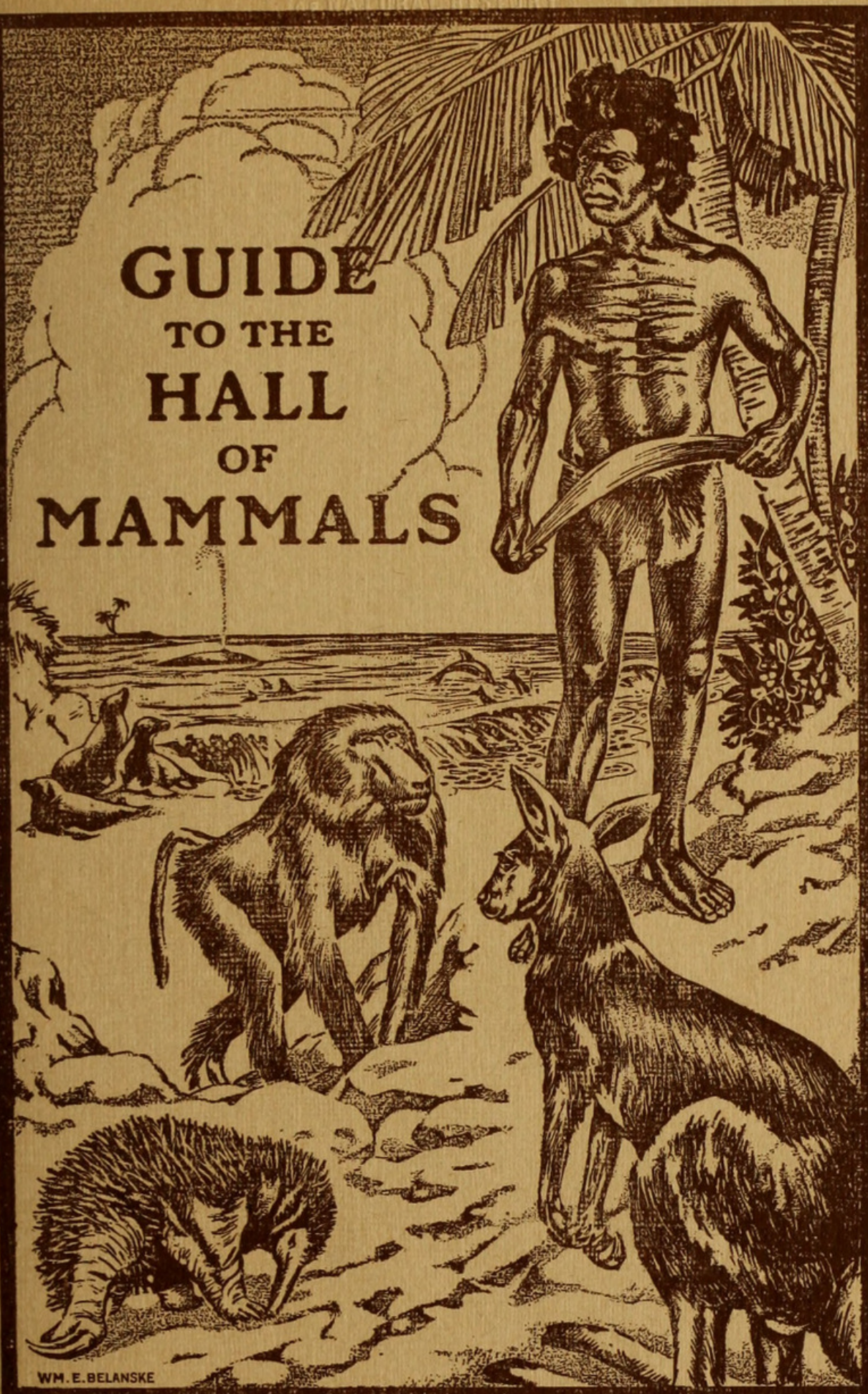
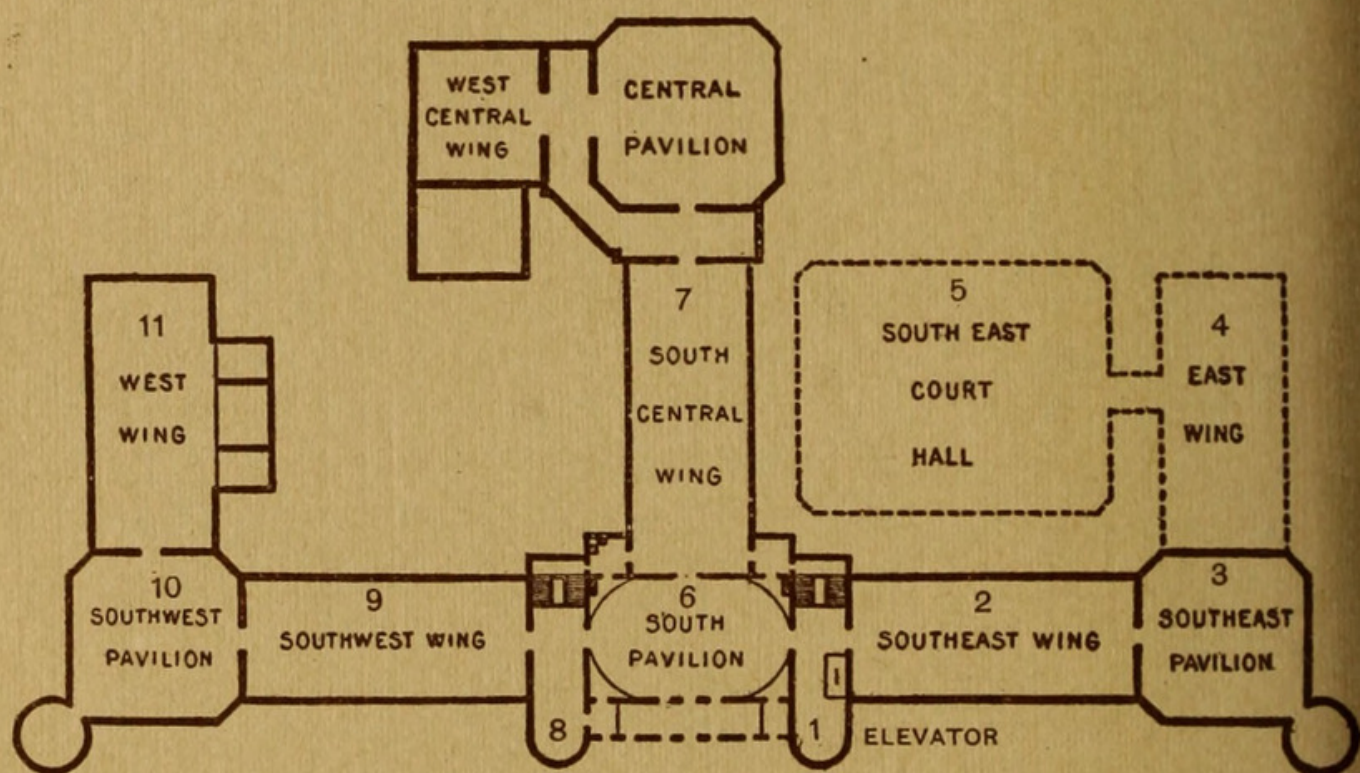


