

Chapter 01

The Discovery of Indian Turtles, with Notes on Publications, Type Localities and Type Repositories

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Introduction

An appreciation of India's turtle diversity, reported as the richest in the world (Iverson, 1992), perhaps would include historical aspects behind its discovery. This essay traces the history of the discovery of Indian turtles, from Linnean to recent times. It retains the original orthography (as derived from an examination of the original publication) and I have attempted to trace all primary types of Indian turtles. Further biographical notes on important collectors and written contributors can be found in the works of Adler (1989), Archer (1962), Bauchot *et al.* (1990), Das (2004), Dawson (1946), Fransen *et al.* (1997) and Leviton and Aldrich (2000).

Appendix 1 comprises institutional repositories of turtle type material and Appendix II is an analysis of turtle names.

The Linnean period (1758–)

Carolus Linnaeus (1707–1778), in the 10th edition of 'Systema Naturae', described several turtles, of which three marine species are known from India. All were allocated to the genus *Testudo*, though none of the types were collected from India. The type locality of the first of these, *Testudo Caretta*, current name- *Caretta caretta* (Linnaeus, 1758) was indicated as "insulas Americanas" in the original description, and was restricted to "Bermuda Island" (32°20'N; 64°45'W, the Atlantic Ocean) by Smith and Taylor (1950), and further to "Bimini, British Bahamas" (25°44'N; 79°15'W) by Schmidt (1953). Wallin (1985) indicated that no type specimen of *Testudo caretta* existed. Another marine turtle described by Linnaeus was *Testudo Mydas*, current name- *Chelonia mydas* (Linnaeus, 1758). The NHRM 19, 26 and 231 syntypes, were from "Insulas pelagi: insulam Adscensionis" (= islands of the oceans: Ascension Island and so on.), restricted to "Insel Ascension" (= Ascension Island, 07°57'S; 14°22'W, in the Atlantic Ocean) by Mertens and Müller (1928). The third species is *Testudo imbricata*, current name- *Eretmochelys imbricata* (Linnaeus, 1766). Its presumed holotype is ZMUU 130, according to Smith and Smith (1979), although Wallin (1985) indicated that no type specimen ever existed. The original description mentioned that it originated from "Mari Americano, Asiatico" (= American and Asian seas), and was restricted to "Bermuda" (32°20'N; 64°45'W; in the Atlantic Ocean) by Smith and Taylor (1950).

Other sea turtle species were described subsequently. For instance, *Chelonia olivacea*, current name- *Lepidochelys olivacea* (Eschscholtz, 1829), based on types that are probably in MZT, according to Smith and Smith (1979), was from "chinesische Meer" (= China Sea), "Bai von Manilla" (= Manila Bay, 14°37'N; 120°58'E, Luzon, the Philippines) and "Sumatra" (in the Greater Sundas, Indonesia), and *Testudo coriacea*, current name- *Dermochelys coriacea* (Vandelli, 1761), whose holotype is an uncatalogued ZMUP specimen (Fretey and Bour, 1980). Vandelli (1761), in his letter to Linnaeus, gave the type locality as "maris Tyrrheni oram in agro Laurentiano" (= to the mouth of the Tyrrhenian Sea in Laurentium countryside), although Linnaeus (1766) gave the provenance as "Mari mediterraneo, Adriatico varius" (= either the Mediterranean Sea or the Adriatic), which was restricted to "Palermo, Sicily" (38°08'N; 13°23'E; in Italy) by Smith and Taylor (1950), and restricted again by Fretey and Bour (1980) to "la côte romaine (Italie), Mer Tyrrhénienne, Méditerranéenne occidentale" (= the Roman coast [Italy], Tyrrhenian Sea, western Mediterranean Sea), which Bour and Dubois (1983) restricted to "Laurentum, between Lido di Ostia and Tor Paterno, shore of the Tyrrhenian Sea, Italy" (not extant at present and once located at ca. 41°42'N; 12°17'E, about 7 km from Lido di Ostia and 4 km from Tor Paterno).

Colonial Period: Europe

Intense British interest in the natural history of her colonies spurred explorations in hitherto uncharted areas of the Empire. Prominent explorers included Major-General Thomas Hardwicke (1756–1835), an armyman,

