AUSTRALIAN MUSEUM

ELEMENTARY GUIDE

TO THE

Exhibited Zoological Collections.

THE AUSTRALIAN MUSEUM, FROM HYDE PARK.

PRINTED BY ORDER OF THE TRUSTEES

R. ETHERIDGE, Junr., J.P.,

CURATOR.

SYDNEY, 23RD JANUARY 1914.

Vale & Pearson, Printers, 2 Castlereagh Street, Sydney.

Telephone No., City 7917. Telegraph Code Word "MUSEUM."

THE AUSTRALIAN MUSEUM,

College Street, Hyde Park,

SYDNEY.

FOUNDED A.D. 1830, INCORPORATED A.D. 1853.

THE MUSEUM IS OPEN FREE TO VISITORS EVERY WEEK DAY from 10 a.m. to 5 p.m.,

EXCEPT on Mondays, when it is closed for cleaning.

It is open on Sundays from 2 to 5 p.m., and usually on all Public Holidays, except Good Friday and Christmas Day.

Children under twelve years of age, unless accompanied by their elders, are not admitted.

Students and Pupils of Public or Private Schools and Colleges are admitted by arrangement on Monday afternoons, and, if the Curator is informed beforehand, facilities for study are given.

Donations of even the commonest specimens of Natural History (if in good condition), specimens of Minerals, Fossils, Coins, and Native Handiwork, are always welcome.

Evening lectures are delivered during the winter months in the Lecture Theatre on the second Thursday of each month, at 8 p.m., open free to the Public at large.

The office is open daily from 9.30 a.m. to 1 p.m., and 2 to 4.30 p.m. (Saturdays to 12 noon), and Visitors applying for information there will receive every attention from the Museum officials.

CONTENTS.

I.—History.

The Australian Museum was founded in 1836, the Hon. Alexander Macleay, at that time Chief Secretary of New South Wales, taking a leading part in its inception. The Institution was originally connected with the Botanic Gardens and was located in one room in Macquarie Street, from whence such collections as then existed were removed to the Surveyor General's Office in Bridge Street, and remained there till 1849, in which year the present building was commenced by the erection of one room and a gallery, afterwards known as the "Old Wing."

The affairs of the infant Museum were managed from 1836 to 1853 by a Committee, but in the latter year an Act of Incorporation (17 Vict., No. 2, 1853) was obtained, under which a Board of Trustees was appointed, composed of twelve official and twelve Elective Trustees, with one appointed by the Governor in Council and called the Crown Trustee. This Act remained in force until 1902, when an "Act to consolidate the enactments relating to the Incorporation and Endowment of the Australian Museum" (Edw. VII., No. 61, 1902) was passed. Under this enactment five additional Official Trustees were added to the existing number to make up the deficiency arising from depletion through the abolition of pre-existing offices.

In 1869 a plan for a structure to contain a Museum, Free Public Library, and Art Gallery on the present site was prepared, but this conception was never carried out in its entirety; the present portion facing College Street, and consisting of two floors was the only part built, of what would have been the handsomest and most striking building yet erected in this city. The original portion of the building facing William Street, and long known as the "Old Wing" was added to in 1892 by the addition of a story comprising workrooms and an Exhibition gallery.

In 1899 was commenced the large South Wing facing the Sydney Grammar School grounds, and completed in 1909. The second half comprised an up-to-date Lecture Theatre (No. 16), a longfelt want, and which is now put to good purpose.

The Museum is maintained by Parliamentary Appropriation, although there is a small Endowment attached to the Act of Incorporation.

II.—Distribution of Specimens.

The space devoted to the display of specimens consists of two floors and two supplementary galleries.

It is not possible to follow a strictly systematic or zoological classification in consequence of structural peculiarities in the building and a not too satisfactory method of casing arising therefrom.

The attention of visitors is specially called to the display of group or explanatory labels. By a perusal of these, wherever they may occur, a more comprehensive knowledge of many specimens will be attained, than by simply reading individual labels.

CENTRAL HALL (No. 1).

On entering the Museum from College Street the visitor passes directly into the Central Hall, from which all other parts of the building may be approached. In front, the main staircase leads to the upper floor, where the Reptiles, Birds, Fishes and a portion of the Ethnology are placed; on the left to the Australian Palæontological and Mineral Sections; on the right to the Foreign Mammals, Skeletons and further Ethnological specimens.

The first object to catch the eye is a group of African Lions, which is well worth examination, both for the interest attached to the animals themselves, and as an illustration of very skilful taxidermy. The animals are supposed to be entering the dry bed of a river or creek, and hungry, when, catching sight of a Cobra, perched on a boulder, different feelings are represented by pose and facial expression—wonderment, fear, or hatred.

On each side of the public entrance is a large "Totem Pole," or Heraldic or Ancestral Column. These are the work of Salish Indians in British Columbia. Each pole tells some ancestral legend and is practically the badge of a family or clan.

In the recesses on each side of the staircase are wall cases containing Monkeys, and in floor cases the Gorilla from West Africa, and the Ourang-Utan, or Mias, from Borneo. Amongst the former are included the maned Sacred Baboon of Abyssinia, and the Aye-Aye with its peculiar middle finger on each hand elongated, enabling it to extract wood-boring caterpillars from their retreats. To the left centre is a reproduction of one of our extinct gigantic Kangaroos (Palorchestes azael). This was prepared on the premises from computed measurements of the known bones of the above extinct form, compared with all the details of an "Old Man" Kangaroo. It affords an idea of the size to which marsupials grew in prehistoric days. Overhead is suspended the skeleton of a Sperm Whale, fifty-six feet long; the animal was stranded at Wollongong some years ago. The visitor may now pass either to the left (north) or right (south).

AUSTRALIAN MAMMALS (No. 2).

That portion of the main floor to the left of the entrance is devoted to Mammals peculiar to Australia, Tasmania and New Guinea. Commencing with the wall case on the entrance side of the room the Kangaroos, Wallaroos and Wallabies first catch the eye. As the case is followed round the angle, smaller Wallabies and Rat-Kangaroos are met with. In the end wall case are the true Phalangers or so-called "Opossums," notably the Ring-tail and its nest, and the burrowing Wombats. In the centre of the end case are the "Flying-Opossums" or "Flying Squirrels," the so-called flying simply consisting of a series of leaps from branch to branch with outstretched membranes. Succeeding these are more Wombats, the inoffensive Native Bear, or Koala, with its young carried on the back, the New Guinea Cuscus, another Phalanger there representing the Australian "Opossum." On turning the case angle are placed varieties

of the Bandicoot; notice particularly the socialistic little animal the Rabbit Bandicoot that lives in burrowing communities. The whole of these comprise the phytophagous, or vegetable-eating Marsupials. Continuing along the same alignment the carnivorous Marsupials are displayed consisting of the Tiger and Native Cats, the vicious Tasmanian Devil, the Marsupial Pouched Mice, and the little Banded Ant-eater of Western Australia. Between a pilaster and the door leading into the Palæontological room is a wall case containing the Dolphins (or so-called "Porpoises"), Native Dogs (Dingoes or Warrigals), the destructive Tasmanian Wolf, and (as a matter of convenience only) Rabbits. In connection with the Dingoes, it may be well to point out the presence of at least two strongly marked varieties—the heavy stout dog built for rough hilly country, and the lighter and more graceful animal accustomed to open and down-like areas. On the right hand side of the same doorway will be found a large series of Bats, inclusive of the large Fruit-bats or so-called "Flying Foxes." Here also are Australian Rats and Mice including the large glossy-coated Water Rats, and the Arboreal Bush Rat, which prepares a nest in low trees and large shrubs, doing much mischief thereby.

Among the floor cases at this end of the Museum attention is called to a fleecy-coated Albino Black-tailed Wallaby from the Clarence River; a group of Native Cats and young, exemplifying the fact that both the yellow and black white-spotted animals are members of the same litter; a Rat Kangaroo and its "form"; a group of Platypi with natural surroundings; two cases containing Tree-climbing Kangaroos, the much stouter limbs to be noted more akin to those of the arboreal so-called "Opossum"; a replica of the head of a Pigmy Whale, illustrating the position in its mouth of the "Whale-bone" of commerce, and the remarkably small gullet existing in the Whalebone Whale family of which this is the smallest representative. Near by are also shown pieces of highly polished limestone from cave rock-passages at Jenolan frequented by Rock Wallabies, the polish caused by the friction of the animal's pads in constant passing and re-passing. By no means the

least interesting exhibit in this room is a series of immature marsupial young, one specimen in particular displaying the fœtus in the uterine membranes of the Great Grey Kangaroo. For want of space elsewhere there is also placed here a series of specimens exemplifying "Attack and Defence," or how some animals are protected with elaborate contrivances for their preservation, or provided for aggression, and in a separate flat case other Platypi, also a semi-fœtus and an egg of the same, examples of the Australian and New Guinea Echidnas, or "Porcupines," and the blind Marsupial Mole from Central Australia.

