed from vegetable hairs contained in the food are also shown. They are found often in the cæcum of the horse.

Vegetable Hair-Balls.

Bezoar Stone.

Several fine examples of the Bezoar—a calculus or concretion formed in the intestine of certain African and American Ruminants—are shown in case 24 at the North end of the gallery. At one time the stones were highly valued on account of their supposed medicinal virtues. The collection of calculi extends along the rail-cases on the North wall and in several on the West wall, the latter cases showing calculi formed in the urinary system of animals—many of them being of large size. The series concludes with specimens of Ambergris—a substance found in the intestine of the Sperm Whale.

Ambergris.

Diseases of the Ear. Toynbee Collection.

In the rail-cases on the Western side of the lower gallery of Room III, will be found a series of prepa-

rations, over 800 in number, made by Mr. Joseph Toynbee to illustrate the disease of the organ of hearing. Mr. Toynbee was one of the first surgeons to make the diseases of the ear a special subject of study. He died in 1866, leaving to the College this collection, with a descriptive catalogue, to which the visitor may refer if he wishes further particulars. Other preparations of the diseases of the ear are shown in the upper gallery of Room I.

Diseases of the Eye.

The remaining rail-cases on the west side of this gallery are occupied by a collection of eyeballs which have been enucleated on account of disease, and preserved because they demonstrate certain pathological features. At the time of writing, this collection and the catalogue attached to it, are undergoing revision. Diseases of the orbit are shown by specimens in the upper gallery of Room I.

Pathology of Special Organs and Systems.

Special Pathology.

The visitor, after examining the series illustrating the general principles of Pathology arranged round the lower gallery of Room III, may wish to see the diseases of some particular part or organ of the body. Unfortunately at the time of writing it is impossible to give the precise case and gallery in which each particular organ will be represented when the revision of the Pathological Collection is completed, but the labels on the shelves and cases and the assistance of the attendants will guide him to whatever section he may wish to consult.

Arrangement of the Special Pathology.

The Pathology of Special Organs commences in the lower gallery of Room I, where the following series are shown :—

Injuries and disease of Muscles.
" " " of Tendons.
" " " of Bursal and of Synovial Membranes.

Injuries and disease of Cartilage.
" " " of Bones.
" " " of Joints.

The Special Pathology Series is contained in the upper galleries of Rooms I and III.

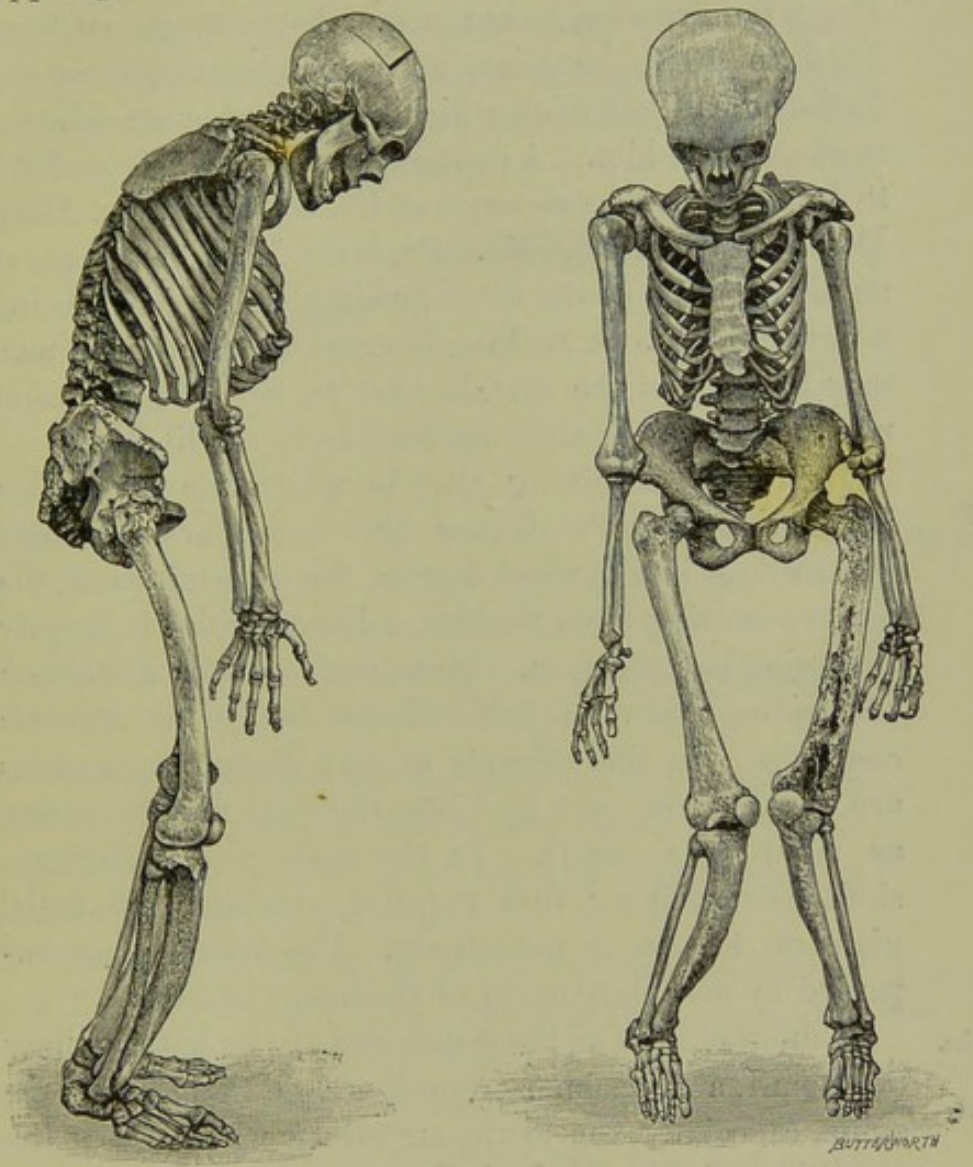


FIG. 7.—Two skeletons showing *Osteitis deformans*, the disease described by Sir James Paget.

Osteitis Deformans.

Only a few of the remarkable specimens in the lower gallery of Room I can be selected for mention here. In the cases at the South end of the gallery will be seen

two skeletons in which all the bones are greatly thickened, and so altered in structure that they no longer serve as adequate supports to the body. These skeletons illustrate the disease known as Osteitis deformans, first described by Sir James Paget in 1876. To Sir James Paget the Museum owes much. As a young man, from 1842 to 1849, he prepared a new catalogue of the Pathological Collection which has served as a model for workers after him. As a successful Surgeon, from 1878 to 1885, with the assistance of Dr. Goodhart, Mr. Alban Doran, and latterly Mr. Frederic Eve, he prepared another edition of the catalogue, the one which is being now re-written. A striking likeness of this eminent man may be seen in the marble bust by Sir Edgar Boehm now placed on the staircase leading to the library.

Sir James Paget, Bart.

In a case adjoining that in which the specimens illustrating Paget's disease are shown are skeletons illustrating, in a marked degree, the deformities of the bones resulting from Rickets, a disease which is happily becoming less common. Here, too, is shown a skeleton illustrating that remarkable disease known as *Myositis ossificans*. In the subjects of this disease the muscles are replaced in part by bone, the body thus becoming as rigid as a statue. In the same case is shown a skull exemplifying that peculiar condition of facial giantism known as acromgaly. The disease is accompanied by an enlargement of the hands and feet.

Rickets, Acromgaly, Ossification of Muscles.

In another case at the South end of the lower gallery of Room I, are specimens representing deformities of the spine, especially the acute curvature which gives the condition of "hunch-back," and usually results from tubercular disease affecting the bodies of the vertebral column. Here, too, are shown the thoracic skeletons of women whose bodies have been deformed by "tight-lacing."

Hunch-backs. The effects of tight-lacing.

Livingstone's broken arm and Bruce's broken rib.

In the series illustrating the healing of fractures will be seen two remarkable specimens. One is the cast of Livingstone's right humerus, crushed at an early part of his missionary career by the bite of a Lion. When the body was brought home there was some doubt as to its being really that of Livingstone. Sir William Fergusson set all doubt at rest by examining the right humerus, the cast here shown being made under his direction. The other specimen—a rib of Robert the

Fig. 8—Rib of Robert Bruce, King of Scots, showing a healed fracture.

Bruce—was obtained when his skeleton was disinterred in 1819. The fracture which is here shown in a healed condition was sustained in a "jousting" match during a visit to England in his youth.

Hydrocephalus.

In the cases at the north end of the lower gallery of Room I are specimens which illustrate the remarkable size the skull and head may attain in the subjects of Hydrocephaplus. The accumulation of fluid in the ventricles of the brain during childhood may lead to a great increase in the size of the head, the bones of the skull becoming greatly expanded and enlarged by an increased growth at their edges.

* These specimens are now placed in the Historical Series (p. 109).

Contents of the upper galleries of Rooms I and III.

The upper galleries of Rooms I and III, which are reached by the staircases placed at the North and South ends of Room III, are occupied by a continuation of the Special Pathology series, just examined in the lower

FIG. 9.—Skeleton of a child, showing a marked degree of Hydrocephalus. (See case at North end of Room I, lower gallery.)

gallery of Room I. The visitor will find case 1 in the south end of Room III, the first on his left hand if he enters the gallery at the South end of the room. The succeeding cases 2, 3, 4, etc. run along the West wall

until they reach the doorway leading to the upper gallery of Room I. On entering that gallery the visitor will, on turning to his left, find the continuation of the series, and after making the circuit of the gallery will again return to the upper gallery of Room III, where the order may be followed round to the point of commencement.

The injuries and diseases of the following systems and organs are represented :—

1. The Skin and Cutaneous Glands and Appendages.
2. The Brain, Spinal Cord, and Nerves.
3. The Organs of Special Sense.
4. The Alimentary Tract—the Mouth, Tongue, Throat, Gullet, Peritoneum, Stomach, Small Bowel, Cæcum and Appendix, Great Bowel, and Rectum.
5. The various forms of Hernia or Ruptures.
6. The Liver and Gall-bladder.
7. The Pancreas.
8. The Spleen and Lymphatic Glands.
9. The Thyroid.
10. The Pericardium, the Heart and its Valves.
11. The Arteries.
12. The Veins.
13. The Pleura, Lungs, Larynx and Air Passages.
14. The Kidneys and Ureters.
15. Supra-renal Glands.
16. The Bladder.
17. The Testicle.
18. The Prostate.
19. The Urethra and Penis.
20. External Genital Parts of the Female.
21. The Ovary and Oviducts (Fallopian Tubes).
22. The Pregnant Uterus.
23. The Female Breast.

It is manifestly impossible, in a cursory survey such as this, to do justice to so extensive a collection—one which seeks to illustrate as fully as possible the numerous and diverse injuries and diseases to which all parts of the human body are liable. Some of the more remarkable specimens may be cited.

Harlequin Fœtus.

In the "skin" series may be seen examples of children born with an armour-like skin, the condition known technically as Ichthyosis, but the subjects of it are usually spoken of as Harlequin fœtuses. Here, too, may be seen examples of epidermal horns and the extreme length to which the human hair may grow. A coiled lock of hair, removed from the head of an aged lady, measures 157 inches.

Hunter's Operation for Aneurysm.

Amongst diseases of the arteries, the condition of aneurysm, a saccular dilatation with thinning of the wall, is very extensively represented. In this series may be seen the arteries of the thigh and ham of the coachman on whom Hunter performed his operation for the cure of aneurysm in 1775 at St. George's Hospital. The improvement he introduced lies in the fact that he tied the artery, not at the site of disease, but high up, where the artery was healthy. Experiments made on animals assured him that the smaller vessels of the limb would dilate and take the place of the main artery so tied, and thus the blood would reach the limb by a new route, the tension in the aneurysm being, at the same time, relieved. The operation was successful. Another specimen shows the condition of the arteries in the lower limb of a patient who lived fifty years after Hunter tied the femoral artery for an aneurysm situated behind the knee.

In the same series is shown the silk-ligature with which Aston Key tied the subclavian artery of a man in 1823, this being the first occasion in which this operation was successful.

Leaving the specimens illustrating diseases of the heart and lungs to speak for themselves, a brief mention

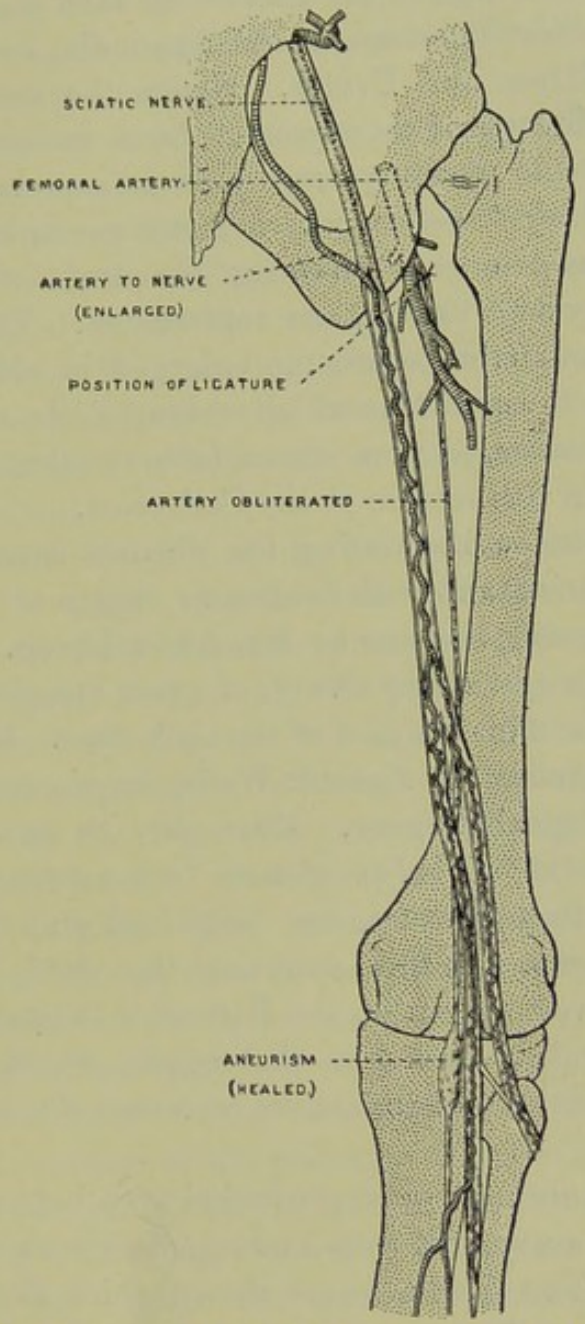


FIG. 10.—The first case in which Hunter performed his operation for the cure of Popliteal Aneurysm.

may be made of those parts and organs which, owing to the great improvement of surgical technique in recent

years, are now frequently and successfully operated on. These recent improvements have led to a great increase in our knowledge of the diseases of such organs as the Gall-bladder, Pancreas, Bowel, Appendix, and especially of the Kidney and Ureter. Hence the sections illustrating diseases of these organs have undergone great extensions in recent years. This is especially true of the "kidney" series, where many examples of renal calculi, and organs showing the destructive lesions caused by such calculi, are represented. The prostate, which is so liable to become enlarged in old men and give rise to conditions which endanger life and render it burdensome, is now successfully enucleated, as may be seen in this section of the Collection.

Gynæcological Series.

