

SHORT NOTES

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**A REASSESSMENT OF
HARDELLA ISOCLINA DUBOIS,
1908 (TESTUDINES: BATAGURIDAE)
FROM THE TRINIL BEDS OF THE
JAVAN PLEISTOCENE**

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Hardella isocline was described by Dubois (1908) from the Trinil Beds (Pleistocene) of Kedoeng Panas (= Kedung Panas), Java, Indonesia, also the source of the famous remains of Java man, *Homo* ("*Pithecanthropus*") *erectus*. The holotype and sole example of this fossil turtle species is at the Nationaal Natuurhistorisch Museum (previously Rijksmuseum van Natuurlijke Historie), Leiden and the original description of the new turtle fossil was brief and carried no illustrations. No reason was given for the assignment to the extant north Indian batagurid genus, *Hardella*, which is restricted to the flood plains of the rivers Indus, Ganges and Brahmaputra, in the northern parts of the Indian subcontinent (Smith, 1931; Das, 1995). Williams (1957) subsequently expanded the description, provided photographs and restorations of the fossil, diagnosis, and comparison with recent batagurids from tropical and subtropical Asia. The Trinil fossil was tentatively assigned to the genus *Clemmys*, then primarily a catch-all taxon used for many small, narrow-headed emydids and batagurids with hexagonal neurals with short sides anteriorly. Williams (1957) commented that the knowledge of the skeletal morphology of Asian turtles that existed then did not permit a resolution to the problem of assigning a generic identity to the material from Trinil, but he indicated a close affinity of the fossil with *Clemmys* (now *Mauremys*) *mutica*. In the almost forty years that have elapsed since Williams' redescription, knowledge of the systematics and distributions of Asian turtles has increased to a point that permits us to grapple with the problem once again.

Williams (1957) compared Dubois' new species with a variety of south-east and east Asian turtle genera and species now assigned by some authorities (e.g. Gaffney, 1984; Gaffney & Meylan, 1988) to the family Bataguridae and assigned it (questionably) to the genus *Clemmys*, close to *C. mutica*, which is supported in a comparison with all known batagurid genera from southern and south-eastern Asia (see Table 1). The latter species is now included in the genus *Mauremys*, *Clemmys* having been restricted to certain North

American species (McDowell, 1964). In Hirayama's (1984) scheme of classification, the *Mauremys* group of batagurids fall out from the rest of the members of the family. The Trinil fossil shows one important characteristic that differentiates *Mauremys* from *Clemmys* (sensu McDowell, 1964), the supracaudal scutes extending forward to cross the pygal/suprapygal seam, as well as several additional features that diagnose *Mauremys*, such as the slightly projecting rather than truncate gular region of the plastron, lack of a plastral hinge, and especially, hexagonal neurals (see McDowell, 1964). The ratio of the carapace width to carapace length (0.687), as well as the ratio of the width of the anterior plastral hindlobe at the level of the junction of the abdomino-femoral seam and the plastral margin to carapace length (0.436), are within the ranges reported by Iverson & McCord (1994) for adults and subadults of the east Asian species of *Mauremys* (0.665-0.781 and 0.425-0.517, respectively). The large size (estimated 308 mm carapace length) and the apparent absence of a plastral concavity suggest that the animal may have been a female: in a sample of recent species assigned to the genus *Mauremys*, Iverson & McCord (1994) found that females exceed males in carapace length, except in the Ryukyu (Iverson & McCord, 1994) and Taiwanese populations of *M. mutica* (Mao, 1971).

Cantor (1842) described *Emys muticus* (amended to *Emys mutica* by Gray, 1844) from Chusan (=Zhoushan Island), Zhejiang Province, China, and the species is now known to exhibit considerable geographic variation, resulting in a rich synonymy (see Iverson & McCord, 1989). McDowell (1964) allocated this taxon to the genus *Mauremys* (after a protracted life in *Clemmys*). Although juveniles of *Mauremys mutica* have been characterised in the literature as showing a tricarinate carapace (e.g. Pritchard, 1979; Ernst & Barbour, 1989), adult shells can be nearly smooth, with only a vestige of a vertebral keel. The illustrations of an adult *Mauremys mutica* (as *Clemmys mutica*) in Siebenrock (1909: Pl. XVII-XVIII) are virtually identical to those in Williams (1957: Pl. VII-VIII), except that in the former, vertebral I is widened anteriorly, vertebrals II-IV are more wide than long, the gular scales projecting more prominently, and the inguinal scales are relatively larger. The fossil turtle differs from *Mauremys japonica* (Temminck & Schlegel, 1835), in showing smooth marginals at the posterior of the carapace (serrated in the east Asian species) and the presence (vs absence) of a vertebral keel. It differs from the recently described *Mauremys iversoni* Pritchard & McCord, 1991, in showing an angular gular region (vs gular region rounded); absence (vs presence) of lateral keels; and the failure of the humero-pectoral seam to cross the entoplastron (vs humero-pectoral seam crosses entoplastron: see Fig. 2A in Pritchard & McCord, 1991). Given these minor differences, allocation of the Trinil fossil to the genus *Mauremys* seems appropriate.