Placed above the doorway and short staircase leading into the "Old Wing" is a replica half-section of a Strap-tooth Beaked Whale, one of the rarer forms of the Cetacea. The original of this cast was stranded at Allandale, Canterbury, N.Z., in March, 1912; it is 18ft. 3in. long. The strap-like teeth (coloured white) arise from the middle of the lower jaw, grow backwards sometimes into long curved tusks which then arch over the upper jaw or beak, and crossing one another at their tips, form a ring and lock the lower jaw so as to materially interfere with its action. It thus becomes a mystery how an animal which can scarcely open its mouth, is able to obtain food.

Since the preparation of this Guide alterations in the positions of many of the animals mentioned under No. 3 have been made, but still all those referred to will be found hereabouts.

FOREIGN MAMMALS (No. 3).

By returning to the African Lions and passing beyond, the visitor will find the remainder of the Mammalian collection comprising, in the wall cases, representatives of the Cats, such as the Bengal Tiger, Leopard, and Lynx, followed by a Striped Hyæna, Wolf and for, convenience, examples of the Two-toed Sloth. On the opposite side of the room are other Carnivora, or flesh-eating animals such as foreign Seals, including a white example of the Greenland Seal, and, above, Civets, Ferrets, Polecats, Stoats, etc. Hereabouts are four floor cases with the Indian and Sumatran Rhinoceri, the Indian Gaur Bull, the American

Bison, and, beyond these, a large case containing Bears, inclusive of a fine example of the Polar-bear. The wall cases at the extreme end of this portion of the ground floor contain many examples of Deer and Antelopes, the latter chiefly from South Africa; Pigs, and the Equidæ or Horse-tribe represented by Burchell's Zebra; near by is a remarkably fine head of the Moose or Elk, the largest living representative of the Deer family. A small case on the floor contains a few examples of the true or flesh-eating Opossums from North and South America. At the archway entrance to the ground floor of the South Wing is a shallow wall case containing Armadilloes, Pangolins and Moles and Shrews; following these Squirrels and the Porcupine. Exigencies of space necessitated an overflow of a portion of the Mammalian skin collection into the Osteological Room; here, on the right hand side are placed Sheep, Goats, other large Antelopes, the South American beast of burden the Llama, and a fine head of a Bison.

PALAEONTOLOGY (No. 4).

On descending the few steps leading from the north end of the Main Floor (Australian Mammals) the "Old Wing" is entered. The ground floor is devoted principally to Palæontology, or that branch of science embracing the study of "Extinct Organic Remains." Here will be found a small general collection of Australian fossils and around the sides, first, a series of specimens arranged to answer the oft repeated question—"What is a Fossil?", followed by small specially selected Educational Groups. Amongst the more important of these are—Descent of the Ceratodus, or "Lung-Fish"; teeth of huge Extinct Sharks; types of Ancient Shells still living (Pholadomya, Pleurotomaria, Trigonia, &c.); oldest known Bird (Archæopteryx); and an exemplification of the extinct Wing-fingered Reptiles (Pterodactyles). These are copiously augmented by descriptive labels and illustrations. In the centre of the room is a long transverse case containing examples of Gold, both in the matrix and as alluvial gold, cut Gem-stones and glass models of the more celebrated Diamonds. At the further end is a floor case containing Meteorites, either the actual stones, or models, both Australian and foreign.

MINERALS (No. 5).

A short double stair leads from the Palæontological collection to the first gallery of this "Old Wing" devoted to a general collection of Minerals, both in wall and balustrade cases. The classification used is that of chemical composition, *i.e.*, all the Carbonates are brought together, the same with the Sulphates, &c. Attention may be drawn to fine examples of Sulphur, Fluorspar (Fluorite), Tin-Ores, Quartz and its varieties. A very instructive exhibit will be seen opposite the entrance-door in the "Physical Properties" collection, a series of specimens arranged to form an "Introduction to the Study of Mineralogy."

In a wall case at the western end of the gallery is a series of gilded replicas of the more important and valuable Australian Gold-nuggets, and in the narrow gangway contiguous to the latter fine examples of Malachite or Green Carbonate of Copper from the celebrated Peak Downs mines in Queensland. At the farther or east end of this gallery are arranged two separate cases, with a few examples of mineral substances as applied to utilitarian articles, and on the wall at the stair-head rectangular slabs of polished English and Australian Marbles.

OSTEOLOGY (No. 6).

A very fine series of articulated skeletons, ranging from Man through the whole vertebrate sub-kingdom occupies the first room of the South Wing, entered from the southern end of the main entrance floor. It is only necessary to draw attention to the more prominent preparations, chiefly those occupying the central portions of the room.

On entering from the direction indicated, the visitor is faced by a fine skeleton of the extinct Irish Elk of the Irish peat-bogs, with its magnificent spread of antlers. Near by is the skeleton of a Giraffe, followed in line by a baby Elephant, Javan and Sumatran Rhinoceri, Hippopotamus and a Wallaby specially prepared to show the relation of the skeleton to the soft tissues.

In the centre of the room is a replica of the extinct huge and massive South American Ground-Sloth, the Megatherium, reproduced from the actual bones, now deposited in the Royal College of Surgeons Museum and the British Museum (Nat. Hist.), London. Behind the Megatherium is the skeleton of a youthful Elephant, the former "Jumbo" of the Royal Zoological Society's Gardens at Moore Park. In advance of the former is another replica, that of the extinct clumsy Diprotodon, the largest known Australian Marsupial, and now having its nearest relatives in the existing Wombats. The original is deposited in the South Australian Museum, Adelaide, and in common with other extinct forms was obtained from the partially dried up bed of Lake Callabonna (Lake Mulligan) in the Lake Eyre System of South Australia. Contiguous to these large animals are two cases exhibiting the cartilaginous skeletons of Sharks and a large Sting-Ray. In these fishes, the skeletons are not composed of bone proper but of cartilage, or as it is commonly called "gristle," and require to be prepared by a special process for their preservation. Skeletons of Crocodiles and an Alligator are shewn, one of a larger mature Crocodile, another smaller, but in this instance the preparation exhibits not only the internal skeleton but the position that would be occupied by the dermal bony scutes (were the skin present) in relation to the endo-skeleton. These creatures are usually known as "Alligators," but the Alligator proper does not occur in Australian waters. Lastly there is a disarticulated human skeleton, the bones placed in their approximate positions and named.

In two interpillar cases are skeletons of small birds and fish respectively, and in the wall case contiguous one of the large Queensland Cod; a Galapagos Tortoise sectioned to show the relation of the upper (carapace) and lower (plastron) halves of the animal's bony enclosure; and several fine preparations of Snake skeletons. Suspended from the ceiling are five Whale skeletons, including the Northern Rorqual, one of the Whalebone Fin-Whales met with in European seas; and the strange Strap-tooth Whale (of which a replica may be seen in the Australian Room). With these is the Killer "Whale" or Grampus, that most

ferocious of all the Dolphin family having a cosmopolitan distribution ranging from Greenland in the north to the Australian coasts in the south.

REPTILES AND AMPHIBIA (No. 7).

On ascending the principal staircase of the Museum the upper main floor is reached, in the centre wall and floor cases of which will be found the Reptiles (Turtles, Tortoises, Lizards, Snakes, Crocodiles, &c.), and Amphibia (Frogs, Newts, Salamanders, &c.). In flat table cases are Australian Snakes, "models" reproduced from life. These are divided for instruction's sake into the harmless (to all intents and purposes), slightly venomous, and deadly. Drawings are placed in one case illustrating the punctures left by the bite of a venomous and non-venomous snake respectively, and are well worth the study of all who are likely to come in contact with these dangerous creatures. Attention is called to an excellent reproduction of the North Australian Python, the largest of our continental snakes, also two fine models of the Diamond and Carpet-snakes. In another flat case are shown three sluggish Death (not "Deaf"!) Adders, with their small spine-like tail-ends, which are not "stings" as so commonly supposed. Amongst the foreign snakes is an example of the Common Rattle Snake of North America; notice the construction of the jointed horny appendage, or rattle, at the tail end, which is believed to be used as a means of communication between individuals; notice also an Indian Cobra, or Hooded-snake. In the same line of flat cases are five Sea Snakes, which may be at once known from land snakes by their flat tails; three of these were captured on our own coasts. There is also a beautiful model of a Viper's head dissected, showing the poison apparatus (fangs, poison sacs, &c.). Other snakes in the skin, such as a Boa Constrictor and an Indian Rock-snake or Python, can be seen in the long wall case under the windows. Many small Lizard groups are in the same wall case, also an Asiatic Water Monitor, an example of the Australian "Goanna," and the Frilled Lizard with its peculiar expanded collar and upright gait. Here it may be well to answer a question often asked—"Is

such and such a lizard poisonous?" A harmful animal of this nature does not exist in Australia, and only one such is known on the globe, the Gila Monster of the south-western United States and Mexico, a model of which may be seen in one of the flat cases. On a central table are two examples of our east coast Crocodile, and one of the smaller species, Johnstone's Crocodile from Northern Australia. On another table are two gigantic Tortoises from the Galapagos Islands, a Green Turtle, two specimens of the Luth, or Leathery Turtle, and a large New Guinea Fresh-water Turtle.

