

## GRAY, HARDWICKE, BUCHANAN-HAMILTON, and Drawings of Indian Softshell Turtles (Family Trionychidae)

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**Abstract.** Each of the original water-color drawings of trionychid turtles of HARDWICKE and BUCHANAN-HAMILTON is discussed. Some of these drawings were published by GRAY and serve as types for four available names (two are valid, *Chitra indica* and *Trionyx hurum*) and one occupied name. Taxonomic data concerning all illustrations is provided. The type-locality of *Trionyx hurum* is restricted to Barrackpore, West Bengal, India. *Emyda dura* ANDERSON, 1876 is regarded as a nomen nudum.

### Introduction

As a requisite toward preparation of a synoptic revision of the turtles of the Family Trionychidae, it seems expedient to comment on the colored drawings of softshell turtles credited to Major-General Thomas HARDWICKE and to Dr. Francis BUCHANAN-HAMILTON (formerly BUCHANAN), and the subsequent publication of some of them by John Edward GRAY. The types of four available names, two valid or correct (*Chitra indica* and *Trionyx hurum*), and one occupied name (homonym) are based on non-extant specimens depicted in these drawings.

SMITH (1931: 3–4) and ARCHER (1962: 8–10, 39–40; 1969: 397–398) provided biographical notes on HARDWICKE and BUCHANAN-HAMILTON. The two men employed artists, both Indian and British, and acquired colored drawings, descriptive notes, and specimens of many Indian plants and animals during their tenures in India. HARDWICKE's activities were centered "in Bengal, at Dum-Dum and Calcutta, and in the United Provinces at Fatehgarh and Cawnpore" (SMITH, 1931: 4), whereas the bulk of BUCHANAN-HAMILTON's drawings were made "at Barrackpore between 1804 and 1805" (ARCHER, 1962: 72). SMITH (l.c.) noted that some of HARDWICKE's drawings "are copies of drawings in the collections of BUCHANAN-HAMILTON." ARCHER (1962: 9) commented that HARDWICKE "was continually giving drawings to his friends." GRAY (1872b: 329) noted that the two men were friends and fellow laborers, and that BUCHANAN-HAMILTON "allowed HARDWICKE to have copies made by his own artist

of the greater part of the fish . . ." SMITH (l.c.) remarked that HARDWICKE bequeathed both specimens and drawings to the British Museum, and that BUCHANAN-HAMILTON's descriptions and some drawings were in the Library of the Asiatic Society of Bengal in Calcutta whereas other drawings of his were in the Library of the India Office, London. GRAY (1872 a: 474-475) remarked that HARDWICKE made three collections, but that each of them was lost by shipwreck. ARCHER (1969: 397) noted that "BUCHANAN's papers . . . were deposited by him with the East India Company . . . in 1816 after he had retired from India."

The colored drawings of trionychid turtles of HARDWICKE and BUCHANAN-HAMILTON are in bound volumes in the Zoological Library of the British Museum (Natural History) and in the India Office Library and Records, respectively. An inquiry to S. BISWAS, Zoological Survey of India, Calcutta prompted a reply (pers. comm.) that the drawings of BUCHANAN-HAMILTON in the Library of the Asiatic Society of Bengal "are now not traceable."

GRAY (1872b) mentioned the drawings of BUCHANAN-HAMILTON and some of those of HARDWICKE, relating them to his published illustrations and to species then recognized by him. The drawings are also referred to in other publications. However, it is difficult to unravel all the published comments to determine the exact interrelationships of all illustrations. It is the purpose of this report to discuss each original water-color drawing of trionychid turtle of HARDWICKE and BUCHANAN-HAMILTON, to note which of their drawings are duplicates, to equate their drawings to those published by GRAY, to relate each drawing to existing nomenclature, and to discuss the available names based on these drawings.

### **GRAY's Published Illustrations of Drawings**

Eight drawings of HARDWICKE and three of BUCHANAN-HAMILTON were reproduced by GRAY in three different publications (Illus. Ind. Zool., 1830-1835; 1831 b: Pl. X; 1873 a: Pl. VIII).

Seven colored plates of softshell turtles were published by GRAY in his "Super-royal folio" Illustrations of Indian Zoology, which was issued in 20 undated parts during the years 1830 to 1835. Each part contains ten colored plates that are bound in two volumes (parts 1-10 in Vol. I; parts 11-20 in Vol. II). The dates of issue of all published plates are given by SAWYER (1953). The plates depicting softshell turtles are dated as follows:

Plate	Date of Issue
78	Vol. I, Part 4-6 October 1830
79	Vol. I, Part 7-27 July 1831
80	Vol. I, Part 8-19 October 1831
63	Vol. II, Part 12-8 October 1832
64	Vol. II, Parts 17-18-1 October 1834
65 and 66	Vol. II, Parts 19-20-20 February 1835

GRAY's names given to the softshell turtles depicted in the seven plates are first listed on unnumbered introductory pages. In Volume I at the top of the second of two pages entitled "Directions for Arranging the Plates, of the Numbers I. to X." the names are listed as follows:

- “78. Eyed Trionyx. *Trionyx ocellatus*, GRAY.
- 79. Flat Trionyx. *Trionyx subplanus*, GEOFF.
- 80. Egyptian Trionyx. *Trionyx AEgyptianns*, var. *Indica*”

In Volume II at the bottom of the first of two pages entitled "Directions for Arranging the Plates, of the Numbers XI. to XX." the names are listed as follows:

- “63. Valvular Trionyx. *Emyda (Trionyx) punctata*
- 64. Valvular Trionyx, (adult.) *Emyda punctata*, (*Trionyx granosus*.)
- 65. Javan Trionyx. *Trionyx Javanicus*.
- 66. Hurum Trionyx. *Trionyx Hurum*”

GRAY's colored illustrations bear legends at the bottom and handwritten, pencilled numbers at the right top of each page. The legends of some illustrations indicate a published date of 1829 (probably when first printed, prior to binding and date of issue), and GRAY's names used there differ slightly in some cases from those used in the introductory lists. GRAY's plates, with legends quoted, are discussed below.

