2012
VOL 6 ISSUE 3

current conservation

Special section:
pre-independence
mammalogists

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Cover illustration: William Thomas Blanford (1832-1905)

The magazine is produced with support from:

Current Conservation carries the latest in research news from natural and social science facets of conservation, such as conservation biology, environmental history, anthropology, sociology, ecological economics and landscape ecology.

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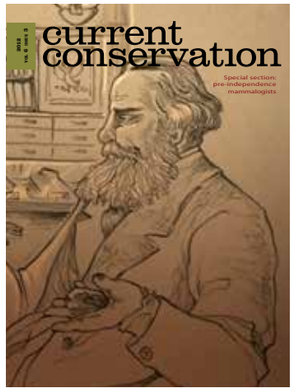

At first glance, an issue on pre-independence mammalogists seems neither current nor about conservation. But it is the work and passion of these early naturalists that provides the foundation for our research in ecology and inspires us towards our conservation goals.

This issue originated with a series of essays written by the fourth batch (2010-2012) of students of the Post-graduate Programme in Wildlife Biology and Conservation, WCS-India and National Centre for Biological Sciences, Bangalore. Bhanu Sridharan, one of the students of that batch, played a significant role in both editing and coordinating the collection. John Mathew, who recently completed his Ph.D. (a second one) at Harvard University on the history of science, specifically late eighteenth to early twentieth century naturalists in India, wrote an introduction to the collection and edited the essays. Ajith Kumar, the coordinator of the programme since its inception in 2004, must be credited with the idea of the essays and of turning them into publishable articles.

The take home message of this collection is that student research and assignments often have value beyond the courses for which they are produced. With a little effort and editing, they can be publishable articles that provide important knowledge about otherwise little known topics. In fact, our section 'Research in Translation' is designed not only to communicate about recent findings in conservation science, but also to serve as a platform for young researchers to learn to write for the public.

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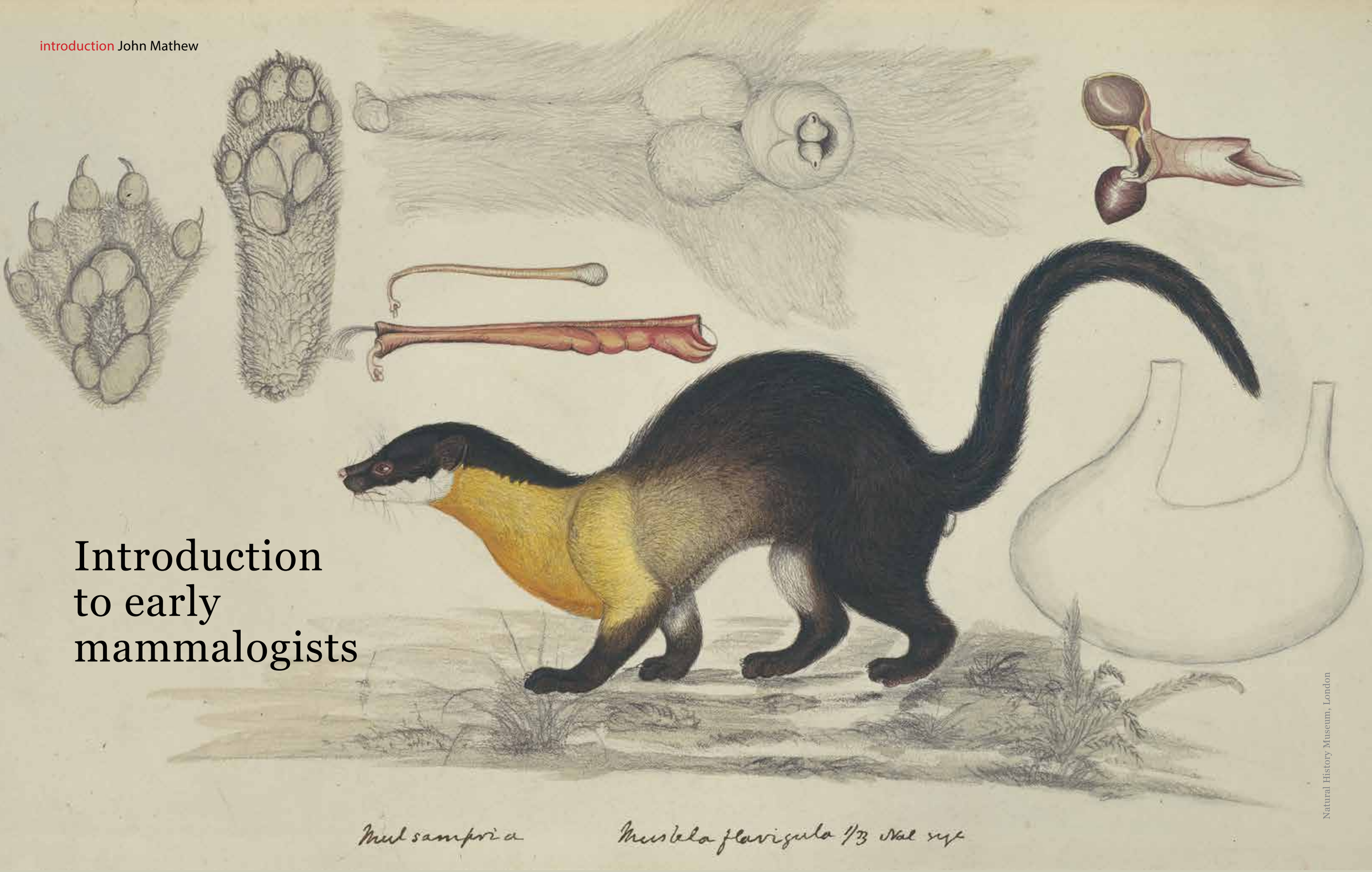
Desert Fox *Vulpes vulpes*, Little Rann of Kutch

Kalyan Varma

A desert fox *Vulpes vulpes* pup stares curiously at the noise of the camera shutter.

Introduction to early mammalogists



Natural History Museum, London

I still recall the frisson of excitement that attended the rediscovery of Jerdon's Courser (*Rhinoptilus bitorquatus*). One of three avian species that marked a Holy Grail of sorts to naturalists, young and old, it would trip off the tongue in connection with the fact that it had last been sighted in the wild in 1900, close to half-way between the other two, the Himalayan Quail (*Ophrysia superciliosa*) recorded in 1874 and never afterwards (an abortive attempt in the late 1980's by India's bird-man, Salim Ali notwithstanding) and the Pink-headed Duck (*Rhodonessa caryophyllacea*) in 1935/36. Then came 1986 and Bharat Bhushan of the Bombay Natural History Society, who, with local help in Andhra Pradesh, effected the find. There have since been sightings of other South Asian species long believed extinct, such as the Forest Spotted Owlet (*Athene blewetti*) with 1884 as a standing record until found again by Pamela Rasmussen in 1997. Yet the point being made is not about rediscoveries, salutary as they are. It is about names. So it was that even with the hoopla over the Jerdon's Courser, there was very little comment about just who the Jerdon might have been in the equation.

In hindsight, this may not be very surprising. Former colonial cities in India are (or least were) chock-a-block with names redounding to the particular cultural potentate in question, be it Montieth Road in Madras (British) or Rue Vicomte de Souillac in Pondicherry (French). The imprint of the European would, it seem, naturally extend to other areas where nomenclature was tried, such as a mountain (Godwin-Austen[1] for K-2, the second highest in the Himalayas), a tree (Beddome's Cycad, *Cycas beddomei*) or a bird, such as Jerdon's Courser, especially when the person doing the naming was another European. Unlike roads, however, there was often an umbilical connection between the trivial name of a species and a naturalist for whom it was named. So it was that budding birders would internalise such names as Jerdon's Chloropsis or Leafbird (*Chloropsis jerdoni*), Hodgson's Pipit (*Anthus hodgsoni*), Tickell's Flowerpecker (*Dicaeum erythrorhynchos*, among the strongest candidates for India's smallest bird) and the alliterative Blyth's Baza (*Baza jerdoni*).

Edward Blyth

The issue remained, just who were Jerdon, Tickell, Hodgson and Blyth?

Thomas Jerdon

Brian Hodgson

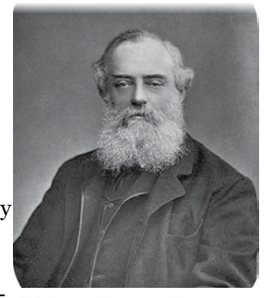
In the accounts that follow, we are afforded an opportunity to find out (with the exception of Tickell). The brief biographies we encounter are those of natural historians who were substantially given to the study of South Asian mammals in the 19th and 20th centuries. Some were just as passionate about birds (as suggested above); others sought out arachnids; still others, reptiles and molluscs. In a world of so many possibilities for the pursuit of natural history, to confine oneself to any one group was often remarkably difficult. So it was that Thomas Caverhill Jerdon (1811-1872), Surgeon-Major in the employ of the East India Company in Madras wrote both *The Birds of India* and *The Mammals of India* and had he had the opportunity, would have embarked substantially on *The Reptiles of India* as well. So it was that Edward Blyth (1810-1873), the first salaried curator of the Museum of the Asiatic Society of Bengal, paid considerable attention to higher vertebrates. So it was that Brian Houghton Hodgson (1800 or 1801–1894), long time British Resident in Kathmandu, named several new species of birds and mammals, including the takin (*Budorcas taxicolor*), now the national animal of Bhutan. So it was that William Thomas Blanford (1832-1905), stalwart in the Geological Survey of India would be named the first editor of *The Fauna of British India* series and would write both the early mammalian accounts for it as well as some of the books on the birds.

Thomas Hardwicke

Yet not every person who contributed was an old India hand. If on one side, there is mention of Thomas Hardwicke (1755-1835), who spent so much of his life in India amassing one of the largest collections of natural history specimens that returned with him to Great Britain, on the other, we have a Reginald Innes Pocock (1863-1947), who updated the section on mammals for *The Fauna of British India* sedulously studying series of specimens at the British Museum (Natural History) in London in the 1930s and 1940s while never laying eyes on the country of their origin. Of course even the figures discussed here are but a scantling of the whole. Others were given in the main to the descriptions of other elements of the Indian fauna. Still others belonged to different empires, returning their specimens to Paris or Leiden or Lisbon. Many of them helped to define European natural history abroad at the turn of the eighteenth to the nineteenth centuries. They too deserve mention.