AUSTRALIAN BIRDS (No. 8).

On the stair case landing is a case of mounted Sea Birds, prominent being an Albatros with a ten feet wing expansion. On turning to the right or north from amongst the Reptiles, the Australian Birds may be studied. These are unquestionably very fine, and out of the approximate 775 birds known on the Australian Continent there are about 600 here exhibited. It is not possible in a limited space to refer to all, but attention may be directed to the Wedge-tailed Eagles (or "Eagle-Hawks" as they are usually called) and their nest, young, and egg in a case to themselves, and opposite, further examples of the same bird with a pair of the White-bellied Sea Eagle, and in the centre a setting of Fairy Martins and their flask-shaped mud nests. Midway on is a floor case, and at the end a wall case containing "Bird Nest Groups," *i.e.*, an attempt to exhibit various birds in natural association with their nests and eggs, or young, as the case may be, accompanied by natural surroundings, in other words a display of "Bird Architecture"; prominent amongst these is the Lyre-bird, nest and young; the Australian Raven, nest and eggs; a colony of Merops Bee-eater, whose habit it is to burrow into a creek bank; the Black-backed Crow Shrike, commonly known as the "Magpie," with a predeliction for fence-lacing wire as a material for nest building; the Calornis, or so-called Australian "Starling," social birds living in colonies, with their globular hanging nests; the White-winged Chough and its mud-built nest and eggs. Of the eight species of true

Bower-building birds found in Australia, the best-known of which is the Black Satin Bower Bird, four are here represented in separate cases, birds, bowers and decorations, or "playthings," as the case may be; these bowers are in reality playgrounds, not nests as so often assumed. The greatest interest attaches to the Pink-naped Bower Bird from Western New South Wales, on account of the great quantity and varied nature of oddments collected by it. Closely allied to these bower builders are the Cat-birds.

In a wall case to one side is a fine display of Cockatoos, Parrots and Parrakeets. Amongst the last named are a number of xanthic (yellow-coloured) sports of the "Rose-hill Parrakeet," or "Rosella." Particularly interesting in this case is a sapling showing the method employed by the Yellow-tailed Black Cockatoo to obtain burrowing grubs, the sapling having been completely felled by the bird's operations; the spales bear testimony to the strength of its powerful beak.

On the opposite side of this room are arranged the numerous Pigeons occurring in Australia; also the Quail, the handsomest of which is probably the Dotterel Quail, Alongside these are the Snipes and again a highly decorated bird, the Painted Snipe. Here also is the true Curlew, a visitor whose habitat is restricted to the eastern coastal districts, in contradistinction to the Stone Plover, which away from the coast in New South Wales is commonly but erroneously called the "Curlew" (this can be seen in the wall recess with the Ducks and Stilts.) Two very remarkable species at once attract attention, the slate-coloured Australian Crane, or "Native Companion," of whose peculiar antics when assembled together extraordinary stories are told, and the Black-necked Stork, or "Jabiru." Our three mound building birds are also represented, the Megapode, or "Jungle Fowl," the Ocellated Lipoa, or "Mallee Hen," and the Wattled Talegallus, or "Brush Turkey"; these are all "scrub" dwellers. Comprised within the term Game Birds is the Australian Bustard or "Plain Turkey," a fast disappearing species in consequence of settlement and depre-

dations of the fox. The mischief wrought by this unfortunate importation is, however, still more manifest in the wholesale disappearance in some districts of the Stone Plover.

Passing onward, in the same line of wall cases, are placed the Plumed Egrets and the White Heron with their beautiful wing plumes, known in trade circles as "Osprey-plumes" (so inconsiderately used by women for personal adornment), followed by Ducks and Geese, the Pelican, Ibises, Black Swans and Stilts. Amongst the nest groups in the centre of the room is that of the Pink-eared Duck with its abundant coverlet of bird's down. On the same side of the room as the Eagle-nest group will be seen our most beautifully metallic-lustred Rifle-birds, of which there are three species; they are the representatives in Australia of the Paradise-birds of New Guinea; the many and highly coloured Warblers, and the brilliant Pittas.

The visitor should not fail to glance at the albino and semi-albino examples of our bush friend, the Giant Kingfisher, more familiarly known as the "Laughing Jackass." In connection with the albino bird attention may be called to the general prevalence of this albinism throughout the Australian vertebrate fauna. White individuals occur amongst Kangaroos, Wallabies, Flying Phalangers, Native Bears, &c. Amongst the birds, besides the aforesaid "Jackass," we are acquainted with a white Crow, "Magpie," Martin, &c., and a near approach to the colour is often found amongst the xanthic Parrakeets already mentioned. An inspection of the Australian Birds may be concluded by a glance at the Hawks, Owls, and Podargus, or "More Pork" as it is generally and erroneously spoken of; the peculiar nocturnal note ascribed to this bird is in reality that of the Little Boobook Owl.

FOREIGN BIRDS (No. 9).

These occupy the southern portion of the Upper Main Floor, corresponding to the northern position of the Australian Birds. The collection, as might naturally be expected, is less complete than the former, still it contains some excellent material.

The more important birds are—on the right a group of South American Toucans, another of gaudy Macaws from the same country; the interesting Owl Parrots, one in its burrow, found in New Zealand, with the Kea and Kaka Parrots from the same region.

Opposite to the case containing these specimens are two cases of New Guinea Birds including the Port Moresby Rifle Bird; Twelve-wired Paradise Bird; King Bird of Paradise; Raggi's Bird of Paradise with its beautiful flank plumes, another feathered friend mercilessly hunted for decorative purposes; and the Great Bird of Paradise distinguished by its dark emerald green throat. In the second of these and contiguous wall case is that fine bird the Goura Pigeon, with its beautiful semi-lunar head crest, also an inhabitant of New Guinea. Further along are placed the South American Scarlet Ibis; the Jacana, or Brazilian Spur-winged Water Hen with feet adapted to walking on large lily leaves; the European and Asiatic White Swan, numerous Petrels, Terns and Gulls, followed by Grebes, Guillemots, and that curious little bird the Crested Auk of the North Pacific Ocean.

On the opposite side following after the case with the Macaws, are arranged many brilliantly coloured birds worthy of study. Prëeminent amongst these are the delicate orange-red tinted Cocks of the Rock, from South America; the Hornbills, both African, East Indian and Southern Pacific; notice particularly the Helmeted Hornbill; and a fine series of Orioles, adorned with beautiful yellow plumage. At the termination of this line is a small separate case containing the diminutive Humming Birds of South and Central America, and the West Indian Islands, accompanied by two of their equally diminutive nests.

At the end of this room is a wall case on the right with a fine collection of "Game" birds including the European Pheasant and its many hybrid varieties; the Golden and Silver Pheasants of China; the Argus Pheasant from the Himalayas, with its remarkable spread of wings and long two-feathered tail; the small Peacock Pheasant with its

delicate eye-spot-marked feathers; a Peacock with expanded upper tail coverts, not tail feathers as so commonly expressed, the latter in this bird being of comparatively small size; the Black Cock and various Grouse of European sportsmen; the large Capercailzie, the Ptarmigan and Willow Grouse in their white winter plumage.

In a continuation of this case are the South African Ostrich, the South American "Ostrich" or Rhea, and, as a matter of convenience, the Australian Emu; also the Cassowaries, both local and those from the Bismarck Archipelago. This is one of the Australian birds obtained by the ill-fated Kennedy Expedition to Cape York, on which the occurrence of the Cassowary on this continent was originally established. With these will be found the New Zealand Apteryx or "Kiwi," one of them in white plumage. In a wall case opposite to that of the "Game" birds can be seen the "Birds of Prey," including the South American Condor, a consumer of offal, the Crested or Caped Black Vulture, with Eagles inclusive of the Golden Eagle, or "King of Birds," Hawks, Falcons and Kites. The Owls are contained in a shallow wall case on the left hand, and in a centre floor-case are the Great White or Snowy Owl, and the Great Horned or Eagle Owl.

In another centre case of this annex are the Penguins, members of the Antarctic avifauna so prominently brought to public notice through the explorations of the Scott, Shackleton, and Mawson Expeditions. The three principal species are the Emperor, King, and Adelie Penguins. In the same floor case are Divers from the Northern Seas.

FISHES (No. 10).