Pl. 78. "TRIONYX OCCELLATUS. n. EYED TRIONYX. From Dr. Buchanan Hamilton's Drawings. India" Dorsal (upper) and ventral (lower) views of a relatively small *Trionyx hurum*. Dorsal view depicts characteristic pale blotches behind eyes and on top of snout, pale spotting on neck and limbs, and buff carapace having pale dotting around the margin and a black-reticulated pattern with four, large, distinct ocellated spots (black center and outer border separated by narrow red ocellus). Same as BUCHANAN-HAMILTON's drawing No. 528 of *Testudo ocellata*. These drawings represent the type of *Trionyx ocellatus* GRAY.

Pl. 79. "TRIONYX SUBPLANUS. Geoff. FLAT TRIONYX. India. 1/4 Nat. Size. from a Dry Specimen." Ventral (upper) and dorsal (lower) views of *Trionyx subplanus*. Dorsal view shows bony carapace with eight pairs of costals completely separated by nine (irregularly fragmented) neurals; ventral view shows plastral bones with indication of small callosities on hyoplastra. Same as HARDWICKE's drawings Nos. 29 (dorsal view) and 30 (ventral view). The specimen depicted in the illustration is mentioned by GRAY (1873 a: 57) as "in the Museum," and by GRAY (1873 b: 82) as coming from Singapore and having a "Dorsal disk, 9 1/2 in." The British Museum (Natural History) catalogue entry (no number) reads "Hgr. stffd. Singapore. Pres. General Hardwicke." This specimen seems to be a stuffed one in the British Museum marked only as "52 a" from Singapore and with a maximum carapace length of about 255 mm (ca. 10 inches), but the arrangement of neutrals is different than shown in the illustration.

Pl. 80. "TRIONYX AEGYPTIACUS. Var Indica. n. EGYPTIAN TRIONYX. Indian. Var. Ganges, called Sewteree, sometimes grows to 240 lbs." Dorsal (upper) and ventral (lower) views of *Chitra indica*. Dorsal view depicts the characteristic pale-dark, coarse marbled pattern on the back and the striped pattern on neck, all on a greenish background; ventral view shows outline of xiphoplastra and hyo-hypoplastra, each with medial callosities. Same as HARDWICKE's drawings Nos. 31 (dorsal view) and 40

(ventral view). These drawing represent the type of *Chitra indica* (GRAY), and are reproduced here as Figure 1.

Pl. 63 (immediately follows Pl. 66 in Vol. II). "TRIONYX PUNCTATA JUNIOR. YOUNG VALVULAR TRIONYX." Lateral (upper) and ventral (lower) views of *Lissemys punctata punctata*. Lateral view shows characteristic domed shell with yellow spotting on head and on green carapace; ventral view indicates callosities on hyo-hypoplastra, preplastra, and beginning (small) on xiphiplastra. Same as HARDWICKE's drawing No. 28 (lateral and ventral views).

Pl. 64. "TRIONYX GRANOSUS. n. Futtéhghur called Bun Gooma. 2/3rd Nat. size" Dorsal (upper) and ventral (lower) views of a *Lissemys punctata*. Dorsal view shows uniform olive-green carapace and greenish limbs and head with yellowish spots on head (two on top of head, one at angle of jaws) and yellowish postocular stripe extending onto neck; described briefly by GRAY (1872 b: 340; 1873 a: 72). Ventral view of plastron only (no limbs or head-neck) showing seven callosities (small on epiplastron) and femoral valves. Size reduction indicates a carapace length of about 210 mm.

Pl. 65. "TRIONYX JAVANICUS. JAVAN TRIONYX. Schweiger. ms. Dr. Buchanan Hamiltons Drawings." Legend in left margin. Dorsal (upper) and ventral (lower) views of *Trionyx leithii*. Dorsal view depicts pale blue head with dark streaks and a uniformly green carapace (no indication of pattern or ocelli) with longitudinal ridging. The darkstriped head pattern (the only diagnostic feature), lacking the characteristic chevron marks of *Trionyx gangeticus*, seems most representative of *T. leithii*. Same as BUCHANAN-HAMILTON's drawing No. 527 of *Testudo gotaghol*. These drawings represent the type of *Aspilus gotaghol* GRAY.