5106 (747) 1111
THE AMERICAN MUSEUM

**GUIDE
TO THE
HALL
OF
MAMMALS**



OF NATURAL HISTORY



THE HALL OF MAMMALS

is on the **THIRD FLOOR**, **SOUTHEAST WING**, just to the right of the elevator. It is number 2 on the floor plan shown above

GUIDE
TO THE
HALL OF MAMMALS

BY
FREDERIC A. LUCAS



The American Museum of Natural History
Guide Leaflet No. 57
New York, October, 1923



The **Guide Leaflets** describe some exhibit, or series or exhibits, of special interest or importance, treat of some branch of museum work, or, as in the present case, may deal with the contents of an entire Hall. A list of the "popular publications" of the museum may be obtained from the librarian.

GUIDE TO THE HALL OF MAMMALS

By Frederic A. Lucas

This leaflet was written in the hope that it might prove useful to classes and visitors in connection with the exhibits in the Hall of Mammals. Its object is to point out the purpose of the exhibits, to tell why the specimens are shown and what they are intended to illustrate. And for the very reason that it is not intended as a text book, but for use with the collections it has been left largely an outline to be filled by those using it.

It deals with Mammals, a term frequently confused with Animals. Strictly speaking, all living creatures are animals, but to many people, possibly the majority, animal means a mammal in distinction to birds and other creatures.

The collection was begun with the view that it might be helpful to students and scholars by providing them with a handbook in which the reading matter should be furnished by the labels and the illustrations by the objects themselves. It was also hoped that it might prove of interest to visitors and that without special effort they might get an idea of what a mammal is.

Like a book it is to be read from left to right, beginning with the Characters of Mammals and the Family Tree of Mammals at the left of the entrance, and ending with Man, who is a species of Mammal and considered by himself to be the head of his class.

The story of man is told elsewhere, his evolution and early history in the Hall of Age of Man and Hall of Archæology, the characters and customs of living races in various halls of the Department of Anthropology.

The object of the exhibits is to show the distinguishing features, or *characters of mammals*, the points wherein they agree with one another and differ from other animals; their main groups or *Orders*, and the subdivisions of their orders or *Families*; as well as the variations in the skeleton, *Modifications of structure*, whereby they are adapted to different modes of life, the whales for dwelling entirely in the sea, the seals for living in the sea or on land, the horse for land only and the sloth for the trees.

As the exhibits give a brief, but comprehensive illustration or synopsis of the points noted above, they form collectively the *Synoptic Series of Mammals*.¹

The exhibits are divided into, or may be considered in two sections, the Systematic Series, that deals with the larger divisions of Mammals, Orders and Families, and a Special Series that deals with special features of the Class and includes examples of some of its rarer or more interesting members.

MAMMALS

Their Characters, Divisions and Modifications

Mammals are warm-blooded, backboned animals that with a few rare exceptions are born alive and nourished for a time on milk.

They may be large or small, naked, covered with hair or scales, have teeth or be toothless; live on land or in the water, swim, walk, fly or burrow in the ground, but they agree in the above particulars and are all placed in the Class Mammalia. They belong, with Birds, Reptiles, Amphibians and Fishes in one of the large groups or Phyla, of the Animal Kingdom termed Vertebrata or back-boned animals, because they all have a vertebral column or back bone. (See Family Tree of Mammals).

¹Note: The writer and curator is well aware that this is not an attractive title, but he has been unable to think of any other that combines brevity with accuracy and will be glad to receive suggestions in regard to it.

CHARACTERS OF MAMMALS

(First Wall Case on Left)

A technical exhibit for advanced students: it deals at length with the distinctive characters of mammals and compares, or contrasts them with the corresponding characters of reptiles, from which mammals are considered to have been derived. It is an answer to the question, What is a mammal?

FAMILY TREE OF MAMMALS

(First Pier Case on Left)

Showing the relation of mammals to other groups of animals.

Note how life began with animals of simple structure from which as time went on more complex or higher forms were evolved. The mammals appeared late in the history of the earth and stand at the top of the "Tree."

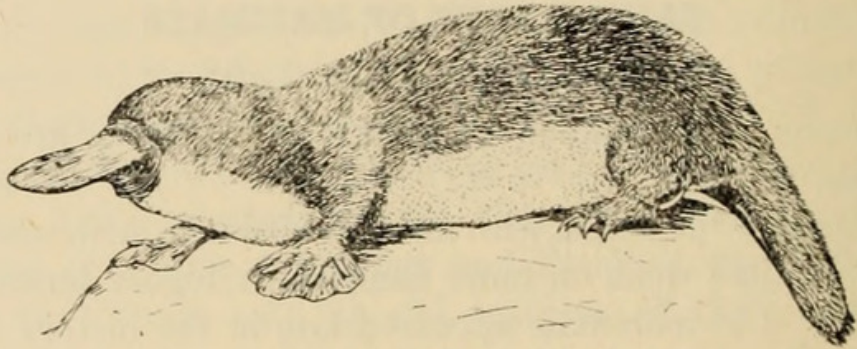
GENERAL OR SYSTEMATIC SERIES

Mammals arranged according to a given plan or system—in this case their structure. An illustration of the methods employed in classification will be found in a pier case on the North Side showing the divisions of the seals—*Pinnipedia*, based on resemblances or differences in their skulls and especially in their teeth. The mounted specimens and skeletons show the outward form and internal structure of the groups, and the maps of distribution show where they occur. The accompanying labels give information as to their general character, appearance in time and peculiarities of structure.

THE ORDERS OF MAMMALS

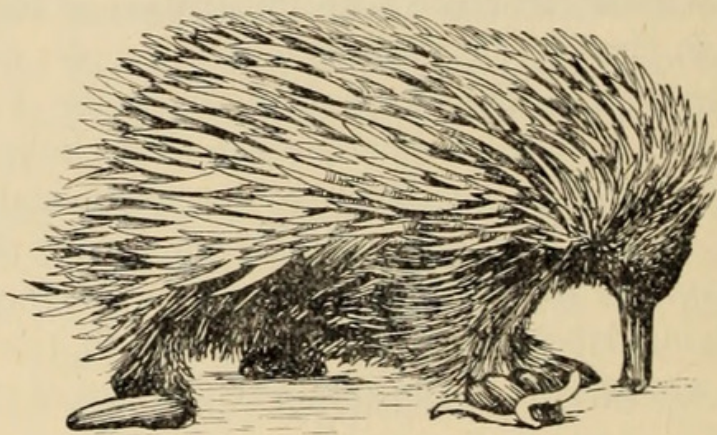
Following is a list of the Orders of Mammals with brief explanatory notes in regard to them. The names may appear formidable because they are unfamiliar but they are the names in general use in text-books, in many cases there are no "common" names and it is hoped that a little observation of the collections and the notes in this leaflet may cause the names used to appear a little less fearsome.