The section illustrating the diseases connected with child-bearing and with the female organs of generation is undergoing revision by Mr. Alban Doran.

Sir Spencer Wells.

A large cyst of the Ovary, of great historical interest, may be seen in this part of the Collection. It is the first one removed by Sir Spencer Wells, the pioneer of modern gynæcological surgery. Here may be seen numerous examples of "Tubal-pregnancy"—a condition so often fatal in former times, but diagnosed and relieved in recent years. In this condition the child, in place of being developed within the Uterus, is lodged in one of the two tubes leading to that organ, which sooner or later ruptures and endangers or causes the death of the mother.

Pubal-Pregnancy.

Ovarian Pregnancy.

The ovum may be impregnated even before it is shed from the ovary, and thus undergo development in that organ. Two specimens are shown which illustrate this condition. They were removed by operation. The gynæcological series terminates with preparations which illustrate the obstructions which may complicate the act of labour, not only in human species but in domestic and

other animals. One preparation shows a pregnant cat, undelivered because of a narrow pelvis. Another, a full-time monkey with the breach delivered (the breach is born first in apes), while the head is still impacted in the pelvis of the mother.

Diseases of the Skin.

In the rail-cases of the upper gallery of Room III. and in the corresponding cases of Room I is to be seen a very full exemplification of the Diseases of the Skin. The nucleus of this Collection was arranged, catalogued, and presented to the Museum in 1869 by Sir Erasmus Wilson, a scientific and successful physician, and one of the greatest benefactors the Royal College of Surgeons of England has ever had. Other donors have added to the Collection.

Sir Erasmus Wilson.

Diseases of the skin cannot be represented by actual specimens; their characteristic features disappear under all methods of preservation. In this collection they are represented by life-like preparations modelled and coloured by Baretta, the artist and modeller to the Saint Louis Hospital in Paris. A new edition of the Catalogue of the Dermatological Specimens was prepared by the late Dr. Radcliffe Crocker and Mr. J. H. Targett in 1895. The visitor should consult this catalogue for descriptions of the casts, models, drawings, and specimens in the Collection.

Exudative Skin Diseases.

The collection begins at case 1, which, as in the collection of calculi in the lower gallery, is placed at the South-west corner of the galiery—to the visitor's left if he enters the gallery by the staircase at the South end of Room I. To follow the order of the cases the visitor passes to his right. The group of diseases first exemplified are the Exudative—peculiar inflammatory disturbances of smaller or larger areas of the skin. In the first case are representations of Erythema, in case no. 2, Urticaria; nos. 3, 4, 5, and 6, Eczema; no. 7,

Eczema.

Impetigo contagiosa; no. 8, Herpes or Shingles; no. 9, Pemphigus; nos. 10 and 11, Psoriasis—with specimens illustrating the profuse manner in which scales of epidermis are shed in this disease; no. 12, Pityriasis; no. 13, Lichenplanus; no. 14, Dry Eruptions. At case no. 15 a new series commences—specimens illustrating hypertrophies of the skin, such as Ichthyosis, Scleroderma, Warts, and Horns (no. 16); Elephantiasis (no. 17); Rhinophyma—peculiar fleshy outgrowths on the Nose, no. 18.

Hypertrophies.

Lupus.

Atrophies and Degenerations of the skin are represented. Tubercular infections of the skin (Lupus, etc.) occupy cases 20, 21, 22 at the North-east corner. Then follows a full illustration of the diverse manifestations of Syphilis in the skin. This series occupies eight cases, nos. 23 to 31. Leprosy is shown in case 32, Keloids—curious growths which appear in scars—in case 33. Tumours and new growths of the skin occupy the remaining cases in this gallery. Amongst the most remarkable of this group are the cases where the skin becomes covered with stalked fibroid tumours. In the last case begins the series illustrating contagious diseases, small-pox being represented first. In this group (case 42) is shown a terra cotta bust (a votive offering) from Pompeii, on which the pitted scars of small-pox are plainly indicated. The series is continued in the upper gallery of Room II.

Syphilis.

Leprosy.

Pompeian Small-pox Bust.

Upper Gallery of Room II.

Passing into the upper gallery of Room II the visitor will find the Dermatological Series continued in case 43, to the left of the door-way. In that case and in the adjoining one (no. 44) drawings and models illustrating diseases in which the sebaceous glands of the skin are the parts chiefly affected. The diseases of the hair and nails are illustrated in cases 45, 46, 47, 48 and 49, Ringworm receiving particular attention. The parasite

and appearances of scabies (Itch) and other contagious diseases of the skin are also represented. The remaining cases along the West and South side of the gallery are occupied by accessory illustrations of Syphilis, Leprosy, and Lupus.

Drawings of Pathological Specimens.

In 1883, at the suggestion of Sir James Paget, it was resolved to form a collection of Original Drawings of Pathological Specimens. A part of this collection is exhibited in moveable frames and stands, designed by Mr. Johnathan Hutchinson, F.R.S. Amongst the drawings are many exemplifications of peculiar forms of disease which could not be represented by actual specimens. A still larger number are catalogued and stored in Room IV, and may be studied on application to the Conservator.

Collection of Entoza.

In the cases on the North wall of the upper gallery are displayed specimens of the various forms of Entozoa or worms found within the body, especially within the alimentary canal. The card catalogue attached to the collection will provide the visitor with the means of distinguishing the various forms. The collection was arranged, described, and catalogued in 1866 by Dr. Cobbold, who was then the leading English authority on the life-histories of this important group of parasites. The collection has been recently revised and re-catalogued by Dr. R. T. Leiper of the London School of Tropical Medicine. Many additions have been made.

SECTION VI.

Teratology.

Malformations and Monsters.

Under Teratology are included the malformations and monstrosities which have excited curiosity at all times. This collection occupies the lower gallery of Room II, and may be reached either by the staircase at the South end of Room III and along the lower gallery of that room, or by a doorway that leads from the lower gallery of Room I. The series commences in case 1, which the visitor will find on the left hand if entrance is made from the lower gallery of Room I.

Transposition of Viscera.

The first three preparations illustrate that curious condition where the viscera are transposed in position, the parts normally occupying the right side being placed in corresponding positions on the left. The cæcum and appendix occur in the left iliac fossa, while the heart-beat is felt on the right side.

Parasitic or Acardiac Fœtuses.

A series of shapeless skin-covered masses represent imperfectly formed children, which never are found alone in the womb, but always as companions of perfectly formed ones. They represent a twin of the perfect child ; but, owing to a developmental error, not yet perfectly understood, their circulation and nutrition are carried on by the placental circulation of the perfect child ; they are thus really parasites on the perfect child, and die whenever they are separated at birth. The condition is common amongst sheep, but human examples are not rare.

Imperfect formation of Twins.

In case 1 begins an extensive series which is continued along the five succeeding cases, illustrating various degrees and stages of fusion of two bodies in one, or, to express the matter more accurately, imperfect formation of two individuals out of one. Twins may be the result of the fertilization of two ova, or they may

result from the ovum separating to form two individuals at an early stage of development. The visitor can conceive that this imperfect division may occur in varying degrees: it may stop short when only the head end is divided, or only the hind end, or when both ends are separated but not the body. The line of division may occur so that the imperfect twins lie face to face, side to side, back to back, head to head, or hind end to hind end. On the first six cases, which extend as far as the doorway leading to Room III, all these forms will be seen amongst the specimens. Similar malformations are found in birds and mammals, including man, who is profusely represented in this series. In case 3 will be seen a model of the bond which united the Siamese twins; they were, compared to other specimens seen here, almost complete individuals.

Parasitic Twins.

In some cases of imperfect separation or division of the embryo to form twins, one individual may be so imperfectly developed as to form a living but useless and insensitive appendage on the body of the normally grown individual. A model of a Chinese lad in case 4 shows such a condition; so does the skeleton of the young heifer in case 1.

Included Twins and Teratoma.

In case 7, beyond the doorway leading to Room III, are some remarkable examples of twin formation. Preparation 172 shows the cyst removed from the abdomen of a child of 10 months in which was included the imperfect fœtus shown in No. 173. Nos. 174, 175, are the parts of a well-known case reported by Mr. N. Highmore in 1814. It was that of a lad aged 16, who died with an abdominal tumour (No. 174) within which the hairy-fœtus—an included twin—was found. Other strange forms of tumours—attached to the palate—also appear to represent imperfect attempts at twin formation (see case 7).

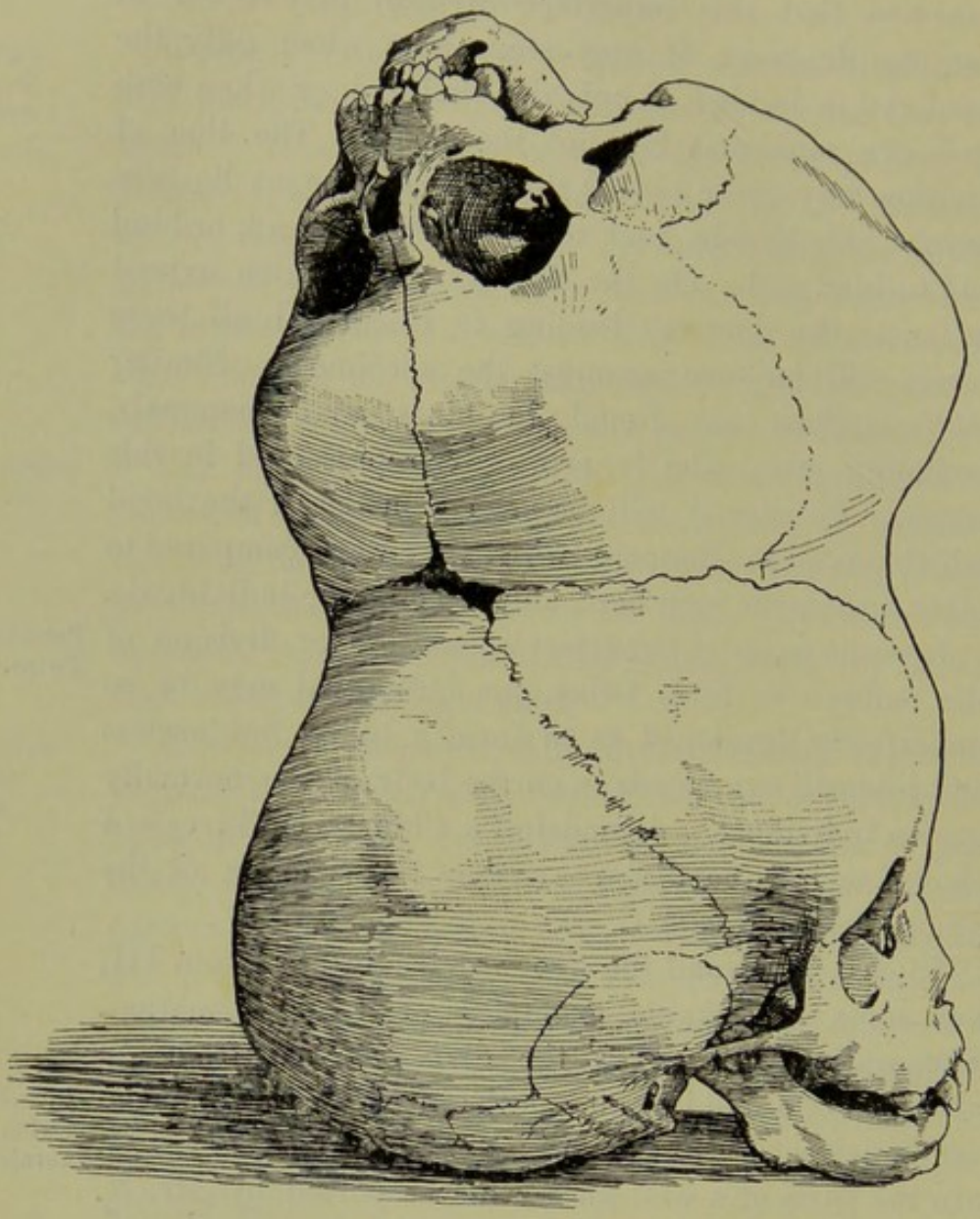


FIG. 11.—Hunterian specimen showing a peculiar form of Imperfect Twins. (See specimen No. 166.)

Hare-lip. Cleft-palate.

In the lower shelves of case 7 begin the series which illustrate the malformation of the individual parts of the body. The lips and the palate are the parts first represented. Hare-lip is due to imperfect fusion of the three parts which form the upper lip. Cleft-palate results from the non-union of the lateral partitions which separate the mouth from the nose. This series continues in the upper shelves of case 8.

Malformation of the face. Cyclops.

The development of the face is liable to many forms of disturbance. One or more of the five parts which go to form it may be blasted and atrophy, or one part, especially that which goes to form the nose, may grow out as a separate proboscis-like structure, leaving the two eyes and orbits free to fuse into one. A cyclops is thus produced. Such children rarely survive birth. This malformation is not uncommon in certain breeds of sheep, especially South Downs, many of the preparations shown being obtained from this breed. In other malformations, both of domestic animals and of children, the lower jaw has been stunted or completely arrested, or the whole face may be absent, only the ears and the hinder part of the head being formed. This series extends into and fills case 9.

Absence of Face.

Symelian Monsters.

In case 10, the last on the East wall, the visitor will observe many examples of children in which the lower limbs are fused so as to form a continuation of the body, thus giving these children the appearance of the mythical Sirens. The fusion is due to an imperfect development of the hind part of the body, the buds which form the lower limbs remaining unseparated and forming an apparently single, yet in reality a compound, structure.

Ectopia cordis.

In this case, too, may be seen examples of those remarkable cases where the heart is exposed nakedly in

front of the chest-wall, and can be seen beating during the short lifetime of such children.

The Brain and Spinal Cord.

In case 11 are specimens which show sac-like extensions of the membranes round the spinal cord and brain, and in some cases expansions also of the brain and cord. The membranous expansions on the back are known as spina bifida, while those from the head form meningoceles. They arise at a very early stage of development, and may be produced in chicks by hatching at too high a degree of temperature.

Malformation of the Body-walls.

Imperfect closure of the body-wall—chiefly at the region of the umbilicus—are shown in case 12. Several specimens are shown in which the body-wall is quite open and turned backwards over the spine (Nos. 373 and 373 A).

Supernumerary Digits.

Duplication and Division of parts are illustrated in case 13 by such forms as extra fingers, extra toes, duplication of horns, etc. In case 14 various degrees of arrest and development, or even of absence, of the limbs and digits are here shown. The numerous congenital malformations to which the feet are liable—club-fooot, and hollow-foot—are shown in the following case 15—the last in the South wall.

Abnormal Appendages.

A series of specimens in case 16 illustrate the various remarkable appendages—often like a median horn—which are found at birth on the heads of many animals.

Clefts and Fistulæ of the Neck.

Small openings and appendages may occur in the neck, and are formed at positions corresponding to the gill-clefts of fishes. These little openings may have an ear-like appendage, as is often seen in the goat. Sometimes a tooth is formed at the opening of the ear. Mr. Bland Sutton, who presented a specimen of this nature, gave the explanation that in such cases an accessory or second mouth has been included in such

ears. Specimens of hernia through the diaphragm and of malformations of the bowel, some of them showing diverticula due to a persistence of the yolk-sac, are seen in case 17.

Malformation of the Heart.

