THE WILD BEASTS OF THE WORLD



BY FRANK FINN F·Z·S·

100 PLATES IN COLOUR

BY LOUIS SARGENT·CUTHBERT E·SWAN·&·WINIFRED AUSTIN

Mrs Scott McNair
Elgin Mills

TEC(NSS fol
FINN
WILD...
v.2



37131 054 911 177

THE WILD BEASTS OF THE WORLD

Mrs Scott McNair
Elgin Mills
Ont



HARE
By Winifred Austen

THE WILD BEASTS OF THE WORLD

BY

FRANK FINN, B.A., F.Z.S.

AUTHOR OF "BIRDS OF THE COUNTRYSIDE," "PETS, AND HOW TO KEEP THEM," ETC.

ILLUSTRATED WITH 100 REPRODUCTIONS IN FULL COLOURS FROM DRAWINGS BY LOUIS SARGENT, CUTHBERT E. SWAN, AND WINIFRED AUSTIN

VOL. TWO



LONDON: T. C. & E. C. JACK

16 HENRIETTA STREET, W.C., AND EDINBURGH

CONTENTS

	PAGE
The Common Hare (*Lepus europæus*)	1
The Mountain Hare (*Lepus variabilis*)	3
The Rabbit (*Lepus cuniculus*)	3
The Pikas (*Lagomyidæ*)	4
The Dassie (*Hyrax capensis*)	5
Tree Dassies	7
The Indian Elephant (*Elephas indicus*)	9
The African Elephant (*Elephas africanus*)	12
The Indian Rhinoceros (*Rhinoceros indicus*)	13
The Sondaic Rhinoceros (*Rhinoceros sondaicus*)	14
The Asiatic Two-horned Rhinoceros (*Rhinoceros sumatrensis*)	15
The Common African Rhinoceros (*Rhinoceros bicornis*)	15
The Great African Rhinoceros (*Rhinoceros simus*)	16
The American Tapir (*Tapirus americanus*)	17
Baird's Tapir (*Tapirus bairdi*)	18
The Pinchaque Tapir (*Tapirus roulini*)	19
The Malayan Tapir (*Tapirus indicus*)	19
Burchell's Zebra (*Equus burchelli*)	21
The Mountain Zebra (*Equus zebra*)	22
Grévy's Zebra (*Equus grevyi*)	23
The Ass (*Equus asinus*)	23
The Kiang (*Equus hemionus*)	24
The Wild Horse (*Equus caballus prezevalskii*)	24
The American Bison (*Bison americanus*)	25
The European Bison (*Bison bonasus*)	27
The Yak (*Poephagus grunniens*)	27
The Gaur (*Bibos gaurus*)	27
The Banteng (*Bibos sondaicus*)	28
The Wild Ox (*Bos taurus*)	28
The Indian Buffalo (*Bos bubalus*)	29
The African Buffalo (*Bubalus caffer*)	31
The Tamarao (*Bubalus mindorensis*)	32
The Anoa (*Anoa depressicornis*)	32
The Black-tailed Gnu (*Connochætes taurinus*)	33
The White-tailed Gnu (*Connochætes gnu*)	34
The Hartebeests	35
The Sassaby (*Damaliscus lunatus*)	36
The Blesbok and Bontebok (*Damaliscus albifrons* and *D. pygargus*)	36
The Springbok (*Gazella euchore*)	37
The Dibatag (*Ammodorcas clarkei*)	38
The Gerenook (*Lithocranius walleri*)	39
The Beira (*Dorcotragus megalotis*)	39
The Chiru (*Pantholops hodgsoni*)	39
The Saiga (*Saiga tatarica*)	39
The Pallah (*Æpyceros melampus*)	40
The Blackbuck (*Antilope cervicapra*)	40
The Beisa Oryx (*Oryx beisa*)	41
The Tufted Oryx (*Oryx callotis*)	42
The Gemsbok (*Oryx gazella*)	43
The Beatrix (*Oryx beatrix*)	43
The Leucoryx (*Oryx leucoryx*)	44
The Addax (*Addax naso-maculatus*)	44
The Sable Antelope (*Hippotragus niger*)	45
The Roan Antelope (*Hippotragus equinus*)	46
The Kob Antelopes (*Kobus*)	47
The Waterbuck (*Cobus ellipsiprymnus*)	47
The Lechwe (*Cobus lechi*)	48
The Eland (*Oreas canna*)	49
The Derbian Eland (*Oreas derbianus*)	52
The Koodoo (*Strepsiceros kudu*)	53
The Lesser Koodoo (*Strepsiceros imberbis*)	54
The Bongo (*Boocercus euryceros*)	54
The Inyala (*Tragelaphus angasi*)	55
The Bushbucks	55
The Sitatungas	56
The Nilghai (*Boselaphus tragocamelus*)	57
The Four-horned Antelope (*Tetraceros quadricornis*)	58
The Duikers	58
The Klipspringer (*Oreotragus saltator*)	60
The Royal Antelope (*Nanotragus pygmæus*)	60
The Dikdiks	60
The Chamois (*Rupicapra tragus*)	61
The Goral (*Nemorhædus goral*)	62
The Serows	63
The Rocky-Mountain Goat (*Haploceros montanus*)	63
The Takin (*Budorcas taxicolor*)	64
The Musk-Ox (*Ovibos moschatus*)	64
The Markhor (*Capra falconeri*)	65
The Wild Goat (*Capra hircus*)	66
The Ibexes	67
The Turs	68
The Tahr (*Hemitragus jemlaicus*)	68
Marco Polo's Sheep (*Ovis poli*)	69
The Mouflon (*Ovis musimon*)	71
The Urial (*Ovis vignei*)	71
The Burrhel (*Ovis nahura*)	72

CONTENTS

	PAGE
The Aoudad (*Ovis tragelaphus*)	72
The Giraffe (*Camelopardalis giraffa*)	73
The Okapi (*Okapia johnstoni*)	77
The Prong-Buck (*Antilocapra americana*)	79
The Musk-Deer (*Moschus moschiferus*)	81
Typical Deer	83
The Muntjac (*Cervulus muntjac*)	84
The Red-Deer (*Cervus elaphus*)	85
The Sambur (*Cervus unicolor*)	87
The Spotted Deer (*Cervus axis*)	87
The Fallow-Deer (*Dama vulgaris*)	88
The Elk or Moose (*Alces machlis*)	89
The Milou Deer (*Cervus davidianus*)	92
The Virginian Deer (*Cariacus virginianus*)	93
The Mule-Deer (*Cariacus macrotis*)	94
The Pampas Deer (*Cariacus campestris*)	95
The Huemul (*Xenelaphus bisulcus*)	95
The Brockets	95
The Pudus	95
The Roe (*Capreolus caprea*)	96
The Water-Deer (*Hydrelaphus inermis*)	96
The Reindeer or Caribou (*Rangifer tarandus*)	97
The Indian Mouse-Deer (*Tragulus meminna*)	101
The Kanchil (*Tragulus javanicus*)	103
The Napu (*Tragulus napu*)	103
The Water Chevrotain (*Hyomoschus aquaticus*)	104
The Camel (*Camelus dromedarius*)	105
The Bactrian Camel (*Camelus bactrianus*)	108
The Guanaco or Wild Llama (*Auchenia huanacus*)	109
The Vicugna (*Auchenia vicuna*)	112
The Hippopotamus (*Hippopotamus amphibius*)	113
The Pigmy Hippopotamus (*Hippopotamus liberiensis*)	116
The Indian Wild Boar (*Sus cristatus*)	117
The European Wild Boar (*Sus scrofa*)	119
The Pigmy Hog (*Sus salvanius*)	120
The Red River-Hog (*Sus porcus*)	120
The Babirusa (*Babirusa alfurus*)	121
The Wart-Hog (*Phacochœrus æthiopicus*)	123
The Forest-Hog (*Hylochœrus meinerzhageni*)	124
The Collared Peccary (*Dicotyles tajaçu*)	125
The White-lipped Peccary (*Dicotyles labiatus*)	127
The Sperm-Whale (*Physeter macrocephalus*)	129
The Pigmy Sperm-Whale (*Cogia breviceps*)	132
The Beaked Whales	132
The Porpoise (*Phocœna communis*)	133
The Common Dolphin (*Delphinus delphis*)	135
The Grampus (*Orca gladiator*)	137
Risso's Dolphin (*Grampus griseus*)	139
The Blackfish (*Globicephalus melas*)	139
The Beluga (*Delphinapterus leucas*)	140
The Narhwal (*Monodon monoceros*)	141
The Whalebone Whales	142
The Right Whales	143
The Rorquals	143
The Humpback (*Megaptera longimana*)	144
The Californian Grey Whale (*Rhachianectes glaucus*	144
The Manatee (*Manatus americanus*)	145
The Dugongs	147
The Two-toed Sloth (*Cholœpus didactylus*)	149
The Three-toed Sloths	151
The Great Ant-Eater (*Myrmecophaga jubata*)	153
The Tamandua Ant-Eater (*Tamandua tetradactyla*)	155
The Little Ant-Eater (*Cycloturus didactylus*)	155
The Pangolins	156
The Hairy Armadillo (*Dasypus villosus*)	157
The Giant Armadillo (*Priodon gigas*)	159
The Ball Armadillos	159
The Pichiciago (*Chlamydophorus truncatus*)	159
The Aard-Varks	160
The Red Kangaroo (*Macropus rufus*)	161
The Tree Kangaroos	164
The Rat Kangaroos	164
The Musk Kangaroo (*Hypsiprymnodon moschatus*)	164
The Vulpine Phalanger (*Trichosurus vulpecula*)	165
The Cuscuses	166
The Flying Phalangers	166
The Koala (*Phascolomys ursinus*)	167
The Noolbenger (*Tarsipes rostratus*)	168
The Wombats	168
The Tasmanian Devil (*Sarcophilus ursinus*)	169
The Thylacine (*Thylacinus cynocephalus*)	170
The Typical Dasyures	170
The Tapoa-Tafa (*Phascologale penicillata*)	171
The Banded Ant-Eater (*Myrmecobius fasciatus*)	171
The Bandicoots	172
The Common American Opossum (*Didelphys virginiana*)	173
The Water-Opossum (*Chironectes yapock*)	175
The Marsupial Mole (*Notoryctes typhlops*)	175
The Raton Runcho (*Cœnolestes obscurus*)	176
The Echidna (*Echidna hystrix*)	177
The Three-toed Echidna (*Proechidna bruijni*)	180
The Platypus (*Ornithorhynchus anatinus*)	181

LIST OF ILLUSTRATIONS

HARE (*Lepus europæus*) . . . . . *Frontispiece*

DASSIES (*Hyrax capensis*) . . . . . *To face page* 4

INDIAN ELEPHANT (*Elephas indicus*) . . . . . ,, ,, 8

INDIAN ONE-HORNED RHINOCEROS (*Rhinoceros indicus*) . ,, ,, 12

AMERICAN TAPIRS (*Tapirus americanus*) . . . . . ,, ,, 16

BURCHELL'S ZEBRAS (*Equus burchelli*) . . . . . ,, ,, 20

AMERICAN BISON (*Bison americanus*) . . . . . ,, ,, 24

INDIAN BUFFALOES (*Bos bubalus*) . . . . . ,, ,, 28

BLACK-TAILED GNUS (*Connochætes taurinus*) . . . . ,, ,, 32

SPRINGBOKS (*Gazella euchore*) . . . . . ,, ,, 36

ELAND (*Oreas canna*) . . . . . ,, ,, 40

SABLE ANTELOPE (*Hippotragus niger*) . . . . . ,, ,, 44

BEISA ORYX (*Oryx beisa*) . . . . . ,, ,, 48

KOODOO (*Strepsiceros imberbis*) . . . . . ,, ,, 52

NILGHAI (*Boselaphus tragocamelus*) . . . . . ,, ,, 56

CHAMOIS (*Rupicapra tragus*) . . . . . ,, ,, 60

MARKHOR (*Capra falconeri*) . . . . . ,, ,, 64

MARCO POLO'S SHEEP (*Ovis poli*) . . . . . ,, ,, 68

GIRAFFES (*Camelopardalis giraffa*) . . . . . ,, ,, 72

OKAPIS (*Okapia johnstoni*) . . . . . ,, ,, 76

MUSK-DEER (*Moschus moschiferus*) . . . . . ,, ,, 80

RED-DEER (*Cervus elaphus*) . . . . . ,, ,, 84

ELK (*Alces machlis*) . . . . . ,, ,, 88

VIRGINIAN DEER (*Cariacus virginianus*) . . . . ,, ,, 92

REINDEER OR CARIBOU (*Rangifer tarandus*) . . . . ,, ,, 96

MOUSE-DEER (*Tragulus meminna*) . . . . . ,, ,, 100

CAMEL (ONE-HUMPED) (*Camelus dromedarius*) . . . ,, ,, 104

GUANACO (*Auchenia huanacus*) . . . . . ,, ,, 108

HIPPOPOTAMUS (*Hippopotamus amphibius*) . . . ,, ,, 112

WILD BOAR (*Sus cristatus*) . . . . . ,, ,, 116

BABIRUSA (*Babirusa alfurus*) . . . . . ,, ,, 120

PECCARY (COLLARED) (*Dicotyles tajaçu*) . . . . ,, ,, 124

SPERM-WHALE (*Physeter macrocephalus*) . . . . ,, ,, 128

PORPOISE (*Phocæna communis*) . . . . . ,, ,, 132

GRAMPUS (*Orca gladiator*) . . . . . ,, ,, 136

NARHWAL (*Monodon monoceros*)	*To face page*	140
MANATEE (*Manatus americanus*)	,, ,,	144
TWO-TOED SLOTH (*Cholœpus didactylus*)	,, ,,	148
GREAT ANT-EATER (*Myrmecophaga jubata*)	,, ,,	152
HAIRY ARMADILLO (*Dasypus villosus*)	,, ,,	156
RED KANGAROO (*Macropus rufus*)	,, ,,	160
VULPINE PHALANGER (*Trichosurus vulpecula*) . . .	,, ,,	164
TASMANIAN DEVIL (*Sarcophilus ursinus*) . . .	,, ,,	168
VIRGINIAN OPOSSUM (*Didelphys virginiana*) . . .	,, ,,	172
ECHIDNA (*Echidna hystrix*)	,, ,,	176
PLATYPUS OR DUCKBILL (*Ornithorhynchus anatinus*) . .	,, ,,	180

WILD BEASTS OF THE WORLD

THE COMMON HARE

(*Lepus europæus*)

The Common Hare has for ages attracted the attention of man more than almost any other of the smaller animals of Europe, its excellence as a sporting beast of the chase and a delicacy for the table having particularly commended it to the Greeks and Romans, who thought even more of it in these capacities than we do. For a rodent it is a large animal, weighing from seven to twelve pounds, and its peculiar form, with long ears and short tail, is very distinctive, not only among rodents, but among beasts in general. The slender but powerful limbs, of which the hind pair are much the stronger, bear five toes on the fore and four on the hind feet, and have the pads covered with hair. The teeth differ from those of most rodents, in that there are two pairs of incisors in the upper jaw instead of one; but the second pair are very small, and are set behind the great centre pair, so that they are neither noticeable nor useful.

The coat of the Hare does not vary much in colour, though occasional black and white specimens have been recorded, and a very pretty silver-grey variety sometimes occurs, in which the tawny-yellow ground of the fur is replaced by white, the black "ticking" remaining. In the northern part of its range the Hare shows some tendency to turn white in winter.

It is essentially a European animal, being generally distributed over Europe, and not found outside it; in certain European countries, also, it is absent—in North Russia, Scandinavia, and Ireland, though in the last-named it has been artificially introduced in a few places. Artificial introduction, also, has established it in New Zealand, where

it thrives well and attains a great size; it does not become a pest like the Rabbit, being less prolific and not a burrower.

Its life of constant exposure on the surface of the ground is made up for by its great speed and agility; its long hind-legs enable it to gallop very rapidly, especially up hill; but the same peculiarity of form is against it in descending a slope, and makes it apt to overbalance. It cannot see ahead very well when running, and hence is apt to run into danger. In addition to being a good runner, the Hare can leap to a vertical height of five feet, and clear as much as five yards' width at a spring; it also swims well and strongly, and readily takes to the water, crossing rivers and even arms of the sea.

By choice it lives in open country, squatting by day in its "form," a depression it makes among the herbage, and coming out at evening to seek its food of grass and other plants; it often ravages gardens and crops, and indeed prefers cultivated land. Hares are not, however, so destructive or omnivorous as Rabbits. They are usually solitary, but in early spring, when they pair, several may be seen playing about together, even by day—the proverbial madness of the "March Hare." The bucks fight savagely together, striking heavy blows with their fore-feet, so as even to kill each other at times; indeed, the Hare, though proverbially so timid, is only so with man and the numerous carnivorous enemies which seek its life. With its own kind, and harmless animals like Cattle and Sheep, it is bold enough. The doe usually produces about five young, which are born furry and open-eyed, not helpless and blind like young Rabbits; these leverets she soon disperses in separate forms, going regularly to each one to suckle it. In this way they run less chance of being lost than if collected all together; and the precaution is needful, for Hares have many enemies, from the Wolf, Lynx, and Eagle, down to the Weasel and Crow, to say nothing of the depredations of man. When being killed the Hare utters a loud painful scream, but its usual note is only an inward grunt, or a low call to its mate and young.

As every one knows, Hares, besides being shot, are hunted in two ways, being "coursed," or run by sight, by a couple of Greyhounds,

or hunted by scent by a pack of Harriers, Beagles, or the curious short-legged Basset-hounds. Its great power of doubling often saves it from swift Dogs, but its habit of running more or less in a circle is fatal to it when pursued by those which run by scent and gradually tire it out. Hares are not often kept as pets, but, when once their great natural shyness is overcome, have been known to become very affectionate, though often strangely spiteful for creatures with such a reputation for harmlessness.

THE MOUNTAIN HARE

(*Lepus variabilis*)

The Mountain Hare is somewhat intermediate in size and form between the Common Hare and the Rabbit, though closer to the former; it weighs about six pounds, and has shorter feet and limbs than our other species. Its coat is of a drab-brown in summer, becoming bluish-grey in autumn, whence the name Blue Hare, often given to it to distinguish it from the Brown or Common Hare of the lowland country. In winter it becomes pure white, except the tips of the ears, which remain black; but this change, like the similar one in the Stoat, is not constant except in the colder localities inhabited by the animal, and in the south of Scotland and in Ireland seldom occurs, especially in the latter country. This is an animal of high elevations and cold climates; with us it inhabits the Scotch mountains, but is, curiously enough, the only Hare native to Ireland. Outside our islands, it is found practically all round the northern parts of the world, a large local form of it being the so-called Polar Hare of Arctic America.

In Ireland it often produces a buff-coloured variety; and where it meets the Common Hare, the two species sometimes interbreed.

THE RABBIT

(*Lepus cuniculus*)

Originally the familiar Rabbit must have been an animal of more limited distribution than any of the Hare family, for its really natural home seems to be only Western, and especially South-Western, Europe, particularly the Spanish peninsula, extending to the other European countries bordering the Mediterranean. Now, however, what with its domestication by man and his introduction of it into various countries as a wild animal, it is certainly by far the most numerous of its kind. The wild Rabbit is a small animal compared to most of its tame descendants,

and, as every one knows, is naturally of a greyish-brown colour, though black, sandy, silver-grey, and other varieties occur even among wild ones. Its ears and tail are much shorter than those of the Hare, and the former have no black patch at the tip. The weight of a wild specimen is two to three pounds.

The social and burrowing habits of the Rabbit are well known, and also the fact that the young, which are kept by the doe in a warm nest in the burrow lined with her own fur, are helpless and naked at first, very different from the young of Hares. There is little need also to dwell on the excellence of Rabbits as food, and their destructiveness when too numerous, especially in our Australasian colonies, where the climate is more favourable to them than it is here. It is important, however, to point out that the animals called "Rabbits" in America are various species of Hares, solitary, non-burrowing animals, with active young; the breeding habits of the true Rabbit being quite exceptional among the Hare kind.

Hares of one sort or another are, indeed, found almost all over the world, except in the Australian region and in Madagascar and southern South America; they are all sufficiently like our species in general appearance to be recognised as members of the Hare and Rabbit family, though they differ much in detail both in form and habits. There are Desert-Hares, Rock-Hares, and even swamp-loving species.

In hot countries Hares are often very foul feeders, and in India, at any rate, are for this reason not often eaten by Europeans, which makes it easier to understand Moses' prohibition of Hares to the Jews, though they do not chew the cud as he imagined when mentioning them as cud-chewing animals without divided hoofs.

THE PIKAS

Pikas (*Lagomyidæ*), also known as Mouse-Hares or Calling-Hares, are a small family of little animals inhabiting Asia, and in one case North America. In general character they are much like the Hare family, and like them have two pairs of upper incisors, but they have quite short limbs and ears, and no tail at all.

In fact, except for their soft, Rabbit-like fur, they at first sight remind one much more of Guinea-Pigs than anything else. They hide among rocks in mountainous districts as a rule, though in Central Asia they are found burrowing on the steppes in communities. Several of them are also remarkable for their loud whistling calls. Like true Hares, they remain active in winter, but have the foresight to lay up in summer a large store of the grass and other plants which form their food, for consumption at that time. The young are said to be naked at birth. Pikas are seldom seen in captivity, but of late years the London Zoological Gardens have had examples of one or two kinds.



DASSIES
By C. E. Swan

THE DASSIE

(*Hyrax capensis*)

As a whole, the animals of the hoofed order (*Ungulata*) are so distinct in appearance that their relationships are at once apparent even to an untrained eye; but the little animals of the family *Hyracidæ* at first sight look much more like rodents, and, indeed, were at one time classed with that order of animals.

The Dassie, or Rock-Rabbit, of the Cape, is a very good type of the family, all of which bear a strong general resemblance to each other. In size it about equals a Cat, and is heavily built, with the tail quite rudimentary and not noticeable. The legs are short, with four toes on the front feet and three on the hind. These are provided with flat nails, except the inner toe on the hind-foot, which has an ordinary curved claw, no doubt used for scratching. In walking, the animal goes on its toes, not on the flat of the foot like so many rodents.

The coat is thick and soft, quite unlike the usual covering of a hoofed animal; and there are whiskers at the sides of the muzzle, and a small tuft of similar long hairs under the chin.

The teeth are very peculiar; the grinders, indeed, almost exactly resemble those of a Rhinoceros in miniature, forming a curious contrast to the general appearance of the creature, but the front teeth are especially characteristic. As in rodents, there are no canines at all, and two large, continually-growing incisors in the front of the upper jaw. These, however, instead of being flat-fronted and square-tipped —chisel-shaped, in fact—come to an edge down the front, and terminate in points, while they are set somewhat apart, not close together like a rodent's incisors. In the lower jaw there are two pairs of incisors, rounded in shape and projecting straight forwards.

The internal structure of this animal, such as that of the brain and stomach, allies it to the hoofed order, and not to rodents. The

habits, however, are, on the whole, more like those of some of that order than any other beasts. The food is entirely vegetable, chiefly the shoots of shrubs, and this is sought by the Dassies in the morning and evening. They inhabit cliffs and stony hills, taking shelter when alarmed in holes and crevices in the rocks, for they do not make burrows, their soft feet and blunt nails being quite unsuitable for digging. In the day-time they may often be found basking in the sun, and sometimes sitting up on their hind-legs to look round. On these occasions, the cry of the animal may be heard if it is alarmed —a shrill prolonged note, variously described as a whistle and a hiss.

The Dassie is a very active animal, climbing over rocks and clinging to them, even when almost perpendicular, in a very remarkable manner. This it can do by virtue of certain peculiarities of its feet; the soles of these are naked, and very copiously supplied with sweat-glands, producing a soft clammy surface eminently suited for adhesion, while the muscles are so arranged that the soles can be contracted and cause the foot to adhere like a sucker without any effort, even dead animals remaining thus clinging.

The young Dassies are born about the end of the year, in the early summer of the Southern Hemisphere; three was the number in two litters observed by Moseley, who says they were very playful, chasing each other about the rocks. These were of the size of very large Rats. The Dassies are sociable animals, and live in family parties; although timid, they are inquisitive, and, after being startled, will after a time come out to take another look at the disturber. Their great enemies are Leopards and some of the large birds of prey, especially the splendid Black Eagle of the Cape (*Aquila vulturina*), which is locally called the "Dassie-vanger" (catcher) by the Boers.

The worthy Boers who colonised South Africa, by the way, seem to have had a perfect genius for misnaming animals. "Dassie" is a corruption for "dasje," a Dutch diminutive of the name of the Badger, to which animal the present one certainly bears but the

faintest resemblance, either in form or habits, but nevertheless the name, being in popular use at the Cape, and not confusing to English people, may well be allowed to stand. "Rock-Rabbit," also a Cape term, is not correct either, and much more likely to make people run away with a false idea of the Dassie's affinities.

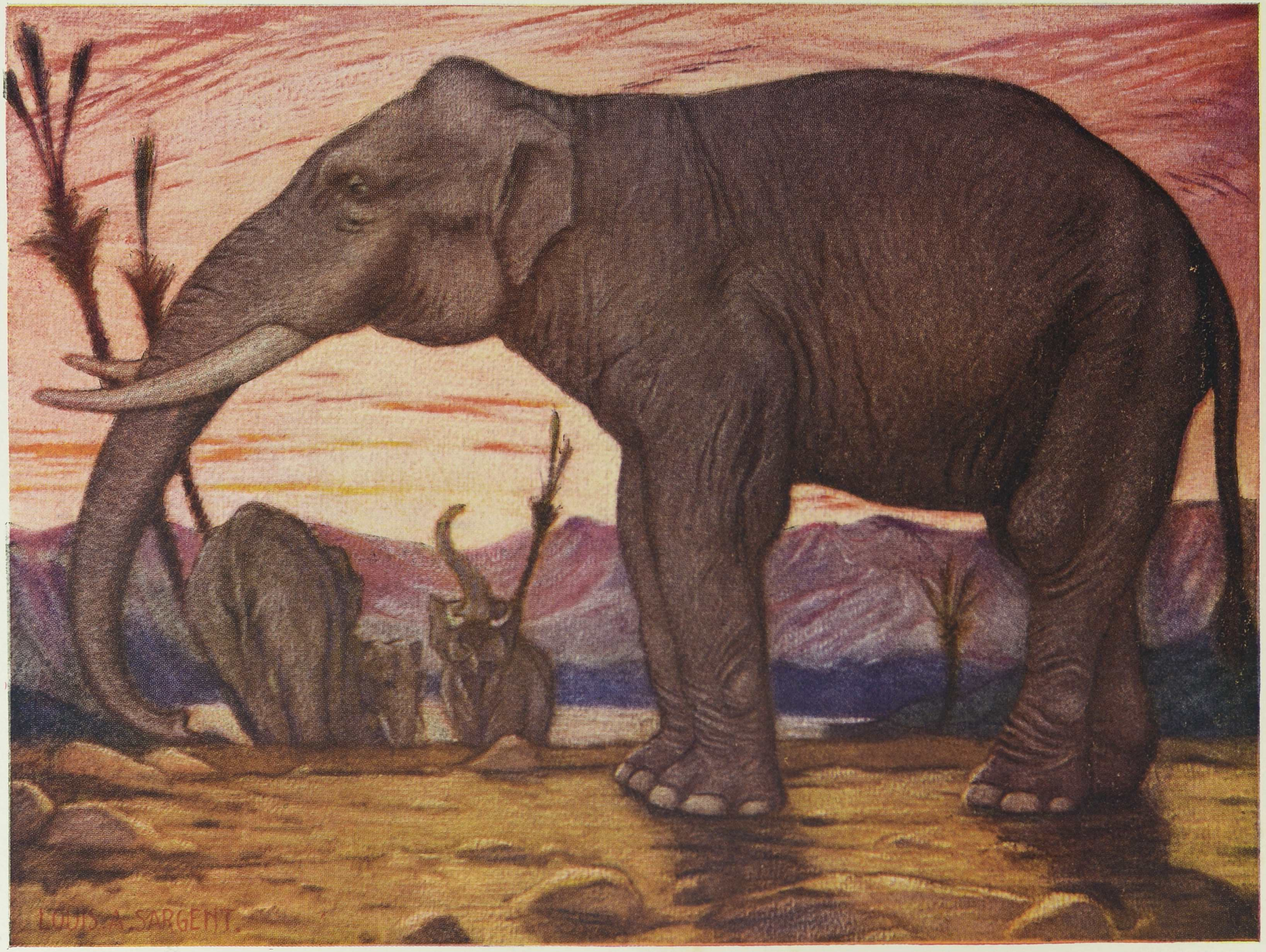
The flesh of this animal is sometimes used for food, but is dry and tasteless. It is tenacious of life, requiring a large charge of shot, and bites fiercely if not killed outright. In captivity it lives well, but does not like being shut up in close quarters, becoming irritable and biting readily. Many specimens have been exhibited in the London Zoological Society's Gardens, and it has bred there, though not of late years.

There are about twenty species of Dassies altogether, all so much alike that any one could at once recognise their relationship, and all are purely African animals except one, the Syrian Dassie (*Hyrax syriacus*) which ranges into Arabia and Palestine. This animal is well known by name as the "Coney" of Scripture, its habit of sheltering its feebleness by lodging among rocks being noted there, while it was forbidden to the Jews as food as being one of the cud-chewers which had not cloven hoofs. It does not, as a matter of fact, chew the cud, but, like the Hare, has a habit of champing its jaws in a way that suggests its doing so. "Coney," of course, simply means "Rabbit" in old English, and every one is familiar with the retention of the word in legal phraseology, "trespassing in search of Conies" being such a common rural offence. It is rather curious to find English colonists at the Cape making the same mistake, and calling their Dassies Rock "Rabbits."

TREE-DASSIES

Although there is such a general similarity among the members of this small family as far as appearance goes, there is a curious difference in point of habits in some cases, several of the species, forming

the group *Dendrohyrax*, being tree-animals. These live in holes of trees, climbing about the branches and trunks, in the same way as their rock-loving relatives traverse the rocks, their peculiar power of clinging with the feet being just as well suited for an arboreal life as for climbing precipices. At the same time, it is curious to find any animal of the hoofed order climbing trees at all, although one or two of the small African Antelopes, and even the common Goat, will jump up on to accessible branches at times. One of these Tree-Dassies has, at the time of writing, been living for some time along with the Squirrels in their open enclosure at the London Zoological Gardens, and has passed the winter outdoors.



INDIAN ELEPHANT

By Louis A. Sargent

THE INDIAN ELEPHANT

(*Elephas indicus*)

Of the two known living Elephants the Indian species is much the more familiar, being that commonly seen in captivity both in its native country of South-Eastern Asia, where it ranges from India to Sumatra, and in menageries away from it. Although not quite so large as the African species, the Indian Elephant is, as every one knows, a huge animal, the male occasionally reaching a height of eleven feet at the shoulder, though it is usually two feet or more less. The female is considerably smaller. It is a curious fact that twice the circumference of the Elephant's fore-foot gives practically the height. The Elephant is even more remarkable for its structure than its size; the long prehensile nose or trunk is a peculiarity which has appealed to humanity ever since the Romans called the Elephant the "snake-handed" beast, and its general shape is very unlike that of the hoofed animals in general, with which it is usually classed. It will be noticed that the joints of the limbs, which are nearly straight, are situated nearly as in ourselves, the wrists and heels being down quite near the toes, and the true knee plainly visible, whereas in most hoofed animals the wrist forms the so-called "knee" of the fore-leg, and the heel the "hock" of the hind-leg, the true knee being tucked up to the body and constituting the stifle-joint. There are five nails on the fore, and four on the hind feet, the toes being five in both.

The huge size of the Elephant's head always attracts attention, but the expanse of brow, which gives the appearance of intellect, is really due to the development of air-cells in the skull, to give surface without weight, the brain of the animal being remarkably small. The teeth are not the least wonderful parts of the creature's organisation. There are no canines, and no incisors except the great tusks in the upper jaw, which grow continuously; in the Indian Elephant, however, they are confined to the male—that is, in their full development, those of females being so short as not to be noticeable. The grinders are equally remarkable in their way; they are very large and longi-

tudinally oval, and when worn show alternating layers of enamel, ivory, and bony cement. They keep gradually working forward in the jaw, the rear teeth coming through from behind as the fore ones are worn away, till at last the remnants of the latter are shed. Thus the Elephant is cutting its teeth all its life, and never has more than one, or one and a half, in use at one time on each side of each jaw; the total number produced is twenty-four, six for each side of either jaw. This number must last the animal's lifetime—at any rate if it wears them all out it must die of indigestion—but the danger of this cannot be great, as there seems good reason to suppose the beast lives a hundred years.

The existing Elephants are among the few land animals which are practically naked, there being hardly any hair on the body, although the end of the long thin tail is tasselled with stout bristles. Young Elephants, however, are more hairy than adults; at birth they are about the size of an ordinary Pig, with the trunk shorter and the forehead less prominent than in the old animal. Only one is produced at a time, and for some time it is carefully kept by the mother beneath her body, under which it can of course walk quite comfortably; as, otherwise, the adventurous sallies of the little creature, which is as playful as other young animals, would expose it to the risk of capture by the Tiger, which willingly preys on young Elephants if he can get them. The little Elephant sucks with the mouth, not the trunk; the old one's teats are situated close up to the armpits.

Elephants become adult at about twenty-five years of age; the members of a herd keep close together, and often show such similarity in appearance that they are evidently related. Of course it takes an Elephant expert to notice this, but there are individual differences conspicuous to a trained eye, besides others more noticeable. Thus, many Elephants have the trunk and face blotched with flesh-colour, and presumably the extension of this hue all over the body constitutes the rare White Elephant. In some cases there are five instead of only four nails on the hind-foot; and some males are devoid of tusks, these being known in India as "mucknas." In Ceylon almost all male Elephants are tuskless. The Elephant is a remarkably active animal for its size, although it can neither gallop nor jump, its only pace being a walk, either slow or fast, and it can stride a ditch of

six and a half feet. It climbs up or down hills with great facility, negotiating slopes which would puzzle a Horse, as, when ascending, it goes down on its wrists, and when descending, on its knees, the situation of its joints making these postures convenient. It is also a strong swimmer, and when in the water has the great advantage of being able to breathe through its trunk held above the surface. With the trunk is collected the food, which consists of grass, and the leaves, twigs, and fruit of various trees; and water is drawn up by it and squirted into the mouth or over the body when bathing.

The Indian Elephant frequents forest country, and is timid and social; it is almost always in herds, and stray females and young animals can gain entrance to these; adult males, no doubt, would have to face the opposition of the leading "tusker," or adult male, in the herd, and such are often found solitary, and sometimes become the well-known "rogues." These individuals have thrown off the natural timidity which is so strong a feature in Elephants, and attack man ferociously; but a "rogue" is not necessarily permanently solitary, since some herd-bulls develop these vicious propensities. The actual leader of a herd is, curiously enough, always a female, and the animals in their travels display a remarkable aptitude for picking out the safest and most convenient routes across a country.

The best-known note of the Elephant is the shrill "trumpeting" sound, but it also roars when in fear or pain. It attacks enemies with its tusks and feet, not with the trunk, and female animals often bite each other's tails off, not having tusks to gore with; mucknas have to put up with much ill-usage from tuskers.

Except when a known rogue, the Elephant is protected in India on account of its utility when domesticated; its capture is usually effected by driving a herd into a stockade or "kheddah," where the captured animals are roped, and afterwards removed, by the aid of tame Elephants. Elephants seldom breed in menageries in India or in Europe and elsewhere, but frequently do so in Burma and Siam. Captive-bred animals are no great acquisition, as they are long in growing to a useful size, and are apt to be wanting in due respect for man—a serious matter in the case of such a gigantic animal.

In the ordinary way, the docility of the Elephant is its most remarkable quality, but, as is well known, the adult male is subject

to periodical fits of blind fury, when he is said to be "must"; fortunately a discharge from an orifice in the temple precedes and gives warning of this dangerous period.

THE AFRICAN ELEPHANT

(*Elephas africanus*)

With close general correspondence in appearance and habits with the Indian Elephant, the African differs in several details. Its forehead is low and receding, and its ears twice the size of those of the other species, almost touching over the neck. Its trunk terminates in two equal lips, instead of the upper finger-like process and short lower margin found in the end of the Indian Elephant's trunk; and there are only three nails on the hind-foot. Moreover, in this species, most of the females develop tusks as well as the males.

The African Elephant is taller and more leggy in build than the Indian species, and the male at any rate attains a greater size. It is more of an open-country animal than the Indian species, and is faster in its movements. As every one knows, it is the animal from which most of the ivory of commerce is derived, and for that insignificant product a noble creature like this is being exterminated, although it is known to be capable of domestication and training—though said to be less amenable to this than the other species. The late celebrated "Jumbo," of the London Zoological Gardens, was an African Elephant, and a few specimens are always to be seen in captivity somewhere or other. In classical times the Elephant inhabited North Africa, but became extinct there during the Roman Empire. It seems to have been used in warfare by the ancients, but, judging from the fact that the old writers speak of Elephant-drivers as "Indians," it is evident that the practice of taming Elephants, and the supply of animals to some extent, came from the East. Before leaving the subject of Elephants, it may be mentioned that the celebrated Mammoth (*Elephas primigenius*), the extinct Elephant of the northern parts of the world, was nearly related to the Indian species, differing chiefly in its heavy coat of hair and its huge upcurled tusks.



INDIAN ONE-HORNED RHINOCEROS
By C. E. Swan

THE INDIAN RHINOCEROS

(*Rhinoceros indicus*)

Owing to its inhabiting a country of ancient civilisation like India, the great Indian Rhinoceros has always been the most familiar of the small family of large hoofed animals of which it is a member; while, though not absolutely the largest, it can challenge comparison with any of them in peculiarity of aspect, owing to the curious armour-plate-like arrangement of its heavy and folded hide, which is studded with tubercles simulating the rivets of real armour.

The horn on the nose is solid throughout, and composed of a mass of horny fibres like agglutinated hair; it is merely seated on the skull, having no bony core, and a captive individual in the London Zoological Gardens once accidentally wrenched his off, to his exceeding pain and dismay. The hoofs are three in number on each foot, but the animal is not supported entirely on them, like a Horse or Cow, but treads also on a pad covering the bases of the toes. The skin is naked and very thick, but in the fresh state is not impenetrable to bullets as used to be supposed.

The mouth is provided with a good set of flat-crowned grinders, but the front teeth are very scantily represented, there being no canines in the upper jaw and usually only one pair of incisors, while the lower jaw has only a pair of small incisors and an outer pair of rather large sharp-edged teeth, which some regard as canines and some as incisors. Whatever they are, the animal knows how to make use of them, ripping an adversary with them as a Boar does with his canine tusks.

This Rhinoceros is one of the largest living land animals, measuring from five to nearly six feet at the shoulder, and exceeding at times ten feet from nose to root of tail; the said appendage is puny and rather short, not reaching a yard. The horn in this species is not very long, seldom reaching more than a foot; it is found in both sexes, as in most Rhinoceroses. When newly born, the Rhinoceros is about as

large as a Pig; it has no horn at birth, but otherwise is a very perfect miniature of its parents. It grows rapidly—at first, at any rate—but is a long-lived animal, believed to live for a hundred years.

The Rhinoceros is a much more active creature than would be supposed from its ponderous build; it has a rapid if heavy trot, and can even gallop. In the ordinary way, however, it is not very energetic; it easily finds food and shelter in the great grass-jungles it frequents, and it much enjoys wallowing in the mud, like so many tropical animals. Its range in India has greatly diminished in historical times; in the time of the Emperor Baber, in the sixteenth century, it extended to Peshawur, and it used comparatively recently to be found along the base of the Himalayas. Its last stronghold is in the plains of Assam, and it is to be hoped that the Indian Government will be able to secure its protection there indefinitely. It is a harmless animal, rarely attacking man even when provoked, and, though it is greatly feared by Elephants, these beasts are so nervous in disposition that their dread of any animal must not be taken as proof that it is a natural enemy, as the Rhinoceros has been credited with being.

There is also a certain amount of positive utility in the Rhinoceros, from the fact that its flesh is considered good food even by Europeans, while its heavy skin can be turned to a variety of uses when cured. It thrives well in captivity, and lives for many years, but, like all Rhinoceroses, is scarce in the animal trade, and very expensive accordingly. During all the time I was in Calcutta—seven years—our dealers were trying to get hold of a live Rhinoceros of any sort, but not a single specimen came to hand.

THE SONDAIC RHINOCEROS

(*Rhinoceros sondaicus*)

This is the only other kind of Rhinoceros with one horn; like the last, it is found in India, but has a much wider range altogether, extending from Eastern Bengal through Burma and the isles to Borneo. Though as tall as the other species, it is not so heavy, and has a smaller head; moreover, the skin, although falling in folds, as

in the great Indian species, differs slightly in the arrangement of these creases—the fold in front of the shoulder runs right across from side to side of the neck, like that behind the shoulder and over the hips. In the Sondaic Rhinoceros, also, the skin is not tubercled, and the nose-horn is confined to the males—at any rate as a rule.

This species usually frequents hilly districts, though it also occurs in the marshy alluvial soil of the Sunderbunds. It frequents tree rather than grass jungle, and is said to be more harmless than the great Indian Rhinoceros. It has once been exhibited in the London Zoological Gardens.

THE ASIATIC TWO-HORNED RHINOCEROS

(*Rhinoceros sumatrensis*)

The Hairy Rhinoceros, as this species might well be called, for its body is thinly covered with hair and its ears fringed therewith, is the smallest of all known kinds, not reaching five feet at the shoulder, and being sometimes less than four. Its skin shows fewer folds than those of the large Asiatic kinds, and only the fold behind the shoulder crosses the back.

In addition to the horn on the nose, there is another over the eyes; the front one grows to a considerable length, well over two feet. This species much resembles the last in range and habits, being a forest animal, found from Assam to Borneo. It has been exhibited in the Zoological Gardens of London and Calcutta, and young ones have been born in the latter place, while in the London Docks a young one was produced aboard ship by a female which had just been imported from Singapore.

THE COMMON AFRICAN RHINOCEROS

(*Rhinoceros bicornis*)

The "Black Rhinoceros," as this species is often rather absurdly called—for it is grey, like Rhinoceroses generally—is the commonest

species now living, ranging all over Africa from Abyssinia to the Cape. It is about as big as the great Indian Rhinoceros, and, like it, has a pointed prehensile upper-lip, but a smooth skin without creases; it is also provided with two horns, the front one, on the nose, sometimes exceeding a yard in length, while that over the eyes is seldom much more than half the length of its fellow; but the proportions vary greatly.

This Rhinoceros is for the most part a bush-haunter, and lives almost entirely by browsing, eating twigs, leaves, and fruit. Opinions differ as to its character, but the general opinion is that it is an irritable, vicious animal, being unusually inclined to attack men unprovoked, and thus very different in disposition from most of the family. Indeed, some years ago, the expedition of Mr. A. Chanler and Lieutenant von Höhnel into East Africa was broken up through the repeated attacks of these animals, who ultimately disabled the latter gentleman. Although so common in the wild state, this animal is rarely captured, and only two have been exhibited in the London Zoological Gardens.

THE GREAT AFRICAN RHINOCEROS

(*Rhinoceros simus*)

The Square-mouthed Rhinoceros of South Africa, so called from its upper lip not terminating in a prehensile point, is also sometimes called "White"—a term as absurd as "Black" for the other, and for the same reason, the animal being also grey. It is the largest land animal after the Elephants, a big male standing six and a half feet at the shoulder, and being about twelve feet long. Like the common kind, it is smooth-skinned, and has two horns, which vary much in length, the front one sometimes exceeding four feet in length. The Square-mouthed Rhinoceros lives in the open, and is a grass-feeder, and generally harmless in disposition. It has never been brought to Europe alive, and is now, by the persecution of hunters, reduced to about a dozen individuals—if even these still exist—in South Africa, though now also found to inhabit Central Equatorial Africa.



AMERICAN TAPIRS

By Winifred Austen

THE AMERICAN TAPIR

(*Tapirus americanus*)

The Common Tapir of South America is the best known of the small family of hoofed animals it represents, and, as all are very uniform in general appearance and habits, may be taken as a type of Tapirs in general. There is something curiously old-world and unfinished about the appearance of the creature, as if it had failed to complete its evolution—something recalling both a Pig and a Pony, while the short trunk suggests an abortive attempt at an Elephant. This little trunk is freely movable, and is used to grasp the herbage on which the creature feeds; when turned up it gives a most comical sneering expression to its owner. In size the Tapir about equals a stout Pony.

The teeth show incisors, canines, and grinders all well developed, and the limbs have four hoofs on the fore feet and three on the hind; the animal, however, like the Rhinoceros, does not rest entirely on these hoofs, but also on a pad under the base of the toes. The tail is almost as short and insignificant as a Bear's.

The coat, which is short, is so scanty that it allows the skin to be seen; but on the neck it forms a standing mane. The colour of the young animal is very different from the uniform brown of its parents; it is very dark, and gaily variegated with cream-coloured longitudinal stripes, alternating with rows of spots of the same tint, and as the fur is very close, the little creature looks for all the world like some painted toy animal. At this stage it is only about as big as a Terrier. Only one young one is born at a time, and it is lively and active, according to the universal rule among hoofed animals.

The Tapir is essentially a forest animal, confined to the wooded parts of South America.

It is usually found solitary or in pairs, and frequents the water-side, for, though not exactly aquatic, it is very fond of water, and

frequently goes into it; it swims well, and has a habit of walking along the bottom. One of its peculiarities is that it always takes to water to deposit excreta. As may be conjectured from its stout build, it is rather a strong than a swift animal; it rushes through the forest with great force when alarmed, and in this way often escapes when seized by its chief foe, the Jaguar, forcing its feline enemy to let go its hold by rushing under boughs. It also bites severely when brought to bay.

Its food is vegetable, consisting of grass, leaves, and fruit, and it is itself esteemed as food by the natives, the flesh being somewhat like beef in quality; insignificant as it is compared to the mighty animals inhabiting corresponding latitudes in the Old World, it is the biggest game animal in South America.

The Tapir is a harmless animal, and not difficult to tame, and is sometimes kept in a state of liberty in its own home, while it is also a familiar exhibit in Zoological Gardens, and has produced young there. It needs a quantity of water sufficient to bathe in, and has to be kept indoors in a warmed house in winter, like the Elephant and Rhinoceros.

BAIRD'S TAPIR

(*Tapirus bairdi*)

Baird's Tapir, which much resembles the ordinary South American Tapir in appearance, save that its cheeks are noticeably pale-coloured, is a Central American animal ranging from Southern Mexico to Panama; in general habits it seems to resemble the Common Tapir, but is addicted to frequenting mountainous districts. It has been known ever since the time of the celebrated traveller Dampier, who wrote of it in 1676 as the "Mountain Cow," though mentioning that personally he had never seen it. It presents a remarkable difference from the ordinary Tapirs, in having the partition of the nostrils bony, but this does not affect its outward appearance. The same peculiarity

is found in another Central American Tapir (*T. dowi*), also not remarkable-looking externally, and chiefly notable for peculiarities in the skull. It is strange that these two distinct Tapirs should both occur, apparently together, in a comparatively small area like Central America; but very little is known about them, though both have been exhibited in the London Gardens, which have possessed all the five known Tapirs except the next species.

THE PINCHAQUE TAPIR

(*Tapirus roulini*)

Of all the Tapirs this is the most nearly related to the common South American species, having no special peculiarity of the nasal division and a plain brown coat. This is, however, much thicker and closer than in the ordinary Tapir, and the chin is white. The thick furry nature of the coat is to be accounted for by the habits of the species, this being strictly a mountain animal, inhabiting a temperate climate, for it is confined to the Andes of Colombia and Ecuador, where it ranges up to eight thousand feet, and appears not to descend into the plains.

THE MALAYAN TAPIR

(*Tapirus indicus*)

The Tapirs afford an interesting example of what naturalists call "discontinuous distribution," four out of the five species, as we have seen, being American, while the other inhabits so remote a region as the Malay peninsula and its adjacent islands, ranging as far east as the island of Borneo. The explanation of this is that Tapirs had formerly a wider range, since extinct species are found fossil in Tertiary strata in Europe and China as well as in North America; for some reason or other they have failed to maintain their existence in the North.