Let me elaborate. Joan Gideon Loten (1710-1789), after whom the Loten's sunbird *Cinnyris* (formerly *Nectarina*) *lotenius* is named, was for five years Governor of Ceylon (1752-1757) in the employ of the Veerenigde Oost-Indische Compagnie (VOC) or the United East India Company accruing to the Dutch. From the Netherlands himself and a long-time VOC employee, Loten was afforded the opportunity to live for significant periods in South and South East Asia, making significant collections of specimens of natural history in the process. Later in life, he would spend about 22 years in total in Great Britain where his neighbour and friend Sir Joseph Banks (1743-1820), a key player in the development of the gardens at Kew and President of the Royal Society, would introduce him to many like-minds and where his collection would be employed by such influential purveyors of natural history as Thomas Pennant (1726-1798), the author of *Indian Zoology* (in 1769 as a booklet and 1790 in a second volume as an expanded book), who, ironically, never laid eyes on South Asia. Loten's contribution, however, was as limited as that of the Dutch generally in the region. If anything, the major power rivalling the British in the subcontinent was the French and while the political back of the latter as the Compagnie des Indes or French East India Company was largely broken in the wake of significant reverses in the last of three Carnatic Wars (subsumed essentially under the better known Seven Years War of 1756-1763) and pushed to tiny redoubts in the main on the East Coast of India, the fact of major maritime voyages at the instance of the Jardin du Roi or King's Garden (and after the French Revolution of 1789-1793, the Jardin des Plantes or Botanical Garden with its associated Muséum National d'histoire Naturelle or National Museum of Natural History) in concert with the Ministère de la Marine (the Ministry of the Navy) ensured that France remained at the vanguard of exploration abroad.

If for the British in the South Seas there was Captain James Cook (1728-1779), for the French there were such notables as Louis-Antoine, le Comte de Bougainville (1729-1811), after whom the plant genus *Bougainvillea* is named and Jean Francois de Galaup, Comte de Lapérouse (1741-1788). There were other great voyages as well, some of which included stops at French outposts in India, including Chandernagore in Bengal and Pondicherry in the Tamil country. Several of the individuals associated with these voyages made considerable inroads into parts of India such as Jean Baptiste Leschenault de La Tour (1773-1826) who helped to establish a botanical garden in Pondicherry while also collecting specimens more generally of natural history interest including memorably in 1820 an Indian elephant (*Elephas maximus indi-*

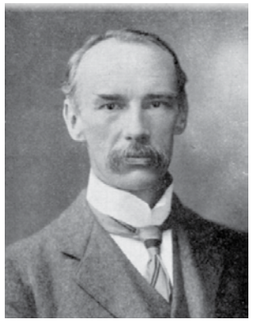


William Thomas Blanford

1 Technically, Mount Godwin-Austen was never the formal name for K2, but it does honour the intrepid eponymous climber, who was also a major contributor to *Indian zoology*, if in the field of malacology.

Images: Wikimedia commons

cus), a black buck (*Antilope cervicapra*), an Indian Giant Squirrel (*Ratufa indica*) and an Asian palm civet (*Paradoxurus hermaphroditus*), the last of which he transliterated through his training to be a coconut marten (*marte des cocotiers*), surmising that the viverrid (i.e. the civet) was a mustelid (i.e. the marten). Between the 1760s and the 1830s, legions of French naturalists descended on India, including Alfred Duvaucel (1792-1824), the stepson of the famed comparative anatomist at the Jardin des Plantes, Georges Cuvier (1769-1832), the mastermind behind sending out so many collectors (he called them voyageurs-naturalistes) and Pierre-Médard Diard (1794-1863), one of Cuvier's students, both of whom were originally charged with establishing a botanical garden in Chandernagore before being contracted by Sir Stamford Raffles (1781-1826 and founder of colonial Singapore and the Zoological Society in London) after discussions in Calcutta to serve as collectors of specimens of natural history in South East Asia. Duvaucel would eventually return to India where he, after making one of the largest known collections of bird specimens among other faunal groups in the region, would die in Madras at only 31, a fate he would share with another renowned French naturalist, Victor Jacquemont (1801-1832), although the latter would succumb in Bombay. These are but a few of the many names associated with French-driven natural history in the subcontinent during the last decades of the eighteenth century and the first three of the nineteenth, leading to a mournful miscellaneous note in the 1829 edition of the journal *Gleanings in Science* associated informally with the Asiatic Society of Bengal that said, '...our neighbours, the French, have we suspect been far from idle. With scarcely any establishments in the country...we suspect that they know more of Indian ornithology than we who have been masters of the country for 70 years'. If my own research into Eurocolonial faunal natural history is any indication, the same case can be made for mammalogy and elements of botany as well. Keeping this element of history in mind, the presentation of contributors to early mammalogy in the pages ahead are, by virtue of restriction to one European domain, Great Britain, necessarily selective.



Reginald Innes Pocock

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Yet this set of accounts is a welcome beginning. It enables some of those workers who gave so much of their energies to the making of Indian natural history in a more contemporary sense, to receive some measure of their due. This is not a moment too soon! Even as revisionists in India are making merry renaming cities and streets, so too the colloquial names of many birds are being stripped of the names of associated naturalists they once bore with some tepid descriptor (Tickell has apparently been forced to cede to Pale-billed before the word flowerpecker). Perhaps the trend is inexorable. For those given to a historical bent, it is tinged with the melancholic. This collection of informative articles therefore is a nudge to remind us to take just a little longer before we forget.

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Thomas Horsfield (1773-1859)

The 17th and 18th century witnessed intense competition among the British, Dutch and French East India companies to monopolise trade, commerce and knowledge in South and Southeast Asia. While key trade routes of the region were usurped as a result of defining battles, scholars from these European nations also raced to study the geology, ethnology, linguistics and most notably the flora and fauna of these exotic lands, often piggybacking on the armies of their countries. During this period of British dominance, one man, Thomas Horsfield, stands out as one of only a few Americans from that newly born nation to study and document the natural history of the South and Southeast Asian region.

BEGINNINGS

Born on the 12th of May 1773 in Bethlehem, a small town in eastern Pennsylvania in the then British North America, Thomas Horsfield belonged to the Moravian sect of Christianity. From an early age he showed interest in all branches of biology, especially botany. While working towards a degree in medicine from the University of Pennsylvania in Philadelphia, he studied the toxic effects of the poison ivy (*Rhus toxicodendron*) for his thesis. It was this interest in plants, particularly those with medicinal properties that led to his natural history career.

EDEN OF THE EAST

In 1799, a year after graduating in medicine, Horsfield took up the Surgeon's post on the American merchant ship, *China*, bound for Asia. During its voyage from the United States to Southeast Asia, the merchantman briefly docked in Batavia, better known today as Jakarta, capital of Indonesia. The natural beauty of the island and the rich variety of medicinal plants that the natives used enthralled Horsfield; he returned to the archipelago in 1801 as a Surgeon for the Dutch East India Army, a position that gave him great freedom to explore the island. For the next 18 years, Horsfield studied the flora, fauna and geology of Java, working initially with limited funds from the Batavian Society of Arts and Science, a group of educated Dutch settlers on the island. Much of his specimens, during these early years in Java, were lost because of poor equipment and collection practices.

Fortunately, in 1811, when the British East India Company took over the island Horsfield met Sir Thomas Stamford Raffles, the new Lieutenant Governor of the island, better remembered today as the founder of Singapore. It was an odd friendship between a man from a deeply religious sect formed on the tenets of love and non-violence, and Raffles a man believed to be both visionary and ruthless in the expansion of the British East India Company. What the two had in common though was their interest in natural history; the founder of the Zoological Society of London and the London Zoo, Raffles was an enthusiastic naturalist himself, and encouraged Horsfield's work on the natural history of the East Indies. Under his patronage, Horsfield officially joined the British Company as a surgeon. For the next eight years, he travelled extensively on the island of Java and later Sumatra observing various taxa and making detailed notes on their behaviour and natural history. He also collected valuable specimens of flora

that he donated to the Royal Botanical Gardens in Kew and fauna that he sent to the India Museum (founded 1801) of the East India Company in Leadenhall Street, London.

However, he was forced to move to a temperate surrounding after his health deteriorated. He continued to be under Raffles' patronage and in 1819, was appointed the curator of the India Museum, a position he kept until his death in 1859. During his time in London, Horsfield synthesised his work in Southeast Asia, into his best known book, Zoological Researches in Java and the neighbouring islands.

Published in eight parts from 1821-1824, the book was a synthesis of knowledge of fauna of Java, and provided notes on the taxonomy, morphological characteristics and some behavioural observations on primates, bats and birds by various naturalists including Raffles. While several of the species mentioned in the book have since undergone substantial taxonomic revision, the book remains relevant for its physical and behavioural descriptions of species that are restricted to few unexplored islands in Southeast Asia.

INDIAN MAMMOLOGY

Although he never visited India, Horsfield was responsible for describing several mammals and plants found in the region. A huge number of floral and faunal specimens from India started to flood the India Museum collection. Horsfield painstakingly examined, identified and catalogued these specimens. This resulted in the description of six new mammalian species from India and neighboring regions—the Intermediate horseshoe bat (*Rhinolophus affinis*) and the Intermediate round-leaf bat (*Hipposideros larvatus*) in 1823, Hardwicke's forest bat (*Kerivoula hardwickii*) in 1824, the golden cat (*Pardofelis temminckii*) in 1827, the Common yellowbellied bat (*Scotophilus heathii*) in 1831 and the Himalayan striped squirrel (*Tamiops mcclellandii*) in 1840. In 1851, he published what could be his most extensive work on the Indian subcontinent—*The Catalogue of the Mammalia in the Museum of the East India Company.* In this book he described all the mammals from this region in great detail, including their taxonomy, and added five mammal species new to science including the Indian endemic bare-bellied hedgehog (*Paraechinus nudiventris*) and the elusive Nilgiri marten (*Martes gwatkinsii*).

LATE RECOGNITION

Despite his many accomplishments recognition was hard to come by in English society, where one's lineage mattered. It was finally perhaps his friendship with Raffles that led to his being elected the First Assistant Secretary of the Zoological Society of London at its formation in 1826 and subsequently a fellow of the Royal Society in 1828.

However, several naturalists from the Indian subcontinent such as George Gray and John Gould paid tribute to Horsfield by naming new species of animals they discovered, such as the Javanese flying squirrel (*Iomys horsfieldii*) and the Horsfield's fruit bat (*Cynopterus horsfieldi*) after him.

On the 24th of July 1859, Horsfield passed away in his English home in Camden Town, London, at the age of 86. After his death, all his personal papers were destroyed according to his prior instructions. Owing to this we have little information about his personal life. Why he undertook such a course of action is now a matter of speculation—perhaps he wished to conceal something or as some historians speculate, in keeping with the Moravian traditions of modesty and privacy, he believed his personal life would be of little interest to others. What we do know however is that he left behind a great legacy in terms of the natural history of India and Southeast Asia.