The malformations of the bowel extend into case 18, but this and the succeeding case are more remarkable for the very complete manner in which the congenital malformations of the heart are exemplified. Dr. Peacock, who was the leading authority on this subject, bequeathed his collection to the Museum. A large number of the malformations of the heart are due to an incomplete union of the right ventricle with the bulbus-cordis—a chamber of the heart which will be seen in the physiological series as a separate chamber of the heart of fishes.

Imperfect Sexual Organs.

Hunter was particularly interested in all imperfections of the sexual organs—especially in those heifer-like cattle known as "free-martins." All the preparations described and figured in his papers are here—in the series in case 21. They have been recently subjected to a microscopical examination, and although the parts of both male and female are equally represented and hence the animals are often spoken of as hermaphrodites, yet the sexual gland is that of the male although not incapable of forming the essential male element. Many remarkable deviations of form are shown—of the uterus—vagina—penis and other parts. Amongst them is the uterus of a woman killed accidentally. The right and left halves of the uterus are separate, and yet each of them is pregnant. Another preparation shows the pelvic parts of an individual in whom no trace of sexual organs was found. This individual was a cook and passed through life as a woman. The series ends at case 23, where numerous examples of included eggs—

shell lying within shell—and of double-yolks are shown.

Malformation in Plants.

The remaining cases of this Gallery (24, 25, and 26) are occupied by preparations illustrating anomalies of development in plants—abnormal division of branches, leaves, and buds and fruit, and substitution of leaf by flower and *vice versa*.

SECTION VII.

Room IV. Contents of Ground Floor.

Series of Comparative Osteology.

Returning to the ground floor of Room III, the visitor will find the doorway leading to Room IV, beyond the floor-case on the right hand of Hunter's statue (see plan p. 28). Passing through the doorway the visitor will find the first case of Comparative Osteology on the right. The series commences with a representation of the great Anthropoid Apes—the Chimpanzee, the Gorilla, and Orang. These are shown in cases 1 and 2. This series is really a continuation of the Anthropological series which was followed round Rooms I, II, and III, ending, so far as man is concerned, at the north-west corner of Room III. There is clearly a great break in the series, only partly made up by the discovery of the extinct Tertiary Javanese man—Pithecanthropus—represented in Room I by a cast of the skull (p. 12). Three articulated skeletons of the Chimpanzee are shown, both sexes being represented; but the difference between the male and female Chimpanzee is not much greater than between men and women, whereas in the Orang, and especially in the Gorilla, the male has very distinctly marked characters, being much larger, with greater temporal crests and larger canine teeth than the female. One of the

The Great Anthropoids.

The Chimpanzee.

skeletons shown was brought home from Africa in 1863 by the pioneer naturalist Du Chaillu, whose discoveries time has verified, and silenced the contemporary experts who maligned him. The skeleton shown (No. 1) was ascribed by Du Chaillu to the species or sub-species named by him *Anthropopithecus calvus*. In case 1 are shown casts of the head, hand, and foot of "Mafuca," a Chimpanzee which lived in the Zoological Gardens at Dresden forty years ago and was a subject of a prolonged and heated discussion as to whether she was a Chimpanzee or Gorilla.

"Mafuca."

In case 2 are shown the skeletons of three Gorillas, two of them being females and one male. The skeleton of the male (No. 20) was prepared from the specimen brought home from Africa by Captain Harris in 1851. It was the first adult ever brought to England and was the subject of Owen's classical memoir on the Gorilla. Du Chaillu brought the two other specimens home; they were purchased for the Museum in 1863. Numerous skulls and other bones are also exhibited.

Gorilla.

The Gorilla and Chimpanzee are natives of Equatorial Africa; the Orang, on the other hand, comes from Borneo and Sumatra. The skeletons of five animals are shown, three of adults (two males and one female), and two of young ones. A past Rajah of Sarawak, Sir James Brooke, and Dr. Charles Hose, a commissioner recently in the service of the Sarawak Government, have been liberal donors to this part of the collection. Here, too, is to be seen the skeleton of a young Orang (No. 48) which lived two years in the menagerie attached to the Exeter Change (it was situated off the Strand), and was presented to the Museum by Sir Everard Home, Bart., in 1819. The specimen (No. 48) was brought home by Dr. Abel, who wrote one of the earliest treatises on the Orang.

The Orang.

The Small Anthropoids.

The Gibbon, the most agile of primate acrobats and, from an anatomical point of view, the most interesting of Anthropoids, is shown in case 3. He serves to bridge the break between the great anthropoids and the ordinary apes and monkeys. His skull and brain are those of the monkeys but his body is formed on the model of the great anthropoids. Forms much like those shown here existed in European forests at the commencement of the Miocene period.

Old-World Monkeys.

The Old-World monkeys—the Catarrhini—begin in case 3 and extend into, and fill, case 4. In case 3 the skeleton of the *Entellus* or sacred monkey of India is shown and that of a corresponding form from Africa—the *Colobus*. In case 4 the Macaques, including the Barbary Ape, found also in Gibraltar, and the Dog-faced Apes, the Mandrill, etc. are arranged.

South-American Apes.

The South-American Monkeys are represented in case 5, a miscellaneous and diverse group which still perplexes the naturalist. The genus of Spider-monkeys (*Ateles*), which use their long tails as organs of prehension, are very different to the Squirrel-monkeys or Marmosets with which they are brigaded.

Lemurs.

The Lemurs, which serve to link the Monkeys with other mammalian forms, also occupy case 5. At one time widely distributed, as we know, from the discovery of fossil forms in many parts of the world, Madagascar now forms the centre of their distribution. They vary in size, the peculiar form known as Tarsius being little bigger than a rat, but in former times, as may be seen from a cast made from a fossil Lemur (*Megaladapis insignis*, No. B 299) described by Dr. Forsyth Major, they attained a considerable size. Those interested in the cranial forms of Anthropoids, Monkeys, and Lemurs, will find an extensive series of skulls in the floor case of Room IV—quite near the cases now being examined.

The Crania of Anthropoids and Monkeys.

Some fossil forms are included, two of which, although represented by the merest fragments, deserve mention. One is the cast of part of the upper jaw (No. A 19) of *Paleopithecus*, a large anthropoid, related to both Chimpanzee and Orang. The original of the cast shown was found in the Siwalik formation of India—belonging to a late Tertiary period. The other, a cast of the lower jaw, belonged to *Dryopithecus* (No. 36), a smaller anthropoid, allied to the Gibbon and also to the Chimpanzee, which lived in France in the Miocene period. The drawers of this cabinet contain collections for study by those interested in Primates.

Paleopithecus and *Dryopithecus*

The skulls and skeletons of Carnivora are shown in the remaining wall-cases along the South and East walls of Room IV. A special collection of skulls and teeth belonging to this order is also to be found in a cabinet in the adjoining room—Room V. The Carnivora are arranged in the following order :—Case 6, Lion, Leopard, and Cat, 321 A being an especially large skull of a lioness. No. 322 is the fragmentary skull of a cave-lion (*F. spelæa*) from Belgium.

The Carnivora.

Case 7, the smaller Felidæ, with many examples of skeletal parts of the tiger. The Sabre-toothed Tiger, an extinct form with a dagger-like canine tooth, of which examples have been found in England, is also represented in this case. The skeletons of many varieties of Dogs, of which additional skulls are shown in a cabinet in Room V, occupy cases 8 and 9. The Sable, Badger, Racoon, Otter, and Pole-Cat are shown in case 10, and the various forms of Bear in case 11, the skull of the cave-bear of Ancient Europe being particularly massive (No. 904, Hunterian). Here, too, is the skull of a Sloth-bear, shot and presented by H.M. King Edward VII when he returned from his visit to India in 1876.

The Sabre-toothed Tiger.

Sea-lion, Walrus and Seal.

In the cases on the Eastern wall—Nos. 12, 13, 14, and 15—are shown skulls and skeletons of Sea-lions, Walrus, Elephant-seal, Common Seal, and many other forms of aquatic carnivora. The manner in which their hind limbs are modified for swimming, as contrasted with Whales, is particularly worthy of notice.

Megatherium.

The floor space of Room IV is occupied by a group of the extinct gigantic Edentates of South America. The largest of these is the *Megatherium Cuvieri*—a form of sloth that apparently lived on the foliage of trees which were uprooted by its great strength and weight. The bones were obtained from recent tertiary deposits near Buenos Ayres and were presented to the College in 1841 by Sir Woodbine Parish. They were articulated at the College, missing bones being replaced by casts made from other skeletons. The bones of a closely allied animal, *Mylodon robustus*, were found in the same province about the same time, but in a more recent deposit. The parts were purchased by the College in 1841.

Sir Richard Owen.

The specimen last named was the subject of a classical memoir, in the year following its arrival (1842), by Sir Richard Owen, who was connected with this Museum as Assistant-Conservator and Conservator from 1827–1856. His bust in bronze, which the Council of the College commissioned Mr. Alfred Gilbert, R.A., to execute in 1893, in memory of the great services rendered to this Museum and to our knowledge of Comparative Anatomy, is placed in this room, near some of the animal forms he so successfully studied and described.

Two examples of the gigantic extinct Armadillo of South America (*Glyptodon clavipes*) also occupy stands on the floor space of this room. Unlike its small representatives of to-day its armour forms an unjointed carapace which shows a tesselated, artistically sculptured

covering of bone-plates. These specimens were also found in the Province of Buenos Ayres between the years 1840–1861, and were obtained by the College through Senor Don Juan N. Terrero, on whose estate they were found.

Megaceros hibernicus.

The large extinct Irish Deer—sometimes named the "Irish Elk"—is also given a place on the floor space of

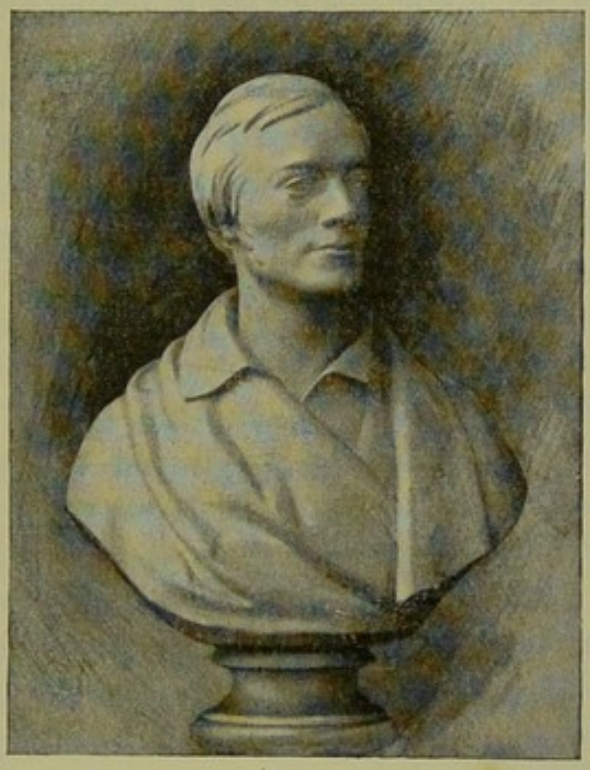


Fig. 12.—Richard Owen. Assistant and Conservator of Museum, 1827–1856. (From Bust in Hall of Museum.)

Room IV. The specimen was dug from a bed of shell-marl beneath a peat bog in County Limerick and purchased by the College in 1843. The span of the antlers is eight feet; the antlers and head weigh 76 lbs., the vertebræ of the neck being strengthened to carry this great weight.

Dinornis maximus.

Occupying a spacious floor-case near the large Irish Deer, is an accurately restored skeleton of the gigantic wingless bird of New Zealand—a form of Moa (*Dinornis maximus*) which was exterminated by the time New Zealand was discovered by Europeans. It was purchased by the College in 1896. With the restored skeleton, which is 9 ft. 8 in. high—measured from the head as now placed—are a cast of the brain and an egg. The egg is large, and the brain small—about the size of a small terrier's. Allies of this extinct bird are the Emu and Cassowary and the small Apteryx of New Zealand.

The Osteology of Fishes.

The contents on the ground floor of Room IV have been mentioned, all except those in the wall-cases on the North side of this room. It is now proposed to make a brief survey of these. They are a continuation of a series which commences in Room III, near its North end, and occupies the Eastern wall-cases of that room. It will be remembered (see p. 29) that in surveying the main groups contained in Room III, we saw that Hunter's aim was to show the series which linked the lowest with the highest animals. At the door of his museum he commenced therefore with the lowest forms —the Invertebrata. These were succeeded by the Fishes. Hence the visitor finds this series commencing near the entrance to Room III, the representative of the original Museum, and ranging along the Eastern wall until the doorway of Room IV is reached where the series, as it passes into that room, is succeeded by the Amphibia. It is beyond the scope of a brief guide to mention the great series which represents the class of Pisces; all the various orders of that class are represented along the Eastern wall-cases of Room III. The skeleton of a large male trout (22 lbs. in weight) caught in the Thames near Drayton Manor, and presented by Rt. Hon. Sir Robert Peel, Bart., is shown in case 13. Specimens of the teeth of fossil sharks,

collected by Hunter, are also shown in this case. Attention is drawn here to the more interesting specimens. In case 14 is a very truthfully articulated skeleton of a large Cod (No. 147 A), an excellent piece of workmanship by a former articulator to the Museum —Mr. James Flower.

Skeleton of the Cod.

The skeleton of a large Sword Fish (*Xiphias gladius*) is shown in case 16. It was captured in 1861 off Lowestoft, after having destroyed a large number of herring-nets. In the lower part of the same case is the portion of the bow of a South Sea Whaler (specimen numbered 251 C) which shows the force of the impact of such a fish. The "sword" has penetrated the copper sheathing, the felt, the deal and the hard oak timber to a depth of 14 inches, and snapped. The manner in which the *Teredo navalis* (ship borers) attack the exposed timbers of ships is also shown by this specimen. In this case is also shown a series of fish skeletons prepared and articulated by the late Professor Hyrtl of Vienna for the Exhibition of 1852.

The Sword Fish.

The force of its Impact.

Professor Hyrtl's Series.

In case 16 is shown the skeleton of the curious Angler Fish (*Lophius piscatorius*) with its over-developed head and large number of cephalic tentacles.

The Angler Fish.

The series of Amphibia begins in the first case on the visitor's left as Room IV is entered. The case is numbered 88, for we are now following the Vertebrate series towards the warm-blooded forms. In this case rests a large slab of New Red Sandstone from Storton Hill, Cheshire, showing the foot-prints of animals, some of five-toed web-footed reptiles, others like those of a small tortoise, and also well-marked impressions of fore and hind feet of a large Labyrinthodont animal. In this case is shown an example of the largest of living amphibia—the Japanese Salamander (*Sieboldia maxima*) which is represented by a complete skeleton. This is

Amphibia.

The Japanese Salamander.

preserved by being placed in a glass jar with spirit in order to show the large element of cartilage entering into its formation. Near it is the skeleton of a very large frog (*Rana boans*). In the next case, No. 87, is shown the skeleton of a Boa Constrictor (No. 602). Those wishing to make a special study of the Amphibia—one of the most interesting vertebrate groups—will find this class amply illustrated in the adjoining floor cabinet—the one already noted as occupied by the skulls of Primates.

Crocodilia.

In the succeeding cases, as far as the door leading to the conservator's office, is a very extensive series showing the osteology of the Crocodile (at all stages of growth), of the Alligator, Gavials, and Iguanas. Extinct forms are also represented.

Turtles and Tortoises.