The Malay Tapir is the most remarkable in appearance of all; it

is rather larger than the Brazilian species, and has an exceedingly close coat and no mane. Its colour is very peculiar, being black and white very sharply contrasted; the head, neck, and fore-quarters generally are black, and also the hind-limbs, while the body is white, so that the general effect is of a black animal round whose body a white sheet has been tightly sewn. As so often happens, however, it resembles its relations much more closely when young, the infant Malayan Tapir having the same curious display of whitish spots and stripes on a dark ground which are found on the young of the American kinds, so that no one would know that they would grow up so different in colour. No doubt this spotted coat was the livery of the original ancestor of the family.

The Malayan Tapir has the same habits as the Brazilian, being a forest-dweller and fond of water; it occasionally falls a prey to the Tiger, as its relation does to the Jaguar, and it seems strange that creatures of this primitive type, with no special facilities either for escape or defence, should have been able to maintain their existence through long ages in the same countries as two of the most terrible of the carnivores.

This Tapir is not nearly so common in captivity as the Brazilian species; it does well enough in India, though not better than American Tapirs, but in Europe it has the reputation of being a delicate animal, and has comparatively seldom been exhibited in the London Zoological Gardens.



BURCHELL'S ZEBRAS

By Louis A. Sargent

BURCHELL'S ZEBRA

(*Equus burchelli*)

BURCHELL'S Zebra, nowadays, is the best known of all the Zebras, as it is the commonest and most widely spread, inhabiting open, dry country in Africa generally, south of the Sahara. In form and size this Zebra is intermediate between the Horse and Ass, though inclining more to the latter, especially in having the root of the tail covered with close, short hair, and in being without the bare, hard patches called "chestnuts" on the hind-legs, though they are present and of large size upon the front pair.

In certain details of its beautiful markings, it varies a great deal; the "shadow-stripes" between the main black stripes are absent in some local races, in some of which the legs may be striped right down to the hoofs, while in others they are plain. Hence many sub-species have been named; but there is considerable variation even among individuals of the same herd. It has even been suggested that the Quagga of South Africa (*Equus quagga*), now unfortunately extinct, was merely an extreme form of this Zebra, which is still known to the Boers as "Bonte (variegated) Quagga." The true Quagga was striped with brown, and this only on the fore-quarters, the legs and hind-quarters being plain.

The gaily-striped pattern of the Zebra looks very striking in a menagerie, but those who have seen the animal wild say that at a little distance the dark and light stripes combine to produce a grey effect, so that the creature is not conspicuous at all, by colour, though its lively movements and loud shrieking bray make it a noticeable animal.

Zebras, like all the wild members of the Horse tribe, live in herds, under the control of the master stallion; their food is grass, and they avoid bushy localities, their great enemy being the Lion, who prefers the Zebra to anything else he can get in the way of game. Except,

however, when it goes to drink, he does not get many chances to secure this delicacy, which seems to commend itself to him by its abundance of oily fat. The same peculiarity of Zebra meat makes it much esteemed by African natives; Europeans seldom shoot the animal, except to provide meat for their negro followers.

The Zebra foal has the handsome markings of its parents at birth, and very soon acquires swiftness enough to keep up with the herd. It is easily tamed if captured young, and even old individuals can be broken to harness; some time ago the Honourable Walter Rothschild used to drive three of them in England, along with a Pony, "four-in-hand." They have also been tried for coaching work in South Africa, and, though they were rather ready to bite at first, they pulled willingly enough. It was found, however, that they had not sufficient strength to bear continuous heavy work. Of course their great recommendation was their natural immunity from the diseases to which Horses are so liable in Africa, especially that communicated by the Tsetse-fly (*Glossina morsitans*). Hopes were entertained that mules between this Zebra and the Horse might share this desirable quality, but on experiment it was found that this was not the case. These Zebra-Horse hybrids, by the way, favour the Horse in colour, but show indistinct stripes, which in pattern more resemble those of Grévy's Zebra than those of the present species.

Burchell's Zebra is the only species commonly seen in menageries nowadays; it lives and breeds well in captivity, and it is to be hoped that more attempts to domesticate and work it in its native country will be made, for complete success can hardly be expected at first, and the ultimate utility of the animal would be very great, the provision of transport animals being one of the greatest difficulties in the opening-up of Africa.

THE MOUNTAIN ZEBRA

(*Equus zebra*)

THIS is the animal which used to be called the Common Zebra, as it was at first the best known in Europe; but it is now nearly extinct, being reduced to one or two herds in the mountains of the Cape, and also occurring in Angola. It is smaller than Burchell's Zebra, and more closely resembles the Ass, especi-

ally in its long ears. Its stripes are bold, on a cream-coloured ground, with no shadow-stripes, and run down to the hoof; on the quarters, above the base of the tail, they form a characteristic "gridiron pattern" of short cross-bars meeting a central band. A small dewlap on the middle of the neck is also a characteristic of this animal.

GRÉVY'S ZEBRA

(*Equus grevyi*)

This beautiful animal, the largest and finest of all wild animals of the Horse family, was only made known to modern science in 1882, although from the fact that it inhabits countries near the seats of ancient civilisation, being found in Abyssinia and Somaliland, it was no doubt the animal known to the ancients as "Tiger-Horse" (*hippotigris*). In size it equals a rather small Horse, with a particularly large but beautifully-formed head and ears. The stripes are very narrow, numerous, and closely placed, black on a pure white ground, and the barrel-stripes do not curve backwards across the quarters as in the other Zebras, both body and hind-quarters being covered with stripes running upwards almost directly. This splendid animal has of late years been represented in the London Zoological Gardens, and while the present work was being written a foal was born there.

THE ASS

(*Equus asinus*)

The wild ancestor of our humble coster's drudge still exists in North-East Africa, and the typical race exactly resembles in colour a common grey Donkey, with the same characteristic cross on the withers, caused by the back-stripe intersecting with a shoulder-stripe. In Somaliland, however, there is a race on which these stripes are absent, while the bars on the legs, which may often be seen in tame Donkeys, are very well developed and distinct.

The wild Ass is bigger than the ordinary Donkeys one sees, though not larger than the fine breeds kept for riding in parts of the East and for Mule-breeding in Europe, and it has the beauty, sleekness, and agility of the Zebra, though the characteristic length of ears is always noticeable. The degeneracy of the Ass in captivity is simply due to neglect, the existence of fine large domestic breeds showing that fine Asses may be had if due attention is paid to their treatment and selection. But neither the Ass itself, nor its hybrid offspring with the Horse, the Mule, is much thought of in England, where there is ample facility

for maintaining Horses, the chief advantages of the Ass and Mule being their ability to work hard with poor food and little attention.

THE KIANG

(*Equus hemionus*)

The Kiang of Tibet is the most Horse-like of the relatives of the true Horse. It equals a small Horse in size, and has a more Horse-like head and shorter ears than any of the other Ass-like species, while the tail is not so closely haired at the base. Indeed, some writers speak of the animal as a wild Horse. It has not, however, the "chestnuts" on the hind-legs, and on the whole is more Ass than Horse. In colour it is chestnut, with the muzzle, legs, and under-parts white, and a dark streak down the back continuous with the chocolate-coloured mane. Inhabiting the cold Tibetan plateau, it grows a thick woolly coat in winter. Sportsmen rather dislike this beast, as they do not want to shoot Donkeys, and the inquisitive Kiang will insist on interfering with their stalking by galloping noisily about and disturbing the game.

The Chigetai of Mongolia is apparently only a local race, allied to this animal, but the Onager (*E. hemionus onager*), which ranges from Arabia to North-West India, where it is called the Ghorhkur, is by some naturalists regarded as distinct: at any rate, it is more Donkey-like than the Kiang, being smaller, with longer ears, and lighter in colour. All these Asiatic wild Asses are very swift, and have never been domesticated, though specimens of all have been exhibited in Europe at our Zoological Gardens.

THE WILD HORSE

(*Equus caballus prezevalskii*)

It is now pretty generally agreed that the wild form of our Horses is the so-called Prezevalsky's Horse of Mongolia, which is a wild Pony, heavy-headed, hog-maned, and switch-tailed, with a colour often seen in heavy working Horses here, a yellowish or reddish brown on the body, with the muzzle, backs of the legs, and belly shading to white, and the mane, long hair of the tail, and fronts of the legs black. Specimens of this animal have been brought to England of recent years, and the Duke of Bedford has a herd at Woburn Abbey. The wild Horses found in America and Australia are not natives of those countries, but are the descendants of tame Horses which have gained their liberty since the days of European colonisation.



AMERICAN BISON

By C. E. Swan

THE AMERICAN BISON

(*Bison americanus*)

WHETHER we consider its extraordinary appearance, or the tragic contrast of its former excessive abundance and its so very recent and almost complete extermination at the hands of man, the "Buffalo" of schoolboy stories of adventure is one of the most interesting of the wild animals of the Ox tribe.

In build it is distinct from any of them, being so heavy and shaggy before, with the hind-quarters comparatively weak, and the tail decidedly short, while the head owes its imposing appearance to the heavy crop of hair and beard, the horns being proportionately shorter than in any of the other Oxen. A large bull will stand nearly six feet at the peculiarly high withers; the cow is of course smaller and not so heavily formed. The young calf is bright red-brown in colour, very different from the dark coats of its parents, and, being straight-backed, with no sign of the heavy mane, would not easily be recognised as a young Bison at all by any one unacquainted with it.

In summer the Bison sheds its long winter coat, and for some time is almost bare, and presents a most disreputable appearance.

This animal was formerly one of the characteristic features of the landscape over a large portion of North America, and existed in larger numbers than any other beast of equal size anywhere, ranging from the Great Slave Lake to Mexico. It was, however, in the great plains of the West that it was especially at home, and it is usually spoken of as a prairie animal, although there was also a woodland race, to which most of the survivors belong.

Bison are essentially gregarious, and were also to a certain extent migratory, as such large numbers of animals of their size naturally exhausted the pasture in one locality. They were noted for their extreme stupidity and persistency in following any particular course, and in this way many members of a great herd, or even whole herds,

used to perish at times in boggy places, or in crossing rivers on thin ice, as those behind would push on to destruction their unfortunate predecessors.

Like so many large animals, they like wallowing, and in default of ponds or rivers, would make mud-holes in soft ground, which hollows have remained as some of the signs of the animal's previous occupation of land where they have long since vanished.

For such heavy animals they are remarkably active; and were of course dangerous to hunters when hard pressed, though not nearly as much so as the true Buffaloes of India and Africa. Their natural enemies were chiefly the Wolves, which attacked calves and weakly adults, and sometimes the Grizzly Bear. The Red Indians regularly hunted them for the flesh and skin, and indeed chiefly subsisted on them in many places; but it is to white men that the almost complete extermination of this fine animal is due. The completion of the Union Pacific Railway in 1869 seems to have given the death-blow to the Bison, splitting the great central herd of millions of animals, which still remained after all the encroachments of civilisation, into two parts, of which both the northern and southern sections had practically ceased to exist by 1890. The cause of the persecution was chiefly the demand for the hides, or "robes," but the beasts were actually shot down merely for their tongues in some cases.

In various places in North America, and especially in British territory, a few hundred Bison are still preserved, which, if carefully guarded, ought to be sufficient to perpetuate the race, while they are well represented in European Zoological Gardens, in which they breed freely enough. In captivity Bison are formidable from their great strength, and, though they have been trained to the yoke, and, by this quality, are good draught animals, they are very difficult to control if excited. Thus, if they are thirsty and come to water, it is impossible to keep them from rushing headlong to it. As they have so good a coat, and are very hardy, bearing the terrible blizzards of the plains, and scraping away the snow to find food, they have been crossed with domestic cattle to improve the latter in these respects. These "Cataloes," as the hybrids are called, can only be bred from the Bison bull and tame Cow, not *vice versâ*, and, in spite of the great distinctness of the parent stocks, they are fertile.

THE EUROPEAN BISON

(*Bison bonasus*)

The European Bison, although a slightly larger animal, is less remarkable in appearance than the American species, although its close relationship is obvious at a glance. It is, however, less heavy in front, and has a less copious growth of mane there, and, in fact, approximates more to the ordinary Ox in appearance.

It is a forest animal, and has long existed only in small numbers in two localities, the forest of Bielowicza in Lithuania, and in the Caucasus, though in ancient times widely distributed in Europe. The few hundreds in existence are protected by the Russian Government. This Bison is much rarer in captivity than the American species, and seems to be a less free breeder in that condition. It is often called the Aurochs, but incorrectly, this being the German name of the Urus, or wild ancestor of our domestic cattle, an animal now entirely extinct.

THE YAK

(*Poephagus grunniens*)

The Yak is a large but short-legged wild Ox, with large spreading horns much like those of many domestic cattle, and a heavy fringe or flounce of long hair covering the flanks and bases of the limbs; the tail also is bushy, like a Horse's. The colour is a brownish black in the wild race, which is only found in the Tibetan highlands and the countries adjoining. In these regions, however, tame Yaks are largely kept, and are, indeed, the chief cattle employed by the natives. They are smaller than the wild ones, and often white or pied, and sometimes hornless; and it is these that are seen in European Zoological Gardens. Yaks are hardy animals and good climbers; they can bear any amount of cold, but are very sensitive to heat. Their voice is a grunt, very unlike the bellow of most of the Ox kind.

THE GAUR

(*Bibos gaurus*)

The Gaur is the characteristic wild Ox of India, and also extends east to Malacca; it is often miscalled Bison by sportsmen in India. It is smooth-coated, unlike the true Bison, but also very high in the withers, with good-sized, well-curved horns. The coat is black, with the legs white, in adults; but calves are chestnut. The bull is a huge animal, being usually six feet at the withers, and has even been known to reach eight. He is, however, far less savage than wild Oxen generally,

and, though a delicate animal in captivity, seems to be the ancestor of the semi-domesticated cattle called Gayals kept by the native hill-tribes in Assam and Tenasserim. These, like most domestic animals, are often more or less pied, and are not rare in menageries.

THE BANTENG

(*Bibos sondaicus*)

The Banteng is more like some domestic cattle than any of the preceding, being nearly straight-backed; it is short-coated and white-stockinged like the Gaur, but also has a white patch on the stern, and the cows as well as the calves are chestnut, as are the bulls in Burma, where the animal is known as Tsine. In the typical race of the Banteng, however, from Malacca east to Borneo, the old bulls are black, contrasting beautifully with their mates. This is an animal of the grass-plains, while the Gaur frequents hill-forests; it is domesticated in Java and Bali. Notwithstanding this, it is a rare animal in zoological collections, and even in museums, though at the time of writing there is a male of a tame strain in the London Zoological Gardens.

THE WILD OX

(*Bos taurus*)

As this animal, the Urus of Roman writers, still survives in the persons of its numerous tame descendants, it needs mention here, though it has been extinct since the seventeenth century, having formerly shared the European forests with the Bison. It seems to have been black or brown in colour, and to have resembled in form the white "wild" cattle still preserved in some British parks—which, by the way, still sometimes produce black calves. Its size, however, was much larger than that of any modern breed, and it is believed to have reached a couple of yards at the shoulder. Julius Cæsar says it was little smaller than an Elephant.

Cattle which have run wild in modern times from undoubtedly tame stock are found in many parts of the world, notably in America and Australasia, and are fierce and dangerous to a degree.

The humped tame cattle of India and most of Africa—the so-called Zebus (*Bos indicus*) have apparently descended from a perfectly distinct animal than the Urus, but one which became extinct so long ago as to leave no record in history. They differ from our breeds in their shorter body and higher legs, differently shaped and set horns, their rarely heard grunting voice, and their gentle disposition, and usually in their different colouration, most usually iron-grey. Some have run wild in India.



INDIAN BUFFALOES

By C. E. Swan

THE INDIAN BUFFALO

(*Bos bubalus*)

The Water-Buffalo, as this animal is often called—and very appropriately, for it is nearly as aquatic as the Hippopotamus—is equal to any of the Ox tribe in size, though it does not stand very high at the shoulder, owing to its comparatively short legs; as the illustration shows, it is a very different animal in every way from the well-known American one which so often usurps its name.

The feet of the Water-Buffalo have large broad hoofs, adapted for progress in marshy localities; its hide is very thinly covered with hair, the dark skin being visible through the scanty black crop, but the ears have a slight fringe, and the tail the usual bovine tassel at the tip. Many Buffaloes have white "stockings," but this is not universal; in Assam there is, or used to be, a dun-coloured local race. These Buffaloes also differ much in the length, and to a certain extent in the form, of their horns; though these always agree in being set well apart on the forehead, in inclining backward, and being triangular in section. Some, however, are much longer and less curved than others, and those of the cow are longer and slenderer than those of the bull; good horns may be as much as six feet each, or even more, in length.

In its movements the Indian Buffalo is usually slow, like most marsh-loving animals, but is capable of being violently energetic on occasion; it is naturally, however, an ease-loving creature, delighting to wallow in water or mud, in which it immerses itself to the eyes and ears. It swims well, and when walking, as when swimming, carries the nose high, so that it is on a level with the back. Its food is the coarse vegetation of the marshes it frequents, so that its wants are simple, and it needs fear no enemies except the Tiger, which, however, is hardly a match for the old bull. Perhaps because of being

so immune from attack, however, the Indian Buffalo is an aggressive and dangerous animal—the old solitary bulls, which will attack man unprovoked, being almost, if not quite, the most savage of all wild things. A herd, however, is far less ready to act on the offensive. The attack of an old "Urna," as the wild Buffalo is called in India, is all the more dangerous because the beast has cunning as well as courage, and chooses a favourable moment to make his attack, while the rush-jungles he frequents are most unfavourable ground for his human adversary.

The natural home of the Water-Buffalo is India and Ceylon, but, as it has long been domesticated, it has been carried to many other parts of the world, and is kept in warm climates throughout Asia, in Egypt, and even in Italy and Hungary. In Northern Australia it has been introduced, but allowed to run wild again, and is now hunted for its hide. Tame Buffaloes are useful for their great strength, especially in soft marshy country, and for their power of thriving on coarse food; the cows also are good milkers, but the beef is not esteemed. They retain all their hatred for the Tiger when in a tame condition, and a well-known plan among Indian sportsmen, when a wounded Tiger has taken cover, is to drive in a herd of Buffaloes, who will to a certainty expel or kill him. Although dangerous to strangers, tame Buffaloes are very gentle with their owners, and may be seen controlled by tiny naked native children. In colour the tame Buffalo varies little more than the wild one—it is all black, white-stockinged, or dun; but sometimes it is white-haired, with a flesh-coloured skin, like a white domestic Pig.

Curiously enough, although constantly kept alongside of the humped Indian cattle, it appears never to interbreed with these animals. That it should do so with its wild relatives, when near the marshy haunts of these, is natural; and many tame Buffaloes have wild blood in their veins, for a wild bull will often come out of the marsh and assume the leadership of a herd of tame cows, whose services the unfortunate owner has to dispense with until the bull has tired of their company. Tame Buffaloes, as a general rule, are

smaller and scraggier than wild ones; they do best in low wet districts, where they can wallow freely, but are also kept even in the mountains. In Calcutta they are commonly seen working in the streets, being put to pull heavy carts, such as dray-horses—unknown in the East—would be used for here.

THE AFRICAN BUFFALO

(*Bubalus caffer*)

The Buffalo of Africa differs strikingly from the Indian one in several particulars; with the same general form and black colour, it is higher on the legs, and has very hairy ears and different horns, shorter than those of the Indian species, and immensely expanded at their bases, which in old bulls actually meet on the forehead, producing an impenetrable horny shield. At least, this is the case with the large South African form, the typical Cape Buffalo; but the species ranges over Africa generally, south of the Sahara, and several of its local races depart somewhat from the type. Those of Eastern Africa are brown instead of black, and show some transition to the Dwarf Buffalo or Bush-Cow of West Africa (*Bubalus nanus*), which is a short-horned tawny animal, only about as big as a Jersey Cow, and is often ranked as a distinct species.

These African Buffaloes are gregarious, like the Indian species, but are not so fond of water. They are all very dangerous when attacked, and many accidents have happened to hunters engaged in their pursuit. Their chief wild enemy is the Lion, but even he has to use discretion in his attacks.

Worse, however, than any natural enemy, and even than the wasteful destructiveness of man, have been the ravages of rinderpest among these animals, which in certain parts of East Africa have become almost extinct, owing to contracting this disease from the tame cattle of the natives. The African Buffalo itself has never been domesticated, but is sometimes to be seen in Zoological Gardens.

THE TAMARAO

(*Bubalus mindorensis*)

The Tamarao is the wild Buffalo of the Philippines, and is an ugly, thick-set, short-horned animal, black in colour, and of about the size of a little Kerry bull. It is, however, a dangerous creature, and is dreaded both by the natives, and also by tame Buffaloes which have run wild in its territory, these animals being widely kept in the East Indies, and readily reverting to the wild state.

THE ANOA

(*Anoa depressicornis*)

Although Buffaloes and Antelopes both belong to the same family of hollow-horned ruminants, they present a very great contrast in appearance as a rule; yet, just as there are Ox-like Antelopes, such as the Eland and Gnu, so in the Anoa we have a Buffalo which makes a decided approach to the Antelopes. The animal, which is only found in Celebes, is very small for a Buffalo, being indeed the smallest of the wild Oxen, and not as large as our smallest domestic cattle.

In general form it resembles the Indian Buffalo, but its limbs, head, and neck have a delicate and refined appearance, much like those of Antelopes, and its horns, which are about a foot long in the bull, are perfectly straight and smooth; they are directed straight backwards, and in the cow are very small.

The coat is scanty as in the large Buffaloes; in adults the colour is black, but the calves, which have a thick, almost furry coat, are light brown in colour. Adults are sometimes marked with white on the face, eyes, and back, somewhat as in certain Antelopes. This is a scarce animal in captivity, but has been occasionally exhibited here.



BLACK-TAILED GNUS

By Winifred Austen

THE BLACK-TAILED GNU

(*Connochætes taurinus*)

The family of Oxen (*Bovidæ*) contains not only those animals, but all other ruminants with the same type of horns—hollow ones, permanently seated on bony cores, also permanently affixed to the skull. Such are the Sheep and Goats, and the numerous tribe of Antelopes, which make up most of the family, but are confined to the Old World, and chiefly to Africa.

"Antelope" is used as the proverbial simile for light and elegant gracefulness; but there are Antelopes of many different shapes, and our present subject, one of the best known of African Antelopes, cannot be called elegant by any stretch of imagination, and does not at all accord with the popular notion of an Antelope, while it does suggest such incongruous animals as a Bull and a Pony, the latter of which it about equals in size.

The usual colour of the coat is, as the illustration shows, a bluish grey, slightly brindled with black, whence the name Brindled Gnu, often used; but there is a certain amount of local variation, and two races of the species are distinguished besides the typical South African one—the White-bearded Gnu from East Africa, in which the long hair under the chin is white instead of black, and the Nyasaland race, in which the beard is black as in the typical form, but there is a white crescent across the face, which is much smoother and less shaggy than in the other races.

The sexes are much alike in general appearance, and both are horned, though the bull is heavier. The calf's horns at their first appearance are straight spikes set some distance apart, and only acquire their peculiar and characteristic curvature as they grow.

The Black-tailed Gnu, commonly known to hunters as the Blue Wildebeest, is a widely ranging animal in Africa, the typical form reaching Benguela on the West Coast, and Lake Nyasa in Central Africa, while it is particularly common in the south-east part of the

Continent. It frequents dry open plains and thin bush, but not absolutely waterless districts, as, unlike so many Antelopes, it likes an occasional drink.

It is very gregarious, being usually found in herds containing one to several score; at some seasons the bulls associate apart from the cows and young. A lone bull will often be found associating with other Antelopes, and the herds are often in company with Burchell's Zebras.

Black-tailed Gnus are quarrelsome and excitable animals, and their antics, prancing and whisking their long black tails, are very characteristic. They are wary and hard to approach, and, if wounded, are remarkable for their extraordinary tenacity of life and power of travelling under injuries—even a broken limb will not disable them. It may be truly said of Antelopes that "they run in all shapes"; for the heavy-headed, awkward-looking Gnu is really one of the swiftest and most enduring animals in existence, and even when severely wounded is often too much for a horseman.

When brought to bay he is dangerous, and will charge savagely. Except for a trophy, he is not much good when brought to book, the venison he furnishes being of very inferior quality from a European point of view.

These Gnus do well in captivity, and may generally be seen at the London Zoological Gardens, where they have bred; they are, however, dangerous animals to deal with.

THE WHITE-TAILED GNU

(*Connochætes gnu*)

This is the real original Gnu—the name being a Hottentot one—but it is very rare nowadays—almost extinct, in fact. It shows an exaggeration of the peculiarities of the Brindled species; its horns are more sharply bent down and abruptly turned up, showing a very decided "pot-hook" shape; its neck is arched, and decorated by a stiff erect mane, and its tail is particularly bushy and horse-like. As the name of the species implies, the tail is white, the mane is also white at the roots, though dark at the tips. The general colour of

the coat is brown, so dark that the animal is commonly known in Africa as the Black Wildebeest. The muzzle is sprinkled with long white hairs, and a few of these surround the eyes.

In disposition and habits, as in appearance, this animal exaggerates the peculiarities of the Brindled Gnu, being much fiercer, and more excitable and given to cutting capers than that animal. It was formerly —about half-a-century ago—a very abundant animal in South Africa, ranging to the southward of the habitat of the Blue Wildebeest, and frequenting the "Karroo" districts. It frequently associated with the Quagga, just as its relative still does with Burchell's Zebra, but the same fate of extinction by man's persecution that has befallen its equine companion, has nearly overtaken the White-tailed Gnu also, and now two or three herds, preserved on Boer farms, are all that represent this remarkable creature in a wild condition nowadays.

Fortunately the White-tailed Gnu does well in captivity out of its native land, and has long been well known in menageries; it has bred freely in our Zoological Gardens, and specimens of both this and the other species were on view there at the time of writing.

THE HARTEBEESTS

Allied to the Gnus or Wildebeests are the Hartebeests (*Bubalis*), a group of Antelopes also of very peculiar form, though less odd in aspect than the former, having none of the heavy Buffalo-like appearance about the head, nor the Horse-like tail, although that appendage is of fair length and well-haired. Their chief peculiarities, indeed, are the very marked slope of the back towards the hind-quarters, and the long miserable-looking face, with the eyes set near the top of the head, which is crowned by a pair of strongly-ringed horns of only moderate length, but with a more or less well-marked double curve, very angular in some species. Both sexes are horned, and look much alike.

Hartebeests are about as big as a Donkey, and range from fawn to bay in colour, sometimes varied with black on the face and legs. Except for details in the shape of the horns, they are much alike and easily recognisable. There are eight species, all purely African, except one (*B. boselaphus*) which ranges into Arabia and even the borders

of Palestine, and they frequent dry open country in herds, and have great speed. Their venison is usually very good.

THE SASSABY

(*Damaliscus lunatus*)

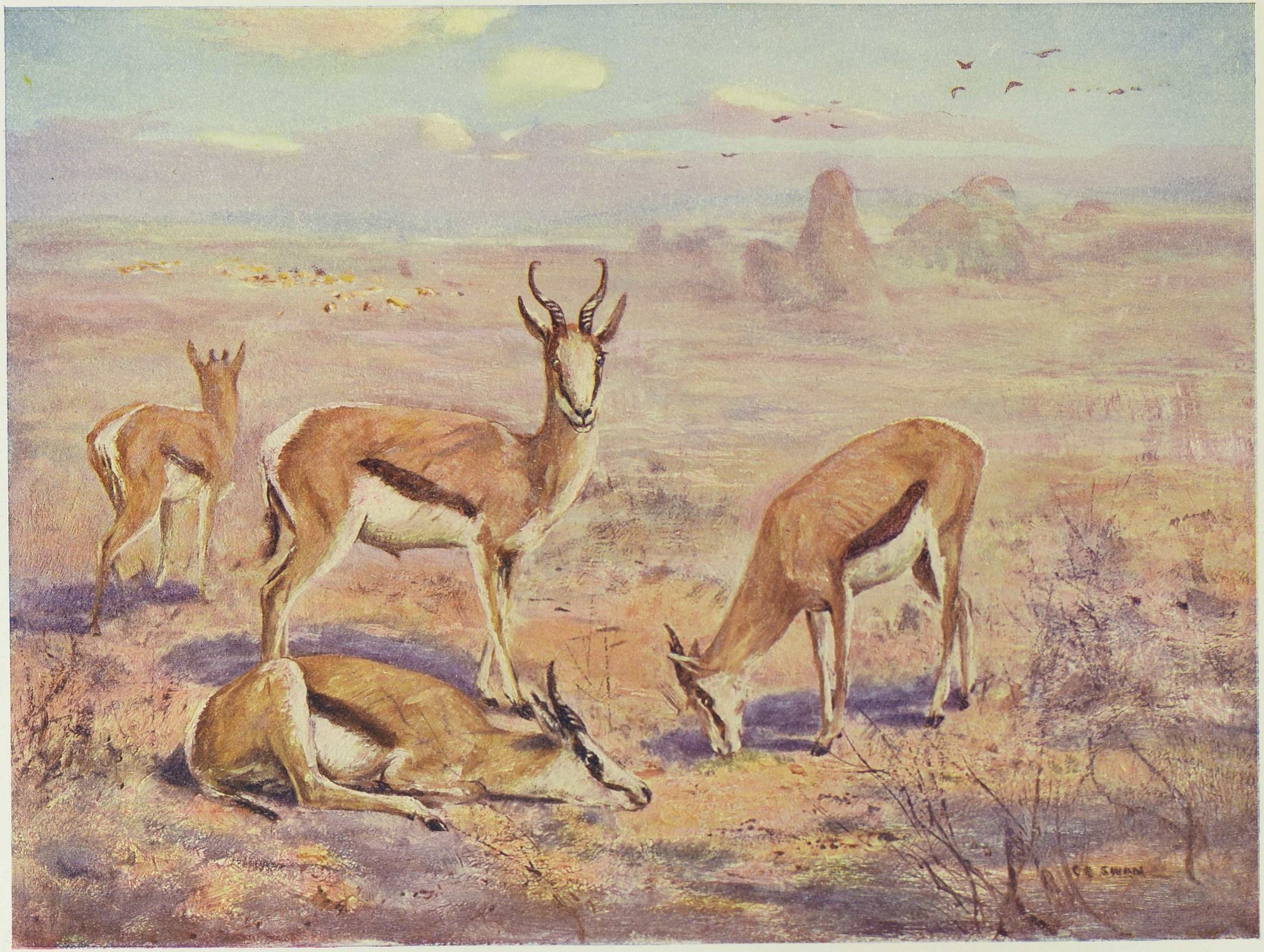
The Sassaby represents a group known as Bastard Hartebeests, which show the peculiarities of those animals in a slightly less marked form, the face being shorter and the horns less angulated. In colour it resembles some of the typical Hartebeests, being a rich red-brown, with a purple gloss; its horns are rather over a foot long, and present in both sexes, as in all this group. It is a South African species, and celebrated for its speed and endurance, although it is doubtful if in these respects it much exceeds the Blue Wildebeest and one or two of the true Hartebeests; but it is at any rate so fast that hunters do not like to risk injuring their Horses by hunting it to no purpose. It has never been exhibited at our Zoological Gardens.

THE BLESBOK AND BONTEBOK

(*Damàliscus albifrons* and *D. pygargus*)

These Antelopes, also close allies of the Hartebeests, are both South African, and, being much alike, have even sometimes been confused together. Both are rather above a yard at the shoulder, of a brown colour, with a beautiful lilac or violet gloss in life, and with a white face and more or less white legs. The Bontebok is the gayer of the two, having a white patch on the stern and the legs all white; its horns also are black, those of the Blesbok being pale.

They are both South African species, but did not occur together, the Bontebok having been confined to the south of the Orange River. It is now nearly extinct, being only found in a protected state on one or two farms, while the Blesbok, which used to be excessively abundant, is now fast approaching the condition in which it will be absolutely dependent on protection for its existence as a species, having been recklessly shot down by hide-hunters. Both species have been exhibited in the Zoological Society's Gardens.



SPRINGBOKS

By C. E. Swan

THE SPRINGBOK

(*Gazella euchore*)

The Gazelles and their allies form a numerous group of Antelopes in which, as a rule, the delicacy and grace which one usually associates with these animals reach their most typical development; and the Springbok of South Africa is the most notable of all for its rich colouration and peculiar habits, to say nothing of its familiarity as the commonest of South African Antelopes, which has led to its name being a household word as the title of the well-known Colonial football team.

The most noteworthy point about the Springbok is the peculiar fold of skin along the hinder part of the back, lined with white hairs five or six inches long. In the ordinary way one only notices a white streak along the hind-quarters, but when excited the animal expands this fold, making a startling display of a great white fan of fur; at the same time it springs perpendicularly into the air for a height of three or four yards, an action it repeats again and again. This is called "pronking" by the Boers, and such a striking habit has of course always called attention to this pretty creature. Like most Gazelles, the Springbok is not a large animal, being of the size of an ordinary Goat—about two and a half feet at the shoulder. The buck's horns are usually about fifteen inches measured along the curves, but may occasionally be more; the doe's are not so large. Young ones are at first of a duller colour than the parents, being yellowish grey with the side stripes indistinct.

The home of the Springbok is Africa south of the Zambesi, but it ranges up to Mossamedes on the West Coast. It frequents, like Gazelles in general, dry open country, and is very gregarious and migratory, "trekking" at times in large herds, though the enormous masses which were the wonder of travellers half-a-century ago are hardly any longer to be seen. These hosts of Springbok, deserting in their countless thousands the barren haunts where subsistence had failed them, used to swarm down into the cultivated lands, devouring

all vegetation before them like locusts. So huge were their numbers that the rear-guard of the great herd were always in a famishing state; while tales are told of the Lion himself being carried away in the midst of the troop, unable to do more than keep a clear space among his unwilling escort, and of Sheep and shepherds, caught by the "trek-bokken" in narrow passes where there was no escape, and trampled to death. It is doubtful if any animal of the size has ever been so abundant; now matters are so changed that the creature, once so serious a pest, receives protection, for in moderation it is a very desirable animal. In addition to its great activity, it is very swift, being usually too much for a Greyhound; and it also has sufficient courage to turn and fight the Dog when by chance it is overtaken. A great many are, of course, shot, though not without careful stalking, and the venison, which is very good, is regularly on sale at Cape Town when in season, and has even been offered on the London markets, having been brought over in cold storage.

The Springbok is not unfamiliar in captivity, and has bred in the Cologne Zoological Gardens, but it is not a very hardy animal, and probably requires more space for exercise than it usually gets.

Except that none of them have the peculiar "fan" of the Springbok, and that their colours are generally less rich, the rest of the Gazelles, which number about two dozen species, are fairly well typified by that animal. Their range is very wide, including all of the open parts of Africa—though there are no others but the Springbok south of the Zambesi—and extending into Asia as far as India and even Tibet. The animal known in the Authorised Version of the Bible as "Roe" is really one of the Gazelles (*Gazella dorcas*). In a few Gazelles, it should be noted, the does are hornless, but usually they have small horns. Two or three abnormal types of Gazelle deserve notice here on account of their peculiarities.

THE DIBATAG

(*Ammodorcas clarkei*)

This is a very slender, long-necked, graceful Gazelle, confined to East Central Somaliland. The tail is long and slender, and there are no horns in the female. When on the move this animal endeavours to make both ends meet by carrying

the head back and the tail curved forward, giving a very curious effect. It is chiefly a browser, and seems independent of water.

THE GERENOOK

(*Lithocranius walleri*)

The Gerenook, although it has a rather short tail, like other Gazelles, exaggerates the peculiarities of the Dibatag; indeed, its neck and legs are so long that it can justly be called a Gazelle modelled on the lines of a Giraffe. It inhabits Somaliland, but is also found outside it, ranging to the Kilimanjaro district. Like the Dibatag, it browses much, as one would expect from its form. In height the male is more than a yard at the shoulder; the female is hornless.

THE BEIRA

(*Dorcotragus megalotis*)

The Beira is a curious little Antelope, mostly grey in colour, and compact in shape, with very large ears, and, in the buck, short straight horns four or five inches long. The animal stands considerably less than two feet at the shoulder. It is only found in Northern Somaliland, where it frequents rocky hills. Neither this Antelope nor the last two have been brought to England alive, apparently.

THE CHIRU

(*Pantholops hodgsoni*)

This is an Asiatic Antelope of the Gazelle group, with very long ringed horns in the male, nearly straight and erect; they measure about two feet long, the animal itself being about as big as the Springbok. The female is hornless. The Chiru, which inhabits the bleak Tibetan plateau, has a very thick, close coat, of a fawn colour, the face of the male being black. Its tail is short, as are those of the typical Gazelles inhabiting cold climates. This Antelope is a very fast trotter, and lives in large herds, the bucks fighting savagely for the does. It seems never to have been brought to Europe alive.

THE SAIGA

(*Saiga tatarica*)

The Saiga is an ugly Sheep-like Antelope, with rather short ringed horns of a curious pale yellowish colour. They are confined to the male, which also has an

enormous Roman nose, which he wrinkles up to keep it out of the way when he is grazing. The coat is pale sandy, and very close and thick; the size about that of a Sheep. The Saiga is a steppe animal, living in Southern Russia and South-East Siberia: it lives in large herds, and is rare in captivity, though our Zoological Society and the Duke of Bedford have possessed specimens.

THE PALLAH

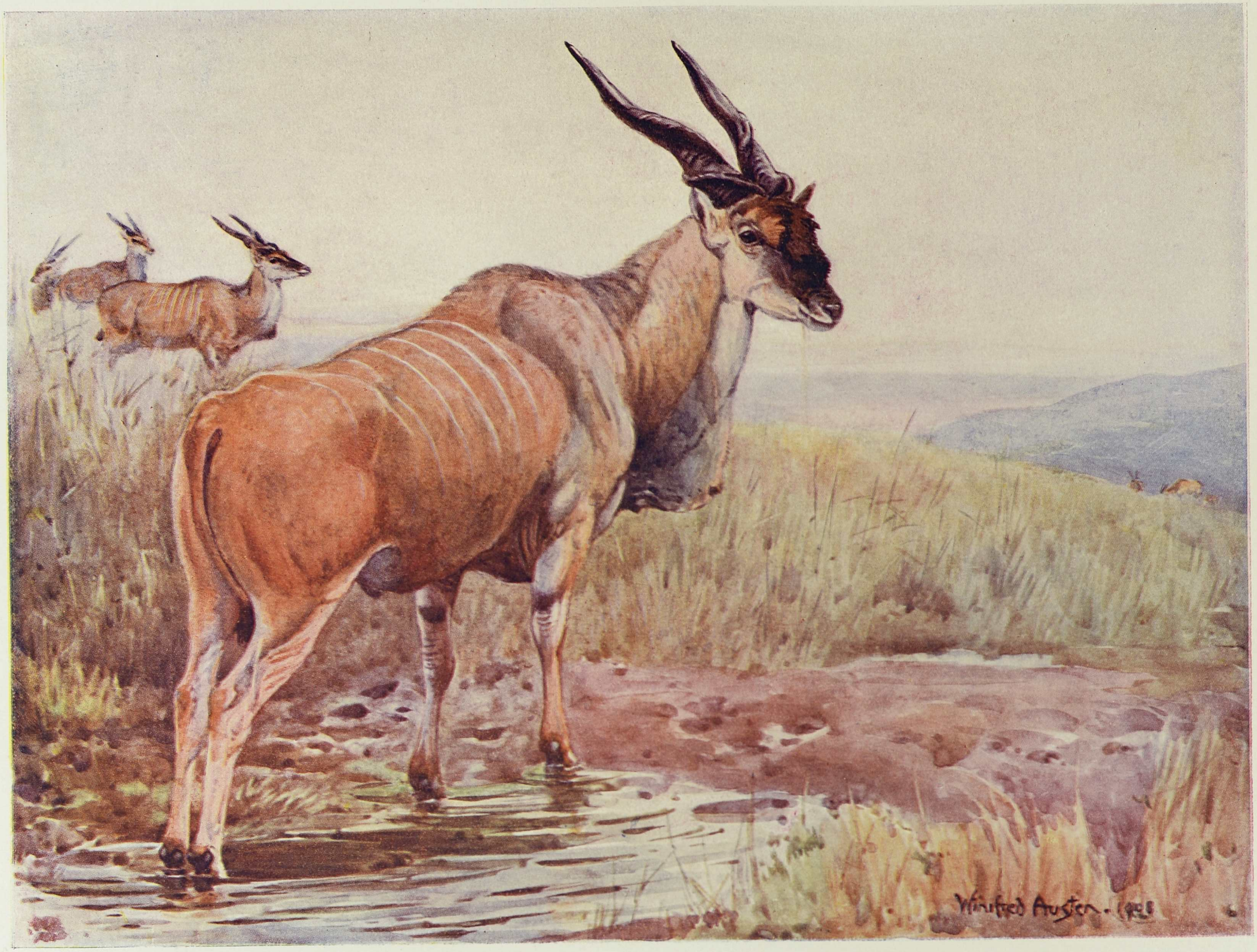
(*Æpyceros melampus*)

The Pallah is rather a large Antelope for one of this group, standing about a yard at the shoulder; the doe is hornless, but the buck has very beautiful horns, with a lyre-shaped curve, backwards, outwards, and upwards. They measure about twenty inches in length. The general colour of the coat is bright red-brown. The Pallah is found in south of East Africa, being replaced on the west side by a very nearly allied form, the Angolan Pallah (*Æ. petersi*), which has a black face-streak. The Pallah is a gregarious Antelope, frequenting forest country, and is remarkable for its powers of leaping.

THE BLACKBUCK

(*Antilope cervicapra*)

Although not to be compared in size with many African Antelopes, since it only stands about as high as the Springbok, the Blackbuck, which is confined to India, can vie in beauty with almost any of them. The buck's horns are strongly ringed, and twisted in a close spiral. They are very long for the animal's size, measuring two feet or even more. The doe is usually hornless, but in rare cases bears small smooth curved horns, very unlike those of the buck. Her colour, and that of the young, is a light fawn, white on the under-parts; but the adult buck is, with the exception of the white belly and insides of the legs, nearly all black, giving a striking contrast. In some cases old bucks assume the fawn coat for a time at any rate; this happens in captivity with some individuals, and an old fawn-coloured buck has been observed in the wild state. The Blackbuck is a gregarious animal, and very polygamous, only one old black male being seen with a herd of does and young. It frequents open plains, and sometimes does much harm to crops: its speed is very great—too much for a Greyhound as a rule, though the Cheetah, as remarked in the article on that animal, can surpass it for a short distance. The Blackbuck does well and breeds freely in captivity.



ELAND
By Winifred Austen

THE BEISA ORYX

(*Oryx beisa*)

This fine Antelope is one of a small group of large species which have somewhat of the Horse in their proportions and general appearance; indeed, it has been suggested that the legendary Unicorn originated in stories of a one-horned Oryx of some kind, such specimens sometimes occurring. The Beisa is about the size of a small Donkey, and both sexes bear the long lance-like horns, ringed at the base and smooth at the tip. The horns of the female are, however, longer and slenderer than those of the male, and may even exceed a yard in length, those of males seldom much exceeding two and a half feet. Probably as a protection against these terrible weapons in their combats with each other, the skin on the shoulders of the male Beisa is very thick; he is also slightly stouter-necked and taller than the female, but the sexes are not easy to distinguish when a herd is sighted.

Blanford has drawn attention to the pointed triangular shape of the hoof in this Antelope, and says that this form of foot is particularly characteristic of desert-haunting species like these Oryxes and the Gazelles, the more forest-haunting species having rounder feet, like Deer or Cattle.

The Beisa Oryx is a characteristic animal of North-Eastern Africa, from Suakin southward to the Tana River, and is very well known in Somaliland. It frequents dry open country, feeding mostly on grass, though occasionally browsing on acacia shoots; and, though in some localities it drinks regularly, it is often found quite away from any water, and evidently living entirely without it.

It is very elegant in its movements, which are much like those of a Horse; it usually walks or trots, but will gallop if greatly alarmed. When charging, it puts down the head between the fore-legs, so as to bring forward the points of the long horns; it is a fierce animal, and decidedly dangerous when brought to bay.

Though often found solitary, especially in the case of males, the Beisa is usually seen in herds, numbering from half-a-dozen up to forty or more; indeed, there is at least one record of a herd numbering

as many as five hundred being seen in Somaliland, where this animal is still common, especially in the desert Haud plateau. In a herd, as might be expected, the proportion of males to females is very small.

The chief foes of the Beisa are the Lion, which lives largely on these Antelopes, and man, for they are keenly hunted by the outcast tribe of Somalis called Midgans, to say nothing of European sportsmen.

The Midgans use bows and poisoned arrows, and employ packs of dogs, described as savage yellow pariahs, no doubt similar to the common tan-coloured pariah of Indian towns in appearance, though of higher courage. They need this to be able to attack so strong and fierce an animal as this Antelope, and some of the pack are often injured or killed.

The thick skin of the male Beisa's shoulders is of value to the warlike Somalis for making shields, as it is sometimes about three-quarters of an inch thick, and will make a shield stout enough to turn either arrow or spear. The horns are also employed for weapons, and many are brought for sale at Aden. The venison is very good, if the animal is in good case when killed. The Beisa is not an uncommon Antelope in captivity; indeed, it is the only one of the Oryxes which is often met with, and may usually be seen in the London Zoological Gardens, where it has bred on more than one occasion. Of the true Oryxes there are but few species, so all of them may be noticed here in detail.

THE TUFTED ORYX

(*Oryx callotis*)

This species is very similar to the Beisa, but the conspicuous tuft at the end of the ears at once distinguishes it from all other Oryxes; it also differs from the Beisa in a few details of colouring, being redder in general tint, with no black patch down the front of the fore-leg below the knee, but with the black cheek-stripe running down from the eye usually much better developed. This species replaces the true Beisa in British East Africa south of the Tana River, and is also found in German East Africa; its general habits seem to be very similar to those of that species, but it frequents open bushy country rather than bare desert plains.

THE GEMSBOK

(*Oryx gazella*)

The Gemsbok of South Africa, although also very like the Beisa at first sight, is more distinct from that animal than the last species. It has very much more black in its colouration, the streaks down from the eyes and the patch across the muzzle being better developed, while the bases of all the limbs are nearly solid black, and there is a black patch on the hind-quarters just before the tail. Moreover, there is a fringe of long hair on the throat, forming in the male a conspicuous tuft on the middle of the neck. In size this Antelope is rather larger than the Beisa, and its horns, which are similar in form, may reach nearly four feet in length—they are longer in females than in males.

This Oryx is found in the dry regions of South-West Africa, and has been known since Buffon's time; its Boer name supposes a resemblance to the "Gems," or Chamois of Europe, and is as inappropriate as several other titles of comparison bestowed by these Dutch pioneers on the new animals they met with in South Africa. It is now nearly, if not quite, extinct in the Cape Colony itself, although its effigy, along with that of the White-tailed Gnu, figures in the arms of that State.

The Gemsbok is a true desert-animal, being able to exist where there is no water, although it drinks at times, and digs up the bulbs of desert plants with its hoofs, thus obtaining a certain amount of moisture. It is not very gregarious, only a pair or a small family being usually found in company; its speed appears to be only moderate, but it is possessed of great courage—even the Lion, apparently, sometimes falling a victim when he attacks it. Although so long known, it seems never to have been brought to Europe alive.

THE BEATRIX ANTELOPE

(*Oryx beatrix*)

In general form this Antelope, which inhabits Southern Arabia, resembles the Beisa, but is a much smaller animal, measuring less than a yard at the shoulder. Its colour is also very different, being chiefly white,

with the legs and some patches on the muzzle and cheeks very dark brown, and the tip of the tail black. Several specimens have been exhibited in the London Zoological Gardens.

THE LEUCORYX

(*Oryx leucoryx*)

The Leucoryx, which is rather smaller than the Beisa Oryx, is the most distinct of all the Oryxes, owing to its horns having a strong backward crescentic curve, instead of being straight as in the rest; they may exceed a yard in length. The general hue of the animal is cream-colour, darkening into brown on the neck and shoulders; the face-markings—nose-patch and eye-stripes—are brown instead of black. This species is found from Dongola to Senegal, inhabiting deserts in herds; it gets much of its food by browsing on acacia twigs, and the Arabs hunt it on horseback for its flesh, which they esteem highly, and its hide. It is not a very common animal in collections, but has lived and bred in the London Zoological Gardens.