Suggested reading:

John Bastin. 1978. '*A Pioneer American Naturalist of Indonesia: Dr Thomas Horsfield'*, Indonesia and Malay world newsletter, School of Oriental and African Studies, University of London.

G K Harrington. 1997. '*Thomas Horsfield: An American Enigma*', the International Institute for Asian Studies Newsletter.

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Illustration: Nilgiri marten (left)

Brian Houghton Hodgson (1801-1894)

Brian Houghton Hodgson was a civil servant, known for his years as the British Resident at the court of King Rajendra Shah of Nepal. He was a shrewd diplomat and, like several of his contemporaries, a scholar who contributed greatly to our knowledge of the people, culture, history and fauna of the little known Himalayan regions of British India.

EARLY LIFE

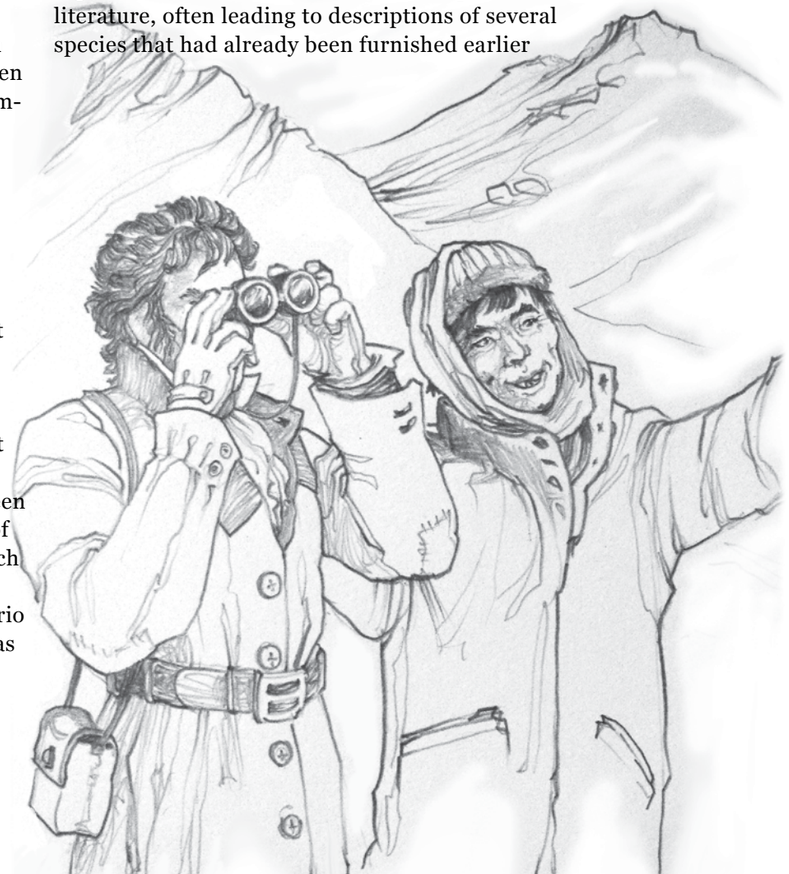
Hodgson was born in England on the 1st of February 1800/01. Although born into considerable wealth, he grew up amidst financial difficulties after his father lost huge sums in a bad bank investment. With support from relatives, the young boy and his six siblings managed a decent education. He was, from a young age, a good student and an accomplished athlete and entered Haileybury College (in Hertfordshire, 20 miles outside London, the breeding ground for future functionaries of the East India Company) nearly a year before he turned the regulation age of seventeen and graduated at the top of his batch. He was then appointed a civil servant with the East India Company (1817-19) in Calcutta and after a few years an assistant to the commissioner of Kumaon, in Nepal.

LIFE IN NEPAL

It was a relief for Hodgson to leave the stifling British social life in Bengal (not least on account of indifferent health) and move to the remote Himalayan forests. Here he encountered dense forests, snow-capped peaks and hill tribes like the Gurkhas from Nepal. What excited him most perhaps was the diversity of wildlife that was a part of everyday life. The Kumaon region had been recently annexed from Nepal (under the terms of the treaty of Sugauli, 1815/1816) because of which the British Empire had to face intense resentment from the Nepalese people. In such a scenario Hodgson proved to be a shrewd diplomat. He was a keen scholar of all cultures and threw himself into the study of Sanskrit, Buddhism, Hinduism and the history of the Gurkha and Lepcha tribes, in the process earning the trust of the local people.

This goodwill proved invaluable during his expeditions in the Himalayas. A keen outdoorsman, Hodgson impressed the Nepalese hunters with his athletic nature and naturalist skills. This provided him the opportunity to learn hunting and trapping techniques of the hill tribes which he employed to collect specimens of mammals, birds, reptiles, amphibians and fish from several parts of the Himalayas, including, Sikkim, Tibet and Darjeeling. Within Nepal, however, he was not allowed beyond the Kathmandu valley by the Nepalese authorities, leaving him reliant on indigenous collectors to bring materials to him, which he then described.

While the posting to a remote region provided him the opportunity to document little known fauna, it also hindered his endeavour to publish his findings. He had little access to libraries or published literature, often leading to descriptions of several species that had already been furnished earlier such as the golden cat (*Pardofelis temminckii*). He also routinely clashed with Edward Blyth, the editor of *The Journal of the Asiatic Society of Bengal* in Calcutta, who took notoriously long to review papers, which allowed other workers who sent their collections directly to the Natural History Museum in London to gain priority in publication.



CONTRIBUTIONS TO INDIAN MAMMOLOGY

In 1832, Hodgson wrote the first catalogue of mammals based on his encounters during his postings in the Himalayas. Unable to gain access to much scientific literature, he could only record 20 species by name. A revised catalogue published by the British Museum in 1846 showed that he had recorded a total of 115 species (10 belonging to Tibet) from the region. He discovered 39 species of mammals new to science, including the Tibetan sand fox (*Vulpes ferrilata*), takin (*Budorcas taxicolor*, today the national animal of Bhutan), and bharal (*Pseudois nayaur nayaur*) along with a number of rodents and bat species.

However, his greatest contribution perhaps was that he not only described new species but also their behaviour at a time when field studies were ignored in Europe. For instance, he not only collected specimens of the Tibetan antelope or chirù (*Pantholops hodgsonii*), which fellow naturalist Clark Able named after Hogdson in 1826, but also made notes on their herding behaviour. He recorded several wild groups while he was posted in the remote Tibetan plateau and noted that the chirù lived in large herds of up to 100 animals in which males fought over females and territories and often broke their horns during the mating season. He also made observations of captive mammals and their breeding. For instance, he was the first one to observe and estimate accurately the gestation period of the one horned rhinoceros (*Rhinoceros unicornis*). He was also interested in the anatomy of different animals. His study of the chirù showed that the animal's nostrils were designed to assist in breathing when exerting itself in the low oxygen environment of the high altitudes. He believed that a study of comparative anatomy of antelopes,

Illustration: Tibetan Antelope

goats, sheep and cattle, which were physically similar species of ruminants, was important to understand the relatedness of these species.

In 1850, Hodgson wrote an important paper on the physical Geography of the Himalayas. In this paper, he recognised that the Himalayan Mountains had three distinct altitudinal ranges with distinct fauna. His study of species distribution along an altitudinal gradient in the Himalayas preceded other such studies by a 100 years.

OTHER WRITINGS AND PUBLICATIONS

Hodgson wrote more than 70 scientific papers on mammals in journals like *The Journal of Asiatic Society of Bengal* and the short-lived *Calcutta Journal of Natural History*. A skilled sketcher himself, he trained Nepalese artists in the use of water-colours to create an extensive pictorial collection of the fauna of Nepal in the style of British zoological illustrations. In 1830, he tried to collaborate with eminent naturalists such as John Gould to publish these illustrations. Gould, however, wanted the book to focus exclusively on birds and not to include mammals. After corresponding with each other for a long time, Hodgson withdrew the idea of a collaborative book with Gould and approached noted Scottish ornithologist Sir William Jardine in 1835. In 1837 Hodgson sent a box of Nepalese bird skins to Jardine which included around thirty new species. However, in 1840 Jardine too withdrew his prospective collaboration. When Hodgson returned to England in 1843, he engaged Frank Howard an illustrator to reproduce some of his original drawings by lithography. However, this collaboration produced only one hand-coloured lithograph of the chirù. Unfortunately, most of his illustrations, which were an excellent depiction of Hodgson's field knowledge along with biological data of species, were not published during his lifetime. Dejected by his failure, Hodgson donated most of his papers and lithographs to various institutions like the British Museum (Natural History) and the Zoological Society of London, where they are displayed today.

Hodgson's work on mammals and other taxa will always be the backbone of Himalayan vertebrate zoology. His descriptions of new species and observations of the behaviour along with internal anatomy were the first of their kind for this part of the world. But his achievements seem even greater when we consider that they were accomplished without access to any of the great museum collections or libraries in the Western world.

Suggested reading:

Cocker Mark and Carol Inskipp. *A Himalayan ornithologist: The life and work of Brian Houghton Hodgson* (Oxford: Oxford University Press, 1988)

Sir William Wilson Hunter. *Life of Brian Houghton Hodgson* (London: J Murray, 1896)

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Thomas Hardwicke (1756–1835)

Thomas Hardwicke was a soldier with the East India Company and a naturalist. Hardwicke entered the military service of the East India Company in 1778 as a country cadet and served till 1819 rising to the rank of a Major General. During his time in India, he undertook several major military expeditions and used the opportunity to survey local fauna and amass a huge collection of specimens. From these, Hardwicke described several new species including the the long-armed sheath-tailed Bat (*Taphozous longimanus*), Himalayan goral (*Naemorhedus goral*) and the Indian gerbil (*Tatera indica*). At the time of his death he bequeathed his collections to the British Museum (Natural History),which led to more new species being described by other naturalists (e.g. Thomas Horsfield who described mammals such as the small mouse-tailed Bat (*Rhinopoma hardwickii*)) and Hardwicke's forest Bat (*Kerivoula hardwickii*). He was also a gifted artist and compiled a series of drawings on Indian fauna that were published by John Edward Gray in his *Illustrations of Indian Zoology* (1830-35).

Hardwicke was also believed to be the first person to discover the red panda (*Ailurus fulgens*) and present it at the Linnean Society in 1821. He called the animal 'wha', after its characteristic loud cry. Hardwicke, however, did not receive credit for his find as he was delayed in bringing back his specimens from India to England. By the time he published his findings in 1827, he was already two years behind the first scientific description of the species, by French zoologist Georges Cuvier who had also acquired a specimen from India.

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Illustration: Fishing cat

Edward Blyth (1810-1873)

In the quest for new knowledge, we often forget those responsible for much of what we know today. One such man buried in the annals of Indian natural history is Edward Blyth.