Passing the door to the conservator's office, the visitor reaches cases on the North side of Room IV, devoted to the osteology of Tortoises and Turtles. The structure of the skull and carapace, of the limbs and pelvis of several large forms are shown in these cases. The skeleton of the Leathery Turtle (case 78), in which the true skeleton is completely separated from the dermal armour, affords a key to the osteology of the group.

Galleries of Room IV.

The upper and lower galleries of Room IV contain specimens belonging to the Physiological series and will be examined in due course. Access to these galleries can be obtained by staircases which open at the East end of Room V and at the South end of Room III. The upper gallery shows the parts connected with the function of sex; the lower is chiefly devoted to the exemplification of the organs of sense and of the skin.

SECTION VIII.

Floor Space of Room V.

Arrangement of Specimens.

On entering Room V by the doorway on the East side of Room IV, the visitor will find the two series traced through the latter room, the descending mammalian series on the right and the ascending reptilian series on the left, continued in the same order until they meet in the wall-cases at the distant (East) end of the room.

Skeletons of large Mammals.

Before following the systematic collection exhibited in the wall-cases, it will be convenient to glance over the group of whale skeletons which is swung from the roof of this room and the series of large mammalian skeletons which fill the floor.

Whales.

The visitor will remember that a specimen of the Greenland Right-Whale with four others of a smaller size were seen in Room III. The remainder of the collection is shown in this room. The skeleton of a male Sperm-Whale or Cachalot, one of the largest of animals and persecuted almost to extinction by the South Sea whalers, is suspended in the centre of the room, with ten examples of smaller kinds of whales forming a row of five on each side of the great central specimen. The skeleton of the Sperm-Whale (*Physeter macrocephalus*) measures 50 feet 1 inch long, its great skull making up one-third of the total length. The skeleton weighs 2½ tons. The specimen was captured off the coast of Tasmania in 1864, and was presented by a Fellow of this College, W. L. Crowther, Esq., of Hobart Town. The great hollow on the upper aspect of the skull is filled in life by an oily matter yielding the "spermaceti," which can hardly be described now as an article of commerce. The jaws of this predaceous whale are long, narrow, and set with peg-like teeth, altogether different from the great arched jaws

of the Whalebone Whale, examples of which (Hunterian) rise up from the floor-space at the distant end of this room. Sections of the jaw-bones of the Whalebone Whale may still be seen as gate-posts in many farms scattered along the east coast of England and Scotland.

The Study of Whales.

Hunter, the founder of this Museum, was the first to recognise that the whale tribe provided the most decisive and most instructive examples of modification and adaptation of structure which can be found in the animal kingdom. They are air-breathing mammals which in the process of time have become adapted to lead the lives of fishes. Hence Hunter, however, pressed for ready money at the time, never lost an opportunity of securing such specimens as were stranded on our shores. Two of the skeletons in this room are from specimens dissected by him. One of the skeletons (No. 2977—to the right of the Sperm-Whale) of the Grampus or Killer (*Orca gladiator*) was captured in the Thames in 1759. Several forms of this destructive, strong-jawed, big-toothed whale are shown. The other Hunterian Whale — subject of a memoir in the Philosophical Transactions of 1787—was captured in the Thames near London Bridge in 1783—ten years before Hunter's death. It is an example of the Bottle-nosed Whale (*Hyperoodon rostratus*—No. 2892) and occupies the second place in the row to the left of the Sperm-Whale.

Sir William Flower.

The investigation of whales commenced by the Founder was continued by Sir William Flower, who was Conservator of the Museum from 1862 until 1884, when he transferred his services to the National Collection at South Kensington. All the great examples were added in his time. Indeed, the arrangement of the Osteological specimens and groups now seen here is his work. The very excellent series of graduated

specimens of bones, seen in glass cases on each side of the floor of this room, is a triumph of his knowledge and skill. Of these cases, more anon.

Antlers and Horns.

Before passing from the Whales to the serried ranks of skeletons on the floor, attention may be directed to certain specimens attached to the rails of the lower gallery of Room V and also of Room IV. On the rail-case of the lower gallery of Room V, just over the doorway to Room IV, is a remarkable Hunterian specimen. Two heads and antlers of the American Elk are locked together. They were found so, and tell the story of a forest-fight ending in the starvation and death of the combatants. Other specimens of horns and antlers are seen in the gallery of this room and also Room IV ; others will be seen presently in the wall-cases with the skulls to which they belong. Those who are interested in such animal structures will find the chief collection displayed on the staircases which lead up to the galleries of this room—at the north and at the east doorways (see plan, p. 28). Hunter prepared many specimens to show the growth and shedding of antlers and horns (see p. 87).

The Skeletons of large Mammals.

The skeleton of "Hafed," a favourite Deerhound of the late Sir Edwin Landseer, R.A., greets the visitor as he enters from Room IV, at the head of the phalanx of skeletons. Near by is the skeleton of a Walrus, presented by General Sabine. Over the glass case to the visitor's left as he enters is the skeleton of that massive animal, the Elephant-Seal—a present which R. H. Mansel, Esq., and Captain R. C. Pack brought from the Falkland Islands in 1881. It is almost 16 feet long.

Nilotic Crocodile.

On the glass case beyond the Elephant-Seal is the skeleton of a large and old Crocodile of the Nile, shot and presented by the Hon. P. F. Berkeley in 1877.

It is out of its proper place, being too large to share the wall-case in Room IV, where others of its kind are shown. This animal, now the subject of study by placid anatomists, was at one time the terror of the inhabitants of a stretch of the valley of the Upper Nile (near Silsilis). The nature of its diet may be inferred from the fact that the ear-rings of a boy, the hoofs and halter of a donkey were part of the contents of its stomach when shot.

Amongst the skeletons on the floor may be seen that of a female Tiger which was presented by H.M. King Edward VII. The tiger from which the skeleton was prepared was the first to fall to his gun, when, as Prince of Wales, he made a tour of India in 1876. Near

"Orlando." by is the skeleton of the famous race-horse Orlando —a gift to the College from H.M. Queen Victoria. He died in 1868, 27 years old ; he won the "Derby"

The Giraffe. in 1844. The skeleton of the Giraffe is that of an animal which lived for more than twenty years in the Zoological Gardens. He died from a hæmorrhage on the brain (apoplexy), his brain being preserved in the physiological series in the gallery. Amongst the larger skeletons may be noted that of a Tuscan Bull ; the Rhinoceros of India with its single horn. The larger skull (No. 2154), placed with this specimen, is that of the nearly extinct White Rhinoceros (*R. simus*) ; the smaller skull belongs to the common African form.

Elephants. The Elephant's skeleton is that of a famous individual of the Indian species, known in his day as "Chunee." He arrived in England in 1810, and by his exemplary behaviour won the favour of the public which frequented his home in the Menagerie of the Exeter Change (off the Strand) until 1826, when he ran amok, partly on account of an annual paroxysm connected with his sex and partly on account of toothache. The

massive teeth of the elephant, deeply socketed and richly supplied with vessels and nerves, when diseased, must awaken demons of pain. It took over 100 musket and rifle bullets fired by a detachment of infantry to relieve Chunee of his agony. But that was in 1826, before the days of the high velocity bullet. Several elephant skulls surround the skeleton of Chunee. One was presented by the London and East India Dock Company in 1909. Three circumstances make it remarkable:—(1) It is one of the largest elephant skulls ever seen; (2) it shows that during life—perhaps in a fight with some other rival in an Indian jungle—the socket of one of its tusks was broken and partly healed; (3) it was found deep in the Thames mud during excavations to enclose the East India Docks, where it was probably pitched by an early trader who was disappointed to find no market in England for such specimens. Near by are the skulls of the African variety, and in the neighbouring wall-cases may be seen sections of skulls which explain the invulnerability of the elephant to low velocity bullets.

Large Skull of Elephant.

The survey of the contents of the floor-space of Room V has broken the thread of the Museum's story. To take up the Mammaliam series which began with the Primates and ended with the Carnivora in the wall-cases of Room IV, the visitor should return to the doorway by which he entered Room V. On the right, as the room is entered, will be found case 16, following the last case, 15, in Room IV. In this the series of hoofed mammals begins. A series of teeth of the Ox, to show the order of eruption and wear with age, may be examined. The various breeds and species of the Ox and Buffalo are shown. Remnants of the extinct forms of Ox which abounded in England and Europe in the Quarternary Period—*Bos primigenius*—are

Continuation of the Mammalian Series.

The Hoofed Mammals.

shown. A skull of that curious variety of South American Ox (the Niata), described by Darwin in the 'Voyage of the *Beagle*,' may be seen here. This specimen, with many others of great value, was given to the Museum on his return from an epoch-making voyage. In case 17 other species of Ox, Bison, and Buffalo are shown, some of them being from remains of fossil animals found in working the brick-earths of

Sheep.

Essex and Kent. Various forms of wild and domesticated Sheep, of the Musk-Ox and of Goats, existing and extinct, are represented by the skulls, horns, and skele-

Antelopes.

tons of cases 18, 19, and 20. In case 21 the Antelopes commence, and are continued in cases 22, 23, and 24, many of the specimens being trophies brought home by sportsmen from Africa and Asia. In case 24 the Giraffe is also represented and remains of that curious extinct ungulate related to the Giraffe—the *Sivatherium* (see No. 1429). A cast of the skull of the *Okapi Johnstoni*—named after Sir Harry H. Johnston, K.C.B., its discoverer—is shown in case 25.

The Deer.

Many skulls and parts of Deer occupy the same case, and are continued in the succeeding cases, 26, 27, and 28. In these there are finely cut sections showing the structure of the antlers and the manner in which they are shed. Other specimens demonstrate the fact that castration arrests the growth of antlers (Nos. 1557–1567). The Elk or Moose is represented in case 28

Alpaca, Llama, Camel.

by a fine head from Sweden (No. 1627). The Alpaca, Llama, and Camel are grouped in cases 29 and 30. With them ends the series of hoofed animals that chew the cud.

The Pig and its Allies.

In case 31 begins another series of Ungulates—the Pig and animals allied in structure—the Hippopotamus, and certain extinct forms, such as *Anthracotherium* (No. 1724) and *Anoplotherium* (Nos. 1718–21) from

the Lower Miocene of France, which are represented by casts presented by Baron Cuvier in the earlier part of the 19th Century. Baron Cuvier.

It is opportune here to draw the visitor's attention to four flat cases which are placed in a row in front of the wall-cases he is now examining. He has already passed two of them, marked by the letters H and G. In those two cases are set out the smaller specimens belonging to the series he is now examining. In case H he will find the skulls, skeletons and fragments of the smaller carnivora, both living and extinct. Case G contains specimens belonging to the Ungulate series, several of Baron Cuvier's gifts being placed in this case. The Floor Cases.

In case 34 begins the series illustrating not only the Osteology of the Horse, but its history as represented by extinct forms, such as *Hipparion, Mesohippus, Protorohippus* (No. B. 1955). *Hyracotherium* and *Phenacodus* (No. B. 2011). In the flat case opposite will be found a remarkable specimen—the tooth (No. 2013) of an extinct variety of South American Horse (*Equus curbidens*). The specimen was found by Darwin, during his famous voyage in the 'Beagle,' and was the first evidence that the horse, which was extinct in S. America when the continent was discovered by the Spaniards, had existed there at a late geological period, with *Mylodon* and *Megatherium*, parts of which Darwin found with the horse's tooth. Specimens 2223–2229 were also presented by Darwin. They are parts of *Toxodon*, a new genus of fossil ungulates discovered by the donor, some distance from Monte Video. The exemplification of the Rhinoceros and of its many extinct varieties—some of them found in England—has its place in cases 35, 36, 37, and also in the adjoining flat case. Amongst these is a fine skull of the Woolly The Horse and its Allies. Darwin's discovery of the Horse in S. America.

Rhinoceros. A skull of the single-horned variety was one of the trophies which fell to the gun of H.M. King Edward VII in his Indian tour of 1876. The varieties of rhinoceros horns are very fully illustrated in case 37. Another of the double-horned species was presented by Sir Joseph Banks, for forty years President of the Royal Society and a friend who supplied Hunter with many valuable specimens.

Osteology of the Elephant.

The various forms of Elephant, both existing and extinct, are represented in cases 38, 39, 40, 41, 42, 43, 44, and 45. Specimens will be seen which illustrate the growth of the skull, the development of the honeycomb arrangement of air-cells, adding so much to the strength and massiveness of the skull, the eruption of the teeth, and the structure of the tusks. Parts of the Mammoth (*Elephas primigenius*) (Nos. 2384, 2385), of the extinct Mastodon of America (No. 2567 etc.), and many other extinct forms, such as *Dinotherium*, may be examined in these cases. In the rail-cases of the lower gallery of this Room are two specimens of the

Mammoth hair and skin.

skin and hair of a Mammoth preserved entire by being embedded in a stratum of mixed soil and ice, in the North of Siberia, where it was discovered by a Tungusian hunter in 1799. The specimens were presented by Sir Joseph Banks in 1808.

Dugong and Manatee.

The succeeding cases, 45 and 46, are occupied by the skulls and skeletons of another order of large mammals—the Sirenia. The Dugong and Manatee are vegetable-feeding animals, adapted for an aquatic existence. In case 46 there is the cast of a form of

Rhytina Stelleri.

Manatee or Sea-Cow—*Rhytina Stelleri*—which is now extinct. It was still alive when Behring discovered the straits which retain his name, and provided food when his second expedition was wrecked in 1741. By 1768 the genus was extinct—killed for its oil and flesh.

The adult animal measured over 25 feet from snout to tail.

The Whales.

Passing the door leading to the galleries in the East end of Room V, the visitor reaches a group of cases (47, 48, 49, and 50) set aside for the osteology of the smaller forms of Whale, the larger forms being suspended from the ceiling of this room.

The Narwhal.

In case 47 is shown a collection of the long, peculiarly twisted teeth of the Narwhal or Sea-Unicorn. In other forms, such as the Sperm-Whale and the Grampus, as may be seen from numerous specimens now surrounding the visitor, the teeth are not only retained, but have undergone a very remarkable increase in number as compared with other mammals. In other forms the teeth have disappeared, being replaced by epidermal, or whalebone plates, of which sections are shown in the lower gallery of this room. In the Narwhal two teeth have persisted—in the upper jaw—usually regarded as canines. In the females these remain dormant in the jaw (see No. 2944), but in the male the left tooth shoots out to form an ivory spear—a dangerous weapon of offence—from which this form of whale is sometimes known as the Sea-Unicorn. The various forms of Dolphin and Porpoise also find their natural place in these cases among the whales.

Teeth of Whales.

The Rodents.

In the first case in the North wall (No. 51) and in the adjoining flat cases are exhibited the skeletal parts of the Order of Rodentia—the rabbit, hare, rat, woodchuck, etc. They also share the next case with the Insectivora—the hedgehog, mole, etc. The delicate skeleton of the smallest known mammal (*Crocideira Etrusca*) may be seen in the flat case (A, 3341), a gift of F. W. Lucas, Esq., in 1895.

The smallest Mammal.

The Edentates.

The Edentates, of which order the great extinct

forms of Sloth—*Mylodon* and *Megalotherium*—seen in Room IV are members, find their systematic representation in cases 53 and 54. The skeletal parts of modern ant-eaters, sloths, armadilloes, are shown side by side with the numerous extinct forms which belong to this order.

Darwinian Specimens.