THE ADDAX

(*Addax naso-maculatus*)

The Addax is closely allied to the Oryxes, and similar in general form, but its horns are very different, having a decided spiral twist much like those of the Koodoo, though they are ringed like those of the Oryxes. In the female they are much thinner than in the male, and have the spiral twist less pronounced. A male's horns may measure a yard along the curve. The Addax is rather less than a yard in height at the shoulder; in colour it is a light brown, greyer in winter and redder in summer, with the haunches and all the limbs white, a black patch of long hair on the forehead just below the horns, and below this two white patches, meeting each other across the nose. The Addax has the same range as the Leucoryx, and is also a scarce animal in collections, though our Zoological Society has exhibited it.



SABLE ANTELOPE

By Winifred Austen

THE SABLE ANTELOPE

(*Hippotragus niger*)

ALTHOUGH belonging to the same group of Antelopes as the Oryxes, the Sable is a very distinct type, and certainly excels all its relatives in beauty—if indeed it is not the finest of all Antelopes, as many would maintain. It is large enough to be imposing, being as big as a full-sized Pony, and its carriage is as gallant and showy as its colours and form are striking and beautiful.

The cow is not much inferior in beauty to the bull, but she is rather dark brown than black, especially in the southern portion of the Sable's range, the females of northern herds being very dark. They may, however, always be distinguished from the bulls by their horns, which are decidedly shorter and not so strongly curved, besides being slenderer. The horns of a good bull are over a yard long.

The young Sable is of a light brown, without the face-markings of the old animal at first.

Like all the finest Antelopes, the Sable is an African animal, being especially characteristic of South Africa, though it ranges up to German East Africa and Angola. It was first discovered by the well-known sportsman, Harris, in the Transvaal, but is now extinct there, though English people still sometimes call it the "Harrisbuck"; the Boers know it as "Zwart-wit-pens" (black-white-belly).

The kind of country it prefers is high, open, and rather bushy, and it is fairly sociable, a number of cows and calves being found in herds together. With these, however, there will be only one old bull, for the Sable is a fierce animal, and brooks no rivals. It may even be aggressive to other Antelopes, as it has an unscrupulous habit of turning out Lichtenstein's Hartebeest from beds or lairs which this animal is fond of making for itself. The attitudes of the Sable Antelope are very picturesque, as it carries its neck gracefully arched; its pace is good, but it has not the extreme speed of some much less handsome and symmetrical Antelopes. When driven to bay it is very

dangerous, being not only high-couraged, but marvellously quick with its horns; like the Gemsbok, it fights lying down, and is very dangerous to hounds. The venison it affords is not of very high quality, but of course the beautiful head is valued as a trophy.

Although not what one might call a common or cheap animal in the wild-beast trade, the Sable Antelope does well in captivity, and is well known in Zoological Gardens.

THE ROAN ANTELOPE

(*Hippotragus equinus*)

The Sable Antelope's only existing near relative, the Roan or Equine Antelope, is a sort of inferior edition of the noble "Harrisbuck." It is considerably larger, it is true, but its horns, though massive, are considerably shorter—about two and a half feet in the bull, and two in the cow. The colour also is not nearly so beautiful; the face, indeed, is marked with black and white much as in the Sable, but with more black, this colour covering the jaw and meeting the black on the muzzle; the body-colour, however, is some shade of light brown, sometimes really a roan, but varying from quite a dark brown to nearly white. The ears are long and Donkey-like, and are carried drooping. The calf is very like the Sable calf, but may be distinguished by the difference in the face-marking, though this is indistinct at first.

The Roan ranges more widely than the Sable, being found over Africa generally south of the Sahara, and it shows a good deal of local variation. In its general haunts and habits, it is much like the Sable, but goes in smaller herds, and has a louder voice, this being described as a bellow, while the other species only snorts. It is not remarkably fast, although its habit of running with its mouth open often gives a delusive idea of its powers, but its courage is unrivalled among Antelopes, and it will turn and charge, not only when wounded, but even when galloped too hard.

Like the Sable, the Roan does well in captivity, and has been exhibited at our Zoological Gardens, though not so frequently.

The only other Antelope closely allied to the Roan and Sable

Antelopes was the Blaauwbok (*Hippotragus leucophæus*), which was smaller than either of them, and bluish-grey in colour, without distinct face-markings, but this animal has been extinct for more than a hundred years; when it existed, it was only known to inhabit the south-western corner of Cape Colony. There are only five stuffed specimens of it in Museums—none of them at South Kensington, unfortunately, though there is one in Paris, the others being at Leyden, Vienna, Stockholm, and Upsala respectively.

The Cervicaprine group of Antelopes is typified by the Reedbucks (*Cervicapra*), which are animals of moderate size, with rather short horns with a forward curve. To the same group belong the various species of Kobs and Waterbucks.

THE KOB ANTELOPES

The Kob Antelopes (*Kobus*) are a group of about a dozen species, equalling or exceeding the common Fallow Deer in size, with no very striking characteristics, their shape being Deer-like, and their horns, which are only found in the males, somewhat lyre-shaped, and ringed except at the points. Several of them are very handsome animals, such as the White-eared Kob (*Cobus leucotis*), which is nearly black, with the ears, muzzle, throat, and parts of the limbs white. Most of these Antelopes are, however, of some shade of brown. They are widely distributed over Africa south of the Sahara. Among them the Waterbuck and Lechwe deserve special mention here.

THE WATERBUCK

(*Cobus Mipsiprymnus*)

The Waterbuck and its immediate ally the Sing-Sing (*Cobus unctuosus*) are the largest of the Kobs, and have a longer coat than is usual in the group, which are generally very sleek. The Waterbuck itself, indeed, has very coarse hair, much more like that of a Deer than an Antelope, and might readily be mistaken for one of the Deer family

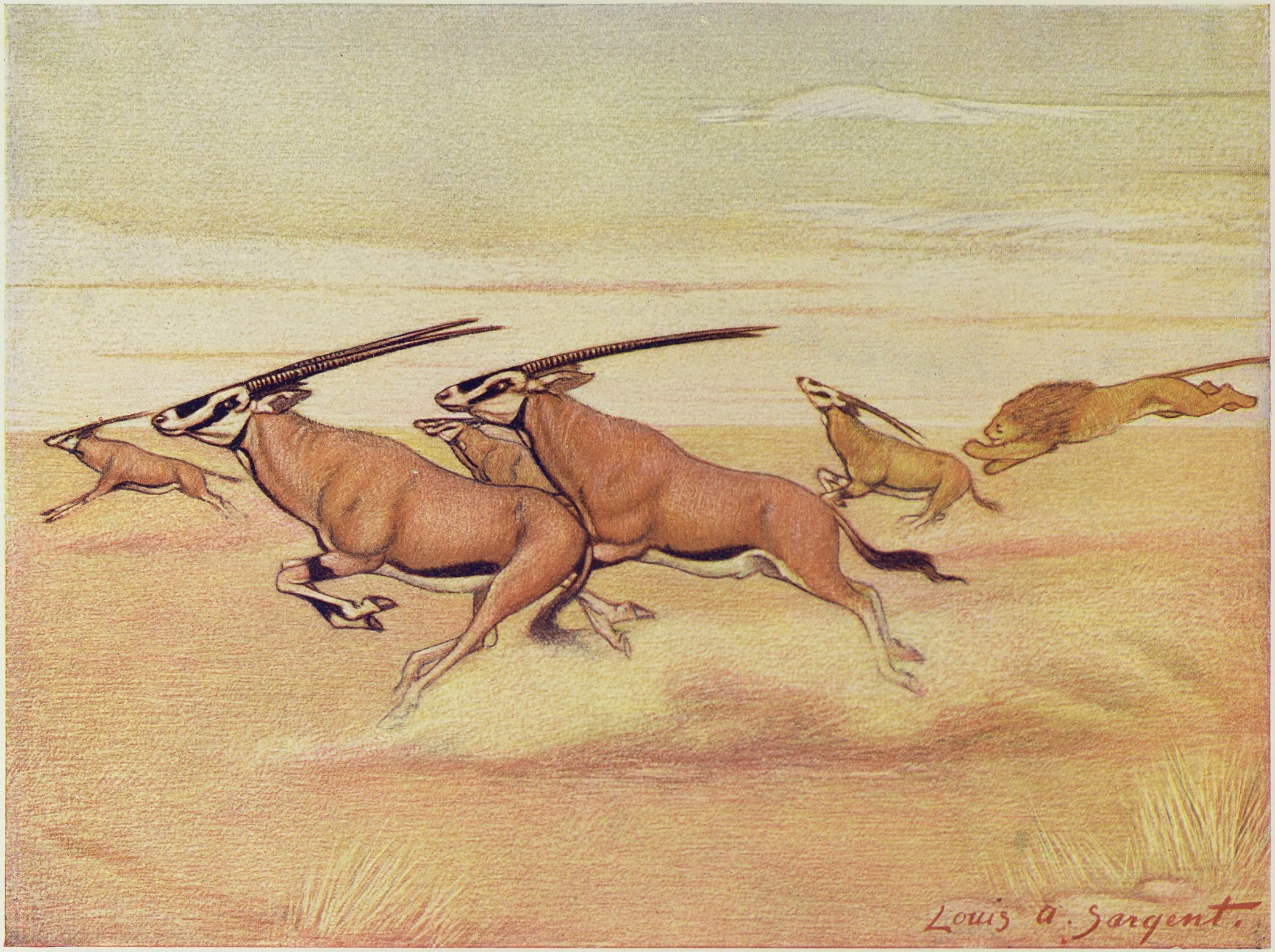
were it not for the different horns of the buck. In size it about equals a Pony, and is heavily built, not light and elegant like the Kobs in general; its strong horns are about two and a half feet long. The general colour is light brown, with a curious elliptical ring of white on the hind-quarters, quite unlike any marking found on any other animal.

This Antelope, which has a peculiarly noble appearance, in spite of its somewhat coarse build and *pelage*, is not an aquatic species, as its name would imply, but merely haunts the neighbourhood of water, and sometimes takes to it to stand at bay when pursued. At such times it is dangerous, as it defends itself fiercely. It frequents bushy country, but feeds chiefly on grass, and it is a good climber, ascending rocky ground with great agility. Usually it goes in small herds, consisting of a buck and a few does. Its meat is very poor indeed, being so rank that nothing but sheer hunger is likely to recommend it to a European palate. The Waterbuck is widely distributed over Africa, from Somaliland to the Limpopo River in the south; but in the west and in parts of East Africa it is represented by the above-mentioned Sing-Sing, which has not the white ring on the stern, but is otherwise very similar.

THE LECHWE

(*Cobus lechi*)

The Lechwe is rather smaller than the Waterbuck, not being much over a yard at the shoulder; its colour is very handsome, being a rich bay, with black down the front of the limbs and white belly. The backs of the pastern-joints are naked, as in the swamp-frequenting Tragelaphine Antelopes like the Situtunga, although the hoofs are not lengthened as in those animals. The Lechwe is, indeed, also an aquatic Antelope, but does not frequent marshy soft-bottomed swamps, rather affecting flooded plains, on which it wades about in large herds, browsing on such plants as project above the water. It swims well, as might be expected, but does not do so as long as it can get a "take-off" from the bottom, preferring to splash along by a succession of bounds.



BEISA ORYX

By Louis A. Sargent

THE ELAND

(*Oreas canna*)

The Eland is one of a very distinct group of Antelopes known as the Tragelaphine section, characterised as a rule by twisted horns, angular in section, which are smooth or nearly so, and by the presence in most cases of distinct white markings on some part or other of the coat. None of them are very small, and the Eland itself is by far the largest of all Antelopes, a large bull reaching six feet at the shoulder, or even more at times, and making a Buffalo seem small by comparison.

The cow is considerably smaller and lighter in make, and the bull does not attain his full bulk and characteristic peculiarities for some years, since he may attain his mature height before he assumes the mat of long hair on the face and the immense fatty thickening of the upper part of the neck, which mark the perfectly adult bull, and are never found in the cows and young males. Old animals, especially bulls, lose so much of their coats that the dark skin shows through and gives them a grey appearance.

The horns are not of great length, those of the bull being about two and a half feet long, while the cow's, which are slenderer, will be about a couple of inches longer.

The Eland has a wide range over South Africa, and shows a good deal of local variation. The southern or Cape Eland is a plain light-brown animal, without any white marking; but as one proceeds northwards this race gradually passes into the striped variety, which is known as Livingstone's Eland, having been first discovered and characterised by the great missionary explorer. In this the sides are noticeably marked with several thin white stripes, most distinct in the females and calves, and there is a well-defined black patch on the inner side of the fore-leg above the knee. Females and young

animals also have a black stripe down the back in this variety, which is far the most handsome, and nowadays the best known, the Eland of the south being extinct in Cape Colony.

Such a large animal as the Eland has, of course, attracted attention from the earliest times of African colonisation, and the Boer settlers of the Cape bestowed on it its present name, which really means "Elk." Except that both Eland and Elk are ruminants, and that each is remarkable for its large size, the two beasts have absolutely nothing in common; but, as previously observed in these pages, the Boer pioneer appears to have had the most delightfully happy-go-lucky methods of nomenclature when he came across a new animal.

The manners and movements of the Eland are what might be expected from his ponderous Ox-like carcase, so strangely combined with a small harmless-looking head. He is a good walker, and can trot at a pace which will force a Horse to go beyond a trot to keep up with him. When allowed to "go his own gait" he is sufficiently enduring, but if forced into a gallop he soon becomes blown and exhausted, for he cannot keep up this pace more than a mile or so. Yet he is able to bound or spring in a remarkable way for so heavy an animal, and can easily get away from a horseman on broken or wooded ground. When cornered he will charge at times, but his attack is not very difficult to avoid, for he has none of the quickness and determined ferocity of such animals as the Gnu and Sable Antelope. Bull Elands, also, often get so fat that they can be driven by a horseman almost like cattle; but the cow, as is so often the case with ruminants, is much more active, and some specimens of this sex may give a mounted hunter a long chase.

The Eland is undoubtedly an easy-going, peaceful animal by nature; although sometimes it may be found singly or in small family parties, it is often met with in large herds, in which case several bulls will be found living in apparent friendship along with their female associates. Its food consists, according to circumstances, either of grass or leaves, for it is addicted to browsing as well as grazing, and, in fact, prefers country which is more or less wooded, if not actual forest. It is

found on low rocky hills as well as on grass plains. Like so many Antelopes, it can, although not abstaining from water when this is available, go for long periods without it, for it is found constantly in the Kalahari Desert, where there is water only for a few months of the year, and even attains a particularly heavy weight in this arid region. The Eland is, indeed, a very "good doer," and is particularly apt to lay on fat, a characteristic which seems to have greatly endeared it to hunters; at any rate, they are generally loud in their commendations of its flesh, which is said to be much like beef, but of a superior quality. It must be remembered that the need of fat is keenly felt in a life in the wilds, and any animal which supplies plenty of this—which most game beasts do not—naturally commends itself to the hunter's proverbially keen appetite. Mr. F. C. Selous, indeed, thinks that Eland meat has been over-rated, in comparison with that of some other Antelopes, though he admits that it is excellent if the beast really is fat, which, of course, is determined by the quality of the food it has been living on.

Eland calves, which are somewhat like those of our Jersey cattle, are usually born in July, and are easily tamed. Indeed, the animal is one well suited for domestication, though its mildness of disposition is, it must be remembered, only comparative—the male, like almost all horned animals, being liable to become dangerous in captivity. I know of a case in which one, in a fit of anger, fatally gored a Burchell's Zebra which had long lived in the same paddock with it.

Hopes used to be entertained that the Eland would be added to our list of European domestic animals as a producer of choice meat; but, though it has constantly lived and bred well in our Zoological Gardens—and even, with but little protection from the weather, in various private parks—it still remains a mere menagerie animal. This is probably because, in Europe, it cannot hope to compete in utility with our ordinary domestic stock; but the recent idea of introducing it into Australia is a very good one, as its powers of doing without water would make it a most invaluable animal for that country—or any other where droughts work havoc with ordinary cattle. So far,

however, only a very few live specimens have reached Australia. It is quite possible that Elands, properly trained, could be used as saddle and draught animals; but, of course, they would have to be trained when young, and would require perseverance and caution in breaking-in.

THE DERBIAN ELAND

(*Oreas derbianus*)

The Derbian Eland is very closely related to the common species, but is an even finer animal, with more massive horns, and a much handsomer coat, this being of a rich reddish fawn, striped with white much as in the striped form of the Common Eland, but set off by a black neck, separated from the chestnut body by a white band across the shoulder. This Eland inhabits Senegal and the Gambia; it is a forest animal, and feeds by browsing on the trees, the bulls, according to native accounts, pulling down boughs for their mates and young. Little, however, is known about this splendid Antelope, and few skins even have reached Europe, to say nothing of living specimens, which would be a great addition to any Zoological Garden.



KOODOO
By C. E. Swan

THE KOODOO

(*Strepsiceros kudu*)

It is a question whether the Koodoo or the Sable Antelope is the most beautiful of all Antelopes, and our illustrations give at any rate a fair opportunity for comparison of these two magnificent beasts. The Koodoo, which is, like the Eland, one of the Tragelaphine group of Antelopes, is also a large animal, but not to be compared in dimensions with that giant species, though about equal to a Horse in size.

The horns in the bull grow to a great size, sometimes four feet measured in a straight line, which, of course, means that over a foot must be added for the measurement taken along their spiral curves; but such specimens of these are rare, though a good horn should be more than a yard, measured straight. In the cow there are, as a rule, no horns; but in very rare cases females with under-sized and malformed horns have been recorded. In colour the female is browner than the male, which gets grey with age.

The Koodoo has a wide range in Africa, from Abyssinia and Somaliland to Cape Colony, but has, unfortunately, been exterminated in some places, not only owing to human persecution, but owing to rinderpest, which has proved a deadly scourge not only to domestic cattle in Africa, but also to several of the wild ruminants, which are unfortunately susceptible to its ravages. Specimens from the northern part of Africa have fewer white stripes than the southern ones. The favourite ground of the Koodoo is hilly country clothed with bush, and not too far from water, as it usually drinks regularly. In such ground, of its own choosing, it can easily evade a horseman; but the bull, at any rate, is a heavy animal in the open, and can be galloped down, though the cow is fleeter.

These Antelopes are usually found in small herds, and even the old males sometimes form little bands of their own. In spite of their imposing appearance and fine horns, they have remarkably little spirit, and show, when at bay, according to Mr. F. C. Selous, less idea of self-defence than any other Antelope—a remarkable contrast to their rival, the plucky and gallant Sable. The note of the Koodoo is a bark, which it utters when alarmed; opinions vary about the quality of

its flesh. In captivity it is not common, though it has several times been exhibited in the Zoological Gardens, and one specimen lived there for seven years; unlike its relative the Eland, it appears to be a delicate animal, and probably requires more exercise and a more varied and natural diet than usually falls to the lot of menagerie animals.

THE LESSER KOODOO

(*Strepsiceros imberbis*)

The Lesser Koodoo was first described by that most excellent but greatly neglected naturalist Edward Blyth, and is confined to Somaliland and the coast of British East Africa. In most respects it is a beautiful miniature of the ordinary Koodoo, but is more slenderly built, and has no fringe of hair down the front of the neck. It measures little more than a yard at the shoulder, and the buck's horns are only about two feet in a straight line, with a less open spiral than those of the large species.

In general habits the Koodoo is not unlike its big relative; it frequents thick forest near water, and is only found in small parties. It has great powers of leaping, and is very wary and hard to shoot —more so than the large kind. A curious point about it is that the meat, according to Mr. F. J. Jackson, disagrees with many East African natives in a most peculiar way, causing great pain in the mouth and gums when eaten. A few specimens have been kept in the London Zoological Gardens, but have not thriven, and it is rare in a living state on the Continent, even if known there at all.

THE BONGO

(*Boocercus euryceros*)

The Bongo is a very fine example of the Tragelaphine Antelopes, being about as big as a Donkey, and very richly coloured—a bright chestnut with very distinct white stripes down the sides. There is the white crescent across the face so common in the Antelopes of this group, and another across the chest, while the legs are marked with black and white. The tail is much like that of an Ox, and the twisted horns are massive, but not very long, proportionately, being

about two and a half feet round the curve. They are frequent also in the female, which is, however, less richly coloured than the male, besides being smaller.

The Bongo is a forest Antelope, found in West and Central Africa, from Liberia and Gaboon to East Africa. As in the case of so many animals from this unhealthy and little explored region, little is known about it, and living specimens are still desiderata for European menageries; there is, however, a fine stuffed one in the South Kensington Museum.

THE INYALA

(*Tragelaphus angasi*)

The Inyala is a good-sized Antelope, standing about three and a half feet at the shoulder. Its shape is graceful, but presents nothing remarkable; the development of its coat, however, is peculiar, this forming a fringe, not only down the front and back of the neck, as in the Koodoo, but also along the flanks, where it is especially long, and the hips. The twisted horns are about two feet long in the male; in the female they are absent. The tail is of fair length, and bushy throughout.

The colour of this Antelope is remarkably beautiful, and differs very much in the two sexes, the male being of a purplish slate, with indistinct pale lines down the flanks, and a few white markings on the face and lower parts of the sides, while the legs below the knees and hocks are tan-coloured; the female is bright tan throughout, with the flank stripes conspicuously pure white.

This Antelope is found in South-East Africa; it is purely a forest animal, and goes in small troops, consisting of a buck and a few does and young. It is not a common animal, and specimens of it are scarce even in Museums, though a fine pair may be seen at South Kensington. So far, it seems not to have been brought to Europe alive.

THE BUSHBUCKS

All over Africa south of the Sahara are to be found species or races of the genus *Tragelaphus*, graceful animals, with no striking peculiarity

of form or coat, rather short bushy tails, and, in the bucks, moderate-sized twisted horns. They are all smaller than the Inyala, not exceeding about two and a half feet at the shoulder; and the straight twisted horns, which are only present in the bucks, are about a foot long.

The colour varies a great deal, some forms being strongly spotted and striped with white, and others plain, or nearly so; but they are all of some shade of brown in the ground-colour.

All are forest-dwellers, and they do not go in large herds, but only in small parties. The two best-known forms are the beautifully variegated Harnessed Antelope (*Tragelaphus scriptus*), from West Africa, which is fairly well known in captivity, and thrives well, having bred in the Earl of Derby's menagerie many years ago; and the Bushbuck of South Africa (*T. sylvaticus*), which is nearly self-coloured on the body, though marked with white on the throat and limbs. This is a well-known game animal at the Cape, and has been represented in our Zoological Gardens.

THE SITATUNGAS

The Sitatungas (*Limnotragus*), or Marshbucks, are a small African group of three species, closely allied to the Bushbucks, but differing in their very long hoofs and in the fact of the back of the pasterns being bare and horny, this structure of the foot adapting them for living in marshes, a very unusual habitat for Antelopes. They are larger than the true Bushbucks (except the Inyala), standing a yard or more at the shoulder, and the horns of the males are longer and with a more open twist, presenting some approach to those of the Koodoo on a small scale. Their coats are shaggy and self-coloured, though there are white marks about the head and neck. The females are of a redder brown than the males, and show more tendency to white markings on the body—at any rate when young. These are truly aquatic Antelopes, living in swamps and spending their time more or less immersed in water, though they are rather waders than swimmers. They live well enough in captivity, but, of course, must have a soft litter, not a hard even floor; two of the three species have been represented in the London Zoological Gardens.



NILGHAI

By Winifred Austen

THE NILGHAI

(*Boselaphus tragocamelus*)

The Nilghai owes whatever distinction it possesses to the fact that it is the largest of the few Antelopes of Asia; for in itself it is not a particularly striking or interesting animal, and in Africa would not be of much account. It is a member of the Tragelaphine group, but differs from all of them in the shortness of the horns, which are also without any twist; they never reach even a foot in length, and in the female are absent altogether. The cow Nilghai also differs much in colour from the bull, being of a light fawn or yellow colour, but with the same white markings as her mate. The calves are also fawn-coloured, and the male illustrated was not quite in full colour, the fully mature bull being of a pure iron-grey, much the same colour as a "blue roan" Horse. In size the Nilghai about equals a Pony, and there is something very Horse-like about its general appearance, although the kind of Horse it suggests is a very badly-shaped one.

The Nilghai is a purely Indian animal, and does not reach Burma or Ceylon, nor does it ascend the Himalayas. It is usually found in small herds, generally frequenting country where there is more or less cover, though not affecting really thick forest. It feeds both on grass and on leaves, wild fruit, &c., and is often very destructive to the crops of the natives. With the Hindoo section of these it is a sacred animal, simply because its name means "Blue Cow," so that the sanctity of the bovine race has been absurdly transferred to it. Mohammedans, of course, will eat its flesh readily enough, but it is not much hunted by European sportsmen, because no one cares much about possessing a head with such insignificant horns. It thus comes about that the Nilghai is probably less hunted than any other animal of the size; but, of course, it has natural enemies to reckon with in the shape of Tigers, Dholes, and other carnivores.

The bull Nilghai is not a very fast animal—at any rate, he can be ridden down if he is pressed hard at first; but the cow is swifter, and will gallop straight away from a horseman.

This Antelope has long been a familiar animal in menageries; it

thrives and breeds well in captivity, and might have become a common park animal here, had it possessed better qualifications for such a position; but as it is only moderately ornamental, and the bulls are decidedly dangerous, there has been no great inducement to take it up. When preparing to attack, the Nilghai goes down on its knees, and then springs up suddenly.

In Calcutta I heard that Nilghais could be, and had been, broken to harness, and would go well in a trap; but my informant added that if they did bolt there was no stopping them!

With the Nilghai we come to the end of most of the larger and more remarkable Antelopes, the others being nearly all small, and not striking in appearance.

THE FOUR-HORNED ANTELOPE

(*Tetraceros quadricornis*)

This is also a purely Indian Antelope, and it is at once distinguished from all others of the family—and, indeed, from all other living wild animals—by the possession of two pairs of horns. Not that these are very much to boast of, the hinder pair, which are situated in the usual place for horns—at the top of the head—being little conical black spikes only about four inches long, while the front pair, placed on the forehead, are considerably shorter, and in some individuals, in the south of India, never appear at all. In any case they develop later than the hinder ones; in the female there are no horns. Except for its number of horns, there is nothing very remarkable about this Antelope; it is a small animal, with a narrow muzzle and rounded back. The colour of the coat is a light brown.

The Four-horned Antelope is a forest animal, and solitary in its habits; it drinks daily, and so is usually found near water. It thrives well in captivity, and is usually to be seen in the London Zoological Gardens, where young have been produced on more than one occasion.

THE DUIKERS

Were it not for its possession of a second pair of horns, the Four-horned Antelope would be a very typical representative of the

Cephalophine group of Antelopes, the other members of which are the widely-distributed Duikers of Africa, forming the genus *Cephalophus*. The Duikers are all short-legged, pointed-headed animals, with rounded backs and short conical horns, which are sometimes present in the males only, and sometimes in the females also. They are nearly all very small, often under two feet at the shoulder, though the Yellow-backed Duiker (*Cephalophus sylvicultor*) of West Africa stands nearly a yard at the shoulder, and there are two or three other species nearly as large in that part of Africa. A very characteristic point of Duikers is the tuft of hair which grows between the horns, and often conceals them when they are especially short. They also have the face-gland situated below the eyes, and present in so many ruminants, very well developed.

In general colour Duikers are brown or grey, and seldom possess any conspicuous markings, though the large Jentink's Duiker (*Cephalophus jentinki*), which is the second largest, has a black head and neck and a light grey body, and the Banded Duiker (*C. doriæ*) has the back with conspicuous transverse black stripes on a chestnut ground.

Duikers are bush-haunting Antelopes, found either singly or in pairs, not in herds, and are very active, their Boer name of Duiker (diver) being derived from the way in which they plunge, as it were, into the cover. About three dozen species are known, chiefly, as might be supposed from their habits, located in the forest regions of the West of Africa. The most widely distributed and best known is the Common Duiker (*C. grimmi*), which is found from the Cape Colony to Somaliland and Angola; it stands rather over two feet at the shoulder, and varies much in colour, from red-brown to silver-grey. This species is often on view at the Zoological Gardens, and about half-a-dozen others have been represented there.

The Neotragine Antelopes form another group composed of species mostly of small size, though not so uniform in type as the Cephalophine group. Only the males have horns, and these are short and straight. To this group belong the Rhebok (*Pelea capreolus*), a grey Antelope frequenting hill-tops, the Grysbok and Steinboks (*Raphiceros*), the Oribis (*Ourebia*), and some other types requiring more particular mention. All the group are African.

THE KLIPSPRINGER

(*Oreotragus saltator*)

The Klipspringer is, of all African Antelopes, the best adapted for a mountain life; its feet are peculiarly formed, there being no bend at the pasterns, and the hoofs being long in a vertical direction, so that the feet look like so many pegs, the animal standing on the very tips. The hair is very coarse and thick, and the horns very small and erect.

The Klipspringer is a small animal, standing about two feet at the shoulder, and is extremely active, skipping about from rock to rock, and finding a foothold in the most inaccessible places; it is only found in small parties, and ranges from Somaliland to the Cape, wherever there is rocky ground.

THE ROYAL ANTELOPE

(*Nanotragus pygmæus*)

In spite of its imposing title, this is the smallest Antelope known, being only about as big as a wild Rabbit, with long and very slender legs. Its horns are very minute, not an inch long; and the coat is bright fawn above and white below. This tiny creature lives in the forests of the West Coast of Africa, being found singly or in pairs, and is extraordinarily active, being said to make bounds of three yards at a time. It is rare even in Museums, and has never been brought to Europe alive.

THE DIKDIKS

The Dikdiks (*Madoqua*) are little creatures not bigger than Hares, with long noses which in some cases almost approach the trunk of the Tapirs in form. Like the Duikers, they have a tuft of hair on the crown, and their tails are very short. They are bush-haunting animals, and not more than two or three are found together. There are about half-a-dozen species of these little Antelopes, widely distributed over East and North-East Africa. They are rare, however, in captivity, and up to date only one species has been exhibited at our Zoological Gardens.



CHAMOIS
By C. E. Swan

THE CHAMOIS

(*Rupicapra tragus*)

THE Chamois is of interest in various ways, especially as the type of a group of non-African mountain Antelopes, which in general appearance and habits closely approach the Goats—indeed, they are often called Goat-Antelopes—and as being, with the exception of the Saiga of the Russian steppes, the only Antelope found in Europe. To Europe, indeed, the Chamois is naturally confined, inhabiting the mountains, in which it is widely distributed, from the Pyrenees, where it is known as the Izard, the Alps, where it is also called Gems, to the Caucasus.

In size the Chamois is about equal to an ordinary Goat, standing about two feet at the shoulder; its coat varies according to the seasons, being longer and nearly black in winter, while short and brown in summer. There is an under-coat of thick wool, and the animal feels cold but little, though it has a strong objection to heat.

The sexes, as in all this group, are remarkably alike, both possessing horns of very similar appearance. The feet of the Chamois are especially adapted for mountain-climbing, the sole being hollow by reason of the outer edge of each hoof being higher than the inner, and the animal is celebrated for its remarkable sure-footedness, being always found high up in the mountains, and commonly on ground very dangerous for the hunter.

It is usually in herds of a score or less (though old bucks are usually solitary), and keeps as near the snows as practicable; but in winter it is naturally forced to lower levels in search of its food, which consists of the various Alpine plants. The pairing season is in autumn, and then the bucks fight savagely; the kids are born in spring, being sometimes single and sometimes twins, and follow the doe almost immediately.

Chamois, as is well known, are keenly hunted by the inhabitants of the mountains they frequent, and the "Gems-bart" (Chamois-beard) is one of the most highly-prized trophies of the Alpine hunter. As the animal, of course, has no beard, it is made of a tuft of the long hair which grows along the back. The enthusiasm with which the Chamois

is pursued is no doubt due to the fact that there is nowadays so little big game in Europe, and to the danger incurred in the pursuit of an animal living in such inaccessible places, as it certainly does not afford any imposing trophy, while the flesh is only moderately good, and the so-called "Chamois" leather, though it gets its name from this animal, is mostly made from the skins of Sheep, Deer, Goats, and subjected to a peculiar process of preparation, consisting chiefly in impregnating the skins with oil.

The Chamois is not one of the easiest of animals to keep in captivity, and so is not a very familiar exhibit in menageries; but specimens are at the time of writing thriving in the London Zoological Gardens. The animal has also been introduced into the mountains of New Zealand, the Emperor of Austria having presented six specimens in 1907 to the Government of that Colony; all of these reached the country safely, and were liberated under the care of Mr. A. E. L. Bertling, formerly head keeper at the London Zoological Gardens, and now Game Ranger to the New Zealand Government; and, as they have already bred, the species will probably be established in the Southern Hemisphere, to the great edification of sportsmen.

THE GORAL

(*Nemorhædus goral*)

The Goral is the Himalayan representative of the European Chamois, but differs rather widely in appearance, being smaller and more thick-set, with much shorter horns, not hook-shaped, but evenly curved backwards. The coat is brown in colour, with a white patch on the throat, but there is also a grey form, lately distinguished as *N. bedfordianus*. The Goral frequents either grassy slopes or rocky forests; it does not range very high, not going above eight thousand feet, and has but little fear of man, though cautious enough when persecuted; there is less temptation for the sportsman to molest it than exists in the case of the Chamois, nobler game being available in the Himalayas. In Formosa there exists a long-tailed species of Goral (*N. caudatus*), in which the tail, which is usually short in these Goat-like Antelopes, is quite long and bushy. This, as well as the common species, has been exhibited at the London Zoological Gardens.

THE SEROWS

The Serows, like the Gorals, are stoutly-built, thick-coated animals, with short backwardly-curved horns. They are of good size for this group, about equalling a Donkey, and rather resembling one owing to their long ears. There are several species or races, ranging from the Himalayas to Sumatra and Tibet, and these differ much in colour. The typical Himalayan Serow (*Nemorhædus bubalinus*), however, is mostly black, with tan on the flanks, and the belly and legs white. This is a scarce animal, generally solitary, and frequenting forest-clad slopes; awkward and uncouth as it looks, it is very active, especially in going down hill, and is a beast of the highest courage, being even able to make a good fight against the dreaded Dholes, and having been known to charge to avenge its wounded mate. It has only recently been exhibited at Regent's Park.

THE ROCKY-MOUNTAIN GOAT

(*Haploceros montanus*)

This is one of the most extraordinary-looking of all ruminants; in form it is very stout and thickset, with short legs, and carries the head low; and, as it has a pure white coat, very long and thick in winter, there is something about it which strongly suggests the Polar Bear. Its horns are short, black, curved backwards, and sharply pointed, with a swollen gland behind them; the ears are quite short. In size this animal may be compared to a large Goat, though the thick fur makes it look larger than it is. It is one of the few members of the hollow-horned ruminants found in America, where it lives at the upper limits of forest growth in the Rocky Mountains.

It is a wonderful climber, though its mountaineering feats are performed more by sheer muscular power and flexibility of limb than by bounding and springing like most mountain animals. It is very rare in captivity, and a male that has thriven well there for years is one of the greatest treasures of our Zoological Gardens, being the only living specimen in Europe.

THE TAKIN

(*Budorcas taxicolor*)

One of the least known of the ruminants is this awkward-looking animal, which is about as big as a Donkey, with very short thick legs, a large clumsy head, and a long shaggy coat. The buck's horns are rather like those of the Brindled Gnu, but the points are directed backwards, those of the female not having the angular bend downwards at the base.

The Takin was first known from the little-explored Mishmi Hills on the Assam frontier, where it is of a brown colour; but there is a race ranging from Eastern Tibet to North China, in which the male has a bright straw-yellow mane. Little is known about this animal, and it has never been exhibited alive in Europe.

THE MUSK-OX

(*Ovibos moschatus*)

An animal called an "Ox" seems out of place among the Goat-Antelopes, but it is agreed by naturalists that it is not a true Ox, and Mr. Lydekker suggests that its place should be here—it certainly does not "fit in" anywhere else.

In size it resembles a small Kerry bull, and is stoutly built and very low on the leg, these peculiarities of form being enhanced by the very long and heavy coat, which hides the short ears and tail. The horns are broad at the base and turn sharply down, following the outline of the face as far as the eyes, when they turn up like hooks and end in sharp points. The colour of the beast is dark brown, and a thick under-coat of wool helps to keep the animal warm in winter; it needs some such protection, as it is a thoroughly Arctic animal, being confined to the barren grounds of the high northern parts of America and North Greenland. Here it lives in herds, feeding on the scanty Arctic vegetation, and displaying, when hunted, much more activity than could be expected from its very clumsy appearance. Although it does at times possess a musky odour and flavour, this is not constant, but very little is known about the animal, which has only once been brought to England.



MARKHOR
By Winifred Austen

THE MARKHOR

(*Capra falconeri*)

ALTHOUGH belonging to the prosaic group of Goats, the Markhor is one of the finest of game animals, with "the tumbling cataract of his beard" and the grand free sweep of his great spiral horns. He is also a good-sized animal, standing over a yard at the shoulder, and sturdily built.

The horns vary much in development according to locality, there being a great difference between the wide-spreading corkscrew type, which is most admired, and the straight horns with a tightly-twisted screw-like spiral, which are accompanied by smaller size and inferior development of beard, while intermediate forms exist connecting the two extremes.

Horns of the open spiral type will measure four feet or more along the curves, though in a straight line they may not be much more than a yard, which is about the length of the straight close-spiral form. In the female the horns are quite short and insignificant, though they show the characteristic twist.

The Markhor wears his long beard both summer and winter, but changes the rest of his coat to some extent, the summer dress being short and whitish, while in winter it is long and grey; he has, however, no under-garment of wool like some other Wild Goats, and hence is rather more sensitive to cold than these. The female is brown in summer, and never has any beard; while the kids are light drab, with a black stripe down the back.

This noble Wild Goat is found in the mountain ranges of the Indian North-West, the Pir Panjál to the south of Kashmir, and the Baltistan, Astor, and Gilgit ranges to the north, as well as in many of the Afghanistan hills, including the Sulaiman range, where the poorest specimens, of comparatively small size, with straight screw horns, are found, the splendid open-spiralled specimens attaining their fullest development in the Astor and Baltistan ranges.

The Markhor, like Goats in general, is a gregarious animal, and a splendid climber, being found in places where its pursuit entails crossing the most dangerous ground. Its favourite haunts in many cases are among the forested heights, though in Afghanistan it has to dispense with cover and make the best of stony hillsides. Its attachment to cover is no doubt largely due to its comparative sensitiveness to cold—not to any deficiency in climbing power, for it is admitted to be the equal of any Goat in this respect; and some of the steep slopes covered with short smooth grass or fallen pine-needles are as bad to negotiate safely as any ground could be—at least to human feet.

One curious fact about the animal is that it is credited by the natives with being a snake-eater—a trait which certainly requires confirmation; but the same story is told about the tame Goat.

It is not common in captivity, though it thrives well enough in that condition, and a young one has recently been born at the London Zoological Gardens. Its father is a most savage and dangerous animal, so that the front of his yard has had to be doubly barred, and he possesses to the full the "personal atmosphere" which has made he-goats so notorious. It is doubtful, however, whether the Markhor has anything to do with our tame Goats, though it will breed with these, and though they often strikingly resemble it in form of horns; it will be noticed, however, that the spiral in a tame Goat's horns generally runs inwards at first, instead of turning outwards as in the Markhor.

THE WILD GOAT

(*Capra hircus*)

THERE seems to be no reasonable doubt that the real original ancestor of our Goats is the animal known as the Persian Ibex (*Capra hircus ægagrus*), which is still a well-known animal in South-Western Asia, extending east to Sind. This beast is practically indistinguishable from many tame Goats; the colour is a light brown in summer, getting greyer in winter. There is a small chin-beard as in the tame Goat, and this is black, as is the face, a stripe all down the neck and back, and another along the lower part of each flank, a broad collar at the shoulder, and the tail and fronts of the legs, with the exception of the

knees. The horns bend backwards in a semicircular curve, and in front are keeled and jagged. In the females the horns are much smaller, and curve back only slightly, and there is no beard or collar.

The height of the male is about a yard at the shoulder. The natural haunt of the Wild Goat is among crags, and it goes in herds; it is prolific, often producing two kids at a birth, as it so frequently does in domestication. Near Quetta, where it reaches the domain of the Markhor, hybrids between the two animals have been obtained. No animals run wild more readily than Goats, which have always retained much of their original agility and intelligence, and so it comes to pass that in many places far removed from the haunts of the original animal there are Wild Goats which originally came there as the dependants of man, since the Goat can thrive under a greater range of climate and conditions than any other domestic animal, and hence has been carried almost everywhere.

THE IBEXES

WHAT may be called the typical Ibexes, as distinguished from the Wild Goat, have similar backwardly curving horns, but the front edge of these is flat and more or less broad, not a knife-edge as in the "Persian Ibex." It is broken up by knots or lumps at regular intervals. The best known nowadays is the Asiatic Ibex (*Capra sibirica*), which ranges through the mountains from the Altai to the Himalayas; it is a magnificent animal, as big as the Markhor, and bears horns which may be four feet long. The coat is of a uniform pale brown, with dark streaks down the back and legs, becoming nearly white in winter, and with a dark chin-beard in the male. There is a thick under-coat, and this hardy animal cares little about cold, keeping at high levels close up to the snow at all times of the year.

It is much hunted by Dholes and the Snow Leopard, and also persecuted by man, both by the local natives and by European sportsmen. Such persecution in time past has now almost exterminated the European Ibex (*Capra ibex*) or Steinbock of the Alps, an almost identical but smaller horned species, now only to be found in a few valleys in the Italian Alps. Another Ibex (*Capra vali*) is also found

in the mountains of Abyssinia; and there is one in Arabia (*C. nubiana*), somewhat intermediate between the Asiatic Ibex and the Wild Goat in colour and style of horns.

THE TURS

The Turs form a group of three species, two of them found in the Caucasus and one in the Pyrenees. The Caucasian Turs are of a nearly uniform brown, and they have very different horns, those of the East Caucasian species (*Capra cylindricornis*) being strongly curved and diverging sideways, while in the West Caucasian animal (*C. caucasica*) they turn backwards as in the Ibexes. The Spanish Tur (*C. pyrenaica*) has the horns ridged and twisted, and in its colour more resembles the Wild Goat.

THE TAHR

(*Hemitragus jemlaicus*)

This well-known Himalayan Goat is an animal of a type very distinct from any of the above. There is no beard in either sex, and the horns, which curve backwards, are quite short, being hardly more than a foot long even in the buck, although he is as big as the Markhor. As, however, he possesses a fine dark brown coat, with a long pale-coloured mane covering the neck, he is a sufficiently imposing animal. Females and young animals are much paler. All stages of growth can commonly be seen in our Zoological Gardens, where Tahr have long lived and bred remarkably well. In the wild state, like Markhor, they frequent very steep ground, often covered with forests, and the two species may at times be found together.

There are two other species of Tahr, the Arabian (*H. jayakari*), which is the smallest Wild Goat known, being only about two feet at the shoulder, and the Nilgiri Tahr of South India, often erroneously called Ibex by sportsmen there. This species (*H. hylocrius*) is larger than the northern Tahr, but has not the long mane, though old bucks are ornamented by a large whitish "saddle," contrasting with the dark brown coat.



MARCO POLO'S SHEEP

By Winifred Austen

MARCO POLO'S SHEEP

(*Ovis poli*)

A Sheep as big as a Donkey, with horns measuring a couple of yards along their splendid spiral curves, is an animal that cannot very well escape notice, and so it is not surprising that it was described by the great Venetian traveller Marco Polo, who met with it when, in the thirteenth century, he traversed its home on the bleak Pamir steppes, "the roof of the world," though it was not until seventy years ago that actual specimens of the animal, in the form of skulls, were brought to England and the species duly named. Of recent years this grand animal has been a good deal hunted, and is now fairly well known, though it has never been exhibited in our Zoological Gardens as yet. The ewe is a much less imposing animal than the ram, being not only smaller, but, as is usual with wild Sheep, having quite short, slightly curved, insignificant-looking horns.

The coat is short, close, and very thick; as in all wild Sheep—and in most tame ones in some parts of the world—it is composed of hair, not wool, the latter type of coat being the result of human selection. The long tail found in many breeds of tame Sheep has also no counterpart in this or most other wild species, which are usually short-tailed.

The coat of the great Sheep varies to a certain extent according to season, being longer in winter, when also the male develops a ruff of especially long white hair on the front of the neck, while the ewe's throat becomes brown.

Marco Polo's Sheep ranges from the Thian Shan Mountains to the Oxus valley, and shows a certain amount of local variation, the Thian Shan race not having such fine horns as the typical Pamir form. Like wild Sheep generally, it does not so much frequent rocks as open undulating ground; for these animals, like their domestic

relatives, though they climb well and like to live high up, care more about good grazing than for skipping from rock to rock and nibbling stray tufts of herbage or browsing on bushes, as Goats are so fond of doing. The pasture of the Pamir in summer is of a very good and nourishing character, but in winter there is a great scarcity of food in this elevated and wind-swept region, and many of the giant Sheep die of sheer hunger in the early spring, while others fall victims to Wolves. Sometimes, too, whole flocks perish by getting snowed-up and smothered in valleys through not moving out into the open in time to avoid the coming storm. In spite of all these destructive agencies, however, the Sheep held their own very well till ten years ago, when an epidemic of rinderpest thinned them out as severely as it has done other game animals in Africa.

The gait of this Sheep when well on the move is a vigorous and rapid gallop; it is usually seen in herds, like all of its kind, but the adult rams, the special objects of the sportsman's pursuit, keep together in small parties. Now and then, of course, they fight, using the same head-to-head butting tactics so familiar with our tame rams. The flesh of this animal is more like beef than mutton, as might indeed be expected from its size.

None of the other wild Sheep have horns that can compare with Marco Polo's, as they are much shorter, and have no second twist or but a slight indication of one, merely curling round once or less. There are, however, two other species which also deserve to be called giant Sheep. The first of these is the Argali (*Ovis ammon*), found in East Central Asia and Tibet, where it is known to sportsmen by its native name of Nyan. This is, if anything, an even bigger animal than Polo's Sheep; with horns, although much shorter, very much more massive, being about eighteen inches in circumference at the base. This is the only giant Sheep which has been exhibited at our Zoological Gardens. The other is the Bighorn (*Ovis canadensis*), of the mountains of the Pacific coast of North America; the great Sheep of Kamtchatka is also considered to be a race of this species. The Bighorn is usually a darker-coloured animal than the other two species,

especially on the legs, and it has smoother horns; but it varies much locally both in size and colour. In Alaska there is a race of it (Dall's Sheep) which is nearly or quite white; and there is also a nearly black variety. Bighorns are especially remarkable for their great climbing powers.

THE MOUFLON

(*Ovis musimon*)

The Mouflon of Corsica and Sardinia is so very similar to tame Sheep in size, voice, and—allowing for the unfamiliar hairy and coloured coat—general appearance, that it is in all probability the ancestor of these. The colour is a bright brown, becoming darker and duller in winter, with the legs and abdomen white, and black streaks dividing this colour from the brown of the flanks and running down the legs. The rams have a well-marked white saddle-mark, which is wanting in the ewes, these being also usually hornless, or with very small horns.

More or less black varieties of Mouflons are not uncommon; several have been bred in the London Zoological Gardens, but the parent ram is himself partly black. He is a very brave animal, and, desiring to get at the buck Markhor next door—a much bigger animal than himself—he broke the padlock on the door of separation with his head, and then went in and made the vicious Goat acknowledge his supremacy. Another race or species of Mouflon (*Ovis orientalis*) inhabits the mountains of Western Asia, and is also found in Cyprus; this is less variegated in coat than the European animal, and is generally larger, though the Cyprian race is smaller than the Corsican and Sardinian animal.

THE URIAL

(*Ovis vignei*)

The Urial, which is about the size of a tame Sheep, but more leggy, is of a sandy colour, with a black or black-and-white ruff in the ram; the ewe in this species is horned, though the horns are small. It is found from Bokhara through Persia to the Punjab, where, unlike

other wild Sheep, it has to endure a really hot climate. It is possible that this species has been a part ancestor of tame Sheep, as it will breed with them; it has also crossed in the wild state with the Argali.

THE BURRHEL

(*Ovis nahura*)

The Burrhel forms in some respects a link between the Sheep and the Goats, but on the whole it is certainly a Sheep, and no one used to wild Sheep would call it anything else. Its size is that of a tame Sheep, and its colour very distinctive, being a stone-grey—rather browner in summer—with, in the rams, strong black bands along the sides and down the fronts of the legs, while the face and chest are also black. The ewes have only the black on the legs; but they have short horns. Those of the male turn out considerably sideways. This Sheep inhabits Tibet and the adjacent parts of the Himalayas; it frequents either rolling or craggy ground, and fights like a Goat, rearing up to butt. It thrives remarkably well in captivity, and breeds freely.