MONOTREMATA, Egg-laying Mammals, Monotremes. Include the Platypus and Echidna; termed primitive because they resemble in structure the reptiles from which mammals are believed to have been derived. They differ from all other mammals in that the young are hatched from eggs, though nourished on milk. They are placed in a group or sub class, termed *Prototheria*, the first mammals.



PLATYPUS

Ornithorhynchus paradoxus



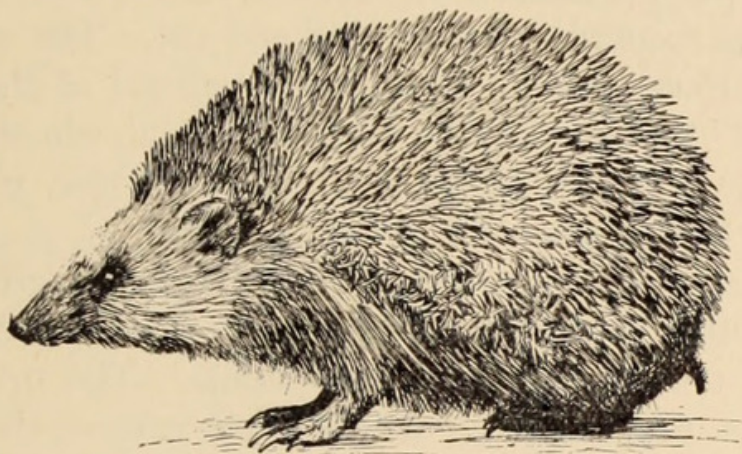
ECHIDNA

Echidna aculeata

Information in regard to Classification, Scientific Names, and related points may be found in A First Chapter in Natural History.

MARSUPIALIA, Pouched Mammals, Opossums, Kangaroos and related animals.

The young are born at an early stage and during the first part of their life carried in a pouch. The greater number are found only in Australia. They vary greatly in form and habits and we have marsupials that are flesh eaters, grass eaters and rodents; they jump, climb, run, and a few sail like our flying squirrel. The Marsupials are given a sub class, *Metatheria*, intermediate mammals, as ranking between the



HEDGEHOG

Erinaceus europæus

An insectivore that suggests a little Porcupine

egg-laying mammals and those in which the young are well-developed when born.

The following *Orders* from Insectivores to Primates contain the vast majority of existing mammals, including those with which we are most familiar; they form a large assemblage known as *Eutheria*, the right or perfect mammals.

INSECTIVORA, Insect Eaters; animals of small size, many of them, like the mole, adapted for an underground life where they feed on worms and insect larvæ.

CHIROPTERA, Bats; the only mammals that really fly, their immensely long fingers, supporting like the ribs of an umbrella, a membrane that forms a wing. Their distribution depends mainly on temperature; when the cold puts an end to the insects on which they feed, the bats hibernate, go into winter quarters and sleep until spring. The fruit-eating bats, the largest members of the order, are found only in warm countries where they can obtain food throughout the year.

CARNIVORA or **FERÆ**, The flesh eaters or Beasts of Prey. Familiar examples are the dog and cat. The cat is "a carnivorous, fissiped, digitigrade mammal of the family *Felidæ*;" that is, it is a flesh-eating animal, whose toes are separate, that walks on the tips of its toes, nurses its young, and is a member of the Cat family.

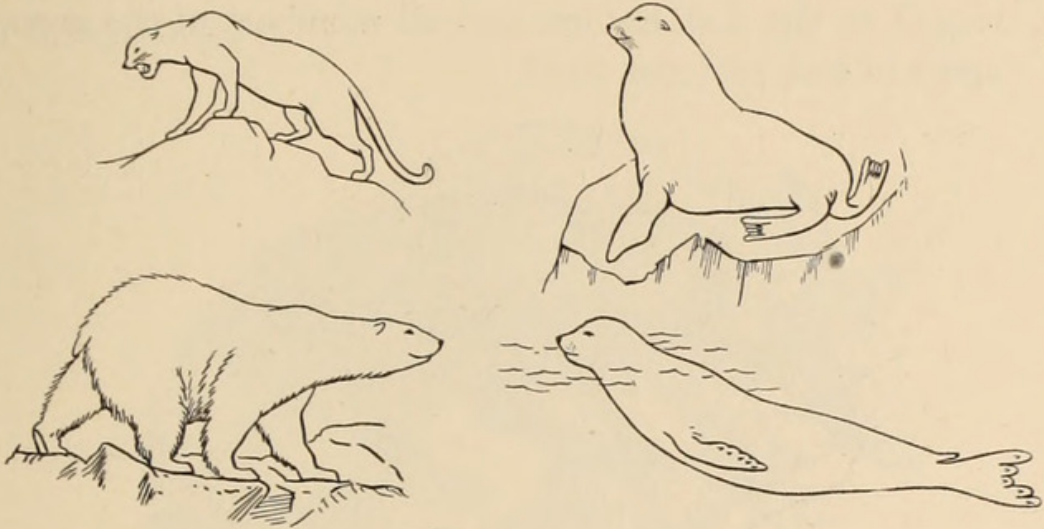
The Carnivores are divided into two great groups, the Fissipedia, whose fingers are free and the Pinnipedia whose fingers are united to form a paddle. The first group includes the majority of the flesh eaters—the Lions, Wolves, Bears and Weasels, the second the Seals and Walruses.

AN OUTLINE OF THE CLASSIFICATION OF THE BEASTS OF PREY—ORDER FERÆ

Fissipedia	Pinnipedia
Feet for Walking	Feet for Swimming
Cats	Walruses
Weasels	Eared Seals
Dogs	Earless Seals
Bears, etc.	

Also the cat is digitigrade—walks on its toes—and the bear is plantigrade—walks flat-footed—and the seal is pinnigrade—swims with its feet.

“Classification” is merely the orderly arrangement of animals or other objects, placing those most closely related to one another in a group by themselves and arranging the groups thus formed with reference to their degree of relationship.