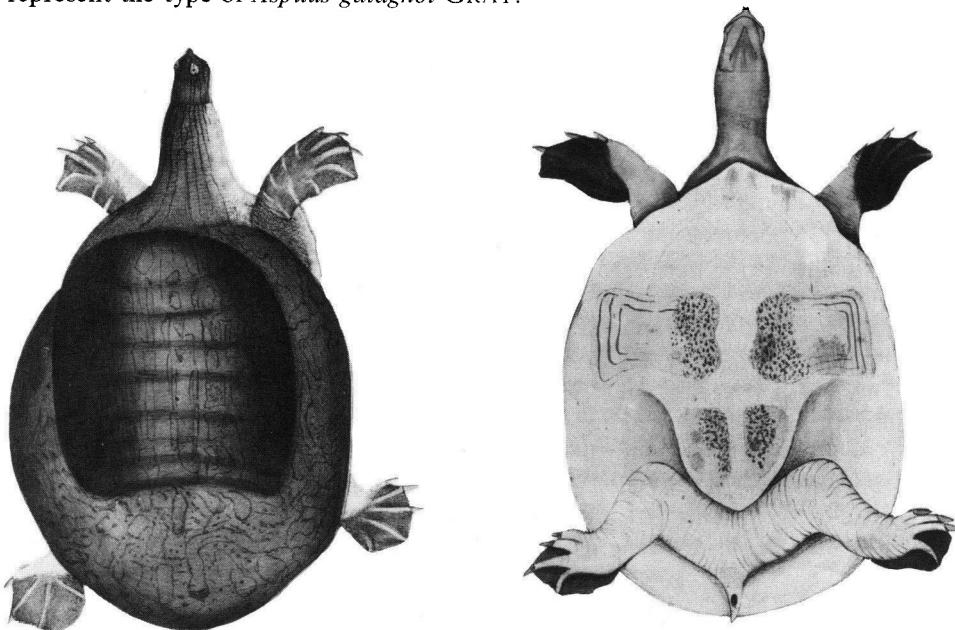


Fig. 1. Type of *Chitra indica* GRAY (copied from Plate 80, GRAY's Illustrations of Indian Zoology)

Pl. 66. "TRIONYX HURUM. n. HURUM TRIONYX. From Dr. Buchanan Hamiltons Drawings." Dorsal (lower) and ventral (upper) views of a large *Trionyx hurum*. Dorsal view shows remnants of four ocelli on olive-gray, black-reticulated carapace, and a dark-patterned head-neck with pale areas on snout and temporal regions. Same as BUCHANAN-HAMILTON's drawing No. 525 of *Testudo hurum*. These drawings represent the type of *Trionyx hurum* GRAY, and are reproduced here as Figure 2.

In GRAY's *Synopsis Reptilium* (1831 b) a large *Trionyx hurum* is illustrated as "Tab. X" that is inserted between pages 46 and 47. The non-colored illustration covers two full pages. There is no legend or name, and no reference to the illustration in the text, but later GRAY (1872 a: 475) refers to "t. x" as *T. hurum*. The carapace lacks ocelli and is blackish, except for the paler central part (above bony elements) that is irregularly patterned with dark markings. The limbs and neck are uniformly grayish, and the pale head has small, dark dots and streaks that are lacking on the snout and behind the eye. GRAY's illustration is the same as HARDWICKE's drawing No. 35.

GRAY also published two more of HARDWICKE's drawings as Plate VIII (1873 a), which is captioned as "TRIONYX GANGETIGA." Plate VIII depicts two turtles (small and large), both showing four ocelli on the carapace and dark streaks on the back of the head. THEOBALD (1874: 85; 1875: 171) regarded both drawings as representing

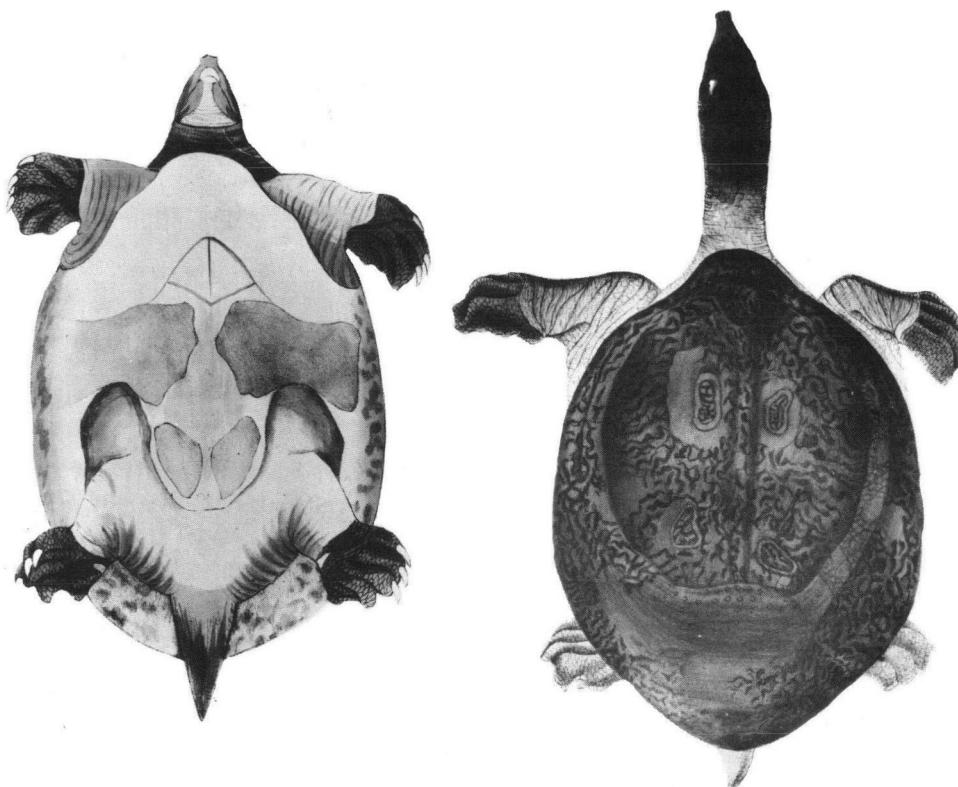


Fig. 2. Type of *Trionyx hurum* GRAY (copied from Plate 66, GRAY's Illustrations of Indian Zoology)

*Trionyx gangeticus*, whereas BOULENGER (1889: 249), ANNANDALE (1912: 159; 1915: 189), and SMITH (1931: 170) referred Plate VIII to the synonymy of *Trionyx leithii*. The illustration of the small turtle (same as HARDWICKE's drawing No. 37) having the characteristic small ocelli and arrangement of dark lines on the head undoubtedly represents *T. leithii*. The large turtle (same as HARDWICKE's drawing No. 38) is tentatively referred to *Trionyx gangeticus* (has characteristic head striping of chevrons, but the nature of the ocelli are questionable).