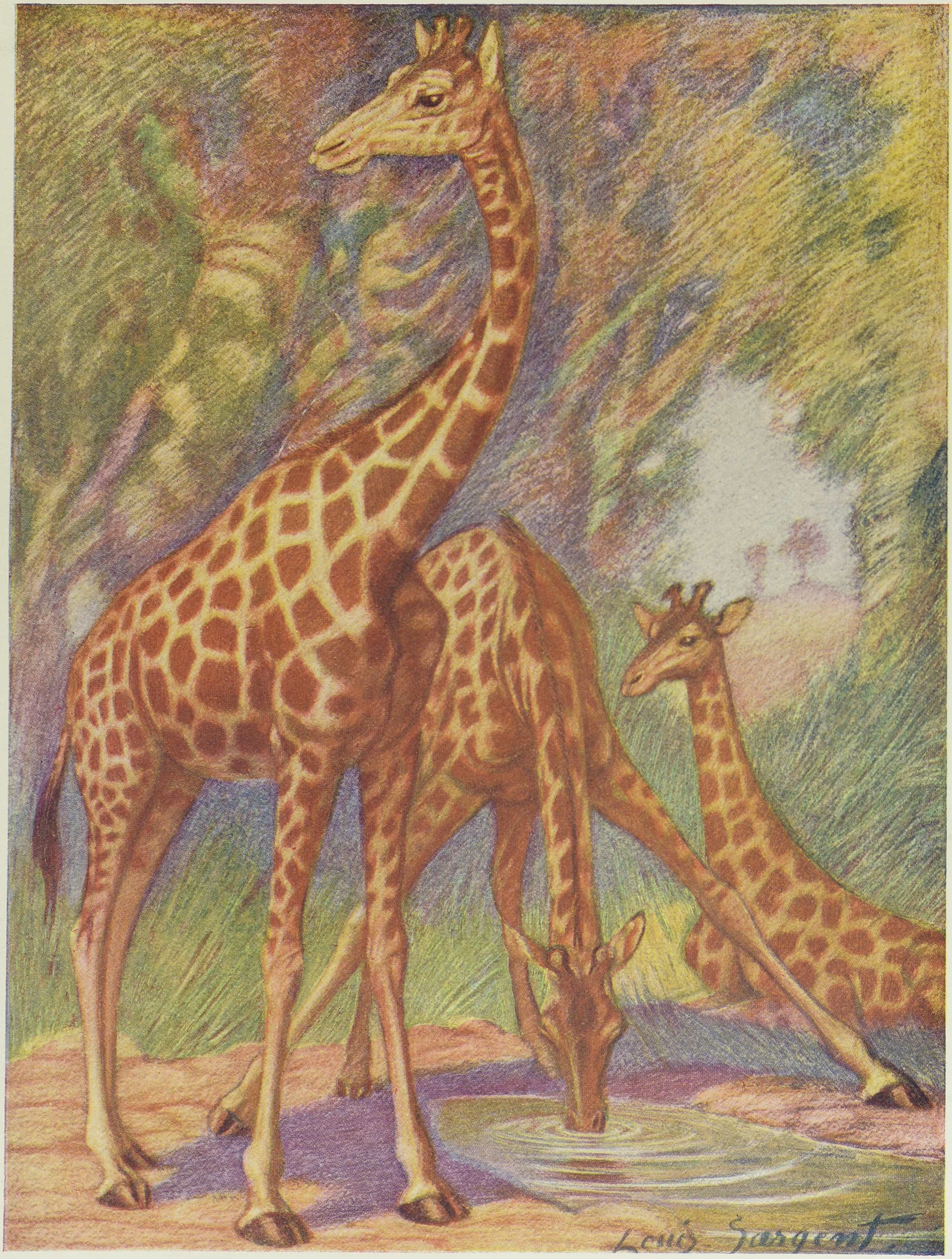
THE AOUDAD

(*Ovis tragelaphus*)

The Aoudad or Arui, which is the only wild Sheep found in Africa, where it inhabits the mountains north of the Sahara, is the most distinct-looking of all Sheep in general appearance, and was, indeed, originally described as an Antelope.

It is a tall, leggy animal, sloping-backed, and standing about a yard at the shoulder. The colour is uniform sandy-red or chestnut, without markings. Its horns turn well outwards, and are almost as big in the ewe as in the ram. The tail is quite long for a wild Sheep's, reaching nearly to the hocks, and a growth of long hair fringes the front of the neck and chest, and covers the fore-legs down to the knees; this is most developed in the ram, and especially, like the Lion's mane, &c., in captive specimens.

In captivity, indeed, this species thrives marvellously, and, though coming from such a hot climate, will endure even so severe a winter as that of New York in the open.



GIRAFFES

By Louis A. Sargent

THE GIRAFFE

(*Camelopardalis giraffa*)

It was well said by the late Mr. Phil Robinson in his charmingly amusing book "Noah's Ark," that the Giraffe is about the best instalment of the impossible that has been vouchsafed to us; for one could hardly reasonably expect an animal to grow to the height of six yards, which is what the bull Giraffe commonly does, though a twenty-foot specimen is apparently still a desideratum. The cow stands two or three feet shorter.

It is not only the extreme height, due to the extreme elongation of neck and legs, that makes the Giraffe so remarkable an animal. One curious fact about it is that the neck, long as it is, has only the seven vertebræ almost universal in beasts—no more, in fact, than the almost neckless Hippopotamus possesses. This seems a case of carrying the "economy of Nature" rather too far, and accounts for the comparatively stiff appearance of the Giraffe's otherwise graceful neck.

The feet are noticeable for the fact that they entirely lack the small "false hoofs" so usually found in ruminants, to which group of hoofed animals the Giraffe belongs, only the two large toes—third and fourth—forming the cloven hoof, being present.

The head presents several points of interest: the nostrils can be closed at will, as in some aquatic animals, and the tongue, which is well developed and more or less prehensile in ruminants generally, possesses these qualities in perfection in the Giraffe, in which it is unusually long and movable; in colour it is nearly black. The horns are bony prominences covered with the hairy skin: they are common to both sexes, and are found in the new-born calf, in which, however, the bony core seems to be undeveloped, as the horns lie flat back on the head. They also have larger tufts at the tip than in the adult animal.

On the whole, the young Giraffe resembles its parents more closely than any other animal, the proportions being perfect at birth, so that, with the exception of the recumbent horns, it might be mistaken for a miniature model of the old ones. It is more swift and active than these are, however. Most people know that Giraffes are purely African animals; they have a wide range in Africa, but are only found south of the Sahara, and in open, dry, thinly-forested country.

They are sociable animals, and usually found in herds; their food consists of the leaves and twigs of various trees, their great height adapting them better for browsing than any other animal. When they wish to reach down to the ground, on the other hand, they straddle in a very awkward way. They will drink water when it is available, but can do quite well without any, so that they may be found many miles away from any supply, a peculiarity which has stood them in good stead in face of human persecution. Among other animals their only enemy seems to be the Lion, which occasionally pulls one down, especially when he has friends to assist him in the feat, and catches the Giraffe alone.

A herd of Giraffes are most difficult for any enemy to approach; their sight and scent are both good, and their great height gives them an advantage in perceiving danger by either of these means which other animals do not possess. Moreover, they are not by any means easy to see in their natural surroundings, their mottled colouration being inconspicuous among the trees on which they feed; unless, as not infrequently happens, they are browsing on scrub a good deal lower than themselves.

This colouration, it should be mentioned, varies a great deal locally, so that several local races have been described; it is sufficient to say here that the Giraffe of the south of Africa has a yellowish ground-colour with rather ill-defined brown spots, while in the northern part of the animal's range it tends to become a dark-brown netted over with a mesh-work of white lines; while at the same time the bony lump on the forehead, which is always present, develops into what may be called a third horn.

Generally speaking, the bull Giraffe is much darker than the cow, and old females are considerably darker than young ones.

The gait of Giraffes when walking quietly is most graceful; it will be observed on watching it that both legs on the same side are moved together. When pressed, however, they break into a very awkward gallop, with their long necks rocking to and fro, and their brush-tipped tails raised erect over their backs, while they straddle their hind-legs so much that it is dangerous to ride close alongside for fear of receiving an involuntary kick. The Giraffe also can and does kick deliberately, but no one seems to have observed the wild animal do what tame ones undoubtedly practise—deliver a swinging blow with the horns, which, blunt as they are, are formidable weapons with the leverage of the long heavy neck. Owing to the Giraffe's long stride, it travels at a pace which gives a horseman much trouble to get on terms with it, and in spite of its height it manages to get through a wood in a most remarkable manner.

The meat of a young cow in good condition is very good indeed, and keeps for a long time, but the old bull smells so terribly strong that it is difficult to remain in his vicinity, let alone eat any of him, though opinions vary as to the precise description of odour he emits. The hide, which is extremely thick, is of value for making whips; but, taking it on the whole, there is very little reason for destroying this uniquely beautiful and absolutely harmless animal. One point to be noted about it is that it is one of the few beasts which are absolutely mute, for no one seems to have heard a Giraffe utter a sound under any circumstances.

The Giraffe has been known in captivity for a very long period, as the Romans used to exhibit it in the brutal shows wherein whole Zoological Gardens were massacred in the arena. In post-classical times it became almost forgotten, and it was not till 1836 that the first specimen reached our Zoological Society's Gardens. Here Giraffes have done remarkably well, and bred quite freely, though they cannot be called very hardy animals. Their transport is also naturally rather difficult, but I have seen one in good condition in Barnum's travelling show.

They are, of course, to be seen in every leading Zoological Garden, which institutions could not be considered complete without one; but during the outbreak of Mahdism in the Soudan, they became very difficult to procure, and the prices asked were very exorbitant.

It may be worth mentioning that in the menagerie of the King of Oude, who was deposed after the Indian Mutiny, there was a Giraffe which was accustomed to be saddled and ridden daily. This idea might well be adopted elsewhere, and a properly broken Giraffe would not only earn its keep by carrying riders, but might be allowed to do a little tree-pruning in a public garden, to its own benefit and the saving of labour to the gardeners.

Captive Giraffes are said not to attain anything like the richness of colour and commanding height which they exhibit in the wild state—indeed, Mr. H. A. Bryden thinks that they compare more unfavourably in these respects with their wild relatives than any other animals commonly exhibited in captivity.



OKAPIS
By Louis Sargent

THE OKAPI

(*Okapia johnstoni*)

The Okapi is the only other living member of the family *Giraffidæ* besides the true Giraffe, and, as many of my readers no doubt know, has only been made known to science during the last decade, its discoverer being Sir Harry Johnston.

As far as its general form goes, it gives us a good idea of what the Giraffe's ancestors were probably like, foreshadowing, as it were, that animal's peculiarities, for its neck and legs are rather long, and its shoulders high, while its head distinctly recalls the Giraffe shape. As in the Giraffe, the back hoofs are wanting, the front ones forming the usual cloven hoof of a ruminant. The Giraffe is noteworthy for having its canine teeth—present only in the lower jaw, and, as in ruminants generally, lying close to the incisors—divided by a deep notch, and this small peculiarity is repeated in the Okapi.

Its horns, however, differ somewhat from the Giraffe's; for one thing, they are confined to the male, and, though short and covered with hairy skin, are tipped, not with a tuft of hair, but with a bare cap of bone, like a very rudimentary Deer's antler. The two horns are generally not quite like each other.

In the colour and pattern of its gay and strikingly-marked coat, the Okapi is very different from the Giraffe, and, indeed, from any other beast whatever, though the banding of the bases of the limbs and the hind-quarters are somewhat like those of a Zebra. In fact, when the first definite proofs of the existence of the animal, in the shape of pieces of the striped part of the skin, came to hand, it was thought to be a new kind of Zebra, and named as such.

The sexes are practically alike in colour, and the same may be said of the young, though these have a more furry coat, the hair of the adult animals being very close-lying and sleek.

In size the animal may be compared to a large Donkey or a Mule, and it was first vaguely heard of by reports obtained by Mr. H. Stanley from the Pigmies of the Central African forests, that they knew of an animal something like a Donkey, which they caught in pitfalls. That anything of the Horse kind should live in a dense forest seemed so strange to Sir Harry Johnston that he resolved thoroughly to investigate the question, and in 1899 he had the opportunity of himself questioning some Pigmies whom he had rescued from the clutches of a showman; and they told him that the beast was like a Mule with Zebra's stripes. That the description gives some idea of the animal, no one who looks at the illustration will deny, but nothing was said about the cloven hoofs, a detail which the Pigmy mind was evidently not scientific enough to take cognisance of.

Thus, when next year Sir Harry obtained further information about the beast from the Belgian officers at Fort M'Beni in the Congo Free State, and even the strips of skin above mentioned, there was nothing to dissipate the Zebra idea, and when he went Okapi-hunting in the forest and saw the marks of cloven hoofs, he was still off the scent.

However, in 1901, Sir Harry, then Governor of Uganda, received from Eriksson, a Swedish officer in the Belgian service, a skin and a couple of skulls of the Okapi, and at once perceived its relationship to the Giraffe. Since then quite a number of specimens—more than two dozen—have come to hand, and a good deal of information about the animal has been acquired, notably with regard to the horns of the male. There are now three stuffed specimens to be seen at the South Kensington Museum, and skeletons have also been sent to Europe. Moreover, two or three specimens have been captured alive, including a baby one about a week old, which was photographed, apparently from life, though it only survived a month. Before long, therefore, we may expect some enterprising individual to bring a live Okapi to Europe.

All the specimens have so far been obtained in the Semliki Forest, and the Belgian Government, in whose jurisdiction the haunts of the

animal lie, have wisely forbidden any one to hunt it without special permission. It appears to be purely a forest animal, and very wary and quick of hearing, as might be expected from its large ears. It is not usually gregarious, only a pair, and sometimes their young one, being found together; and they travel in single file, the male strictly observing the rule of "ladies first," a piece of gallant behaviour which is apt to lead to his receiving the bullet of the hunter when the pair are in retreat. He also is credited with keeping watch while his mate grazes, whereas in many, if not most ruminants, it is the female which does sentinel duty; but a monogamous animal might naturally be expected to show more devotion to his female than the usual polygamous members of this group.

The Okapi is said to be gentle and harmless, with a soft gazelle-like expression in its dark eyes; it appears to low like a Cow. Its food consists of leaves and grass, in search of which latter it frequents open places in the forests traversed by little brooks which enable the grass to grow; these places it only visits at night, and it has very seldom been seen alive by Europeans as yet. The savages procure it not only by means of pitfalls, but also by lying in wait for it and spearing it. Their word *Okapi*, applied to it, really means "Donkey," and the more usual name is *Dumba*.

THE PRONG-BUCK

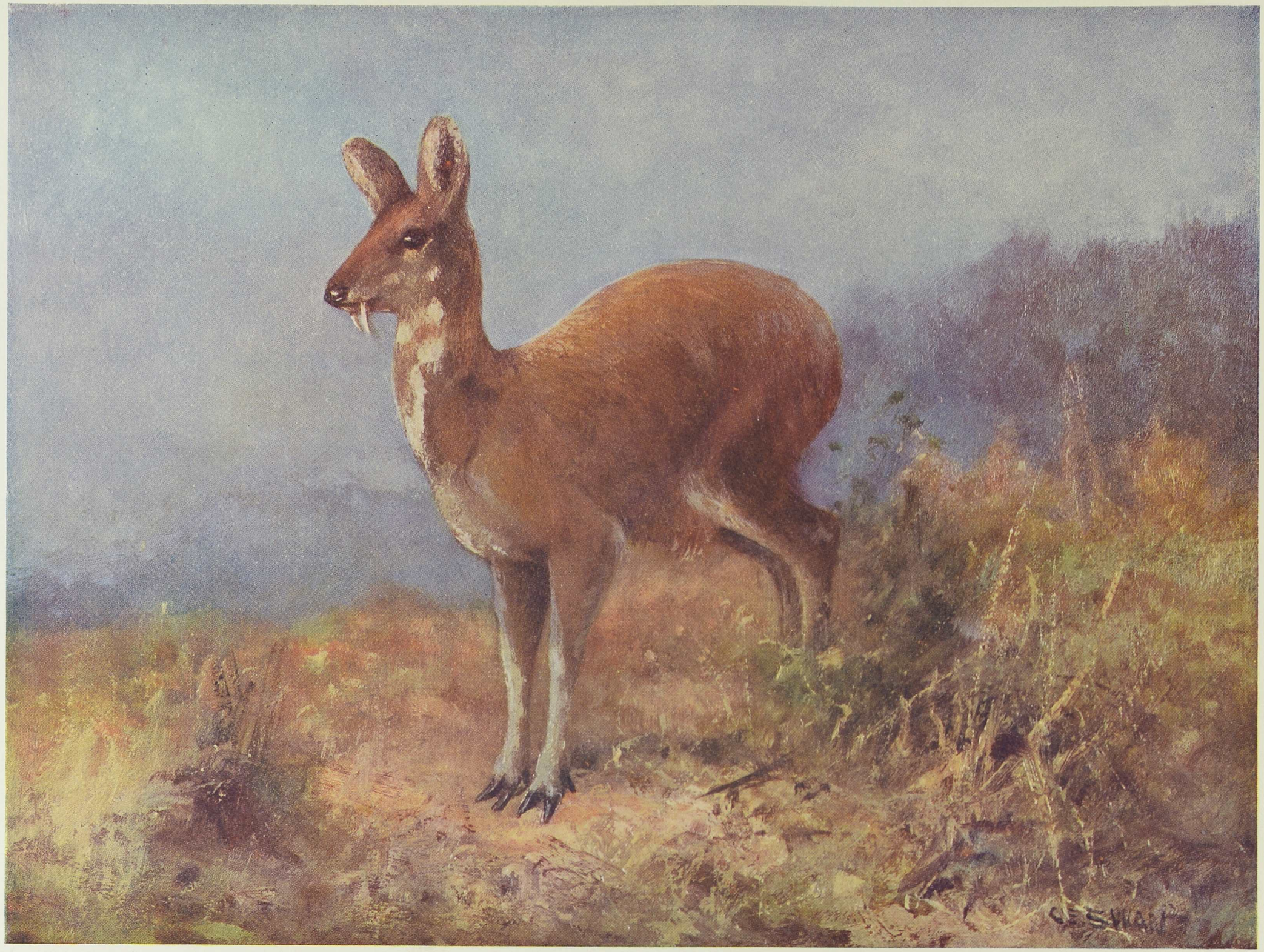
(*Antilocapra americana*)

THE Giraffe family find their nearest allies in the Deer, while the Prong-buck, although it has a distinct family (*Antilocapridæ*) all to itself, is undoubtedly very near the hollow-horned ruminants, and therefore rather out of place here; but it demands notice, and the true Antelopes are so numerous that it could not be dealt with after them. It is often known in North America, where alone it is found, simply as "the Antelope," and, were it not for its peculiar horns, would pass as one of that group. It is about as big as a Fallow-deer, and

slenderly built, with large eyes, long ears, delicate limbs, and short tail. Its colour is pale sandy brown, white on the stern and under-parts, while the front of the neck is white crossed by a band of the body-colour.

The horns, which are only found in the buck, are situated far forward—above the eyes, in fact; they are not a foot in length, and stand nearly upright, but with a slight curve backwards at the tip. Their great peculiarity is that they have a tine or prong about the middle of the front, and also that, although composed of horn, covering a bony core, they are shed yearly. Only the outer horny part comes off, a new horn forming on the core underneath it. This curious change, which is the most distinctive point of the animal, was first observed by A. D. Bartlett, in the London Zoological Gardens, where this animal has several times been exhibited, though it is delicate, and not very easily kept even in its own country.

It is essentially a prairie animal, and is possessed of great speed, though it is no jumper, and would appear not to be so fast as some of the true Antelopes of the Old World. Its flesh is esteemed as good venison, and it is persecuted by Wolves as well as by man, so that its numbers have been greatly reduced, and it is one of the animals whose extinction is to be feared if it cannot be efficiently preserved.



MUSK-DEER
By C. E. Swan

THE MUSK-DEER

(*Moschus moschiferus*)

THE Musk-Deer has for many centuries been a familiar animal on account of its valuable scented secretion, though little known in its own person, which is indeed insignificant enough, for it is a small creature, not so large as an ordinary Goat, and measuring less than two feet at the shoulder. It is also one of the very few Deer which never possess horns, these weapons being replaced by the long upper canines in the males; the female's canines are quite short, and of no service as weapons.

In build the Musk-Deer is also very different from other Deer, having particularly long hind-legs; its hoofs are particularly characteristic, being very pointed, and with the small hinder pairs, or "false hoofs," much better developed than in any other ruminant—so much so, in fact, that they are of use in helping the animal to get a grip on rocky ground, being movable. The coat is very characteristic, being composed of long and extraordinarily coarse hair, almost like small quills; it is extremely close and thick, and the hairs are very brittle.

The colour varies a good deal, some specimens being much redder than others, while pale and dark varieties occur, and some have white on the under-parts. The young animals have white spots, like Deer fawns generally.

The Musk, which has given the animal its reputation and commercial importance, is to be found in a pouch about the size of a hen's egg, situated under the skin of the abdomen; it is a dark-coloured substance of a pasty consistency. This "musk-pod" is absent in the female, which also differs from the male not only in not possessing tusks, but in having the tail, which is very short in both sexes, covered with hair in the ordinary way, while in the male it is naked except at the tip.

Unlike other Deer, the Musk-Deer has a gall-bladder like most animals. The Musk-Deer is purely a mountain animal, but it has a wide range, being found from the Western Himalayas to Western China. It frequents forest-covered places, and ranges very high up, being indifferent to cold, from which its remarkable coat well protects it. In its movements it is very active, and it is remarkable for its agility and surefootedness, travelling in great bounds. The food of the Musk-Deer consists of leaves, flowers, lichens, and grass; it is evidently, like the Goat, an animal that enjoys a change of diet.

It is solitary in its habits, and never seen in flocks, at the most a pair consorting together; and it is also a very silent animal, except for an alarm hiss, and the loud screams which it will utter when captured.

Few animals are more relentlessly persecuted by man than this, and the persecution has been a long-continued one, for musk used formerly to be even more esteemed than it is at the present day, being used freely in cookery and medicine as well as in perfumery. The great value of musk in the last-mentioned art lies in the extra-ordinary power of the scent, which, almost intolerably strong in the crude article, gives a needed "body" and persistence to the various delicate manufactured perfumes. It might naturally be supposed that so highly flavoured an animal would be unpalatable—at any rate to Europeans, but Mr. Lydekker states that even the buck's meat is free from muskiness if the scent pouch is removed at once; the doe, of course, is not musky at all, and the venison is very good.

The skin of the Musk-Deer does not seem to be commonly utilised, but if properly cured it makes a most excellent bedroom mat, on account of its warm nature. These Deer are secured either by shooting or snaring, the latter poaching method being especially favoured by natives.

Although it is not a very common animal in captivity, the Musk-Deer does well in our climate, and is sometimes on view in our Zoological Gardens; it also thrives in those few parks in which it has been introduced. It would be a very desirable proceeding to acclimatise this valuable and harmless animal, not only in some of our mountain

districts in Great Britain, but also in such parts of our Empire as New Zealand, where conditions suitable to its existence occur; but few things are more remarkable than the extreme indifference of humanity to the naturalisation of unimpeachably useful animals, though we have distributed pests widely enough.

There seems to be only another species of Musk-Deer known beside the common one—the Kansu Musk (*Moschus sifanicus*), which is said to have longer and darker ears. The Musk-Deer is so very different from other Deer that it has even been doubted whether it does not deserve a family to itself; but it is generally treated merely as an outlying member of the typical Deer (*Cervidæ*).

TYPICAL DEER

These, as every one knows, usually have horns, confined—except in the case of the Reindeer, and of individual "freak" does in one or two other species—to the males, and shed and renewed at more or less regular intervals. The growth of these horns, which are composed of true bone, and have no real horn in them, is one of the most wonderful things in nature. They begin as soft knobs, covered with the "velvet," a skin coated with plush-like fur, and gradually assume their full size and form, hardening meanwhile. Then the knotted ring at the base (the "burr") forms, and the blood circulation dies away almost completely. The velvet dies and dries, and is rubbed off by the stag against trees, &c., and he is as anxious to use his new weapons for combat as he was previously to save his tender growing antlers from contact with the boughs, &c. In Deer with the usual branching horns, the young stag's first set have only one spike, and the prongs increase in number yearly till the maximum is reached; but when the stag has passed his prime, the antlers diminish in size and beauty yearly as he advances in age. Deer are found everywhere except in the Australian region and in Africa south of Sahara; but they are not nearly so numerous or so varied a family as the hollow-horned Ruminants, or even as the Antelope section of that family.

THE MUNTJAC

(*Cervulus muntjac*)

THIS is a curious-looking little Oriental Deer, with short legs and small two-pronged horns seated on long bony pedestals, the bases of which are continued down as ridges on the skull, and show prominently under the skin of the face. The buck has the upper canine teeth in the form of short strong tusks.

The coat is very sleek and of a foxy red, but dark brown and greyish black varieties occur, and sometimes albinos. I once saw a skull of a buck which had an extra little antler growing out of the sides of the horn-pedestals of bone.

The doe, except for the absence of long tusks, and of the horns and their supports, is very like the buck, and has the same ridges on the face. A marked peculiarity of this animal is its strong gamy scent, and also its note, which is a bark like that of a Fox. Indeed it is often known in India as the "Barking Deer." Another peculiarity of this animal is the length of its tongue, which can be put out of the mouth far enough for it to lick its face all over with it. It is a forest animal, usually solitary, and very clever at getting quickly through thick cover. When at bay, it relies more on its tusks than on its little horns, and will make a stout defence with them. Its meat is very good venison indeed, which is sufficiently remarkable, seeing that the animal is, in captivity, almost as omnivorous as a Pig, eating cooked meat readily; I have also read of a case in which a buck, which was allowed his liberty, searched for and ate hens' eggs.

This Deer is found all over India, both in mountains and plains, and ranges east to Borneo; it does well in captivity in England, and would be an excellent subject for acclimatisation anywhere, being very easy to keep and transport. There are only about half-a-dozen other species of Muntjacs, all from Eastern Asia, and all sufficiently like the common species for their relationship to it to be obvious at sight.



RED DEER
By Winifred Austen

THE RED-DEER

(*Cervus elaphus*)

The Red-Deer may be taken as the type of the Deer family, and, though not so large as some of them, it is unrivalled among living species in majesty of appearance and in the beauty of its finely-branched horns. These have, besides the "brow-tines" at the base, a "bez" or second, and a "tres" or third tine, while the three points at the end of the horns is known as the "crown." The words *bez* and *tres*, by the way, are pronounced "bay" and "tray." When the stag has the three lower tines, he is said to be a "royal," although his horns are as yet not nearly perfect; many specimens even have more than three of the terminal points, for this Deer is very variable as to the form and branching of its antlers.

Antlers a yard long may be considered good, but much larger specimens are preserved in some Continental collections; the evidence available goes to show that the Red-Deer of to-day are distinctly degenerate compared to their ancestors. Some stags never have horns at all, but may yet become owners of a harem.

The Red stag measures about four feet at the shoulder; his coat is redder and shorter in summer than in winter, and is variable according to individuals; there is even a breed of white animals of this species preserved in some parks. The hind is coloured like the stag, but the fawns are spotted with white.

This Deer is a typically European animal, being found over most of Europe and in North Africa; eastwards it ranges into Persia, the "Maral" of that country being a race of the Red-Deer. It is the largest of our living British land animals existing in a truly wild state, and its great stronghold is in the Scottish Highlands and Islands, though it is also found in the free condition in Devon and Somerset, and in Kerry in Ireland. As a park animal it is much more widely distributed with us, and park specimens are larger and finer than those from the bleak northern mountains, rather inappro-

priately called "forests," for the Red-Deer, like most of its family, is properly a forest animal, and only attains its full development when it has the shelter and the variety of food afforded in a forest country. Thus, in New Zealand, where this Deer was introduced from Scotland, it is now a far finer animal than its ancestors were, although the stock is very much inbred, the original animals introduced having been only about a dozen all told. It may be gathered from this that the Red-Deer is a browser as well as a grazer; the development of the antlers depends very much upon the feeding the animal gets in the winter and spring, as, of course, their production involves a great drain on the system. Red-Deer's horns are perfect in autumn, and at this time the stags, which usually live apart from the hinds, often in small bachelor parties, fight savagely, and roar defiant challenges to each other; and at this time, especially if at all tame, they are apt to be very dangerous to man. Red-Deer are in any case most destructive animals to crops, devouring corn, apples, and roots, and the stag is worse, being more wasteful, than the hinds; in the hunting country on Exmoor, a "Deer Damage Fund" is maintained to compensate for the loss thus occasioned to the farmers. Their depredations are made at night. On the other hand, Deer-stalking is one of the great attractions of the Highlands, and has done much for the prosperity of that part of our country.

On the Continent the Deer has not only to contend with man, but with his hereditary enemy the Wolf, and even with us he is liable to be attacked, especially when young, by the Golden Eagle.

The venison is esteemed, but not so much so as that of the Fallow-Deer, and the great recommendation of the animal is its picturesque appearance and its value to the sportsman. Like Deer generally, the Red species does well and breeds freely even in close confinement; it had among the ancients a reputation for long life, but in point of fact a stag seems to be past his prime long before he reaches twenty years.

Closely allied to the Red-Deer are several Asiatic species, such as the Hangul of Cashmere (*Cervus cashmirianus*); but in Central Asia begins the range of the Wapitis, of which the North American species (*Cervus canadensis*) is the type. These are animals of much greater size than the Red-Deer and most of its allies, but otherwise very similar. They have, however, shorter tails, and squeal instead of

roaring in the breeding season. Horns of the American Wapiti may measure over five feet in length. These great Deer do well in our parks, but are very dangerous animals at the rutting-time.

THE SAMBUR

(*Cervus unicolor*)

The Sambur and its allied races take in South-East Asia the place occupied by the Red-Deer and Wapitis in the northern parts of the world. The typical and finest form of Sambur is found in India, where it inhabits both the mountains and the plains, being known as the Jerrow in the Himalayas. It is about the size of the Red-Deer, but far less elegant in build, and its tail is much more bushy. The old stag is of a very dark brown, while the hinds are redder, and the calves, which are usually unspotted, quite foxy red in many cases. But it is the antlers which make the greatest distinction between the two types. Those of the Sambur have no bez or tres tines—only the brow tine and two points at the crown. The beam of the antler is, however, very thick and rugged, and, as it may attain a yard in length, the head is imposing enough.

Sambur are forest-haunting animals, usually less gregarious than Red-Deer, as they never collect in large herds, and are often found singly. The shedding of the horns is very irregular in this species, and sometimes stags do not drop them for years together. The Eastern races of Sambur, which range to the Philippines, are usually smaller than the Indian variety, some of them not being so big as Fallow-Deer. Of recent years Sambur have been introduced into New Zealand.

THE SPOTTED DEER

(*Cervus axis*)

This very beautiful Deer is widely spread in the plains of India, inhabiting groves near water. In size it is about equal to our Fallow-Deer, and is very like that animal in summer coat, but even more richly coloured, the chestnut ground of the white-spotted hide

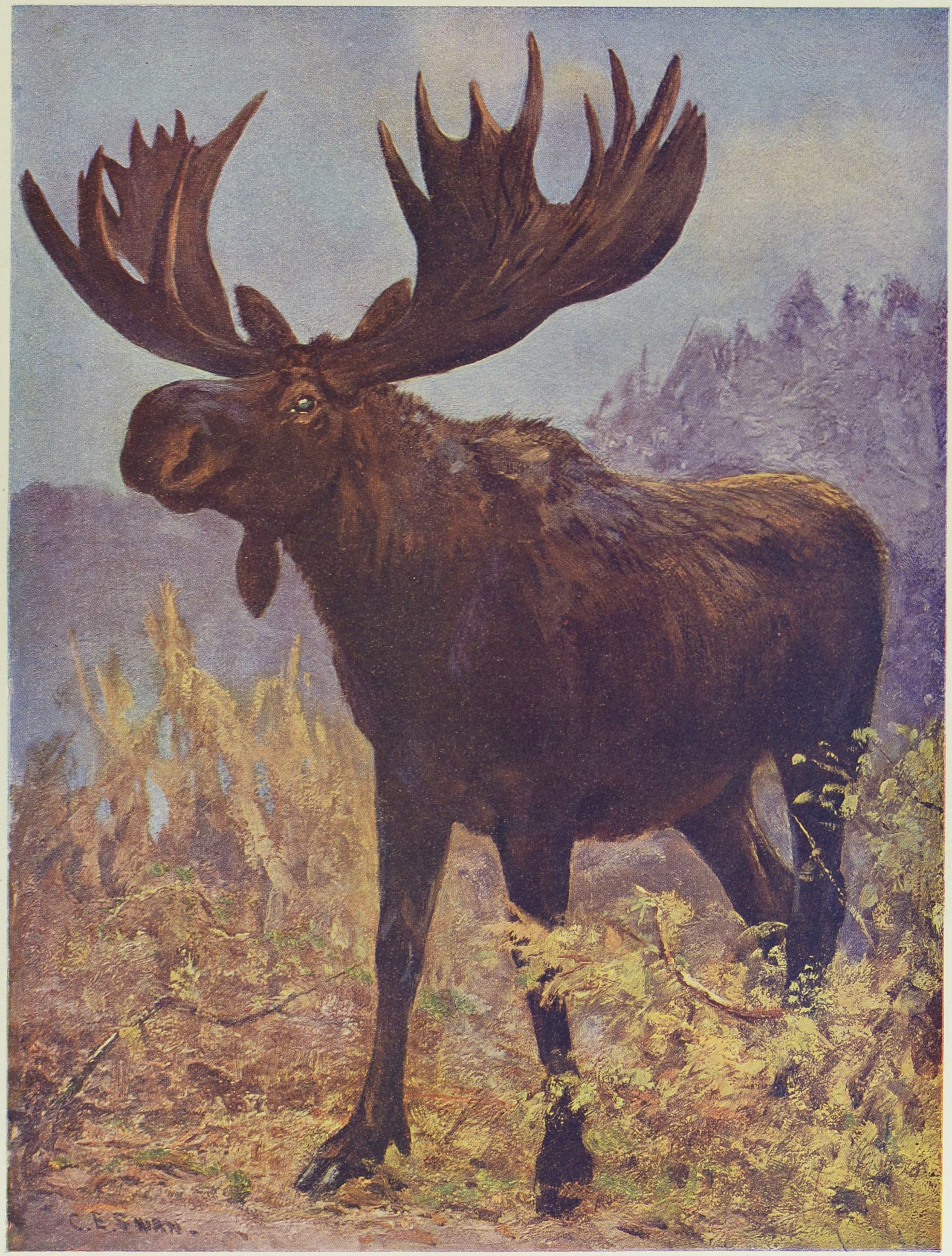
being very bright. The horns of the buck are, however, very different, having, like those of the Sambur, three tines only on each, a brow-tine and two end points. They are long and slender, but vary a good deal, some diverging much more than others; a yard is not an uncommon length. This Deer is gregarious, and suffers a good deal from the persecution of various carnivora, as well as the assaults of man; but it holds its own well, and is a common animal. The fawns may be born and the horns shed at any time of year. In European parks this Deer does well, though the fawns are apt to die when dropped in the winter.

THE FALLOW-DEER

(*Dama vulgaris*)

No hoofed animal exceeds this familiar ornament of our parks in grace and beauty, though its white-spotted coat is less brilliant than that of the last species, and varies a good deal in depth of tint. In winter the spots disappear, and there is a sooty variety which never has any. White specimens are also found. The horns of the Fallow-Deer are very different from those of other typical Deer, being palmated or flattened at the ends; both brow and bez tines are present.

This Deer's natural home seems to be the countries bordering the Mediterranean; but it is far better known in semi-captivity as a park animal, for which position it is eminently fitted, not only by its great beauty and utility as a provider of excellent venison, but by its gentleness, for it is the only Deer in which the bucks are usually not dangerous. It must be admitted, however, that vicious individuals occasionally are found. When it is found living free and is hunted, the Fallow-Deer exhibits much more cunning than the Red-Deer, in spite of its long domestication.



ELK
By C. E. Swan

THE ELK OR MOOSE

(*Alces machlis*)

THE Moose of America is the same animal as the Elk of the Old World, for its range extends all round the globe, in the great northern forests; indeed, it is a pity that the name Elk cannot be entirely dropped in favour of the American title, as it has been so extensively misapplied.

In America, for instance, "Elk" always means the Wapiti, and in Ceylon it is applied to the Sambur; moreover, the long extinct giant Fallow-Deer of Europe (*Cervus hibernicus*), of which such well-preserved horns are dug up from the Irish peat-bogs, used to be called the "Irish Elk."

However called, the true Elk is a very distinct animal from all other Deer, presenting as it does so many remarkable points. Its short neck is unique among Deer, and in fact no other creature presents the combination of a short neck and long legs. The antlers of the male are also characteristic, with their broad palmated form, and lateral direction on each side of the head, to say nothing of the absence of the brow-tine.

In young animals the antlers are not palmated at first, and show more resemblance to those of ordinary Deer. Another peculiarity of the bull Moose is the "bell," or hair-covered pouch, which hangs from his throat, its use being quite unknown.

The great muzzle, short tail, and characteristic form of body and limbs are common to both sexes. The calves are much lighter in colour than adults, but are not spotted. The Moose easily excels all living Deer in size, measuring about six feet at the shoulder, while its antlers may span five feet in width. It attains its greatest size in America, and especially in Alaska; the illustration was taken from a splendid Alaskan bull mounted in the South Kensington Museum:

this animal, by the way, is darker on the legs than usual, Elk usually having the limbs much lighter than the body—nearly white, in fact. But, as with so many animals, there is much variation in depth of colour in this species. The Elk, wherever found, is essentially a forest animal, and, its structure rendering it unsuited for grazing, it feeds on the foliage and twigs of trees; it is a very destructive animal in the forest, rearing up on its hind-legs to eat off twigs growing high up, and "riding down" young trees by straddling the stem and pressing them down till it can reach the crown. The mountain-ash is a great favourite with it, and where Elk are at all common this tree gets fairly eaten out of the forest.

In summer time it varies its diet with water-plants, wading in to feed on the leaves of water-lilies, and plunging its head under to pull up their roots. Owing to its broad spreading hoofs, it is at home on marshy ground, and is particularly fond of water, this taste being not at all uncommon among the Deer family. It swims with great power, and higher out of the water than other land animals.

Its ordinary gait is a walk, and it moves through the forest very skilfully, avoiding touching the twigs in a most marvellous way, considering its huge antlers; it trots well and swiftly, and is very enduring at this pace, but, like the Eland, cannot gallop for long at a time.

This is not a gregarious animal, though at times a single family may be found together. The bull has no ambition to own a harem, but he mates more than once in a season, the attachment of the pair being short-lived. A most keen-scented and quick-eared animal, he is difficult to approach at other times, but in the breeding season in autumn he loses his caution to a great degree, and becomes fearless and even aggressive.

He not only uses his horns in attack, but, like many Deer, is a skilful boxer, and his terrible chopping blows with the fore-feet are greatly dreaded: the cow, when with a calf, is almost equally dangerous, as she practises the same tactics. The bull is often lured to his doom at the breeding season by imitations of the roar of his mate; for at this time of the year the females call as well as the males.

The cow Elk drops her young in spring; she is more prolific than any other equally large animal, frequently having twins.

In winter, Moose are exposed to great danger from the attacks of man and Wolves, as they cannot travel well on "crusted" or surface-frozen snow, owing to their great weight, which causes them to break through. To avoid as much as possible the necessity of travelling about at this time, they "yard," as it is called; this means that one or more animals select a sheltered piece of forest with plenty of their favourite trees, and keep to it, their constant travelling over the same ground beating down the snow and giving them a safe range—safe, that is to say, against the Wolf, which dares not face the great Deer in a fair fight; but, of course, once a hunter finds the "yard," the unfortunate inmates are more or less at his mercy. If wounded, they do not die unavenged if they can help it, for an infuriated Moose is one of the most dangerous of animals. At the beginning of the new year the bull drops his antlers, and these are renewed by autumn.

So large a beast as this has, of course, always been greatly subject to human persecution, which has exterminated it over much of its range. In Europe it is now confined to Scandinavia, Northern Russia, and East Prussia: in classical times it was widely spread in Europe, and even inhabited Britain. Its equally large and far more beautiful rival, the Giant Fallow-Deer, became extinct long before the dawn of history, unless the unknown beast called the "Schelch" in the "Nibelungen Lied," and mentioned as distinct from the other ancient European big game, Aurochs, Bison, and Elk, was this animal.

In America it still exists as far south as the northern parts of New York, and is well known in Canada. It is, of course, greatly esteemed both there and in Europe as a sporting animal, and its meat is not to be despised. In former times it was trained as a sledge animal in Scandinavia, and showed such speed that its use was prohibited as facilitating the escape of criminals—a measure which does not say much for the police efficiency of the government of the period: it might very well be tried again for use in the countries it

naturally inhabits, where transport in winter is always a matter of more or less difficulty. There seems to be plenty of evidence that this formidable creature is really one of the most easily tamed of the Deer tribe when taken young enough, and the experiment has been tried on both sides of the Atlantic.

Notwithstanding this, the Elk is not a common animal in captivity, and at the time of writing there has been no representative of the species in our Zoological Gardens for some years, though several have in times past been on view there. A praiseworthy attempt is being made to introduce this grand beast into New Zealand, where it certainly would greatly add to the attractions already offered to sportsmen by that enterprising colony.

THE MILOU DEER

(*Cervus davidianus*)

This curious Deer is not closely related to the Moose or to any other species. It is about as big as the Red-Deer, but clumsily formed, with a Donkey-like appearance, especially about the tail, which is longer than any other Deer's, reaching down to the hocks and ending in a tuft. It carries its head low, and, according to Mr. Lydekker, trots like a Mule, with an action quite unlike that of its family generally. Its antlers are very ugly, and of an altogether peculiar type. There is no brow-tine, but a long straight beam merely forked at the tips, and sending out a long branch from the back near the base.

This Deer is fond of water, and feeds on water-plants when it can; it has a braying call. The coat is plain brown in the adults, and spotted with white in the fawns. Its native home is unknown, as it has only been seen in the Imperial hunting park at Pekin, and I believe it is not to be found there since the recent troubles in China, so that the only known specimens of the race now living are the small herd in the Duke of Bedford's park at Woburn; specimens have also been exhibited at our Zoological Gardens. Of course there is a possibility that some traveller will rediscover it in a truly wild state, so that it is worth while to draw attention to it here.



VIRGINIAN DEER
By C. E. Swan

THE VIRGINIAN DEER

(*Cariacus virginianus*)

THE Virginian or White-tailed Deer, as it is called in its own country, is far the most abundant and widely-spread Deer in North America, and continues to exist even in long-settled districts where any woodland remains.

It is about the size of our own Fallow-Deer, and equally graceful in form, but differs very much in colour of coat and style of antlers. The general hue is reddish brown in summer and grey in winter, the difference being usually very marked, though there is much individual variation. The fawns are usually white-spotted in the orthodox Deer fashion, but self-coloured ones, like that in the illustration, a British Museum specimen, are not uncommon; and Mr. Lydekker records a case in which a doe in captivity bore a spotted one and a plain one together—the normal number at a birth in this species being two.

The antlers of the buck, like those of all purely American Deer, are of a very different type from those of the Old World species. It will be noticed, for instance, that there is no brow-tine, while the style of branching is quite different, and the beam bends abruptly forward in a peculiar way. The length of the horn is about two feet. The typical race of this Deer inhabits the eastern side of North America, from Maine southwards, but different races or local varieties of it range through the Western States, down through Mexico and Central America, even into Peru and Bolivia in the southern half of the continent. As so often happens, the southern races are much smaller than the northern or typical form of the species.

This Deer is a woodland species as a rule, and is very shy and wary; indeed, it is owing to its cunning that it is enabled to maintain itself so well in the neighbourhood of man, though it is nowadays also protected as a sporting animal. When rushing off, its tail, which is rather long for a Deer's, and conspicuously white for the most part,

is strikingly displayed, while the head is carried low. Like so many Deer, it is very fond of water, and will often wade in after water-lilies, like the Moose. In the ordinary way, like most other Deer, it both grazes and browses on twigs and leaves, and is very fond of beech-mast.

This is the Deer ordinarily hunted by American sportsmen, Deer-shooting in the Adirondack ranges of New York State being one of the recognised pastimes in the States. It does well and breeds freely as a park animal, over here as well as in its native country, but is not often kept in England. No Deer becomes so tame and confiding as this species does in many instances, but it is also capable of showing itself extremely vicious, so that it evidently cannot be implicitly trusted.

THE MULE-DEER

(*Cariacus macrotis*)

The Mule-Deer is one of the most distinct and handsome of American Deer; it is rather larger than the Virginian at its best, and has particularly big ears, whence its name. As its tail is tipped with black, it is often called the Black-tailed Deer, though this name more properly belongs to another American species (*Cariacus columbianus*). The antlers of the Mule-Deer are very handsome, and branch in a characteristic and peculiar way; a little distance above the head the beam forks into two like a letter Y, and each of these branches similarly forks again, producing a very symmetrical "head." The whole antler is usually over two feet long. The colour of the coat is brown in summer and grey in winter, with white on the face, under-parts, and base of the tail.

The Mule-Deer is widely distributed over western North America; it keeps in small herds, and in habits is more like an Antelope than a Deer, frequenting dry open country more than woods, and feeding chiefly on grass. It is a fine hill-climber, and also appears to be the swiftest of the Deer, which are not, as a rule, very fast animals compared with the average Antelope; at any rate, it appears to be able to escape from both Wolves and Greyhounds. It has thriven well and bred remarkably freely in our Zoological Gardens.

THE PAMPAS DEER

(*Cariacus campestris*)

The Pampas Deer is a small species, light brown in colour, and with three-pointed antlers in the back. This is one of the few open-country Deer, inhabiting the grassy plains found in some parts of Brazil and ranging south over the Argentine Pampas to Patagonia. It is chiefly remarkable for the extremely strong nauseating smell emitted by the buck, which is said to be perceptible a mile off, so that he would appear to be worse than the Skunk as a scent-diffuser.

THE HUEMUL

(*Xenelaphus bisulcus*)

The Huemul is a smaller and stouter-built animal than the Fallow-Deer, brown in colour, with the buck's horns showing two nearly equal spikes only; it ranges along the mountains of South America from Chili to Patagonia, and sometimes comes out on the plains. Where it has not met with men, it is extraordinarily tame; Mr. Hesketh Prichard, in his book on Patagonia, mentions a case in which a doe came up and smelt him, and her mate made as if to turn him over with his horns.

THE BROCKETS

The Brockets are a number of small species of Deer from Central and South America, in which the horns are reduced to short single spikes; their tails are very short also. The best known is the Red Brocket of Brazil (*Cariacus rufus*), which has been often exhibited at the London Zoological Gardens; this is also the largest, but is not much over two feet at the shoulder. It is a solitary animal, frequenting either forest or grassy plains, and very destructive to crops.

THE PUDUS

The Pudus (*Pudua*) are very like the Brockets, but still smaller and with shorter horns. They inhabit Western South America, and the Chilian Pudu is the smallest Deer known, being little more than a foot at the shoulder. The only other kind, found in Ecuador (*Pudua*

mephistopheles) is not much bigger, and is noteworthy as being the only ruminant which has no tail at all.

THE ROE

(*Capreolus caprea*)

ALTHOUGH an Old-World Deer, ranging from Great Britain to the Caucasus, this species is more nearly allied to the American types just described. It is a small animal, little over two feet at the shoulder, with long ears and a very short tail; the legs are long and the build very graceful. The buck's horns are seldom a foot long, rough in the beam, and carry three points, but have no brow-tine. The coat is red in summer, grey with a white patch on the stern in winter; the fawns, of which there are two at a birth, are spotted as usual.

The Roe is found solitary and in pairs or families, and is a woodland animal; it is a most graceful creature, and is often kept as a pet on the Continent. The buck, however, in spite of his small size, is a very dangerous animal. It is only nowadays found in the northern parts of Great Britain, and does not thrive so well in parks as our other Deer. In Siberia its place is taken by a much larger Roe (*Capreolus pygargus*), which may be as big as a Fallow-Deer, and often migrates in large herds.