who served in the Bengal Artillery of the East India Company, and collected natural history specimens and coloured sketches of plants and animals. Hardwicke's collection of natural history art ran into some 32 folio volumes that included over 2,000 drawings, of which 366 were of amphibians and reptiles. These were based on specimens collected/observed by his artists around places he was posted, especially Bengal and the United Provinces. His most famous contribution was a work which he collaborated with John Gray (1800–1875) of the British Museum, entitled 'Illustrations of Indian Zoology' (Gray, 1830–1835). The text was not published, owing to Hardwicke's premature death. The work was famous in depicting several turtle iconotypes, including *Emys baska*, current name- *Batagur baska* (Gray, 1830), which was apparently not based on biological material (= type specimens), and type locality was not specified, and was later restricted to "India" by Gray (1831); *Emys dhongoka*, current name- *Batagur dhongoka* (Gray, 1832), the type of which is currently untraced, and no type locality was specified, was subsequently restricted by Smith (1931:130) to "N. India"; and *Emys kachuga*, current name- *Batagur kachuga* (Gray, 1831) (Plate 1A), similarly without type material or specific type locality, again restricted by Smith (1931:131) to "N. India". In the massive folio work where these Indian turtle names appeared, two familiar turtle names were credited to the British herpetologist, Thomas Bell (1792–1880), as Gray cited an unpublished Bell manuscript (see Wheeler, 1998), and *Emys tectum*, current name- *Pangshura tectum* (Bell in: Gray, 1831), whose type specimens have not been located, with the type locality of the species simply given as "India".

John Gray's solo efforts resulted in a number of papers that described new turtle taxa. *Cyclemys mouhotii*-currentname- *Cuora mouhotii* (Gray, 1862), the original type series composed of BMNH 1947.3.4.27, 1947.3.4.48–49 and 1947.3.4.64–67 (seven syntypes), was described from "Lao Mountains, in Siam", restricted without explanation to "presumably the Luang Prabang mountain range on the border between Thailand and Laos" (also spelt Louang Phrabang, ca. 20° 00'N; 102° 30'–50'E, Luang Prabang Province, Laos) by King and Burke (1989). Fritz *et al.* (1998) designated BMNH 1947.3.4.27, as a lectotype, reiterating the type locality, as previously restricted, to "Luang Prabang, Laos, 19°54'N, 102°8'E". The species was, of course, named for Henri Mouhot (1826–1861), the French naturalist and explorer who collected reptiles in Thailand, Cambodia and Laos, and wrote an account of his travels "Voyages dans les royaumes de Siam, de Cambodge de Laos et autres parties centrales de l'Indo-Chine". Another Gray discovery was *Emys Hamiltonii*, current name- *Geoclemys hamiltonii* (Gray, 1830), based on the holotype, BMNH 1947.3.4.41 from "India", according to the BMNH register, although OUM 8477 is also labelled as a syntype. The namesake for this taxon is Dr. Francis Hamilton (1762–1829), aka Francis Buchanan, botanist and surgeon with the British East India Company based in Bengal and Burma. In the same volume, Gray described another geoemydid, *Emys Thurjii*, current name- *Hardella thurjii* (Gray, 1831), based on two syntypes (OUM 8433–34), from "India". Two other species described by Gray currently allocated to the genus *Pangshura*: *Emys tentoria*, current name- *Pangshura tentoria* (Gray, 1834), based on a holotype, BMNH 1947.3.4.72, from "Indiæ Orientalis regione Dukhun dictâ" (= the Deccan region of southern peninsular India), and was restricted to "Dhond, Poona Dist." (15°30'N; 75°04'E, Maharashtra State, west-central India) by Smith (1931:128), and *Batagur smithii*, current name- *Pangshura smithii* (Gray, 1863), was based on two syntypes (BMNH 1947.3.4.69–70), that were acquired from "North-western India: Punjab" and "River Chenab" (in Pakistan or north-western India), and named for Sir Andrew Smith (1797–1872), the Director-General of the Army Medical Board, and author of 'Illustrations of the zoology of South Africa'.

Softshell turtles appear to have been a favourite of John Gray, and he described a number of species worldwide (many currently in synonymy). The distinctive *Trionyx Hurum*, current name- *Nilssonina hurum* (Gray, 1830) was based on Buchanan Hamilton's drawings in the BMNH from "Indiæ fluvio Ganges", although the drawing bears the locality "Fatehgarh" (27°22'N; 79°38'E, Uttar Pradesh, northern India), to which the type locality was restricted by Smith (1931:171). Webb (1980a) emended the type locality to "Barrackpore (about 23 kilometers north Calcutta), West Bengal, India" (= Barakpur, 22°45'N; 88°20'E). A congener, *Trionyx Leithii*, currentname- *Nilssonina leithii* (Gray, 1872) was described on the basis of two syntypes, BMNH 1947.3.4.15 and 1947.3.6.7 from "Poonah" (= Pune, 18°34'N; 73°58'E, Maharashtra State, south-western India). Gray is also credited with the description of two remarkable trionychid turtles: *Trionyx indicus*, current name- *Chitra indica* (Gray in: Griffith and Pidgeon, 1831), which has been generally stated to be based on a colour plate in Gray (1831:Pl. 80), from "India, fl. Ganges, Penang" (the latter locality at present spelt Pulau Pinang, 05°30'N; 100°28'E, West Malaysia, in error), according to Gray (1831). However, Farkas (1994) demonstrated that a RSCM specimen

(from Penang), that was destroyed during World War II, was part of the original type series. The type locality was restricted to "Fatehgarh, Ganges" (27°22'N; 79°38'E, Uttar Pradesh, northern India) by Smith (1931:162). The second species, *Pelochelys cantorii* Gray, 1864, was based on two syntypes, BMNH 1947.3.6.21–22, from "Malacca" (= Melaka, 02°12'N; 102°15'E, West Malaysia). The last-mentioned species was named in honour of Theodore Edward Cantor (1809–1860), Danish surgeon-naturalist with the British East India Company, who collected and got illustrations of Indian reptiles sketched by local artists.