To reach the collection of Fishes it will be necessary to still further mount the main staircase; on the landings of which are shallow wall cases. That on the right hand landing contains various large fish, inclusive of the Tasmanian Trumpeter, the Halibut of the North Pacific and Atlantic Oceans, also the Palu, or "Oil-Fish" of the traders, about which there appears some mystery; it is only caught in the deepest water, hence its large eyes. It is known to weigh

up to 150 lbs., and be six feet long. On the left hand landing are arranged a number of Rays, including the "Sea Devil"; a Nurse Shark; and Spinous Shark from the Atlantic coasts of Europe. At the head of the stair is a case of coloured fish replicas well worth inspection, this plan being now the acknowledged method of exhibition in preference, whenever possible to that of "stuffing" or preservation in a preservative fluid. Amongst these is a fine representation of the Opah, a cosmopolitan pelagic fish, and a Spotted Cod, whose range extends from the Red Sea to the Western Pacific.

On the walls of this stair-head is a series of finely executed prints of Australian Fishes; these figures have been used to illustrate various publications of this Museum.

On leaving the models to enter the gallery turn to the right, and in the short length of wall case may be seen the following fishes:—

Gobies.—Small fishes with the ventral fins united to form suckers; these they use to cling to stones and weeds.

Dragon Fish.—The pectoral fins are modified into hand-like organs with which they creep about the bottom.

Sucking Fish.—Possess a curious organ on the top of the head enabling them to cling to ships and larger fish, such as Sharks.

Soles and Flounders.—Greatly flattened and asymmetrical fishes which in early life are slender and swim in the usual upright position; as they grow the body expands laterally and the fish fall over to one side, the eye on that side creeping round the top of the head so that the adult fish has two eyes on one side and none on the other, the blind side being also without colour.

Anglers.—Small fish with the pectoral and ventral fins modified for use as limbs to crawl with. The snout usually bears a slender spine with a fleshy bait-like end with which the fish entices its prey. They are coloured to resemble the weeds and mud amongst which they live.

On turning the case angle the more interesting fish are:—

Anemone Fish.—A small fish commensal with a large stinging Anemone on the Queensland reefs, but immune to the stings, and living in the midst of the Anemone's tentacles, which when expanded cover an area as large as a dinner plate. If the Anemone be disturbed it contracts, the fish is left exposed, and it is so helpless it can be easily caught with one's hand.

Albino Black-fish.—Fishes rarely lose all their colours as a result of albinism like mammals and birds, but usually become more or less yellow. Compare with the normal example next to it.

Parrot Fishes.—Are exceedingly abundant in the tropics and exhibit the most gorgeous colours when alive, but these cannot be preserved. The sexes are differently coloured.

Coral Fishes.—All very strikingly marked, and often with brilliant colouration. Usually have pointed snouts with fine projecting teeth to extract minute worms, etc., from the coral on which they feed.

Surgeon Fishes.—Armed with one or more recurved spines on each side of the tail which lacerate the hands of man, or the mouths of larger fish attacking them.

File Fishes.—Often similarly armed, with the body encased in hard bony scales and the back with a large strong spine, which can be locked in position by specially formed bones at its base.

Toadoes or Swell Fishes.—Usually covered with prickles. When attacked they gulp in either water or air, blowing out the body into a spherical shape setting all the prickles upright.

Red Fire Fish.—These are remarkable for the great development of fins and colour markings; all the species of this family are capable of inflicting very poisonous wounds.

Stone Fish.—Most deadly of all poisonous fishes; conceals itself amongst coral, which it resembles. The dorsal fin spines are exceedingly sharp and each provided with a poison gland at its base.

Flatheads.—Bottom fish in which the head and body are much depressed and the eyes placed on top of the former, a provision to enable them when lying buried in the sand to watch for prey swimming above. The Deep-sea Flathead has an enormous head armed with a row of strong spines along either side.

The visitor now passes to the front line of wall case and therein will be found:—

Pilot Fish.—One famous in legends, as it is said to pilot storm-swept vessels to safety, and Sharks from danger. It really accompanies both for the scraps of food thrown overboard from the one, or left by the other. Portuguese Man-o'-War Fish accompany the Physalia or "Portuguese Man-o'-War" to secure small animals paralized by the latter's stinging tentacles and is apparently immune from the sting itself.

Soldier Fish.—Small fishes which have the interesting habit of carrying their eggs in their mouths until they are hatched.

Snapper.—Remarkable for the curious change with growth; small specimens (Red Bream) have the curve from the snout to the back even and unbroken. As the fish grows a curious bony hump develops on the neck which increases in size with age, while very old specimens have also a fleshy protuberance on the snout.

Above this wall case are two examples of the "Ribbon" or "Oar Fish," one of them thirteen feet long, but a length of twenty feet is known. They live in deep water and rarely come to the surface. They are scaleless, usually silvery in colour with rosy fins; both specimens were cast ashore in Port Jackson.

Again turning at the wall angle several very interesting fish will be met with, for instance:—

Chimæra or *"Ghost Sharks"*.—Curious ugly fishes with a superficial resemblance to Sharks, and possessing one gill opening. They are mostly deep-sea forms and noticeable on account of their long whip-like tails.

Sturgeons and *Bony Pikes*.—Are living representatives of the almost extinct Ganoids (principally fish with hard enamelled scales). The tail is heterocercal (unequally lobed) as in the Sharks and the body is covered with more or less numerous enamelled scales. They are all exceedingly voracious fishes, and the majority are mainly carnivorous.

"Lung Fish" or *Ceratodus*.—A peculiarly Australian form also called "Barramundi," but this is the native name in Queensland for several large fresh-water fishes. The skeleton is cartilaginous, and the swim-bladder is modified into a lung, hence the popular name. They inhabit only the Mary and Burnett Rivers.

Painted or *Reef Eels*.—Some species show remarkable colour-markings.

Fresh-water Eels and larva.—Occur in the fresh-waters of the world when connected with the sea. Adults migrate to ocean depths to breed and afterwards die. The young pass through various stages and are both ribbon-like and translucent. As they develop they decrease in size and after acquiring the adult form (elvers) make their way up rivers.

Salmon.—Represented by an enormous number of species in European, Asiatic and American rivers and lakes. Salmon breed in rivers, but otherwise pass their lives in the open sea.

Lantern Fishes.—Small fishes which live on the surface of the ocean at night, but descend to the depths in the day time. They are provided with rows of phosphorescent (light producing) organs along the lower surface, and often have large "lanterns" on the front of the head, &c.

Flying Fish.—The pectoral fins are greatly developed, to enable the fish to leap out of the water and skim along the surface for considerable distances. They "fly" to escape their enemies in the water, but are also preyed upon by large birds.

Bellows Fish.—Are remarkable for their extraordinary shape, the snout being produced into a long tube with the mouth at end; there is a long spine on the back.

Razor Fish.—In this fish the body is so greatly compressed as to be but little thicker than a table knife with the ventral edge very sharp. The dorsal fin and tail are bent downwards to enable the fish to swim in a vertical instead of horizontal position.

Leafy Sea Dragon.—An extraordinary example of protective imitation, the skin outgrowths resembling leaves and branches of seaweed amongst which the fish live.

Pipe Fish and *Sea Horses.*—Here the body is encased in hard bony plates, with the fins minute and but little used. The males are provided with pouches to carry the eggs until they are hatched.

Fighting Fish.—Minute fishes bred by the Malays for sport and gambling. The males are very pugnacious, and if two are placed in a jar together, they fight until one is maimed or killed.

In the short end wall case which completes the inspection of this gallery, are some most interesting examples of Shark's egg-cases and young.

Port Jackson Shark's Eggs.—Two kinds, one with long tendrils to attach it to seaweeds, and one without, the latter being wedged into rock-crevices; there are also curious spiral flanges around the central case. Exhibit also shows young, with still unabsorbed yolk-sack, removed from egg.

Dog Fish Egg-cases.—These are sometimes known as "Mermaids' Purses." The long tendrils at each corner are wound around weeds (probably by the lips of the mother-shark) to keep the egg in position.

Blind Shark (young).—The young of a Shark which does not produce eggs. These are in a very early stage of development, and have both an enormous yolk-sack and external gills.

Saw Shark (young).—Adults (see floor of case) are provided with fixed teeth projecting from the snout, but in the young, before birth these are laid down against the sides of the snout, so as not to injure the mother.

Numb Fishes or *Electric Rays*.—Have complicated electric organs with which they can transmit an electric shock.