THE WATER-DEER

(*Hydrelaphus inermis*)

THIS curious Deer, which agrees with the Musk-Deer in having long upper canine tusks in the buck instead of horns, seems to be allied to the Roes. It is a small animal, less than two feet at the shoulder, and light brown in colour. The fawns are spotted, but not very distinctly; a great peculiarity of the animal is the number of them it produces at a birth—from three to six—thus showing a prolificacy unrivalled among ruminants.

The Water-Deer is found in Eastern China, where it lives in the long reeds by the water-side, and on river islands; it swims readily, and has a bounding action when on land. Its venison is only moderately good, or it might be a good subject for acclimatisation, especially as it does well in our climate, though seldom imported.



REINDEER
By C. E. Swan

THE REINDEER OR CARIBOU

(*Rangifer tarandus*)

LIKE the Elk, the Reindeer is an example of an animal inhabiting both worlds, but known by a different name in each; for the Caribou of America is not regarded as a different species from the Reindeer of the Old World, though presenting some slight differences, not important in an animal so variable locally as this is.

It is very strikingly different from all other Deer, and, with the exception of the misshapen Moose, is the least elegant of the family, its large head, usually carried low, short thick neck and legs, and sturdy build more suggesting an Ox than one of the graceful and elegant Deer family. It is a large animal, often considerably exceeding our Red-Deer in size. The ears and tail are both short, and the feet broad, with great power of expansion, so that they readily support the beast on a yielding surface like snow or mud. The back or false hoofs are larger than in any other species except the Musk-Deer.

The coat is very thick and close, and varies a good deal in colour, some specimens being much whiter than others. The white neck is a very marked character in some American races, from one of which the illustration is taken; the females show less white than the males, and the winter coat is whiter than the summer one. The young fawns are not spotted, like those of most other Deer.

The antlers of the Reindeer are altogether peculiar, and can be distinguished at once from those of any other Deer, though in no other species are they more variable, both individually and locally. Especially to be noted is the fact that the brow and bez tines are forked or flattened, while the tres tine is absent altogether; the beam is strongly bent, and is often flattened at the end.

Often, especially in the American Caribou, one brow-tine is very

large and branched, while the other is of the ordinary prong-like shape, and other instances of asymmetry occur. The antlers often attain a very great size, sometimes measuring over five feet along the curves of the beam; the horns of the American forest race, known as Woodland Caribou, are peculiarly short, but well-branched, while some races have very straggly-looking horns.

This is the only Deer in which the does usually have horns as well as the bucks, though individual cases of horned does have—very rarely—been recorded in other species. The horns of the females, however, are much smaller and less branching than those of the males, and in Kazan the female Reindeer are said to be hornless. The two sexes shed their horns at different times, the does dropping them much later than the bucks, and not forgetting to remind their partners of their defenceless condition while they have the chance to assert themselves.

The antlers are developed very early in the life of the animal—before it is two months old, in fact, whichever the sex, whereas those of other Deer do not make their first appearance till it is nearly a year old or even more.

The Reindeer is one of the characteristic animals throughout the Arctic regions, being found as far north as Nova Zembla and Spitzbergen, but also ranging south as far as the Kirghiz steppes and Lower Canada. It is migratory wherever the character of the country permits it, and in classical times seems to have been found as far south as Germany. In spite of its awkward appearance, it is an active animal, being able to travel for long distances with great speed, and to negotiate the most difficult ground; it is a good hill-climber, and in Scandinavia affects the high "fells," while at the same time, unlike most mountain animals, it can traverse soft ground easily, and can, in fact, get along over swampy country where any other animal would inevitably succumb; a tame individual has been seen to be bogged up to the horns, and then extricate itself without assistance. It will also manage to get along through soft snow, travelling by bounds like a gigantic Rabbit: generally, however, it does not bound or leap like

other Deer, and will crawl under an obstacle rather than jump over it. It is the fastest and most powerful swimmer of all Deer, and swims higher out of the water than any other beast, buoyed up by the air entangled by its thick coat.

With the exception of the Woodland Caribou of America, which keeps to cover and is found only in small numbers together, the Reindeer affects open country and is found in large herds; the Barren-ground American race, which lives north of the forest limit, is said not to interbreed with its forest relatives, even when they meet.

The staple food of the Reindeer is the celebrated Reindeer "moss" —a lichen which grows abundantly in the north; it also feeds on any other available vegetation—grass, shoots of trees (where available) and bushes, and even seaweed. When its food is concealed under the snow, it reaches it by pawing with its fore-feet, the idea that the expanded brow-tine is a "snow-shovel" being apparently a mistake. It has, like so many Arctic animals, a great power of elaborating fat, and lays on more of this than any of the Deer when food is obtainable; but, of course, it often has to suffer much privation during the long winters, when the surface of the snow is liable to freeze hard.

The Wolf is a deadly enemy to it in winter, and it is also much subject to the attacks of insects, such as gadflies, in summer. It is a wary and restless animal, always ready to shift its ground if hunted.

Its meat is, of course, a very important article of food to the natives of the countries it frequents, and the skin is also of value, and many are sent to England, while the antlers are extensively exported also.

Most important of all, however, is the utility of the Reindeer as a domestic animal, in which capacity it has been known from very ancient times, both in Europe and in Asia; the Caribou of America has never been domesticated, but Lapland Reindeer have been exported to Alaska.

The value of this creature to the northern tribes who use it is invaluable, as no other animal could supply its place; since it furnishes meat, milk, hides, and is also used as a working animal. In this

capacity it is generally yoked to a sledge, either singly, as in Lapland, or several abreast, as in Northern Asia. Some tribes in Asia also ride their Reindeer, which are larger than the European breed; but, generally speaking, tame Reindeer are not so large and fine as wild ones, and they are also more variable in colour.

Reindeer will live in our climate, but do not thrive very certainly, though they have often been exhibited in our Zoological Gardens; they certainly ought to be introduced into the cold regions of the southern hemisphere, where there is at present a complete absence of land mammals, so that they would be of great service to those forced to spend any length of time in the inhospitable islands of these southern seas.



INDIAN SPOTTED MOUSE-DEER

By Louis Sargent

THE INDIAN MOUSE-DEER

(*Tragulus meminna*)

This insignificant-looking little animal is one of the small family of Chevrotains (*Tragulidæ*), as they are often called in books, which represent a very primitive type of ruminant, and give us some idea of what the ancestors of Deer and Antelopes were like before they developed horns.

Even the typical ruminant stomach is not fully developed in the Mouse-Deer, although it chews the cud. This organ should consist of four compartments—the paunch, honeycomb bag, manyplies (a chamber with longitudinally pleated walls, and the rumen or true stomach—but in the present animal the manyplies is not developed.

The slender limbs also show a primitive feature unknown in the higher ruminants; the small back hoofs, which represent the second and fourth toes, are really the terminations of complete toes, the bones of which are hidden under the skin, whereas in other ruminants this is never the case, only the lower ends of these toes remaining, even when they are present at all.

The teeth of the Mouse-Deer also show a primitive feature in the front grinders being narrow-topped and pointed, not broad and suited for crushing, as all the grinders of ruminants usually are. The long tusk-like upper canines of the male, though much less developed, of course recall those of the Musk-Deer, and there has been much confusion between the two groups, the Chevrotains having long been regarded as allies of that animal, although they have no special relationship to it any more than to other Deer, except in so far that it is also a primitive type, though not nearly so much so as the Mouse-Deer are.

As in the Musk-Deer, the canines of the female Mouse-Deer are short; indeed, in none of the ruminants with long tusks in the males

are these organs well developed in the female, and, as they never occur along with large horns, they appear to be primitive weapons which the more highly organised ruminants have been able to dispense with as their horns became more efficient.

The Indian Mouse-Deer does not measure more than a foot at the shoulder, and is not so big and heavy as a Hare; its curious olive-brown coat with white spots will distinguish it from any other animal.

The colouration, however, recalls that of many young Deer fawns, and no doubt is another primitive peculiarity, since the coat or plumage of young beasts and birds often appears to "hark back" to their ancestors. The young Chevrotains, however, are apparently always like their parents, even when these are self-coloured.

In its habits the Mouse-Deer is singularly unobtrusive; it is usually solitary and chiefly nocturnal in its habits, so that, although widely spread over Southern India in forest tracts, and also found in Ceylon, it is comparatively very little known. In the daytime it hides among rocks, and here the doe drops her young, which are usually twins. The gait of the little animal is peculiarly stealthy; it carries its head low, and steps daintily along on the very tips of its tiny hoofs. Some of the poses of Chevrotains show their primitive character very well; unlike other ruminants, they sometimes sit up on their haunches like a Cat or a Dog, and when lying down do not incline to one side, like hoofed animals generally, but rest on a level as it were, with the fore-feet tucked under them.

This little creature is not very common in captivity, but it has bred in that condition, and has often been exhibited at the London Zoological Gardens, where all the species of the family have been on view at one time or another. Mouse-Deer should be fed and treated much like Rabbits, appreciating such food as salad, sliced carrots and fruit, bran, &c. It is important not to keep them constantly on a hard floor, as they are subject in that case to enlargement and soreness of the hocks, while damp is also injurious to them—at any rate, in the case of the Asiatic species. Except that the males will, as

might be expected, maltreat each other, they are harmless little things; and in one case, when one of the present species was kept in the Calcutta Zoo in the aviary along with some birds, I noticed a hen Gold Pheasant had struck up a friendship with the little Deer, and always kept near it.

THE KANCHIL

(*Tragulus javanicus*)

The Kanchil, or Little Malay Chevrotain, is the smallest of the family, and thus the smallest of ruminants except the little Royal Antelope of West Africa. It is, in fact, about as big as an ordinary Rabbit; its coat is of a rich red-brown, with the under-parts white, and the throat streaked brown and white. The tail is longer than in the spotted Indian Mouse-Deer. The Kanchil ranges from Malacca to Java, and, like all the family, is a forest animal. Its name, in Malay, means "little," and in the folk-tales of the Malays it stands for the small, weak, but cunning creature which outwits stronger ones by dint of brain-power and resource, just as the Rabbit does in Negro stories, and the Wren in European fairy tales. In the case of the Kanchil, at any rate, there is probably some foundation for this view of its character; for, unless these little primitive creatures are very cunning, it is difficult to see how they have existed for so many ages, since they have neither great speed nor defensive weapons, and are not highly prolific.

THE NAPU

(*Tragulus napu*)

The Napu is the largest of the Asiatic Mouse-Deer, rather exceeding the Indian spotted species in size. In colour, however, it is very similar to the Kanchil, and, like that species, has a longer tail than the Indian one. It has much the same range as the Kanchil, but is not nearly so abundant an animal. Apart from the great difference in size (the Kanchil being only about eighteen inches long from nose

to tail, and the Napu nearly a foot more), the two species can be distinguished by the difference in the brown-and-white streaking on the front of the neck, the Napu having five white streaks here, while in the Kanchil there are only three.

THE WATER CHEVROTAIN

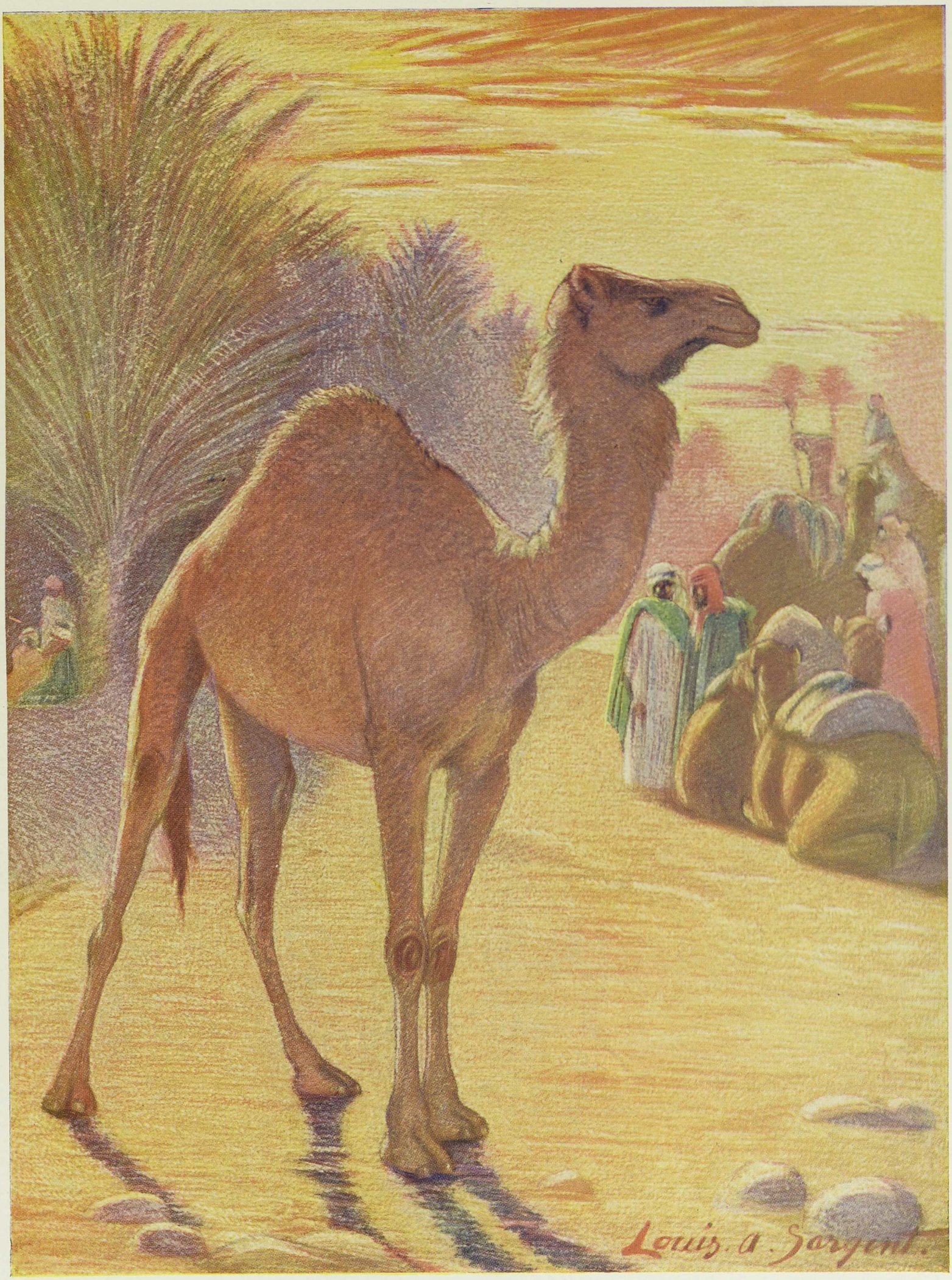
(*Hyomoschus aquaticus*)

This animal is the only other species of Mouse-Deer known, and is the only one found away from Asia, its home being in West Africa. It is the largest of the known species of the family, being considerably bigger than the Napu, and more heavily built in proportion to its size, the legs being less slender and delicate.

In the structure of the limbs also, it is more primitive even than the other Mouse-Deer, for the supporting bones of the large third and fourth toes which form the "cloven hoof" are not fused into a "cannon-bone" as in all other ruminants, even the other Mouse-Deer, but remain separate beneath the skin; thus, as in the Pig, all four toes of the foot are distinct in the skeleton.

In colour the African Mouse-Deer combines the peculiarities of the Asiatic species; it is spotted and striped as in the Indian kind, but the spotting, which is pure white, is on a red ground like the coat of the Eastern or Malayan species. This creature is found along the sides of rivers and streams, and, though specimens kept in captivity during the last century did not display any of the aquatic proclivities with which this animal is credited in the wild state, the last individual the London Zoological Gardens possessed frequently entered the water to which it was allowed access.

That this creature is really a very ancient form is shown by the discovery of fossil remains of a very closely allied species in Greece, which was named *Dorcatherium*, before the present animal was known to exist at all; a fact which, with the discovery of the Okapi, encourages us to hope for yet more novelties—if the discovery of a supposed extinct type can be reckoned as such—in the wilds of the West African bush.



ONE-HUMPED CAMEL

By Louis A. Sargent

THE CAMEL

(*Camelus dromedarius*)

SOME apology is necessary for the introduction of so thoroughly domesticated an animal as the ordinary One-humped Camel into a book on Wild Beasts; for this animal has been so long and so thoroughly domesticated, that it is not known to exist anywhere in a primitively wild state. On the other hand, it is far too important a type to be left out, and it may be urged that no "wild beast show," stationary and scientific, or migratory and mercenary, is complete without Camels, while they have at any rate reverted to a wild state in parts of Spain.

The Camel is the representative of a small group of ruminant animals known as *Tylopoda* (pad-footed); they cannot be called hoofed in the ordinary sense of the word, as the two toes, third and fourth, which alone are present—there being no back toes—merely bear large blunt claws at their extremities, and the animals do not walk on the very tips of the toes as ruminants usually do, but the whole under-surface of the toes is applied to the ground. In the Camels, these toes, though distinct above, are confined below in a single broad horny pad or sole.

The Camel is also peculiar with regard to its teeth. In other ruminants there are no upper incisors whatever, and the lower canines are like incisors in shape, and lie close alongside of these teeth; but the Camel has a full set of upper incisors in its youth, and the outer pair are always present, though they are pointed canine-like teeth. Then the canines, present in both jaws, are typical in form, not incisor-like in the lower jaw, and the first grinders in the upper jaw are canine-like teeth; thus the Camel is well provided with teeth for biting, and, it may be added, has the will to use them on occasion; and in this it is greatly aided by the flexibility of its neck.

The typical ruminant stomach is not quite fully developed in the Camel, which, like the Mouse-Deer, has not the third compartment or "manyplies"; it has long been known as remarkable, however, for the water-pouches, which are found in the walls of the first and second compartments, and by their muscular rims can be shut off from the rest of these cavities. This structure has reference to the Camel's famous power of abstaining from water, which, however, has been somewhat exaggerated; as a matter of fact, it can, generally speaking, go without water only about twice as long as the Horse, and cannot compare in powers of abstinence from fluid with the Giraffe and several of the Antelopes, which can live on a dry régime for months, though without any special arrangement for water storage in their interiors.

The characteristic hump of the Camel is not so important a feature as those above mentioned; it is chiefly composed of fat, which is gradually absorbed into the system in case of scarcity of food or other organic need. Hence a hard-worked and underfed Camel has a flabby hump, and a plump firm one is an unfailing sign of high condition.

The ordinary colour of the Camel is the sandy-dun represented in the illustration, and this is no doubt the primitive tint, as it is what might be expected in a desert animal; but black and white Camels are also found, though pied and spotted ones seem to be unknown.

There is much difference, also, in the various breeds of Camels, the ordinary slow-paced pack-Camel comparing with the swift and slender "Dromedary," which is a sort of Camel-thoroughbred, much as a cart-horse does with a racer.

The ordinary gait of the Camel is deliberate, and he moves the two legs on the same side together in a very characteristic way; but he is very enduring, and in this, as well as in his powers of bearing thirst and subsisting on the coarsest and driest herbage—and very little of that—his value as a beast of burden consists. When lying down, the Camel, like the Mouse-Deer, does not lean to one side like most hoofed animals, but lies down squarely, with the limbs bent under him, and the bare horny pads on the chest, knees, and stifle-

joints are adapted to this position. This Camel is kept throughout the hot, dry, and barren districts of Africa and Asia; and he is especially fitted for such countries; in fertile districts, where the Horse and Ox can be employed for the same work, he is of comparatively little use; and he is extremely destructive to trees and shrubs, devouring branches as thick as a man's little finger. His docility and patience have been rather over-rated; he is really a rather ill-conditioned animal, given to biting very severely and to grumbling, gurgling, and growling, not only at the proverbial "last straw," but at the first. In the breeding season the bull Camel is positively dangerous, and at this time he blows out a red bladder from his throat, to the accompaniment of a bubbling noise.

The female produces one calf at a time, which is able to follow her immediately, but is suckled for the whole of its first year.

Camels are, as is well known, chiefly employed as pack-animals, and will carry a load up to five hundred pounds, but they are also employed to a limited extent for purposes of draught. They are never bitted, but controlled by a ring through the nose. For many years past they have been much employed in Australia, a country for which they are peculiarly well suited. They are very sure-footed on almost any sort of ground, being as good at hill-climbing as in marching over the level desert, though they do not like really loose sand more than any other creatures. They are very awkward swimmers, being apt to overbalance in the water, and their long loose limbs are apt to slip laterally, and get dislocated in marshy ground—so much so that if they have to be taken over such country, it is usual to tie their hocks together. Yet Camels brought up in marshy land will be accomplished "bog-trotters," and it is a curious fact that these desert creatures have run wild in the Spanish marshes, where they wade about like so many quadruped Flamingoes.

Both the meat and milk of Camels are utilised by the Arabs, and their woolly hair is used for the manufacture of cloth, while their bones are valuable for inlaying work, being nearly as dense as ivory.

THE BACTRIAN CAMEL

(*Camelus bactrianus*)

The Bactrian or Two-humped Camel is in all essential points of structure very similar to the one-humped or Arabian species; but is more stoutly and heavily built, and has a much heavier coat, to say nothing of the characteristic two humps instead of one. It presents much the same colour variations as the ordinary Camel, with which it is sometimes crossed, and produces a hybrid which has but a single hump. These mule Camels are in some respects better working animals than pure-bred ones; they are capable of reproduction, but the second cross animals are not good for much.

The Bactrian Camel is the characteristic Camel of temperate and cold climates, being kept from Southern Russia through Central Asia to China; it can endure intense cold, and some tribes possess both this animal and the Reindeer. Like the ordinary Camel, it is chiefly used for burden, but sometimes for draught, and is exceedingly frugal and hardy. In the Gobi Desert it is found in an apparently truly wild state; at any rate the Camels there are very wary, sandy in colour, and with comparatively small humps; a specimen can be inspected in the South Kensington Museum.

In European menageries this Camel thrives admirably, as it finds nothing uncongenial in our climate; the pair at present in the Zoological Gardens breed regularly, and it may be observed that the baby Camel has the humps in the form of mere flaps of skin at first, filling out and standing up as the little animal grows.



GUANACOS
By Winifred Austen

THE GUANACO OR WILD LLAMA

(*Auchenia huanacus*)

The Guanaco and its ally the Vicugna are the American representatives of the Old-World Camels, and the only other members of the family *Camelidæ*. The resemblance of the Guanaco to the Camel is obvious at once, although it has a very straight back instead of the familiar hump, a much shorter and bushier tail and longer ears, and the toes almost completely divided, instead of being united below into a single pad, so that the foot is very like that of a two-toed bird.

The resemblance extends to points less easily observable; the Guanaco has essentially the same structure of stomach as the Camel, with its characteristic water-pouches, and also possesses, like that animal, the canine-like outer incisors and pointed canines, though it has not the canine-like premolars.

In size the Guanaco is about equal to our Red-Deer, and in appearance, as the illustration shows, a very elegant creature; a characteristic point of its appearance is the way in which the body is "tucked up" at the loins, as in a Greyhound. The coat is of a woolly nature in the body, and very soft and fine. There is not much variation in colour, but some specimens have the face blacker than others, and white and pied varieties may occasionally occur.

The range of the Guanaco is very wide, extending over the temperate parts of South America generally, from the Andes of Ecuador to Tierra del Fuego. It is a very active beast, being equally at home on rocky slopes, in ascending and descending, while it shows itself remarkably sure-footed, and showing great speed when on the open plains. It is a particularly common and characteristic animal in Patagonia. Its food consists of such herbage as may be found about its haunts, and it seems to be able to live on very little, as it is sometimes found in the most barren localities, and, in some cases, appears to drink either

salt water or none at all. For all their hardiness, however, the severe winters of Patagonia are often too much for the Guanacoes, and in many places there may be found large deposits of the bones of the unfortunate animals, generally in some sheltered locality near water, whereto they have resorted in the vain hope of picking up some nourishment.

Guanacoes are essentially gregarious, and are usually seen in large herds; one buck will accumulate a harem sometimes numbering as many as a hundred does; but this he does not manage without a struggle; for, in spite of their harmless and innocent appearance, these creatures are savage and quarrelsome to a degree, and any old veteran is pretty certain to be well marked with scratches from the teeth of former rivals, especially about the neck, which is the main point of attack. As, however, the skin here is very thick, the combatants cannot hurt each other very seriously. The Guanaco also attacks by rearing and striking its adversary with its knees; besides which it spits freely, though one would think that this method of offence would not much impress a serious enemy, though disconcerting enough to a visitor to a menagerie. The note of the animal is a laugh or neigh, and the buck will often thus challenge intruders on his domain, for, though wary when it has been at all hunted, the Guanaco is very inquisitive, and has some idea of resenting the intrusion of strangers.

Its natural enemy is the Puma, which, where they occur together, makes it a principal object of pursuit, springing on it and breaking its neck; sometimes the Guanaco will make a brave resistance to its foe, but very seldom with success. The young are also attacked by the Colpeo (*Canis magellanicus*), a large, Wolf-like Fox; but this animal does not range far out on the plains. The Patagonian Indians—now, alas! sadly reduced in number—also hunt the Guanaco keenly, as it forms their principal means of subsistence. It is true that its flesh, which is like lean mutton, is not so much esteemed by them as that of the "Ostrich" of Patagonia—really Darwin's Rhea (*Rhea darwinii*), which is more palatable and nourishing; but as the bird is much more wary, it is often a case of Guanaco venison or nothing; and

besides, they need the skins of the old animal for making their "toldos" or tents, and those of the young for their own clothing. The Guanacoes are hunted with the bolas—balls connected by thongs and thrown at the animals; and the aid of Hounds is requisitioned, the Guanaco Hound being apparently very similar to a smooth Lurcher or the Kangaroo Hound of Australia.

It may be mentioned that Guanacoes take to the water readily and swim well, unlike their relative the Camel. The Guanaco is the wild ancestor of the Llama, the only large domestic animal possessed by the American aborigines at the time of the Spanish conquest of the New World—in fact, the only other domestic animals found there at all were the Dog, Guinea-Pig, Turkey, and Muscovy Duck.

The Llama has a heavier coat than the wild Guanaco, and is most often white in colour, though, like most domestic animals, it varies a good deal; thus, of the pair at present in the London Zoological Gardens, the buck is black, with a white "blaze" on the face, and the doe white, with the head marked with fawn-colour. Llamas breed well in Europe, and are to be found in most menageries. Their original use was as pack animals, and they can be ridden, but their habit of spitting is highly objectionable. Apropos of this, I may mention that, though this nasty trick was noticed in the earliest account of the Llama, written in the middle of the sixteenth century, and though I have often heard from eye-witnesses of the animal's expectoratory performances, I have never seen the feat performed myself, though a constant frequenter of Zoological Gardens; and I mention this to show how cautious one ought to be in disbelieving accounts of unusual habits in animals, merely because one has not had personal experience in any particular case.

Another domestic breed of the Guanaco is the Alpaca, which is smaller than the Llama, and usually black, or nearly so. Its fleece is very long, reaching nearly to the ground, and hanging all over the face. It is solely on account of this wool that the animal is bred, being kept in large flocks on the mountain pastures and regularly shorn. The name of the animal is, indeed, more familiar than that of

any other of this group, owing to the large use of Alpaca wool in making various fabrics. This animal would be a good subject for introduction into some of our colonies where suitable conditions exist, and, indeed, it was tried in Australia, but the herd imported did not thrive, possibly on account of the heat of the climate, unsuitable for mountain animals; New Zealand would probably have been better.

THE VICUGNA

(*Auchenia vicuna*)

The Vicugna is a considerably smaller animal than the Guanaco, and has a shorter head even in proportion to its size—indeed, it might very easily be mistaken for a young specimen of the larger species, as its colour is very similar. It may, however, always be distinguished by the absence of the bare patches found on the stifle-joint of the hind-legs in the Guanaco, which agrees in this respect with the Camel. The Vicugna is found high up in the mountains of South America from Peru to Central Bolivia. In general habits it much resembles the Guanaco, but is, unlike that species, purely alpine, and never occurs in the plains.

Its wool is peculiarly fine and soft, and the animal would be well worth domesticating, as, of course, this product can at present only be obtained by hunting the wild animals. A worthy priest in Peru, the Curé Caprera, once succeeded in producing hybrids between the Vicugna and Alpaca, which bore fine fleeces and were fertile, but poverty fell upon him, and the valuable breed was lost. There would be no difficulty, however, in repeating the experiment, for the Vicugna thrives in captivity as well as the Guanaco, though both are naturally not as often met with as the domesticated Llama.



HIPPOPOTAMI
By C. E. Swan

THE HIPPOPOTAMUS

(*Hippopotamus amphibius*)

THE very ugliness and unwieldiness of the "River-Horse"—the Greek name of the beast, which has been adopted as its English one—has always attracted attention to it, and indeed it is one of the most remarkable of hoofed animals, as well as the largest after the Elephants and the great Rhinoceroses. Its relationships are not at all with the Horse, the family to which it belongs being nearer to the Pigs than to any other existing animals. It resembles Pigs in having four hoofs on each foot, but all these touch the ground, and the weight is likewise borne, as in the Tapir and Rhinoceros, by pads beneath the base of the toes. The huge broad swollen muzzle is very unlike that of a Pig, and the teeth are very characteristic of the animal. There are a pair of huge canines in each jaw, which grow continuously, and, meeting at the tips, wear each other flat, the upper pair being slantingly bevelled off behind, and the lower in front. There are two pairs of incisors in each jaw, of which those in the upper jaw curve outwards, while the lower incisors project straight forwards in a very curious way, and look like thick sticks of ivory. These also have continuous growth.

The small eyes have a bulging appearance, and the features, if the expression may be permitted, are so arranged that the animal can have its nostrils, eyes, and ears all above water, while the rest of its body is submerged. The body generally is devoid of hair; but there are a few bristles on the muzzle and on the short tail. Not the least remarkable peculiarity of the Hippopotamus is that its sweat is red, and has much the appearance of blood. The young animal, as the illustration shows, is not so uniformly grey as its parents, and has a much more reasonably-sized face; there is only one at a birth, and when quite small it has the habit of riding on the back of its mother when in the water.

The bull Hippopotamus reaches a length of twelve feet, but only stands about five in height; the female is smaller. The young Hippo takes five years to grow up, and the animal's whole length of life is about thirty years, judging from the ages attained by animals bred in captivity.

The Hippopotamus is one of the characteristic beasts of Africa, having been originally distributed almost all over the river-systems of that continent south of the Sahara. It has long, however, disappeared from Lower Egypt, and has given way in other places to human persecution. In habits it is essentially aquatic, though its requirements are not exacting, as it is in many cases found on quite small streams, so long as they contain pools sufficiently large for it to shelter in. Although it can swim well enough, it is not, as the small size of its feet show, especially a swimming animal; its special accomplishment is sinking below the surface and walking along the bottom. It can remain under for more than five minutes, but cows carrying a young calf rise more frequently than others, for the benefit of the little one.

On land the Hippopotamus is much more active than its awkward shape would lead one to expect, and can gallop at a rate which would give a man small chance of escape. It also climbs steep places readily, and on occasions travels long distances overland from one pool or stream to another; often so many animals have followed the same path for such unnumbered generations that regular roads are formed. The food of the animal consists of marsh vegetation and grass; this it generally seeks by night, but is more ready to come abroad by day where it has not been persecuted. Its depredations on the crops of the natives are naturally very severe; for an animal whose stomach is eleven feet long needs a great deal of material to replenish it, while to the damage done by its appetite must be added the trampling down of much more by the creature's movements. At the same time, the great bulk and large food-requirements of the Hippopotamus must make it useful in clearing away the rank growth of aquatic plants which are constantly blocking up water-courses in Africa.

Hippopotami are gregarious animals, and almost always live in herds; but furious fights take place between rival males, whose wide mouths and terrible array of teeth enable them to bite with great power. Some individuals are extremely savage, and will attack any man or cattle they may find swimming in their haunts, and bite through canoes, and even larger craft such as river-steamers. In fact, the ferocity of the Hippopotamus, in addition to its raids on the crops, is a justification for its destruction when it comes into too close contact with humanity, though no excuse for its complete and wasteful extermination. When much hunted, it becomes very wary, and is difficult to shoot, so small a part of the head being exposed when it rises to breathe as to offer but a very small target for the rifle.

Natives capture it in various ways—by pitfalls, by harpoons, by weighted spears suspended in trees in connection with a cord which will be struck by the animal passing underneath, and by the cruel method of keeping herds in isolated pools till they are starved to death. The great value of the Hippopotamus to natives is its flesh, which is considered good even by Europeans, and the abundant supply of fat it gives, fat being always at a premium with the African negro, who has to subsist chiefly on vegetable food and the dry meat of wild game. The layer of fat immediately under the skin is especially prized, being very pure, and when salted is known at the Cape as "Zee-Koe speck,"—"Zee-Koe," or Lake-Cow, being the Boer name of the animal. The tusks of the Hippopotamus also yield ivory of good quality, and its skin, which is very thick—as much as two inches in places—makes the sjamboks, or hide whips, about which one hears so much. Walking canes can also be made of the hide; after the long quadrangular strips have been rounded down, they are soaked in oil, and then polished, so as to look rather like amber; they are quite as stiff as real cane of the same thickness.

Although the Romans exhibited the Hippopotamus in their shows in the arena, it was not for many centuries after the fall of their empire that the beast was again seen alive in Europe. At last, in 1850, the celebrated Obaysch, obtained as a quite young calf on the

Nile, was brought to the London Zoological Gardens, and, when a mate was obtained for him, bred there. Since then Hippopotami have been better known in menageries, and have bred elsewhere. They thrive well enough, but must be kept warm in winter, and either have constant access to a bath or be bathed by hand, or their skin will soon become disordered. It may be mentioned, in conclusion, that the Hippopotamus is supposed to be the "Behemoth" of Scripture, and that an extinct species, found fossil in India, was probably the "Water Elephant" of Sanscrit writers. At any rate, this semi-mythical beast, though represented on ancient Indian sculptures with an Elephant's head and fore-feet and Dolphin's hinder-parts, is there given teeth which are somewhat like those of a Hippopotamus, but utterly different from the Elephant's.

THE PIGMY HIPPOPOTAMUS

(*Hippopotamus liberiensis*)

THERE is only one other living species of Hippopotamus—the much smaller kind confined to the tropical parts of Western Africa. This is not bigger than a large Pig, and in its general form is like the young of the ordinary species, as it has not the huge muzzle of the large Hippopotamus. In colour also it is different, being of a greenish cast, shading into yellowish below, and it has only one pair of incisors in the lower jaw. The accounts, however, which represent it as being not so fully aquatic as the large kind, but more like a Pig in habits, seem not to be correct, for Sir Harry Johnston has recently stated, in his book on Liberia, that the small Hippopotamus is also a water-animal. But it is a little-known creature, and only one short-lived specimen has reached England.



INDIAN WILD BOAR

By Winifred Austen

THE INDIAN WILD BOAR

(*Sus cristatus*)

THERE is practically very little difference between the Wild Boar of India and that of Europe and Western Asia (*Sus scrofa*), but the Eastern animal deserves the honour of heading and illustrating this article, as the noblest representative of the porcine race, since he is unequalled in courage.

In size a large Indian Boar will reach or even exceed a yard at the shoulder, and the lower tusks will be about nine inches long, including the portion embedded in the jaw. The Boar's tusks are very curious as well as very formidable weapons; they are simply enlarged canine teeth, but have the peculiarity of growing continuously, and the upper pair turn outwards and upwards instead of growing downwards as upper canines usually do. The two pairs meet and work against each other in such a way that they wear each other to an edge, which much increases their efficacy as rippers. A Boar's tusks are most formidable when he is in his prime; as he becomes older, the lower pair get so long and curved that he cannot rip much with them; and though the increased length of the upper pair brings these into use, they are not so effective. So, though the old Boar is more crusty in his temper, he has less ability to gratify it. The skin of the beast's neck is very thick, which is a great protection against the tusks of his rivals.

In the Sow, which is smaller than the Boar, the tusks are quite short, so that she does not rip, but bites, which she can do to some purpose, for the typical Pigs have a very full and complete set of teeth.

The Indian Boar, although its coat is not so long and thick as that of the European species, is well covered with hair, which is of a brownish or grizzled black in adult animals, becoming greyer with age. The young Pigs are marked with longitudinal stripes of brown and buff, this being the usual pattern in the young of this family, just as

the white spots are in the coats of Deer fawns. In some localities brown Wild Swine have been observed, and there is a good deal of variation in size and form, the Boar of the rich lands of Bengal, where the feeding is good, being heavier in build than the Punjab Pig, which has to travel farther for his meals.

Wild Swine are widely spread through India, Ceylon, and Burma, in the hills and plains alike; they are fond of cover, and often make shelters for themselves by cutting quantities of grass, and then burrowing under the pile. Such shelters are used especially by Sows with litters, but also sometimes by old Boars, which generally live by themselves, while the Sows and young animals go in "sounders" or herds.

Wild Swine generally feed at night, and are practically omnivorous; they root like tame Pigs for their food, but much more energetically, and are terribly destructive to crops. They like frequenting marshy land, where they can dig up roots in the soft soil, and they will also root for those fish which in India bury themselves in mud when the water dries up in the hot season. Carrion occasionally forms part of their food, but they are not usually ranked as foul feeders. They gladly devour, of course, any wild fruit they can get.

Like their tame relatives, they are prolific animals, having several young in a litter, and breeding more than once a year. Many are killed by Tigers, Leopards, and no doubt other carnivora; but the Sow fiercely defends her litter, and the "grim grey Boar" is an adversary that even the Tiger prefers to leave alone as a rule. Should he venture on an attack, he stands an excellent chance of being fatally ripped before he can kill his victim,

The great courage of the Boar makes "Pig-sticking," as the pursuit of him is styled, with humorous modesty, in India, the finest and most manly of field sports. Several riders engage in it together, and for about a mile the pace is very great, for the Boar has a great turn of speed for a short burst, and is also an active jumper, easily clearing obstacles in awkward places where a Horse cannot get a good "take-off" owing to his size. If, however, he finds his pursuers are

overhauling him, he turns, with a savage grunt, and charges desperately. Then is the time to hold one's lance steady and not try to prod at him; but, with all precautions, the shaft will often be snapped or the spear wrenched from the rider's grasp, and the half-impaled Boar makes good his charge at a second foe; and this goes on till the gallant brute at length bites the dust. Horses often get cut, sometimes very badly, in these encounters, but the riders are seldom hurt by the Boar, as, if one happens to be thrown, there is generally some one else handy to divert the beast's attention, since all ride close up in the hope of getting "first spear." The chief danger lies in the very bad ground over which the chase has often to be pursued. The Arab Horse is found to be the safest mount, from his cleverness in getting over dangerous places at a high speed, and in dodging the Boar's attack, while his high courage makes him less afraid of the alarming brute than other Horses.

The Boar is more respected by his adversaries than any other beast of chase; as in the case of the Fox, he is not shot, except on ground where riding after him is impossible, and, moreover, his female relatives are allowed to go unscathed. Indian Wild Swine have done well in captivity in England, and bred for many years in the Royal Park at Windsor.

THE EUROPEAN WILD BOAR

(*Sus scrofa*)

In addition to his thicker coat, the European Boar has a less leggy build than the Indian variety, and has the last grinder in the lower jaw of smaller size and less complex structure, but the differences are barely of specific importance. This Swine is the Wild Boar so well known in literature; it occupies the region west of India, ranging over Europe generally and into North Africa: it inhabited Britain down to the time of the Civil Wars. It is still an esteemed beast of chase on the Continent, but is usually shot, not hunted; and its flesh is much

esteemed, especially for making the celebrated Westphalian hams. In general habits it is like the Indian Boar.

Our tame Pigs, which descended from one or both of these species, have run wild in Australia and New Zealand, and are as hairy and tusky, and nearly as savage, as true Wild Swine; but they still show marks of servitude in the concave profile, as they do not seem to revert to the straight face-line of the wild type.

THE PIGMY HOG

(*Sus salvanius*)

The Pigmy Hog, which is a little brown animal hardly larger than a Hare, and with a very short tail, inhabits the grass-jungle of the Terai or foot-hills of the Himalayas. Here it lives in herds, both sexes associating; but little is known of its habits, for it is seldom seen. The only specimen I ever saw alive was one recently exhibited at the London Zoological Gardens, but many years ago it bred there. This would be a very good animal for acclimatisation, as it is too small to be seriously destructive or dangerous, though fierce enough when in herds, and it provides the most delicious pork; moreover, it would probably give much sport when hunted with hounds.

THE RED RIVER-HOG

(*Sus porcus*)

This West African Pig deserves notice as the dandy of its family, for it has a sleek, bright chestnut coat, set off by black markings on the face, and its pointed ears are tufted like those of Lynxes. The young ones are striped like most other wild Pigs. It is a fierce animal when brought to bay, and seems to have a strong carnivorous tendency, as a tame specimen kept in West Africa made itself a nuisance by devouring fowls. It is usually to be seen in our Zoological Gardens.



BABIRUSA

By Louis A. Sargent

THE BABIRUSA

(*Babirusa alfurus*)

EVEN classical naturalists in ancient times had heard of a "Four-horned Hog," which was to be found in the far East, so that the reputation of this most remarkable of wild Swine was early widely diffused, though the animal itself has but a limited range, being confined to the islands of Celebes and Bouru in the East Indies.

The so-called horns were, of course, the tusks, which are certainly remarkable enough to give any animal a reputation. The lower canines are chiefly notable for their great length and curvature, being, indeed, when fully developed, too long and curved for the proper use of such teeth. The upper ones, however, as the illustration shows, grow directly upwards, and actually pierce the skin of the face, presenting an exaggeration of the condition found in the Wild Boar. Their development varies considerably, and in some cases they not only approach, but again pierce the skin of the head in curling downwards and forwards. These huge tusks are of pure ivory, having no enamel coating at all; they are confined to the Boar, the Sow having the canines quite small.

They certainly are not well designed for fighting, though the fact that in old animals they are usually found to be broken, shows that they are used in that way; and probably the suggestion of Dr. A. R. Wallace, that they are degenerate, over-developed organs, comparable to the overgrown teeth sometimes seen in Rabbits and Rats that have had the misfortune to lose one incisor, is the correct one. The other teeth of the Babirusa present the peculiarity of being less numerous than in the Wild Boar and its immediate allies, there being two upper incisors and four grinders wanting from the full Pig complement.

The Babirusa is one of the very few land animals which is prac-

tically naked. Its coarse, rough, wrinkled skin is only very thinly covered with small brown hairs, which are only noticeable on close inspection; there is, however, a scanty tuft on the end of the tail. The young, however, have rather more hair, which is black in hue.

The eyes are peculiar, as Dr. Graham Renshaw has pointed out, in having the iris nearly white, which gives the animal a very characteristic expression. It will be noticed that the general form is quite slender and elegant for a Pig, and the head unusually small, so that, taking the horn-like upper tusks also into consideration, it is not so surprising that the name of the animal means in the Malay language "Pig-Deer."

The Babirusa is found in forests, usually singly, for it is not a very sociable animal. Like so many naked beasts, it is very fond of a bath, though wallowing is a taste common to many of the Pig family. It is a fierce brute, and fights bravely when brought to bay. Guillemard, in "The Cruise of the Marchesa," mentions an instance in which an infuriated Babirusa actually started to run up a sloping tree-trunk in pursuit of a native who had climbed the tree to get out of his way, thus confirming a rather incredible-sounding native story that this Pig would ascend suitable trees. Tree-climbing is certainly a very abnormal performance for a cloven-hoofed animal; but among the Goats the Markhor has been known to climb, and so will even the common Goat —always, of course, if the tree is suitably sloped and branched. It is just possible that it is in this way that the old story arose which credited the Babirusa with hanging himself up at night by his curved tusks: possibly some unfortunate specimen had involuntarily committed suicide by getting up on a branch, and, falling, hitching his tusks on another, and the assumption was thence made that the position was voluntarily selected.

For a Pig, the Babirusa is not at all prolific; it has only two young at a time, and these remain for a day or two in a hole lined with leaves, wherein they are deposited at birth. They soon, however, follow the mother about.

This curious Pig thrives well in captivity, but is not a very common animal in menageries; it has produced young in our Zoological

Gardens, and bears our winters in an outdoor sty, in spite of its lack of a hairy coat.

THE WART-HOG

(*Phacochœrus æthiopicus*)

The Wart-Hog, or Vlack-Vark, has long been known as a menagerie exhibit under the unflattering title of "the ugliest animal in creation"; and it must be admitted that there is considerable justification for the description. About the size of a Wild Boar, the Wart-Hog is remarkable for the great breadth of its head and muzzle, which are further disfigured by the characteristic warts—a pair of small ones just below the eyes, and two much larger protuberances on the snout. The body is nearly naked, except for the tuft at the tip of the tail and a mane of long, laxly-drooping bristles down the neck and back. The tusks are very characteristic: the upper and lower canines both follow the same outward curve, and the former, unlike what obtains in the Wild Boar, are much the larger and more conspicuous. They may attain even to a length of a foot outside the gum in a fine Boar, and even in a Sow may be four or more inches, for the female Wart-Hog, unlike the female of other wild Swine, has quite large and conspicuous weapons. The young are not striped like those of the more typical wild Pigs; there are only four at a litter, and the mother has but four teats accordingly. The Wart-Hog has a wide range through Africa south of the Sahara, and at least two local races are recognised, the Wart-Hog of the north-east being considered by some a distinct species from the southern type; but the differences are hardly of specific importance.

Wart-Hogs go in small parties as a rule; they do not care so much for soft ground and forest country as most Pigs, but rather affect dry country and scrub. They are not, however, averse to wallowing. Their usual food consists of roots, for which they seek at night. One of their most marked habits is their tendency to "go to ground," for they much appreciate the shelter of the large earths constructed by the

Aard-Varks (*Orycteropus*). These they prudently enter backwards, so as to get out easily and present the front to an invading foe. When galloping they have a very grotesque appearance, not only on account of their general ugliness, but because of the finishing touch given by the erection of the tail, whose tasselled tip droops forward. When driven to bay they fight fiercely, but are not so savage and dangerous as the true Wild Boars and Bush-Pigs. The pork is very good and tender when the animal is in good condition.

THE FOREST-HOG

(*Hylochœrus meinerzhageni*)

This Pig, the giant of the family, has only been recently discovered, which is not surprising, as it inhabits the little-known forest region of Equatorial Africa. It is of large size—even the sow, judging from the mounted specimen in the South Kensington Museum, being as big as an ordinary Wild Boar, and provided with almost equally formidable tusks, so that her mate would be a monster indeed, worthy to personate the Calydonian and Erymanthian Boars of the classical Greek legends.

In structure this Pig comes between the typical Pigs and the Wart-Hogs; its coat is black, and very thin, so that the skin appears through it as in most of our tame Pigs.



COLLARED PECCARIES

By Louis A. Sargent

THE COLLARED PECCARY

(*Dicotyles tajaçu*)

THE true Pigs (*Suidæ*) are purely Old-World animals except where man has introduced his domestic Swine artificially; but America has Pigs of her own in the shape of the two species of Peccary, which are sufficiently distinct to be classed in a separate family (*Dicotylidæ*). Of these the Collared Peccary is the better known, and is the only one found in North America, where it ranges as far north as Arkansas, being really a southern animal, as it is chiefly found in the northern part of South America.

It is a rather small animal for one of the Pig tribe, not reaching quite a yard in length, and it presents some remarkable differences from the true Pigs in the matter of its teeth and toes. The upper canines point downwards as in most animals, and the lower ones do not project outwards; thus those teeth have a quite ordinary appearance, not appearing outside the lips, and cannot be used in ripping. They are, however, large for the size of the animal, which can give a most severe bite. In the upper jaw there are only four incisors, whereas the Wild Boar has six in each jaw.

In the feet it will be noticed that the outer back toe of the hind-foot is missing, so that the fore-feet are even-toed, having the usual two large hoofs and two small ones of the Pigs, and the hind-feet asymmetrical. The stomach is different from that of the Old-World Pigs, not consisting of a single cavity only, but of three, thus approaching to the ruminant type. The tail is remarkably short—a mere rudiment, in fact. The coat of the Collared Peccary is very full, forming a mane or crest down the head and back, and is composed of bristles so coarse that they look like miniature Porcupine-quills, especially as they are similarly ringed with alternate black and white bands.