Gray's successor in the BMNH, Albert Carl Ludwig Gotthilf Günther (1830–1914) prepared a catalogue of the herpetofauna of an expanded British India, entitled "The reptiles of British India" that included the description of a new turtle, *Pangshura flaviventer* Günther, 1864, treated by some authorities as a subspecies of *Pangshura tentoria*, based on the holotype, BMNH 1947.3.4.82 (ex-BMNH 80.1.28.8); its type locality was not specified, but several turtles along with the holotype originated from "Bengal" (at present West Bengal State, eastern India, as well as Bangladesh). Günther, in turn, was succeeded by George Albert Boulenger (1858–1937), whose encyclopaedic knowledge of the world's herpetofauna is reflected in his voluminous publication record. A Boulenger tortoise name is *Testudo travancorica*, current name- *Indotestudo travancorica* (Boulenger, 1907), based on two syntypes, BMNH 1946.1.22.80–81 (a third syntype cannot be located at present), from "near Trivandrum" (on p: 560) (= Tiruvananthapuram, 08°30'N; 76°57'E, Kerala State, south-western India) and "...Travancore hills between 500 and 1,000 feet altitude, but not higher" (p. 560–561; the Travancore region is located in the southern Western Ghats, south of Palghat, 10°46'N; 76°39'E, Kerala State, south-western India). For some years, turtle biologists and others followed the opinion of Hoogmoed and Crumly (1984), in considering Schlegel and Müller's (1844) name, *Testudo forstenii*, as valid for the species from India's Western Ghats, arguing for an introduction of the Indian species into Sulawesi in eastern Indonesia, through human agencies.

Research on continental Europe too was active at the time. Prominent among them were the French, centred around MNHN. François-Marie Daudin (1774–1804), the author of a multi-volume series on the world's herpetofauna, entitled "Histoire naturelle, générale et particulière des reptiles" described *Testudo amboinensis*, current name- *Cuora amboinensis* (Daudin, 1801 "1802"). Daudin mentioned that the type was lost at sea before he saw it (see also Bour in Rümmler and Fritz, 1991:36) and wrote that the description of *Testudo amboinensis* was based on a manuscript by the French naturalist Claude-Antoine-Gaspard Riche (1762–1797), in the footnote on page 309, following the short description of the species. However, Bourret (1941:149), in his work on the turtles of Indo-China and adjacent areas, mentioned that the type was in MNHN (where it cannot be located at present). The type locality was given in the original description as "Amboine" (= Ambon, 03°41'S; 128°10'E, Maluku [Moluccas], Indonesia).

Printing presses flourished in Europe from the end of the 1700s, and many scholarly volumes appeared, with extensive colour plates, often distributed via subscription to the landed gentry as well as scholarly institutions of the time. One such work is 'Historia Testudinum iconibus illustrata', authored by Iohannes Davidis Schoepff (1752–1800), and published between the years 1792–1801, which described the now familiar Indian star tortoise, *Testudo elegans*, current name- *Geochelone elegans* (Schoepff, 1795). The holotype has not been traced, although Schoepff (1795) mentioned that the specimen on which the species was based was from Museis Hagae Comitibus et Harlemi (possibly TSMHN in Haarlem, the Netherlands), and came from "India orientali" (= eastern India). The date of publication of *Testudo elegans*, which was in part III of Schoepff's work is usually given as 1794. However, Ernst *et al.* (1994) showed that the third part was published in 1795. Petrus (also, Pieter) Boddaert (1730–1796), in a rarely-seen bilingual (Dutch and Latin) work, with an extremely long title (see reference) and typically shortened to 'Epistola' described the now familiar large south-east Asian trionychid turtle, *Testudo cartilaginea*, current name- *Amyda cartilaginea* (Boddaert, 1770); the holotype, originally at the Museo viri Celeberrimi Johannis Alberti Schlosseri, is at present MNHN 4150. No type locality was specified, and Baur (1893) subsequently restricted it to "Java" (in the Greater Sundas, Indonesia). Another French encyclopaedia, 'Tableau encyclopédique et méthodique des trois règnes de la nature. Erpétologie' by Pierre-Joseph Bonnaterre (1751–1804), described the familiar *Testudo punctata*, current name- *Lissemys punctata* (Bonnaterre, 1789) (Plate 1B), based on MNHN 7978 (ex-MNHN 819; holotype), from "Des grandes Indes" (= continental India), which was restricted to "Pondicherry, Coromandel Coast, India" (11°56'N; 79°53'E, on the south-east coast of India) by Webb (1980b). French nobleman, Baron Georges Jean-Léopold-Nicolas-Frédéric Dagobert Cuvier (1769–

