



## Short communication

# Rediscovery of the type specimen of *Bubalus mindorensis* Heude, 1888

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Receipt of Ms. 03. 09. 2001

Acceptance of Ms. 11. 02. 2002

**Key words:** *Bubalus mindorensis*, Tamaraw, Heude

The tamaraw (*Bubalus mindorensis*), of Mindoro Island, Philippines, was first brought to scientific notice by EVERETT (1878), who reported that he had found “a specimen of the Wild Ox of Celebes (*Anoa depressicornis*), which had been brought from Mindoro” in the museum of the College of St. Thomas in Manila. MEYER (1878) briefly described another specimen, and insisted that the species, known as “Tamarao”, is not in fact similar to the anoa, and differs also from the tame and feral buffaloes of Luzon; and that he and Dr. GRAY had failed to find a specimen of it in the British Museum (referring to Dr. J. E. GRAY, Keeper of Zoology). BARTLETT (1878) reported that about 30 years earlier three specimens of a small wild buffalo from “the island of Mindanao or Mindoro” had been offered to the museum, but Dr. GRAY had declined them on the grounds that “they were only small varieties of the common Manilla or Water-Buffer”; and said that this was his opinion also.

The Jesuit missionary Père P.-M. HEUDE was the first author to give the tamaraw a scientific name. His note (HEUDE 1888) bears no specific date, but according to MEYER (1896; see also HOOPER 1941) several

book dealer catalogues (e.g. Friedländer Nat. nov. Sept. 1888, 289) indicate that it had been available before August 1888. HEUDE described the tamaraw as *Bubalus mindorensis* and denied that it is a variant or close relative of *Anoa depressicornis*. Although he characterized the overall impression of the tamaraw as a kind of dwarfish ordinary water buffalo, with the same typical colour scheme, he rejected GRAY’s and BARTLETT’s opinion that it is merely a variety of the water buffalo. Instead he pointed out that domesticated buffaloes introduced to Mindoro long ago feralized and reverted to the ancestral large Chinese or Indochinese type, never producing the tamaraw.

Père HEUDE acquired his specimen, a skull with mandible, lacking only the upper premolars, from M. SAINZ DE BARANDA, Director of Water and Forest in the Philippines. Apart from describing it as very reduced in size, and differing in premolar morphology from the anoa, HEUDE (1888) noted as the most interesting characteristic the only slight divergence of the horns and the convergence of their tips. He proposed the name *Bubalus mindorensis*, which is the name under which it is still known today. The one and only spe-

cimen available to HEUDE is, accordingly, the holotype of the species.

In August 1888, another brief description of the tamaraw by Prof. J. B. STEERE (1888a) was published independently; a much more detailed account followed a few months later (STEERE 1888b). Strikingly, STEERE also used the name *mindorensis*, but placed it in the genus *Anoa*. He had collected three adult specimens (two males, one female) and preserved skins and skeletons. His description was more extensive than HEUDE's, including some body measurements and even behavioural aspects, and he noted again that it was quite different from the domesticated buffalo which, he added, runs wild in Mindoro and is attacked and driven back by the "Tamaron".

As noted by HOOPER (1941), the specimens collected by STEERE are now deposited in the following museums: University of Michigan, Museum of Zoology: one adult male, skin and skeleton (the type of *Anoa mindorensis* Steere); Field Museum of Natural History, Chicago: three skins, male, female, and female calf, one skeleton and two skulls; Natural History Museum, London (as seen by P.G.): one mounted skin of a male, with separate skull, which according to LYDEKKER (1913), was collected by Prof. J. B. STEERE and purchased in 1892.

For STEERE's type specimen HOOPER (1941) gave the following measurements in mm (the skin measurements were taken from the mounted skin): Cord length of head and body 2200, tail 600, hind foot from hock to distal tip of hoof 445, height at shoulder 945, height at hind quarters 983, girth behind shoulder 1655, app. length of ear, from notch 135, length of left horn on outside curve 420, circumference of base of left horn 335, distance between tips of horn cores 271, greatest length of skull 380, basal length 354, palatal length 237, zygomatic breadth 162, mastoid breadth 185, anterior border of orbit to tip of rostrum 202, width across lateral alveolar border of M<sup>2</sup> 108, length of maxillary tooth row 101, length of mandibular tooth row 114.