TYPES OF CARNIVORES

Panther
Polar Bear

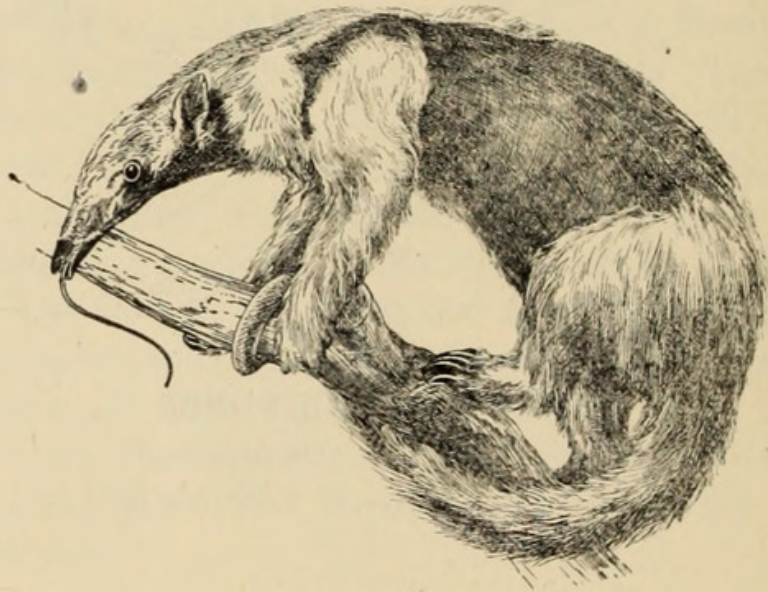
Fur Seal
Harbor Seal

RODENTIA or **GLIRES**, Gnawing Animals, including rats, mice and rabbits; mostly small animals, the giant of the order being the South American Capybara. This group contains more species and individuals than any other order and owing to their small size, adaptability and rapidity with which they breed, its members are found over the greater part of the earth. The most evident character of the order is the structure of the front teeth, incisors, which are made on the principle of some chisels, a thin cutting edge of hard enamel in front, backed with soft dentine; this wears away faster than enamel, automatically keeping the teeth sharp. The cutting teeth grow continuously and rodents *must* gnaw to keep them worn down.

BRUTA or **EDENTATA**, Sloths, Armadillos and their relations.

A mixed assemblage of mammals varying greatly in outward appearance. They are "low" in their brain characters and intelligence, "low" in the simple structure of their teeth and in some features of the skeleton.

The term Edentata—toothless—is literally true in regard to the Ant Eaters, and all members of the group agree in lacking front teeth.



ANTEATER

Tamandua tetradactyla

PHOLIDOTA, Scaly Anteaters, Pangolins, Manids—one of the cases where the so-called common name conveys no idea to the average person. The members of this order are distinguished by being clad in overlapping horny scales which offer a pretty good protection when the animal coils up with the tail outside. They are confined to Tropical Africa south of the Sahara, and southern Asia. One species is noteworthy as having the longest tail of any Mammal, fifty-two vertebrae, one for every week in the year.

EFFODIENTIA, the Aard varks, so called in allusion to their burrowing habits, though the order has also been termed *Tubulidentata* in reference to the structure of the teeth which are composed of little tubes placed on end.

This order includes only two species of animals found in the warmer parts of Africa and formerly placed with the Edentates.



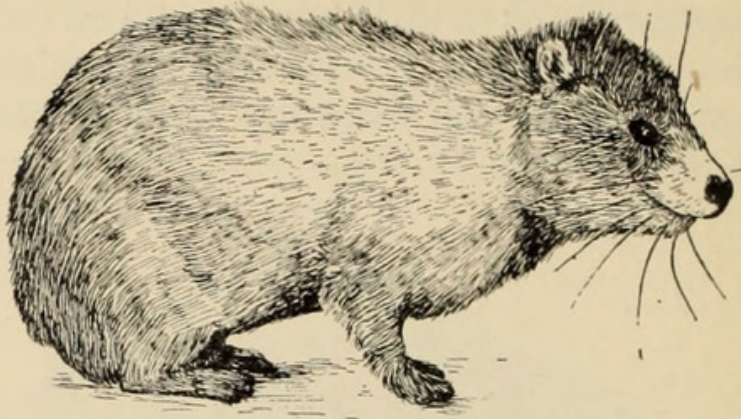
AARD VARK

Orycteropus ater

UNGULATA, the Hoofed Mammals, including such well known forms as sheep, deer, antelope, camels, cattle and horses. The vast majority of large quadrupeds belong in this order whose members are widely distributed over the earth, save Australasia, and were abundant until killed off by man. They are most numerous in Africa, least numerous in South America and there are none in Australia.

HYRACOIDEA, Hyraxes or Dassies, neither of which "common" names conveys any meaning, being a good illustration of the fact that a so-called "common" name may be just as meaningless to the majority of people as a scientific name. An order including a few species of small mammals looking something like rabbits, but not at all like them in any part of their structure and really related to the Rhinoceroses. The species found in Syria is the coney

mentioned in the Bible, "The conies are but a feeble folk, yet make they their homes in the rocks."

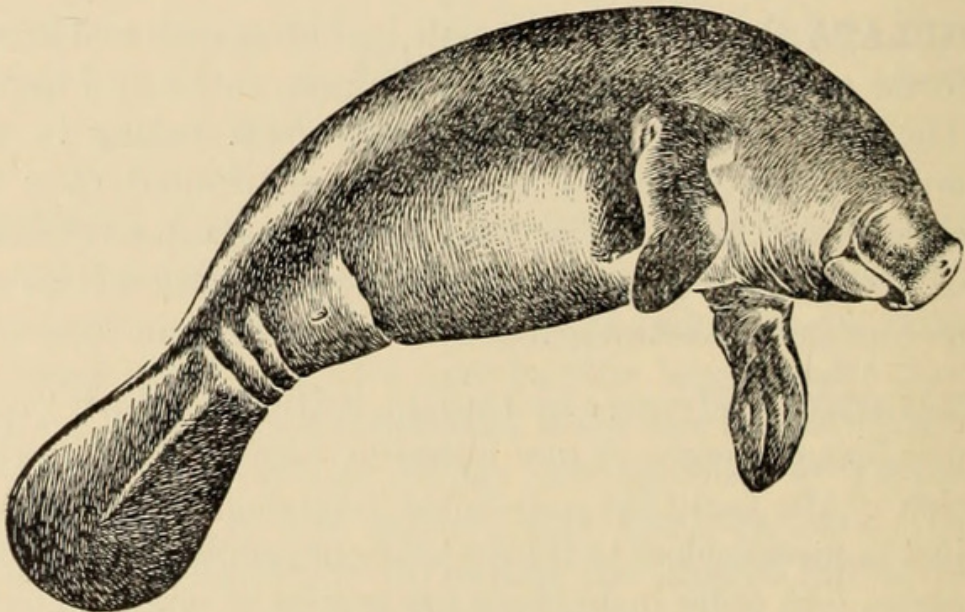


HYRAX OR DASSIE

Hyrax capensis

PROBOSCIDEA, Elephants, present and past.

"Beast that hath between its eyes a serpent for an arm."
The largest of land mammals distinguished from other mammals by many well defined characters, size not being a character.