1832), in his work on fossil vertebrates, described *Trionyx gangeticus*, current name- *Nilssonina gangetica* (Cuvier, 1825), on the basis of MNHN 9387 (ex-MNHN 799; lectotype designated by Bour *et al.*, 1995), from "Gange, Inde" (= River Ganga, northern India); MNHN 4148 (ex-MNHN 797; paralectotype), MNHN (AC) a.5226 (ex-MNHN V.130; paralectotype) and MNHN (AC) 1887.838 (ex-MNHN V.77; paralectotype).

Two other continental workers will be discussed here. August Friedrich Schweigger (1783–1821), in his monograph on the world's chelonians, entitled "Prodromus monographiae cheloniorum" described *Emys trijuga*, current name- *Melanochelys trijuga* (Schweigger, 1812). The holotype was in the MNHN, according to the original description, but cannot be traced at present. The type locality was given as "insula Java" (in the Greater Sundas, Indonesia; in error), the collector, French explorer and naturalist, Jean-Baptiste-Louis-Claude Théodore Leschenault de La Tour (1773–1826), having collected in both Java and India, presumably may have had the label of the holotype transposed with that of a Javanese specimen. The last turtle name to be discussed in this section is one created by René-Primevère Lesson (1794–1849) in a volume entitled "Centurie Zoologique, ou cloix d'A. maux rares, nouveaux ou imparfaitement connus". *Emys thermalis*, current name- *Melanochelys trijuga thermalis* (Lesson, 1830) (Plate 1C), whose types are untraced at present, acquired from "Ceylan" (= Sri Lanka), the species observed "...dans les eaux thermals de Cannia,.. Ceylan" (= living in the hot waters of Cannia [= Kanniya, 09°15'N; 80°41'E, near Trincomalee, Eastern Province], ... in Sri Lanka). This subspecies has since been reported from southern Peninsular India.

Colonial Period: India

Edward Blyth (1810–1873), was hired from England in 1840 as the first Curator of the Museum of the Asiatic Society of Bengal in Calcutta. Blyth's success in building up the museum through acquisition of specimens was largely through the establishment of contact with civil servants in far-flung parts of the British Empire, including Brian Houghton Hodgson (1800–1894), British diplomat and official Resident in Kathmandu, Nepal, Lieutenant-Colonel Sir Arthur Purves Phayre (1812–1885) in Burma; the Dutch-Ceylonese civil servant and naturalist, Edward Fredric Kelaart (1819–1860) in Ceylon; and the British administrator, Robert Francis Christopher Alexander Tytler (1818–1872) in the Andaman Islands. Three currently-valid names of Indian turtles and tortoises are credited to Blyth, including two testudinid species- *Testudo elongata*, current name- *Indotestudo elongata* (Blyth, 1853), based on four syntypes (ZSI 796 and ZSI 798–800), from "Arakan" (= Rakhine Yoma, a mountain range along coordinates ca. 21–18°N; 93–95°E, western Myanmar); *Testudo Phayrei*, current name- *Manouria emys phayrei* (Blyth, 1853), based in two syntypes (ZSI 813 and ZSI 15492), also from "Arakan", in addition to "Tenasserim Provinces" (= Taninthayi, ca. 12°05'N; 99°00'E, southern Myanmar) and the geoemydid, *Geomyda tricarinata*, current name- *Melanochelys tricarinata* (Blyth, 1856), which was described on the basis of a dried shell, ZSI 816 (holotype), from "Central India (Chaibása)" (= Chaibassa, 22°31'N; 85°50'E, Jharkhand State, eastern India).

Major Thomas Claverhill Jerdon (1811–1872), an authority on Indian mammals and birds, and a member of the Asiatic Society, collected extensively from the Himalayas and the Khasi Hills. His important herpetological publications include two papers that deal with his collections. The sole turtle species Jerdon described is *Pangshura Sylhetensis*, current name combination unaltered, except for Jerdon's usage of upper case 'S' for the species nomen- *Pangshura sylhetensis* Jerdon, 1870, based on three syntypes, BMNH 1947.3.4.22 and BMNH 1947.3.4.62–63, from "Terria Ghat at the foot of the Khasi hills" (unlocated in the maps and gazetteers consulted, presumably in Sylhet District, Bangladesh, where several localities named Tori Ghat [= passenger country boat stations] exist).