EARLY LIFE

Born in London on the 23rd of December 1810, Edward Blyth inherited from his father a keen love for nature and a remarkable memory. His father's death, when Blyth was ten years old, plunged the family into poverty setting the stage for a life of hardship that never ended. His early schooling began in Wimbledon, where he was considered an exceptionally bright student, albeit not a well behaved one; the young boy was in the habit of wandering away from classrooms and into the woods.

IN LONDON

There was however the question of earning one's bread and butter, as the study of nature was not a lucrative enterprise. So in 1832, after studying chemistry, Blyth took on a druggist's business in Lower Tooting, London. Leaving the management of his business to others, he began to focus on his studies in natural history. Much of his time was spent trying to gain access to books and literature at the British Museum. He became a regular speaker at meetings of the Zoological Society in London. Unsurprisingly, his chemist's business did not prosper under such neglect, leading to great financial difficulties. Five years later, he gave up his pharmaceutical career to focus on zoology exclusively. Despite monetary troubles, he began writing for journals such as the *Magazine of Natural History* and *Field Naturalist* while continuing to present several papers on birds and mammals at the Zoological Society of London.
In 1840, at the age of 30, he had his first major literary accomplishment; contributions to the section on Mammals, Birds and Reptiles in Georges Cuvier's mammoth *Regne Animal* (Animal Kingdom). His familiarity with Indian fauna began long before he ever set foot in the country. At the Zoological Society meetings, he presented several illustrations and specimens of Himalayan ungulates such as the Yak (*Bos mutus*), Markhor (*Capra falconeri*) and Ibex (*C sibirica*). Particularly well known is his monograph on the genus *Ovis* in which he described fifteen species of sheep, including a new subspecies of Argali (*Ovis ammon*). Blyth proposed naming this race the Marco Polo sheep (*O a polii*), after the legendary Venetian traveller who first reported them from the Pamir mountain ranges. It was around this time that young Blyth's paths crossed with an institution that was to be both friend and tormentor for the remainder of his career.

The Asiatic Society of Bengal was established in 1784 by Sir William Jones as a centre for study of Asian natural history and culture; a vision that it promotes to this day. At the peak of the East India Company's reign in India, several prominent naturalists such as Brian Hodgson and John McClelland regularly contributed specimens and illustrations to the museum of the Asiatic Society in Calcutta. However, with no experienced curator or funds to hire one, the collections were in disrepair. Blyth was by this time in poor health and had been advised to seek warmer climes. More importantly, he was eager to travel to a country whose fauna had long held his fascination. Although it did little to improve his financial condition, he accepted the offer.

INDIAN VOYAGE

It was in September 1841 that he reached Calcutta and took over as the society's curator. While at the Asiatic Society, Blyth described several new mammals such as the hangul (*Cervus elephus hanglu*), a subspecies of the European red deer and three species of Indian bats. His detailed notes on the many specimens he received and his ability to maintain open channels of communication with hunters who supplied him with these, helped increase the collections of the Society's museum. However, Blyth's attention to detail and meticulousness were often a source of great irritation to his colleagues. According to Arthur Grote, Blyth's magnum opus *Catalogue of Birds and Mammals of Burma* was only published posthumously owing to his habit of constantly waiting for the latest possible information on the subject. In his memoir of Blyth in *The Journal of the Asiatic Society of Bengal*, Grote mentions, 'It had been constantly kept back for the Appendices, Addenda and Further Addenda, which disfigure the volume, and seriously detract from its value as a work of reference.' Blyth also faced criticism for letting his passion for ornithology and mammalogy lead to the neglect of other departments. These allegations came even as he sought an increment in his salary in recognition of his contributions in increasing the collections of the Asiatic Society's museum. Perhaps because of its dire financial conditions, the Society declined to change its salarial position citing the need to first investigate the complaints against him. Furthermore, he had a number of acrimonious disputes in public, including a sparky exchange with Brian Houghton Hodgson in the pages of *The Journal of the Asiatic Society of Bengal*. However, several naturalists of the time acknowledged his contributions, including Charles Darwin.

THE DARWINIAN CONNECTION

Between 1835 and 1837, Blyth had written three articles on variation in different species in the *Magazine of Natural History,* almost 24 years

Illustration: Marco polo sheep

before Charles Darwin's *The Origin of Species*. Furthermore, it was Blyth who first sent to Darwin Alfred Wallace's paper 'On the Law which has regulated the introduction of Species' that may have pushed Darwin to hurry with his publication. This led to much speculation about the originality of Darwin's ideas; for instance the anthropologist Loren Eisley suggested in his book *Darwin and the Mysterious Mr X: New Light on the Evolutionists* that Blyth had developed ideas regarding selection in animals (if artificial rather than natural) much before Darwin, by studying variation in domesticated animals. A respected authority on the subject of artificial selection or domestic breeding, Blyth had corresponded with Darwin several times about the subject. However, several historians and evolutionary biologists such as Stephen J Gould, Ernst Mayr and Theodosius Dobzhansky discredited Eisley's thesis and argued that Blyth, like other creationists of the time, believed variations in species were only certain imperfect forms that did not have the ability to survive, unlike the original perfect forms created by divine intervention. Darwin on the other hand saw variation as a continuous process where each new form was a step in evolution. Blyth's contribution was however valued by Darwin as is evident from the very first chapter of the *Origin*, where Darwin expressed his gratitude for Blyth's contribution of considerable information on plants and animals in India. Darwin wrote in his book, 'Mr Blyth, whose opinion, from his large and varied stores of knowledge, I should value more than that of almost any one....'

FINAL DAYS

In 1857, Blyth's short marriage ended with the death of his wife. This perhaps was the beginning of his decline. Although still an active writer and naturalist, his personal life began to disintegrate. He suffered from what appears to be depression, and soon took to alcohol. In 1865, after a nervous breakdown he formally retired from the Asiatic Society and left to be tended by his sister in England. During his time in India, he had described 21 new mammals and several species of birds. While in London, Blyth kept up active correspondence with the Zoological Society and continued to write several articles under the pseudonym Zoophilus. He was conferred with honorary membership to the Asiatic Society and elected Extraordinary Member of the British Ornithological Union. His personal life, however, was in stark contrast with his professional achievements. He was convicted for assaulting a taxi driver in London, under the influence of alcohol. In December 1873, at the age of 63, he succumbed to heart disease.

Edward Blyth lived a life of difficulty, but also one of discovery and learning. He expressed this best in his introduction to the 1836 edition of Gilbert White's *Natural History of Selborne*: "my mind cleaves to its favourite pursuit in defiance of many obstacles and interruptions, and eagerly avails itself of every occasion to contribute a mite to the stock of general information."

Suggested reading:

Arthur Grote. 1875. *Memoir and portrait of the author (Edward Blyth), in Catalogue of the mammals and birds of Burma.*

Christine Brandon-Jones. *A Clever, Odd, Wild Fellow: The Life and Work of Edward Blyth, Zoologist, 1810-1873* (Madras: Madras Snake Park Trust, 2006).

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Robert Armitage Sterndale (1839-1902)

Robert Armitage Sterndale was a British naturalist, statesman and Fellow of the Zoological Society of London. He moved to India at the age of seventeen to work for the East India Company. His administrative duties aside, Sterndale took a keen interest in natural history, geography and other scientific studies. He was an avid naturalist and writer, and published a number of books based on his experiences and observations of wildlife in India. His writings include *Natural History of the Mammalia of India and Ceylon*, *Seonee, or Camp Life on the Satpura Range* and *Denizens of the Jungles*, the last a series of sketches illustrating wild animals, their forms, behaviour and natural attitude.

Sterndale was a close observer of animal behaviour and made detailed notes on captive animals such as chevrotains, gibbons and cheetahs often kept at his home. He observed for instance that gibbons were largely docile and capable of great attachment in captivity and that young cheetahs were not as consistent in chases as adults. Such information was often taken seriously leading to several Indian Princes capturing adult cheetahs to tame for hunts. Sterndale's writings also influenced several naturalists and writers in India at that time. For instance his work, *Seonee, or Camp Life on the Satpura Range* published in 1877 set in the Seonee district of Madhya Pradesh, was the inspiration for Rudyard Kipling's *Jungle Book*. Seonee documents the wildlife of the Satpura Range and describes Sterndale's adventures and experiences with the wildlife and the local inhabitants of the landscape. He also provided a topographical and historical sketch of the Seonee district, which helped Kipling create the setting for the *Jungle Book* in a place Kipling had never seen.

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Illustration: Hoolock Gibbon

Thomas Caverhill Jerdon (1811-1872)

Thomas Caverhill Jerdon, a medical surgeon with the East India Company, is better known for his contributions to the mammalogy, ornithology and herpetology of British India. He is credited with the compilation of the first comprehensive book on Indian mammals.

EARLY LIFE

Born on the 12th of October, 1811, in Durham, Northeastern England, Jerdon's keen interest in natural history, particularly plants and birds, was believed to have been encouraged by his father. In 1828, he went to Edinburgh University where he studied natural history under Professor Robert Jameson, who had tutored several well-known naturalists like Charles Darwin. While at the University, Jerdon was a part of the Plinian Society, a club for natural history enthusiasts. Scottish students of the time received a broad education in a variety of fields including history, geography, navigation and philosophy. In the same spirit and perhaps because natural history was not a particularly lucrative career prospect, Jerdon also trained in medicine between 1829 and 1835.

In 1835, he joined the East India Company as an assistant surgeon under the Madras Medical Service of the Madras Presidency and was posted to the Ganjam district of Orissa where he was responsible for the treatment of troops affected by fever and dysentery. His passion however lay elsewhere. Apart from his physician's duties, he diligently started documenting the birds of the Eastern Ghats. This trend continued as he moved to various parts of India, especially the south, including what is now Andhra Pradesh, Ooty and Trichy. He obtained information on endemic birds through observation as well as interaction with the locals. After the Mutiny of 1857-58, he was named Surgeon-Major. Around this time, he went to Darjeeling on sick leave and spent considerable time studying the Himalayan fauna.

With the requirement of a comprehensive and brief compilation of all the characters, descriptions and classifications of the vertebrates of British India, Jerdon proposed in a prospectus directed to the British Government in India to publish a series of books for the Mammals, Birds, Reptiles and Fishes. Having already produced *Illustrations of Indian Ornithology* in 1844, Jerdon's ideas were well received. The purpose behind Jerdon's compilation of *The Mammals of India* was to provide a complete data base for observers and sportsmen. Recognising Jerdon's passion, Lord Canning, the then Viceroy, placed him on special duty that enabled him to work on a series of books on Indian vertebrates. This began with his works on *The Birds of India*, a 3 volume treatise on the birds in the subcontinent which led to the discovery of the Jerdon's Courser, a rare nocturnal bird found in present day Andhra Pradesh.