### HARDWICKE's Drawings

HARDWICKE's water-color drawings of trionychid turtles are in the Zoological Library of the British Museum (Natural History), are bound in a volume entitled "Reptiles of India, China, etc. Vol. I. Bequeathed by Maj. Gen. Hardwicke," and include 13 consecutive drawings with pencilled numbers at the top of each drawing. SAWYER (1971: 136) notes that these and other drawings with his specimens were bequeathed to the museum in 1835, the year of HARDWICKE's death. Five of the 13 drawings were published by GRAY in his Illustrations of Indian Zoology (1830-1835), one was published in his Synopsis Reptilium (1831b: Pl. X), and two were published in a subsequent paper (1873 a: Pl. VIII). None of the 13 drawings is the same as the six drawings of BUCHANAN-HAMILTON. HARDWICKE's 13 drawings (Nos. 28-40), some with legends handwritten in ink, some lacking legends or names, are discussed below.

No. 28. No legend (dim, pencilled inscription added, "Bun Goma"); lateral and ventral views of *Lissemys punctata punctata*; same as Pl. 63 in GRAY (Illus. Ind. Zool.).

No. 29. No legend; dorsal view of *Trionyx subplanus*; same as lower figure of Pl. 79 in GRAY (Illus. Ind. Zool.).

No. 30. No legend; ventral view of *Trionyx subplanus*; same as upper figure of Pl. 79 in GRAY (Illus. Ind. Zool.).

No. 31. "Sewteree—Country Name Found in the Ganges-grows to the size of 240 lbs. Futtehghur May" Dorsal view of *Chitra indica*; same as upper figure of Pl. 80 in GRAY (Illus. Ind. Zool.).

No. 32. No legend; dorsal and ventral (inside) views of bony carapace of *Lissemys punctata*.

No. 33. No legend; assorted bones of plastron, pelvic and pectoral girdles of *Lissemys punctata*. These disarticulated bones, and the carapace mentioned above (No. 32), are in the British Museum (Natural History) and uncatalogued; GRAY (1873b: 88) referring to the carapace as specimen "i" notes its length as "7 1/2 in." and BOULENGER (1889: 269) lists the "loose bones" as specimen "f." The inside of the bony carapace (prenuchal lacking) bears the number 55i, and the museum catalogue (pencilled number 55 i) notes the locality as "Bengal . . . Pres. Gen. Hardwicke." An accompanying loose note in the box of bones indicates the bones as figured in HARDWICKE's drawings 32 and 33.

No. 34. No legend; incomplete outline sketches of ventral view (upper) showing seven plastral callosities and lateral view (lower), dimly colored, of *Lissemys punctata*.

No. 35. "Kaavez—Country Name Found in the Ganges-grows to 120 lbs. Futtehghur May 17" Dorsal view of *Trionyx hurum*; same as Pl. X in GRAY (1831b).

*Trionyx hurum* seems to be restricted to the lower Ganges and is otherwise not known to occur in the vicinity of Fatehgarh (Uttar Pradesh).

No. 36. "Sewaare—Country Name for this sp. of turtle's Inhabits the Ganges-grows ... [illegible] ... of 160 lbs and upwards" Dorsal view of *Trionyx hurum*; uniformly dark brown carapace, except for pale-dark mottling coinciding with bony central part, with six ocelli (anterior two pair obscure), and head with one pale blotch behind eye. Drawing represents the type of *Trionyx sewaare* GRAY.

No. 37. "A young of the kind called Dekoolee Futteghur April" Dorsal view of small specimens of *Trionyx leithii*; same as small figure on Pl. VIII in GRAY (1873 a).

No. 38. "Dekoolee—Country Name Found in the Ganges-grows to 120 lbs. Fig. Nat. Size Futteghur" Dorsal view of *Trionyx gangeticus*? (nature of ocelli questionable); same as large figure on Pl. VIII in GRAY (1873 a). Natural size indicates carapace length of about 160 mm.

No. 39. "Jaank—Country Name-found in the Ganges-grows to 240 lbs. Natural size of the one drawn from Futteghur May" Dorsal view of *Trionyx gangeticus*; dark head stripes and no ocelli on a uniformly, but finely dark-reticulated, greenish carapace.

No. 40. "The underside of the turtle called Sewtere" Ventral view of *Chitra indica*; same as lower figure of Pl. 80 in GRAY (Illus. Ind. Zool.).

### BUCHANAN-HAMILTON's Drawings

Through its years of operation the Honourable East India Company amassed a sizeable collection of natural history specimens, fine arts objects, notes and drawings. The first public despository for this material was founded by the directors of the company at their House on Leadenhall Street in 1801. When the East India Company was abolished in 1858 (the Company's Library has since been called the India Office Library) and the old East India House demolished in 1861 the accumulated materials were periodically parceled to various institutions (reptiles received by the British Museum in 1860, SMITH, 1931: 6; 1952: 908). Many of the natural history drawings have been retained by the India Office Library, which has since been housed at various locations (ARCHER, 1962).

BUCHANAN-HAMILTON's water-color drawings are still in the India Office Library and Records (Prints and Drawings section), Foreign and Commonwealth Office, which is now housed in Orbit House, 197 Blackfriars Road at the corner of Union Street, London. His drawings of six trionychid turtles (numbered 521, 522, 525, 526, 527, and 528 in red ink at top of each drawing) are bound in a volume entitled "India Office Library. Natural History Drawings. Vol. III 311–536, NHD 3." Most of these drawings bear a pencilled date of "1 June 1819" which is the date received at the Library of the East India Company. Three of the six drawings seem to be the same (identical or close copies) as those published by GRAY (Illus. Ind. Zool.), but none of these six drawings is the same as drawings of the same species by HARDWICKE. BUCHANAN-HAMILTON's six drawings, each inscribed with handwritten scientific names, are discussed below.

