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THE CALCUTTA PUBLIC LIBRARY.

THE Calcutta Public Library was founded in 1835. The initiative appears to have been taken by Mr. Joachim Hayward Stocqueler the Editor of the *Englishman* and a man of literary ability and varied experience. It is said that, like that distinguished scholar the late Professor Blochmann, Mr. Stocqueler first came out to India as a private soldier. Among other books, he wrote a "Fifteen Months' Pilgrimage through Khuzistan, Persia, &c., and a "Hand Book of India" which can still be recommended as containing much curious information. Mr. Stocqueler issued in August, 1835, a circular containing some needlessly florid language, but which opened with the practical announcement that—

"As considerable inconvenience is sustained by almost all classes of the community of Calcutta, owing to the absence of anything like a General Library combining the advantages of a Library of Reference and Resort with those of a Circulating Library, it is proposed to take measures for immediately establishing such an institution, upon a scale commensurate with the interests and wants of the reading population."

Goldmohurs and rupees were apparently more plentiful in Calcutta than they are now, for one of the last sentences of the circular said that—

"To ensure the most complete success to the proposed institution, and to render it acceptable to all persons of whatever stations, it is intended to

BREEDING OF ANIMALS IN CAPTIVITY.

IN his Resolution on the report of the Calcutta Zoological Gardens for the year 1888-89, published in the *Calcutta Gazette* of the 9th October 1889, His Honor the Lieutenant-Governor of Bengal expressed his opinion to the effect that "as the Gardens have now been in existence for 13 years (since 1875-76), it is presumable that many events have taken place among the large number of mammals, birds, &c., exhibited from time to time which would be of interest to the scientific world and to persons interested in Zoology." A short account of some of the most interesting of these events which have, from time to time, happened among the denizens of the Calcutta Zoo, and of the London Zoological Society's Gardens in the Regent's Park of that city, and of other celebrated menageries of the world, may prove interesting to those readers of the *National Magazine* who take an interest in the study of natural history. For the benefit of those not acquainted with the first principles of zoology, it would be better to give a brief description of the group of animals known as Mammalia and of their classification. Zoologists say that Mammalia are backboned air-breathing animals, more or less clothed with hair on the exterior of the body; the females are provided with milk-glands and the young are brought forth alive, with the exception of the Duck-billed Platypus and the Echidna which lay eggs and incubate their young ones by hatching them and which are peculiar to the fauna of Australia. Their limbs are usually four in number. In some mammals, the hinder pair of limbs are modified into swimming-paddles or suppressed altogether as in the group Cetacea or whales and dolphins; while the anterior pair in some mammals are developed into wings and into flippers as in the groups Chiroptera or bats, and Dermoptera or flying lemurs. In some members of the Mammalia as in Man and the Anthropoid or man-like apes, the tail is quite rudimentary; it is prehensile or possessed of the power of curling round and grasping objects as in the Monkeys and the Opossums peculiar to the American fauna. In the Felidæ or cats, the tail is an useless appendage—being long and simple.

In elephants, cattle &c., it is provided with a long tassel for driving away insects from the skin ; whereas in some mammals it is modified into a swimming-organ as in the whales, the beaver, the musk-rat, the water-rat and others. The heart of mammals is divided into two parts, each of which is provided with a ventricle and auricle. High temperature is the characteristic of the blood of this group of animals, excepting the Echidna of Australia, the temperature of whose blood is lower than that of other mammals—it standing at about 78°.

At present nearly 3000 kinds of mammals are known to Zoologists as existing on the earth and as being sufficiently distinct from each other to be recognised as a species. Palœontologists say that mammals existed on the earth so far back as the early Mesozoic period for, among the fossils characteristic of it., a few minute teeth representing three small species of mammals have been discovered, Mammalia are divided into three subclasses, viz., *Monodelphia*. *Didelphia* and *Ornithodelphia*. The subclass Monodelphia is again divided into ten orders, namely, *Primates, Carnivora, Insectivora, Chiroptera, Dermoptera, Rodentia, Ungulata, Sirenia, Cetacea* and *Edentata*. The subclass Didelphia includes one and one group only, namely *Marsupialia* ; whereas the single order *Monotremata* is included in the subclass Ornithodelphia.