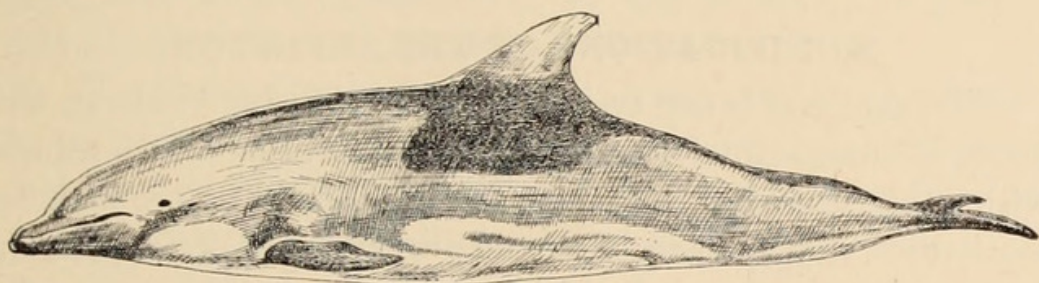
FLORIDA MANATEE

Trichechus latirostris

A member of the Order Sirenia noted on the opposite page

SIRENIA, the "Sea Cows," Manatees and Dugongs. An ancient order including but few species and these widely separated. Mostly confined to tropical, or warm waters, though one species, the Rytina or Arctic Sea Cow, the largest member of the group, was found in the north where it was exterminated by man.

CETACEA, Whales and Porpoises. Mammals adapted for living wholly in the water, often mistakenly thought to be fishes, though they breathe by lungs and not by gills and must come to the surface for air. Their fore limbs are modified into flippers, the hind limbs present as mere vestiges concealed within the body and the tail present in the shape of flukes.



COMMON DOLPHIN

Delphinus delphis

A rough and ready means of distinguishing between cetaceans and fishes is that the former have the tail, or flukes, crosswise to the body while in fishes it is always vertical, up and down.

The order contains the largest animals that have ever lived, the great Blue Whale reaching a length of 103 feet.

PRIMATES, the "highest" mammals, Man, Apes, Monkeys and Lemurs, these last widely separated from the others in characters and intelligence. Man is sometimes placed apart in a Suborder Bimana, two-handed, while his relatives are termed Quadrumana because in most of the species the big toe is opposable to the others so that the foot, like the hand, is fitted for grasping.

SPECIAL SERIES

Illustrations of the relation of internal structure to form and habits; modifications of the teeth; change of color with the season.

RELATION OF ANIMALS TO THEIR ENVIRONMENT

On the left (North) Relation of Animals to their surroundings or *Environment*. Mammals, and other animals, that dwell in deserts are pale and harmonize in color with the sand, thus illustrating protective coloration. The birds, insects and plants offer further instances of adaption; in the case of plants the leaves are reduced in size and number to lessen evaporation.

MODIFICATIONS OF THE SKELETON

The skeleton is the best, and most enduring evidence we have, of any animal's place in nature and its relationships with other animals: it is also the solution of a problem in mechanics, that of carrying a given weight and of adaptation to some particular mode of life. So the skeleton not only indicates the group of animals to which its owner belongs, but also tells of his mode of life, for it varies, or is modified, according as a creature dwells on land, lives underground, or in the water, walks, swims or flies; feeds on grass, catches insects, or preys upon its fellows.

TEETH

Their structure, location, method of implantation, growth, mode of replacement and modifications, with special reference to the teeth of mammals: Case on south or right side of hall.

ALBINOS AND MELANOS

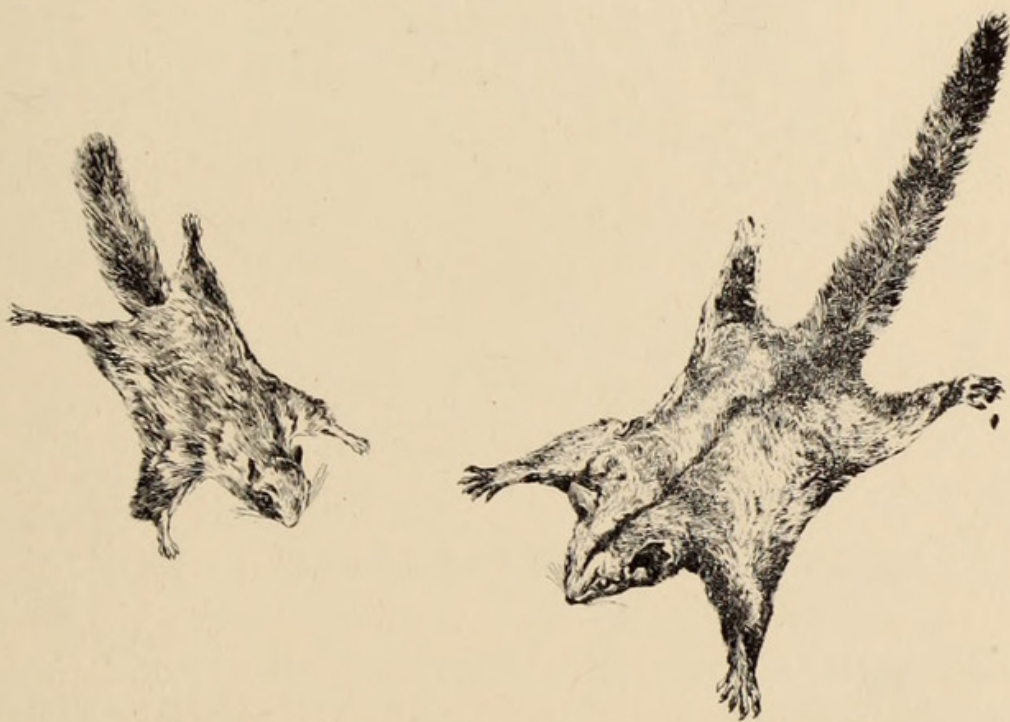
Albinos are animals in which the coloring matter or pigment of the hair or other parts of the body is lacking. They may occur in any group of mammals.

Melanos are animals in which there is an excess of coloring matter. They occur more often than albinos and are particularly numerous in some species or in some localities. In the Grey and Fox Squirrels melanos occur so often as to form a distinct color phase, and black Leopards are common in some localities in southern India and the Malay Peninsula. Baghera of the "Jungle Stories" was a Black Leopard.

ANIMALS THAT LOOK ALIKE BUT ARE DIFFERENT

These specimens illustrate the point that because two animals look alike they are not necessarily related, differences in the skeleton (*Structural Differences*) being much more important than mere resemblance, and furnishing the characters on which classification, or the grouping of animals according to their relationships is based.

The Flying Squirrel and little Acrobat both sail from tree to tree, but one is a rodent and one is a marsupial; the Squirrel and Squirrel Shrew look alike and have the same habits, but one is a rodent and one an insectivore.