John Anderson (1833–1900), who replaced Blyth after the natural history collection of the Museum of the Asiatic Society of Bengal was transferred to the newly established Indian Museum, was the first Supervisor of the Museum. An Indian softshell turtle species described by Anderson is *Trionyx nigricans*, current name- *Nilssonina nigricans* (Anderson, 1875), based on material from "Chittagong, Bengal" (22°20'N; 91°48'E, Chittagong District, south-eastern Bangladesh). The two syntypes, ZSI 664 and 1898, are extant at present. Long considered to be restricted to a single pond attached to a shrine in Chittagong, south-eastern Bangladesh, it has, in recent years,

been found widespread in north-eastern India. Anderson took part in the two Yunnan Expeditions (1868–69 and 1874–75), and produced a fine work in 1878 (published in 1879) entitled 'Anatomical and zoological researches: comprising an account of the zoological results of the two expeditions to western Yunnan in 1868 and 1875; and a monograph of the two cetacean genera, *Platanista* and *Orcella*', which was a monograph on the vertebrate fauna of the Upper Burma-Yunnan region and included a review of freshwater turtles of India and adjacent regions of south-east Asia. Anderson described two geoemydid turtles, *Emys trijuga* var. *Coronata*, current name- *Melanochelys trijuga coronata* (Anderson, "1878" 1879), based on the holotype, ZSI 1012, from "Travancore" (southern Western Ghats, south of Palghat, 10°46'N; 76°39'E, Kerala State, south-western India) and *Batagur (Morenia) petersi*, current name- *Morenia petersi* (Anderson, "1878" 1879) (Plate 1D), based on three syntypes (ZSI 155–156 and ZMB 8865), that were purchased in a "Calcutta bazaar", the type series originating from "Huzurapur in the Jessore District" (unlocated), Furreedpore (= Faridpur, 23°29'N; 89°31'E, Faridpur District) and "Dacca" (= Dhaka, 23°42'N; 90°22'E, Dhaka District), Bangladesh. The species was named for Wilhelm Carl Hartweg Peters (1815–1883), Curator of the ZMB.

Thomas Nelson Annandale (1876–1924), joined the Indian Museum as Deputy Superintendent and is credited with the establishment of the Zoological Survey of India in 1916. Although primarily an ecologist and limnologist, conducting extensive work on the ecology of Asian lakes, Annandale described several new herpetological taxa, including the turtle, *Geoemyda indopeninsularis*, current name- *Melanochelys trijuga indopeninsularis* (Annandale, 1913), based on two syntypes (ZSI 17098 and 17100 from "Singhbhum district of Chota Nagpur" (ca. 22°30'N; 85°30'E, Orissa State, eastern India) and one (in error) from "Dharwar district...southern part of the Bombay Presidency" (ca. 18°28'N; 74°38'E, Maharashtra State, western India).

A collector of the Indian Museum, Calcutta, acquired the holotype (ZSI 17117) of the enigmatic geoemydid, *Geoemyda silvatica*, current name, *Vijayachelys silvatica* (Henderson, 1912), from "Near Kavalai in the Cochin State Forest...at an elevation of about 1500 feet above sea level" (10°06'–23'N; 76°09'–53'E, Thrissur District, Kerala State, south-western India). Henderson (1912) also examined a juvenile from the same area, but it was not made part of the type series, and no descriptions were provided.

Post-colonial Period

Paulus Edward Pieris Deraniyagala (1900–1973), Director of the National Museum, Colombo published an important account on the crocodilians and turtles of Sri Lanka, entitled 'The tetrapod reptiles of Ceylon. Vol. 1', published in 1939, as well as a two volume set in the 'Colored Atlas' series (Vol. 2: Tetrapod reptiles, including crocodilians, turtles and lizards; and Vol. 3: Snakes), between 1953–1955. Deraniyagala described 51 taxa of reptiles, both living and fossil. Deraniyagala (1933) described a subspecies of *Caretta caretta* from Sri Lanka, which he named *gigas*, based on a shell (BMNH 1947.3.5.76) and cranium (BMNH 1946.1.22.64; ex-BMNH 1934.5.1.1), from "Ceylon". The illustration in the original description is of a mounted specimen in the Colombo Museum, which should also be part of the type series, which need to be treated as syntypes. It is assumed that this subspecies name applies to the adjacent Indian populations.