On the hinder part of the back is a gland secreting a very evil-smelling fluid; gentle titillation of the gland appears to please the Peccary, and the pair at the Zoological Gardens may be occasionally seen standing head to tail and rubbing each other's back with their cheeks, no doubt to procure this gratifying sensation.

The female Peccary, which closely resembles the male, has only two teats, not a large number like the common sow, and in accordance with this she only brings forth one or at most two little Peccaries at a birth. These young Peccaries are not striped like the young of most typical Pigs, nor do they possess the cream-coloured neck-stripes or "collar" of the adults. In fact, their colour is altogether different, being a plain light-brown with a black stripe down the centre of the back.

The Peccary is a sociable, active, and very courageous animal. Like the Swine tribe generally, it lives in cover, and will eat practically anything; but it is not so fond of water as most of them, being able to do without a drink when it can get access to such succulent food as the prickly pear, and seldom resorting to it to bathe. Being a small-footed animal, too, it cannot swim so fast as Pigs generally do. It is also not very fast on foot for more than a short distance, and after a run of a few hundred yards it will turn and face Dog, Horse, or man, bristling its long hair and champing its teeth with the greatest fury, and will then fight to the death. Occasionally it will attack man unprovoked, but naturally such instances are the less likely to occur where the animals have been a good deal hunted and have learnt caution, as in the United States, where the animals have never been found but quite in the south-west corner, and are now nearly extinct. The danger in a conflict with Peccaries lies especially in the fact that there are generally a number to contend with, as the animal usually goes in herds, sometimes numbering as many as thirty animals, and from such a mob there is little chance of escape, unless a tree be at hand which can be climbed.

Even the Jaguar, one of the chief natural enemies of these plucky little Pigs, has to be very careful how he picks off a straggler, for if

he has not a line of retreat planned out, he is likely to be torn in pieces by the infuriated friends of his victim. The Harpy Eagle also attacks these animals, but presumably only the young, as he could certainly not carry off an adult.

One peculiarity about the habits of the Peccary is its fondness for a sheltered home, in which it agrees with the Wart-Hog of the Old World. What a band of Peccaries particularly like is a hollow fallen tree, in which they ensconce themselves one by one, going in stern first. The one nearest the entrance of course keeps guard, and the whole number may thus be killed off with little risk, each, as his comrade in front is shot, coming forward to take his place.

Peccaries are hunted by men for their flesh, which is of good flavour, more gamy than, and not so fat and cloying as, ordinary pork; but it is important to cut out the scent-gland on the back as soon as possible after the beast has been killed, or the flesh will be so tainted as to be unfit for food. The hides are also of some value, and it is to obtain these that the animal has been so largely killed down in Texas.

In captivity these Peccaries thrive as well as other Pigs, and, as any one can see at the London Zoological Gardens, where they have bred, will bear our climate well with ordinary pig-sty accommodation.

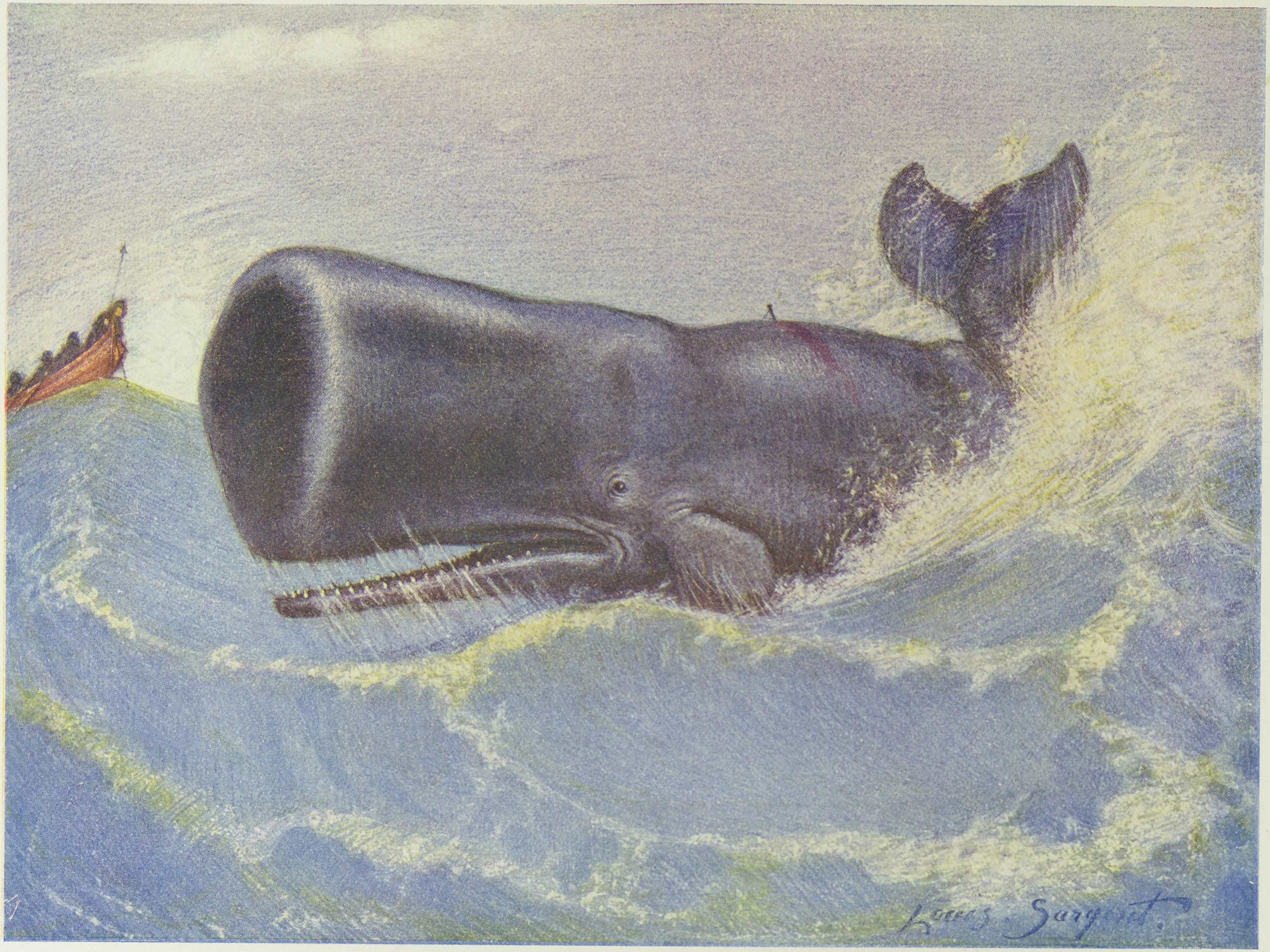
THE WHITE-LIPPED PECCARY

(*Dicotyles labiatus*)

The White-lipped Peccary, or Warree, is similar to its better-known relatives in all essential respects, but is a slightly larger animal, with the tail a little longer. There is also a considerable difference in colouration, the Warree not having any collar, while, as implied by its English name, its lips are white, as are also the throat and chest.

This species of Peccary is found, like the common kind, in northern South America, and it extends into Central America, but not farther north.

In general habits and attributes it closely resembles its relative, as might be expected, but it is very much more fierce and aggressive. It has, indeed, been suggested that this is due to the fact that it usually associates in much larger herds, so that it is more conscious of strong support, but it is probable that there really is some difference of disposition in any case. At any rate, there was once a specimen of the White-Lipped Peccary in the Calcutta Zoological Garden which had a very adventurous career and showed a very unpleasant character. It at first lived in friendship with a Malayan Tapir, but ultimately seriously injured its large companion; it was then associated with a Rhinoceros, but was soon apparently bored by the monster's company and jumped over a three-foot wall into the next paddock. Here its companions were a pair of Spotted Deer (*Cervus axis*), which were quite ready to be civil, but were often annoyed by their uninvited guest. This state of things went on for nearly two years, when a nip on the nose so provoked the buck that he fatally gored the peccant Peccary and terminated its variegated career. This species, although not so common in captivity as the other, has yet been exhibited at the London Zoological Gardens, and has produced hybrids with it. Peccaries, however, will not interbreed with ordinary Pigs.



SPERM WHALE

By Louis A. Sargent

THE SPERM-WHALE

(*Physeter macrocephalus*)

Both on account of the value of its products, and of the terrible revenge it sometimes takes on its assailants, the Sperm-Whale, if not absolutely the largest, is the most noteworthy of the beasts of the sea. In these days of popular education, it is hardly necessary to remind readers of this book that the Sperm-Whale *is* a beast, and not a fish, though the latter term is commonly applied to the members of the order *Cetacea*, to which all the Whales and other similar animals belong.

Under the skin of its fins are the bones of a beast's fore-paw, and it breathes the air just like a land animal; hence the tail-fin is horizontal, to aid rising in the water. The "blow-hole," however, is not situated on the top of the head, as in other Cetaceans, but at the end of the huge muzzle, in a position more in accordance with that of the nostrils of other beasts, to which it corresponds. It is, however, but a single orifice, as in other toothed Whales, whereas the "blow-hole" in the Whalebone Whales is a double orifice, like the nostrils of beasts in general.

In the form of its massive head the Sperm-Whale differs from all other Cetaceans. Seen "end on," the muzzle is widest in the middle, and tapers above, and much more below; its great bulk is mostly made up of a collection of cells containing oil laden with the characteristic product of spermaceti, and underneath this a mass of fat, the outline of the actual skull being quite different, as it is beaked much like that of an ordinary Porpoise. The lower jaw is also peculiar, being very long and narrow; it is well provided with large conical teeth, set well apart, and without enamel covering. Their number varies remarkably, from twenty to twenty-five on each side; while it is quite common for the two sides of the jaw not to match in this respect. In old males

they are particularly massive, but short. These teeth are received into holes in the upper jaw, which is only provided with about eight teeth barely appearing above the gum.

The eyes are small, and there are no external ears, while the ear orifice, about a foot behind the eye, is only big enough to admit the tip of a finger.

The tongue is very short and small for the size of the animal, and cannot be protruded: the inside of the mouth is conspicuously white, contrasting with the general black colour of the hide. This is occasionally, however, marked with white, especially about the hinder-parts. As is usual in Cetaceans, it is hairless; but this species differs from the Whalebone Whales in the cleanness of its skin, which in many of the others is apt to be encrusted with barnacles or other parasites.

The adult bull Sperm-Whale is an enormous brute, at least twenty yards long, but the "cows" are not more than half his size. They go in herds or "schools," which may number as many as fifty, and are commonly accompanied by one old bull; younger bulls go in smaller schools by themselves. Sometimes several schools will unite into one great herd; and single individuals may be found, which are usually old bulls.

The Sperm-Whale, or Cachalot, as it is sometimes called, is remarkable for its wide distribution, even among the ocean animals, which, naturally enough, often range more widely than any of the beasts of the land. Except in the Arctic and Antarctic waters, it is to be found practically everywhere, though most especially in the southern seas; and, unlike most Whales, is generally met with in warm waters. Now and then individuals occur on the British coasts, either alive or as stranded carcases, and these are always old bulls, which no doubt have been driven from the herd and were leading a wandering life. As a general rule, however, this is an animal of the deep sea, and avoids even the neighbourhood of land, so that it is not to be expected in our narrow waters. It can be recognised at sea by its "spout," which is discharged in a single jet diagonally forward, not in

a double upright jet as in the Whalebone Whales; this spout is composed of steam or vapour from the exhaled breath. A large bull Whale will remain below water an hour without rising to breathe, but when up he will "blow" many times in succession, at intervals of ten seconds or so, before diving again. Smaller specimens do not stay below so long.

When travelling quietly, the Sperm-Whale only shows the top of its head and back above water, but when going at speed, it travels "head out," as the Whalers say, its huge head appearing at each vigorous stroke of the tail-flukes, and then disappearing again. In spite of its unwieldy shape and huge size, it can spring clear of the water like a Salmon, descending with a tremendous splash. Its food consists of Cuttle-fish or Octopuses, often of enormous size; in fact, the earliest proof of the existence of gigantic species of this class of animals was afforded by the vomiting of huge fragments of their tentacles by Sperm-Whales when wounded and dying. It will also feed on true fish, though it is a puzzle how so clumsy a creature catches these; it is thought that the white lining of its mouth, when displayed below water, acts as an attraction to smaller marine creatures.

The baby Cachalot is about five yards long; usually there is but a single one, as is generally the case with the *Cetacea*, but twins are occasionally produced. It is active at once, and is suckled by the cow when lying on her side, taking the teat in the corner of its mouth. It may be born at any time of the year. Unlike some of the Whalebone Whales, the cow Cachalot shows but little maternal devotion, and will often desert her young when hunted. Generally speaking, indeed, this huge animal is harmless and timid, but there are many exceptions, and no creature is so terrible in its fury as the fighting Cachalot. Such an animal will not only crush a boat with powerful blows of its tail, but will ram it with its head, or even bite it in two, to accomplish which feat it rolls over on its back, so as to bring the formidably-armed under-jaw uppermost. Savage bulls will even charge a ship, and as several have actually been sunk by such animals, their

crews escaping in the boats, there is reason to believe that many a vessel whose fate is unknown may have come to this end.

This also accounts for the belief in the ferocity of Whales which is expressed by classical writers; no doubt in ancient times Cachalots were more common and dangerous. Nowadays, this animal has been so much hunted for its valuable oil and spermaceti, that it has been much reduced in numbers, and the fishery has declined. In addition to the above products, the Sperm-Whale is the source of ambergris, a soapy substance with a powerful scent, which is used in perfumery, and is very valuable. It is a concretion formed in the intestines of sickly individuals, and is sometimes found floating in the sea.

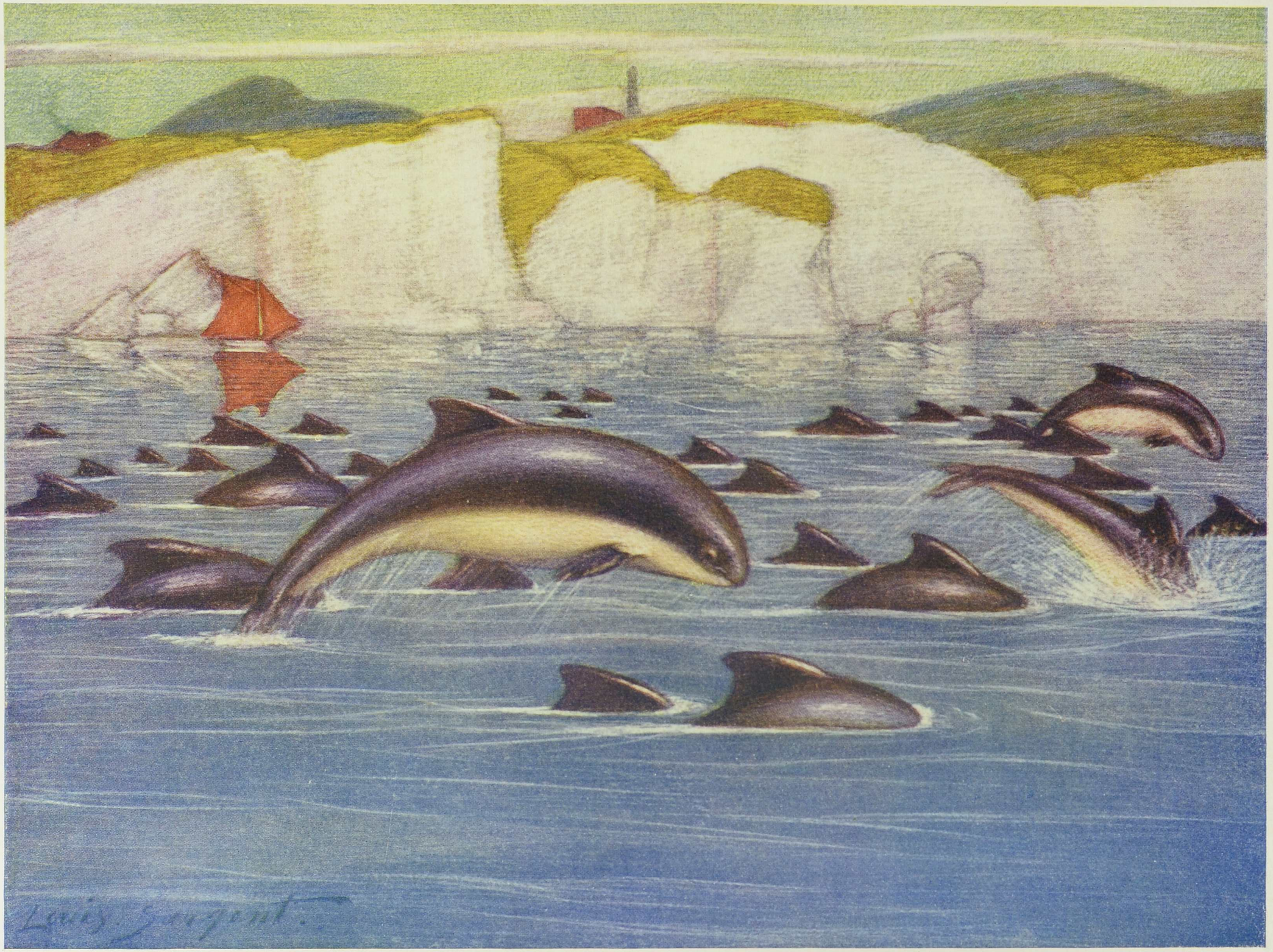
THE PIGMY SPERM-WHALE

(*Cogia breviceps*)

This Cachalot bears somewhat the same relation to the large species as the Pigmy Hippopotamus does to the ordinary kind; it looks more like a large Porpoise than anything else, having a back-fin and an ordinary-looking Porpoise-like head—except that the mouth is situated some distance below the end of the snout—and being only about ten feet long. It is confined to the Southern Seas.

THE BEAKED WHALES

These Whales belong to the same family (*Physeteridæ*) as the two Sperm-Whales, and are characterised by their pointed muzzles, and by only having a single pair of teeth, situated in the lower jaw. Unlike the large Cachalots, they have a small back-fin. Some species or other of this group is to be found in all seas, but several of them are exceedingly rare. The best known is the Bottle-nose (*Hyperoodon rostratus*) of the North Atlantic, which is hunted for its oil and spermaceti. It is about thirty feet long, black when young, and light brown when old.



PORPOISES
By Louis A. Sargent

THE PORPOISE

(*Phocæna communis*)

The Porpoise is far the most familiar Cetacean to British eyes, as it is a common animal round our coasts; it is also a fair average sample of the Dolphin family (*Delphinidæ*) to which it belongs—which family includes about half of the whole Cetacean order, numbering some three dozen species.

The most noteworthy peculiarity differentiating the Porpoise from its allies is the form of the teeth, which are heart- or spade-shaped rather than conical and pointed, as in most Dolphins. They are very small, and, as in this group generally, exceedingly numerous, and at the same time variable in number, twenty-five or twenty-six on each side of each jaw. As in all existing Cetaceans, they show no distinction into incisors, canines, and grinders. Their only use is to hold the fish on which the creature feeds, which are bolted whole; the stomach is complicated, consisting of three compartments, of which the first is much the largest, as in the stomach of the ruminants. This kind of stomach is characteristic of the *Cetacea*, and it has even been suggested that they chew the cud; but no one has ever seen them do so, and their teeth and jaws are never suitable for such an action.

It will be noticed that the Porpoise has a back-fin, which, it may be mentioned, is different in structure from that of a fish, not being supported by rays or spines, and the same applies to the tail-fin. Porpoises vary a good deal in size, measuring from four to a little over six feet; their colour also shows some variation in the extent of the black and white, and a creamy-white Porpoise, with the fins on the back and tail edged with black, has been seen upon one occasion.

The Porpoise is essentially a coast animal, often coming close inshore, and not found in the open ocean; often, indeed, it ascends rivers,

and has been seen as high up the Thames as Chiswick. It has a wide distribution, being found both in the Atlantic and the Pacific, but only frequents their northern portions, and is rare in the Mediterranean.

The fish it selects as food are those of moderate size, such as Mackerel and Herrings, whence the name "Herring-Hog," sometimes applied to it; its name "Porpoise," by the way, is supposed to mean "Hog-fish." It is a sociable creature, usually seen in parties, and is lively in its actions, frequently jumping out of the water as depicted in the illustration. A very common belief credits these gambols with being an indication of bad weather. The female produces a single young one.

The Porpoise does no harm to man except when it gets caught in a fishing-net, which it damages by its powerful struggles for freedom; nor is it nowadays much utilised, for most of the "Porpoise-hide" boot-laces are really made from the skin of the Beluga or White Whale. Our ancestors, however, thought highly of the Porpoise as a table delicacy; it had the great advantage of being legitimate food for Fridays, being reckoned canonically as a fish, and was served up roasted, with a sauce made of white bread-crumbs, sugar, and vinegar. It must have been the Porpoise that Tom Hood was thinking of in "Miss Kilmansegg" when he said of Queen Elizabeth that she

> "Broke her fast upon ale and beef
> Instead of toast and the Chinese leaf,
> And, in place of Anchovy, Grampus."

Porpoises have been successfully kept in captivity at the Brighton Aquarium, and one short-lived individual was exhibited at the London Zoological Gardens, the only Cetacean which has ever graced the collection. There are only about three species of true Porpoises, the others being the Prickly-finned Porpoise (*Phocæna spinipinnis*) of South American waters, which is black all over, with fewer teeth than our species, and short spines on the short back-fin and the back itself, and the little Eastern Porpoise (*P. phocænoides*), ranging from the Cape east to Japan, which is only about four feet long, and has no back-fin at

all. The name "Porpoise" is, however, commonly given by sailors to all Cetaceans which are too small to be dignified with the title of "Whales," such as the various Dolphins.

THE COMMON DOLPHIN

(*Delphinus delphis*)

This celebrated animal is nearly related to the Porpoise, but is much larger, measuring from five to eight feet; it is also more elegantly formed, being a perfect model of symmetry, with the jaws prolonged into a narrow beak-like muzzle clearly marked off from the forehead. The sharp conical teeth are very numerous, being from forty-six to fifty on a side. In colour the Dolphin is lighter than the Porpoise, and has a grey or buff shading between the dark hue of the back and the white of the belly. It is the common Cetacean of the Mediterranean, and also inhabits the Atlantic, though it is a more southerly animal than the Porpoise, seldom occurring as far north as Scotland, though sometimes to be found in the Channel. It appears possible that it ranges even into the southern oceans, but there is some doubt as to the exact species in this case. The Dolphin is not a coast-loving animal like the Porpoise, but keeps more to the open sea, where it is found in schools. Like the Porpoise, it feeds on fish.

Lively as the Porpoise is, it cannot be compared with the Dolphin, which is perhaps the jolliest beast alive. When the school catch sight of a ship, they hasten towards it in single file, jumping out of the water in sheer exuberance of spirits; coming alongside, they range up to the bows, and there play all sorts of antics, seeming delighted to find something with which they can have a race. So wonderful are their swimming powers, that they have no trouble, not only in keeping up with a great liner, but in indulging in the most beautiful feats of fancy swimming in the meantime. Thus, I have seen them jump out of the water, and turn on their backs in the air right in front of the ship's stem, heedless of the risk they were running. The stroke of

the tail must give them an enormous impetus, or be given so rapidly that it escapes the sight; for, watch as I might, I could never catch sight of it. The beautiful creatures slid through the water apparently motionless, for all the world as if they were moved by will-power alone, like Hiawatha's canoe.

It seems a shame to countenance the taking of such happy lives; but as the supply of fresh meat is sometimes a matter of importance at sea, it must be mentioned here that the flesh of the Dolphin is quite good eating, even to a landsman, according to Mr. Frank Bullen. Here it should also be said that the "Dolphin" of sailors is really a fish (*Coryphæna hippurus*), and it is this creature which changes its colours while dying.

Being so well known in the Mediterranean, the Common Dolphin was, of course, familiar to the ancients, who told wonderful stories of its intelligence and its friendliness to man; it was even credited with the philanthropic habit of rescuing drowning people by carrying them ashore on its back. At any rate, in the present day, some species of Dolphin helps the Moreton Bay natives in their fishing by driving the fish inshore to them.

Dolphins more or less nearly allied to this species are found in all seas, and even in some great rivers, and three kinds visit our coasts—the White-beaked Dolphin (*Lagenorhynchus albirostris*), distinguished by its white muzzle; the White-sided Dolphin (*L. acutus*), with a white and buff stripe along its flanks; and the Bottle-nosed Dolphin (*Tursiops tursio*), with a peculiarly swollen muzzle, which last kind reaches ten feet in total length.



GRAMPUSES
By Louis A. Sargent

THE GRAMPUS

(*Orca gladiator*)

This fierce member of the Dolphin family, the deadly foe of the rest of its kin, is in form very like a huge Porpoise; it is the largest of the Dolphin group, and is often alluded to as a "Whale," for it reaches ten yards in length. Its teeth are large and powerful, but not very numerous for an animal of this family, numbering from ten to thirteen on each side of the jaws. The high back-fin is a characteristic point of this creature; it is sometimes so tall and thin that it droops over at the tip. The Killer, as the Grampus is perhaps more usually called, varies not only in the length of this fin, but also in colour, the light markings differing much in tint and extent. If all the varieties can be regarded as forms of one species, the Killer may be said to be found in all seas; it often visits our coasts, and sometimes comes up the rivers—on one occasion a party of three ventured up the Thames nearly to Battersea Bridge, and apparently had the luck to get back safely to sea again.

In the ordinary way, however, the Grampus haunts the open sea, over which it ranges in packs, seeking what it may devour. It is, indeed, a sort of Sea-Wolf, though to liken it to the Wolf gives no idea of its courage and ferocity—it is rather to be compared to the Dhole or Red Dog. Like that animal, it disdains carrion, preferring fresh meat, and that usually of its own killing. It is the only Cetacean which habitually feeds on other beasts, and it is the worst foe of Porpoises, Dolphins, and Seals, which it bolts whole after shaking and crunching their luckless carcases. So much do the Seal tribe fear it that they will rush on the ice, even close to a man, to escape its attacks. Often they fall victims even when they have taken shelter on a floe, for the relentless Killer bears down the piece of ice till the victim is tilted into the water and his ready jaws.

The ferocity of the Grampus is equalled by its storage capacity; one has been found to have devoured no less than thirteen Porpoises and fourteen Seals. Even the great powerful males of the Sea-Lions, for all their courage, dare not face this terror of the sea, but hastily make for the shore and "haul up" when his pointed back-fin appears in their vicinity; and, though he dares not attack the old Walrus, he hankers after its cub, and sometimes obtains the little animal by his cunning. In vain the mother carries it on her back, for the foe butts her so violently from below that it is shaken off; but the Killer, in attempting this manœuvre, sometimes loses his life at the tusks of the infuriated parent.

The ferocity of the Grampus is best shown, however, in his attacks on Whales—that is to say, on the Whalebone Whales, for the Sperm-Whale is too much even for him.

The wretched Leviathan, when attacked by these Sea-Hounds, vainly lashes the water with his huge tail flukes and flippers; the savage pack bound into the air and descend with resounding smacks upon his back; they fasten like Bull-Dogs on his huge lips and drag his mouth open, tearing at and devouring his tongue. Ultimately the poor baited giant succumbs to exhaustion and loss of blood, and the ravenous pack glut themselves on his flesh. Although they cannot kill the Sperm-Whale for themselves, they will gladly feed on his carcase when he has been killed by the Whalers, and they also vary or make up their diet with fish.

With all their ferocity, they do not attack man, although displaying practically no fear of him—another curious analogy with the Dhole and the African Hunting-Dog. It would seem that human flesh is distasteful to these boldest of the carnivorous beasts.

Indeed, off the Australian coast the Killers are actually in partnership with the Whalers, helping in the attack on the Whales, and taking their fill of flesh as payment.

In the ordinary way, however, these creatures are naturally regarded as a great nuisance and hindrance to the Whaling industry, as they frighten away the game.

RISSO'S DOLPHIN

(*Grampus griseus*)

THIS peculiar Dolphin reaches thirteen feet in length, and in form is much like a large Porpoise, with a swollen forehead and long pointed curved flippers. Its teeth are confined to the lower jaw, and are only few in number, three to seven on each side. Its colour is very peculiar—grey, with the belly white and the fins black; but it varies a great deal, being sometimes black above. A characteristic point is the number of pale streaks and spots scattered all over the body. Risso's Grampus, as the creature is sometimes called, is very different in habits from the true Grampus, being harmless in disposition and depending on Cuttle-fish for its food. It is a gregarious animal, and found nearly in all seas, though rarely taken. In a few cases it has been found on our coasts.

THE BLACKFISH

(*Globicephalus melas*)

THE Blackfish, well known in our northern islands as the "Ca'ing Whale," is a Porpoise-like creature, with a bulging forehead surmounting a short snout; it is black nearly all over, but has a white patch on the throat continued downwards as a long streak. It is a large animal for a Dolphin, reaching twenty feet in length, and has ten teeth on each side of the jaws.

This Whale is found in all seas, and is, as above remarked, well known in the north of our islands, though rare in the south. "Blackfish" is the Whalers' name for it in Australasian waters. It is the species called "Ca'ing" (driving) Whale in the Shetlands, and "Grindhval" in the Faroes; and the inhabitants of these groups find it a most convenient creature. This is because it goes in very large herds, which follow their leader as blindly as Sheep, and it is also inclined

to enter the "voes" or inlets of the sea. When a shoal is seen about such a place, every one who can turns out, and boats put out and try to get behind the Whales and drive the whole school up the voe into shallow water. This they can easily do unless the leader breaks away; and if they succeed, there follows a massacre of the unfortunate Blackfish with any available weapon, women as well as men taking their share in the work. Such a capture is a windfall indeed to the islanders, for each Whale is reckoned to be worth more than three pounds, yielding a barrel of oil and a good supply of meat.

THE BELUGA

(*Delphinapterus leucas*)

The Beluga, or White Whale, which is the only close ally of the Narhwal, next to be noticed, much resembles the female of that animal in form, having no back-fin and a comparatively small head. It has not the Narhwal's tusk, however, but possesses a set of ordinary teeth; but these are not large, and there are only eight or ten on each side of the jaws. In length this animal reaches four yards or more. The colour is pure white in fully adult individuals, but younger ones are mottled, and the youngest specimens are grey. The White Whale feeds on fish and Cuttles; it is one of the characteristic Arctic animals found everywhere in the high North, but it sometimes strays southwards, and several individuals have occurred on our own coasts. This is one of the very few Cetaceans which have been kept in captivity; a pair were once exhibited for a short time at the Brighton Aquarium, and one which was kept in America got so tame that it would come up to be harnessed, and carry people round its tank on its back.



NARWHALS
By Louis A. Sargent

THE NARHWAL

(*Monodon monoceros*)

THE Sea-Unicorn, as the Narhwal is often appropriately called, is one of the most remarkable beasts in the world, and quite unique in its dental arrangements. It has only two teeth in its head, and in the case of the female neither is of any use, as they remain short and embedded in the gum. In the male the left tooth grows into the long tusk—often miscalled a horn—which in length about equals half that of the animal's body. The right tooth generally remains aborted, as in the female, but in very rare cases both grow into long tusks, as may be seen by a skull in the South Kensington Museum. In one case also a female with a well-developed tusk, though not so long as in a male, has been recorded, no doubt an analogous case to the occasional development of horns in female Deer.

The tusk is hollow for a great part of its length, and the spiral grooving of the surface is purely superficial, and does not indicate a twisted structure. In length this huge tooth may measure as much as seven feet, the beast itself being about fourteen. The newly-born Narhwal has a few irregular rudimentary teeth, which soon disappear; in colour it is much darker than the adult, for this creature gradually whitens with age, and old ones are more white than grey.

The Narhwal is a purely and characteristically Arctic animal, found all round the world in the vicinity of the eternal ice; it very rarely leaves the Polar regions, and only three specimens have ever reached our coasts. In its native haunts it has been observed to be a swift swimmer, and of a sociable and playful disposition, males often indulging in fencing-bouts with their tusks; no doubt they also engage in serious combats for the females, since the most obvious purpose of the tusk is to serve as a weapon. It certainly appears not to be used to procure the food, which consists mostly of Cuttle-fish and, among

true fish, of the various flat-fishes. The animal's mouth is not only practically toothless, but small, and it is a puzzle when it is found to have swallowed, in sections, a Skate larger than the diameter of the mouth, unless it had picked this up in fragments, some other animal having done the biting. That the tusk is put to some use appears from the fact that the point is always clean, the base being encrusted with a greasy substance.

Little, however, is known about the habits of this strange creature, though its "horn" has been a familiar curiosity for many centuries, and was that assigned to the Unicorn of fable; it still has some value.

THE WHALEBONE WHALES

The Narhwal is the most nearly toothless of the Dolphins, though not so quite short of teeth as the Beaked Whales; but there is an important section of the Cetaceans which have no teeth at all—the *Mystacoceti*, or Whalebone Whales. The Whalebone, or "baleen," which takes the place of teeth, hangs from the sides of the upper jaw in long parallel slips, whose inside edges fray out like hairs; it is, in spite of its name, a horny, not a bony substance. The use of the ranges of baleen plates is to strain off the water when these Whales feed; they all have very large mouths, though their throats are narrow, and feed on sea-animals which swim in shoals, gulping in great mouthfuls of the life-laden brine, and then letting the water drain off at the sides of the mouth, leaving the hapless victims stranded on the great tongue. A humble miniature repetition of this performance may be seen in the Common Duck's way of feeding, and in the wild Shoveller Duck (*Spatula clypeata*), the straining plates of the bill are, as Darwin has pointed out in one of the most interesting sections of his great work, a very fair reproduction of whalebone on a small scale, various other Ducks showing graduating approaches to the Shoveller's perfected arrangement.

THE RIGHT WHALES

THE great Right Whales (*Balænidæ*), which have no back-fin and possess the longest whalebone, are those which have been most ardently pursued by Whalers, especially as they are neither swift nor fierce, and so not so very hard to kill. There are only two species, the celebrated Greenland Whale (*Balæna mysticetus*), a purely Arctic animal, which is white on the lower jaw and at the base of the tail, and has the longest whalebone of any; and the Biscay Right Whale (*B. australis*), widely spread over the world's seas, which is all black, with smaller head and shorter "bone." Both of these, beginning with the last, have been so mercilessly hunted that it hardly pays to trouble about going after them nowadays. The Biscay Whale has occasionally been found on our coasts, but the other apparently never, though it is much more familiar by name, owing to the extensive use formerly made of its whalebone.

Both of these Whales measure about twenty yards; but there is also a Dwarf Right Whale (*Neobalæna marginata*), which only measures about as many feet; it has long whalebone, but also a small back-fin, and is a rare animal, only known from Australasian waters.

THE RORQUALS

MOST of the Whalebone Whales belong to the family *Balænopteridæ*, and of these the Rorquals or Finners (*Balænoptera*) are by far the best known, all of the four kinds, which seem to be spread over all seas, occurring more or less frequently on our own coasts.

Finners, as their name implies, have a back-fin, which is small and set far back, much nearer to the tail than to the snout. Their shape is long and narrow, and their throats are pleated or thrown into many folds, and will expand like a Pelican's pouch. Their whalebone is short and coarse, and, from their great speed and the fierce temper they sometimes display, they used to be thought too dangerous and unprofitable to be worth hunting; now, however, what with the scarcity of better Whales, and the facilities afforded by steam-whalers and harpoon-guns, &c., they are successfully attacked and made to contribute their quota to the world's needs.

The commonest, with us at any rate, is the Common Rorqual (*B. musculus*), which measures about twenty yards, and is slate above and white below, with black whalebone. Then there are the Blue Whale (*B. sibbaldii*), the hugest animal in existence, which grows to thirty yards, and is blue-slate all over, also with black whalebone, and Rudolphi's Rorqual (*B. borealis*), which is slaty-black spotted with white above, and white below, with white tips to the black whalebone. This is about fifteen yards long, but is not so small as the fourth species, the Pike-Whale (*B. rostrata*), black above and white below, with a white band across the flipper, and pale-coloured whalebone. This is only about ten yards long, but is a great fish-eater, like the Common Rorqual, the idea that all Whalebone Whales feed on minute creatures not being quite correct.

THE HUMPBACK

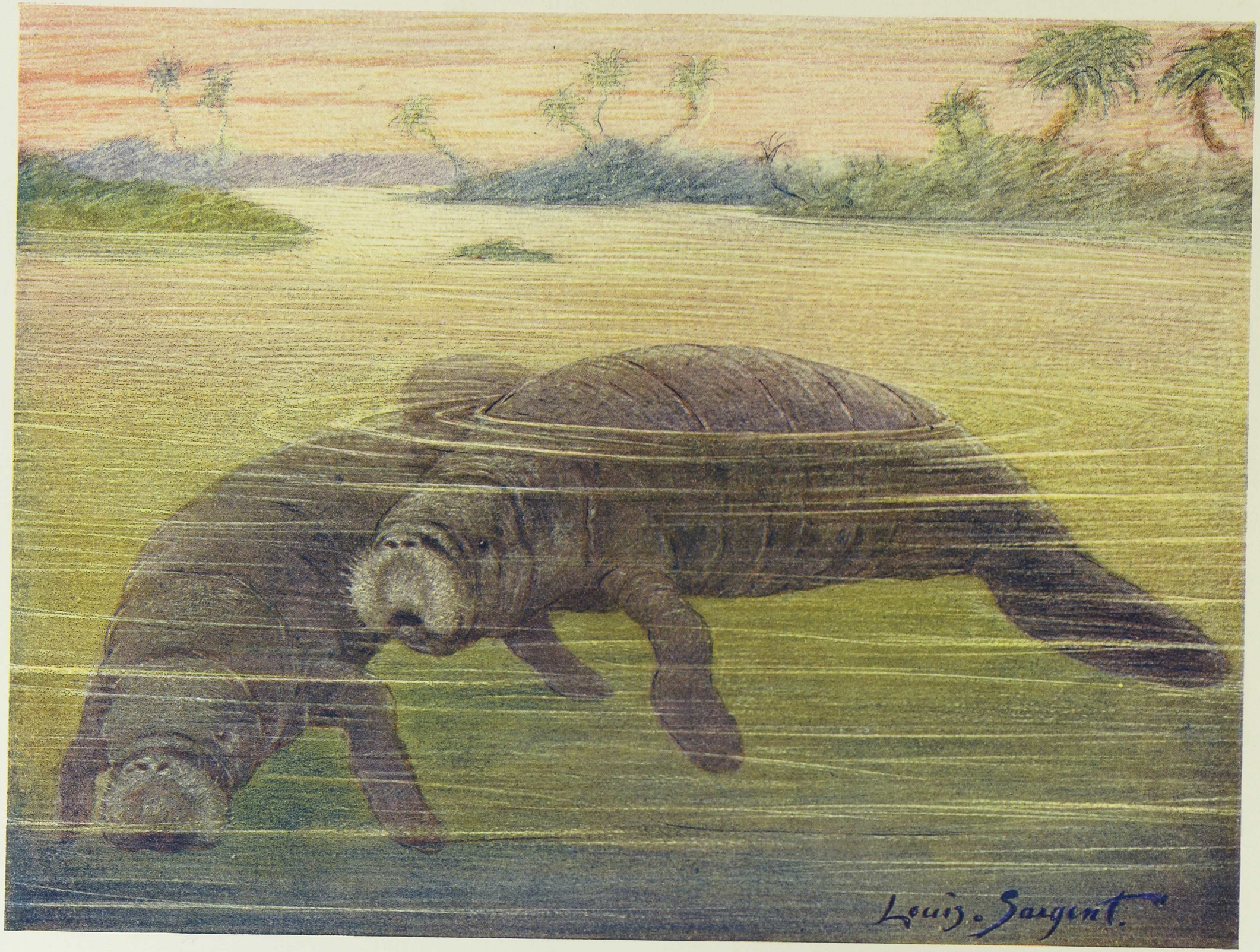
(*Megaptera longimana*)

The Humpback, which is found in all seas, is a clumsy-looking Whale, with a pleated throat and short hump-like back-fin. It is variably marked with black, white, and grey, but its great characteristic is the length of the flippers, which are also white in colour. They measure about four yards, the whole length of the beast being about fifteen. The whalebone is short and black. This is a rather tame and playful Whale, being particularly given to smacking its friends with its flippers, producing a noise which may be heard miles off in calm weather.

THE CALIFORNIAN GREY WHALE

(*Rhachianectes glaucus*)

This Whale, which is confined to the Pacific coast of North America, up and down which it ranges according to season, is of a mottled grey colour, with light-coloured whalebone. It has no back-fin, and only two pleats on the throat. It measures about fourteen yards only, but is considered one of the most dangerous of all Whales, owing to its fierce temper and its habit of frequenting very shallow water, where it is difficult to see what it is doing owing to the stirred-up sand; hence it is often called "Devil-fish."



MANATEES
By Louis A. Sargent

THE MANATEE

(*Manatus americanus*)

THE Cetaceans are not the only beasts which in their form and their exclusively aquatic habits resemble the fish; there is another perfectly distinct order of which the same may be said, though in the *Sirenia*, as these animals are called, the resemblance to fish is not carried so far. The Manatee, which we take as a type of this group—a very small one, by the way—has no hind-limbs, any more than a Whale or Porpoise, and the general form of its body is fish-like, though not so much so as in those animals. Nor are the fore-limbs, though they are more like fins than paws, so completely fin-like as in the Cetaceans. They have some power of movement at the elbow and wrist-joints, as well as at the shoulder, and, indeed, the very name Manatee is derived from the Latin *manus*, a hand, through the Spanish, owing to the habit the animal has of employing these flexible flippers more or less as hands in managing its food and its young.

The nostrils are at the end of the muzzle, not on the top of the head, as in most Cetaceans, and the lips, which are very bristly, show a cleft in the upper one, whose halves open and close, so as to grip the leaves on which the creature feeds; for, unlike the Cetaceans, the Sirenians are essentially vegetarians. The eyes are small, as in the Whale tribe; and the Manatee resembles these also in having a mere pin-hole for an ear.

The body is practically naked, what hairs there are being very minute, and ends in a broad, rounded shovel-shaped tail, set horizontally like a Porpoise's, and no doubt for the same reason, the Manatee being of course an air-breather, and needing to "blow" frequently. There are no teeth in the front of the jaws, but a good set of grinders, broad-crowned and ridged like those of hoofed animals, and utterly unlike what are seen in Cetaceans. There are eleven on a side in

both jaws, but as these work forward as in the case of the Elephant's grinders, and are shed when worn out as fresh ones cut through behind, in practice only about half that number are in view and in use at once.

The Manatee grows to about eight feet in length; its home is the coasts and estuaries of the warm parts of the eastern coasts of America. On the opposite side of the Atlantic, on the West Coast of Africa, is found another species (*Manatus senegalensis*), and confined to the fresh waters of the Amazon and Orinoco is a third (*Manatus inunguis*), but all are very much alike.

The Manatee is a slow, sluggish creature, very different from the lively, active Porpoises and Dolphins. Its food consists of aquatic plants, on which it browses by the aid of its bristly cleft upper lip as above stated. It will feed on land herbage also when this is conveniently accessible from the water, but there seems no reason to believe that it ever comes ashore to graze, as has sometimes been stated. The probabilities are very much against such a performance, since, from observations made on a specimen at our Zoological Gardens years ago, the Manatee is very helpless and excessively uncomfortable out of water. When lying on its chest it is especially ill at ease, but obtains some relief by rolling over on its back, the fact being that its weight compresses its chest and makes breathing difficult.

It may here be mentioned that it is for this reason that stranded Cetaceans cannot live very long, although air-breathers, the unfortunate brutes, whose chests are built for expansion, being slowly choked by their own weight.

Owing to the sluggish mode of life and vegetarian habits of feeding of the Manatee, it prefers quiet, shallow water; when not browsing it rests under the surface, only coming up to blow every two or three minutes; but it can also float when the water is too deep for this to be convenient. It has but one young one at a time, and this the mother is said to hold under her fore-flipper, the teats being situated just behind the arm-pits.

The young animal has a couple of incisors in the upper jaw, but

these are mere rudiments, and are concealed beneath the horny plates which cover the front part of the mouth and even the tongue, which is small and not movable. Manatees live in pairs, and the male is said to exhibit much affection for the female, so that if his mate is harpooned there is considerable chance of securing him also.

There is considerable inducement for hunting these creatures, the flesh being very good eating, while the abundant fat supplies an oil of excellent quality; and the animal is all the more valuable as the forest region of South America, so prolific in vegetation and in small forms of animal life, is singularly deficient in large beasts, especially those of edible kinds. Thus the Manatees, under the names of "Peixe-boi" (Ox-fish) and "Vacca Marina" (Sea-Cow), are important animals to the water-side population of their native haunts.

The Manatee is not a difficult animal to keep in captivity in its own country, and several specimens have been exhibited elsewhere—for instance, in Philadelphia, at the Brighton Aquarium, and in our own Zoological Gardens.

THE DUGONGS

The Dugongs (*Halicore*) are so like the Manatees in general appearance that any one would at once see that they are near relatives of those animals, which they resemble in size and in general form. They can, however, be immediately distinguished by the tail, which in the Dugongs is forked like that of a Porpoise.

There are also some noteworthy differences in the teeth, the male Dugong having two large incisor tusks, which grow continuously, though only the tips show outside the mouth; while in the female they never project beyond the gum, remaining undeveloped in their sockets.

The young animal has several more small front teeth, which are never seen, being hidden under the horny gums. Moreover, the grinders differ somewhat in structure from those of the Manatees, and

are less numerous, not exceeding half-a-dozen in all. There are three species of Dugongs, so much alike that they are hard to distinguish—the Indian (*Halicore australis*), the Australian (*H. australis*), and that of the Red Sea (*H. tabernaculi*). They are sea animals, though keeping near the coasts, and feed upon sea-weed; and one or other of them is found from the Red Sea to Australia. As, like the Manatees, they are good for food and yield excellent oil, they have been much persecuted; and there is reason to fear that, as the Manatees themselves have been much reduced by man's attacks, the whole of this harmless, interesting, and useful order of animals will be exterminated unless reasonable protection be given in time.



TWO-TOED SLOTHS

By Louis A. Sargent

THE TWO-TOED SLOTH

(*Cholœpus didactylus*)

The Sloth has achieved the somewhat paradoxical feat of acquiring an extended reputation merely by not exerting himself, although his sluggishness has been somewhat overrated by people who have not had the opportunity of observing him under the only conditions for which he is fitted by nature.

The Sloth is, indeed, one of the most perfect examples of an animal specialised exclusively for one way of living—in his case, that of tree-climbing, and climbing upside-down at that. His long limbs are terminated by two toes only on the fore-feet, and three on the hind, and these are joined in a common skin, and provided with powerful hook-like claws, so that he remains suspended without the slightest muscular exertion. His tail, which would be of no importance to a creature in his position, is a mere rudiment, and, like his ears, not noticeable, especially as his coat is so long and shaggy, except on the face.

His muzzle is short, and but poorly provided with teeth; indeed, he belongs to the order of beasts known as *Edentata* or toothless animals, in all of which the teeth, though usually not completely absent, are deficient in the front of the mouth, and of very simple shape elsewhere. Thus the Two-toed Sloth has no incisors, and, indeed, only ten teeth at all in the upper jaw, and eight in the lower, which are peg-like in shape; the first pairs in each jaw are bigger than the others, however.

In size the Sloth may be compared to a Terrier; and in colour it is very variable; generally, however, in a wild state it exhibits a decided greenish tinge, which is not due to the colour of the hair itself, but to the growth of minute vegetable organisms on it, this being rendered more possible by the fact that each hair is minutely grooved. The Sloth therefore may almost be said to gather moss, unlike the

proverbial rolling stone; but in dead and captive specimens this curious microscopic growth naturally disappears from the hair.

The Sloth was one of the earliest American animals to acquire a reputation, but it was some time before naturalists understood how to put him right side up, as it were. In his proper upside-down position he is able to move about among the boughs with considerable speed; this he does entirely by clawing himself along hand over hand, never jumping like so many other arboreal animals. In the thick forests he frequents he can travel a long distance without ever coming to the ground, by simply passing from one tree to the boughs of another touching it, or by means of the many trailing creepers. His best time to be on the move is in windy weather, for then, even if the trees are not close enough for him in the ordinary way, the swaying of their boughs brings them into contact, and he is not slow to avail himself of the opportunity of changing his quarters if he desires to do so.