Mention has been made of various specimens presented by Darwin—trophies of his voyage in H.M.S. 'Beagle' (see pp. 78, 79). In the Edentate cases and in the flat case (D) are a number of the important fossils—the first traces of certain extinct species and of genera of extinct Edentates—discovered by Darwin in South America. They include parts of a new form of *Mylodon* (*Mylodon Darwinii*), of *Megatherium*, and a new genus, *Scelidotherium*, all of which he handed over to Owen and to this Museum for investigation and description (see Nos. 3443, 3445, 3446, 3506–22). The College also owes to Darwin the specimens of the extinct South American genus *Toxodon* (see case 37, Nos. 2223–2229).

Marsupials.

Many of the specimens gathered in Australia during Captain Cook's first voyage were presented to Hunter for examination. Hence some of the earliest specimens of the remarkable pouched animals of Australia to reach England are to be found in this Museum. The Marsupialia, with the Monotremes—the very lowest of Mammalian forms—occupy cases 55 and 56 and the adjoining flat case (D).

The Boxing Kangaroo.

In the latter may be seen specimens of the recently discovered form of Marsupial mole—*Notoryctes*—presented by Prof. E. C. Stirling, of Adelaide University, in 1890. In wall-case No. 55 is preserved the fine skeleton of a large Kangaroo (No. 3699 A, *Macropus rufus*), which received a large share of public favour for a few years owing to its prowess in the boxing-

ring. The skeleton was presented to the Museum in 1893 by P. D. Coghill, Esq. In some of the Marsupials the teeth are adapted for a carnivorous diet, such as in the Thylacine or "Tasmanian devil," the largest of the carnivorous forms, and now nearly exterminated by the settlers because of the ravages made on their flocks.

Osteology of Birds.

The series illustrating the Osteology of the Birds begins at case 57 and extends along the North wall, almost to the end of the room, the series terminating at case 71. The birds are at once the most highly specialised, most beautiful, and, from a zoologist's point of view, the most puzzling of vertebral forms. Their relationship to reptiles is not at first apparent; but in the adjoining floor-case (B) will be seen winged and feathered fossil forms—Pterodactyles—which clearly show how closely birds and reptiles are related. The class Aves contains the most diverse forms. In the opening case of the series—wall-case No. 57—will be seen the small and delicate skeletons of the Humming-Birds; in the final case the bones of the extinct gigantic Moa, with the skeletons of allied forms—the Ostrich, Emu, Rhea, and Cassowary. A description of the Osteological collection of birds is impossible here; it occupies a large volume (Vol. III of the Series of Comparative Osteology) which Dr. Bowdler Sharp, a leading authority on the classification of birds, prepared for the College in 1891.

The Dodo.

Some of the more important specimens in these cases deserve mention. In case 58, near the Pigeons, to which it is allied, the visitor will find an articulated, but imperfect, skeleton (No. 701) of the Dodo, an extinct bird, of which scanty remains have been found in the Island of Mauritius. Some casts of the skull and other bones are shown in the adjoining floor-case.

The Solitaire.

Close by are placed the skeletons of a male and female Solitaire (*Pezophaps solitarius*, Nos. 706, 707), a flightless bird, now extinct. The specimens were brought from the Island of Rodriquez by Mr. H. H. Slater, who was attached to the expedition which visited that island to observe the Transit of Venus in 1874. The birds of prey are shown in case 58. In the succeeding cases are arranged the Parrots, the Pelicans, Frigate-birds, Darters, and their allies (case 59); the Herons and Storks (cases 60–62), including a specimen of the very rare Boat-bill (*Balæniceps rex*); the Ducks, Albatross, and Petrels (case 63); the Penguins, Terns, and Gulls, including a Hunterian specimen of the Great Auk (case 65, No. 1605); the Divers, Rails, Bustards, and Cranes, with a model of the skull of the remarkable fossil bird (*Phororhacus*) recently discovered in Patagonia (case 66); the Game-birds (case 67).

The Ostrich and Allies.

In the last few cases (68, 69, 70, and 71) will be seen specimens of the Ostrich, the Rhea, the Cassowary, the Apteryx or Kiwi, and other members of the order formerly known as the Cursores. While the wings have become useless for flight, their legs have become specially developed and strengthened for running. The skeleton of a young Emu preserved in spirit (No. 2342) shows the great size attained by this bird two days after being hatched.

Æpyornis.

The gigantic size of *Æpyornis*, an extinct bird, of which remains are found in Madagascar, may be inferred from the cast of the leg-bone and foot shown in case 70. Other specimens illustrating the Osteology of Birds are displayed in the adjoining flat case (C). Amongst them may be mentioned a cast of the fossil bird (*Hesperornis*) from the chalk-formation. Here, too, will be seen the curious manner in which the

trachea, or wind-pipe, of storks is coiled on the breast-bone, and the peculiar inner structure of the bill of the Hornbill.

Gigantic Fossil Reptiles.

The remaining cases on the North and West walls of Room V, beginning at No. 72 and ending at No. 76, where the series is continued into Room IV (already examined, see p. 72), are examples of the great reptilian forms which have lived in distant geological periods of the earth's history. Some specimens are also shown in the adjoining floor-cases A and B, those in the former case being skeletons of modern smaller reptiles. From the labels on the specimens and a reference to the Catalogue, the visitor will be able to glean all the information which relates to this part of the collection.

The Evolution of the Skull.

Before leaving the floor-space of Room V, the visitor is strongly recommended to examine the very wonderful series of specimens set out by Sir William Flower (see p. 74) to illustrate the evolution of the various parts of the vertebrate skeleton. In case 1, placed on the visitor's left as he enters Room V, are shown preparations of the skull, beginning with that of Man, and linked up by intermediate forms—Anthropoid Ape, Lemur, etc.—with the very lowest vertebrate cranial forms. The mandible and tongue-bone (hyoid) are also represented by separate series.

Vertebræ.

Case II illustrates the modifications of the vertebræ—the characteristic parts of the higher Animal Kingdom. The series is continued into Case III, which also shows the modifications of the breast-bone. The sternum, or breast-bone, of birds is highly modified by their power and manner of flight; they are grouped in Case IV.

Breast-bone.

Ribs and Shoulder-bones.

The series is continued in Case V, on the opposite side of the room. Here are shown the various forms of ribs, collar-bones, shoulder-blades, and humeri—all duly labelled, so that their modification in the various

members of the Vertebrate Kingdom are easily recognised.

Fore-arm and Hand.

In Case VI one of the most interesting parts of the series is shown—viz., the modification of the bones of the hand. The hand of Man retains a large number of the primitive parts; whereas in the Horse an extensive degree of specialization has been reached, the evolution of which is shown in ancestors of the Horse. Dissections of the fore limb of the foal show vestiges of some of the missing digits.

The Lower Limb

In Cases VII and VIII, which bring the visitor again towards the door leading to Room IV, are shown the evolution of the various parts of the lower extremity—the pelvis, the thigh-bone, the bones of the leg, tibia and fibula, and the bones of the foot. Here, again, the high specialization of the horse's foot is demonstrated. It should be noted that the specimens are arranged with the human form as the first of each series. This has its advantages as well as its drawbacks, because in some cases Man is a mammalian type and in others he is a most aberrant member.

SECTION IX.

Physiological Series.

Having thus finished a survey of the Osteological Collection, the Guide now begins a brief survey of the largest and most characteristic section of the Museum—that which Hunter rightly named the Physiological Series. The form of a part of the body, or of an organ, interested Hunter only in so far as it helped him to understand its function. Since Hunter's time Function, as a subject of Biological Investigation, has been largely neglected by anatomists, who have been carried away

by the study of Form (Morphology). There are signs, however, of a return to Hunter's point of view.

The Galleries of Rooms IV & V.

The Physiological Series, including upwards of 10,000 preparations, is arranged in the galleries of Rooms IV and V. The galleries may be reached by three staircases—one at the South end of Room III, one at the North side of Room V, and a third at the East or furthest end of Room V. If the last-mentioned approach is taken the visitor will find the commencement of the Physiological Series on the left as the lower gallery is entered.

The Skeletal System.

The first or "A" section of the Physiological Series, which extends along cases 1, 2, 3, 4, and 5, illustrates the various methods by which living organisms are provided with a supporting or skeletal system. These methods, as the specimens show, are very diverse in plants and the invertebrate animals, such as sponges, corals, etc.; but in the vertebrate forms cartilage and bone become the chief means of providing a means of support and movement.

Growth of Bone.

The manner in which bone is nourished is well shown by the femur of a young Ostrich, in which the vessels of the periosteum, or protecting membrane, are injected (case 4, A. 85, Hunterian *). The growth of bone is illustrated by Hunter's preparations of the growing antlers of the fallow deer (see case 4). The leg-bones of the domestic fowl (A. 78) show the results of an experiment made by Hunter to discover how bones grew in length. He implanted lead pellets in the leg-bones of a growing pullet, and found at a subsequent period, when the fowl was killed, that although the bone had greatly increased in length, the pellets, now deeply imbedded

* Hunterian preparations may be recognized by their *black* numbers; specimens added after Hunter's time are inscribed with *red* numbers.

in the bone, remained the same distance apart. He inferred that bones grew in length at their ends only. Numerous preparations of human fœtal and growing bones from the human body are also used for illustration (see case 5).

Joints.

Section B, which extends along the next four cases of the South wall—from Nos. 6 to 10—illustrates the various methods in which movement or growth is made possible by the establishment of joints, and the various methods in which joints are safeguarded and parts supported by means of ligaments. The rope-like elastic ligament in the nape of the neck, which helps to support the weight of the head, is shown in a preparation from the sheep (B. 9). The evolution of joints is illustrated by sections of the cartilaginous spinal column of sharks. The plate of cartilage in the articulation of the lower jaw is illustrated by a large example from a young whale (B. 58).

Muscular System.

Section C, occupying cases 11, 12, 13, 14, 15, 16, 17, 18, and 19, illustrates the arrangement and mechanism of the system which gives the individual a power of movement. In the more highly evolved types this function is subserved by a specialized system —the muscular ; but in the lowest forms movement is a property of living protoplasm. The series commences

Sensitive Plant.

with Hunterian specimens which illustrate reflex movements in plants—as in C. 6, a sensitive mimosa. Preparations showing the complicated muscular system which lines the tunic of the sea-cucumber (C. 12), the retractors of the foot-plate of the freshwater mussel (C. 31), the muscles which move the quills and skin of the Hedgehog (C. 80), and those which endow the python with its gliding movement by acting on the ribs (C. 116), may be instanced as illustrative specimens. The series ends by preparations of the musculature of the anthropoid apes.

All the preparations of Sections A, B, and C are fully

described in the 'Catalogue of the Physiological Series,' vol. i. 2nd edit., 1900, prepared by the late Conservator, Professor Charles Stewart, F.R.S.

The Nervous System.

Series D illustrates the evolution of the Nervous System—of the Brain and the Spinal Cord. It is one of the most extensive and most representative of all the sections in the Museum, and extends along the eastern side of the lower gallery of Room V as far as the doorway leading to Room IV, occupying eleven cases, from Nos. 20 to 31. Amongst the most beautifully dissected and instructive specimens of this Series are those executed by the Assistant-Conservator, Mr. R. H. Burne, to show the nervous system of Invertebrate animals. The dissections of the nervous system of the King Crab (D. 20), of the Scorpion (D. 21), and of a large Spider (D. 22) in case 20 may be instanced. Primitive stages in the evolution of the brains of Vertebrates are seen in the Fishes and Amphibia as a number of nerve-masses or ganglia. In Reptiles, Birds, and Mammals the nerve-masses connected with the olfactory organ begin to predominate in size and become the cerebrum of the higher forms. Attention may be drawn to preparation No. D. 161, a section of the head of the tufted Polish fowl, in which the brain is extended into the base of the feathered crest on the crown of the head; and to D. 89, showing the purely membranous cerebral roof of the cod.

Evolution of the Brain.

The Brain of the Polish Fowl.

Mammalian Brains.

The variation in the size, shape, and pattern of the mammalian brain is extreme, and yet all conform to a certain type. The massive and highly convoluted brains of the elephant (D. 391) and of the whale (*Balænoptera musculus*, No. D. 523) are shown here, as well as the diminutive brain of the rat. The gap between the simple brain of the lemur and the highly evolved brain of man is bridged by scores of intermediate links (see cases 27, 28, 29, and 30).

Brains of Primates.

Brains of Idiots.

The brain development of the great anthropoids—the Orang, Gorilla, and Chimpanzee—is represented by over 20 preparations. Near them are placed (in case 22) the brains of two microcephalic idiots (Nos. D. 683, D. 683 A), which in several points, besides that of size, show a certain degree of resemblance to the anthropoid. The mean weight of the human brain is about 1315 grammes (47 oz.), whereas these weigh only 355 grammes, about the same as that of the Chimpanzee. The microcephalic brains have been fully described recently by Mr. Macnamara.

Brain of a famous Mathematician.

The brain of the famous mathematician, Professor Charles Babbage, is also placed in this series (No. D. 685). Sir Victor Horsley has recently published a full description of it in the 'Philosophical Transactions.' Many more brains of men with specially developed faculties must be preserved for investigation before any definite statement can be made as to a relationship between any particular part of the brain and the manifestation of a particular faculty.

Casts of the Brain Cavity.

Some of the most interesting specimens of this series are shown in the adjoining rail-cases. In the rail-case No. 24 is shown the cast of the cranial cavity of a huge mammal—*Dinoceras*—known from fossil remains found in the Eocene formations of the United States. It was about the size of an elephant, but its brain is less than one-third in size.

Round Brains, Long Brains, Deformed Brains.

The globular brain of a short-headed Turk, described as a type by Huxley, and the elongated form with which he contrasted it, are shown in the rail-cases Nos. 698, 701. 704 A and 704 B show the cranial casts of the normal Peruvian brain contrasted with the deformed. Clearly the brain is greatly altered in shape, but its functions appear to be unaffected.

Here, too, is shown a cast of the brain-cavity of Dean Swift, of mediocre size and common shape, quite unlike the products of the brain which the cast represents. Casts of the brain-cavities of the Neanderthal man, the Gibraltar woman, and of the Galley Hill man—very ancient inhabitants of Europe—may be compared, to their advantage, with similar casts of the native Australian and of Bushmen. The brains of Bushmen, Chinamen, Negroes, and other races, may be examined on the shelves of gallery-case 30.

Dean Swift's Cranial Cast.

Preparations of the spinal cord and its membranes occupy case 31. The cord of the giraffe is shown in a specially long glass jar.

The Spinal Cord.

The preparations in this section are described in vol. ii. (1902) of the 'Physiological Catalogue.' It is largely the work of Professor Elliot Smith, F.R.S., a leading authority on all matters relating to the anatomy of the brain.

Catalogue of the Nervous System, Vol. II.

Entering the lower gallery of Room IV from Room V the visitor will find the commencement of a new section in the third case (No. 35) on the left. Section E comprises the organs for receiving and transmitting impressions of Touch, Taste, Smell, Hearing, Sight, and other sense-organs of unknown nature. Nerves, both for sensation and movement, are illustrated by the preparations in cases 32 and 33.

Organs of Special Sense.

In case 34 begins the series of tactile organs. The preparations of the duck's beak (E. 21), the bill of the Australian Platypus (E. 22), the lips of the sheep (E. 34), and the trunk of the elephant (E. 2) illustrate well the rich nerve-supply of parts specially endowed with tactile sensibility.

Tactile Organs.