No. 521. "Testudo Chhim" Dorsal (upper) and ventral (lower) views of large specimen of *Trionyx hurum*. Dark brown-black carapace with uniformly distributed

small pale vermiculations; head having pale blotches behind eyes and on snout (less distinct) with small pale marks medially between large postocular blotches; ventral view non-descript, pale with indication of hyo-hypoplastral and xiphiplastral callosities. GRAY (1872b: 329–330), referring to BUCHANAN-HAMILTON's drawing of "Testudo chin" in the India Office Library, notes that it is "copied" as Pl. X in his *Synopsis Reptilium*; drawing No. 521 resembles but is not the same as Pl. X, which was copied from HARDWICKE's drawing No. 35.

No. 522. "Testudo Chitra" Ventral (upper) and dorsal (lower) views of *Chitra indica*. Marbled pattern on carapace with prominent dark brown spotting middorsally and around margin, and striped pattern on extended neck; ventral view, non-descript, pale.

No. 525. "Testudo Hurum" Ventral (upper) and dorsal (lower) views of *Trionyx hurum*. Same as Pl. 66 in GRAY (Illus. Ind. Zool.).

No. 526. "Testudo Dura" Dorsal (left) and ventral (right) views of *Lissemys punctata punctata*. Uniformly pale brown limbs and proximal part of neck, and dark brown head and carapace having characteristic yellow-spotted pattern; yellowish ventral surface with seven, pale olive callosities.

No. 527. "Testudo Gotagholt" Ventral (left) and dorsal (right) views of *Trionyx leithii*. Same as Pl. 65 in GRAY (Illus. Ind. Zool.).

No. 528. "Testudo ocellata" Dorsal (left) and ventral (right) views of young *Trionyx hurum*. Same as Pl. 78 in GRAY (Illus. Ind. Zool.).

The spatial orientations of the specimens in BUCHANAN-HAMILTON's three drawings, Nos. 525, 527, and 528, are reversed from the published copies by GRAY (Pls. 66, 65, and 78, respectively). GRAY (1844, 1855) specifically mentioned some of BUCHANAN-HAMILTON's drawings by number -- *Testudo ocellata*, No. 14; *Testudo gotagholt*, No. 15; *Testudo hurum*, No. 13 -- but the numbers do not correspond to those now inscribed on the drawings in the India Office Library and Records. In this regard, Dr. Mildred ARCHER informed me (pers. comm.) that "the original numbers . . . must have been trimmed off when the drawings were all remounted and given red ink numbers in a continuous sequence. There is no way of telling when these changes were made . . . I have always assumed, however, that the remounting and renumbering was done about 1879 when the natural history collections were dispersed to Kew and the British Museum . . ."

Drawings of BUCHANAN-HAMILTON were also deposited in the Library of the Asiatic Society of Bengal. ANNANDALE (1912: 161–162) mentions three of them, *Testudo ocellata*, *Testudo hurum*, and *Testudo chhim*, as bearing numbers 52, 54, and 53, respectively. Thus some drawings at least were inscribed with the same scientific names. Since BUCHANAN-HAMILTON's drawings in the Asiatic Society of Bengal's Library seem to have been lost (S. BISWAS, Zoological Survey of India, pers. comm.) the degree of resemblance of those drawings to those now in the India Office Library and Records, or to the drawings of the same species in HARDWICKE's collection in the British Museum (Natural History), is unknown. There are, however, at least some drawings of BUCHANAN-HAMILTON still extant. Dr. Mildred ARCHER wrote me (pers. comm.): "I saw a whole group of BUCHANAN-HAMILTON drawings in the Asiatic Society of Bengal in 1966. As far as I remember they were mostly of fishes and were drawings of which copies did not exist in England. They were found for me after a

great search and they had been badly damaged with leaking water." During my inquiry at the Asiatic Society of Bengal in 1978 I was shown only two bound volumes, both containing drawings of birds, entitled "BUCHANAN's Zoological Drawings II Birds" and, same title, "III Birds." I am not totally satisfied that the reptile drawings are no longer extant, but they may have been lost. The biological-specimen collections of the Asiatic Society of Bengal (1, Park Street, corner of Park and Chowringhee Sts., 700016, Calcutta--same location since initial occupation in 1808) were transferred to the Indian Museum (a block away) some time after its establishment by legislative sanction in 1866; the amphibians and reptiles are now under the direction of the Zoological Survey of India, formed in 1916. The Society still retains historical-cultural objects and a library. During World War II most, if not all, collections and library materials of the Society and Indian Museum-Zoological Survey were moved for safekeeping to Banaras (= Varanasi) where they remained from May 1942 until the end of 1948. Unfortunately some items were destroyed, others damaged owing to inundation by the flooded Varuna River in September, 1943. Perhaps some of BUCHANAN-HAMILTON's drawings were then lost.