Western contributors to the knowledge on Indian turtles continued well into the period post independence, and into modern times. Robert Friedrich Wilhelm Mertens (1894–1975) from Senckenberg Museum, Frankfurt am Main, Germany, conducted extensive field work in Pakistan on herpetofaunal diversity, describing numerous new species. A new turtle described from northern India by Mertens is *Kachuga tecta circumdata*, current name- *Pangsuria tentoria circumdata* (Mertens, 1969), based on SMF 52793 (holotype) and SMF 47847 (paratype), from "Meerut, Indien" (= Meerut, 29°00'N; 77°42'E, Uttar Pradesh, northern India); SMF 51067 (paratype), SMF 51569–71 (three paratypes), "Gebiet von Calcutta, Indien" (= vicinity of Kolkata, ca. 22°30'N; 88°20'E, West Bengal State, eastern India); SMF 58084 (paratype), "Calcutta"; SMF 61209 (paratype), "200 km nordwestlich Calcutta" (= 200 km north-west of Kolkata, possibly around the Jharkhand-West Bengal border, eastern India, at coordinates ca. 23°47'N; 86°32'E); SMF 65292 (paratype), without data; in addition, the location of two paratypes, that were alive at the time of description, are at present unknown.



During the course of his investigations on the systematics and nomenclature of the ubiquitous Indian "mud" turtle (genus *Lissemys*), Robert Graven Webb (1927–), then Professor at the University of Texas at El Paso, USA, noticed that incorrect subspecies names were being applied, the unspotted peninsular Indian (and Sri Lankan) *granosa* representing the type of the species *Lissemys punctata*, which, strangely, left the equally common northern subspecies nameless. Webb then supplied a name for this form, *Lissemys punctata andersoni* Webb, 1980, based on the holotype, MNHN 1977.1986 from "Belbari, Terai, south-eastern Nepal, elevation 210 m" (ca. 26°33'N; 87°43'E, near Haraincha, Kosi Province), and named after John Anderson (1833–1900), Superintendent of the IMRR.

A significant joint US-Indian research project, headed by Edward Owen Moll (1939–) was conducted for India's freshwater turtles in the early-1980s. One of the new taxon described was *Kachuga smithii pallidipes*, current name- *Pangshura smithii pallidipes* (Moll, 1987), comprising FMNH 224177 (holotype), from "Gandak River, Bherihari Wildlife Sanctuary, Bettiah (West Champaran) District, Bihar" (26°48'N; 84°30'E, northern India); USNM 257778 (paratype), "Karnali River, Royal Bardia Wildlife Reserve, 2 km N. Thakurdara, Nepal" (28°11'N; 81°31'E); and FMNH 224186 (paratype), "Ghagra River, near Kailaspuri at Girija Barrage, Bahraich District, Uttar Pradesh" (Ghagra River mouth at coordinates 23°17'N; 84°33'E, in northern India). A second subspecific nomen relevant to Indian turtles was occupied in the course of a revision of *Cuora amboinensis*: *Cuora amboinensis kamaroma* Rummel and Fritz, 1991, derived from Thai material (ZMH-R 00277 [holotype], "circa 50 km nördlich von Bangkok, Thailand" [= about 50 km north of Bangkok, 13°45'N; 100°31'E, Phra Nakhon Province, Thailand]; MNHN 2032: 1–2 [two paratypes], "Bangkok"; RMNH 14902: 1–2 (two paratypes), "Bangkok"; SMF 64641, "Bangkok"; SMF 68190 (paratype), "Bangkok"; SMNS 5480 (paratype), "Bangkok"; SMNS 5484: 1–2 (two paratypes), "Bangkok"; SMNS 7493 (paratype), "Bangkok"; ZMH-R 00276 (paratype), "circa 50 km nördlich von Bangkok, Thailand"; ZMH-R 00278 (paratype), "circa 50 km nördlich von Bangkok, Thailand". The most-recent Indian turtle to be described is *Cyclemys gemeli* Fritz *et al.* (2008), from "...street from Tezpur to Arunachal Pradesh, 5 km to border of Arunachal Pradesh, Jia Bhoroli River Region, Assam, India", based on NMW 37153 (holotype).

Among higher level turtle taxon names created in recent years is the geoemydid turtle genus, *Vijayachelys* Praschag, Schmidt, Frittsch, Müller, Gemel and Fritz, 2006, type species: *Geoemyda silvatica* Henderson, 1912, monotypy and designation. It was named in honour of Jagannathan Vijaya (1959–1987), turtle biologist with the Madras Snake Park Trust and the Madras Crocodile Bank Trust, who spent several months living in a cave to study the biology of this species.

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Appendix I

Abbreviations of systematic institutions mentioned in the text are listed below. Where available (marked with an asterisk), abbreviations follow Leviton *et al.* (1985) and Leviton *et al.* (1988).