The first order Primates, which is divided into two suborders, namely, Anthropoidea and Lemuroidea, consist of Man, Monkeys and Lemurs. Of the Monkeys living in the Calcutta Zoological Gardens, only some peculiar to the fauna of the old world and belonging to the group known as *Catarrhini*, have bred there. The Rhesus Monkey (*Macacus rhesus*) has not only bred in the Gardens but has also crossed with the crab-eating monkey of the Malayan peninsula (*Macacus cynomolgus*). Dr. John Anderson, late Superintendent of the gardens, says of these hybrids that "they possess more the characters of the female parent (*M. rhesus*) than of the male." A pair of the Bonnet Monkey of Southern India (*Macacus Sinicus*), brought from Madras, also bred in the Calcutta Zoo. But the newly-born male baby monkey died on the 22nd June 1880. The Langur or Hanuman monkey (*Semnopithecus entellus*) has also bred in the gardens. Of the other semnotes (*Semnopithecus pileatus, S. phayri ; S pyrrhus ; S nasicus ; S. pruinosus ; S. cephalopterus, &c. &c.*) which have been, from time to time, exhibited in the gardens, none has bred there. Specimens of other rarer species of semnotes or leaf-eating monkeys have from time to time been exhibited in the Alipore gardens. A specimen of a Thigh-striped Semnote (*Semnopithecus femoralis*) lived in gardens in 1881-82. A crested semnote (*S. cristatus*) was obtained by ex-

change in 1882-83 by the Committee from Mr. W. Rutledge of Calcutta. In 1883-84 two White-eyelid semnotes (*S. holotephreus* of Anderson and described by that naturalist in his "*Anatomical and Zoological Researches*" 1878 p. 27), obtained by exchange from Mr Rutledge, lived for some time in the Calcutta Zoo. The Committee have not yet been able to obtain living specimens of Barbe's Leaf-eating Monkey (*S. Barbei*)—an inhabitant of Tipperah, Irrawadi Valley and Tenasserim—which is supposed by Dr. J. Anderson to be identical with the *S. Phayrei*. The *catarrhini* of of Africa have also been represented in the Calcutta Zoo in the following monkeys peculiar to the fauna of the western part of that Continent. They are the Pluto monkey (*Cercopithecus pluto*), Talapoin *(C. talapoin)*, Diana monkey *(C. Diana)*, Lesser white-tipped nosed monkey with silky manes (*C. petaurista*), the Houtans monkey (*C. nyctitans*), (Mona (*C. mona*), Malbrouck (*C. malbrouck*) Moustache monkey (*C. cephus*), &c. The last named species has only succeeded in rearing a beautiful young one which the female of a pair of Malbroucks in the gardens gave birth to, some years ago. The other section of the Anthropoidea is the *Platyrrhini* and includes the "broad-nosed" monkeys of America, which are characterised by their widely separated nostrils, frequently prehensile tails, less perfectly opposable thumbs &c. Of this group only three species, belonging to three distinct genera respectively, have hitherto been exhibited in the gardens, viz., the Sapajou or Weeper Capuchin monkey of Brazil (*Cebus capucinus*), the squirrel monkey of Guiana *(Chrysothrix sciurea)* and the common marmoset of Brazil *(Hapale jacchus)*, pair of which has bred in the Calcutta and the London Zoos. Though the second suborder of the primates the *Lemuroidea*—has been illustrated in the Calcutta Zoo by specimens of the Ruffed lemur and the mongoose lemur, by the *Galago Garnetti* of Africa, and by the slow-paced Lemur of India *(Nycticebus tardigradus)* and by the Slow Loris of the same region *(Loris gracilis)*, it is very difficult to keep them alive in confinement for a long time. The other Lemurs that have been exhibited in the Alipore Gardens are the Yellow-fronted Lemur (*Lemur flavifrons*) and the Black Lemur (*L. varius*). The next order Carnivora comprise the whole groups of animals known as the Beasts of Prey such as the cats, wolves, dogs, bears, weasels and other animals. It is divided into two suborders, *viz.*, *Fissipedia* or land Carnivores and *Pinnipedia* or Four-footed Carnivores such as seals and walruses. The suborder *Fissipedia* includes three sections known as the *Ailuroidea* (cats, hyænas, and civet-cats), the *Cynoidea* (dogs, wolves and foxes) and the *Arctoidea*