Three of BUCHANAN-HAMILTON's names, *Testudo chitra*, *T. chhim*, and *T. dura*, are unavailable. The first two names have been declared *nomina nuda* by WERMUTH and MERTENS (1961). These two names were first published as synonyms by GRAY (1831 b: 47, "*Testudo Chitra*" and "*Testudo Chim*"). Neither of BUCHANAN-HAMILTON's two drawings of *T. chitra* an *T. chhim* has been published, and brief descriptive remarks concerning only *T. chhim* have been published (CANTOR, 1847: 615; THEOBALD, 1875: 173; ANNANDALE, 1912: 162). Since the two names have always been treated as synonyms, with neither name having ever been adopted as the valid name for any species, *Testudo Chitra* GRAY and *Testudo Chim* GRAY qualify as unavailable names and *nomina nuda*. BUCHANAN-HAMILTON's *Testudo dura* was also first published as a synonym by GRAY (1831 b: 50, "*Test. Dura*"), but was later treated as available and adopted as the name of a taxon by ANDERSON (1876). The lead sentence of ANDERSON's paper, which is concerned with the description of the plastron of an embryonic *Lissemys*, begins "On removing a living embryo of *Emyda dura*\*, B. H., . . ." An explanatory footnote reads "\*I have applied this term to the Gangetic *Emyda*, because it appears to me to be distinct from the Madras species to which the names *E. granosa* and *E. punctata* are more correctly referable." The name *Emyda dura* ANDERSON is thus based on BUCHANAN-HAMILTON's drawing of "*Testudo Dura*." ANDERSON (as first Curator, later Superintendent, of the Indian Museum from 1866 to 1886) presumably referred to the drawing in the nearby Library of the Asiatic Society of Bengal. This drawing, the type of *Emyda dura*, now seems to have been lost. The degree of resemblance of that drawing and BUCHANAN-HAMILTON's drawing No. 526 of *Testudo dura* now in the India Office Library is unknown. And HARDWICKE's drawing (No. 28), published by GRAY (Pl. 63, Illus. Ind. Zool.) is not the same as BUCHANAN-HAMILTON's drawing. Certainly ANDERSON's *Emyda dura* refers to the yellow-spotted *Lissemys punctata punctata*, but since he did not describe the drawing on which *Emyda dura* is based, and no drawings of BUCHANAN-HAMILTON have ever been published or described, I regard *Emyda dura* ANDERSON, 1876 as a *nomen nudum*. BUCHANAN-HAMILTON's three other names, *Testudo hurum*, *T. ocellata*, and *T. gotaghol*, are available and discussed below.

## Available Names Based on Illustrations

Four available names, and one occupied name, are based on the colored drawings of HARDWICKE or BUCHANAN-HAMILTON. Since the specimens on which the drawings were based are not known to exist, the illustrations are herein designated the types. The allocation of the names hinges solely upon allocation of the illustrations.

Two names are valid (or correct)---*Chitra indica* and *Trionyx hurum*. Both names appear in GRAY's Synopsis of the Class Reptilia (1831 a) and in his Synopsis Reptilium (1831 b). The first usage of both names is in reference 1831 a, which seems to have been published prior to reference 1831 b. A footnote at the bottom of the title page (p. l) of the first reference (1831 a) terminates with "J. E. Gray, Oct. 1830." whereas the preface of four pages (pp. v-viii) of the second reference (1831 b) terminates with "British Museum; Jan. 1831." GRAY's trionychid accounts in the former Synopsis (1831 a) are abbreviated spanning only two pages (pp. 18-19); the accounts are more elaborate in his Synopsis Reptilium (1831 b), comprising pages 44 through 50. GRAY's Synopsis Reptilium is usually cited as the source of new names.

*Chitra indica* (GRAY).--The first-published, abbreviated, original description is as follows (GRAY, 1831 a: 18): "Indian *Trionyx*. *Trionyx Indicus*, GRAY Illust. Ind. Zool. t. Olive green, with black-edged irregular pale tortuous and forked streaks; sternal xallosities four, the hinder ones rounded triangular. India." The subsequent, slightly more lengthy description (GRAY, 1831 b: 47) of "*Trionyx Indicus*" includes in synonymous fashion "*Trionyx Egypiacus*, Var. *Indicus.*, HARD. Illust. Ind. Zool. t. *Testudo Chitra*, HAMILTON, Icon. Ined. (v. Icon. Mus. Ind.)" The locality is "Habitat. in India, fl. Ganges, Penang, Dr. Henderson, (v. Mus. Col. Surg.)"

The original description is based on GRAY's illustration (Pl. 80) published in his Illustrations of Indian Zoology, which is the same as HARDWICKE's drawings Nos. 31 and 40. The type (illustration) was published 19 October 1831 and postdates the original description (GRAY, 1831 a) that probably appeared in early 1831.

The type-locality is "Ganges" (legend of illustration, Pl. 80). HARDWICKE's drawing of the type is inscribed "Futtehghur" (= Fatehgarh), where some of HARDWICKE's activities were located (SMITH, 1931: 4). There are at least three of those place-names in India, one on the Ganges River proper, another to the southwest in the Ganges River drainage, and a Fatehgarh in the Indus River drainage (see also comment by ANNANDALE, 1912: 159, footnote). The type-locality is regarded as Fatehgarh on the river Ganges (SMITH, 1931: 162).

*Trionyx hurum* GRAY.--The type description of *Trionyx hurum* parallels that of *Chitra indica* in occurring in both of GRAY's 1831 publications. The brief, original description is as follows (GRAY, 1831 a: 18-19): "Hurum *Trionyx*. *Trionyx Hurum*, GRAY, Illus. Ind. Zool. *Trionyx Gangeticus*, Cuv. Oss. Fos. Dull brown; head green, with two yellow spots on each side [p. 19] over the eyes; sternum with four callosities, the lateral truncate on the inner hinder angles, and the hinder ovate-triangular. India." The later more elaborate description (GRAY, 1831 b: 47) of "*Trionyx Hurum*" repeats the above in Latin, then lists immediately below--"Testudo Hurum, HAMILTON, Icon. Ined, (v. Icon. Mus. Ind.) Cop. *Trionyx Hurum*, Illust. Ind. Zool. t. Var.?" BUCHANAN-HAMILTON's other drawings of *Testudo chhim* (spelled "Chim" by GRAY)

and *Testudo ocellata* are listed as synonyms. The locality is “Habitat in Indiae fluvio Ganges, General HARDWICKE et Dr. HAMILTON.”