THE MAMMALS OF INDIA

Jerdon followed this by works on mammals, reptiles and then fishes of India. These manuals were some of the most comprehensive works on Indian fauna at that time. *The Mammals of India: A Natural History of all the Animals known to inhabit Continental India* was first published in 1866, in Roorkee, in current day Uttarakhand, India, with a second version appearing in 1867. However, Jerdon, notorious for being disorganised with his specimens, is said to have made several errors in the early version, compounded by typological errors by the printers. Thus a third, corrected version was published by John Wheldon in London in 1874 two years after Jerdon's death.

The Mammals of India provided a comprehensive and brief compilation of all the characters, descriptions and classifications of the vertebrates of British India. The book included the observations made by Georges Cuvier, Henri Marie Ducrotay de Blainville (France) and Richard Owen (England) working with specimens sent from India, and other naturalists such as Edward Blyth, Colonel William Sykes, Sir Walter Elliot, Brian Hodgson, William Blanford, Colonel Samuel Tickell and Thomas Hutton while they travelled in India. In his description of mammalian species, he pointed out that the richness as seen on the Malabar Coast and in the Western Ghats was unparalleled when compared to the plains of Central and Northern India, although he acknowledged that the greatest diversity was to be found in the Himalayas.

He also made the first ever attempt at providing complete descriptions of all the mammal species of British India. He placed hedgehogs in the now defunct order Insectivora. The book also paid great attention to game species most attractive to trophy hunters, particularly the Himalayan black bear (*Ursus thibetanus*), the Bengal tiger (*Panthera tigris tigris*), the Asiatic cheetah (*Acinonyx jubatus venaticus*), now extinct in India (although still found in small populations within Iran) and the Indian wild ox or gaur (*Bos gaurus*). He was the first to examine the Lesser Fishing Cat (*Felis jerdoni*). Ironically, the same species was later named after him by Edward Blyth and concluded that the animal was not a distinct species and possibly a juvenile form of the Rusty Spotted Cat (*Prionailurus rubiginosa*). However, Jerdon did not suffer for taxonomic posterity with species such as the brown palm civet (*Paradoxurus jerdoni*) being named after him by W T Blanford in 1885.

In the preface of *The Mammals of India*, Jerdon stated that he hoped the manual would be as useful as that on birds, as he knew that many sportsmen and observers had been keenly awaiting its appearance. While admitting that the book was incomplete, particularly with regard to smaller mammals like bats, shrews, rats and mice, he trusted that the work would spur further efforts to render in time a more complete volume on mammals. Nonetheless, his effort marked the first serious attempt to provide a systematic account of the mammals in India and in that regard he at least partially achieved what Brian Houghton Hodgson with his proposed Fauna Nepalensis, and Edward Blyth, with dreams of a Fauna Indica, could not.

Illustration: Travancore flying squirrel

The Mammals of India, apart from being much sought after by hunters and sportsmen of British India, also served as the template for the multi-volume series, *The Fauna of British India*. As the Scottish naturalist Walter Elliot would remark in Jerdon's obituary, "Although he did not live to complete his grand design, he accomplished enough to be of incalculable value to the lovers of natural history scattered over the length and breadth of that vast country in which he laboured so zealously himself... Works of greater pretension and more accurate detail have been given to the public and at a cost beyond the reach of ordinary students. To no one is Indian science more indebted as to Mr. Jerdon, not for his discoveries, considerable as they were, but for enabling others to follow his steps."

Suggested reading:

Walter Elliot. Memoir of Dr T C Jerdon. Hist. Berwickshire Nat. Vol. 7: 143–151.

Thomas C Jerdon. *The Mammals of India - A Natural History of all the animals known to inhabit continental India*. London: John Weldon, 1874.

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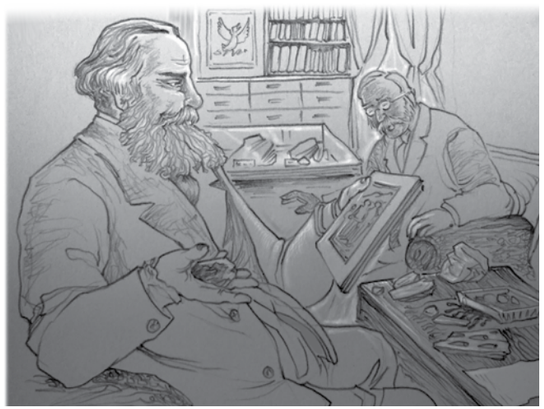
A different version of this essay was first published in IndiaBioscience.org

William Thomas Blanford (1832-1905)

"This is the first volume of the Handbooks on the Fauna of British India published since the death of Dr. Blanford, under whose Editorship the series was initiated and carried on for over twenty years. The many obituary notices that have appeared in the publications of the learned and scientific societies fully testify to the great value of the work done by him during a long and strenuously productive life, and the loss that science has sustained by his death. To few, however, will that loss be personally so great as to those who under his direction were working for the Fauna of India series."

This wistful note in the Editorial preface to the third volume (1906) on the Rhyncota (the old name for the true bugs, now known as the Hemiptera) by W L Distant (1845-1922) was penned by C T Bingham (1848-1908), successor to the first overseer of the *Fauna of British India* series, William Thomas Blanford. It pointed to the extraordinary contributions of a man who, in his role as editor of the series, would play one of the most important innings of a multifaceted life. Born in London in 1832, Blanford over the course of his early years would dabble at carving, gliding and designing before joining his younger brother, Henry Francis Blanford (1834-1893) at the Royal School of Mines.



GEOLOGICAL SURVEY OF INDIA

The Blanford brothers were appointed to the Geological Survey of India in 1855 and in fairly short order attained prominence in the field by identifying the effects of ice in the boulder beds of the Talchir tillites while surveying the eponymous coalfields in Orissa and Bengal, a study of extensive Permian glaciation that would anticipate and contribute to later conceptualisations of the southern continental landmass of Gondwanaland. Other geological expeditions would follow for W T Blanford, including Burma (1860), the Bombay Presidency (1862-1866) and possibly his most celebrated, that of the Indo-Persian Boundary Commission (1871-1872). There would also be a foray into Sind (1874-1877) during the course of which he would describe the Indian bush rat (*Gollunda ellioti*). The zoological interpolation was not stray; Blanford had earlier been assigned to the Absyssinia Expedition (1867-88) as part of the Bombay Army led by Lieutenant General Sir Robert Napier (1810-1890) to relieve European missionaries and British Governmental representatives imprisoned by the local ruler Emperor Thewodros II (1818-1868). During that effort, Blanford made considerable collections, which would be central to his acclaimed *Observations on the Geology and Zoology of Abyssinia* (1870). A journey to Sikkim the same year with H J Elwes (1846-1922) would result in a paper describing new bird species in the *Proceedings of the Asiatic Society of Bengal*, while, in a marvellous commingling of geological and biological interests, i.e. palaeontology, Blanford would write at length on the Miocene, Pliocene and Pleistocene fauna of the Siwalik range in *A Manual of the Geology of India* (1879), a book he co-authored with H B Medlicott (1829-1905), also of the Geological Survey of India and for a period its Superintendent. Blanford would also contribute substantially to natural historical reports emerging from expeditions to Yunan and Yarkand in the 1860s and 1870s, particularly with reference to malacology (the study of molluscs).

THE FAUNA OF BRITISH INDIA

It was however in the context of the *Fauna of British India* that Blanford would achieve lasting renown. Part of that accrued reputation would emerge from well beyond Blanford's own immediate stature, eminent though it was—the supporters of the effort to produce a series of handbooks on zoology for the Indian region included such stalwarts as Charles Darwin (1809-1882), the grand old man of evolutionary theorising, Sir Joseph Hooker (1817-1911), keeper of the Royal Botanical Gardens at Kew, Thomas Henry Huxley (1825-1895), 'Darwin's Bulldog' and celebrated comparative anatomist, Sir William Henry Flower (1831-1899), Conservator at the Hunterian Museum, Sir John Lubbock (1834-1913), the first Baron Avebury, Member of Parliament and strong votary for science and Philip Lutley Sclater (1829-1913), the founding editor of the journal *Ibis.* At the time of the memorial (1881), duly signed by these heavyweights of establishment-science in Great Britain, Blanford was ill in Quetta, Baluchistan, a condition that would largely force his retirement to London the following year. Nonetheless, given his immense knowledge of the natural history of the Indian region, the suggestion was made by the aforementioned luminaries that he edit the first series of the fledgling *Fauna of British India*. To this he acceded, being paid at a rate of two thirds his regular salary whilst in harness. Even as he gained public approbation for his work in his original field of endeavour, receiving the Wollaston Medal from the Geological Society of London, he was sedulously making plans for the new series. A decade and a half later, he would have this to write in the preface to Volume 4 of the *Birds* (1898):

"The Vertebrate animals of British India have now been described for the first time in a single uniform series, consisting of eight volumes, of which this is the last to appear. The work comprises two volumes on the Fishes by the late Dr. F. Day, one on Reptiles and Batrachians (an older name for the Amphibians, in particular the Anura which include frogs, toads and tree-toads) by Mr. G. Boulenger, and two on Birds by Mr. E. W. Oates; the remaining two volumes on Birds and one on Mammals, together with the editing of the whole, having been my own contribution to the undertaking. Five volumes on Invertebrata – four on the Moths of British India by Sir G F Hampson, and one on the Hymenoptera by Colonel C T Bingham - have also been published on the same plan. The work has fully occupied me during the fifteen years that have now elapsed since my retirement from Indian service; but the completion of the Vertebrate series would not have been practicable without the valuable cooperation of the able naturalists already mentioned."

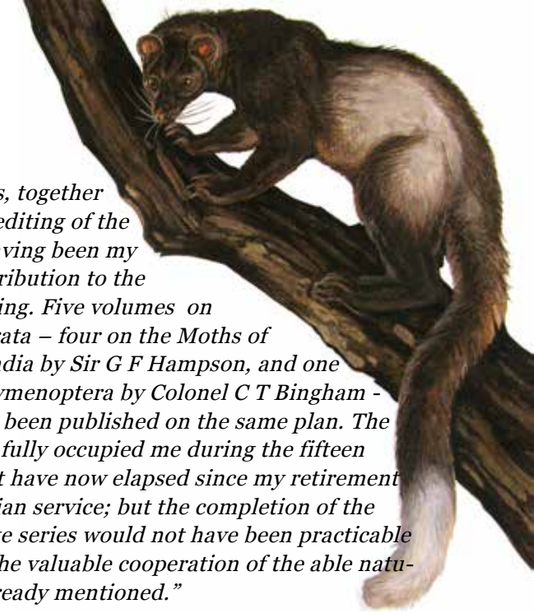


Illustration: Brown palm civet

Blanford's major contribution to the Mammals and Birds of India therefore was in a work of synthesis and editorship, bringing everything that was known at the time in the region into taxonomic relief. His achievement at the time was towering and would set the stage for the continuation of the project, something that lasts to this day, if under the title of *The Fauna of British India*, reflecting the status of an independent nation free from its colonial adjective. Blanford himself had embarked on a malacological project potentially to attend his work on mammals and birds for the series at the time of his demise in London in 1905. For the organisational context in which we know so much about the mammals and other elements of the fauna of the subcontinent, so very much is owed to this indefatigable geologist.