(bears, weasels and raccoons). Of the representatives of the first family *Felidæ* or the cats belonging to the section Ailuroidea, now in the Calcutta Zoological Gardens, a tigress *(Felis tigris)* once gave birth, to a number of cubs. In 1882 another tigress, named "Hira", gave birth to a litter of two or three cubs, all of which grew up to be fine young tigers, one of which was sent in exchange to the London Zoological Gardens. Several tiger cubs were also born at Alipore in the April of 1889, and they are now thriving well there. Though lions both male and female (*Felis leo*) have, from time to time, been exhibited in the Calcutta Zóo, none of them has been blessed with any offspring as yet. Lions are said to breed freely in England, especially in Bristol and in the London Zoo, and lions have been known to breed even in Madras, for a specimen of a young lioness born in the People's Park of that city was once obtained by the Calcutta Zoo in exchange for a young Orang-outang. Lions have been known to breed even in Calcutta, for a lioness in the *menagerie* of Baboo Hari Mohan Ray of Badoor-bagan, gave birth to a litter of cubs, all of which unfortunately died very soon after birth in spite of the care that was taken for the preservation of their lives. But lions seem to be shy breeders here in the Calcutta Zoo. They may be successfully encouraged to breed here by inducing them on to a more secluded situation. With this view the Committee of Management have built a secluded den at the rear of the lions' den in the Burdwan House. We wish the Committee's efforts in this direction to be crowned with success at no distant date. A pair of Jaguars (*Felis Onca*), obtained by exchange from the Hamburgh Zoological Gardens, were added to the Alipore menagerie in February of the current year. They are very handsome animals of the size of a wolf, and are of a pale brownish yellow color variegated with black spots and stripes. To a person not acquainted with their specific distinctions, they will appear as a pair of Indian leopards (*Felis-pardus*) of which there are lots in the Calcutta Zoo. The Jaguars constitute the "tiger" of the *fauna* of the New World just as Pumas (*Felis concolor*), a very fine specimen of which was exhibited at Alipore from February 1887 to March 1888, are called the "lion" of the same region. The Jaguar rarely breeds in captivity. One, that was in the London Zoo, littered a cub on the 23rd September 1864. The mode of their breeding as well as of the Pumas in the Regent's Park Menagerie have been described by Mr. Bartlett, Superintendent of that institution, in the Proceedings of the Zoological Society of London for the year 1861, p. 141. The third section of the fissiped Carni-

vora is the Arctoidea, consisting of the Beeas, Weasels, Raccoons, &c. The last family *Ursidae*, belonging to this section, includes the true bears. The Calcutta Zoological Gardens have had, at one time or other, specimens of all the species of the Ursidæ, excepting four, now living on the surface of the globe. The species, that have from time to time been exhibited in the Alipore Gardens, are the common plains bear *(Ursus Tibetanus)*, Himalayan bear *(U. Himalayanus)*, Himalayan brown bear *(U. Isabellinus)*, Malayan bear *(U. Malayanus)*, grizzly bear *(U. horribilis)*, American black bear *(U. Americanus)*, European brown bear *(U. arctos)*, specimens of which were purchased by the committee at the sale of the late King of Oudh's menagerie, and the Polar bear *(U. maritimus)* a specimen of which was deposited in the Gardens by Mr. W. Rutledge the well-known dealer in wild animals. All of them are shy breeders, except the last-named species a female of which whelped a pair of cubs in the London Zoological Gardens. I will now pass over the next three orders Insectivora, Chiroptera and Dermoptera as they include small animals which are not much understood, and treat at once of the *Rodentia* or gnawing animals. This last order is divided into two suborders, viz., *Simplicidentata* and *Duplicidentata*. The *Simplicidentata* include those gnawing animals which possess only one pair of incisor teeth in the upper jaw; whereas the *Duplicidentata* comprise those with two. The *Simplicidentata* are again sub-divided into three sections, namely, *Sciuromorpha* (squirrels), *Myomorpha* (rats and mice) and *Hystricomorpha* (porcupines). Of the *Sciuromorpha*, only the North-American Prairie-Marmots (*Cynomys Ludovicianus*), some specimens of which were presented to the Calcutta Zoological Gardens by Mr. Salvia, the representative of Mr. William Cross, the well-known Liverpool dealer in *feræ naturæ*, have bred in these Gardens as they have done in the London Zoo. Of the specimens of the Myomorpha or Rat section, which have been illustrated in the Calcutta Gardens, only the Indian Jerboa (*Gerbillus indica*) and the common and the chestnut-colored Bamboo-rats of India and Malaya (*Rhisomys sp.*) have succeeded in rearing broods of young ones in the Gardens. Only members of three families of the Hystricomorphine section of the Rodentia, namely, the *Hystricidæ*, the *Dasyproctidæ* and the *Caviidæ* regularly breed in the Calcutta Zoo. Of the *Dasyproctidæ*, the Central American Agouti (*Dasyprocta isthmica*) and the Guiana Agouti (*D. prymnolopha*) breed freely in the Gardens; whereas of the *Hystricidæ*, only the short-quilled porcupine *(Hystrix bengalensis)* regularly rear young ones there, but this species has the bad habit of Saturn-like devouring its own