- The Natural History Museum, London (formerly, British Museum of Natural History), U.K. (BMNH*)
- National Museum, Colombo, Sri Lanka (CMS*)
- Field Museum of Natural History, Chicago, U.S.A. (FMNH*)
- Indian Museum Reptile Registry, Calcutta, India (IMRR*; now accessioned in the collection of the ZSI)
- Musée National d'Histoire Naturelle, Paris, France (MNHN*)
- Zoological Museum, Estonia, Russia (MZT*)
- Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRM*)
- Naturhistorisches Museum Wien, Vienna, Austria (NMW*)
- Oxford University Museum, Oxford, U.K. (OUM*)
- Royal College of Surgeons, London, U.K. (RCSM)
- Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Histoire), Leiden, The Netherlands (RMNH*)
- Natur-Museum und Forschungs-institut Senckenberg, Frankfurt am Main, Germany (SMF*)
- Staatliches Museum für Naturkunde, Stuttgart, Germany (SMNS*)
- Teylers Strichtina Museum, Haarlem, the Netherlands (TSMHN*)
- National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A. (USNM*)
- Zoologisches Museum Humboldt-Universität, Berlin, Germany (ZMB*)
- Zoologisches Institut und Museum, Universität Hamburg, Hamburg, Germany (ZMH*)
- Museo Zoologico, Istituto di Zoologia, Zoologia Comparativo e Genetico, Università di Padova, Italy (ZMUP*)
- Zoologiska Museet, Uppsala Universitet, Uppsala, Sweden (ZMUU*)
- Zoological Survey of India, National Zoological Collection, Kolkata, India (ZSI*)



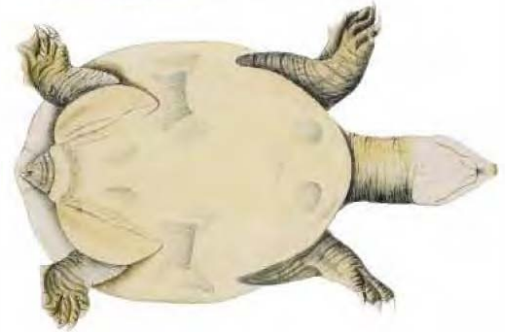
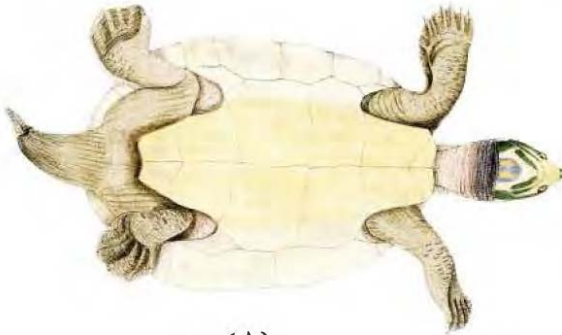
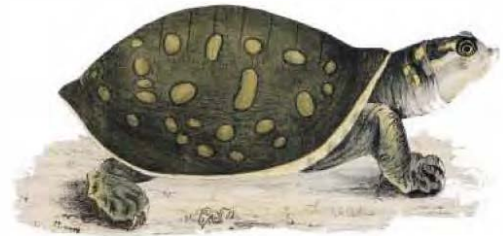
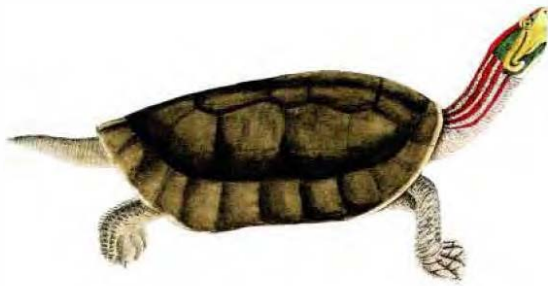
Appendix II

Etymology of Indian Turtle Names.