Beneath the gallery are suspended a number of large fish, chiefly Sharks and Rays. Here may be seen the Hammer-headed Shark from the Richmond River, belonging to a genus unique amongst fishes by the extraordinary conformation of the head; a large Tiger Shark; the usually harmless Basking Shark from Twofold Bay; several White Pointers obtained in Port Jackson but mostly pelagic in habits; a Thresher or Fox Shark, the voracious assistant of the Killer Dolphin in its attacks on whales; and the Grey Nurse, caught in Port Jackson. The White Pointer, Great White Shark, or "Man-eater," is probably the most voracious of fish-like animals and is known to attain a length of forty feet. It is the living representative of a shark that is believed to have become extinct during comparatively recent geological time as its teeth have been dredged from great depths on the ocean bottom. It is known as Carcharodon megalodon, and must have attained a length of eighty feet, computing this from the size of the teeth in question, six inches (see specimens in Palæontological Room.)

In a floor case amongst the Reptiles may be found species of the pavement toothed Port Jackson Sharks, the Crested Bull-head and the Port Jackson Shark proper. With these are two forms of "Wobbegong," the Oscellated Wobbegong from Torres Straits, and the southern species, or Marbled Wobbegong, also the Zebra Shark found in the Indian Ocean, noticeable for its handsome colouration. Most peculiar of all is the Goblin Shark from Japanese waters with its strange snout-like flap over the upper jaw. Shark egg-cases and young may be seen in the gallery above.

It may not be uninteresting to record the lengths of the larger of these exhibited local Sharks, thus:—

Hammer Head	13ft. 8in.
White Pointer	10ft. 8in.
Tiger	13ft.
Basking	9ft. 6in.
Thresher or Fox	12ft.
Grey Nurse	8ft. 8in.

Again beneath the gallery are a Horned Ray, and a smooth Sting Ray caught in Port Jackson; Sword-fish from Wollongong, and a Saw-fish from Moreton Bay. On the opposite side are suspended two examples of the apparently unwieldy Sun-fish, likewise obtained in the harbour; on the right hand side wall case of the gallery above is a young individual which is provided with very large projecting spikes as a protection from the attacks of other fishes.

SEMIVERTEBRATES.

Tunicata, Ascidians or Sea-squirts.

Before entering the Invertebrate Gallery attention is called to a peculiar group of animals commonly known in a general way as "Sea-squirts," and technically as Tunicata or Ascidians, placed in a small wall case opposite to that containing the lesser Turtles and Tortoises.

These Sea-squirts are both sedentary, remaining fixed during life to one spot, and pelagic or free-swimming. There are both simple and compound forms, the latter constituting colonies of individuals produced by budding from a single parent stock, and at times brilliantly coloured. As an illustration is the tough, leathery object so common on the tidal rocks along our coast known as "Cungevoi."

The chief interest, however, attached to these Ascidians centres in their free-swimming larval stage, during which are developed organs that recall features in the anatomy of the lowest forms of vertebrate life *i.e.*, the Lancelets. Hence these Ascidians are sometimes termed "Semivertebrates."

INVERTEBRATES (No. 11).

(Animals devoid of a vertebral column or backbone.)

Insects, Shells, Crabs, Sea Eggs, Starfish, Corals, Sponges.

From the central portion of the Upper Main Floor (the room containing the Reptiles), a doorway leads to a gallery, the uppermost of two in the "Old Wing," the lower or first, as already explained, being devoted to Minerals. This gallery contains all the Invertebrates that space will allow, but with proper facilities a very fine and highly instructive collection could be displayed.

INSECTS and ARACHNIDS.—On entering is a wall case on the left, devoted to Australian Insects including Beetles, Flies, Ants, Butterflies, Moths, Bugs, Cicadas (otherwise called "Locusts"), Crickets, Grasshoppers, Locusts proper, Dragon-flies, Praying Mantis, and those fantastic insects called "Stick Insects," and "Native Ladies."

In the first panel of this case is the dissection of a Longicorn Beetle to illustrate the anatomy of the Coleoptera that order of the class to which Beetles belong, and an "Index to Orders," or those divisions into which the Class Insecta is primarily divided for classificatory purposes.

In the second panel will be found the "Life Histories of Spiders," and examples of "Mimicry," as it is called, amongst Butterflies. By Mimicry we understand that an animal, which in itself is either harmless or edible, has assumed a close resemblance, either in form or colour, to those commonly regarded with fear or repugnance, or which are distinctly inedible, whether it be owing to the toughness of their bodies or the existence within them of acrid or unpleasant juices (Rainbow).

Further along are other "histories" tracing a particular insect through its various metamorphoses from the egg to the imago or perfect insect, including the large Australian Wood-boring Moths, and in particular the Great Swift Moth.

Between the case angle and a door marked "private" is a shorter line of wall case containing Spiders, Scorpions, Phasmids, &c., above as wet preparations, and on the sloping shelf the work of Gall-making Insects, cocoons and carded silk of the Silkworm-Moth. Below are anatomical models of a Beetle, Spider and Honey-Bee for instructional and lectural purposes. These are followed by a number of examples of the ravages committed by Termites, the "White Ants" of the settler, in timber, lead gutter-flashing, and two books, and also two termitaria, or "nests." A comb of the Honey Bee is likewise exhibited and pieces of timber displaying the work of wood-boring moths. There are also the mud nests of Wasps and a large Spider web from the Grand Arch at Jenolan.

The balustrade cases opposite the long wall case are set aside for Exotic Beetles. In the first case from the door are the Longicorns, beetles with a great development of their antennæ or feelers, and limbs, the latter feature being particularly noticeable in the Macropus; also the Goliath-beetles from the West African Gold Coast indicating the great size to which some of these insects attain. Near them are the Hercules-beetles, inhabitants of Tropical America. In the same case may be seen those most interesting of all, the Scarabs or Sacred-beetles, sometimes called "Dung-ball Tumblers." One of these, the Egyptian Sacred-Beetle (Scarabæus sacer) was regarded by the ancient people referred to with great reverence. They have the habit of rolling together wet dung into round pellets with their hind feet and trundling them into previously prepared holes. To the mind of the ancient Egyptian these orbicular pellets were symbolical of the world, and the projections from the beetle's head of the sun's rays. In the second case are the Stag-beetles (Chiasagnathus and Lucanus) remarkable for the massive development of their heads and jaws; also the Fiddler-beetle of the Malay Archipelago, with its strange lateral expansion of the elytra or wing covers.

The gallery gangway is occupied by five small table cases containing the Exotic Rhopalocera, or Butterflies, many of them of brilliant hue. The first case contains the

beautiful Ornithoptera of India and the Malay Archipelago, a name applied to these insects from their bird-wing like appearance, some of which are known to measure nearly a foot across the expanded wings; Papilios from India, some of brilliant hue, and many attractive from the peculiar club-shaped terminations, or "tails" adorning their hinder wings, a feature that will be found carried to a much greater extent in the large Attacus moths. Also a large series of Whites, Brimstones and Yellows belonging to the same assemblage, but without tails to the hind wings; these insects are noted for their gregarious flights when occurring in numbers. In the same case is the Paradise-butterfly from New Guinea.

In the second case is an illustration of protective resemblance (Aganisthos), in that the butterfly whilst with wings expanded possess nothing in particular to attract attention, when, however, it is at rest with the wings closed, the insect practically becomes a dead leaf, rendering itself inconspicuous to its enemies.

In the third case is a still more remarkable example of the same resemblance in the Leaf-Butterfly proper (Kallima) from India; and other butterflies from the Indian jungle (Cyrestris) with map-like wing venation, or its imitation of a spider's web. Here also are many handsome Fritillaries which are mostly confined to the temperate regions of the Northern Hemisphere; and to old world collectors the well-known Admiral (Pyrameis), the Painted Lady (Pyrameis) and the Peacock-Butterfly (Vanessa).

The fourth case contains the wonderful Owl-Butterfly (Calligo) from Central America, the under side much resembling the head of the bird in question from the presence of two large ocelli, or "eye-spots." Near by is perhaps the most beautifully coloured insect in the collection—the giant Morpho from Brazil, with its wonderful play of colour, the most conspicuous tint being of a dazzling metallic sky-blue; one of these is known as the Resplendent Ptolemy. By keeping the eyes fixed on these butterflies whilst walking around the case, the marvellous change in the tint from a copper-brown to a sky-blue will at once be

apparent. This interference of colour is caused by the light falling on minute hairs, or cilia, with which the wings are clothed, at different angles. Following this gorgeous example of nature's handiwork are the New Guinea Tenaris with double eye-spots on the hind wings.

Finally in the fifth case devoted to Exotic Butterflies are the beautiful Danaus, Hestia and Ideopsis from India with their multi-coloured spotted wings.

On returning to the door of entry are two other gangway cases containing Exotic Moths. In the first of these is a series of Hawk Moths, followed by the Sphinx of the South Pacific regions, the Elephant Hawk Moth, the Bee and Humming-bird Hawk Moths; and one of the largest of all moths, the giant Attacus, some species of which are furnished with graceful swallow-tails to the hind wings.