offspring. The little animals known to us as Guinea-pigs, which belong to the family *Caviidæ*, also breed regularly in the Gardens. Of the *Duplicidentata*, hares and rabbits breed freely in captivity. Next we come to the order *Ungulata* or hoofed animals. This order is sub-divided into four suborders, namely, *Proboscidea* (Elephants), *Hyracoidæ* (Coneys), *Perissodactyla* (Rhinoceroses, Tapirs, Horses and Asses) and *Artiodactyla* (Camels, Deer, Giraffe, &c., &c.). Of the *Perissodactyla* or odd-toed Ungulates, represented in the Calcutta Gardens, only the *Rhinoscerida* and the *Tapiridæ* have bred in this menagerie. There are now four, species of Rhinoceros living in the Calcutta Zoological Gardens, namely, the Great Indian Rhinoceros *(R. Indicus)*, the lesser Indian Rhinoceros *(R. Sondaicus)*, the Sumatran Rhinoceros *(R. Sumatrensis)*, and the hairy-eared Rhinoceros *(R. Lasiotis)*. Some of them were purchased from the sale of the menagerie of H. M. the late King of Oudh. By the acquisition of these valuable and rare animals, the Committee were able to complete their collection of Asiatic Rhinoceri and to exhibit them side by side. The most interesting and, at the same time, the rarest event that has happened in the annals of the Calcutta Zoological Gardens since their establishment is the birth of a hybrid between *Rhinoceros Sumatrensis* and *R. Lasiotis*. This interesting domestic occurrence took place at the Calcutta Zoo on Wednesday, the 30th January 1889, and was reported next morning in the local columns of the Calcutta dailies. Rhinoceri so seldom breed in captivity that it appears that this is the first instance on record in which they have done so, and, what is still more remarkable, is the first instance of which one species has crossed with another of a different one. The history of the example of the *R. Lasiotis* now in our Zoo is quite remarkable, so that an account of it will not, I hope, prove uninteresting to those who are real lovers of natural history. The mother of the baby rhinoceros now in the Calcutta Zoo, namely, the *R. Lasiotis*, is the second individual of this species known to Zoologists at present. The other specimen of this hairy-eared species is in the London Zoological Gardens, Regent's Park. Dr. P. L. Sclater, in his "*Guide to the London Zoological Gardens*," gives the following interesting account of this latter specimen: "Of this new Rhinoceros, which is nearly allied to the Sumatran, an adult female is in the Society's collection. 'Begum,' as she is called, was captured near Chittagong in British Burma by some officers employed in the Kheddah Department of the Indian Army—that is, in the capture of wild elephants. In January 1872, she was brought to