Sl	Nomen	Translation
	CHELONIIDAE	
1	<i>Caretta</i>	Spanish for scutes (of turtles)
2	<i>Caretta</i>	As for genus
3	<i>Gigas</i>	Latin for large
4	<i>Chelonia</i>	Greek for turtle
5	<i>Mydas</i>	Greek for wet
6	<i>Eretmochelys</i>	Greek for oar-turtle, an allusion to the oar-like fore limbs
7	<i>Imbricata</i>	Latin for imbricate, for the imbricate (or overlapping) scales on all except old turtles
8	<i>Lepidochelys</i>	Greek for scute turtle, an allusion to the large number of carapace scutes
9	<i>olivacea</i>	Latin for olive, for the carapace colouration
	DERMOCHELYIDAE	
10	<i>Dermochelys</i>	Greek for leather turtle
11	<i>coriaca</i>	Latin for leathery, for the leathery shell
	GEOEMYDIDAE	
12	<i>Batagur</i>	Apparently one of the meaningless names created by John Gray
13	<i>baska</i>	Latin for bewitching
14	<i>dhongoka</i>	Apparently from the Hindi vernacular for the species
15	<i>kachuga</i>	Hindi vernacular for the species
16	<i>Cuora</i>	From the Malay <i>Kura</i> , meaning hard-shelled turtle
17	<i>amboinensis</i>	Latin implying inhabitant of Amboina (Ambon), Maluku, Indonesia
18	<i>kamaroma</i>	Greek for arched, for the high domed shell
19	<i>mouhotii</i>	For Henri Mouhot (1826–1861), naturalist and explorer who collected reptiles in Thailand, Cambodia and Laos
20	<i>Cyclemys</i>	Greek for circle turtle, for the rounded shell
21	<i>Cyclemys gemeli</i>	For Richard Gemel (1948–), Austrian herpetologist
22	<i>Geoclemys</i>	Latin for earth turtle
23	<i>hamiltonii</i>	For Dr. Francis Hamilton (1762–1829), botanist and surgeon with the British East India Company based in Bengal and Burma
24	<i>Hardella</i>	Apparently one of the meaningless names created by John Gray
25	<i>thurjii</i>	Apparently one of the meaningless names created by John Gray
26	<i>Melanochelys</i>	Greek for black turtle
27	<i>tricarinata</i>	Latin for three keeled
28	<i>trijuga</i>	Latin for three-ridged
29	<i>coronata</i>	Latin for crowned
30	<i>indopeninsularis</i>	Latin for inhabitant of the Indian peninsular
31	<i>parkeri</i>	For Hampton Wildman Parker (1897–1968) of the BMNH
32	<i>thermalis</i>	Latin for heat
33	<i>Morenia</i>	Greek for sluggishness
34	<i>petersi</i>	For Wilhelm Carl Hartweg Peters (1815–1883) of ZMB
35	<i>Pangshura</i>	Apparently one of the meaningless names created by John Gray
36	<i>smithii</i>	For Sir Andrew Smith (1797–1872), Director-General of Army Medical Board, and author of 'Illustrations of the zoology of South Africa'
37	<i>pallidipes</i>	Latin for pale-footed

38	<i>sylhetensis</i>	Latin implying an inhabitant of Sylhet
39	<i>tectum</i>	Latin for roofed
40	<i>tentoria</i>	Latin for extended, for the elevated shell
41	<i>circumdata</i>	for surrounding, for the pinkish-orange pleuro-marginal ring
42	<i>flaviventer</i>	Latin for yellow-bellied
43	<i>Vijayachelys</i>	For Jagannathan Vijaya (1959–1987), turtle biologist with the Madras Snake Park Trust; chelys, Greek for turtle
44	<i>silvatica</i>	Latin for forest-dweller
	TESTUDINIDAE	
45	<i>Geochelone</i>	Greek for earth turtle
46	<i>elegans</i>	Latin for elegant
47	<i>Indotestudo</i>	Greek for Indian tortoise
48	<i>elongata</i>	Latin for elongated
49	<i>travancorica</i>	Pertaining to Travancore, Kerala
50	<i>Manouria</i>	Greek for rare, domed
51	<i>emys</i>	Greek for turtle
52	<i>phayrei</i>	For Lieutenant-Colonel Sir Arthur Purves Phayre (1812–1885), British Commissioner at Pegu, Burma and Chief Commissioner of British Burma
	TRIONYCHIDAE	
53	<i>Amyda</i>	Greek for turtle
54	<i>cartilaginea</i>	Latin for cartilage
55	<i>Chitra</i>	After the north Indian vernacular, meaning picture
56	<i>indica</i>	Latin for pertaining to India
57	<i>Lissemys</i>	Greek for smooth turtle
58	<i>punctata</i>	Latin for spotted
59	<i>andersoni</i>	For John Anderson (1833–1900), Superintendent of the IMRR
60	<i>Nilssonia</i>	For Sven Nilsson (1787–1883), Professor of Natural History at Lund
61	<i>gangetica</i>	Latin for pertaining to the River Ganga
62	<i>hurum</i>	Apparently derived from a north Indian vernacular for the species
63	<i>leithii</i>	For Dr. Andrew Leith Adams (1827–1882), who collected plants and animals between 1840–1857
64	<i>nigricans</i>	Latin for blackish
65	<i>Pelochelys</i>	Greek for mud turtle
66	<i>cantorii</i>	For Theodore Edward Cantor (1809–1860), Danish surgeon-naturalist with the British East India Company

Plate 1



(A)

(B)



(C)

(D)

Images of Indian turtles from early published works. (A): *Emys kachuga* from Gray's (1831) 'Illustrations of Indian Zoology'; (B): *Testudo punctata* from Gray's (1831) 'Illustrations of Indian Zoology'. (C): *Emys thermalis* from Lesson's (1830) 'Centurie Zoologique, ou cloix d'A. maux rares, nouveaux ou imparfaitement connus' and (D): *Batagur (Morenia) petersi* from Anderson's ("1878" 1879) 'Anatomical and zoological researches: comprising an account of the zoological results of the two expeditions to western Yunnan in 1868 and 1875; and a monograph of the two cetacean genera, *Platanista* and *Orcella*'.