Preparations of the tongue of various animals in case 35 illustrate the peculiar papillæ in which the nerves of taste begin. Numerous specimens of tongue

Taste and Smell.

are also shown under Section J. The organs of smell show many modifications in the Animal Kingdom. The preparation E. 171 is the dissection on which Hunter, when assistant to his brother William, demonstrated the distribution of the olfactory nerves. The various forms of the external nose are also illustrated, specimens E. 208 (Proboscis Monkey), E. 209 (the Gibbon), and E. 210 (the Gorilla) being specially worthy of note.

The Organ of Hearing and Equilibrium.

The organ of hearing in Vertebrate animals arises in connection with the organ which regulates the equilibrium of the body—the semicircular canals. Hunter began the investigation of these structures in fishes in 1760, when he went as an army surgeon to Belleisle, and made many dissections and preparations. One of them (E. 224) shows the semicircular canals of the skate. The opening of the duct which leads from the

The Internal Ear.

internal ear to the surface of the head (seen well in E. 238, E. 239, preparations from the Fox-Shark) was first discovered by him. The open condition is seen at an early stage of the human embryo. The late Conservator, Professor Stewart, added many beautiful dissections showing the modification of the canalicular balancing system of fishes. The cochlea which contains the organ which changes sound-waves into nerve stimuli arises in connection with the system of semicircular canals. Its beginning is seen in fishes (see E. 239). Lately a series of transparent preparations of the semi-

Dr. Albert Gray's Preparations.

circular canals and cochlea (organ of hearing) in a representative collection of land Vertebrates has been presented to the College by Dr. Albert Gray. No finer examples of anatomical technique are to be seen in the Museum. They occupy the greater part of case 41. Preparation E. 334 A is that of a man who was a deaf mute ; the internal ear is normally formed ; the cause of the deafness lies in the brain.

In some fishes the swim-bladder comes in connection with the ear (see preparation of the bream, E. 274, and herring, E. 277). Hunter's preparations of the ear of the Porpoise and other Cetaceans are particularly worthy of note.

Organ of Sight.

The modifications of the eye occupy cases 43 to 45. The various parts of the eyeball are shown by dissections—the transparent cornea which allows free entrance to light, the lens which focuses the rays, and the sensitive retina, in which the nerves of sight commence. The outer coat of the eye (sclerotic) is enormously thick in some sharks, and particularly in whales (see Nos. E. 1090, E. 1143). The atrophied condition of the mole's eye is shown in preparation E. 1187. The protective and the tear-secreting mechanism is illustrated in cases 45, 46, and 47.

Lateral Line Organs.

In the last-named case are shown very clear dissections of certain curious sensory organs of fishes, the meaning of which is not fully known at the present time.

The Skin: its Modifications and Glands.

The preparations illustrating the various forms of body-covering found in the Animal Kingdom occupy the cases on the North side of the lower gallery of Room IV. They form Section F, and commence at case 48 (to the right of the door leading to the gallery of Room III) and end at case 59, near the door leading to Room V. The remarkable manner in which the crab sheds its external covering or shell is shown in F. 22. 1. The little crab shown here lived three years, and shed its shell thirteen times. The manner in which feathers are developed, grow, and moult are illustrated by Hunterian preparations in case 50. The structure and pigmentation of the human skin are illustrated in case 52. The modification of the body-covering to form Nails, Hoofs, Spurs, and Horns may be examined

Renewal of the Crab's shell.

Growth of Feathers.

Nails and Hoofs.

in cases 53 and 54. The skin is modified for the protection of the individual in many ways. F. 411. 1 shows a butterfly (*Kallima inachis*) mimicking a leaf, F. 419. 1 the manner in which the plumage of the Ptarmagan is altered to its surroundings in summer, autumn, and winter. How such adaptations are effected cannot be demonstrated as yet.

In the next case is a representative series of Butterflies from Africa, Oceania, and Tropical America, illustrating the complex facts of the kinds of mimicry described by Muller and Bates.

Sexual and Protective Secretions.

The glands of the skin—sebaceous, wax, and sweat—may be modified so as to secrete odoriferous or lubricating substances. As may be seen from the preparations in Cases 58 and 59, these glands may be situated anywhere on the body, but their usual situation is in the neighbourhood of the anus (as in the beaver, skunk, civet, &c.). Special glands in the cleft between the hoofs of Ungulates are fully exemplified.

PoisonGlands.

The manner in which the hind limb of *Platypus* (the Australian Duck-bill) is furnished with a poison-spur and gland is shown in F. 547. 1. In the same case, No. 59, a dissection shows the poison apparatus of the Rhinoceros viper.

Luminous Organs.

Entering the lower gallery of Room V again, the visitor finds on the left some of the most remarkable adaptations of the animal body. Here will be seen parts of the animal body modified to form luminous organs in some and electric organs in others. In case 60, the first on the left, are seen Hunter's dissections of the electrical organ of the Torpedo (the electric ray, *Torpedo galvannii*). The columnar structure of the organ and the massive nerves which regulate it are well shown. Hunter's selection of the electrical organ as a subject for investigation is another example of his

A Beetle and its Lantern.

Luminous and Electric Organs.

genius of seizing on those manifestations of Nature which are most likely to provide the key to the problem of life. In recent years it has become clear that the electrical reactions of living and working tissues provide the most delicate means of investigating the phenomena of life.

In the adjoining rail-case are set out twelve models showing the anatomy of the electrical ray and of its special organ. They form one of the most realistic and accurate studies ever made in the anatomy of an animal. They were given to Professor Owen in 1850 by His Imperial and Royal Highness the Grand Duke of Tuscany, and are the handiwork of Calamai, at that time a professor in the University of Florence. It is unnecessary to explain these preparations; a full description is attached to each.

Calamai's Models of Torpedo.

The first preparation of the series (G) now being examined shows two South American beetles of the species *Pyrophorus noctilucus*. On the upper surface of one are seen two yellow spots which emit during life "a bright lambent light." The other or ventral surface of the second specimen shows a more powerful organ which is seen only during flight.

In the following five cases—from 60 to 64—is shown the wonderful manner in which corresponding parts are modified to suit the animal's mode of life. The contents of these cases form Series H. The specimens are arranged in the following groups :—

Modifications of the Body in connection with Locomotion, etc.

(1) Adaptations for creeping.
(2) Walking and running.
(3) Leaping.
(4) Climbing.
(5) For seizing or holding (see suction-discs of tree-frog, H. 81).

(6) For burrowing.
(7) For floating and swimming.
(8) For flying.
(9) For anchorage and fixation.

Reserve Stores of Food.

The various methods by which food-material is stored by the tissues of the body are illustrated by the specimens grouped in the next case under the Series I. Fat,

Hibernating Gland.

marrow, spermaceti, and the remarkable hibernating gland of the hedgehog and the corresponding structure in the human fœtus, are shown in this section.

Alimentary System.

Having surveyed the structures concerned in the movements of animals—the bones, joints, and muscles, the structure concerned in regulating these movements —the nervous system, and the covering of the body, the visitor now enters on one of the most extensive sections of the Museum, Series J, in which the structures concerned with the preparation, digestion, and assimilation of food are exhibited. The series commences with

Capture of Food.

illustrations of the modification of the mouth, lips, tongue, and teeth for the seizure of food (cases 66–72). The darting thread-like tongue of the chameleon (No. 1453 A) and the whip-like tongue of the ant-eater (No. 1502 D) may be instanced as illustrative specimens.

Teeth.

Hunter, as is well known, was the first to study teeth in a scientific manner; during his conservatorship Owen greatly extended our knowledge of their morphology. Although their growth and structure are illustrated here, it is better to postpone their description until the visitor reaches the Odontological Collection in Room VI (p. 110).

Egg-eating Snake.

The peculiar habits of the Egg-eating Snake (*Dasypeltis palmarum*) are illustrated here. No. 446 A *a* shows a snake with an egg in its gullet; 446 A *b* is a dissection to show the vertebral processes which project

into the gullet and serve to break the shell. The contents are swallowed, while the broken shell is returned by the mouth.

Vestigeal teeth of *Platypus*.

Here, too, is placed the preparation of the palate of a young duckbill, showing the two teeth which are later replaced by horny pads, recalling the horny beak of birds. No. 381 shows the curious manner in which the teeth are hinged to the jaw of the fishing frog.

Palate, Salivary Glands, and Tongue.

Passing cursorily along cases 69, 70, 71, 72, 73, and 74, noting a specimen here and there illustrative of the salivary glands, the cheek-pouches of apes, and the multiple modifications of the tongue, the visitor reaches the organs concerned with digestion. The assimilative properties of roots, and the modification of the leaf, as in the pitcher-plant, to form an organ of digestion, form the opening illustration. Darwin showed that these plants die if they are so caged that insects cannot reach them. The evolution of the alimentary canal is then traced through the classes of Invertebrates to the most complicated mammalian form—the stomachs of ruminants. This series is undergoing a re-arrangement.

Stomach.

Leaf-stomachs.

Stomach of the Gillaroo Trout.

In the group illustrating the stomach of fishes will be seen a specimen of the Gillaroo trout (No. 501 B). The stomach of this trout was the subject of one of Hunter's papers. It is formed rather like a bird's gizzard, in order that it may break and grind down the small shell-fish on which this Irish trout feeds.

A Gull's Gizzard.

In case 77, beyond the doorway which breaks the case-series on the North wall, are placed the stomachs of amphibia and reptiles; in the two following cases those of birds. No. 523 is the gizzard of a gull which Hunter fed with grain—a food foreign to that animal. The muscular walls of the stomach have become hypertrophied in grinding down the resistant husks. To assist the grinding action of the stomach certain birds

swallow stones. A collection from the stomach of the Ostrich is shown in No. 533 E. The preparation is one given by the first Conservator, William Clift, F.R.S.

Mammalian Stomach.

Five cases (79–84) are occupied by preparations showing the form and structure of the mammalian stomach. In nearly all two parts can be recognized—the saccular part for the reception of food, and the thick-walled muscular pyloric part in which the food is ground down. The stomach is separated from the duodenum by a sphincter muscle at the pyloric orifice. A good example of the complicated ruminant stomach is seen in No. 555 A. The cells for water storage in the camel's stomach are shown in preparation No. 567. They are formed in the wall of the second cavity or reticulum.

The Small Intestine.

Cases 85, 86, and 87 show the structure of the small intestine in various orders of animals. The villi which line the small intestine and increase its surface for the absorption of food are especially well seen in the intestines of Tortoises (see case 86) and in the intestine of the Rhinoceros, in which the intestinal blood-vessels are well injected (see case 87).

The Cæcum and Appendix.

The remaining cases of the lower gallery of Room V (Nos. 88, 89) are filled with preparations of the Cæcum and Appendix. The evolution of the Cæcum commences in the Amphibia; it is simply the beginning of the great intestine, being marked off from the small by a muscular sphincter. In birds (see case 87) there is a double structure; in mammals it is single. In some forms, as in man, the anthropoids, lemurs, and in some rodents and opossums, the apex of the cæcum is narrow and tubular, and forms a worm-like appendix to the cæcum. In the monkeys the appendix is represented by the conical apex of the cæcum. Although the function of the appendix is still obscure, there can be no doubt that it does play a part in the animal economy.

Rail-cases of the Lower Gallery, Room V.

Some of the contents of the rail-cases have been already indicated (see pp. 90, 95), but mention must be made of the dried preparations (Hunterian) showing the vessels of the lung and kidney in the southern cases and other dried preparations of stomach, cæcum, &c. In the rail-case at the East end is shown an extensive collection of the small bones of the ear—the malleus, incus, and stapes. The collection, which is provided with a separate catalogue, was brought together and arranged by Mr. Alban Doran when Assistant in the Museum (1873–1877). As far as is possible the specimens have been grouped in the rail-cases to correspond with the structures in the adjacent gallery-cases.

Mr. Alban Doran's Collection of the Ear Ossicles.

Upper Gallery of Rooms IV. and V.

Cæcum (*cont.*).

When the visitor enters the upper gallery of Room V by the staircase at the Eastern end of that room, the series illustrating the anatomy of the cæcum will be found continued in the first case on the left. In case 2 are shown specimens of the terminal part of the alimentary canal.

Rectum an Cloaca.

The Liver.

The series illustrating the form and anatomy of the pancreas and liver begins at case 3 and extends to case 7. The gall-bladder is also shown in the same series. It is absent in some animals, such as the horse and elephant, and in several forms of birds and fishes. On the other hand, a Hunterian preparation (No. 820) shows three gall-bladders.

Thyroid, Thymus, Adrenals, and Spleen.

In cases 8, 9, 10, 11, 12, 13 are illustrated the various forms of ductless glands. All are concerned with the formation of secretions which regulate the growth of metabolism of the body. The thyroid and the adrenals vary much in position and arrangement, but are probably very similar in function. Many of

the preparations of the Thymus were made by Sir Astley Cooper.

Circulatory System.

Hunter continued his researches on the Blood, the Heart, the Blood Vessels, and Lymphatic Vessels throughout his busy life. In this system are found what pleased him most, a series which carried him from the very simplest forms—where there was no special blood-pump, or heart, to the complicated four-chambered heart of the mammal. The series commences with the blood system of invertebrates and passes rapidly on to a survey of the modification of the heart in fishes. It is in this class (see case 15), specially in the various sharks, that the most instructive form of heart is to be found. The specimens illustrating the amphibian, reptilian, and unmammalian forms of heart are clearly modifications of such a type of heart as is seen in the sharks.

Whale's heart.

In case 17 may be seen a specimen of a whale's heart and preparations of its enormous valves. Casts of the left ventricle and specimens of the bone found in the heart of larger mammals are shown in cases 17 and 18. The casts of the ventricles show the curious manner in which its walls are "rifled"—recalling the similar arrangement in the barrel of a gun.

Plexus Mirabile.

In cases 19 and 20 may be seen preparations of the fine plexus of arteries (plexus mirabile) in the limbs of lemurs, and the turgid plexus of capillaries within the chest-wall of the Seal, Manatee, and other aquatic mammals. The circulation of the gills is fully elucidated in the Respiratory Section.

Veins and Lymphatics.

The series of valves which prevent the backflow of blood in the veins are well shown by preparations in case 20. The preparations of injected lacteals of the intestine and of the lymphatic system of various organs, show that the anatomists at the end of the 18th century

had command of a more perfect technique than their successors of to-day.

Gills & Lungs.

It is essential for animal life that oxygen be taken in and carbonic acid thrown out from the system. Gills can carry out this exchange by means of circulating water, and lungs by circulating air. In some forms both gills and lungs are present. The various modifications of these structures are shown by preparations in cases 22, 23, 24, 25, and 26. No. 1032 shows the injected filaments of a Cod's gill (Hunterian) ; 1061 D, the accessory breathing organ of a Climbing Perch ; 1044 B, the gills and lungs of a Mud-fish (*Ceratodus*) ; 1076 B, the tracheal tubes of a Water-beetle larva ; 1100, the simple saccular lung of a Toad (Hunterian) ; 1118, the more complex lung of a Crocodile ; and 1133 A, the richly injected vessels of the lung of the Manatee. In some animals the lungs are much divided (see 1134 AC). In case 26 are shown injected preparations of the air-sacs attached to the lungs of birds—structures which Hunter was the first to investigate experimentally.

The Syrinx Larynx.

In cases 28, 29, 30, and 31 the evolution of the larynx is exemplified. The Syrinx, a curious modification of the lower end of the trachea in birds, for the production of sound and song, is represented by many dissections.