England by Mr. W. Jamrach, a well-known dealer in living animals, and purchased by the Zoological Society of London for the sum of £ 1,250." The specimen in the Alipore Gardens is an adult female which was caught near Chittagong on the estate of Begum Latifa Khatun of Rámu, by some shikaris. "Muni Begum," as she is named, soon became tame and tractable, and became a great favorite in the Begum's household, where the children used to ride her, as the London children did on Jumbo's back. She was presented to the Gardens by the Begum in 1882. The father of the baby rhinoceros—namely, *(R. Sumatrensis)*, is one of a pair of the black-haired two-horned rhinoceros from Malacca which was purchased by the Committee of the Calcutta Zoological Gardens, I believe, in 1883 or thereabouts. Another specimen of the Hairy-eared Rhinoceros (*R. Lasiotis*) has also been exhibited in the Calcutta Zoo. It is a fine young male from Burma. "The Committee are greatly indebted to Mr. C. E. Bernard, C. S. I., Chief Commissioner of British Burma, by whom this valuable animal was procured for the Calcutta Zoological Gardens in 1884-85." The Tapirs *(Tapiridæ)* are swamp-loving animals, excellent swimmers and divers, of which one species occurs in Malaysia and the others in Central and South America. They occasionally breed in captivity; for a female Malayan Tapir *(Taprius Malayanus)* in the Calcutta Zoo, which was obtained in 1877, from Mr. William Jamrach, the well-known London dealer in wild animals, when in Calcutta, in exchange for a young elephant gave birth in that year to a young male tapir. This interesting event was announced in the Calcutta morning papers and large numbers of visitors went to see Dame Tapir and her new-born son and heir. Dame Tapir must have been *enceinte* previous to her arrival in the Calcutta Zoo, and so Mr. Jamrach, had the worst of the bargain. Both the mother and the son lived for some time in the Calcutta Zoo, but their subsequent history is not known to me. A female American Tapir (*Tapirus Americanus*), in the London Zoological Gardens also gave birth to a young one in 1884, or thereabouts. The equine family of the Perissodactyla, namely, horses, asses and zebras have hitherto been represented in the Calcutta Zoological Gardens by several fine specimens of the Wild Ass of Scinde (*Equus Onager*), which was presented to the Gardens by the late Sir William Mereweather, Commissioner of Scinde, and by a fine specimen of the Domestic Ass of Soudan (*Equus asinus*). Though the *Onagers* have been living in our Zoo, from a long time, they have not bred there. All the species of Zebras now known to Zoologists, namely, the nearly extinct

true Zebra (*Equus Zebra*), the comparatively common Burchell's Zebra (*Equus Burchelli*) and the Quagga (*Equus Quagga*), have, from time to time, been exhibited in the Gardens of the Zoological Society of London but only Burchell's Zebras have thriven well and have bred in captivity there. Any of the Zebras would be a desirable acquisition for the Calcutta Zoo. The fourth suborder of the Ungulata, namely, the (*Artiodactyla*), or the even-toed Ungulates, are distinguished by having two central hoofs of each foot equal in size. They consist of two very distinct groups of animals, *Viz.*, the *Suina* comprising the Pigs and Hippopotami which are non-ruminants, and (*Ruminantia*), or mammals that chew the cud. Of the (*Suidæ*), the peculiarly-coloured River-Hogs (*Potamochærus*) of Tropica Africa and the White-lipped Peccary of America (*Dicotyles albirostris*), have thriven well and reared young ones in captivity in the London Zoological Gardens. The (*Hippopotamidæ*), have also been represented in the Calcutta Zoological Gardens, for a fine young specimen, which was purchased by the Committee of Management for Rs. 5,000, was exhibited at Alipore for some time but it did not thrive well there and died some time after. But hippopotami have done very well in the Gardens of the London Zoological Society for they have not only lived there for a long time but have also calved there regularly. A pair of them—the male being named *Obaysch*—have been living in the Regent's Park since 1850, and have given birth to two or three calves. Hippopotami have also bred in the Amsterdam Zoological Gardens from where a young female was procured by the Zoological Society of London as a mate for the old *Obaysch*. Regarding the breeding of Hippopotami in captivity, *Science* of the 20th December 1889, announced the following interesting event:

"A hippopotamus was born in the Central Park Menagerie of this city (New York U. S. A.), on the night of December 1st; and this is said to be the first instance of an event of this kind in this country. Unfortunately it died on the 6th of pneumonia, as we learn from the *Boston Medical and Surgical Journal.*"