The chances are, however, that he does not so desire, for he is really a very lazy, sluggish animal, and does not need to move about much for his food, which is all about him, consisting as it does of leaves, shoots, and fruit. To bring a coveted morsel within his reach, he will hook a bough towards him with his fore-legs, which are much longer than the hinder ones. In the very exceptional cases when the Sloth is absolutely forced to come to the ground to get to a distant tree, he is seen at great disadvantage. He cannot walk at all in the proper sense of the word, as he rests sprawling on the outer edges of his hook-like feet, and so is reduced to hauling himself along by grasping at any roughness of the ground; on a smooth surface he is almost helpless. It was from seeing him in this unhappy position that the old writers formed such erroneous ideas of his miserable incompetence.

One old book says, for instance: "Its legs are thick, and awkwardly placed; so that it can only move one of them at a time, and requires an hour to advance three yards. When it has, by the most laborious exertions, ascended a tree, it remains there till it has stripped it of everything that can be eaten, when it rolls itself into a ball, and, to

save the trouble of a gradual descent, falls to the ground with a horrid scream."

Even yet the Sloth does not seem to be fully understood by everybody, for a modern scientific writer, some years ago, actually went to the other extreme, and stated that it could walk, trot, and gallop, and this although Sloths of one species or other have been constantly on view at the Zoo, for, as might be expected in the case of such sluggish creatures, they thrive quite well in captivity.

They cannot, however, be called very interesting animals in a menagerie, as, being nocturnal, they are really slothful all day, coiling themselves up into a ball, with their head tucked in and the long fore-arms grasping a perch. The Sloth's one instinct, indeed, is to "hold on," and his only idea of defence is to grapple and hug his enemy with his powerful limbs and claws.

He holds on to his sluggish life with the same pertinacity, and is one of the very hardest beasts to kill, surviving some time even a puncture of the brain or spinal cord, and being remarkably resistant to poison. The female Sloth has but one cub at a time, and this is carried on her breast as she climbs about the trees.

All the Sloths are inhabitants of the warm forest-clad regions of America, the Old-World animals sometimes confused with them being sluggish, short-tailed Lemurs—the African Pottos and Asiatic Lorises—which are quite brilliant and vivacious creatures by comparison. The ordinary Two-toed Sloth is an inhabitant of Brazil, and there is another two-toed species (*Cholœpus hoffmanni*) in Central America.

THE THREE-TOED SLOTHS

The Three-toed Sloths (*Bradypus*) very closely resemble their two-toed relatives in most respects, but differ from them in certain details. Most noticeable of these is, as the name implies, the presence of three toes on the fore-feet as well as the hind; but there is also a difference in the teeth, the four foremost teeth in the Three-toed Sloths not being

larger than the rest; indeed, those in the upper jaw are considerably smaller. One very curious point about these Three-toed Sloths is that they are the only beasts which have more than the regulation number of seven vertebræ in the neck—for they have nine. This would seem to be an admirable adaptation to allow the beast to twist its head about as it hangs upside-down; but then we are confronted with the awkward fact that among the Two-toed Sloths the Brazilian species has the ordinary seven neck-vertebræ, and Hoffmann's Sloth of Central America only six—the only exception to the rule of seven on the side of deficiency. Cases like this show that anatomical characters are not necessarily in themselves important, and are thus worthy of careful note.

There are several species of Three-toed Sloths, ranging, like the Two-toed kinds, through tropical America; they are often called by the name of "Ai"—said to be derived from their cry, the Brazilian Two-toed species being known by the title of "Unau." In any case, the note is not to be described as a "horrid scream," being rather a bleat or a snort; but they are not noisy animals.



GREAT ANT-EATER
By C. E. Swan

THE GREAT ANT-EATER

(*Myrmecophaga jubata*)

The Ant-Bear, as this creature is sometimes called in its own country, easily stands first among the curious beasts of the New World. It is a truly typical member of the *Edentata*, having no teeth at all, and but a very small mouth, the long jaws being bound up in the skin almost to their ends. The tongue is very long and extensile, and looks much like a big worm. The fore-paws are also extraordinary: there are five toes, but these are very unequally developed, the middle one forming the main part of the foot, and carrying a huge claw; the other toes are all small, and the fifth has no claw, but is covered at the tip with a hard skin—for on it, and on the backs of the next two toes, the beast rests on walking, the tips of the toes being turned in, to keep the claws sharp for digging. This is what gives the peculiar clubbed appearance to the fore-foot, so well shown in the illustration. The hind-feet are much like those of a Bear, with five ordinary-looking toes and claws, and the beast treads flat-footed like that animal, behind, though walking on its knuckles before.

In size this Ant-eater is far the largest of the living Edentates, being about six feet from snout to tip of tail, with a height of a couple of feet at the shoulder; it is, in fact, as big as a small Bear, but narrow and slab-sided in form. Its coat is coarse, but close, except on the great bushy tail, which is laid over the animal as a blanket when it goes to bed. Internally, the Ant-eater is remarkable for having the hinder part of the stomach very strong and muscular, like the gizzard of a bird, no doubt to facilitate the grinding of the food, which is necessarily swallowed whole, there being no facilities for chewing it.

The Great Ant-eater is a characteristic animal of tropical America, but is not common; its favourite haunts are on low moist ground, either in forests or in the swampy plains. It is purely a ground animal, and neither climbs nor burrows, nor can it travel fast; a man can easily

overtake and even drive it along; but it is not a creature to take liberties with, nevertheless, for when roused to desperation it will turn and hug its enemy, its huge fore-claws penetrating with deadly effect. It is even said that the Jaguar himself has succumbed to the fatal talons, and Dogs are liable to fare badly in such an encounter.

The ordinary use of these formidable claws is to tear open Ant-hills, or those of the Termites—the so-called "White-Ants" so numerous everywhere in the tropics, for on such small creatures the Ant-eater feeds, licking them up with its long slimy tongue.

The Ant-eater seems usually to be a solitary animal, but the female displays considerable affection for her single cub, which when quite small is already a miniature of the parents; there is a case on record in which an Indian, who had captured a young Ant-eater, was pursued by the infuriated mother, and perished in her relentless grip, as he unhappily tripped over his blow-gun in trying to escape her attack. The creature is sometimes killed for food, and its flesh is said by Bates, who found it a great stand-by when on one occasion he found it difficult to get anything to eat but fish and vegetables, to be very good, something between pork and goose in flavour.

A creature of this kind does not seem at first sight to be at all a promising subject for captivity; but in point of fact it thrives well, and is usually to be seen in the large Zoological Gardens, including our own. It has even bred in one of these institutions on the Continent. Minced raw horse-flesh mixed with milk has been found by experience to be a good substitute for its natural insect food, but this diet would probably be much improved by the admixture of a quantity of the various kinds of dried insects now so much in favour for feeding insectivorous birds, as well as of that invaluable insect, the Mealworm. It will also eat such small animals as Cockroaches and young hairless Mice. Although, of all land animals, hardly any can be less suited to aquatic habits, in captivity at any rate it shows a decided inclination to take to water, and those kept in our Zoological Gardens are always provided with facilities for having a bath, of which they are not slow to avail themselves.

THE TAMANDUA ANT-EATER

(*Tamandua tetradactyla*)

"TAMANDUA" appears to be a native name for the Ant-eaters generally, but here it is usually appropriated to a rather small species, which also inhabits tropical America, but does not encroach on the domain of the large one, as it is a climber, and keeps mostly to the trees.

The Tamandua, which is about as big as an ordinary Cat, is sufficiently like the Great Ant-eater to be recognisable at a glance as a near relative of that most eccentric-looking beast, and its feet are similarly formed. Its muzzle, however, is of only moderate length, and its tail very different, being devoid of long hair, and indeed bare towards the end; besides which, it is prehensile.

The limbs are shorter than in the big ground Ant-eater, and though the beast walks on its front knuckles in the same way, its gait is awkward and straddling, for it is only really at home in the branches. The method of defence is much the same as in the large species—a clutching inward stroke with the well-armed fore-paws. In colour this species is very different from the large kind; it presents much variation, but, broadly speaking, the general hue is straw-colour, with the flanks covered by a broad black patch along each side. The coat is short and close throughout. This Ant-eater feeds on those Ants and Termites which make their nests in trees; it will live in captivity, but is not so common in that condition as its larger and more sensational-looking relative.

THE LITTLE ANT-EATER

(*Cycloturus didactylus*)

THIS, the only other species of the Ant-eater family, is more different from the other two even than these are from each other, and is the most thoroughly adapted for a life in the trees. It is quite a small creature, only about as large as a Rat, and is covered with soft straw-yellow fur. The tail is very long and naked below, and is strongly prehensile. The muzzle is quite short, but bent downwards in a way almost unique among animals. The feet differ greatly from those of

the other Ant-eaters; the hind ones have practically only four toes, the first being rudimentary; the other four are strongly clawed and curved, being opposed to a pad on the heel, so as to grip boughs in climbing. The fore-paw is even more peculiar, there being practically only two toes, the very large and strongly-clawed third toe, and the second, which is much slenderer; the others are rudimentary.

This little creature has much the same range as the other two Ant-eaters, but none of the three interfere with each other, the Great Ant-eater being terrestrial, the Tamandua chiefly a tree-dweller, while the Little Ant-eater is entirely so. It feeds to a great extent on the grubs of tree-building wasps, which it extracts from their cells by means of the pincers formed by the two-toed fore-limbs. It is not an easy animal to keep alive in captivity, and so far has not been exhibited in our Zoological Gardens.

THE PANGOLINS

The Pangolins (*Manidæ*) of tropical Africa and Asia resemble the Ant-eaters of the New World in their toothless jaws and long tongues adapted to a diet of Ants, and even in their habit of walking on the fore-knuckles to protect the huge digging claws, but they are not closely related to them, although belonging to the same order of Edentates. In their general appearance they differ from any other beasts, being covered with broad horny scales above, and on the tail and outsides of the limbs. The long tail is very broad and thick where it joins the body, and there are no external ears. In fact, were it not for the scanty hairs that are found on the under-surface, these creatures might reasonably be taken for some curious sort of Lizard rather than for beasts of any kind. When disturbed, these creatures roll themselves into a ball, and are then practically invulnerable owing to the hard sharp-edged scales. They are slow-paced, nocturnal animals, some species living entirely on the ground and in burrows, and others climbing trees. One young one is born at a time, and this, in the Burmese species at any rate, rides on the base of the mother's tail, clinging with its powerful claws.

These animals are very rare in captivity, but one species, the West African (*Manis tricuspis*), has been exhibited in our Zoological Gardens.



HAIRY ARMADILLOS

By Louis A. Sargent

THE HAIRY ARMADILLO

(*Dasypus villosus*)

BEING frequently brought to Europe in captivity, the Hairy Armadillo is the best known of its family (*Dasypodidæ*), which are distinguished, not only from all other Edentates, but all beasts of any sort, by their peculiar jointed cuirass of bony plates, formed by the deposition of bone in the skin of the upper parts.

This forms two great shields on the fore-parts and hind-quarters respectively, with several bands filling up the intervening space, and allowing of the necessary flexibility of the body; the tail is covered by rings of plates, at any rate at the base. In the present species many hairs appear at the joints of the plates, and the under-surface of the body also shows a good many, although they are so scanty that the general effect is much like that of the sparsely-bristled skin of an old fowl when plucked, leaving the hair-like feathers known as "filoplumes." The body of the Armadillo is peculiarly broad and flat, and as the legs are very short, with their basal joints not projecting from the body, the whole effect is rather tortoise-like. There are five toes on all the feet, all clawed, the claws on the three outer front toes being particularly strong.

The teeth are about three dozen in all, and very simple and uniform in structure, like pegs: there are none in the front of the mouth, as in Edentates generally. The tongue is long and narrow, and can be protruded some distance out of the mouth, showing a slight tendency to the worm-like type of tongue so characteristic of the Ant-eaters. In length the beast measures about two feet, but is surprisingly heavy and solidly built for its size.

The Hairy Armadillo, which is very closely related to the Six-handed Armadillo of Brazil, also a well-known species, is found in Argentina, and its habits on the Pampas have been admirably described by Mr. W. H. Hudson. He points out how curious it is that this comparatively slow and lowly organised creature is able to maintain its existence in the face of the encroachments of civilisation, to which higher animals succumb; and to this we may find a parallel

in the successful survival of the humble Hedgehog with us, while we have nearly exterminated the Wild Cat, and only allow the Fox to survive that he may make sport for us. The Armadillo is diurnal or nocturnal according to circumstances and the risks he runs from mankind; he is easily satisfied in the matter of food, devouring worms, grubs, mice, snakes, the eggs and young of ground-breeding birds, and any carrion he can come across. Should he scent out the carcase of a Horse, he is in luck's way, for he will drive a shaft under it and live in luxury, eating away at the carcase from beneath. If his more natural animal food should fail, he will make shift with herbage, and even maize has been found in its stomach.

Clumsy as it is, the creature can move nimbly enough, and it displays some strategy in capturing its prey. When it scents a mouse, for instance, according to Mr. Hudson, it will creep cautiously up and fling itself bodily on the unfortunate little rodent; while snakes it circumvents by sawing them into helplessness with the notched edges of its armoured overcoat.

The said coat of mail also protects it to a considerable extent from the attacks of beasts of prey, and it is further secured by its great strength and powers of rapid burrowing. When seized it does not bite, but uses its claws to some purpose.

Man himself relishes the flesh of this creature, as in the case of several others of the family; it is said to eat better than roast pig, and is very fat—almost too rich, in fact. Of all animals, certainly, none looks so much as if it were made to be eaten; there is so little to be done to make it ready, as its few sparse hairs are easily singed off, and the shell makes a capital dish to roast it in.

In captivity the Hairy Armadillo is a very hardy animal, but its cage or sty must be strongly constructed, or the beast, which is very restless and constantly on the look-out for a weak point, will fairly force itself out. It bears cold well, and will endure our winters in an outdoor habitation—a sufficiently remarkable thing in the case of an animal practically devoid of fur. The Armadillo, however, appreciates the value of a warm bed, and, if provided with straw, will bite it up into chaff, and then bury itself in the heap thus formed. Armadillos are long-lived animals for their size; at any rate, a species allied to the present lived in the Calcutta Zoological Gardens for twenty years.

Most of the Armadillos are much like the Hairy species in general appearance, and few are any larger, but some especially remarkable species deserve notice.

THE GIANT ARMADILLO

(*Priodon gigas*)

The Giant Armadillo, as its name implies, is much larger than any other Armadillo, for it even exceeds a yard in length. In general structure it resembles the common Hairy Armadillo, but the armour bands across the back, between the shoulder- and hip-shields, are more numerous, about a dozen in all, and the feet are somewhat different, the hind toes being very short, with short nails, while the middle toe of the fore-foot is enlarged at the expense of the other four, and bears an enormous claw. Strangely enough in an "Edentate" animal, the teeth are very numerous indeed, being about two dozen on either side of each jaw, a number unequalled in any beast except some of the Cetaceans. This Armadillo inhabits the Brazilian forests, feeding on insects and carrion; it bears a bad name as a violator of graves, and probably deserves it—its great claws are quite equal to any feat of the kind, and its appetite sufficiently accommodating.

THE BALL ARMADILLOS

These curious little animals (*Tolypeutes*) have the shoulder- and hip-shields very well developed, but only three cross-bands between them; they can roll themselves up like Hedgehogs, and when thus contracted form perfect balls, the head and short tail fitting neatly into crevices. They are not less remarkable when running about, for the fore-feet have a huge middle claw on the tip alone of which they tread, while on the hind-feet the three middle claws are enlarged, and support that part of the body, though not absolutely on their tips. Three species of these Armadillos are known, and two of these have been exhibited at our Zoological Gardens.

THE PICHICIAGO

(*Chlamydophorus truncatus*)

This quaint little creature, which differs much more from the other Armadillos than these do amongst themselves, is a sort of armour-plated

Mole, for it spends most of its time in burrowing. It is the smallest Armadillo known, being hardly six inches long, and has a rather pretty appearance, its armour-plating being pink, and the hair on its under-parts, which is silky and abundant, and conceals the small eyes and ears, pure white. There are no solid shoulder- and hip-shields, but the body is covered from head to hinder end, which is, as it were, cut off flat, with a series of transverse bands. The flat hind end has a solid shield, notched below for the short tail, which is permanently turned downwards. The limbs are very short and the claws well adapted for burrowing, the centre fore-claws being especially enlarged. The home of this curious animal, which is not common, is the sandy districts of Western Argentina; it has but one relative, from Bolivia (*Chlamydophorus retusus*), which is not quite so small in size.

THE AARD-VARKS

The Aard-Varks or Ant-Bears (*Orycteropodidæ*) of Africa are placed with the Edentates on much the same principle as the Cobego is associated with the Insectivores, because they will not "fit in" anywhere else, their relationship to the other families of this order being very questionable.

They are most extraordinary-looking animals, about the size of small Pigs, and something like a caricature of a Pig in appearance. The snout is long, with the end broad, but the mouth small; the ears long like a Hare's, the tail very thick at the root and rapidly tapering, and the limbs short and with four toes on the front and five on the hind paws, all with strong straight claws. The mouth is well provided, except at the front, with peg-like teeth, and the tongue is long, though not so much so as in the Ant-eaters. In captivity, at any rate, the animal often feeds in a different way, for one I watched sucked up its bread-and-milk just like a Pig, and did not lick its food like an Ant-eater. Yet in the wild state they appear to feed on Ants in the same way as those animals. They are great burrowers, making huge earths, but, as they come out at night, are rarely seen. There are two species or races, the Ethiopian (*Orycteropus æthiopicus*) from North-East Africa, which is nearly naked, and the Cape Ant-Bear (*O. capensis*), which is covered with hair; and both have been on view at the London Zoological Gardens.



RED KANGAROOS

By C. E. Swan

THE RED KANGAROO

(*Macropus rufus*)

The Red Kangaroo is the most beautifully-coloured of the large species of the Kangaroo family (*Macropodidæ*), a group which are so much alike that when one has been seen any of them can easily be referred to its proper position. As every one knows, Kangaroos belong to the order of Marsupials, or pouched animals, whose females are typically characterised by a pouch on the abdomen in which the young—born extremely tiny and imperfect—are placed by the mother immediately on birth, and thereafter remain hanging to the teats for a considerable period.

In addition to their characteristic bodily shape, with small fore-legs and long hind ones, the Kangaroos are noticeable for their peculiar hind-feet, which are chiefly made up of the huge fourth toe, which is armed with a powerful claw; the fifth toe is of only about half the length of this, and the second and third toes not only equally short, but exceedingly slender, and bound up together in the skin, so that only their two claws, which the animal uses for scratching itself, are visible externally. The first or great toe is absent altogether.

The fore-feet have five ordinary-looking toes, and the animal uses them as hands, in lifting its food to its mouth, &c. The teeth of the Kangaroo are decidedly peculiar; there are no canines in the lower jaw, and the upper pair are insignificant and early shed. The upper incisors are six in number, the lower only two; the grinders are suited for crushing and chewing the food of these creatures, which, like the hoofed animals, feed on herbage, and similar products of the vegetable kingdom.

The leaping gait of the Kangaroo is well known to every one, and, when going fast or far, is the only means of locomotion it has; the fore-feet are only used when the creature is moving along slowly, when it places these paws on the ground, and swings its hind-limbs forward with the action of a person walking on crutches. In the ordinary way, its leaps are not more than a yard or so, but when pressed it bounds

along in leaps of three or four yards, and can keep up this exertion for an hour or two, clearing in its course obstacles which are serious to pursuers, such as Dogs, which employ the ordinary quadruped way of going about. When thus travelling, it alights only on the toes of the hind-feet, and it can also stand upright on these, with the aid of the powerful tail, when it wishes to take a look round. On a slope the Kangaroo is awkward and liable to overbalance itself, and so avoids such ground when pursued. It swims well and powerfully, and will often take to water when brought to bay. In this case, however, it stands up on its hocks, and seeks to grapple its antagonist and force him under water. On land, it takes up a similar position, and strikes terrible blows with the powerful claws of the hind-feet, which are quite capable of disembowelling an antagonist in the case of large species like this. The Red Kangaroo is, indeed, the largest of the family—a male measuring over eight feet in total length, of which a yard is tail. The great difference between the sexes in this species is rare among Marsupials; the male only being red, while the female is grey—often much more so than the specimen figured,

The rose-pink colour on the male's throat looks unnatural in a beast, and indeed it is not in the fur itself, but is due to staining by a pollen-like substance—a sort of natural rouge which is secreted by the skin in that part. Kangaroos have but one young one at a time, and these are born not only blind and naked, but with the limbs of nearly equal length; the young are excessively small, being in a large species like this only about as big as one's thumb at birth. The mother places them in her pouch with her lips, holding it open with her paws. When they cease to cling on to the teat, from which they can at first be only removed by force, they put out their little heads and begin to browse on the grass like their mother; then they venture out to hop about and play, but in case of alarm rush hastily back to the old one and tumble head first into the pouch. A hunted doe Kangaroo, if carrying a big young one, and hard pressed, will fling the "Joey," as it is called in Australia, aside to lighten herself, returning to look for it afterwards if she escapes with her life. So swift is the female of the Red species, when unencumbered, that she is called the "Flying Doe," and can hardly be caught by a Dog except on soft ground; the male is slower.

Kangaroos are hunted in Australia not only for sport, but on account of the harm they do to the not too abundant pasturage, as their peculiar teeth, of which the lower incisors project forward and can be slightly separated and brought together, having besides sharp inner edges, fairly cut the grass out by the roots.

The Hound used in hunting them is very similar to a Greyhound, but rather more powerful, and, though derived from crosses in the first place, is now a distinct breed. They used to be imported into India in my time, and no doubt are so still, as they are excellent Dogs for swift game.

The present species of Kangaroo is, however, not so much hunted as the commoner Great Kangaroo (*Macropus giganteus*), as it inhabits chiefly the eastern and southern hilly districts, whereas the other is found almost all over Australia; it has, like all these large Kangaroos, plenty of courage, and the male specimen mentioned in Gould's magnificent work on the Mammals of Australia as being procured by him for the British Museum was not captured, he says, without making a fierce and desperate resistance. This beast weighed two hundred pounds, and his meat supported Gould and his party, who were making a forced march, for four days. The best part of a Kangaroo, it may be mentioned, is the thick powerful tail, which is much esteemed for making soup.

Though not nearly so common in captivity as the Great Kangaroo, the Red species is not rare in collections, and, like Kangaroos generally, thrives well even in close confinement, and breeds freely.

The typical Kangaroos are all Australian, with the exception of a few in New Guinea, New Britain, and the Aru Islands, one of which (*Macropus bruni*) was the first Kangaroo to be brought to the notice of science. They vary a good deal in size, from large species like the Red, the Common, and the Wallaroo (*Macropus robustus*), through the smaller species called Wallabies, to some not bigger than Hares. Their habits also present some differences in detail, some being beasts of the plains, while others never leave the hills, where they hop about from rock to rock.

The Rock Wallabies have the tail less thick at the base than the more typical kinds.

THE TREE KANGAROOS

From the Rock Wallabies the transition is easy to the Tree Kangaroos (*Dendrolagus*), of which there are a few kinds inhabiting Australia and New Guinea. In these animals the fore- and hind-limbs are proportioned as in ordinary animals, and the tail is not thickened at the base; yet they sit upright and jump on their hind-feet, and are unmistakable Kangaroos, in spite of these climbing and perching habits. They spend most of their time in trees, feeding on the leaves as they climb and jump among the boughs. They are moderate-sized animals for Kangaroos, not being bigger than an ordinary Dog, and are seldom seen in confinement, though our Zoological Gardens have exhibited two of the species.

THE RAT KANGAROOS

The Rat Kangaroos (*Aepyprymnus*, *Bettongia*, *Potorous*) are small creatures, only about as big as Rabbits, with pointed ratty-looking heads, short ears, and thin tails; their form is also rather Rat-like, the hind-limbs being shorter than in the larger Kangaroos. There are several kinds, found in Australia and Tasmania. They are very different in habits from the large Kangaroos, being more like some rodents. They have but little speed, and are solitary and nocturnal, taking refuge in holes when disturbed, and making concealed nests of grass in cavities scratched out under a bush. Their tails are prehensile, though never used in climbing, as these are ground animals, but employed for bringing home the grass for the nest, which is grasped in a bundle by the tail. In addition to herbage, they live on roots, which they scratch up with their long fore-claws.

THE MUSK KANGAROO

(*Hypsiprymnodon moschatus*)

This curious little beast is the smallest of the Kangaroos—being only as big as a Rat, and resembling this animal in its naked scaly tail. Its most remarkable peculiarity, however, is the fact that, unlike other Kangaroos, it has a great toe on the hind-foot; this is nailless, and set far up, not far from the heel, but is opposable, and thus this animal forms a link between the Kangaroos and the Phalangers. It is found in Queensland, where it lives in the forests, hiding by day in a nest lined with leaves, and feeding on roots, berries, and also—a remarkable diet for a Kangaroo—insects and worms. It has two young at a birth. Though it seems not to be rare, it has never been brought to England.



VULPINE PHALANGERS
By C. E. Swan

THE VULPINE PHALANGER

(*Trichosurus vulpecula*)

The Vulpine Phalanger is the animal commonly known in Australia as the Opossum, although it is a very different animal in many ways from the true Opossums of America, and belongs to a family (*Phalangeridæ*) closely allied to the Kangaroos; although the general shape of the creature is very different, and quite of the ordinary quadruped type. The limbs of this Australian Opossum are short, and all the paws have five toes; those on the fore-foot present nothing peculiar in appearance, but in the hind-foot the second and third toes are joined in a common skin up to the claws, and the first, which is opposable to the others like a thumb, has no nail. The tail is bare on the under-surface at the end, and it is prehensile.

The teeth of the Phalanger are a fairly complete set, there being six incisors in the upper jaw and four in the lower, while canines are present in the upper only, and are not large. The grinders are well represented, and the centre pair of lower incisors are large, as in Kangaroos. In size this pretty animal rather exceeds an ordinary Cat; its coat is thick and soft, and in colour generally corresponds with the specimens shown in the illustration, over most of Australia. In Tasmania, however, the creature grows to a greater size, and is sooty-brown all over. A pretty white specimen was once shown at our Zoological Gardens; its eyes were dark brown, not pink as is so often the case in albinistic animals.

This beast is presumably the proverbial "'Possum" which lives up gum-trees, those trees being so important an element in the Australian flora; it is a true climbing animal, seldom coming to the ground, and moving slowly when there. Even on a tree it is not very active, and can be caught by a good climber. It is quite nocturnal, and spends the day sleeping in a hole in a tree, whence it is sometimes rudely extracted by the Australian blacks, who jerk the poor 'Possum out by the tail, and dash its head against the trunk before it has time to bite and scratch in self-defence. It is relished by these people as food, but their liking for eating it would not be much recommendation to a

European, as they are some of the most omnivorous of savages. The Australian Opossum's meat, however, is quite passable, being much like Rabbit. This is not surprising, as it is chiefly a vegetable feeder, devouring shoots and fruit, though, as it likes an occasional small bird in captivity, it is evidently not a pure vegetarian. In the breeding season it utters loud cries; the young are one or two only in number, and remain a long time in the pouch of the mother.

The fur of this animal is esteemed for the manufacture of rugs, and it is presumably on account of its utility for this purpose that the beast has been introduced into New Zealand, although it is destructive in orchards, as might be expected from its feeding-habits. I have heard that the fur in New Zealand examples is finer, following the usual rule, that furred creatures grow better fur in a cool than a warm climate. In captivity the Vulpine Phalanger thrives well and breeds freely; it will live in an outdoor hutch, and so far abandons its nocturnal habits as to take food by day. It is always well represented in our Zoological Gardens.

The Phalangers are the most numerous family of Marsupials, and vary considerably in size and to some extent in form, though all are short-legged climbing animals. Only a few of the more remarkable can be noticed here.

THE CUSCUSES

The Cuscuses (*Phalanger*) are noticeable for the fact that their prehensile tails are naked for the end half; they have shorter ears and muzzles than the Vulpine Phalanger, which they resemble in size and generally in habits, though less vegetarian in their tastes. They are the most westerly in range of all the Marsupials of the Old World, as only one is found in Australia, and they extend from New Guinea to Amboyna. There are about half-a-dozen species in all, and some of them are extremely variable in colour, being pied and spotted, as is so commonly the case in domestic animals, and so rarely in wild ones.

THE FLYING PHALANGERS

The Flying Phalangers are provided with an extension of skin along the flanks, similar to what is found in the Cobego and the Flying

Squirrels, and they perform sailing "flights" from tree to tree in the same way; indeed the smaller Flying Phalangers are commonly called Squirrels in Australia, there being no true Squirrels there, though true native Rats and Mice of various kinds occur. These Flying Phalangers vary a great deal in size more than the Flying Squirrels, the biggest (*Petaurista taguanoides*) being as big as a Cat, while the smallest (*Acrobates pygmæus*) is not larger than a Mouse, and is indeed known locally as the "Opossum Mouse."

One of the Flying Phalangers (*Petaurus breviceps*), a lovely little animal about as big as our Squirrel, with exquisitely soft grey chinchilla-like fur, is constantly to be seen at our Zoological Gardens, and has bred freely there.

THE KOALA

(*Phascolomys ursinus*)

When watching the quaint appearance and antics of Bears in menageries, many people may have regretted that Nature has not been kind enough to provide a Bear small enough to be a safe and convenient pet; but such an animal practically exists in the Koala, this Marsupial being popularly called "Native Bear" in Australia. It is really a member of the Phalanger family, but differs from all these in the absence of a tail, and it is larger than any of them, though not exceeding a Terrier in size. In general appearance it is extremely Bear-like, and its ears are tufted like those of the Indian Sloth-Bear; its teeth, however, are not at all of the Bear pattern, but resemble those of the Vulpine Phalanger in type, and its fore-paws are quite unlike those of any other beast, the thumb and forefinger being opposed to the other fingers, as the thumb alone is in Monkeys; the hind-paws are like those of the Vulpine Phalanger. The coat of the Koala is of soft thick grey fur, the nose having a large naked pad. The creature lives almost entirely in the trees, and is very slow in its movements on the ground; it has but one cub at a time, and when this is big enough to leave the pouch, it rides on its mother's back—another resemblance to the Sloth-Bear. The food of this creature consists practically entirely of the shoots of the gum-trees, and it is not easy to keep in captivity unless this food can be supplied. It has, however, been exhibited in our Zoological Gardens, and I should suggest that any one trying to bring it home should get a quantity

of gum-leaves dried, and make tea of them, mixing this and the leaves with artificial food; when once in England gum-leaves could sometimes be obtained for the animal, so that it need not be entirely deprived of its natural diet.

THE NOOLBENGER

(*Tarsipes rostratus*)

This extraordinary little Australian animal, which is of about the size of a Mouse, is very different from all other Phalangers. It has very short claws and a nearly naked prehensile tail; its jaws are long and slender, and poorly provided with tiny, pointed teeth, though there are two long lower incisors. The mouth is small, and the tongue long and pointed; it is used to lick honey from the flowers, this being the only beast which lives on honey, though the little Flying Phalangers also partake of it. In captivity the Noolbenger readily eats insects, and no doubt does so at large. It is, of course, an excellent climber. Although it would make a nice pet, it seems never to have been brought to Europe.

THE WOMBATS

The Wombats (*Phascolomyidæ*), of which there are three species found in Australia and Tasmania, are very like giant Guinea-Pigs in appearance, and even have rodent-like teeth, the canines being absent, and the incisors two only in each jaw, enamel-faced and continually growing. They are, however, true Marsupials, of rather large size, being about two or three feet long and very bulky. There are five well-developed toes on the fore-feet, but on the hind the first toe is very short and nailless, and the three middle ones joined at the base. These creatures are nocturnal burrowing animals, living on the ground, and feeding, like rodents, on roots and herbage. They are singularly harmless, sluggish, and inoffensive; one has even been known to allow itself to be picked up and carried, though on an attempt being made to tie its legs it at length lost its temper, made a whizzing noise, and snapped sharply enough. As might be expected in the case of such philosophical animals, they bear captivity well, and one or other kind may constantly be seen in our Zoological Gardens.



TASMANIAN DEVIL
By C. E. Swan

THE TASMANIAN DEVIL

(*Sarcophilus ursinus*)

So varied are the types of Marsupials that the order is almost an epitome of the whole class of beasts, putting on one side the fish-like Cetaceans and Sirenians and the flying Bats; in addition to the vegetable-feeding types we have been considering, we have Marsupial carnivores of various grades, of which the Australasian group of Dasyures (*Dasyuridæ*) are the chief. Among these the Tasmanian Devil has attained special notoriety on account of its ferocity, and, with one exception, it is the biggest carnivorous Marsupial, though not larger than a Badger. There are five toes on the fore-feet, and four on the hind, the first being absent; the beast goes on the soles of the feet like a Bear, and much resembles a small one, except for having a tail of ordinary length. The teeth are singularly like those of the true Carnivora, with large canines and small incisors; the latter, however, are eight instead of six in the upper jaw. The grinders are very large and powerful, and in strength and bone-cracking power may be compared to those of the Hyænas. In fact, no animal of the size can boast of such a set of teeth.

The Tasmanian Devil is confined to the island whence it takes its name; "remote, unfriended, solitary, slow," it prowls about at night in search of food, which consists of the flesh of any creature it can catch and overpower, and, although not a large animal, it is a serious enemy to Sheep as well as to poultry. It will also feed on carrion, and is believed to search the beach for stranded fish. When eating, it will use its fore-paws to hold up its food, unlike most of the true Carnivora. It is a really fierce animal; resents interference by savage snorts and growls, when disturbed in its lair among the rocks, and is credited with snarling with its dying breath, according to Herbert Spencer, who tauntingly alludes to the admiration it gains thereby; but surely so "game" a Marsupial need not fear the comments of a peevish philosopher!

The number of young is three to five; thus it might easily increase and be a serious pest, but it is easily trapped with any meat bait.

In captivity it acts up to its character; furiously resents interference, greedily devours its rations, and quarrels with its companions. It may generally be seen in our Zoological Gardens, and sometimes even in a travelling menagerie, for which it forms a nice sensational exhibit. It is worth mentioning that the Devil's flesh has been eaten and found to taste like veal, because it does not look like the sort of animal one would care to eat; but in the early days of Australasian colonisation people were not disposed to be particular, so long as they got some fresh meat.

THE THYLACINE

(*Thylacinus cynocephalus*)

The Thylacine is the largest carnivorous Marsupial at present living, and bears a remarkable resemblance to one of the Dog family, especially in its head, muzzle, and limbs. The coat, however, is close and flat, like that of so many tame Dogs, not furry like a Wolf's or Fox's, and the tail is not of the "brush" type, being very long, straight, and covered with close, short hair; it is also very thick at the root.

The colour of the animal is light brown, banded across the hinder part of the back with bold black stripes, whence the names of "Tiger" and "Zebra-Wolf" often applied to the beast. This colouration only recurs in the Banded Duiker among the Antelopes, and, if the two animals lived in the same country, would certainly be set down to "mimicry." In size the Thylacine is rather smaller than a Wolf, and is long-bodied and low on the leg; its teeth differ from those of the true Dogs in being more numerous; as in the "Devil," there are eight upper incisors, and the grinders are also more numerous than in the true Carnivora. This animal is nocturnal, and hides by day in the clefts of rocks; it used to be a pest to Sheep-owners, and has consequently been so much persecuted that it is very near extinction, being, like the Tasmanian Devil, confined to Tasmania. Indeed, it would now pay to preserve the few survivors in the mountains, as, although the beast has been exhibited in our Zoological Gardens, it is rare in the animal trade, and would be worth twenty pounds a specimen alive.

THE TYPICAL DASYURES

These animals (*Dasyurus*), which are known in Australia as Native Cats, somewhat resemble the Mongooses among the true Carnivora in

general form, but have larger heads; in size they are considerably smaller than an ordinary Cat. Their fur is very peculiarly coloured, being light-brown with white spots; black varieties are quite common, and, as these retain the white spots, they have a very striking appearance. In habits these creatures resemble the Martens; they are good climbers, and prowl about the trees at night in search of birds and other prey; in the day they retire into hollow boughs to sleep. They have about six young ones at a time. From their carnivorous tastes, these animals are a great pest to poultry-keepers, and are persecuted in consequence. They are easily kept in captivity, and the commonest (*Dasyurus viverrinus*) is usually to be seen in our Zoological Gardens. There is a species in New Guinea, as well as four in Australia.

THE TAPOA-TAFA

(*Phascologale penicillata*)

THE Tapoa-Tafa is Rat-like in size, form, and general colour, but has a very characteristic tail, covered for the last two-thirds with long black hairs. This animal is similar in its general habits to the Dasyures, and is equally bloodthirsty; it is generally distributed over Australia, except in the north.

Allied to it are a whole series of smaller carnivorous Marsupials, of a Rat- or Mouse-like type, some of them climbers and some ground-livers, which take the place in Australia of the Shrews and other Insectivora, which do not exist in that continent. One of them (*Antechinomys lanigera*) is a jumping species, and thus curiously recalls the Elephant-Shrews of Africa.

THE BANDED ANT-EATER

(*Myrmecobius fasciatus*)

THIS peculiar little creature is much the most distinct of this varied family of Marsupial carnivores. In size it is insignificant enough, being no larger than a Squirrel, and, as it has a long bushy tail, it is at first sight not unlike one until the long slender muzzle is noticed. The colouration is very remarkable and pretty, being chestnut, with the back covered with transverse bands of black and white alternately. Like the two Ant-eaters of America and the African Pangolins, it has a long worm-like tongue; but, unlike these crea-

tures, it retains a very full set of teeth, numbering from fifty to fifty-four; all, however, are very small, and set apart from each other, except the last four lower grinders. These teeth are remarkably like those of some of the earliest fossil beasts known, so that this little insignificant creature is perhaps the oldest beast now living. It is a ground animal, feeding on Ants and other insects, and has no pouch; the young, however, hang on to the mother's nipples as in other Marsupials, and are concealed by her long fur.

THE BANDICOOTS

The name Bandicoot properly applies to a large Indian species of Rat (*Nesokia bandicota*), but it has been transferred to a curious family of Marsupials (*Peramelidæ*), which agree with the Kangaroos in the structure of the hind-feet, having the second and third toes thin and united, and the fourth very large and strongly clawed; the fifth is of fair size, but the first rudimentary. In their teeth, however, the Bandicoots show undoubted resemblance to the carnivorous Marsupials of the last family, the canines being well developed and the lower incisors six in number. In spite of the Kangaroo-like structure of the hind-foot, this member is not prolonged, and the general form of the creature is like that of a large, long-snouted, short-tailed Rat, and they resemble Rats in their movements. The fore-feet have the middle toes large and strongly clawed, and the outside ones rudimentary; the foot is, in fact, adapted for digging, and the animals are ground-livers and feed largely on roots, though they also freely partake of such animal food as they can get, in the shape of insects, &c.; they are, in fact, omnivorous. There are a good many species, found not only in Australia, but in the islands adjacent. Two Australian Bandicoots differ so much from the ordinary kinds, however, as to demand special notice; these are the Rabbit Bandicoot (*Peragale lagotis*), which has Rabbit-like ears and a fully-haired tail, and is bigger than the others, being as large as a real Wild Rabbit; and the very remarkable Pig-footed Bandicoot (*Chœropus castanotis*), which is hardly as large as a Rat, with long ears and most peculiar feet. The limbs are long and slender, and there are only two toes in the fore-foot, with small claws; while on the hind-foot all the toes are exceedingly small and useless except the fourth, which is large, with a short claw; the creature is thus almost in the position of a hoofed animal, and it goes about on tip-toe in a very similar way.



COMMON AMERICAN OPOSSUM

By Louis A. Sargent

THE COMMON AMERICAN OPOSSUM

(*Didelphys virginianus*)

The familiar 'Possum of American natural history and folk-lore enjoys the distinction of being the only Marsupial found in the northern part of the world, and thus it was the first of these pouched beasts to come under the notice of naturalists.

Although considerably the largest of its family (*Didelphyidæ*), it is not a very big animal, hardly equalling an ordinary Cat in size; and in general structure it is a good type of the American Opossums, which are a very uniform group in most respects.

Its short legs have five toes on each foot, all clawed with the exception of the great toe of the hind-feet, which can be opposed to the others like a thumb, so as to aid in climbing. The teeth much resemble those of the true Carnivora in general appearance, the canines being large, the molars sharp, and the incisors insignificantly small. The incisors, however, are more numerous than in the Carnivora proper, which never have more than six in each jaw, whereas the Opossum's incisors are ten in number in the upper and eight in the lower jaw; their size is, however, so small that they cannot be of very much use to the animal.

The tail is only hairy at the root, being bare and scaly like a Rat's for the rest of its length, and it is strongly prehensile, so that the animal can suspend itself by it when it wishes to lower itself down to reach something from a higher bough when foraging for food in a tree.

The ragged-looking coat varies a good deal in colour, not only locally, but individually and as a matter of age; in the mixture of black and white hairs it presents the darker colour predominates in the younger specimens, and the light in the older ones.

This Opossum has much the widest range of its family, being, in fact, a member of a tropical group which has intruded, or succeeded in maintaining itself, in a temperate region, much like the Kingfisher among our British birds; for it is not confined to North America, but ranges through Central America down through Brazil, the so-called Crab-eating Opossum of South America not being a really distinct species.

It is a slow-moving, rather stupid animal, largely arboreal in its habits, and very omnivorous in its food; it devours birds and their eggs, Squirrels and any other small animals which fall in its way in its nocturnal prowlings, for it is a creature of the night. Fruit also forms part of its food, nor does it disdain the tender shoots of plants which show themselves in the spring, when it is pinched with hunger after the hard times of winter. Sometimes, it is said, it even lives in towns and acts as a street-scavenger by night, retiring into drains or climbing up to the roofs to escape observation by day. It not unfrequently gets into trouble by robbing hen-roosts, but in compensation for the harm thus done, it itself furnishes a valued article of food, though its meat is most especially appreciated by the "nigger" element of the American population, who take the keenest possible delight in a 'Possum hunt by torchlight, and consider 'Possum stew as one of the greatest delicacies they can obtain. With this idea in mind, they do their best to capture the Opossum alive after he has been "treed" by their Dogs, and carry him home in triumph to be fattened up for the table on bread, potatoes, and so forth, of which he consumes a most unprofitable quantity. One very characteristic trait of the Opossum is that when brought to bay it proceeds to feign death, a trick so familiar that "playing 'Possum" has become a proverbial expression for deception. This death-feigning instinct is found in many other animals of very diverse kinds—the Fox, for example—but the Opossum is considered to be a particularly skilful artist in this line. It is as well, however, to handle him with caution when apparently defunct, or a severe bite may remind his incautious captor that he is not so dead as he looks. When provoked in captivity, the Opossum snarls in a peculiar way, opening his mouth, which is remarkably wide, and showing his fine set of teeth, without making any noise.

The young Opossums are brought forth in a very helpless state and very minute, as in Marsupials generally; they are only half-an-inch long, and have no claws on the hind-toes at first; about a dozen form a litter. During the first fortnight after they are born the old Opossum keeps her pouch very tightly closed, and the young ones are not as big as Mice till nearly a month old. As in the case of the Kangaroos, they do not leave the pouch entirely for some time. This Opossum has long been well known in menageries, but is not very commonly kept, as it does not make at all an attractive pet.

Taken as a group, all these American Opossums are much alike, so that any species of them can be readily referred to its family. All the other species are much smaller than this common North American one, some being hardly bigger than Mice; and most of them have but a rudimentary pouch or even none at all. The young of several, when they cease to cling on to the nipples of the old ones, ride on her back, holding on not only with their paws, but also by twining their tails round that of their mother. One beautiful little species of this group is the Murine Opossum (*Didelphys murina*), a pretty chestnut-coloured animal hardly bigger than a Dormouse, but with its tiny head a perfect miniature of the big Opossum's, and the same habit of noiseless snarling. The last specimen of this little creature exhibited in our Zoological Gardens was imported accidentally along with bananas.

Some of the small Opossums are very like Shrews, having comparatively short and non-prehensile tails; and, indeed, these little Opossums seem to be the natural representatives of these Insectivores in South America.

THE WATER-OPOSSUM

(*Chironectes yapock*)

The Water-Opossum enjoys the distinction of being the only truly aquatic Marsupial, and, in adaptation to this habit, has large webbed hind-feet. Like an Otter—by which name it is called in Demerara—the Water-Opossum lives in holes in the banks, and feeds on fish and other aquatic creatures. Its cheeks are pouched to hold its food, and it has the marsupial brood-pouch fully developed. The litter are about six in number. This Opossum is about as large as a Rat, and peculiarly coloured, being light grey, with some large transverse dark-brown patches on the upper parts. It is found in Brazil as well as in Guiana, but has never been exhibited at our Zoological Gardens.

THE MARSUPIAL MOLE

(*Notoryctes typhlops*)

This curious little animal, which is the sole representative of its family (*Notoryctidæ*) is of peculiar interest as exemplifying the great variety among these pouched animals; it is a quite recent discovery,

having only been described in 1891. In general form it is quite Mole-like, with very short limbs, in which the second and third toes in the fore-foot are greatly developed at the expense of the other three, and bear enormous claws. The muzzle is shorter than in the true Moles, and has a callous pad at the tip; the eyes are covered by the skin.

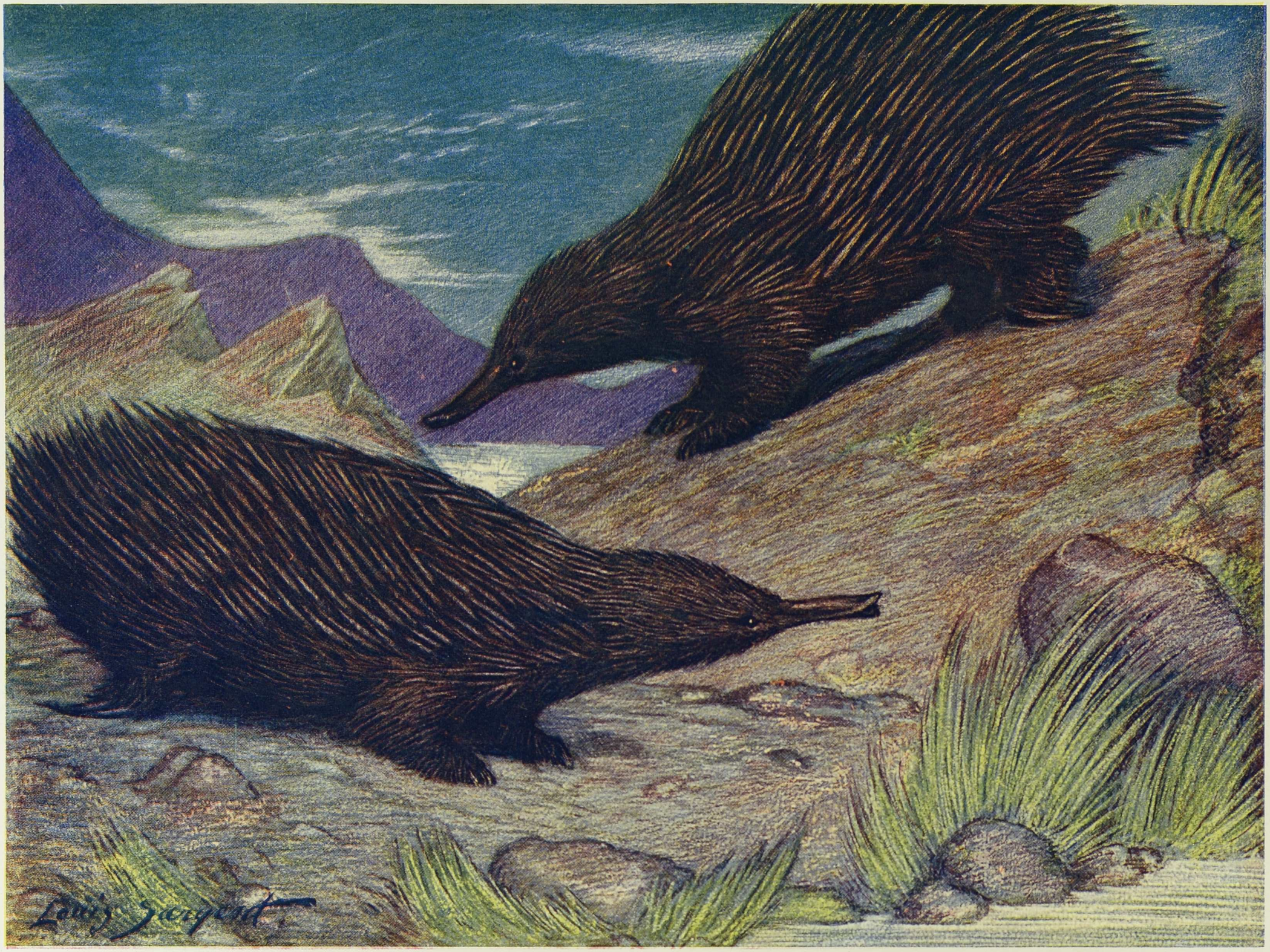
The teeth are very peculiar, though on the whole conforming to the general type of the carnivorous Marsupials. The canines, however, are small, and the teeth vary remarkably in number, being sometimes different on the two sides of the jaw. This creature lives in the dry and arid districts of Central Australia; it is essentially a burrower, and very few specimens have ever been captured.