It is clear that the type-description is based on the specimen depicted in BUCHANAN-HAMILTON’s drawing No. 525 of *Testudo hurum*, which was published 20 February 1835 by GRAY as Plate 66 in his *Illustrations of Indian Zoology*. GRAY in his *Synopsis Reptilium* (1831b) published a different (but similar) illustration (Pl. X) of *Trionyx hurum* (HARDWICKE’s drawing No. 35) that bears no legend and is not referred to in the text.

Different references to the type-locality are in GRAY (1831a: 18) as “India,” in GRAY (1831b: 47) as the “fluvio Ganges,” and in SMITH (1931: 171) as “Fatehgarh, Ganges.” However, no locality is associated with either BUCHANAN-HAMILTON’s drawing No. 525 or GRAY’s published illustration, Plate 66, and *Trionyx hurum* is not known to occur at Fatehgarh (Uttar Pradesh). As previously mentioned, most of BUCHANAN-HAMILTON’s drawings were made at Barrackpore (ARCHER, 1962: 72); this datum prompts me to restrict the type-locality to Barrackpore (about 23 kilometers north Calcutta), West Bengal, India.

*Trionyx ocellatus* GRAY (= *Trionyx hurum* GRAY).--BUCHANAN-HAMILTON’s name and drawing (No. 528) were first published in GRAY’s *Illustrations of Indian Zoology* (name misspelled *occellatus* in legend of Pl. 78), dated 6 October 1830, and the name is considered to be available as of this date. The occurrence of “*ocellatus*” and “*occellatus*” is a case of “multiple original spellings” [Art. 32b and c]; the correct spelling is regarded as *ocellatus*, which is employed by the first reviser (GRAY, 1831b: 47) and all subsequent authors (*occellatus*, a lapsus). In GRAY’s *Synopsis Reptilium* (1831b: 47) the name *ocellatus* is treated as a synonym of *Trionyx hurum*. The taxon *ocellatus* was subsequently regarded as an available and valid name by DUMÉRIL and BIBRON (1835: 489), GRAY (1872b: 337; 1873a: 51) and THEOBALD (1875: 174; 1876: 29). *Trionyx ocellatus* is a synonym of and predates *Trionyx hurum* GRAY, 1831. But the otherwise available name is occupied and must be rejected since it is a junior primary homonym. The name is preoccupied by *Trionyx ocellatus* LESUEUR, 1827 (= *Trionyx spiniferus* LESUEUR, 1827). The type-locality is given only as “India” (legend of GRAY’s Pl. 78); no locality is indicated on BUCHANAN-HAMILTON’s drawing No. 528. The type-locality is restricted to Barrackpore, India (see account of *Trionyx hurum*, above).

*Aspilus gataghul* GRAY (= *Trionyx leithii* GRAY).--BUCHANAN-HAMILTON’s drawing No. 527 of “*Testudo Gotaghul*” was published by GRAY as Pl. 65 in his *Illustrations of Indian Zoology*; GRAY, however, captioned Pl. 65 as *Trionyx javanicus*. The name “*Testudo Gotaghul*” was first published as a synonym by GRAY (1831b: 48). Later GRAY (1872b: 339) considered the illustration to represent a distinct species, which he named *Aspilus ‘gataghul’*; both illustrations are referred to in the context of synonyms. The spelling of the handwritten specific name on BUCHANAN-HAMILTON’s drawing has been interpreted and usually published as “*Gotaghul*.” THEOBALD employed the spelling “*gatajhal*” (1874: 77; 1876: 28) and “*gatajhol*” (1875: 171, 172). The availability of the name, however, stems from GRAY (1872b: 330, 339), who utilized “*gataghul*” and which is therefore the correct original spelling. There is no locality associated with either BUCHANAN-HAMILTON’s drawing or the published illustration by GRAY, and GRAY (1872b: 339) later provided only

“India.” The type-locality of *Aspilus gatagholt* is restricted to the vicinity of Barrackpore (see account of *Trionyx hurum*, above).

*Trionyx sewaare* GRAY (= *Trionyx hurum* GRAY).—GRAY’s original description of *Trionyx sewaare* (1872b: 336) is clearly based on HARDWICKE’s drawing No. 36 of “Sewaare” which GRAY specifically mentions and lists as a synonym. HARDWICKE’s drawing No. 36 has not been published, but GRAY does provide brief descriptive comments. GRAY’s description also includes reference to “two half-grown specimens (95 a & b) agreeing in some respects with these figures, one of which is marked with six spots [as is specimen depicted in HARDWICKE’s drawing], and the other has the anterior pair deficient.” Both of these specimens are mentioned in GRAY’s Handlist (1873b: 79) as specimens “a” (skull removed, “b”) and “c”, and as “Presented by Gen. Hardwicke.” HARDWICKE is also indicated as the collector in the museum catalogue, but his name is not mentioned as such in the original description. These specimens, 85 a and b (the number 95 mentioned by GRAY is incorrect), are now catalogued as British Museum (Natural History) 1973–1051 (four ocelli) and 1973–1052 (six ocelli). The specimen with four ocelli has a plastron length of 83 mm, and has had its skull removed (basicranial length, 34.2 mm) and figured by GRAY (1873a: 50, figs. 4a–d). The specimen with six ocelli has a plastron length of 73 mm and does not resemble the specimen depicted in HARDWICKE’s drawing. The type-locality is given as “Bengal” (GRAY, 1872b: 336; 1873a: 50). No locality is indicated on HARDWICKE’s drawing No. 36 of “Sewaare.”