The *Ruminantia*—the second great group of the Artiodactyles—consists of three sections, namely, the *Tylopoda* or camel tribe, the *Tragulina* or Chevrotains and the *Pecora* or the Oxen, antelopes and deer, and the Giraffe. The *Tylopoda* include the camels and the Llamas which have pads of skin beneath their hoofs (hence the name Tylopoda or "pad-footed.") Both the Dromedary (*Camelus dromedarius*), and the Bactrian or Two-humped camel (*Camelus Bactrianus*), as also the Llamas of Peru (*Auche-*

nia glama), have been represented in the Calcutta Zoo. A Bactrian Camel once bred in the London Zoo. Of the Chevrotains, only three species have hitherto been exhibited in the Calcutta Zoo. The Rib-faced Barking deer (*Cervulus muntjac*) can be found in the gardens at all times.* In December 1877 I found two specimens of the Reeves' Muntjac (*Cervulus Reevesii*) and two specimens of the Sclater's Muntjac (*C. Sclateri*) living in the Alipore Gardens but they do not appear to have thriven well there for they died shortly after. The section Pecora consists of the following families: the *Bovidæ* or Bull tribe containing the Oxen, Sheep, Antelopes and Gazelles; the *Antilocapridæ* containing only a single species, the Pronghorn of North America (*Antilocapra Americana*); the *Giraffidæ;* and the *Cervidæ* or Deer family. Of the *Bovidæ* or bovine family of animals exhibited in the gardens, the Gyals or mithuns (*Bibos frontalis*), the wild Oxen of the hilly regions of South-Eastern India, have calved freely in the gardens; while a pair of Bantengs or Sondaic wild ox (*Bos Sondaicus*), said to be from Borneo, and obtained by exchange from Mr. Rutledge, the well-known Calcutta dealer in wild animals, once gave birth to a fine young calf. The other species of *Bovidæ* that have, from time to time, been exhibited in the Calcutta Zoological Gardens are the Gaur (*Bos Gaurus*), the Bison (*Bos Americanus*), the Cape Buffalo (*Bos Caffer*), and the Indian Buffalo (*Bos arni*). Another very rare member of the Bovidæ, namely, the Wild Buffalo of Celebes (*Anoa depressicornis*)—a pair of which was obtained by exchange from Mr. Teysmann of Buitenzorg in Java—has been illustrated in the Calcutta Zoo. Unfortunately they did not thrive well here. Of the antelopes, the Indian Gazelle (*Gazella bennetii*), the Black Buck (*Antelope cervicapra*), and the Nilgai (*Portax picta*), breed freely in our Zoo. Of the third family *Giraffidæ*, a fine pair of Giraffes was presented to the Calcutta Zoological Gardens by the late Mr. E. D. J. Ezra. One of them died of licking the poisonous paint on its label but the other lived for some time but gradually pined away and ultimately died. Giraffes breed regularly in the London Zoo as well as in some other principal Menageries of Europe. Of the *Cervidæ* or deer tribe, some species breed freely in the Calcutta Zoo. A pair of the Wapiti deer (*Cervus Canadensis*), once bred in the gardens, but the fawn, that was born, was unfortunately killed at its birth. The Barasingha deer (*Cervus duvancelli*), the Equine deer (*Cervus equinus*), the Hog deer (*Cervus porcinus*), the spotted deer (*C. axis*) and the Samber (*C. aristotelis*) breed freely in the Calcutta Zoo. The other deers that have been represented in the