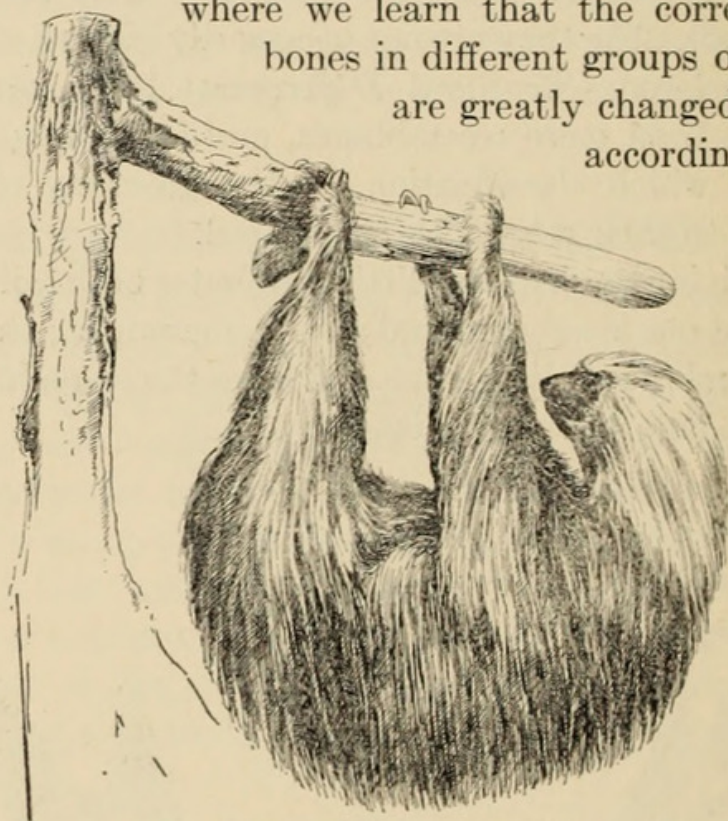
FLYING SQUIRREL. FLYING PHALANGER

The Echidna, the Hedgehog and the Porcupine all have spines but belong to widely separated orders of Mammals.

The Tasmanian Wolf and the Coyote are much like one another in form and habits, both being flesh eaters, but one is a marsupial and the other a true carnivore.

RELATION BETWEEN FORM AND HABITS

According to their mode of life, the limbs of mammals are modified to form fingers, feet, paddles or wings. The underlying changes are shown in the *Modifications for Locomotion* where we learn that the corresponding bones in different groups of animals are greatly changed in shape according to their function.

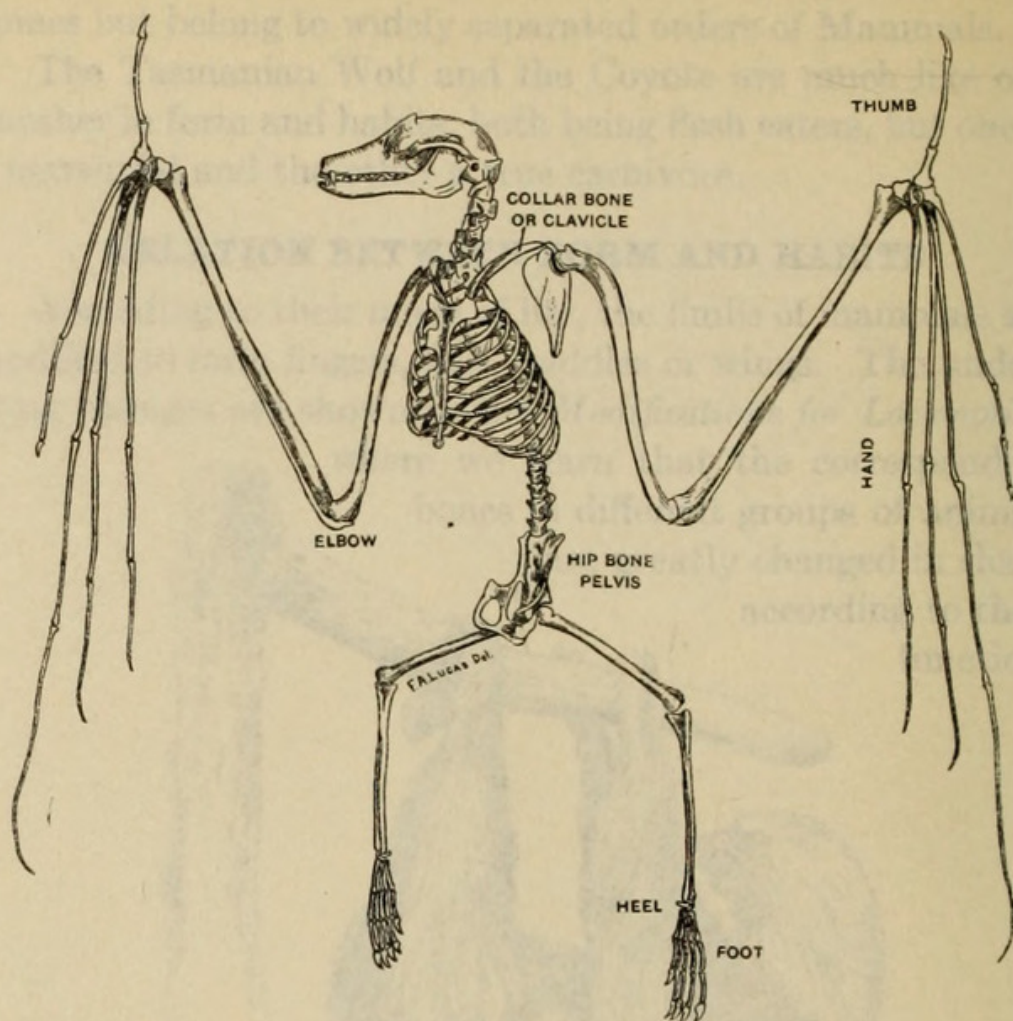


TWO-TOED SLOTH

Cholopus didactylus whose feet are hooks.
The sloth hangs below the branches.

COLOR CHANGE IN THE VARYING HARE

In northern regions many mammals and some birds change their coats with the season, becoming white in winter, a familiar example being the Ermine and Weasel. It is a change of hair and not in the hair, the gray coat being shed and the white one put on early in winter and the process reversed in spring.