Immediately on the left of the doorway is a small case containing Australian and other South Pacific Centipedes, commonly called "Hundred-legs," and Millepedes or "Thousand-legs." The first are represented by the giant of the group, Scolopendra, some of the tropical forms reaching as much as a foot in length. Unlike the Centipedes, the Millepedes are perfectly harmless; moisture is necessary for their existence. Here also are placed examples of the Cattle-tick, a pest that has given rise to so much trouble in Queensland as the cause of Texas fever, and also a piece of infected hide; associated with these animals, simply as a matter of convenience, is a peculiar caterpillar-like object, formerly known as Peripatus, but now called Peripatoides from Australia and New Zealand. Although resembling a caterpillar it is not an insect, but occupies a position between insects and the segmented worms. These animals always frequent damp localities, living beneath the bark of trees, in the crevices of rotten stumps and under decaying leaves.

CONCHOLOGY (Shells). — The remaining balustrade cases (48), as well as those in the gangway (16), are devoted to a general collection of Shells, arranged systematically. To call special attention to a fractional part of this extensive and wealthy series would require a guide to itself. All that can be done is to indicate a few of the

more important specimens, and, as the cases are numbered from 1 to 48 this will not be difficult by commencing with No. 1 of the balustrade series opposite the door of entry from the Reptile collection.

In case No. 1 are the Brachiopoda or "Lamp-shells." representatives of which are to be found in the oldest stratified deposits of the earth's crust. Although there are two valves, these differ from the ordinary bivalve shells such as Mussels, Cockles, &c., by being equilateral (equal sided) Many so commonly resemble the antique lamps that the old naturalists called them "lampodes," or "lamp shells." They are all marine, and are found attached to corals, undersides of shelving rocks, cavities of other shells, or moored to any hard substance occurring on the sea bottom, and often clustering one upon another. As a representative may be selected the Lamp-shell (Magellania flavescens) from Port Jackson. In the same case will be found the Chitons, or "Coat-of-mail Shells" in which the animal is protected by eight overlapping plates forming a shield, this when inverted presents a boat-shaped appearance. They are mostly shallow water shore dwellers living under stones and feed upon marine vegetation.

In No. 3 case are the Arks or "Chest-shells," more or less heavy box-like shells of world-wide distribution. The Australian "Cockle" (Arca trapezia), which has given its popular name to various creeks throughout Australia, occurs in great numbers, and was a source of food to the Aborigines. Here also are the generally thin-shelled Pinnas, or "Pen-shells," which hold fast to rocks by a rope of silky golden threads. This was long ago spun and woven into cloth along the Mediterranean shores; robes made of this material were known as "tarentine."

Case No. 5 contains a number of Pearl "Oysters," of which Meleagrina margaritifera is one of the principal pearl-producers. It is largely collected off the North Australian coasts both for the contained pearls and the shells themselves, which are valuable as "Mother-of-pearl." In case No. 6 are Oysters of various kinds and sizes; note the size atttained by the "mud" variety of the Edible Oyster, also the peculiar form of the Hammer Oysters, hence the name Malleus given to them.

Case No. 7 has within it the Fresh-water Mussels (Unio), Trigonias, and commencement of the Pectens or "Scallops" (continued in case 8). Some species of the first-named are also pearl producers, whilst allied forms occurring in the United States, on account of their thick and highly nacreous shells are extensively employed in the button manufactory. The Trigonia must be familiar to nearly every inhabitant of Sydney so freely are its valves displayed in jewellers windows mounted as hat-pins and other articles. The mollusc is exceeding active, jumping well, and is probably migratory in its habits; it has been obtained freely in Port Jackson, and it is to all intents and purposes a purely Australian shell, but in bygone ages the genus was represented by an immense number of world-wide species now found in the fossil state. Of the Scallops some are delicate shells, many are well coloured, and others variously decorated. In some parts of the world multitudes collect on a restricted area, forming "Scallop-banks," and are gathered for food.

In case 9 are the Thorny Oysters (Spondylus), showy bivalves, all striking in ornamentation and colouring; they were admired and eaten by the early Greeks. "Window Shells" (Placuna) and Mussels (Mytilus) can be found in case No. 10. The first are so called from the custom of separating the thin laminæ of the shell apart and using the sheets in lieu of window glass by the Chinese. The Edible Mussel, native to the temperate shores of Europe, may be found by the acre on mud flats at low tide, and is regarded as a staple food. The French carry on mussel-farming as a business.

Rock-borers (Lithopagus) are placed in case 11. These pod-shaped shells bore into rocks and coral. A species of Lithophagus is highly esteemed in the Mediterranean as food. In case 15 are other shells used in various parts of the world as food—the Cockles—many of large size. In Europe the Edible Cockle is extensively used for food and bait, and is one of the most familiar shells in the fish-markets.

The shells contained in cases 16 and 17, the Tridacnas or "Furbelowed Clams," are amongst the largest of all molluscs, and live in crevices of coral reefs in Eastern and Pacific seas. The Giant Tridacna attains the enormous weight of 6-7 cwt., and from its solid hard shell adze-heads are prepared by some of the Pacific Islanders.

Passing over an interesting series in cases 18 to 22, such as Cytherea, Chione, Tapes with its strange divaricating colouration lines, and the delicate-shelled Tellinas, many remarkable for their beautiful radiating tints, we come in cases 23-24 to the Wedge Shells (Donax), the Razor Shells (Solen) and Surf Clams (Mactra). The first are noticeable by their ornamental colours; the second from their peculiar form; the third by reason of their solid although comparatively small shells. The "pipi" (Donax deltoides) is extensively employed as bait, and was used by the Aborigines for food. In case 25 and last of the Bivalves, is the remarkable shelly tube known as Kuphus, or the "Giant Teredo," often attaining a length of six feet, and which lives in sand (another example is placed in the wall case with other large specimens.) It is related to the Teredo or "Ship-Worm," so-called. With this are the "Piddocks" or Pholas some of which form a staple food in different parts of the world; they burrow into stone by constantly turning the shell about in close quarters.

From this point onward are arranged the Univalves (Gasteropoda), or those molluscs in which the shelly covering is in one piece. In case 26 are the Limpets or "Tent-shells," which choose the surface of rocks as a place of residence, adhering firmly thereto. The Haliotis or Ear-shells follow on in cases 27 and 28. Many of them attain to a large size; all are remarkable for their beautiful iridescent colours and are utilised in commerce for the manufacture of "mother-of-pearl" articles, such as buttons &c. In cases 29 to 32 are the "Top-shells" (Trochus), the "Turban-shells" (Turbo) and their allies, the pearly layers in both being again in request for button manufacture.

As an example of a free-swimming or pelagic family is the beautiful, delicate violet-blue Ianthina or "Violet-snail" (case 34). It is supported on the surface of the open sea by a raft formed by a secreted slimy substance which when exuded hardens in contact with the water. So plentiful are these shells when cast on a sandy beach that a conspicuous purple band is often formed thereon.

The Naticas or "Moon-shells" seen in case 35 are familiar objects on the sandy beaches of our coast. They are highly carnivorous, drilling holes in other shells by means of the long proboscis each possesses. In case 39 are the "Screw-shells" (Turritella); it is believed the idea of the screw was suggested to the philosopher Archimedes by the spiral form of one of these shells.

The appearance of the Vermetus or "Worm-shell" in case 40 would hardly lead to a belief in its molluscan affinities, such, however, is the case; these shells often form, as if for mutual protection, an intricate, tangled mass.

A very remarkable group of shells may be seen in cases 41 to 43, Strombus, the "Conch-shells," and Pterocera, the "Spider-shells," many attaining a large size. The pink outer layer of the lip in some has a white foundation and is used in cameo cutting. With these are arranged the white Ovulums, or "Egg-shells," so commonly employed by Pacific Islanders for all kinds of decorative purposes, both personal and utilitarian.

In cases 43 to 46 are the Cowries, the shells being amongst the most beautiful and highly prized of the collector. Special attention need only be called to the "Map Cowry" (Cypræa), from its supposed resemblance to a map; the "Orange Cowry" (C. aurantium), so highly prized by the Fijian chieftains as a mark of the highest distinction; and the "Tiger Cowry" (C. tigris), known by its handsome mottled shell. In cases 46 and 47 are the "Tun-shells" (Dolium), and the "Helmet-shells" (Cassis), the latter group yielding most valuable material to the cameo cutter

The Univalves are continued in the gangway table cases. In cases 51 and 52 are the handsome Mitras or "Mitre-shells," followed (in case 52) by the Volutes, a remarkable genus whose distribution centres in Australian waters, and one largely sought by collectors; the "Magnificent Volute" (Voluta magnifica) is a typical Australian form. No less important are the Cones (cases 54 and 55), some of large size, and chiefly from the Pacific.