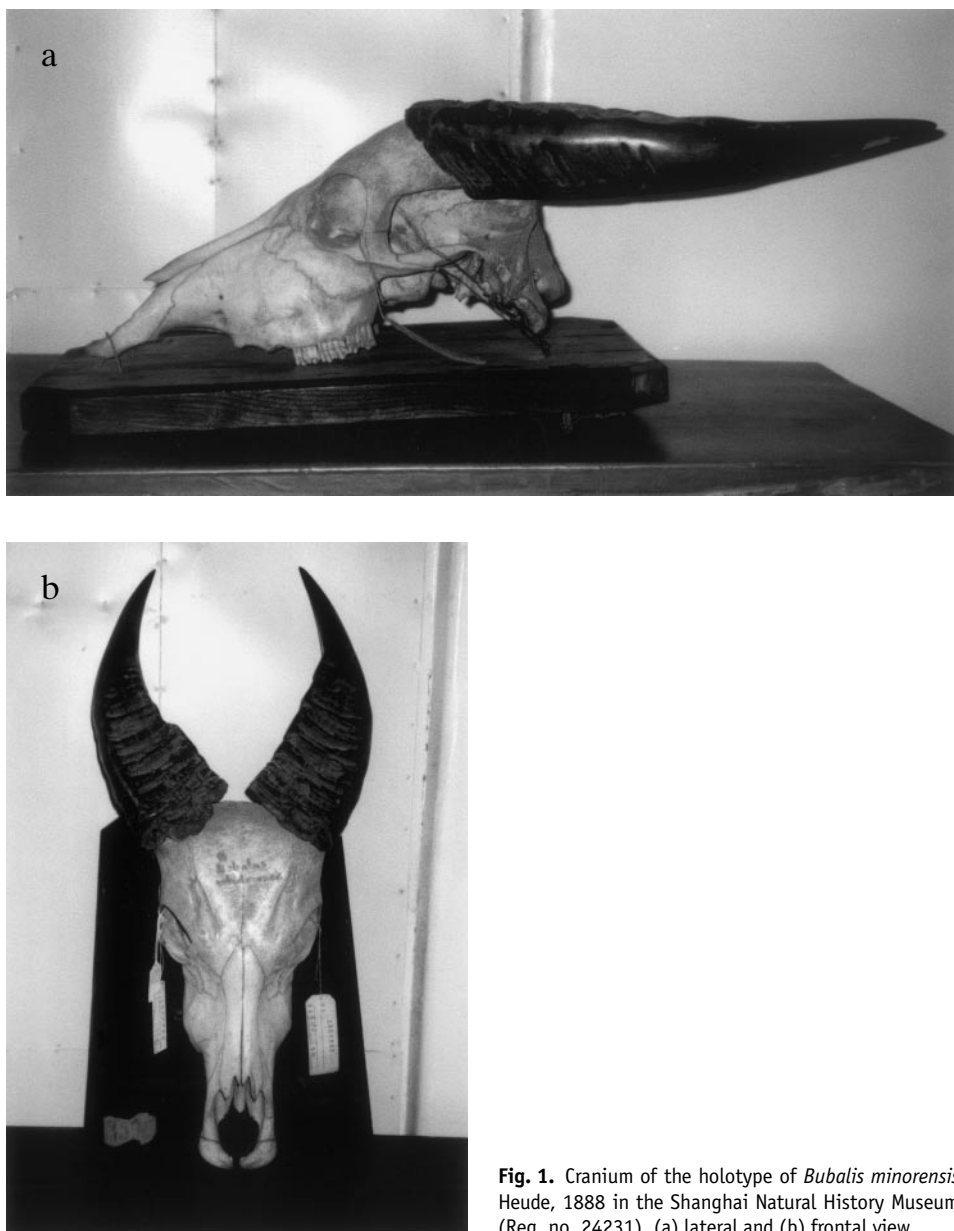
STEERE's name *Anoa mindorensis* was published on August 16<sup>th</sup>, 1888; as noted above,

HEUDE's name *Bubalus mindorensis* was published before August in that year, and so has priority.