FRUIT BAT

Pteropus species

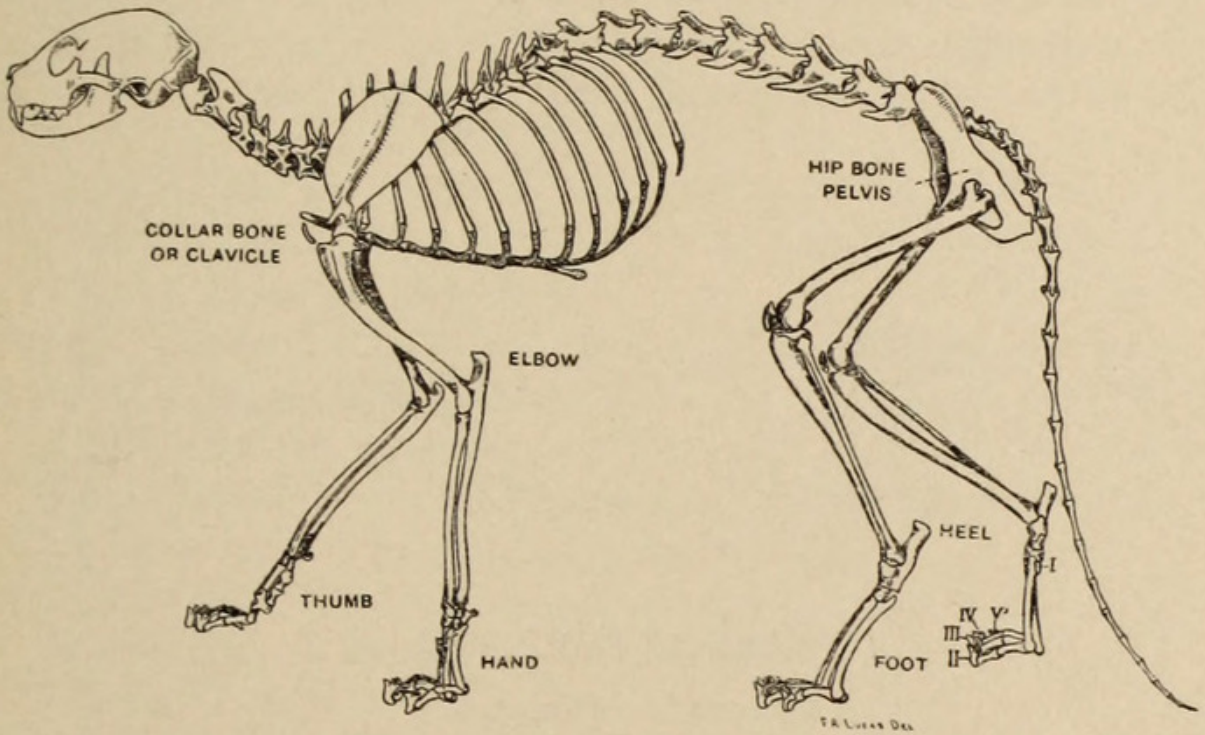
As in other bats the fore legs are modified, or changed, for flight, all the bones, but especially the fingers, being greatly lengthened to form supports for the membrane that serves as a wing. The fruit bats fly with rather slow wing beats and the outer part of the wing is proportionately larger and more rounded than in their smaller, more active relatives. The hind feet are little used, serving mainly as hooks by which the bat hangs itself up—head downwards—to sleep.

MODIFICATIONS FOR LOCOMOTION

Shows the variations in the skeleton, and especially in the limbs, by which animals are adapted for walking, jumping, flying or swimming. The snake is introduced to show that it is possible for an animal to run, climb or swim with no limbs at all.

The series of limbs in a nearby case shows details of structure, the bones being colored so that the same bone in the various feet may be readily distinguished.

See also Relation between Form and Habits.



THE CAT

Felis domestica

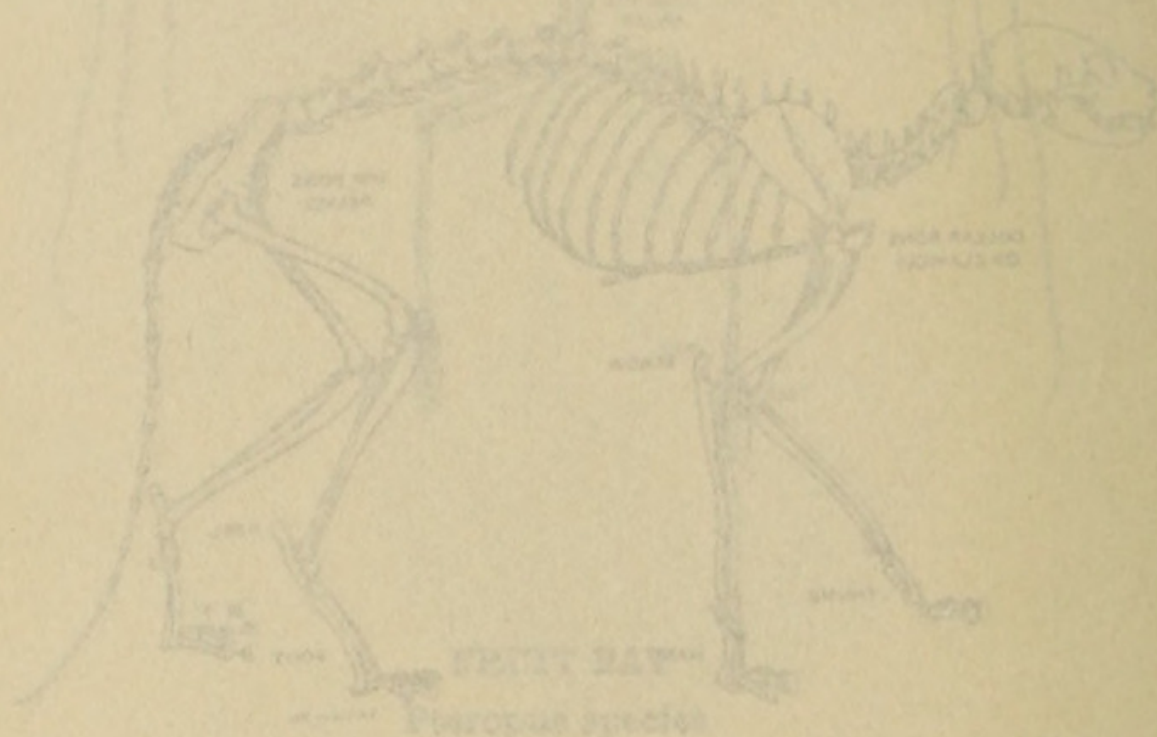
An example of a skeleton slightly modified for free and rapid movements and for jumping—this last point is indicated by the length of the foot bones and the size of the heel and elbow. The skeleton of the cat may serve as a convenient term of comparison with the skeletons of other animals.