We now meet an entirely different group of Univalves, those known as Pulmonata, land and fresh water mollusca breathing air, many known under the general name of "Snails." In cases 58 and 59 is the important genus Placostylus, essentially a South Pacific one, and particularly numerous in New Caledonia, where its members attain to a large size. In cases 59 to 62 will be found a large series of Snails proper, all formerly grouped under the old genus Helix, but now subdivided under many names. The form of the shell is exceeding variable, and the variety of colour endless. Many fine examples are exhibited, and most of them Australian.

The last of these gangway cases, No. 63, is devoted to "Chambered Shells" or Cephalopoda, of which the well-known Nautilus may be taken as a representative of those with external shells, whilst the Octopus, of which a glass model is exhibited, illustrates the internal-shelled forms. Specimens of both the Pearly Nautilus and the beautiful delicate Argo, Argonaut or Paper Nautilus, only the female of which possesses a shell, are on view. Other Cuttlefish and Squids are placed in the contiguous wall case, with an anatomical model of a female squid, and a similar piece model of a Snail.

Intercalated in the general series is a portion of the well-known Hargraves Collection, exclusively acquired in Sydney.

CRUSTACEA.—Crabs, Lobsters, Crayfish, Prawns:— On the sloping shelf of the Wall-case between the two doors marked "private," are numbers of small Crabs, the short-tailed forms, and underneath larger examples, particu-

larly the Giant Edible Crab; the so-called Robber Crab which bears the reputation of being a coconut stealer; a group of "Calling" or "Fiddler Crabs" with one of the fore pinching claws enormously enlarged, and another group of "Sand Crabs." In each instance the burrows are reproduced. With these are the long-tailed forms including Lobsters, Crayfish, and the Limulus or "King Crab," not strictly a Crustacean but representing a group intermediate between the latter and the Scorpions and Spiders, and one of great geological importance in bygone ages. Towards the end of this basal row are the Barnacles, so frequently attached to ships' bottoms or floating timber; the Acorn-barnacles covering rocks on the coast; and the large Coronet-barnacles which attach themselves to the skin of Whales.

ANNELIDA (Worms).—On the top shelving are a number of Worms as wet preparations. These include the Oligochaeta, the most familiar representatives of which are the Earth-worms; particularly notice the "Giant Earth-worm" (Megascolex) of Gippsland, which attains a length of over three feet, the Gephyrea, marine cylindrical worm-like animals; the Trematodes, a group unsegmented, both internal and external parasites, usually leaf-like worms; Cestodes, or "Tape-worms," segmented internal parasites, one, infesting in one of its stages the human intestines, often attains a length of six yards; Turbellaria, or "Whirl-worms," nearly all of which lead a free life either in fresh or salt water.

POLYZOA.—Sea-mats, Lace Corals.—The contents of this line of Wall-case is completed by examples of the "Lace Corals," "Seas Mat," or as they are sometimes called "Moss Animals"; these occur both in sea and fresh water. The individual animals are minute, usually live in colonies, and are joined in a number of ways to form stocks. The colonies are, as a rule, small, and require the closest inspection to realise their usually brilliant structure. As an example of those congregations attaining some size is the fine exhibited "Sea-mat" (Biflustra) from Port Jackson, and several examples of the palmate-fronded Flustra.

ECHINODERMS.—Stone-lilies and Feather Stars, Starfish, Brittle-Stars, and Sea-Eggs:—This division of the Animal Kingdom in the wall case beyond the second door marked "private" commences with a few examples of those remarkable stalked organisms known as "Stone-lilies," "Lily Encrinites," or Crinoids, so easily recognised by their branching arms; most of them at some period of existence are attached to the sea floor, or some other object by their long stems.

Following these are the "Star-fish" (Asteroidea) and "Brittle-stars" (Ophiuroidea), all free-moving forms, and usually adorned with spines and tubercles of various kinds. Amongst the former notice the fine Pentaceros, the long-rayed Luidia, the many-armed "Gorgon's head" (Gorgonocephalus), and the multi-rayed Heliaster, or "Sun Star-fish"; amongst the "Brittle Stars" take note of the large long armed Pectinura.

Turning the angle of the wall case the visitor will find the Echini or "Sea-Eggs," some with fine long acicular spines (Diadema), others with club-shaped (Heterocentrotus), and some with toothed spines (Goniocidaris). Some display a rock boring habit by forming, when young, pot holes, and gradually enlarging these to accommodate their growth. These Echini present two very marked differences in outline—one group consisting of forms more or less spherical to dome-shaped, a second series in which flattened and cake-liked or heart-shaped outlines predominate. The flat to heart-shaped species are usually densely clothed with fine spines, the former being typified by the "Buckler Urchins" (Clypeaster), and the latter by the Schizasters.

COELENTERATA.—Jelly-fish, Hydromedusæ and Hydrocorallia, Sea Anemones, Alcyonaria, Sea-pens, and True Corals:— The Echini are followed by that great group of organisms—the Cœlenterata—comprising all those creatures, more or less radiate in structure, in which the internal cavity, corresponding with the alimentary canal of other animals is not a closed canal running through the body, but is commensurate with the whole cavity of the body.

Along the upper shelves are a few glass models of "Jelly-fish" such as Aurelia and Physalia or "Portuguese Man-of-War," so well known to bathers by the stinging properties of its tentacles. Succeeding these models are a number of those pretty, feathered plant-like creatures found on the sea shore often thought to be plants, but still true animal colonies, included in the order Hydromedusæ—such are the well-known types Sertularia and Plumularia; a very characteristic form of our Port Jackson waters is known as Ceratella fusca. On the sloping shelf are examples of the Hydrocorallia, in which the stocks secrete masses of carbonate of lime out of which the animals protrude like those of true corals; these are typified by the brilliant red, crimson and orange branching forms known as Distichopora and Stylaster, also the sponge-like Millepores.

A number of finely executed glass models of "Sea Anemones" are next exhibited, particular attention being directed to the "Dahlia Wartlets," the "Deeplet" and the "Opelet," with its pink-tipped green tentacles.

Turning the angle of the wall case, along the upper shelves are many fine examples of the Alcyonaria, or speaking generally, the "Sea Fans," and on the shelves below, the "Stony" or True Corals. The Alcyonaria are all shrub-like growths more or less, and many of them brilliantly coloured yellow, orange or various shades of red. One of the principal characters of these organisms is the presence of a horny or calcareous skeleton secreted by the polyps beneath their bases, and the colonies are generally attached to rocks, &c. A typical family is that of the Gorgonias, the "Sea-Fans" *par excellence;* perhaps the handsomest specimen in the case is the beautiful expansion labelled Melitodes.

Associated with these will be found peculiar bodies known as "Sea-Pens," which may be either attached by means of a stem to submarine objects or else rest loosely in the sand. Examples:—Sarcophyllum and Pennatula.

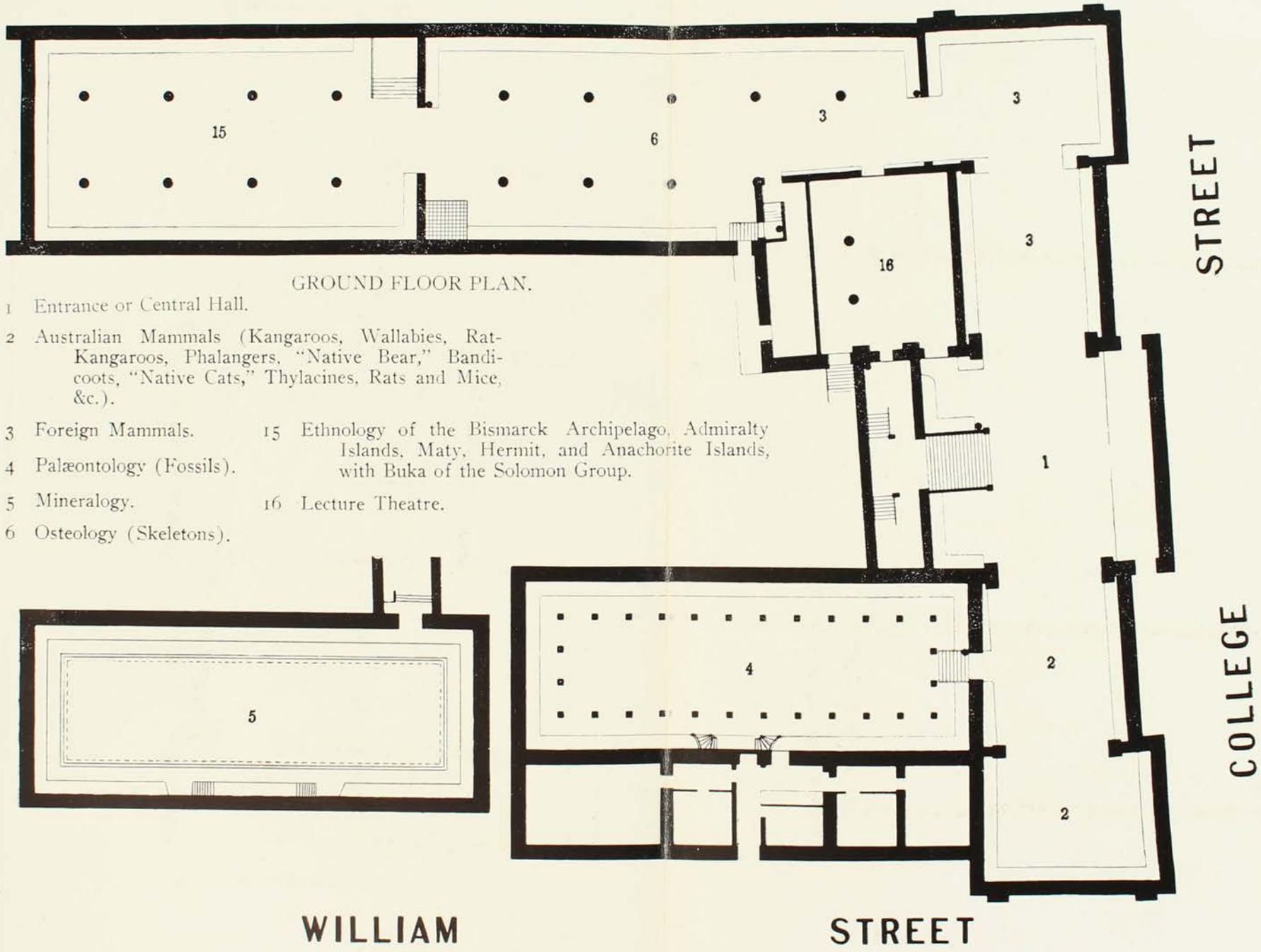
A form allied to the Gorgonias in which the axis is not horny, but calcareous, is the "Red-Coral" (Corallium