Laryngeal Air-sacs.

The curious air-sacs, of obscure functional import, developed in connection with the trachea in reptiles (see case 28) and with the larynx in mammals—especially in primates—are in this part of the collection (see case 31).

Kidneys and Bladder.

Life is attended with the production of certain waste products, which, in order that life may continue, must be eliminated from the blood. The main organ for the excretion of such products is the kidney. No organ, as may be seen from the preparations in cases 32, 33, 34, undergoes a greater evolutionary change in shape and

position than the kidney. The bladder is better developed in the amphibia and mammals than in other vertebrates. In case 35 are many finely executed dissections of the human bladder, made by the late Professor Pettigrew, F.R.S., when anatomical assistant in the Museum.

Reproductive System.

The preparations planned and executed by Hunter to illustrate the methods of propagation and organs of reproduction are sufficient to constitute a museum in themselves. Here they can only be mentioned—a treatment altogether unequal to their merits. The

The Male Organs.

series commences in case 36 by illustrating asexual reproduction, and passes quickly on to specimens illustrating sexual reproduction by male and female parts placed in the same individual. Then follows in cases 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, and 51 of the upper gallery of Room IV a very complete demonstration of the male organs—testes, ducts and organ of impregnation throughout the animal kingdom. Attention may be drawn to the Hunterian series showing the sexual changes in the testes of the

Testes of the Sparrow and Mole.

sparrow : Nos. 2457 to 2462, case 42. The testes are at their minimal size in January (No. 2457) and at their maximal size in April (No. 2461). A similar series of the mole is shown in case 44, Nos. 2505–2509. In cases 49 and 50 are shown many fine injections of the semeniferous tubes of man and some remarkable specimens of the external organ of the Negro.

Female Organs.

The series illustrating the female organs of generation commences at case 51, and extends into case 61 on the West side of the upper gallery of Room V—the first case on the left as that gallery is entered from Room IV. No. 2659, showing the thousands of eggs in the ovary of the Lamprey, may be mentioned ; so, too, the preparations of the ovaries and oviducts of the Common

Fowl (2730) and the genital organs of the female Marsupial Mammals (cases 55 and 56). The sexual organs of women complete this section.

Products of Generation Development.

In this section, which commences at case 62, the visitor again encounters Hunter's marvellous faculty for demonstrating the ingenuity of Nature. In no part of the animal kingdom is there such a wealth of examples of adapting means to ends as in the provisions made for the safety and nourishment and the development of the young. The series, as usual, commences with the methods of securing perpetuation in plants, and passes quickly on to invertebrate animals, the means adopted by bees for the safe developement of their young being profusely illustrated (see cases 63, 64). No. 2970 shows a piece of the skin of the Reindeer with a nest for the larva of the "Breeze-fly." Then, again, the formation of the chitinous cases round the young of the Rays receives full attention, and the development and absorption of the yolk-sac in the free swimming young of the Shark family. The modification of the lower end of the oviduct in a Shark to form a uterus in which the young are developed and nourished, foreshadows an adaptation which receives its fullest development in the higher mammals (see No. 3263 A*a*).

The nest of the Breeze-fly.

The Yolk-sac of Young Dog-Fish.

Uterus Development in a fish.

Transformation of *Pseudis*.

In case 68 is shown a series which illustrates the transformation of *Pseudis* from a thick-tailed newt-like amphibian to a frog-like shape. The Hunterian preparations Nos. 3293, 3294 demonstrate the manner in which the skin on the back of the Surinam Toad becomes a spongy mass, in which the ova hatch and assume the form of the parent in miniature. The formation of the egg in Turtles, Tortoise, Lizards, and Crocodiles and Fowls, and the hatching and form of the young are shewn by numerous preparations placed in cases 69, 70, and 71.

Surinam Toad.

The Eggs of Lizards and Birds.

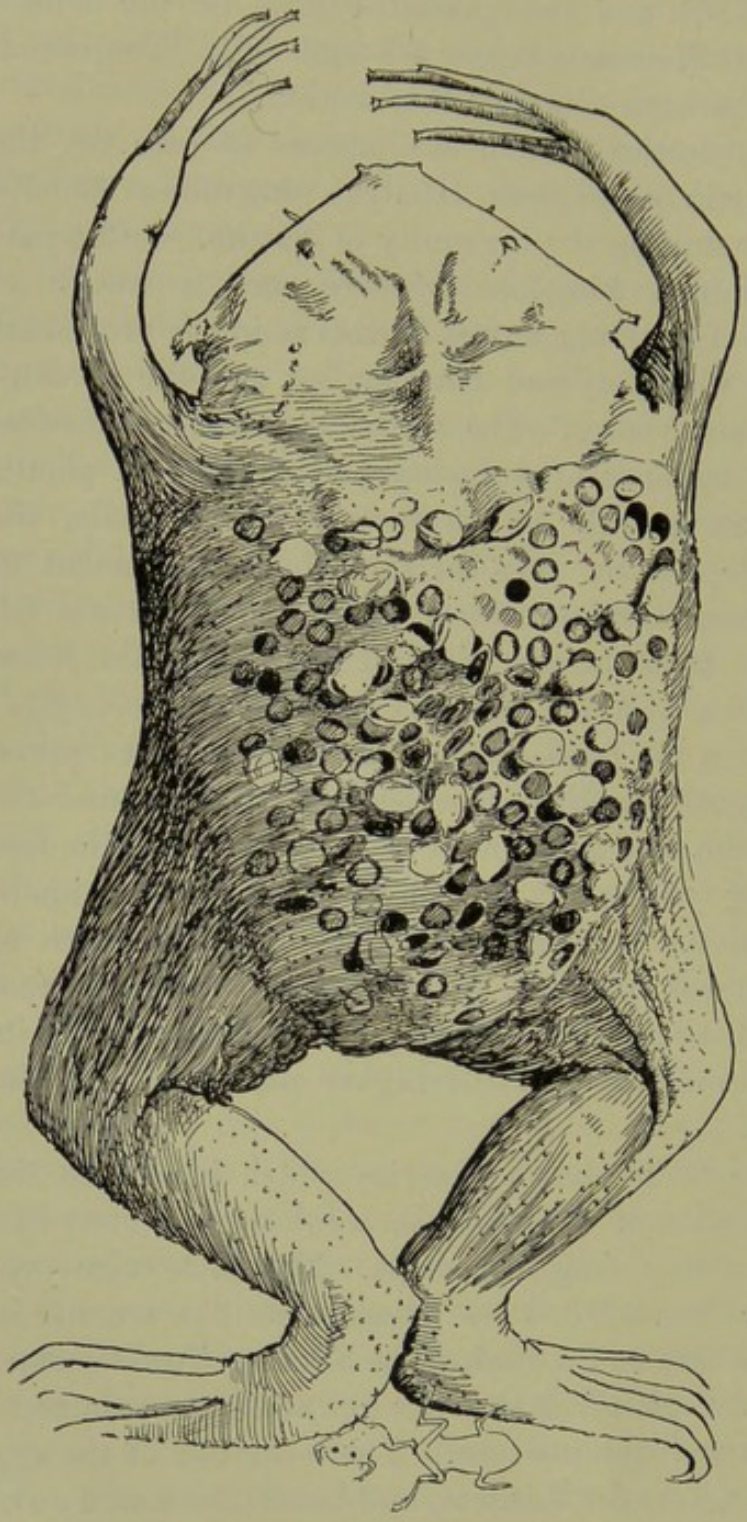


FIG. 13.—Surinam Toad, showing the manner in which the young are developed in nests formed in the skin of the back.

The Placenta.

In case 72 begins the exemplification of placentation —the peculiar adaption by which the young of mammals are enabled to draw the means of life from the circulation of the mother. The structure of the placenta was an early subject of study with Hunter ; the quarrel between him and his brother William in later years was connected with certain observations on the structure of the placenta. The anatomy of the various forms of this structure are shown in cases 72, 73, 74, 75, 76, 77, and 78. Two specimens showing the young of the Chimpanzee at the later stages of fœtal development are shown in case 76 ; such specimens are very rare.

Fœtal Chimpanzee.

Fœtal stages of Human growth.

Stages in the growth of the human embryo and fœtus are represented by the preparations in case 79. The fœtus of the Negro (3668), although only in the fifth month of development, already is distinguished by its black pigmentation. In many of the younger human ova shown here the embryo has been arrested in its development by pathological processes.

Quartettes & Quintettes.

Preparations showing multiple pregnancies are placed in case 79 ; in one preparation (Hunterian) 5 fœtuses were born at one time ; in another, there were four.

Fœtal adaptation.

Life within the egg, or womb, necessitated many alterations in the structure of the young. These adaptational changes—affecting the heart, the lungs, the bladder, and many other parts—are shown in case 80.

Nourishment of the Young.

In cases 81, 82, and 83, are structures or adaptational changes concerned with the nourishment of the young—such as mammæ, etc. The manner in which the young are protected by nests, by being carried on or in various parts of the body, are also illustrated. A small fish from the Nile (*Tilapia Nilotica*), No. 3786 A, carries the ova and hatched young in its pharynx.

Sexual Characters.

In the remaining cases of the upper gallery of Room V illustrations of the sexual characters are shown—characters which are not developed, or, if developed, disappear when the sexual glands are excised. Sexual characters reach their most distinctive manifestations in Birds; hence many of the examples shown belong to that class. Nuptial colouring is represented by the Drake and Duck (V 20).

Owing to changes in the sexual gland, the female may assume characters of the male (see tail of Pea-hen, V. 26). The effects of castration on the horns of Sheep are shown in No. V 34 and V 36.

Commensalism and Parasitism.

Preparations showing the various methods in which living forms may enter into partnerships in their modes of living constitute the last section of the Museum. The following instances may be cited :—

A Caterpillar infested and finally replaced by a fungus : X 48 a.

The colon of a Lemur infested by Echinorhynchus : X 50.

A mouse infested with jiggers : X 52.

A crab with a parasitic cirripede attached to its abdomen.

SECTION X.

Annexes of the Museum.

Instrument Room.

Surgical Instruments.

The frequent gifts of instruments used in past times and by famous surgeons, and the desire to illustrate the history of surgical technique, led in 1875 to the formation of a collection of instruments. The collection is shown in a separate room at the East, or further, end of Room V. The passage leading to the collection opens in the first flight of the Eastern staircase. The collection is supplemented by a manuscript catalogue.

Reducing Dislocation of the Shoulder.

The visitor will find on the right, before entering the room, a remarkable chair and apparatus formerly used for reducing dislocations at the shoulder-joint.

Window case.

The collection commences in the case placed under the windows, at the end towards the visitors' left as the room is entered. Here will be found the instruments used by the past surgeons, arranged in the following groups :—

A. Instruments used in operations on the Eye.
B. " " " " Ear.
C. " " " " Nose.
D. " " " " Mouth and Throat.
E. " " " " Thorax.
F. " " " " Abdominal Organs.
H. " " " " Female Organs.

The series just named are placed in the window case.

G. Instruments used for operation of the Male Uro-genital system : an extensive collection shown in a case at the right hand, on entering the room.

I. Instruments used in Amputation, placed in case on the East wall (to the left on entering the room).

K. Instruments for operations on Bone (in the same case).

L. Tourniquets, etc., for operations on the vascular system.

M. Instruments used for plastic operations.

N. Instruments used for the extraction of bullets.

Microscopes.

O. Scientific instruments used for clinical research form: Section O :—Here are shown two microscopes—one designed and made by Professor Quekett, Conservator of the Museum (1856–1860), the other that used by Ross in his discovery of the malarial parasite.

Malarial Parasite.

Splints, etc.

P. Forms of splints and surgical beds and tables form Section P (see case in the recess to the left on entering the room).

Lænnec's Stethoscope.

Two specimens of the form of stethoscope introduced by the discoverer of auscultation—Lænnec—are shown in the East-wall case, at the end nearest to the window.

Japanese and Chinese Instruments.

In a case over the fire-place are shown collections of Japanese and Chinese surgical instruments—ancient and modern—many of them of finished and artistic workmanship.

Native Surgical Methods.

Dr. Glanvill Corney presented a collection of instruments used by the natives of Fiji, and it is hoped that it may become the nucleus of a collection which will illustrate early stages in the evolution of surgical technique.

Greek & Roman Instruments.

The surgical appliances of the Greeks and Romans are exemplified by a series of casts of the instruments found in Pompeii (see East case, end next to window). Near this series is the artificial limb—made of wood ensheathed by bronze plates—used by a Roman of 300 B. C.

Artificial Limbs.

Here, too, is shown a model of the limbless trunk of a woman, fitted with four artificial limbs made by Mr. H. Bigg in 1869.

Specimens of Plants and of Large Invertebrates.

Collection of Plant Structures and Large Invertebrates.

In the small room at the eastern end of Room V, adjoining that in which the instruments are exhibited, may be seen various specimens illustrating the growth and structure of plants and the nature of some vegetable products. Here, too, are grouped and labelled the large specimens belonging to the series of Invertebrates shown at the North end of Room III.

Historical Cabinet.

Historical Cabinet.

Specimens which have not an intrinsic scientific value but are interesting because of past associations, or are illustrative of superstitious customs long since passed away, are arranged and labelled in a small room which opens off Room V. This annex of the Museum is reached by the staircase on the North side of that room, or by the door which opens from the North side of the upper gallery.

English, Egyptian, and Peruvian Mummies.

The first group of specimens illustrates mummification of the body. One of the specimens represents the wife of Van Butchell—a famous quack of Hunter's time. Her body was embalmed in 1775 by two famous anatomists, Dr. Wm. Hunter and his assistant Dr. Cruikshank. After keeping the body for some years in his house, Van Butchell found it expedient, having again married, to have the specimen deposited elsewhere.

Napoleonic Specimens.

Two small pathological specimens—pieces of the gut showing tumour-like growths but in reality enlarged lymphoid follicles—are said to have been removed at the post mortem examination of Napoleon the Great. They were given to Sir Astley Cooper, and came with his collection to their present place. A recent investigation of Napoleonic literature leaves little doubt that they are authentic.

Barbarous Instruments.

Several specimens of instruments used in past times for restraining the insane are shown. A specimen of the Chastity Belt finds its place here.

Dane's skins.

Here, too, may be seen specimens of human skin which in former times were nailed to church doors. They may have been obtained from the dead bodies of early piratical Danes.

Thibetan Anatomical Chart.

Over the fire-place is shown an exact copy of an anatomical chart from a Bhuddist Temple in Lhasa. The copy was made at the instigation of Major H. J. Walton, who presented it to the College in 1909.

SECTION XI.

Room VI. Odontological Museum.

Its Origin.