HEUDE's specimen, the type of *Bubalus mindorensis*, had been considered lost for a long time. Père HEUDE had stored his accumulated material in the Zikawei Museum of Natural History (Xujiahui Bowuyuan), which he founded 1868 next to the Catholic Church in Xujiahui/Shanghai. When it was taken over by Zhendan or Aurora University (now Fudan University) in 1933, parts of the collection were put on display in a newly erected museum, the Zhendan Bowuyan, or Musée Heude. In 1952, the Shanghai Natural History Museum took charge of the Zhendan Museum, and later moved the exhibited part of the collection to the museum at 260 Yanan Road (East). The main part of the collection, which was still in the Xujiahui storehouse, was sent to the Institute of Zoology, Beijing.

Because the labels and inscriptions on the skulls were sometimes written in illegible French handwriting, and rapidly faded, the Chinese curators missed their significance; and in time the location of the collection was forgotten. In Beijing, it remained in storage crates at the Institute of Zoology until in the 1990s a new building at last afforded space for the specimens to be laid out on shelves. There, in July 1997, one of us (C.P.G.) discovered the type specimen of *Sus bucculentus* Heude (see GROVES et al. 1997) bearing an identification in Père HEUDE's handwriting, and organized a full listing of the material (BRAUN et al. 2001). From mid-April to mid-May 2000, we catalogued and labelled all of the mammal skulls of the HEUDE collection in both locations (Beijing and Shanghai). The descriptions, and particularly the excellent lithographs of skulls, as published in the journal "Mémoires concernant l'Histoire naturelle de l'Empire chinois", founded by HEUDE, were very helpful and allowed us to identify many type specimens.

We found the holotype of *Bubalus mindorensis* (Fig. 1) in the Shanghai Natural History Museum among other Bovidae of the Heude collection. It was not specially



**Fig. 1.** Cranium of the holotype of *Bubalis minorensis* Heude, 1888 in the Shanghai Natural History Museum (Reg. no. 24231), (a) lateral and (b) frontal view

marked, but it was the only tamaraw and its premolars were lost due to the preparation, exactly as described by HEUDE (1888). Unfortunately, the lower jaw had disappeared, as had those of most of the other Bovidae.

The measurements of HEUDE's type taken by P. G. in mm: Greatest length 384, nasal length 152, horn, base to tip in straight line 419, span of horns 303, horns, tip to tip 171, biorbital breadth 165, postorbital breadth 161, greatest occipital breadth 172,

least occipital breadth 55, nasal breadth anterior 43, nasal breadth at base of nasals 35, horn, basal diameter 107, horn length on outer curve 450, length of maxillary tooth row 111.

Although the tamaraw has sometimes been regarded as a subspecies of *Bubalus arnee*, e.g. by BOHLKEN (1958), it should be treated as a separate species, even if it is more closely related to *B. arnee* than to the anoa of Sulawesi (GROOVES 1969, 1981). More recent genetic research also indicates a closer relationship with domesticated buffalo *Bubalus bubalis* – especially the swamp breeds – than with the anoa (TANAKA et al. 1996).

## Acknowledgements

We would like to thank YANG QISEN, Associate Professor, and Ms. XIA LIN, of the Institute of Zoology, Beijing, and HUANG HONG, Foreign Coordinator, of the Shanghai Natural History Museum, for their assistance with the collections and the organisation. For the history of the collection we are indebted to TANG QING WEI, Dr. GEREMIE BARMÉ and Mr. SANG YE. We also express our gratitude to YANG SONGNIAN, Director, and ZHANG NIAN SHI, Deputy Director, of the Shanghai Natural History Museum; to Professor WANG SUNG, of the Institute of Zoology, Beijing, and the many others who helped us. The work was funded by Australian Research Council Grant no. S6116073.

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