gardens are the Rusa deer (*C. hippelaphus*) and the Formosan deer (*C. taevanus*). A pair of Molucca deer (*Cervus moluccensis*) obtained by exchange from the London Zoo, once bred in the gardens and the fawn grew up to be a fine specimen. Three species of African antelopes have hitherto been exhibited in the Alipore menagerie. They are the Eland antelope (*Oreas canna*), the Beisa antelope (*Oryx beisa*) and the Grant's gazelle (*Gazella granti*) discovered by Captains Grant and Speke the celebrated African travellers. Of these, only the second species has bred there. Another African antelope has been exhibited in the Alipore Gardens. It was a fine specimen of the Bubaline Antelope (*Alcephalus bubalis*) from North Africa which, "with two young giraffes and some other African mammals and ostriches, were purchased and imported through the exertions of the late Mr. E. D. J. Ezra; but the Committee regret that the young giraffes died on the passage to Calcutta." Another hardy deer which has been acclimatised in England but which is, however, unrepresented in the Calcutta Zoo, is the Japanese Deer (*Cervus sika*). It breeds regularly there; and there are fine herds of it in English noblemen's parks. We pass over the orders Sirenia and the Cetacea and come to that of the Edentata. This last order is divided into four suborders, namely, the *Pilosa*, the *Loricata*, the *Squamata* and the *Tubulidentata*. The Pilosa or Hairy Edentates comprise two families, namely, the Sloths (*Bradypodidæ*) and the Ant-eaters (*Myrmecophagidæ*). The *Bradypodidæ* are represented in the Calcutta Zoo by the Two-toed Sloth of Tropical America (*Bradypus didactylus*). This species once bred in the London Zoo. There are two other species of this genus, which are, however, very rare and are not represented at Alipore. They are the Hoffman's Sloth (*Bradypus Hoffmanii*) and the Three-toed Sloth (*B. tridactylus*). The only species of the Myrmecophagidæ, which the Calcutta Zoological Gardens have hitherto possessed, is a specimen of the Great Ant-eater (*Myrmecophaga Jubata*) of Tropical America, which was obtained by exchange from the Zoological Society of London. Much smaller in size than the Giant Ant-eater, are the other members of this family, *viz.*, the Tamanduas and the Two-toed Ant-eater, the latter being scarcely larger than a rat. The Loricata or Shielded Edentates have hitherto been represented at Alipore by several specimens of the Six-banded Armadillo (*Dasypus sexcinctus*). The Squamata have also been illustrated in our Zoo by specimens of the *Manidæ* or Pangolins. These animals do not thrive well in captivity. We next come to the Subclass Didelphia which, however, consists of only one order Marsupialia or Pouched

Mammals. They are so called because of their females possessing a peculiar *marsupium* or pouch of skin on their bellies. This order consists of six families. The first family *Macropodidæ* contains the Kangaroos of Australia and have hitherto been represented in the Calcutta Zoo by two species, *viz.*, the beautiful Red Kangaroo (*Macropus rufus*) and the Great Kangaroo or Boomer (*M. giganteus*). These species breed in the Regent's Park menagerie and in the Gardens of the Acclimatization Societies of Australia. The third family *Dasyuridæ* contains some small carnivorous mammals of which one species Geoffroy's Dasyure (*Dasyurus geoffroyi*) has been exhibited at Alipore. The otherDasyure that has been illustrated at Alipore is the Viverrine Dasyure (*Dasyurus viverrinus*). The fourth family *Phascolomyidæ* contains the Wombats of which two species, *viz.*, the Plattyrhine Wombat (*Phascolomys plattyrhinus*) and the Hairy-nosed Wombat (*P. latifrons*) have been illustrated in our Zoo. The fifth family *Phalangistidæ* has hitherto been represented at Alipore by two species—the Vulpine Phalanger (*Phalangista vulpinus*), and the Koala (*Phascolarctos cinereus*). The sixth family *Didelphyidæ* contains the Opossums which are the only living extra-Australian members of the order Marsupialia. Only the Virginian Opossums (*Didelphys virginiana*) have been exhibited at the Calcutta Zoo. Smaller members of the family *Macropodidæ* have also, from time to time, been exhibited in the Calcutta Zoo. They are the common Wallaby (*Halmaturus ualabatus*) and the Bennett's Wallaby (*H. benetti*); the Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*) and the Unadorned-footed Rock-Kangaroo (*P. inornata*); and the Gaimard's, Rat Kangaroo (*Hypsiprymnus gaimardi*). Of the marsupials in the Calcutta Zoo only the Common Wallaby (*Halmuturus ualabatus*) thriven well in captivity and has freely bred there. Some other marsupials breed freely in the Gardens of the Zoological Society of London. Efforts are now being made to acclimatize and breed the Kangaroos in England. *Science* of the 18th April 1890 contains the following note on the acclimatization and the propagation of the *Macropodidae* in England: "The problem whether Kangaroos can be acclimatized in England appears to have been solved at Tring Park by a very simple process. Hitherto it seems to have been assumed that the only chance of keeping Kangaroos in that climate is to rear them on the principle which, to use a vulgar colloquialism is known as coddling. They have accordingly been kept and tended in pens or small enclosures, as we see them in Regents' Park. At Tring Park, however, according to the interesting account to Mr. Walter Rothschild, they have simply been turned loose in the park and

woods, and the experiment has proved remarkably successful. Fifteen years since, the late Baron de Rothschild endeavoured to breed kangaroos; but the male and young one were unfortunately poisoned by eating laurel,—a danger which English Kangaroo-breeders will do well to note. Of late, however, the experiment has been renewed with success. They are found, we are told, to breed freely, and there are now to be seen in Tring Park twenty-eight or thirty native Kangaroos, including the red and black species, Bennett's Wallaby (*Halmaturus Bennetti*, the black Wallaby (*H. Ualabatus*), and the larger Macropus, generally known as the "Giant Kangaroo" (*Macropus Giganteus*)."