In 1909 it was found necessary to add another room to the Museum—Room VI. The extension was occasioned by the great collection formed by the Odontological

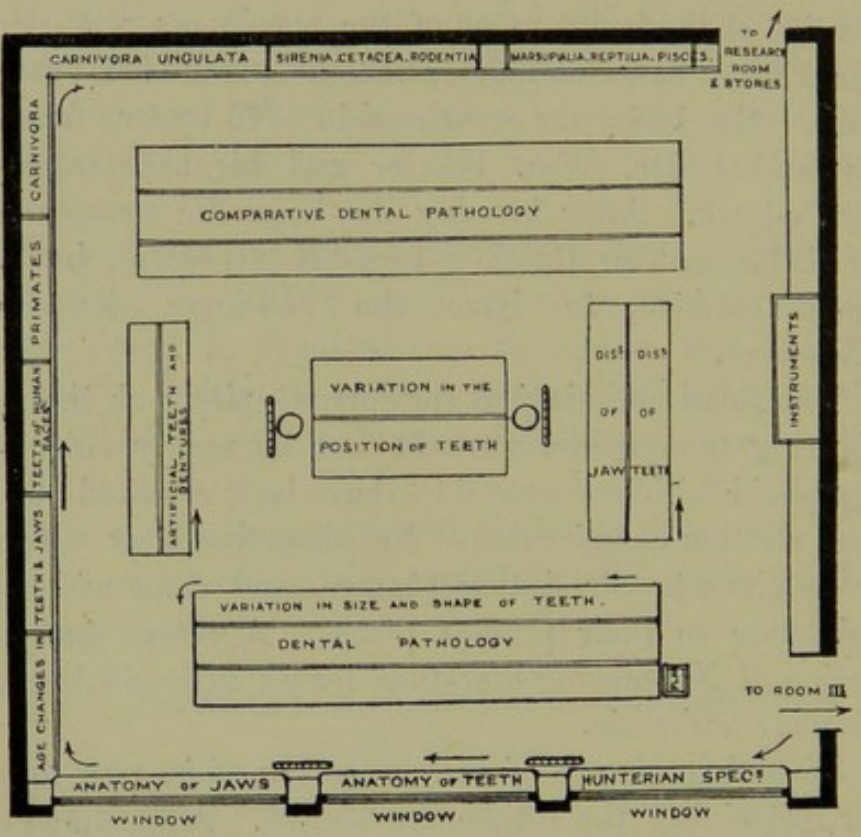


Fig. 14.—Plan of Odontological Room.

Society of Great Britain (now the Odontological Section of the Royal Society of Medicine) being entrusted permanently to the care of the Royal College of Surgeons. The necessary accommodation was found by extending

the Museum into the basement under Room II. The entrance to Room VI—the Odontological Museum—is from the South end of Room III, behind Hunter's statue.

The Nature of the Odontological Collection.

Of the 5000 specimens in the Odontological Museum, rather more than 4000 belong to the collection entrusted to the care of the College; the remainder (Hunterian, and many other valuable dental preparations) were obtained from the College Collection. The specimens illustrate the Anatomy of the Human Teeth, the Evolution and Morphology of Teeth, their Development, Eruption, Irregularities, and, above all, their Diseases. The arrangement and cataloguing of the collection is superintended by the Honorary Odontological Curator, Mr. J. F. Colyer.

The collection is specially designed for research and progress of knowledge. Special opportunities are given to dentists for carrying out investigations.

Hunter's Preparations of the Teeth.

The plan reproduced on page 110, and especially the enlarged copy at the entrance of the room, will guide the visitor to the arrangement of the collection. The cases are labelled. On the 1st window-case on the left will be seen the famous preparations which Hunter made to illustrate his work 'On the Natural History of the Human Teeth' (1771). His specimens illustrating their diseases, growth, and results and implantation are also shown here.

Development and Anatomy of the Teeth.

The development and anatomy of teeth are represented by a special series in the 2nd window-case, while in the 3rd may be seen illustrations of the Anatomy of the jaws—especially Mr. Cattlin's preparations to show the variations of the air-sinus (antrum) of the upper jaw.

Eruption of the Teeth.

Where the window-cases leave off (at the S.W. corner of the room) the wall-cabinets commence and

continue the Anatomical series round the room. The series shown in the first and second wall-cases—about 200 in number—illustrate the eruption of the teeth at every stage from the 6th month of fœtal life to the 25th year. In the second case, too, are represented the changes which come with age—the falling out of the teeth and the wasting of the jaws.

Teeth of various Human Races.

The third cabinet illustrates the condition of the jaws and teeth in various races, the lower or more primitive races enjoying superiority as regards dental development.

Comparative Anatomy of the Teeth.

The remaining wall-cases are devoted to exemplifying the Anatomy of teeth in Vertebrate animals, both present and past. The series commences with the order nearest to man—the Primates—and ends with the lowest forms—the Fishes.

Comparative Pathology of the Teeth.

As is well-known, animals, especially in the domestic state, are liable to diseases of their teeth. The section which illustrates the Pathology of the Teeth of Animals is placed in the furthest floor-case—furthest from the door by which the visitor enters—and is a very notable feature of the collection. The dental diseases to which the elephant, horse, and rabbit are liable are particularly worthy of note.

Irregularities of the Teeth.

The human teeth are liable to great variations in size, shape and number—all kinds and degrees being illustrated in the floor-case in front of the windows. Here, too,

Diseases of the Teeth.

are shown the diseases of the teeth, especially caries of the teeth, a disease from which scarcely anyone is exempt. The irregularities in position of the teeth—their number is legion—are illustrated in the central floor-case.

Dentures and Artificial Teeth.

The evolution of artificial teeth and of dentures is illustrated in another of the floor-cases (see plan). Some of the early bone dentures, with real teeth set as incisors, are of artistic workmanship.

Abscess of the teeth (gum-boils) and the numerous diseases to which the jaws are liable are shown in the central floor-case nearest to the main entrance. Diseases of the Gums and Jaws.

An extensive collection of instruments used by past generations of dentists in the extraction of teeth and in dental work occupy a case on the East wall (to the right on entering). Some of these are more remarkable for strength than for fine workmanship. Dental Instruments.

The Card form of catalogue is being fitted to the cases of the Odontological collection. The Book catalogue, in which the specimens of the Odontological Society are described, is also available for visitors. Catalogue.

SECTION XII.

Pictures and Invertebrata.

Hunter formed a collection of oil paintings to represent pathological conditions which could not be preserved or represented by spirit preparations. These pictures may be seen on the staircase at the North end of Room III (entrance from the Hall of the Museum) and in the passage and staircase leading from the Common Room of the College to Room V. Additions have been made to the collection by various donors. Hunter's Pictures.

It is plain from his pictures of dwarfs that the conditions which stunt the growth of the human body greatly interested Hunter. Three dwarfs are depicted in the collection. Dwarfs.

The Physiogonomy of the various human races was another subject he studied. An oil-painting of Omai (by Hodges), the native of Tahiti, brought home by Capt. Cook, hangs on the staircase of Room III. The Red Indian and other races are also represented. Racial Anatomy.

Albinos (Blacks and Mixed).

The problem of pigmentation and the absence of pigmentation also occupied his attention. A picture of an English father, albino-negro mother, and their children, represent one of his studies in heredity. A number of

Maria Sabina.

pictures represent albino animals. In this group falls the picture of Maria Sabina, a piebald negress child, born of two black slaves. The picture was presented to the College by Sir Erasmus Wilson. The picture was painted in 1735 in the United States; it was captured by a French Privateer on its way to England, and given to Baron Buffon who figured it in his works. It

Telegomy.

hangs in the staircase of Room III. The series of pictures representing breeding experiments made by Lord Morton hang in the passage from the Common Room to Room V. They are regarded by some as demonstrating that the first sire may influence the future progeny of a mare.

Animal Forms.

Many of Hunter's pictures depict the external characters of rare or foreign animals. Sir Everard Home added a number of very early studies of Marsupial animals (Kangaroos, etc.) to this part of the collection.

Collection of Invertebrates.

The visitor has noted when examining the various groups of specimens in the Physiological series that each group commenced, as it did in Hunter's original collection, with simple illustrations drawn from invertebrate forms of life. Hence, it is to the main collection that he must refer for details of the anatomy of Invertebrates. The collection of Invertebrates shown at the north end of Room III, where formerly visitors began the survey of the Museum (see p. 29), belong to Hunter's Zoological series—the one in which he wished to illustrate the various families of the animal kingdom arranged in their natural order from the most

simple to the most complicated. Hunter's conception was magnificent, but time has shown that the limits of the Invertebrata are far wider than the space available in the Museum. Still the visitor will find in the six floor-cabinets in the North end of Room III and in the wall-cases on each side of the door leading to the Hall, selected examples from the various Invertebrate orders. The dried specimens are shown in the floor-cases ; the corresponding forms, preserved in spirit, will be found in the adjoining wall-cases. Those studying the Invertebrata will find many other preparations stored in the drawers of the floor-cases and described in a special volume of the Museum Catalogue.

Impossibility of carrying out Hunter's Zoological Scheme.

SECTION XIII.

A Brief History of the Museum.

The history of the Museum of the Royal College of Surgeons commences in the middle of the 18th century, and owes its origin to the peculiar conditions under which medical education was then carried on in London. The medical Schools and Colleges now attached to the great hospitals of the Metropolis had not come into existence. The schools of Anatomy were then private ventures. It was customary for the physician or surgeon who owned and managed such schools to prepare and preserve specimens to assist him in his lectures. In the case of Dr. Wm. Hunter, at least, specimens were preserved as evidence of discoveries made in the structure or mechanism of the body. In 1748 John Hunter, a raw, brusque but shrewd, Scot of twenty, began to assist in the school managed by his brother William, especially in making dissections and preparations for lectures and, at the same time, to qualify

himself for the medical profession. He remained in his brother's school until 1760, when he accepted a Commission as Staff-Surgeon in the Army. The preparations he made during this early period went subsequently with his brother's collection to the University of Glasgow.

The real foundation of the Museum collection commenced in 1763 when Hunter, retiring from the army on half pay, put up his plate in Golden Square and began to build up a collection and a practice. While other teaching surgeon-anatomists were content to treasure the instructive and the rare specimens found in the routine work of the post-mortem room and in the operating theatre, Hunter set out to discover the nature of Life and Disease by deliberate observation and experiment on living things. He preserved the results of his experiments to serve as evidence of the knowledge he thus won. His collection and his practice grew.

In 1783 he bought the lease of two houses and of a piece of ground between Leicester Square and Charing Cross Road—almost where the Alhambra Music Hall now stands—and on it built a Museum for his collection, which had grown beyond the accommodation of a private house. He died suddenly in 1793, aged 65. His executors—one his brother-in-law, Sir Everard Home, Bart, the other his nephew, Dr. Matthew Baillie—had to raise money to support his wife and children. The Museum and Collection, on which Hunter spent his life and some £70,000, represented his sole fortune. After seven years of negotiations, the British Government purchased the collection for the Nation (£15,000 was the price paid) and entrusted it to the Corporation of Surgeons. This body was granted a royal charter under

the title of the Royal College of Surgeons of London—subsequently—of England.

Hunterian Trustees.

Trustees, known as the Hunterian Trustees, were appointed by the Government to see that the conditions of trust were duly carried out. The Trustees still meet quarterly.

In 1800 the Council of the College, on accepting the collection as a trust, took steps to provide suitable accommodation in premises adjoining its own building on the south side of Lincoln's Inn Fields. The various steps in the building and enlargement of the present Museum have been already mentioned (page 27). The Government, besides the purchase price, £15,000, contributed subsequently £42,500 to assist in building. It is estimated that a sum upwards of £500,000 has been expended on the Museum and its contents, the major part of that sum being provided from the current revenue of the College. The income of the College depends on its power to grant diplomas in surgery to candidates who, after searching examinations, are found to be suitably qualified.

Total Cost.

Museum Committee.

The management of the Museum is entrusted by the Council of the College to a Committee of its members—now known as the Museum Committee, but originally as the Board of Curators. The administration of the Museum is carried out by a staff consisting of Conservator, Assistant Conservator, Pathological Curator, and Prosector, with nine assistants and attendants. Experts are called in to assist in the revision of special parts of the Museum.

Donations and Purchases.

Mention has already been made of the numerous and often extensive private collections formed in the 18th and earlier part of the 19th century. Many of those were sold, the College acquiring the best specimens;

Hammick, Howship.

other collections were presented. It is in this manner that the Museum came to shelter and preserve the valuable material gathered by men like Blizard, Brookes, Langstaff, South, Howship, Astley Cooper, Heaviside, Liston, and many other famous surgeons and collectors of past periods. While the Council of the College has not hesitated to purchase to the full extent of the means at its disposal, the growth of the Collection has depended and still depends on the generosity of private donors. Many of the most valuable specimens in the Museum have come to it as gifts. The name of the donor is fully acknowledged, with the description of the specimens, in the catalogue.

Number of Specimens.

The following table shows the composition of the Hunterian Collection as handed over to the Corporation of Surgeons at the end of 1799 contrasted with its extent at the present time. The list also gives an index to the Museum contents :—

	Hunterian Collection. 1799.	*Museum Collection. 1910.*
Pathological and Teratological Specimens. (Rooms I, II, III)	1927	9566
Calculi. (Room III)	536	2095
Specimens illustrating function (physiological series.) (Rooms IV–V)	4362	10429
Human Anatomy and Osteology. (Rooms I, II, III)	number uncertain	4902
Comparative Osteology	965	8984
Zoological Preparations (mostly of Invertebrates)	5677	9041
Microscopical Preparations	215	12,699
Surgical Instruments (used in past times)	..	806
Odontological Collection	..	4000
	13,682	62,522

REGULATIONS

FOR

ADMISSION TO THE MUSEUM.

Admission of Men.

THE Museum is open to Fellows and Members of the College and to Trustees of the Hunterian Collection on each week-day, except Saturday, from Ten to Five o'clock from the 1st of March to the 31st of August and during October, and from Ten to Four o'clock from the 1st of November to the last day of February, and on Saturdays from Ten to One o'clock. During the month of September the Museum is closed.

The Museum is open on Monday, Tuesday, Wednesday, and Thursday to Peers and Members of Parliament; to all Fellows Members, and Licentiates of the several Royal Colleges of Physicians and Surgeons in the United Kingdom; to Medical Students; to the Officers of the Public Service; to the Members of all the Learned and Scientific Bodies in the United Kingdom; to all learned and Scientific Foreigners; to persons introduced personally or by written orders from Fellows and Members of the College or Trustees of the Hunterian Collection; and to persons obtaining orders of admission from the Secretary or Conservator.

Admission of Women.

The Museum is open to Fellows and Members of the College on each week-day, except Saturday, from Ten to Five o'clock, from the 1st of March to the 31st of August and during October and from Ten to Four o'clock from the 1st of November to the last day of February, and on Saturdays from Ten to One o'clock. During the month of September the Museum is closed.

The Museum is also open on Friday and Saturday to qualified Medical Women; to Women Medical Students; to Nurses; and to Women obtaining orders of admission from the Secretary or Conservator.

Women holding other Medical or Surgical Qualifications than those of the College, and Women Medical Students desirous of admission on other days, must make application in writing to the Secretary or Conservator. The application must be accompanied by a letter from the Dean of the applicant's Medical School (in the case of a Medical Student) recommending that a ticket of admission be granted. Tickets of admission, which are not transferable and must be produced on application for admission. are granted for six months; at the expiration of this time application must be made for their renewal.

On other days than Friday and Saturday, Women who do not hold a Medical Qualification or who are not Medical Students can only be admitted on the personal introduction of a Fellow or Member of the College, or Trustee of the Hunterian Collection, who will accompany them during their visit.

General Regulations.

Persons desirous of devoting special study to particular departments of the Museum may have access for that purpose on Friday and Saturday on making written application to the Conservator.

Special facilities for making drawings of specimens may be obtained by artists (men or women) on application to the Conservator.

Special leave for the inspection of the Histological Collection may be obtained on application to the Conservator.

Visitors are required to write their names and addresses in the Book kept for the purpose in the Entrance Hall.

S. FORREST COWELL,
Secretary.

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