Suggested reading:

W T Blanford. *Birds, Vol IV. The Fauna of British India, including Ceylon and Burma.* (London: Taylor and Francis, 1898), iii.

J Mathew. 2011. 'To Fashion a Fauna for British India,' Doctoral Thesis (Cambridge, MA: Harvard University).

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George Edward Dobson (1848-1895)

George Edward Dobson was an Irish army surgeon stationed in India, known for his work on small mammals, particularly bats and insectivores. Little is known of his personal life, except that he was born to Mr Parke Dobson in County Longford, Ireland on 4th September, 1848 and he died in West Malling, Kent, England, on 26th November 1895. It is evident from his academic background that Dobson had a keen interest in science. He obtained a degree in surgery from Trinity College, Dublin and won numerous awards such as a Gold Medal in Experimental and Natural Science, for his work in medical research.

CHIROPTERA

After his medical training, in 1868, Dobson was posted as an Army Surgeon in Calcutta. He held this post for twenty years till he retired in 1888 as a Surgeon Major. He began working on two groups of mammals, bats (Chiroptera) and insectivores (Insectivora), and in 1871 published his first paper 'On four new Species of Malayan Bats from the Collection of Dr Stoliczka' in the *Proceedings of the Asiatic Society of Bengal*. He then began examining bat specimens from the Indian Museum at Calcutta in 1871. After describing all the bat species from there, he wanted to extend his study and record all the species of bats found in the Indian subcontinent. However, his work was disrupted for a short while by a posting in the remote Andaman Islands in 1872. The stint proved fruitful for Dobson who was able to explore his interest in anthropology by interacting with one of the Negrito tribes of the Islands, the Andamanese. His photographs depicting their various activities and lifestyle drew a great deal of appreciation. He also published two articles in 1875 and 1877 on the Andamanese in the *Journal of the Royal Anthropological Institute.*

THE MONOGRAPH OF ASIATIC CHIROPTERA

When his assignment in the Andamans ended in 1874, Dobson returned to England for a short spell. While in England he continued his study on bats and examined specimens from museums in Berlin, Leyden and Paris, and Horsfield's bats from Java. Back in India, he compared the European bats to Indian specimens and in 1876 published his observations in his *Monograph of the Asiatic Chiroptera*. This monograph contained notes on the fur, form of the ear, dentition, various body measurements and the geographical distribution of 122 species. Of these, 87 species were believed to belong exclusively to Asia. According to Dobson, all the European bats, except for four species, were also found in Asia. Including notes on these four species as well, he stated in the preface to his work that the monograph may also be called "A Monograph of the Asiatic and European Chiroptera".

With this work Dobson had described several new species of bats including the dawn bat *Eonycteris spelaea*, Theobald's tomb bat *Taphozous theobaldi*, Dobson's horseshoe bat *Rhinolophus yunanensis* and the hairy-faced bat *Myotis annectans.* After the publication of the monograph, he returned to England to work at the British Museum (Natural History) (later the Natural History Museum) in London.

His task was to make a compilation of all the bat species in the museum. *The Catalogue of the Chiroptera in the Collection of the British Museum* was completed in 1878 and it contained detailed descriptions of 400 species of bats. By this time, Dobson was considered an authority on bats, and had corresponded with several important naturalists of the time, including Charles Darwin (on secondary sexual characteristics of bats).

INSECTIVORA

After completing his study on bats, Dobson turned his attention to insectivores, especially focusing his attention on shrews (Family Soricidae). He conducted thorough studies on their structure, nomenclature and classification and in 1881, described Day's shrew (*Suncus dayi*) a species endemic to India and threatened today by habitat loss. In 1882, he began his *Monograph of the Insectivora, Systematic and Anatomical* but it remained incomplete as he fell severely ill. He was able to produce only three parts (1882-1883). He had to resign from his position as an Army Surgeon in 1888 and stop all his scientific work in 1890. After seven long years of suffering, he finally succumbed to his illness on November 26, 1895. One of the most methodical and comprehensive studies carried out on any group of mammals at that time, was thus left unfinished.

At the time of his death Dobson was a member of the Linnean Society of London and a Fellow of the Royal Society, member of the Zoological Society of London and a corresponding member of the Academy of Natural Sciences of Philadelphia and of the Biological Society of Washington.

Suggested reading:

George Edward Dobson. *Monograph of the Asiatic Chiroptera: and catalogue of the species of bats* in the collection of the Indian Museum. (London: Taylor and Francis, 1876).

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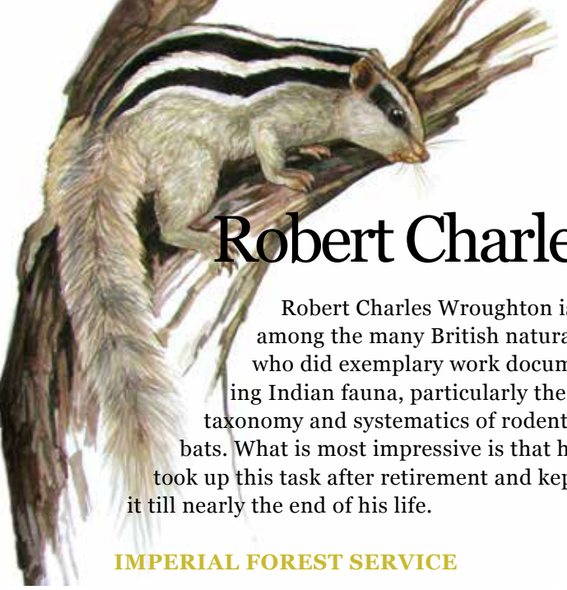
Illustration: Hairy faced bat (left)
Dobson's horshoe bat (right)



Robert Charles Wroughton (1849-1921)

Robert Charles Wroughton is among the many British naturalists who did exemplary work documenting Indian fauna, particularly the taxonomy and systematics of rodents and bats. What is most impressive is that he took up this task after retirement and kept at it till nearly the end of his life.

IMPERIAL FOREST SERVICE

Wroughton was born on 15th August, 1849 in Naseerabad, in what is today the province of Baluchistan in Pakistan. Little is known of his personal life. His father, Major General R C Wroughton, was also a naturalist and a keen sports person, from whom he might have inherited his interest in natural studies. Wroughton's childhood was spent in India, where he developed an early interest in natural history. He was then sent to England for his schooling in Bedford, followed by higher education in King's College, London. He further trained in forestry at the L'Ecole Forestière in France. In 1871, he returned to India as the Assistant Conservator of forests in the Imperial Forest Service.

EARLY CONTRIBUTIONS TO NATURAL HISTORY

Wroughton's interest in the natural world began with the order Hymenoptera, comprising ants, bees and wasps. He collected numerous specimens of ants while in service and sent them to renowned Swiss myrmecologist Auguste Forel. Under Forel's guidance Wroughton not only identified ant species but also studied their social life.

On a trip to England, he approached Reginald Pocock who headed the arachnid section at the British Museum (Natural History), South Kensington, London, with a view to studying scorpions. He provided Pocock with specimens of scorpions and myriapods from India during that time. From these collections, Pocock described a new species of scorpion in 1899 and named it after Wroughton—*Heterometrus wroughtoni.* Although an authority on arachnids at the time, Pocock had become interested in mammals and encouraged Wroughton to focus on mammalogy, particularly the study of little known small mammals.

CONTRIBUTIONS TO MAMMOLOGY

On returning to India, in 1897-1898, he collected several specimens of bats in the districts of Surat and North Konkan. While most of these specimens were described by Oldfield Thomas, who headed the Mammals section at the British Museum (Natural History), Wroughton also examined a few and published his first paper titled 'Some Konkan Bats' in the *Journal of the Bombay Natural History Society* in 1899. He credited Thomas with encouraging him to undertake his first attempt at systematic zoology.

It was only after this first effort that he gained confidence in his aptitude to be a mammalogist. Following this, he wrote several papers on rodents that he had collected during his stint in Konkan. He also published detailed notes on several rodent genera such as *Mus, Bandicota, Tatera* and *Micromys.* He was also the first to describe the five-striped palm squirrel *Funambulus pennanti* in 1905. In this paper, he stated that both the three-striped and five-striped squirrel were originally considered a single species called *Funambulus palmarum.* Wroughton however found two individuals within half a mile distance of one another on the north bank of River Tapti and felt that the two were distinctly different in the number of stripes on the back and a few other characteristics. He studied several specimens of these in the national collection at South Kensington and was certain that they were actually two different species. There was one with three distinct stripes and another with an additional faint stripe on either side. He named the latter *Funambulus pennanti* and suggested that this species had its distribution in north India.

SURVEY OF MAMMALS IN INDIA

After retirement, Wroughton returned to England and focused on specimens of mammals from Africa, as collections from India were slow to arrive. Although collections poured in from Africa giving him much work, Indian natural history was his obsession. He tried very hard to persuade his friends to send him specimens. Although a few rodents arrived in this way, it was far from the larger plan he had envisaged. He believed that, although many eminent natural historians had explored India well in the early 1800s and described many species, their notes were inadequate. Most naturalists focussed only on salient characters, mainly at the generic rather than at the specific level, particularly with regard to small mammals like bats and shrews. In order to address this problem, Wroughton proposed a massive and exhaustive survey of mammals throughout India, by hiring paid naturalists to do the collections. Most people were against such an idea at that time as they felt that natural history collections ought to be done out of interest rather than for money. However, Wroughton believed that his scheme would get a greater number of people involved in such work. He convinced W S Millard, the honorary secretary of the Bombay Natural History Society (BNHS) to help him. The survey was intended not just to describe species in meticulous detail but also to differentiate characteristics of populations in different geographic regions of the country. It would revise systematic zoology and make it more precise.

BNHS organised funds for the task and began the long hunt to find people for the job. Fortune turned when finally in 1911, Mr C A Crump arrived in Bombay and offered his services to the BNHS. He started some of the earliest collections from northwest Maharashtra. Within a year of this event, more people joined the mammal survey.

The First World War in 1914 stopped work briefly but the work soon continued with other eminent naturalists such as Stanley Prater joining the survey.