THEOBALD credits the original drawing of *Trionyx sewaare* to BUCHANAN-HAMILTON (1874: 86; 1875: 172–173; 1876: 29), not to HARDWICKE. And SMITH (1931: 171) does the same noting “HAMILTON’s drawing in Brit. Mus. Nat. Hist.” Possibly THEOBALD’s reference drawing was a duplicate copy of HARDWICKE’s bearing HAMILTON’s name, which existed at that time in the Library of the Asiatic Society of Bengal (see previous discussion concerning interchange of drawings of the two men).

In summary, the pertinent data relating to the one occupied and four available names based on the colored drawings of HARDWICKE or BUCHANAN-HAMILTON are as follows:

*Trionyx ocellatus* GRAY, 1830: unnumbered introductory page, Illus. Ind. Zool. (*ocellatus*, legend of Pl. 78); preoccupied by *Trionyx ocellatus* LESUEUR, 1827 (= *Trionyx spiniferus* LESUEUR, 1827). Type--Plate 78, GRAY’s Illus. Ind. Zool. Type-locality--Barrackpore, West Bengal, India.

*Trionyx Indicus* GRAY, 1831a: 18; 1831b: 47. Type--Plate 80, GRAY’s Illus. Ind. Zool. Type-locality--Fatehgarh on the river Ganges, India.

*Trionyx Hurum* GRAY, 1831a: 18; 1831b: 47. Type--Plate 66, GRAY’s Illus. Ind. Zool. Type-locality--Barrackpore, West Bengal, India.

*Aspilus gatagholt* GRAY, 1872b: 329. Type--Plate 65, GRAY’s Illus. Ind. Zool. Type-locality--Barrackpore, West Bengal, India.

*Trionyx sewaare* GRAY, 1872b: 336. Type--HARDWICKE’s drawing No. 36 in Zoological Library of British Museum (Natural History). Type-locality--Bengal, India.

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## References

ANDERSON, J. (1876): Note on the plastron of the gangetic mud-turtle (*Emyda dura* of Buchanan-Hamilton).—J. Linn. Soc. Zool., **12**: 514–516

ANNANDALE, N. (1912): The Indian mud-turtles (Trionychidae).—Rec. Indian Mus., **7**: 151–180

ANNANDALE, N. (1915): Notes on some Indian Chelonia. — Rec. Indian Mus., **11**: 189–195

ARCHER, M. (1962): Natural history drawings in the Indian Office Library.—Her Majesty's Stationery Office, London

ARCHER, M. (1969): British drawings in the India Office Library. Volume II. Official and professional artists.—Her Majesty's Stationery Office, London

BOULENGER, G. A. (1889): Catalogue of the cheloniants, rhynchocephalians, and crocodiles in the British Museum (Natural History).—London

CANTOR, T. E. (1847): Catalogue of reptiles inhabiting the Malayan Peninsula and islands.—J. Asiatic Soc. Bengal, **16**: 607–656, 897–952, 1026–1078

DUMÉRIL, A. M. C., BIBRON, G. (1835): Erpétologie générale ou histoire naturelle complète des reptiles, 2.—Paris

GRAY, J. E. (1830–1835): Illustrations of Indian Zoology; chiefly selected from the collection of Major-General Hardwicke, F. R. S. Volumes I and II.—London

GRAY, J. E. (1831 a): A synopsis of the species of the Class Reptilia, pp. 1–110. In: GRIFFITH, E., The animal kingdom arranged in conformity with its organization, by the Baron Cuvier, . . .—London

GRAY, J. E. (1831 b): Synopsis Reptilium; or short descriptions of the species of reptiles. Part I.—Cataphracta. Tortoises, crocodiles, and enaliosaurs. —London

GRAY, J. E. (1844): Catalogue of the tortoises, crocodiles, and amphisbaenians, in the collection of the British Museum.—London

GRAY, J. E. (1855): Catalogue of shield reptiles in the collection of the British Museum. Part I. Testudinata (Tortoises).—London

GRAY, J. E. (1872 a): On Indian mud-tortoises (*Trionyx*).—Ann. Mag. Nat. Hist. (4), **9**: 473–475

GRAY, J. E. (1872 b): Notes on the mud-tortoises of India (*Trionyx*, GEOFFROY).—Ann. Mag. Nat. Hist. (4), **10**: 326–340

GRAY, J. E. (1873 a): Notes on mud-tortoises (*Trionyx*, GEOFFROY), and on the skulls of the different kinds.—Proc. Zool. Soc. London, 1873: 38–72

GRAY, J. E. (1873 b): Hand-list of the specimens of shield reptiles in the British Museum.—London

SAWYER, F. C. (1953): The dates of issue of J. E. Gray's "Illustrations of Indian Zoology" (London, 1830–1835).—J. Soc. Bibliog. Nat. Hist., **3**: 48–55.

SAWYER, F. C. (1971): A short history of the libraries and list of mss. and original drawings in the British Museum (Natural History).—Bull. Brit. Mus. (Nat. Hist.) Histocial, **4**: 77–204

SMITH, M. A. (1931): The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. I.—Loricata, Testudines.—London

SMITH, M. A. (1952): The history of herpetology in India.—J. Bombay Nat. Hist. Soc., **50**: 907–909

THEOBALD, W. (1874): Observations on some Indian and Burmese species of *Trionyx*.—Proc. Asiatic Soc. Bengal, 1874: 75–86

THEOBALD, W. (1875): Observations on some Indian and Burmese species of *Trionyx*, with a rectification of their synonymy and a description of two new species. — Proc. Asiatic Soc. Bengal, 1875: 170–180

THEOBALD, W. (1876): Descriptive catalogue of the reptiles of British India. — Calcutta

WERMUTH, H. and R. MERTENS. (1961): Schildkröten, Krokodile, Brückenechsen. — Jena.

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