THE RATON RUNCHO

(*Cænolestes obscurus*)

THE "Opossum Rat," to give this animal an English name, is, except its relative *Cænolestes fuliginosus*, the only living representative of the family *Epanorthidæ*, though these are well known as fossil animals. Only one specimen of each of the living species has ever been taken, and *C. fuliginosus* was described fifty years ago, from Ecuador. The "Raton Runcho" was captured at Bogota, and is about the size of a small Rat, and resembles one in shape and is of a dark colour. On the fore-paws it has five toes, the first and fifth bearing nails instead of claws; the hind-feet have practically only four toes, the first being rudimentary.

The teeth are very remarkable; in the upper jaw are several incisors and well-developed canines, as in the carnivorous Marsupials; but in the lower jaw we find the two great projecting incisors of the vegetarian Phalangers and Kangaroos, the canines are very small, and the grinders also are like those of Phalangers. There is, however, no union between the second and third toes of the hind-foot, which are free, as in carnivorous Marsupials. Moreover, the creature, which is a climber, is said to live on small birds and their eggs, so that to a certain extent it unites two great Marsupial divisions, though it must be referred rather to the herbivorous section as far as structure goes.



ECHIDNAS

By Louis A. Sargent

THE ECHIDNA

(*Echidna hystrix*)

BEING a frequent exhibit at the Zoological Gardens, the Common Echidna is the best known—though not the most remarkable—of the extraordinary order of beasts known as *Monotremata*, the lowest of milk-giving creatures, for, unlike all others which suckle their young, they lay eggs like birds. It must not be supposed that on this account they form in any way a link between birds and beasts, although in some particulars of their anatomy also they are bird-like. But in these points they are reptilian also, and it will be remembered that most reptiles are egg-layers. The fact appears to be that both beasts and birds arose from reptilian types, so that they form as it were the two branches of a letter Y, the reptiles being the stem; and our living monotremes are the sole survivors of a race which branched off from the beast stem very soon after the departure from reptiles, when all these great classes were more alike than they are now.

The Echidna has, it must be admitted, a very bird-like head, with its narrow toothless beak and want of external ears; the jaws, however, are united nearly to the tips, where there is a small mouth, and the nostrils are also at the end, as in a beast's muzzle. The tongue is long and worm-like, as in the Ant-eaters.

The short, stumpy, awkward-looking limbs bear each five huge claws, those on the fore-feet particularly strong and broad; on the hind-foot the toes are turned out and back in a very peculiar way, unlike what is seen in other beasts. The tail is very short, and concealed by a cluster of the spines which cover the upper parts of the broad squat body, the lower, as is always the case in spiny beasts, being hairy. On the middle of the back the spines of the opposite sides overlap each other.

In length the creature measures about a foot from muzzle to

tail; it may be compared to a small Rabbit. The sexes are alike in general appearance, but the male is provided with a spur on the heel, horny like a Cock's, but perforated by the duct of a gland on the leg.

The Echidna inhabits Australia and New Guinea; it shows a considerable amount of local variation, three races being distinguished, of which the most distinct is the Tasmanian Echidna, in which a thick coat of fur grows between the spines and almost conceals them from view. A similar difference, it will be remembered, exists between the species of American Porcupines. The food of the Echidna consists of Ants, which, like an Ant-eater or Pangolin, it licks up with its long worm-like tongue. Along with these it swallows a great deal of sand, and sometimes nothing but this is found in its interior, for it has the power of living a long time without food, being able to exist thus for weeks together. This is, of course, a reptilian peculiarity, and another is the creature's low temperature, which is only about 78°.

The Echidna is a nocturnal animal, frequenting sandy and rocky districts, where it hides in holes in the daytime; when on the move, it shuffles about actively enough, though with a very awkward gait, with the fore-toes turned inwards and the hind ones outwards. It has no means of active defence, but is a "passive resister" of the first order; it not only can roll itself up like a Hedgehog, but is so strong and struggles so vigorously that the only way to handle it without getting hurt is to catch hold of it by one hind-leg while it is unrolled. When disturbed, it also tucks in its head, and clings to the ground so tenaciously that the only way of moving it is to fairly scrape it off the surface with a spade. This is on a hard surface like boards; on the ground it will soon get out of reach, for it is, as might be expected from its structure, a remarkably powerful and rapid burrower. When asleep, it generally rolls itself up; in performing its toilet, it shows considerable power of change of position, as the work is done entirely with the hind claws. Unlike its relative the Platypus, it seems to have no voice.

The Australian natives call this creature in some places *Nickobejan*,

and in others *Jannocumbine* and *Cogera*. They eat it—as they do most things—their method of cooking being to roast it in the skin, and fifty years ago, at any rate, it was considered good eating by our colonial countrymen also.

It is, however, the reproduction of this animal that has the greatest scientific interest. About the beginning of August—which is, of course, winter in Australia—the female lays her one egg, which is about as big as a Sparrow's, but rounder in shape, and of a yellowish colour without markings; a specimen of it can be seen in the South Kensington Museum in the case devoted to this group of animals. The egg, when laid, is placed by the animal in her pouch, which is a special temporary development, having been formed, a short time before the egg is laid, by an overgrowth of a fold of the skin. The temperature of this pouch is higher than that of the body generally, and thus aids in the incubation of the egg. The young one has a hard pimple on its snout, like the "egg-tooth" which can be seen on the bill of a newly-hatched chicken, its purpose being similarly the breaking of the shell, which is then removed from the pouch by the mother.

She has no teats, but the milk oozes from the surface of the skin and collects on tufts of hairs, which are sucked by the young one. This, at birth, is very small, weak, and quite naked; it remains in the pouch till it is as big as one's fist, but the spines do not appear till after the fur has grown. When caught at this age, it can be reared on milk.

As soon as it becomes prickly, the mother, probably finding it an uncomfortable object to keep in her pocket, digs a burrow and puts it there while she roams abroad. When at length she abandons it as able to shift for itself, her pouch gradually shrinks away, not to re-appear till the next breeding season.

During the driest part of the year the creature falls into the state of "æstivation," or summer sleep, which in some animals living in hot dry countries, answers to the hibernation of some of those inhabiting climates with a severe winter. The only enemy which seems to attack the Echidna, other than man, is the Thylacine or Marsupial Wolf of

Tasmania, which appears to be able to overcome it as the Fox and Badger with us do the Hedgehog.

The Echidna is not difficult to keep in captivity, feeding on minced raw meat, chopped hard-boiled egg, and milk; probably a mixture of dried "Ants' eggs" and dried "Flies," as used for insectivorous birds, would be a beneficial addition to this diet. Only the typical Australian race has been exhibited in this country at the time of writing.

THE THREE-TOED ECHIDNA

(*Proechidna bruijni*)

Besides a local race of the ordinary Echidna, there exists in New Guinea a very distinct species. In this animal the muzzle is much longer than in the common kind, and is curved downwards. The body is much more furry than in the Australian Echidna, and is less spiny, thus recalling the Tasmanian race. But the most notable distinction is the fact that there are only three toes on each foot—though this is not invariable, for sometimes others are developed on a small scale, and a specimen has been found with five toes on the fore-feet and four on the hinder pair. In size this creature is larger than the Common Echidna.



DUCK-BILLED PLATYPUS

By Louis A. Sargent

THE PLATYPUS

(*Ornithorhynchus anatinus*)

It is not astonishing that the first specimens of this creature which reached Europe should have been suspected of being "faked"; for no one could reasonably be expected to believe in the genuineness of a skin which seemed to have come from a web-footed Mole as big as a small Rabbit, provided with a Duck's bill! The bill of the creature has, indeed, a peculiarly artificial look, as the skin of it is continued as a sort of flap at the base, giving it the appearance of being fastened on; it is much softer in life than would appear from the examination of stuffed specimens, and the nostrils are situated towards the tip, not at the base as in most real Ducks, though in one of our British species, the Golden-eye Duck (*Clangula glaucion*) they occupy much the same position. The inside of these Duck-like jaws is provided in the Platypus with flat horny plates, which serve as teeth in chewing the food; but in young specimens there are true teeth, two pairs of broad flat grinders with very complicated crowns, and a minute pair in front of these. Like the Echidna, the Platypus has no external ears.

The legs of the creature are excessively short and furnished on each foot with five toes, strongly clawed and fully webbed; on the fore-feet, indeed, the web extends well beyond the tips of the claws, but it is folded back when the animal is walking or engaged in digging. On the hind feet there is in the male a horny spur on the heel, perforated to discharge the secretion of a gland in the leg, as in the case of the male Echidna. There has been considerable discussion as to this structure, so analogous to the poison-fangs and glands of venomous Snakes; and it seems that the secretion is poisonous, though very faintly so, while the animal is not in the ordinary way at all inclined to use its spurs in self-defence. It is, however, not the easiest creature to handle, as its skin is so loose that it feels as if

enclosed in a fur bag, while its appearance, as it shuffles along, is so quaint and unnatural that Dogs prefer barking at it to biting it, and Cats fairly run away from it. The fur of the Platypus is thick and soft, and composed of two sorts of hair, the under-fur being shorter, while the end portions of the longer hairs are stouter. On the upper part of the flattened tail, which, by the way, ends off squarely, not tapering as tails usually do, the hair is coarser and stronger than elsewhere, and the under-side of the tail is nearly naked in adult specimens, though covered with fine silvery-white fur in the young. Young animals also have the under-jaw white, this becoming mottled in the old ones; the under-part of the upper jaw, which is quite soft, is of a flesh colour. As happens to some extent in the case of some of the softer-billed Ducks, the beak loses considerably in appearance in the dried specimens, becoming hard and leathery-looking. The bill is much used by the beast in dressing its fur, and it also combs itself with the claws of the hind-feet.

Any one, on looking at this creature, could see at once that it was aquatic in its habits, and, indeed, it is usually seen in the water, where it swims well, propelling itself with the fore-paws, and with the head only above the surface, the body being level with it. The high position of the eyes in the head is an advantage to the animal when swimming, but renders it liable to run against objects when travelling on land, where it runs awkwardly, but rapidly enough. It is, of course, a good diver, and seldom remains for long together on the surface, while it is very shy, diving at once when alarmed, after which it is hard to see it again. It is most active in the early morning and the evening, and especially affects weedy places in the rivers. In suitable localities the Platypus is widely distributed over Australia, and it is found in Tasmania also. Its method of feeding is, as might be expected, very similar to that of a Duck, and its food is the same as that especially sought by those birds—water-snails and other shell-fish, and small aquatic life generally. The cheeks are provided with pouches, and these the animal fills with food before rising to the surface to chew it with its teeth. The true teeth of young specimens

are gradually worn away by this, and the permanent horny teeth gradually grow up round and replace them. Much sand is taken in as well as food, after the manner of birds.

The home of the Platypus is a burrow, dug by the beast itself, for it is an excellent burrower as well as a good swimmer; the tunnel may be as much as twenty feet long, and has two entrances, one under the water, and one a foot or more from it. At the end of the hole is to be found an enlarged chamber which is lined with dry weed. It is here that the young ones are deposited when old enough to be left by the mother for a time, and it is believed that the eggs, which are two in number, yellowish, and flexible-shelled like a Snake's, are deposited also in the burrow, for the female Platypus does not develop a nursing-pouch like the Echidna. She resembles that animal, however, in having no teats, the milk exuding upon the surface of the skin. The young have short bills, adapted for sucking it up; and when first born they are blind and naked.

The Platypus is known to the Australian blacks by the names of *Mullingong* and *Tambreet;* they eat it, especially esteeming the young ones, the sight of a plump young Platypus fairly making a "black-fellow's" mouth water, The colonists, by whom the beast is known as "Duckbill" and "Water-Mole," used to use the fur for rugs, and I am sorry to say sometimes do so still, although this most interesting and harmless animal is very properly protected by law. Such an animal as this would be a most desirable exhibit in any Zoological Garden, but so far it has not been brought to Europe alive. Even the Australian Zoological Gardens do not exhibit it; but this is not surprising, as there seems to be at present but little knowledge of the management of delicate animals at the Antipodes.

Delicate the Platypus certainly is, compared to its relative the Echidna; but it has been successfully kept in captivity in Australia for some weeks, and even taken some distance on the homeward journey.

Dr. Bennett, in his *Wanderings of a Naturalist*, gives a very interesting account of a couple of young specimens which he kept for

some time; they appeared to have been very nice little pets, much resembling Puppies in many of their ways, as they constantly played with each other. and would nibble at his fingers sportively with their bills. They enjoyed bathing and rolling about in shallow water, but did not like a deep bath, nor did they stay in for more than a quarter of an hour at a time. This indicates the sort of accommodation such creatures should have when closely confined for a voyage to Europe; it would be best to keep them in a cage, and let them out for a bath two or three times a day. They slept a great deal, curled up into balls, and usually together; when disturbed they growled, a habit also common to old specimens. The food given them — soaked bread, chopped egg, and finely minced meat—does not seem to have agreed with them; but on such a diet many of the more delicate insectivorous birds, such as Nightingales, would not long survive; yet these are kept for long periods by our fanciers on more suitable diet, including plenty of live food, and there seems no reason why this very bird-like beast should not be treated in the same way, using "dried flies" and "dried Ants' eggs"—well soaked, of course—with the addition of Mealworms. Earthworms and Water-Snails could easily be taken in sufficient quantity to last the whole voyage if only a few of the Platypus were shipped; it would surely be worth while to go to considerable trouble and expense to import an animal of such surpassing scientific and popular interest, the only Monotreme besides the Echidnas.

INDEX

Aard-Wolf, i. 100
Aard-Varks, ii. 160
,, Cape, ii. 160
,, Ethiopian, ii. 160
Acouchy, i. 215
Addax, ii. 44
African Buffalo, ii. 31
,, Civet, i. 90
,, Elephant, ii. 12
,, Mouse-Deer, ii. 104
,, Ratel, i. 128
,, Rhinoceros, ii. 15–16
,, ,, Great, ii. 16
,, Wild Cat, i. 80
Agoutis, i. 215
Aguarâ-guazu, i. 108
Almiqui, i. 172
Alpaca, ii. 111
Alpine Marmot, i. 192
American Badger, i. 127
,, Bison, ii. 25–26
,, Black Bear, i. 151–152
,, Caribou, ii. 97
,, Chipmunk, i. 191
,, Marten, i. 117
,, Mink, i. 119
,, Opossum, ii. 173–175
,, Raccoon, i. 116
,, Tapir, ii. 17–18
Angolan Guereza, i. 22
,, Pallah, ii. 40
Anoa, ii. 32
Ant-Bear, ii. 153–154
,, Cape, ii. 160
,, Ethiopian, ii. 160
Ant-Eaters, Banded, ii. 171–172
,, Great, ii. 153–154
,, Little, ii. 155–156
,, Tamandua, ii. 155
Antelopes, Four-horned, ii. 58
,, Harnessed, ii. 56
,, Kob, ii. 47
,, Roan, ii. 46–47
,, Royal, ii. 60
,, Sable, ii. 45–46
Aoudad, ii. 72
Ape, Barbary, i. 27
Arabian Tahr, ii. 68
Arctic Fox, i. 111
,, Lemming, i. 195
Argali, ii. 70
Arimau-dahan, i. 77
Armadillos, Ball, ii. 159
,, Giant, ii. 159
,, Hairy, ii. 157–159
Arui, ii. 72
Asiatic Ibex, ii. 67
,, Two-horned Rhinoceros, ii. 15
Ass, ii. 23–24
Aswail, i. 150
Aurochs, ii. 27
Avahi, i. 55
Awantibo, i. 56
Aye-aye, i. 56

Babakoto, i. 55
Babirusa, ii. 121–123
Baboons, Black, i. 36
,, Gelada, i. 36
,, Sacred, i. 36
Bactrian Camel, ii. 108
Badger, i. 125–127
,, American, i. 127
Bagdas, i. 90
Baird's Tapir, ii. 18–19
Bald Chimpanzee, i. 2
,, Ouakari, i. 47
Ball Armadillos, ii. 159
Bamboo-Rats, i. 203
Banded Ant-Eater, ii. 171–172
,, Duiker, ii. 59
Bandicoots, ii. 172
,, Pig-footed, ii. 172
,, Rabbit, ii. 172
Banteng, ii. 28
Barbary Ape, i. 27
Barking Deer, i. 84
Barrigudos, i. 39–40
,, Humboldt's, i. 40
Bassaricyon, i. 139
Bats, Fishing, i. 183
,, Long-eared, i. 184
,, Rat-tailed, i. 183–184
,, South American White, i. 141, 144
Bay Lynx, i. 81
Beaked Whales, ii. 132
Bear, American Black, i. 151–152
,, Blue, i. 144
,, Brown, i. 145–148
,, Cat, i. 92
,, Grizzly, i. 148
,, Himalayan, i. 151
,, Japanese, i. 151
,, Malayan, i. 152
,, Pied, i. 144
,, Polar, i. 141–144
,, Spectacled, i. 152
Bear-Pig, i. 128
Beatrix, ii. 43–44
Beaver, i. 185–188
Beech-Marten, i. 118
Beira, ii. 39
Beisa Oryx, ii. 41–42
Beluga, ii. 140
Bhaloo-soor, i. 128
Bharal-hay, i. 73
Bighorn, ii. 70
Binturong, i. 92
Biscay Right Whale, ii. 143
Bison, American, ii. 25–26
,, European, ii. 27
Black Baboon, i. 36
,, Bear, American, i. 151–152
,, Cat, i. 119
,, Fox, i. 119
,, Guereza, i. 23
,, Howler, i. 46
,, Lemur, i. 54
,, Leopard, i. 65–67
Black Tamarin, i. 51
,, Wildebeest, ii. 35
Black-backed Jackal, i. 105–106
Blackbuck, ii. 40
Black-eared Marmoset, i. 51
Blackfish, ii. 139–140
Blackheaded Ouakari, i. 47
Black Rat, i. 200
Black-tailed Deer, ii. 94
,, Gnu, ii. 33–34
,, Marmoset, i. 52
Bladdernose, i. 164
Bleauwbok, ii. 47
Blesbok, ii. 36
Blind Mole-Rat, i. 203
Blue Bear, i. 144
,, Whale, ii. 144
,, Wildebeest, ii. 33
Boar, European Wild, ii. 119–120
,, Indian Wild, ii. 117–119
Bongo, ii. 54–55
Bonnet Monkey, i. 25
Bontebok, ii. 36
Bottle-nose, ii. 132
Bottle-nosed Dolphin, ii. 136
Brazilian Otter, i. 135
,, White-eared Marmoset, i. 51
Brindled Gnu, ii. 33
Brockets, ii. 95
,, Red, ii. 95
Brown Bear, i. 145–148
,, Capuchin, i. 41–44
,, Hare, ii. 3
,, Howler, i. 46
,, Hyæna, i. 98–99
,, Monkey, i. 25
Brush-tailed Porcupine, i. 206–207
Burchell's Zebra, ii. 21–22
Buffalo, ii. 25
,, African, ii. 31
,, Dwarf, ii. 31
,, Indian, ii. 29–31
Bunder, i. 25–28
Bun manus, i. 11
Burmese Civet, i. 90
Burrhel, ii. 72
Burrhel-Tiger, i. 73
Bushbucks, ii. 55–56
Bush-Cow, ii. 31

Cachalot, ii. 129–132
Cacomistle, i. 140
Ca'ing Whale, ii. 139–140
Californian Grey Whale, ii. 144
,, Sea-Lion, i. 153–156
Calling-Hares, ii. 4
Camel, ii. 105–107
,, Bactrian, ii. 108
,, One-humped, ii. 105
,, Two-humped, ii. 108
Canadian Lynx, i. 81
,, Porcupine, i. 206–207
Cape Eland, ii. 49
Capuchin, Brown, i. 41–44
,, Horned, i. 41
,, Smooth-headed, i. 41
,, White-throated, i. 41
Capybara, i. 213–214
Caracal, i. 83–84
Carcajou, i. 121
Caribou, ii. 97–100
,, American, ii. 97
,, Woodland, ii. 98, 99
Cat, African Wild, i. 80
,, Bear-, i. 92
,, Black, i. 119
,, Servaline, i. 79
,, Wild, i. 79–80
Caucasian Turs, ii. 68
Cavy, Patagonian, i. 214
Central American Tapir, ii. 19
Chacma, i. 36
Chamois, ii. 61–62
Cheetah, i. 85–88
Cherry-crown Monkey, i. 32
Chevrotain, Little Malay, ii. 103
,, Water, ii. 104
Chigetia, ii. 24
Chilian Pudu, ii. 95
Chimpanzee, i. 1–4
,, Bald, i. 2
Chinchilla, i. 211–212
,, Long-tailed, i. 212
,, Short-tailed, i. 212
Chipmunk, American, i. 191
Chiru, ii. 39
Civet, i. 89–90
,, African, i. 90
,, Burmese, i. 90
,, Large Indian, i. 90
,, Small Indian, i. 90
Clawless Otter, i. 135
Clouded Leopard, i. 77–78
Coast-Rat, i. 203
Coati, Ring-tailed, i. 137
,, White-nosed, i. 137–138
Coatimondis, i. 137–138
Cobego, i. 174–176
Collared Fruit-Bat, i. 180
,, Peccary, ii. 125–127
Colobus Monkey, i. 21
Colugo, i. 173
Coney, ii. 7
Couendou, i. 208
Cougar, i. 69
Cow, Mountain, ii. 18
Coyote, i. 104
Coypu, i. 204
Crab-eating Macaque, i. 27
,, Raccoon, i. 138
Cuscuses, ii. 166

Dall's Sheep, ii. 71
Dassie, ii. 5–7
,, Syrian, ii. 7
Dasyures, Typical, ii. 170–171
Deer, Barking, ii. 84
,, Blacked-tailed, ii. 94

Deer, Milou, ii. 92
,, Pampas, ii. 95
,, Spotted, ii. 87–88
,, Typical, ii. 83
,, Virginian, ii. 93–94
,, White-tailed, ii. 93
Derbian Eland, ii. 52
Desert-Hares, ii. 4
Desman, i. 168
,, Pyrenean, i. 168
Devil-fish, ii. 144
Devil, Indian, i. 122
,, Tasmanian, ii. 169–171
Dhole, i. 113–115
,, Malay, i. 113
Diademed Sifaka, i. 55
Diana Monkey, i. 29–32
Dibatag, ii. 38–39
Dikdiks, ii. 60
Dingo, i. 107–108
Dog, Red Wild, i. 113–115
Dolphin, Bottle-nosed, ii. 136
,, Common, ii. 135–136
,, Risso's, ii. 139
,, White-beaked, ii. 136
,, White-sided, ii. 136
Dormice, i. 204
Douroucoulis, i. 48
Duckbill, ii. 183
Duikers, ii. 58–59
,, Banded, ii. 59
,, Common, ii. 59
,, Jentink's, ii. 59
,, Yellow-backed, ii. 59
Dumba, ii. 79
Dwarf Buffalo, ii. 31
,, Lemurs, i. 55
,, Right Whale, ii. 143

EASTERN Porpoise, ii. 134
Echidna, ii. 177–180
,, Three-toed, ii. 180
Egyptian Jerboas, i. 202
,, Mongoose, i. 95–96
Eland, ii. 49–52
,, Cape, ii. 49
,, Derbian, ii. 52
,, Livingstone's, ii. 49
Elephant, African, ii. 12
,, Indian, ii. 9–12
,, White, ii. 10
Elephant-Shrew, i. 171
Elk, ii. 89–92
Emperor Marmoset, i. 52
Endrina, i. 55
Enjocko, i. 8
Ermine, i. 120
European Bison, ii. 27
,, Ibex, ii. 67
,, Mink, i. 119
,, Wild Boar, ii. 119–120

FALLOW-Deer, ii. 88
,, ,, Giant, ii. 89
Fat Dormouse, i. 204
Fat-tailed Lemurs, i. 55
Fennec, i. 112
Field-Mouse, Long-tailed, i. 199
Field-Vole, i. 196
Fisher, i. 118
Fishing Bat, i. 183
Five-toed Sloth, i. 149
Flittermouse, i. 184
Flying-Fox, Indian, i. 177–180
Flying Phalangers, ii. 166–167
Flying-Squirrels, i. 191
Forest-Hog, ii. 124
Fossa, i. 92
Four-horned Antelope, ii. 58
,, Hog, ii. 121
Fox, i. 109–111
,, Arctic, i. 111
,, Black, i. 119
,, Red, i. 109
,, Silver, i. 109
Fruit-Bat, Collared, i. 180
,, Long-tongued, i. 180
Fur-Seals, i. 155–156

GALAGOS, i. 55
Garden Dormouse, i. 204
Gaur, ii. 27–28
Gelada Baboons, i. 36
Gemsbok, ii. 43
Genets, i. 90–91
,, Common, i. 91
Geoffroy's Marmoset, i. 52
Gerenook, ii. 39
Ghorpkur, ii. 24
Giant Armadillo, ii. 159
,, Fallow-Deer, ii. 89
Gibbon, Hainan, i. 16
,, Javanese, i. 15
,, Silvery, i. 14
Giraffe, ii. 73–76
Glutton, i. 121–123
Gnu, Black-tailed, ii. 33–34
,, Brindled, ii. 33
,, White-bearded, ii. 33
,, White-tailed, ii. 34–35
Goat, Rocky-Mountain, ii. 63, 141
,, Wild, ii. 66–67
Golden-headed Marmoset, i. 51
Golden Moles, i. 172
Golden-tailed Tupaia, i. 169–170
Gophers, i. 202
Goral, ii. 62
Gorilla, i. 5–8
Grampus, ii. 137–138
,, Risso's, ii. 139
Great Ant-Eater, ii. 153–154
,, Kangaroo, ii. 163
Green Monkey, i. 31
Greenland Whale, ii. 143
Grévy's Zebra, ii. 23
Grey Indian Mongoose, i. 93–94
,, Seal, i. 163
,, Whale, Californian, ii. 144
Grison, i. 123–124
Grizzly Bear, i. 148
Ground-Squirrels, i. 191–192
Grysbok, ii. 59
Guanaco, ii. 109–112
Guatemalan Howler, i. 46
Guereza, i. 21–24
,, Angolan, i. 22
,, Black, i. 23
,, Kirk's, i. 23
Guinea-Pig, i. 214–215

HAINAN Gibbon, i. 16
Hairy Armadillo, ii. 157–159
,, Rhinoceros, ii. 15
,, Saki, i. 47
Hamster, i. 197–198
Hangul, ii. 86
Hare, Brown, ii. 3
,, Common, ii. 1–3
,, Jumping, i. 201
,, Mountain, ii. 3
,, Polar, ii. 3
Harnessed Antelope, ii. 56
Harp Seal, i. 163–164
Harrisbuck, ii. 45
Hartebeests, ii. 35–36
,, Bastard, ii. 36
Harvest-Mouse, i. 199–200
Hedgehog, i. 165–167
Himalayan Bear, i. 151
,, Lungoor, i. 19
,, Lynx, i. 81
,, Serow, ii. 63
Hippopotamus, ii. 113–116
,, Pigmy, ii. 116
Hog, Pigmy, ii. 120
,, Four-horned, ii. 121
Hog-Badger, i. 127–128
Hoolock, i. 13–16
Horned Capuchin, i. 41
Horse, Prezevalsky's, ii. 24
,, Wild, ii. 24
Horse-Whale, i. 157
House-Mouse, i. 199
,, Rat, i. 200
Howler, Black, i. 46
,, Brown, i. 46
,, Guatemalan, i. 46
,, Red, i. 200
Huemul, ii. 95
Humboldt's Barrigudo, i. 40
Humpback, ii. 144
Hunting-Dog, i. 115–116
,, Leopard, i. 85
Hyæna, Brown, i. 98–99
,, Spotted, i. 99–100
,, Striped, i. 97–98

IBEXES, ii. 67–68
,, Asiatic, ii. 67
,, European, ii. 67
,, Persian, ii. 66
Ichneumons, i. 93
Indian Buffalo, ii. 29–31
,, Civet, Large, i. 90
,, Civet, Small, i. 90
,, Devil, i. 122
,, Elephant, ii. 9–12
,, Flying-Fox, i. 177–180
,, Jackal, i. 106–107
,, Marten, i. 118
,, Mongoose, Grey, i. 93–94
,, Mouse-Deer, ii. 101–103
,, Ratel, i. 128
,, Rhinoceros, ii. 13–14
,, Striped Squirrel, i. 189–190
,, Vampire, i. 183
,, Wild Boar, ii. 117–119
Inyala, ii. 55

JACKAL, Black-backed, i. 105–106
,, Indian, i. 106–107
,, Maanhaar, i. 100
,, Maned, i. 100
Jaguar, i. 74–76
Jamrack's Mangaby, i. 32
Japanese Bear, i. 151
,, Monkey, i. 28
Javanese Gibbon, i. 15
Jentink's Duiker, ii. 59
Jerboas, i. 202
,, Egyptian, i. 202
Jerrow, ii. 87
Jumping Hare, i. 201

KAGUAN, i. 173
Kalong, i. 180
Kanchil, ii. 103
Kangaroos, i. 57
,, Common, ii. 163
,, Free, ii. 164
,, Great, ii. 163
,, Musk, ii. 164
,, Red, ii. 161–163
Kansu Musk-Deer, ii. 83
Kiang, ii. 24
Killer, ii. 137–138
Kinkajou, i. 139–140
Kirk's Guereza, i. 23
Klipspringer, ii. 60
Koala, ii. 167–168
Kob Antelopes, ii. 47
,, White-eared, ii. 47
Koodoo, ii. 53–54
,, Lesser, ii. 54
Kulong, i. 173

LABBA, i. 215–216
Lake-Cow, ii. 115
Large Indian Civet, i. 90
Lechwe, ii. 48
Lemming, i. 194–195
,, Arctic, i. 195
Lemurs, Black, i. 54
,, Dwarf, i. 55
,, Fat-tailed, i. 55
,, Mouse, i. 55
,, Ring-tailed, i. 54
,, Ruffed, i. 53–54
,, Slow, i. 56
Leopard, i. 65–68
,, Black, i. 65–67
,, Clouded, i. 77–78
,, Hunting, i. 85
Lesser Koodoo, ii. 54
Leucoryx, ii. 44
Linsangs, i. 90–91
Lion, i. 57–60
,, Marmoset, i. 49–52
Little Ant-Eater, ii. 155–156
,, Malay Chevrotain, ii. 103
Livingstone's Eland, ii. 49
Llama, ii. 111
,, Wild, ii. 109–112
Long-eared Bat, i. 184
Long-tailed Chinchilla, i. 212
,, Field-Mouse, i. 199
,, Monkey, i. 28
Long-tongued Fruit-Bat, i. 180
Loris, Slender, i. 56
,, Slow, i. 56
Lucivee, i. 81
Lungoor, i. 17–20
,, Himalayan, i. 19
,, Madras, i. 19
,, Malabar, i. 19
,, White, i. 32
Lynx, i. 81–83
,, Bay, i. 81
,, Canadian, i. 81
,, Himalayan, i. 81
,, Northern, i. 81
,, Spotted, i. 81

MAANHAAR Jackal, i. 100
Macaque, i. 26–27
,, Crab-eating, i. 27
Madras Lungoor, i. 19
,, Tree-Shrew, i. 169
Malabar Lungoor, i. 19
Malay Chevrotain, Little, ii. 103
,, Dhole, i. 113

Malayan Bear, i. 152
,, Tapir, ii. 19–20
Mammoth, ii. 12
Mandrill, i. 33–36
Maned Jackal, i. 100
,, Wolf, i. 108
Mangabeys, i. 32
,, Jamrack's, i. 32
,, Sooty, i. 32
,, White-collared, i. 32
Mara, i. 214
Marco Polo's Sheep, ii. 69–71
Markhor, ii. 65–66
Marmoset, Black-eared, i. 51
,, Black-tailed, i. 52
,, Brazilian White-eared, i. 51
,, Emperor, i. 52
,, Geoffroy's, i. 52
,, Golden-headed, i. 51
,, Lion, i. 49–52
,, Pigmy, i. 50, 51
,, Silky, i. 52
Marmots, i. 192
,, Alpine, i. 192
,, Prairie, i. 96
Marshbucks, ii. 56
Marsupial Mole, ii. 175–176
Marten, American, i. 117
,, Beach, i. 118
,, Indian, i. 118
,, Pine, i. 117
,, Stone, i. 118
Meerkat, i. 96
,, South African, i. 71
Mexican Tree-Porcupine, i. 208
Mias, i. 11
Milou Deer, ii. 92
Mink, i. 119
,, American, i. 119
,, European, i. 119
Moles, i. 167–168
,, Golden, i. 172
,, Marsupial, ii. 175–176
,, North American, i. 168
,, Star-nosed, i. 168
Mole-Rats, i. 203
Mongoose, Egyptian, i. 95–96
,, Grey Indian, i. 93–94
,, White-tailed, i. 22
Monkey, Bonnet, i. 25, 27
,, Brown, i. 17–25
,, Cherry-crown, i. 32
,, Colobus, i. 21
,, Diana, i. 29–32
,, Green, i. 31
,, Japanese, i. 28
,, Long-tailed, i. 28
,, Negro, i. 40
,, Proboscis, i. 19
,, Red-faced Spider, i. 37–39
,, Rhesus, i. 52
,, Snub-nosed, i. 20
,, Squirrel, i. 48
,, Tchelli, i. 26
,, White-whiskered Spider, i. 37, 39
,, Woolly Spider, i. 39
Moose, ii. 89–92
Mouflon, ii. 71
Mountain Cow, ii. 18
,, Hare, ii. 3
,, Zebra, ii. 22–23
Mouse-Deer, African, ii. 104
,, Indian, ii. 101–103
Mouse-Hares, ii. 4
Mouse Lemurs, i. 55
Mouse, Opossum, ii. 167
Moustached Tamarin, i. 52
M'pungu, i. 8
Mule-Deer, ii. 94
Mullingong, ii. 183
Muntjac, ii. 84
Murine Opossum, ii. 175
Musk-Deer, ii. 81–83
,, Kansu, ii. 83
Musk Kangaroo, ii. 164
Musk-Ox, ii. 64
Musk-Rat, i. 171, 193
Musk Shrew, i. 171
Musquash, i. 193–194

NAPU, ii. 103–104
Narhwal, ii. 141–142
Negro Monkey, i. 40
Nilghai, ii. 57–58
Nilgiri Tahr, ii. 68
Nisnas, i. 30
Noctule, i. 184
Noolbenger, ii. 168
North American Mole, i. 168
,, ,, Otter, i. 135
Northern Lynx, i. 81
,, Raccoon, i. 138
Ntschego, i. 8.
Nyam, ii. 70

OCELOT, i. 78–79
Okapi, ii. 77–79
Old English Rat, i. 200
Onager, ii. 24
One-humped Camel, ii. 105
Opossum, ii. 165–166
,, Common American, ii. 173
,, Mouse, ii. 167
,, Murine, ii. 175
Opossum Rat, ii. 176
Orang, i. 9–12
Orang-utan, i. 9–12
Oribis, ii. 59
Oryx, Beisa, ii. 41–42
,, Tufted, ii. 42
Otter, i. 133–135
,, Brazilian, i. 135
,, Clawless, i. 135
,, North American, i. 135
,, Small-clawed, i. 135
,, Spotted-necked, i. 135
Otter Shrew, i. 171–172
Ouakari, Bald, i. 47
,, Black-headed, i. 47
,, Red, i. 47
Ounce, i. 73–74
Ox, Wild, ii. 28

PACA, i. 215–216
,, Tailed, i. 216
Painter, i. 69
Pallah, ii. 40
,, Angolan, ii. 40
Pampas Deer, ii. 95
Panda, i. 140
Pangolins, ii. 156
Panther, i. 65, 66
Paradoxures, i. 91
Patagonian Cavy, i. 214
Patas, i. 30
Peccary, Collared, ii. 125–127
,, White-lipped, ii. 127–128
Pekan, i. 118
Persian Ibex, ii. 66
Phalangers, Flying, ii. 166–167
,, Vulpine, ii. 165–166
Pichiciago, ii. 159–160
Pied Bear, i. 144
Pig-footed Bandicoot, ii. 172
Pigmy Hippopotamus, ii. 116
,, Hog, ii. 120
,, Marmoset, i. 50, 51
,, Shrew, i. 170
,, Sperm-Whale, ii. 144
Pikas, ii. 4
Pike-Whale, ii. 144
Pinchaque Tapir, ii. 19
Pinché, i. 51, 52
Pine Marten, i. 117
Pipistrelle, i. 184
Platypus, ii. 181–184
Pocket-Gopher, i. 202
Polar Bear, i. 141–144
,, Hare, ii. 3
Polecat, i. 119
Pongo, i. 8
Porcupines, Brush-tailed, i. 206–207
,, Canadian, i. 205–206
,, Common, i. 207–208
Porpoise, ii. 133–135
,, Eastern, ii. 134
,, Prickly-finned, ii. 134
Potto, i. 56
Prairie-dog, i. 192
,, Marmot, i. 96
Prevost's Squirrel, i. 190
Prezevalsky's Horse, ii. 24
Prickly-finned Porpoise, ii. 134
Proboscis Monkey, i. 19
Prong-Buck, ii. 79–80
Pudas, ii. 95–96
,, Chilian, ii. 95
Puma, i. 69–72
Pyrenean Desman, i. 168

QUAGGA, ii. 21
,, Bonte, ii. 21

RABBIT, ii. 3–4
,, Bandicoot, ii. 172
Raccoon, i. 138–139
,, American, i. 116
,, Crab-eating, i. 138
,, Northern, i. 138
Raccoon-Dog, i. 116
Rasse, i. 90
Rat Kangaroos, ii. 164
,, ,, Old English, i. 200
,, ,, Opossum, ii. 176
Rat-Shrew, i. 166
,, Small, i. 166
Rat-tailed Bat, i. 183–184
Ratel, African, i. 128
,, Indian, i. 128
Raton Runcho, ii. 176
Red Brocket, ii. 95
,, Cat, i. 84
,, Deer, ii. 85–87
,, Fox, i. 109
,, Howler, i. 45–47
,, Kangaroo, ii. 161–163
,, Ouakari, i. 47
,, River-Hog, ii. 120
,, Wild Dog, i. 113–115
Red-backed Saki, i. 47
Red-faced Spider Monkey, i. 37–39
Red-handed Tamarin, i. 51
Reedbucks, ii. 47
Reindeer, ii. 97–100
Rhebok, ii. 59
Rhesus, Common, i. 25
,, Monkey, i. 52
Rhinoceros, Asiatic Two-horned, ii. 15
,, Black, ii. 15–16
,, Common African, ii. 15–16
,, Great African, ii. 16
,, Hairy, ii. 15
,, Indian, ii. 13–14
,, Sondaic, ii. 15–16
,, Square-mouthed, ii. 16
,, White, ii. 16
Right Whales, ii. 143
,, ,, Biscay, ii. 143
,, ,, Dwarf, ii. 143
Ring-tailed Coati, i. 137
,, Lemur, i. 54
Ringed Seal, i. 163
Risso's Dolphin, ii. 139
,, Grampus, ii. 139
River-Hog, Red, ii. 120
River-Horse, ii. 113
Roan Antelope, ii. 46–47
Rock-Hares, ii. 4
Rock-Rabbit, ii. 5–7
Rock Wallabies, ii. 163
Rocky-Mountain Goat, ii. 63, 141
Roe, ii. 38
Roes, ii. 96
Roloway, i. 29
Rooi-Kat, i. 84
Rorquals, ii. 143–144
,, Common, ii. 144
,, Rudolphi's, ii. 144
Royal Antelope, ii. 60
Rudolphi's Rorqual, ii. 144
Ruffed Lemur, i. 53–54
Runcho, Raton, ii. 176

SABLE, i. 117–119
,, American, i. 117
,, Antelope, ii. 45–46
Sacred Baboon, i. 36
Saiga, ii. 39–40
Saki, Hairy, i. 47
,, Red-backed, i. 47
Sambur, ii. 87
Sand-Mole, i. 203
Sassaby, ii. 36
Scaly-tailed Squirrels, i. 192
Sea-Elephant, i. 164
Sea-Lion, Californian, i. 153–156
Sea-Otter, i. 136
Sea-Unicorn, ii. 141–142
Seal, Common, i. 161–163
,, Grey, i. 163
,, Harp, i. 163–164
,, Ringed, i. 163–164
,, West Indian, i. 164
Serows, ii. 63
,, Himalayan, ii. 63
Serval, i. 79
Servaline Cat, i. 79
Sewer-Rat, i. 200
Sheep, Dall's, ii. 71
,, Marco Polo's, ii. 69–71
Short-tailed Chinchilla, i. 212
Shrews, i. 170
,, Common, i. 170
,, Elephant, i. 171
,, Musk, i. 171

Shrews, Otter, i. 171
,, Pigmy, i. 170
,, Water, i. 171
Siamang, i. 16
Siberian Tiger, i. 92
Sifaka, Diademed, i. 55
Silky Marmoset, i. 52
,, Tamarin, i. 49
Silver Fox, i. 109
Silvery Gibbon, i. 14
Sing-Sing, ii. 47
Sitatunga, ii. 48, 56
Skunk, i. 129–130
,, Small, i. 131–132
,, Southern, i. 131
Slender Loris, i. 56
Sloth, Five-toed, i. 149
,, Ursine, i. 149
Sloth-Bear, i. 149–150
Slow Lemurs, i. 56
,, Loris, i. 56
Small-clawed Otter, i. 135
Small-headed Capuchin, i. 41
Small Indian Civet, i. 90
,, Rat-Shrew, i. 166
,, Skunk, i. 131–132
Snow-Leopard, i. 73
Snub-nosed Monkey, i. 20
Sondaic Rhinoceros, ii. 14–15
Sooty Mangabey, i. 32
South African Meerkat, i. 71
South American White Bat, i. 141, 144
Southern Skunk, i. 131
Spanish Tur, ii. 68
Spectacled Bear, i. 152
Sperm-Whale, ii. 129–132
,, ,, Pigmy, ii. 132
Spider-Monkey, i. 37–38
,, ,, Red-faced, i. 37–39
,, ,, White-whiskered, i. 38, 39
,, ,, Woolly, i. 39
Spotted Deer, ii. 37–38
,, Hyæna, i. 99–100
,, Lynx, i. 81
Spotted-necked Otter, i. 135
Springbuck, ii. 37–38
Spring-Haas, i. 201
Square-mouthed Rhinoceros, ii. 16
Squirrel, Common, i. 190–191
,, Indian Striped, i. 189–190
Squirrel, Prevost's, i. 190
,, Scaly-tailed, i. 192
Squirrel Monkey, i. 48
Star-nosed Mole, i. 168
Steinbok, ii. 59, 67
Stoat, i. 120
Stone Marten, i. 118
Striped Hyæna, i. 97–98
Suricate, i. 96
Syrian Dassie, ii. 7

Tahr, ii. 68
,, Arabian, ii. 68
,, Nilgiri, ii. 68
Tailed Paca, i. 216
Takin, ii. 64
Talapoin, i. 31
Tamandua Ant-Eater, ii. 155
Tamarao, ii. 32
Tamarin, Black, i. 51, 52
,, Moustached, i. 52
,, Red-handed, i. 51
,, Silky, i. 49
Tambreet, ii. 183
Tana, i. 169
Tangalung, i. 90
Tapir, American, ii. 17–18
,, Baird's, ii. 18–19
,, Central American, ii. 19
,, Malayan, ii. 19–20
,, Pinchaque, ii. 19
Tapoa-Tafa, ii. 171
Tarsier, i. 56
Tasmanian Devil, ii. 169–170
Tayra, i. 123
Tcheli Monkey, i. 26
Teetees, i. 48
Teledu, i. 123
Tenrec, i. 172
Three-toed Echidna, ii. 180
Thylacine, ii. 170
Tiger, i. 61–64
,, Siberian, i. 62
Tiger-Horse, ii. 23
Timber Wolf, i. 103
Toddy-Cat, i. 91
Tree-Civets, i. 91
Tree-Dassies, ii. 7–8
Tree Kangaroo, ii. 164
Tree-Porcupine, Mexican, i. 208
Tree-Shrew, Madras, i. 169
Tsine, ii. 28
Tufted Oryx, ii. 42
Tupaia, Golden-tailed, i. 169–170
Turs, ii. 68
,, Caucasian, ii. 68
,, Spanish, ii. 68
Two-horned Rhinoceros, Asiatic, ii. 15
Two-humped Camel, ii. 108
Typical Dasyures, ii. 170–171
,, Deer, ii. 83

Urial, ii. 71–72
Ursine Sloth, i. 149
Urus, ii. 27, 28

Vampire, i. 181–182
,, Indian, i. 183
Vervet, i. 31
Vicugna, ii. 109, 112
Virginian Deer, ii. 93–94
Vizcacha, i. 209–211
Vlack-Vark, ii. 123–124
Vulpine Phalanger, ii. 165–166

Wallabies, i. 57
,, Rock, ii. 163
Wallaroo, ii. 163
Walrus, i. 157–160
Wanderoo, i. 19, 28
Wapitis, ii. 86
Waree, ii. 127–128
Waterbuck, ii. 47–48
Water-Buffalo, ii. 29–30
Water Chevrotain, ii. 184
Water-Civet, i. 92
Water-Deer, ii. 96
Water-Hog, ii. 123–124
Water-Mole, ii. 183
Water-Opossum, ii. 175
Water-Rat, i. 196
Water Shrew, i. 171
Water-Tiger, i. 135
Water-Vole, i. 196
Weasel, i. 120
West Indian Seal, i. 164
Whaiapu-Sais, i. 48
Whalebone Whales, ii. 141–142
Whales, Beaked, ii. 132
,, Biscay Right, ii. 143
,, Blue, ii. 144
,, Ca'ing, ii. 139–140
,, Californian Grey, ii. 144
,, Dwarf Right, ii. 143
,, Greenland, ii. 143
,, Right, ii. 143
,, Whalebone, ii. 141–142
,, White, ii. 140, 141
White-beaked Dolphin, ii. 136
White-bearded Gnu, ii. 33
White-collared Mangabey, i. 32
White-eared Kob, ii. 47
,, Marmoset, Brazilian, i. 51
White Elephant, ii. 10
White-lipped Peccary, ii. 127–128
White Lungoor, i. 32
White-nosed Coati, i. 137–138
White Rhinoceros, ii. 16
White-sided Dolphin, ii. 136
White-tailed Deer, ii. 93
,, Gnu, ii. 34–35
,, Mongoose, i. 22
White-throated Capuchin, i. 41
White Whale, ii. 140, 141
White-whiskered Spider Monkey, i. 38–39
Wild Boar, European, ii. 119–120
,, ,, Indian, ii. 117–119
,, Cat, i. 79–80
,, ,, African, i. 80
,, Dog, Red, i. 113–115
,, Goat, ii. 66–67
,, Horse, ii. 24
,, Llama, ii. 109–112
,, Ox, ii. 28
Wildebeest, Black, ii. 35
,, Blue, ii. 33
Wolf, i. 101–104
,, Maned, i. 108
,, Timber, i. 103
Wolverine, i. 121
Wombats, ii. 168
Woodchuck, i. 192
Woodland Caribou, ii. 98
Wood-Mouse, i. 199
Woolly Spider Monkey, i. 39

Yak, ii. 27
Yellow-backed Duiker, ii. 59

Zebra, Burchell's, ii. 21–22
,, Grévy's, ii. 23
,, Mountain, ii. 22–23
Zebra-Wolf, ii. 170
Zebus, ii. 28
Zee-Koe, ii. 115
Zorillas, i. 132
,, African, i. 132
Zwart-wit-pens, ii. 45

THE END

The text is printed by Ballantyne, Hanson & Co., Edinburgh
The plates by Bemrose & Sons Ltd., Derby