The survey went on till 1923, two years after Wroughton's demise. Nearly 25,000 specimens were collected from all parts of India over the course of 13 years and sent to the British Museum to be sorted and catalogued by Wroughton, resulting in 33 articles. By the age of seventy he had completed summaries of almost all the years of the survey and had described a total of 200 species of rodents and bats including the Cutch rock rat (*Cremnomys cutchicus*) and Wroughton's wood mouse (*Apodemus wardi*). Ninety of the specimens at the British Museum (Natural History) were brought in by Wroughton and some such as the Wroughton's free-tailed bat (*Otomops wroughtoni*) were named after him in recognition of his work.

In 1921, at the age of 72, R C Wroughton died in England. He was known to be a keen, energetic and robust person, endearing to all his acquaintances. He was perhaps best described by his friend and collaborator Oldfield Thomas who wrote in Wroughton's obituary that he was very humble and modest about his accomplishments and preferred to stay away from the scientific society of London.

Suggested reading:

Robert Charles Wroughton. Bombay Natural History Society's Mammal Survey of India, The Journal of the Bombay Natural History Society.1912-1916. Vol. 22(1) -24(4).

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Illustration: Five striped palm squirrel (left)
Kutch rock rat (left bottom)
Wroughton's wood mouse (right)

Reginald Innes Pocock (1863-1949)

Reginald Innes Pocock was a British naturalist, who is today considered one of the most important mammalogists connected with India. Born on March 4, 1863 in Bristol, England, Reginald Pocock was the fourth son of Rev Nicholas Pocock and Edith Prichard. As a child he had varied interests; he was athletic and played rugby, lacrosse and lawn tennis. He was fond of poetry and was a skilled artist. He also showed keen interest in animals and frequently visited the Zoological Gardens at Clifton where he learned about keeping and breeding mice, lizards, turtles and other smaller animals.

THE NATURAL HISTORY MUSEUM

As his interest in zoology grew, he went on to study biology and geology at University College, Bristol. His education made him ideal for an Assistantship at the Department of Zoology at the British Museum (Natural History) now known as the Natural History Museum in London. The position involved mainly organising the Museum's zoological specimens and describing those that were unidentified. After a brief stint arranging British birds in the public gallery, Pocock moved to the Entomology section where he took over the arachnid and myriapod collections, becoming a recognised authority on these groups. His stint with the Zoological Society museum substantially increased its entomological collections. He worked at the museum for the next 18 years, publishing over 200 papers, including a special volume on *Arachnida* for the *Fauna of British India* series. He also contributed several of his own illustrations to his papers, enhancing their aesthetic value.

INTEREST IN MAMMALS

While still at the Entomology section in 1897, Pocock came across a zebra like specimen in the museum simply labelled Quagga. Curious about the taxonomical affinities of the animal, he examined it and came to the conclusion that it was closely related to the plains zebra *Equus quagga* found throughout East Africa. The animal, extinct by the time Pocock came across it, featured in his first paper on mammals, 'The species and subspecies of Zebras'. Soon after this, Pocock helped Dr P L Sclater, Secretary to the Zoological Society of London (1860-1902), finish the remaining chapters of the *Book of Antelopes*, co-authored with Dr Oldfield Thomas, Pocock's colleague who headed the section on mammals at the museum. This helped him develop a better understanding of mammals. He then made trips to the Balearic Islands of Spain with Oldfield Thomas to collect mammals, arachnids and myriapods. This trip further spiked his interest in mammalogy leading to the publication of several papers in *Nature* during this period. So great was his interest that when fellow naturalist R C Wroughton, who was then interested in studying arachnids, approached him for help, Pocock advised him to instead turn his attention to studying mammals.

CONTRIBUTIONS TO MAMMALOGY

Having decided to focus on mammals, Pocock was eager to move to the mammalian section of the Museum. However no position opened up for him and in March 1904, he resigned from his assistantship at the museum to become the Superintendent of the Zoological Gardens at Regent's Park, which held a curious connection to his past; the quagga specimen that first drew him to mammals was housed there when it was alive. Although the position mainly involved administrative duties, Pocock spent considerable energy trying to improve living conditions for the captive animals. Here, his experience from childhood days spent at the zoo in Clifton came in handy. He also started collecting skins and skulls of dead animals at the zoo, and realised the importance of external features such as ears and hooves, which most animal collections lacked, for accurate identification of species. He went on to thus pioneer the use of external morphological characters for classifying mammals.

During this period, Pocock also worked on a revision of the genus *Cercopithecus*, Old World monkeys from Africa and on digestive systems in ruminants. He wrote a series of papers on carnivores, such as 'The Jackals of SW Asia and SE Europe', from 1914 till the time of his death. These works earned him a reputation as an authority on mammals. His specialty was considered ungulates, carnivores and primates, with notable writings on the external characters of Artiodactyla or even-toed ungulates such as pigs, deer and antelopes; the classification of felids and mongooses and the external characters of Madagascar-restricted lemurs and South American monkeys.

INDIAN MAMMALOGY

In 1923, after nineteen years, Pocock resigned from his post at the Zoological Gardens to dedicate the rest of his life to the study of mammals. He went back to the Natural History Museum as a 'temporary scientific worker', a voluntary position. His second stint at the museum marked a period of great advances in Indian natural history. Pocock became a regular contributor to the *Journal of the Bombay Natural History Society*, and wrote several important papers describing langurs or leaf monkeys, Asiatic lions, leopards and civets.

His greatest contribution to Indian mammalogy was perhaps the *Mammalia* volume of the second edition of *Fauna of British India* series in 1939. In this revised edition, he highlighted a new more systematic approach to mammalogy based on a method devised by American naturalist C Hart Merriam. Pocock pointed out the

Illustration: Desert fox

inadequacies in the first edition of *Mammalia* produced nearly 50 years prior by W T Blanford, where specimens (mainly skins) were often poorly preserved and rarely accompanied by details of their geographical origin. Using the new approach that involved collection of entire animals and notes on location, altitude and date of collection (all common practices now), mammalogists were able to identify whether an animal was indeed a new species or merely a sub species or race that showed minor variation in morphology due to its local environment. The trinomial system of nomenclature was also introduced in this new edition by Pocock. Using this method he pointed out that Blanford had for instance classified the Red Fox (*Vulpes vulpes montana*) found in the Himalayas and Desert Fox (*V v pusilla*) as two distinct species when they were merely sub species of the common fox (*V vulpes*) that showed morphological variations. Using this new method he examined minor variations in skulls and skins of forty specimens of felids previously classified as five distinct species and concluded that they were subspecies of the wildcat *Felis silvestris*. The taxonomy of the species however continues to remain in flux. While the International Union for Conservation of Nature only recognises four sub species, *Mammals of the World* (third edition, 2005) the standard reference guide by Wilson and Reeder recognises twenty two subspecies.

Pocock continued to work till the day before his death on 9th of August 1949, at the age of 86. At the time of his demise, he was involved in the compilation of a systematic monograph of Felidae, the *Catalogue of the Felidae* in the British Museum, and a description of the external characteristics of rare mammals, such as the endangered one-horned rhino *Rhinoceros unicornis*, from the Indian sub-continent. He described over 85 species of extant mammals from around the world and inspired several other naturalists to take up the study of mammals.

Suggested reading:

Reginald Pocock. *The Fauna of British India, including Ceylon and Burma – Mammalia Vol. 1 (1939) and Vol. 2 (1941).* (London, Taylor and Francis, 1939, 1941).

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Edward Pritchard Gee (1904-1968)

Edward Pritchard Gee was a British naturalist and tea planter, who lived and worked in Assam, India. Gee travelled extensively through the jungles, protected reserve forests and wildlife sanctuaries of India. He observed, recorded and photographed various species in their natural habitat and published many articles on them in different volumes of the *Journal of the Bombay Natural History Society.* He was a member of the Indian Board for Wildlife from 1952 and was also its eastern regional secretary for many years.

Apart from being a keen naturalist, Gee was also a passionate wildlife conservationist. This led him to document and survey the status of several endangered animals in India. For instance, in 1946, he undertook what may have been the first survey of the status of Indian wild ass (*Equus hemionus khur*), across the Little Rann of Kutch. His objective was to assess the status of the wild ass after a mass die off from a mysterious disease. He also visited the Maharaja of Rewa to study his captive white tigers. He wanted to confirm if they were indeed rare white tigers or albino. Gee was of the opinion that a rare or endangered mammal could be bred in captivity and later distributed to different regions in order to save it from extinction. His most significant achievement was the discovery of the golden langur (*Presbytis* (Now *Trachypithecus*) *geei*) in the Manas Wildlife Sanctuary in the northern part of Assam, close to Bhutan border. This remains the only population of golden langurs to be found in India.

Uddipana Kalita is an independent researcher studying resource extraction patterns and how this affects primate communities in the Manas Tiger Reserve, Assam, India.

Illustration: Golden langur

Stanley Henry Prater (1890-1960)

Stanley Henry Prater is arguably the best known pre-independence Indian mammalogist. He is best known for the popular wildlife book, *The Book of Indian Animals* which describes mammals of India for the benefit of the lay person.

BEGINNINGS

Prater had an early introduction to the study of wildlife. Born on the 12th of March, 1890, he spent much of his early childhood in the Nilgiri hills where his father William Prater was a coffee planter. According to noted ornithologist Salim Ali, Prater was left in an orphanage in Bombay run by Jesuit priests at a young age. While studying at St Mary's School in Bombay, he spent most of his holiday exploring the forests around Khandala in Maharashtra.

His interest led him to the Bombay Natural History Society (BNHS) in 1907, where he worked as a bottle washer. Impressed by the dedication and commitment of the young boy, BNHS wanted him to join the scientific staff, but the lack of higher education was an impediment. Thus he was sent to St. Xavier's college in Bombay along with Salim Ali to study Biology.