rubrum) of commerce, found only in the Mediterranean and Asiatic seas, and is made into articles of ornament. Accompanying the specimen is a glass model displaying the polyps expanded. Also specimens of the "Blue-Coral" (Heliopora cœrulea) of the Indian and Pacific Oceans, in which the skeleton is also calcareous; the blue tint is still visible on fractured surfaces, otherwise the specimens are faded. Finally we have the well-known "Organ-pipe" Coral (Tubipora musica) which in structure is unique amongst extant corals, and recalls certain extinct forms.

The "Stony" or True Corals on the lower shelves present the most varied shapes and outlines. For instance the hemispheric or globose "Star-Corals" (Goniastræa and Favia); the long bud-like stems of Euphyllia, the meandering "Brain-Corals" (Meandrina and Cœloria), the surfaces of which look like a series of deeply excavated valleys; the "Crisp-Corals" (Flabellum), characterised by the slit-like form of the mouth; the "Mushroom-Corals" (Fungia), again solitary forms taking their name from their resemblance to the head of an expanded mushroom turned upside down; and the branching Madrepores, particularly the fine M. florida and the platter-like M. conferta.

PORIFERA.—Sponges:—The remainder of this line of wall case is occupied by the Sponges. By far the most attractive are the "Glass Rope-Sponge" (Hyalonema) and "Venus' Flower-basket" (Euplectella), in both of which the skeletal elements are siliceous. In the "Glass Rope" of Japan the solid-looking ovoid cup above is anchored from its lower end by the long siliceous twisted strands of spicules, hence its name. In the "Flower-Basket" the sponge is cornucopia-like and perforated by a series of holes as in a sieve. The various forms and textures of the Sponges exhibited are too numerous to be specifically referred to, but at the end of the case are important groups named Euspongia and Hippospongia, the "Toilet" and "Bath Sponges" of commerce. It is now known that at least eight species and varieties, which are valuable commercially, occur on our coast! From an economic point of view, one known as Euspongia illawarra is the most important, being quite equal, if not superior to many of the imported kinds used for domestic purposes.

GROUND FLOOR PLAN



GROUND FLOOR PLAN.

1 Entrance or Central Hall.

2 Australian Mammals (Kangaroos, Wallabies, Rat-Kangaroos, Phalangers, "Native Bear," Bandicoots, "Native Cats," Thylacines, Rats and Mice, &c.).

3 Foreign Mammals.

4 Palæontology (Fossils).

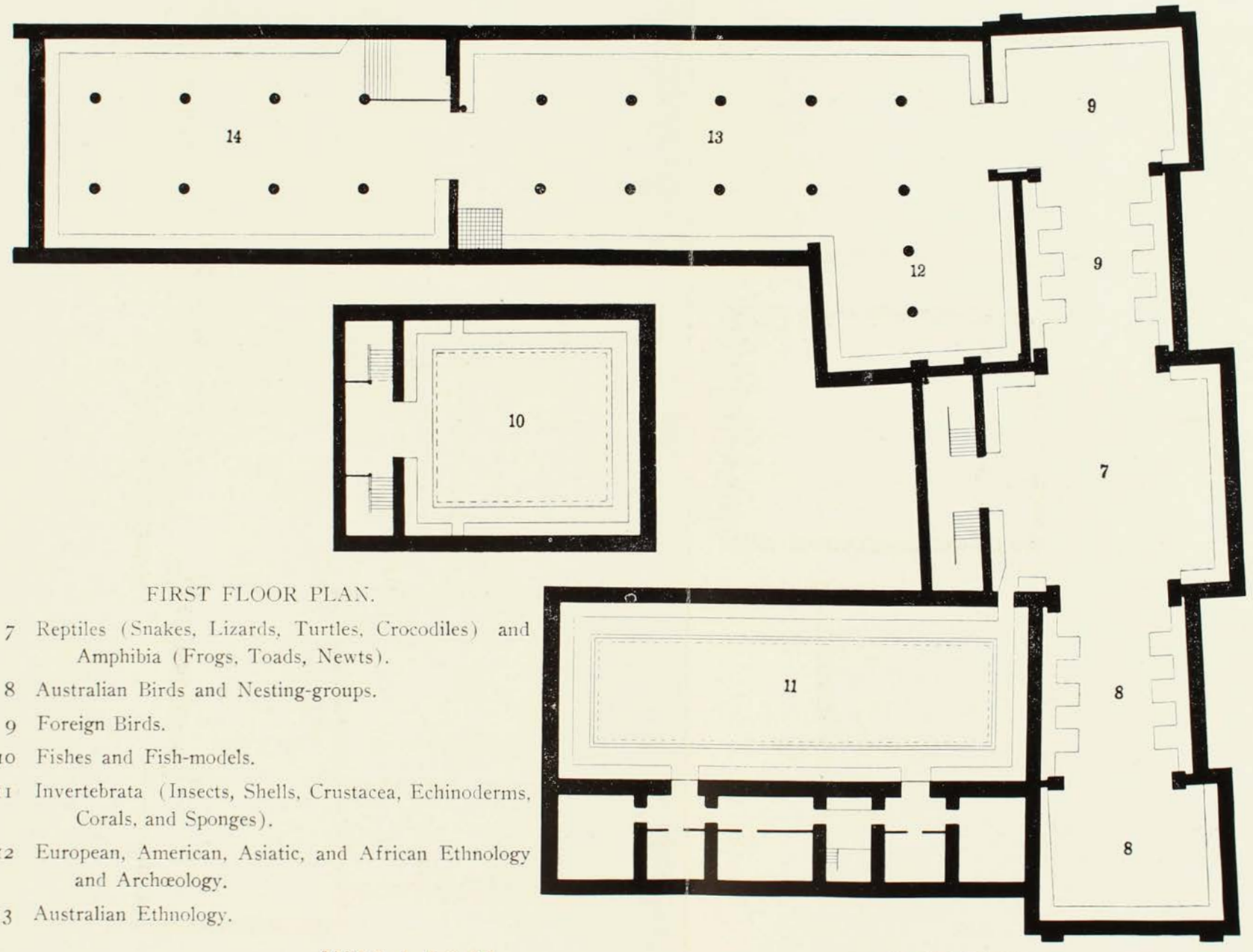
5 Mineralogy.

6 Osteology (Skeletons).

15 Ethnology of the Bismarck Archipelago, Admiralty Islands, Maty, Hermit, and Anachorite Islands, with Buka of the Solomon Group.

16 Lecture Theatre.

FIRST FLOOR PLAN



FIRST FLOOR PLAN.

7 Reptiles (Snakes, Lizards, Turtles, Crocodiles) and Amphibia (Frogs, Toads, Newts).

8 Australian Birds and Nesting-groups.

9 Foreign Birds.

10 Fishes and Fish-models.

11 Invertebrata (Insects, Shells, Crustacea, Echinoderms, Corals, and Sponges).

12 European, American, Asiatic, and African Ethnology and Archœology.

13 Australian Ethnology.