Of the *Aves*, or birds which are divided into several orders, namely, *Raptores Grallatores*, *Natatores*, *Scansores*, *Passeres*, *&c.*, a female of a pair of African Ostriches (*Struthio camelus*), laid in 1880, a number of eggs, but she did not succeed in hatching them. The late Mr. Carl Loui's Schwendler, Superintendent of the Gardens, who took a personal interest in the welfare of the animals, tried to hatch them by means of electricity but his efforts, I regret to say, were not crowned with success. *Apropos* of the successful hatching of Ostrich eggs, an anecdote (quoted from Bosworth Smith's *Life of Lord Lawrence*, is told by Dr. John Anderson, F. R. S., in his interesting "*Guide to the Calcutta Zoological Gardens*." In 1864, an Ostrich in the Menagerie at Barrackpore Park happened to deposit her first egg on the grass. It was picked up by the park-keeper's daughter who carried it home in triumph. After taking it home she kept it in a box containing sand and exposed it to the rays of the mid-day sun. At night the egg was transferred to the care of a hen who took kindly to her task. At last the monster chick was hatched. The girl's father having died in the meantime, the man who succeeded her father, as the park-keeper, claimed the chick as Government property and placed it in the *Menagerie*. The girl became disheartened and ill at the loss of her pet, but the military surgeon who attended on the girl during her illness, reported the matter to the Government. As soon as it reached the ears of Lord Lawrence, who was then at Simla, he ordered it to be restored to its rightful owner. Strangely enough, the girl recovered after the restoration of her pet and carried it home to England. The Rhea or American Ostrich (*Rhea Americana*), is also in the Calcutta Zoo. This species has bred in the Regents Park menagerie. The female Emu (*Dromæus novæ-hollandæ*), in the Calcutta Zoological Gardens, succeeded in rearing a brood of Emu-chicks in 1885. The eggs were covered with sand and ex-

posed to the sun during the day-time, but at night they were hatched by the female hen herself. Of the Pheasants in the Calcutta Zoo, only some of the *Euplocamudæ* or Firebacks and the *Phasianidæ* or True Pheasants have bred there. The magnificent Argus Pheasant (*Argus giganteus*),—an inhabitant of the Malayan Peninsula—readily breeds in the London Zoological Society's Gardens in the Regents' Park. Specimens of this gorgeous bird have been exhibited in the Calcutta Zoo from a long time but, strangely enough, they have not bred there. Among the other birds, in the Alipore Gardens, that breed regularly, are the various species of aquatic birds, kept in the Mullick and the new Aquatic Birds, Houses. Under this latter category come the various species of Ducks, Geese and Swans. Of the smaller birds, some species do well in captivity and occasionally construct nests and breed therein. Of the *Raptores* or Birds of Prey, no species thrives well and breeds in confinement.

Some typical instances in which mammals and birds have bred in captivity have been given above. An idea how animals will readily breed in menageries under favorable circumstances, may be formed from a perusal of the following tabular statements of animals which have from time to time been born in the Calcutta Zoological Gardens since 1879.

	Mammals.	Birds.	Reptiles.
1879-80	29	5	0
1880-81	34	8	2
1881-82	8	2	4
1882-83	15	0	47
1883-84	11	3	0
1884-85	6	5	0
1885-86	5	3	0
1886-87	4	11	0
1887-88	4	11	0
1888-89	7	6	0

The conditions which are most favorable to the breeding of animals in captivity in menageries are that they should be provided with (1) ample space for habitation, grazing and airing, (2) proper diet. The third condition is that a large number of males and females of each species should be kept together. Larger animals, when pregnant, naturally seek retired spots; hence seclusion is also necessary for their successfully breeding in captivity.

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