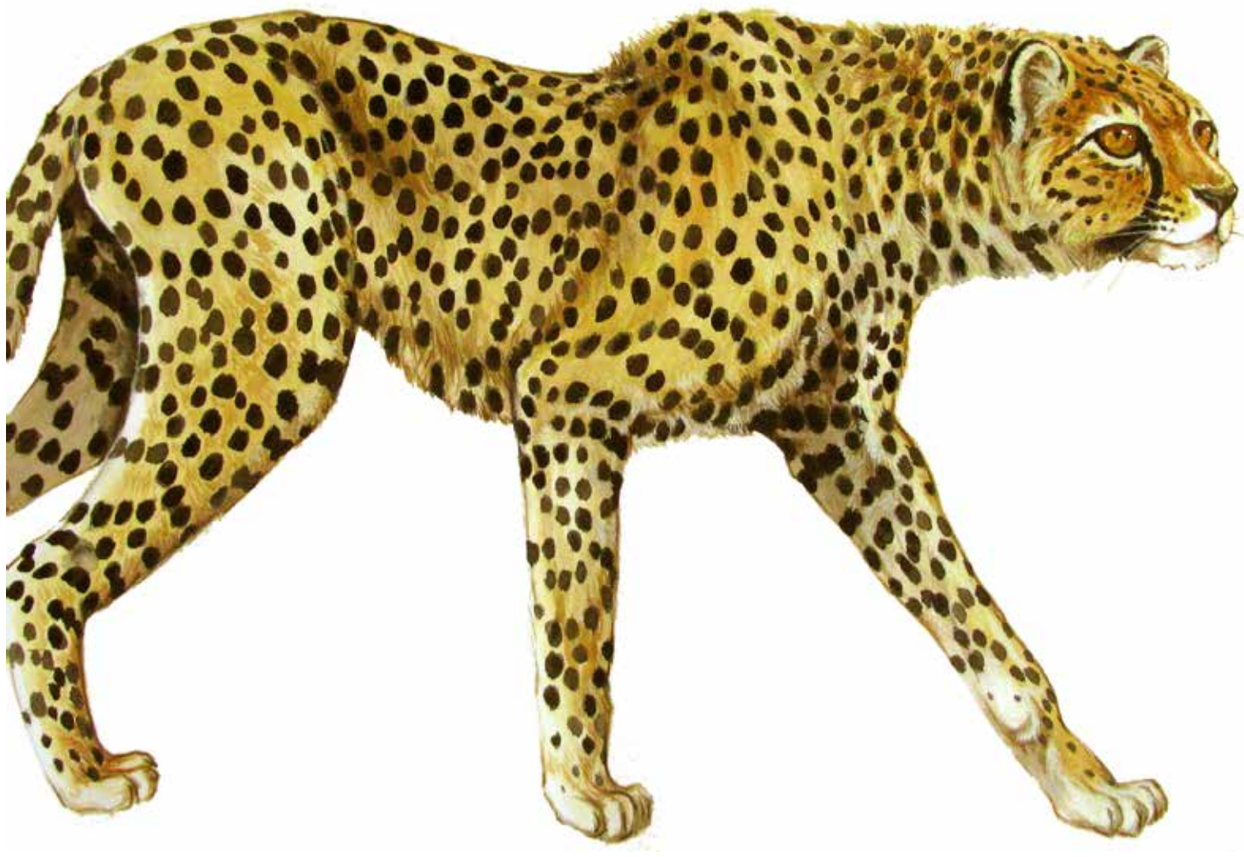
INDIAN MAMMALOGY

Prater's contributions to the study of Indian mammals began in early 1911. Robert Charles Wroughton, a British naturalist was in the process of conducting a massive countrywide survey of small mammals in the Indian subcontinent. Prater was one of many collectors for the survey; his time in field was however cut short by an accidental gunshot wound. Although he was only able to participate in the survey for two of the twelve years, he made detailed observations of several small mammals, such as the ecology of Wroughton's free tailed bat (*Otomopos wroughtoni*) in 1913.

In 1916, at the age of 26, he became the Editor of the *Journal of Bombay Natural History Society (JBNHS).* In 1919, Prater became the acting Curator of the BNHS museum for four years, when the then Curator Norman Boyd Kinnear went back to Britain. In 1933, he published a series of articles titled 'Preservation of Wildlife in the Indian Empire', highlighting threats faced by wildlife in India and importance of conservation at a time when hunting was prominent. He talked particularly about threatened species such as the Asiatic cheetah (*Acinonyx jubatus*), the Javan rhino (*Rhinoceros sondaicus*) and the Sumatran rhino (*Dicerorhinus sumatrensis*). He also discussed the breeding behaviour of dugongs (*Dugong dugon*) on the east coast and highlighted the rise in tiger hunting in Burma in 1937.

THE BOOK OF INDIAN ANIMALS

In 1948, he brought out the widely acclaimed *Book of Indian Animals* published by the BNHS, which provided observations of several Indian mammals. In the book, Prater compiled information from several sources (such as the *Fauna of British India* series) to create detailed descriptions of mammals found in India. The book in simple prose provided notes on the behaviour and ecology of different species and the threats they faced in the wild—a first for India, where naturalists tended to focus on taxonomic features. The species recorded range from large carnivores like the tiger (*Panthera tigris*) to little known rodent and bat species. The book was also perhaps the first to record, in detail, the marine mammals found in Indian waters.



Throughout this work, Prater also stressed on the need to increase protection of these mammal species, preserve their habitat and regulate hunting. He also emphasised the need to create awareness among Indian people of their rich biodiversity, crucial in garnering support for protecting India's wildlife. The book remains in demand even today in a revised third edition.

He was also active in politics. From 1930 to 1947, Prater was the President of the Anglo-Indian and Domiciled European Association and a member of the legislative assembly from Bombay. For his contributions, he was awarded an Order of the British Empire. Under pressure from his family, Prater moved to the United Kingdom in 1950, where he spent his last ten years, reading, writing and plaster modelling. After a long debilitating illness that left him crippled, Prater breathed his last on the 12th of October, 1960. His legacy lives on with the *Book of Indian Animals* continuing today in the third edition.

Suggested reading:

Salim Ali and Stanley Henry Prater. 1960. *The Journal of the Bombay Natural History Society*, 57(3):637-642.

Prater Stanley Henry. 1948. *The Book of Indian Animals*. BNHS and Oxford University Press.

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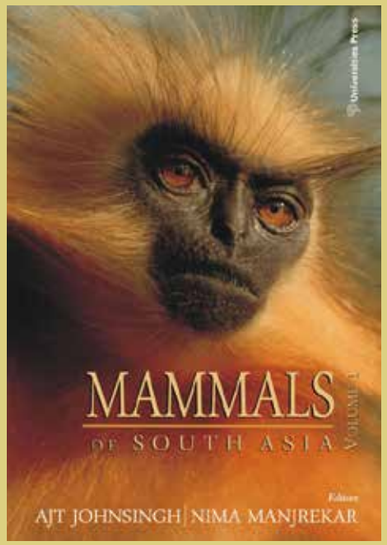
Illustration: Asiatic cheetah

Major mammal book published



Mammals of South Asia, volume 1.
Edited by A J T Johnsingh & Nima Manjrekar

ISBN: 978-81-7371-590-7
Universities Press (India) Private Limited (August 29, 2012)

VOLUME 1 OF THE EAGERLY ANTICIPATED COMPREHENSIVE MULTI-AUTHOR GUIDE TO MAMMALS OF INDIA AND SURROUNDINGS

On my first visit to India, I saw more large mammals in a month than in a decade in South-east and East Asia. Naturally I wanted to read up on the wonderful species I was seeing. Prater's book still did a great job, but so much has been found out since it was written that people have been anticipating, with relish, *Mammals of South Asia.* After a 17-year gestation, its first volume (of two) is here. About as thick as the binding could take, it covers insectivores, treeshrews, bats, primates and carnivores; the rest will be in volume 2, capped by the mouth-wateringly entitled final chapter 'Little-known mammal species'.

The superb eye-catching front cover (a Golden Langur *Trachypithecus geei)* shows a species endemic to South Asia, in great need of improved conservation, and little known by the general public. The many colour plates, sourced from many different photographers and overall excellent, are grouped in four blocks. This presumably makes the book affordable to more people. Many monochrome photographs of animals and habitats enliven the text, although some, unfortunately, have reproduced too dark in the review copy.

Almost four dozen authors wrote the species accounts, giving a great diversity of style. Nonetheless, nearly all chapters share one important attribute: readability. Many species have chapters to themselves, but single chapters cover each of: insectivores; treeshrews; bats; mongooses, civets, linsangs and non-lutrine mustelids (small carnivores); otters; and small cats. These latter vary in structure, from the otters (three sequential species accounts) to the small carnivores (structured by topic, with no species accounts). It must be a matter of personal taste whether to prefer the former (easy to find information on each species) or the latter (gives a good feel for diversity within the group). Irrespective of number of species covered, each chapter contains, typically, a delightful line-drawing, introduction, description, taxonomy, distribution and status, ecology and behaviour, conservation, and references.

The species accounts are preceded by a preface and acknowledgements, an excellent foreword by George Schaller, and a 30-page introduction. This latter sets South Asia's mammals in global context, with a strong focus on biogeography and endemism. Bizarrely, almost throughout, 'Palearctic' is used to mean the true Palaearctic and that part of the Oriental region not in South Asia. This obscures (in, e.g., Table 4, p. xlix) the true zoogeographic affinities of South Asia's mammals, which lie overwhelmingly with South-east Asia, not with the Palaearctic. 'South Asia' itself is taken as India, Sri Lanka, Nepal, Bhutan, Pakistan, Bangladesh and, although few authors give much attention to them, Myanmar and Afghanistan.

Taxonomy and nomenclature are mostly fairly conventional, although some chapters mention modern proposals (e.g. that 'Grey Langur *Trachypithecus entellus'* may be a complex of seven species) and a few adopt them (e.g. that the linsangs *Prionodon* are remarkably distinct animals that belong in their own family). Unhelpfully, *Cuon alpinus* is here called 'Asiatic Wild Dog'. This necessitates starting its account with a stern warning about this misnomer, the species being unrelated to domestic dogs! Why not just call it 'Dhole', a name in wide use in the rest of the world? I hope that the chevrotains *Moschiola* (to come in vol 2) will not be miscalled 'mousedeer', thereby requiring another announcement that 'these animals are not deer'.

Unfortunately, the book is not flawless. A few photographs are mislabelled: Plates 27.40–42 and Fig. 27.3 all show Altai Weasel *Mustela altaica*, not the species they are labelled as. Some chapters seem to have been written in the 1990s and not updated. The pace of new insight leaves some very dated, such as Red Panda *Ailurus fulgens.* There are many inconsistencies and errors, mostly small, but sometimes resulting in entirely the wrong message. Perhaps paramount among these are statements about otters such as "In Southeast Asia, there does not seem to be any intentional otter trapping" (p. 517): the last 20 years have seen otters trapped to eradication over much of Vietnam, Lao PDR, Thailand, Cambodia and Myanmar! This is a sad reminder of how quickly things can change. The serious researcher must make his/her own exhaustive search of the literature, particularly that published after the mid 1990s.

Despite the foregoing cautions, it is a genuine pleasure to read this book. It succeeds admirably in presenting the species in depth yet accessibly to the general public. The lengthy and, mostly, well-considered sections on conservation are thus very important. This remarkable book deserves to be a key reference not just for those in its region, but for naturalists throughout tropical Asia. Volume 2 is eagerly awaited.

J W Duckworth has spent most of his working life involved in conservation in South-east Asia, with a particular interest in mammals. He has visited India several times for inspiration in this work, and looks at the book in recognition of its regional interest. Will.DUCKWORTH@iucn.org

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