MODIFICATIONS FOR LOCOMOTION

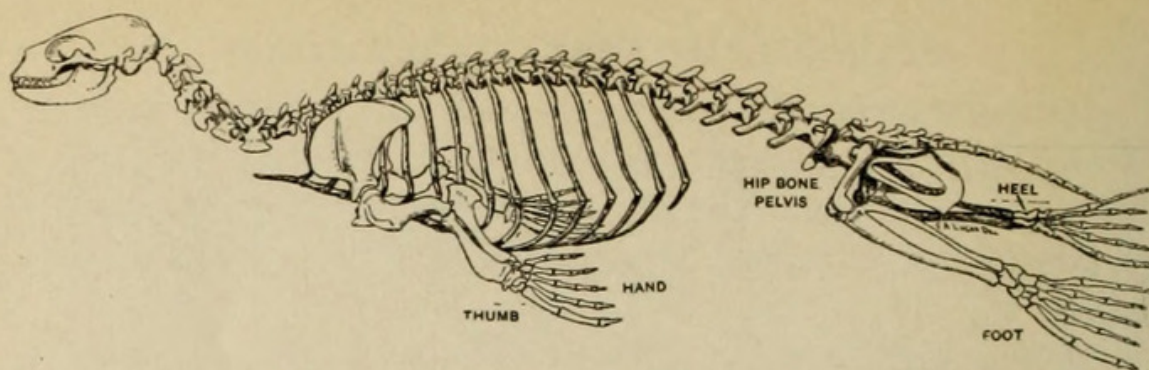
Shows the variations in the skeleton, and especially in the limbs, by which animals are adapted for walking, jumping, flying or swimming. The snake is introduced to show that it is possible for an animal to run, climb or swim with its limbs at all.

The series of limbs in a group usually shows details of structure, the bones being colored so that the same bone in the various feet may be readily distinguished.

See also Relation between Form and Habitat.



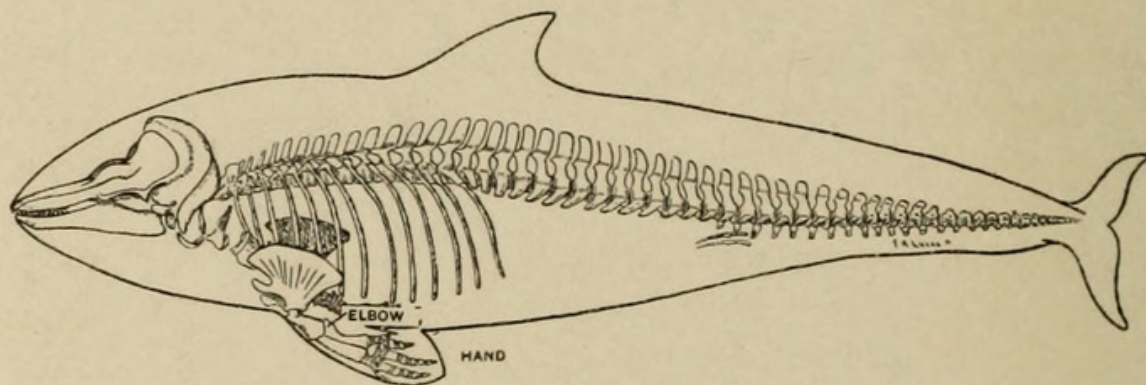
Compare the skeleton of a cat with that of a dog, and note the differences in the shape and position of the bones. The cat is adapted for jumping, and its hind legs are much longer than its forelegs. The dog is adapted for running, and its forelegs are much longer than its hind legs. The skeleton of a cat is modified for its mode of locomotion, and the bones are shaped and positioned accordingly. The cat's spine is very flexible, and its ribs are short and close together. Its forelimbs are short and stout, and its hindlimbs are long and slender. The cat's skull is large and rounded, and its jawbone is very strong. The cat's teeth are sharp and pointed, and its tongue is long and flexible. The cat's skeleton is a masterpiece of adaptation, and it is well suited to its life as a predator.



HARBOR SEAL

Phoca vitulina

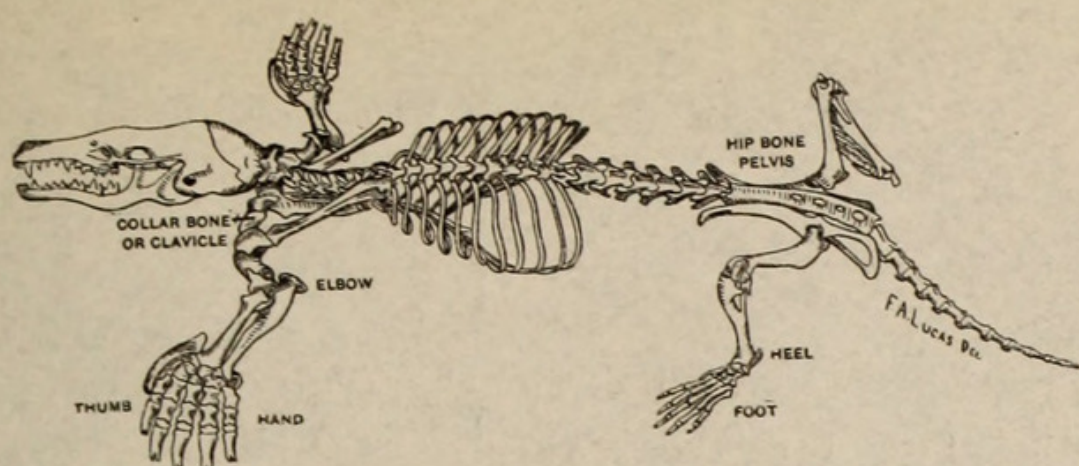
Like other seals this species passes some time on land, coming out to bask in the sun, but the legs are of little use for locomotion on land. All four limbs are changed into paddles for swimming, though the hair seals swim mainly with their hind feet and the eared seals with their front feet.



HARBOR PORPOISE

Phocaena communis

The porpoise is an example of a mammal fitted for living only in the water, and represents the extreme of modification among mammals. The hind limbs have been lost, their only vestiges being two little bones that represent the pelvis, or hip bone: the front limbs have been changed into rigid paddles, fit only for balancing or steering; locomotion is effected by what is really the tip of the tail, which has been developed into flukes for swimming. Note that unlike the tail of fishes the flukes of whales and porpoises contain no bones.



MOLE

Scalops aquaticus

Modifications of the skeleton for an underground life are most evident in the fore limbs which perform the work of digging, being for this purpose short and stout, the hands large, and turned on edge. (In the figure the hand is turned down to show the bones).

The foot is also strengthened by the addition of a bone running along the edge of the foot, shown in the picture. This bone is not found in other mammals.

The skeleton of the mole illustrates the fact that a bone of little importance in one group of animals may be of great value in another.

In the cat and the seal, in which there is no particular strain on the fore feet and great freedom of movement is needed, the clavicle or collar bone is very small, or absent: it is also absent in the porpoise in which the fore limb is scarcely used.

In the bat and the mole in which flying or digging bring great strain on the fore limb, the collar bone is very strong to brace the shoulder. This is particularly evident in the mole.



Lucas, Frederic A. 1923. "Guide to the Hall of Mammals." *Guide leaflet* 57, Page 1-23.

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