Journal of the Palaeontological Society of India
Volume, 54(1), June 2009: 111-114

ISSN 0522-9630

SHORT PAPERS

A FOSSIL MAMMAL FROM MARINE EOCENE STRATA (JAINTIA GROUP) OF THE MIKIR HILLS, ASSAM, NORTHEASTERN INDIA

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ABSTRACT

We report the occurrence of a mammalian lumbar vertebra and several associated fish teeth from Dillai Parbat, in the southeastern part of the Mikir Hills of Assam, in northeastern India. The specimens were recovered from a shallow marine limestone unit of upper middle Eocene age (40-37 Ma). The vertebra is tentatively described as that of an archaeocete cetacean. This is the first report of Eocene vertebrates from the northeastern part of India, and it significantly expands the geographical distribution of Eocene marine mammals of India. Further fieldwork is required to assess the potential of this new locality.

Keywords: Mikir Hills, Eocene, vertebrates, mammals, Assam, Dillai Parbat

INTRODUCTION

During the course of doctoral investigations undertaken recently by one of us (Whiso, 2007) in the Dillai Parbat area of Assam, a vertebrate-yielding horizon was discovered in this geologically poorly explored region of NE India (Fig. 1). This horizon is part of the Jaintia Group in the Mikir Hills region of Assam (Fig. 2) and has been assigned an upper middle Eocene age (Chatterji and Pant, 1971; Lokho et al., 2004). This locality extends the Eocene vertebrate record by approximately 2000 kilometers as the nearest aquatic mammal horizon is in the Subathu Formation of the northwestern Himalayan region (Bajpai and Thewissen, 1998).

The recovered fossil vertebrates comprise a mammalian vertebral centrum and a few isolated fish teeth. The material comes from the Dillai Parbat limestone quarry of the Cement Corporation of India Ltd., in Karbi Anglong District, Assam (Fig. 1). The area lies between 25°49'45? and 26°01'00? N and 93°34'40? to 93°35'50? E and is part of the Survey of India Toposheet nos. 83F/12 and 83G/9. The Dillai Parbat hill is located 44 km NE of Diphu, the district headquarters and 28 km west of Dimapur town in Nagaland. The quarry is situated on the southern slopes of the Dillai Parbat hill with a maximum elevation of 429 m.

The specimens described here are housed in the Wadia Institute of Himalayan Geology, Dehradun, India under the aconyms WIMF/A and WIF/A.

PREVIOUS WORK

Following Medlicott's (1869) initial study of the Paleogene shelf deposits of the Shillong Plateau, Evans (1932) designated the shelf facies of the Paleocene-Eocene beds as Jaintia Group (nee Series) and further subdivided it into a lower Sylhet Limestone Stage and an upper Kopili Stage. Subsequently, Wilson and Metre (1953) worked out foraminiferal biostratigraphy of the Upper Cretaceous - Eocene sequence of Assam, followed by Nagappa (1959). Later, Samanta (1971) proposed a foraminiferal zonation of the Early Tertiary sediments on the basis on his study of outcropping and borehole samples in and around Garampani, He assigned a middle to upper Middle Eocene to the Garampani Formtion and a lower to lower Middle Eocene to the Mikir Formation (equivalents of Sylhet Formation). Other notable palaeontological contributions include those by Biswas (1962), Srivastava (1968), Bhandari (1981, 1992), Neale and Singh (1985), Bhatia and Dave (1996), Singh et al. (1986), Jauhri (1994, 1997, 1998), and Whiso et al. (2003).

Whiso (2007) recovered foraminifers, crabs, and corals from the sandy limestone that also yielded the vertebrates described here (Figure 3). Foraminifers identified by Whiso (2007) include *Discocyclina javana*, a late Middle Eocene form; *Nummulites* sp., *Assilina* sp., and also smaller benthic forams such as *Cibicides lobatulus*, *Cibicides* sp., *Lagena* sp., *Nonion* sp., *Pararotalia* cf. *intermis*, *Pararotalia* sp., *Quinqueloculina* sp. and *Triloculina* sp.

SYSTEMATIC PALAEONTOLOGY

Phylum **Chordata**
Class **Chondrichthyes**
Subclass **Elasmobranchii**
Order **Selachii**
Indet.
(Pl. 1, figs. I and J)

Material: WIMF/A 601, fragmentary tooth

Description: The specimen is an incomplete tooth and represents the principal cusp of a shark tooth. It is similar to the teeth of *Galeorhinus* described by Kumar and Loyal (1987) from the Subathu Group of northwestern Himalaya.

Order **Batoidea**
Suborder **Myliobatoidea**
Family **Dasyatidae**
Genus ***Dasyatis***
Dasyatis sp.
(Pl. 1, figs E-H).

Material: WIMF/A 602, isolated female tooth

Description: A well preserved, robust tooth, possibly from a female. In occlusal view it is convex with elliptical outline and ornamented with coarse pits. The root is divided

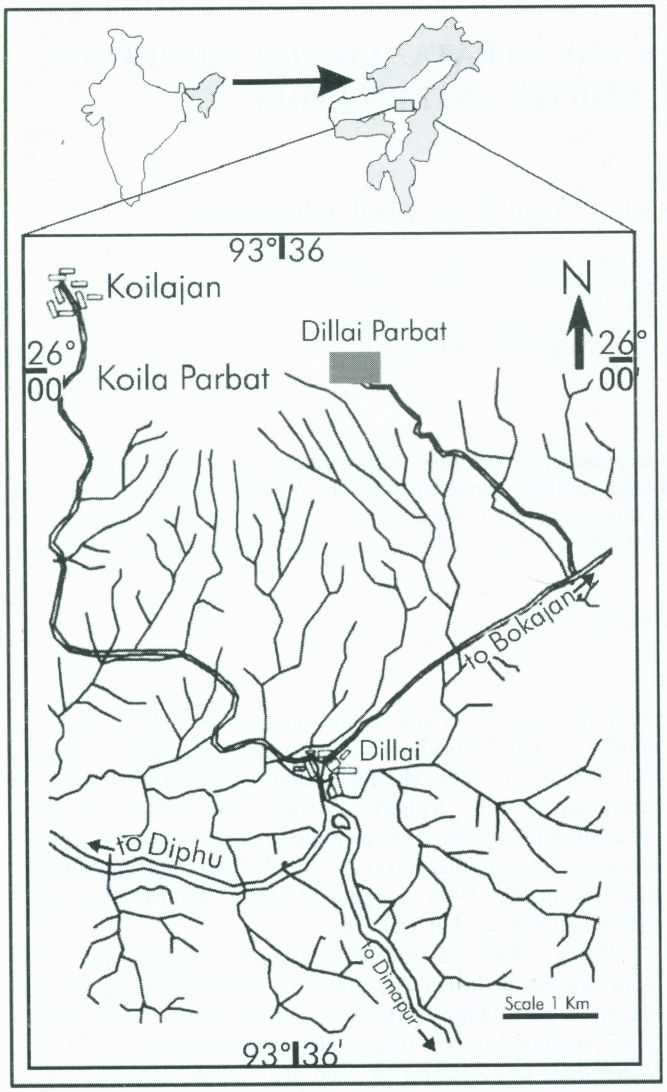


Fig. 1. Locality map of the exposure yielding the fossils near Dillai in Mikir Hills.

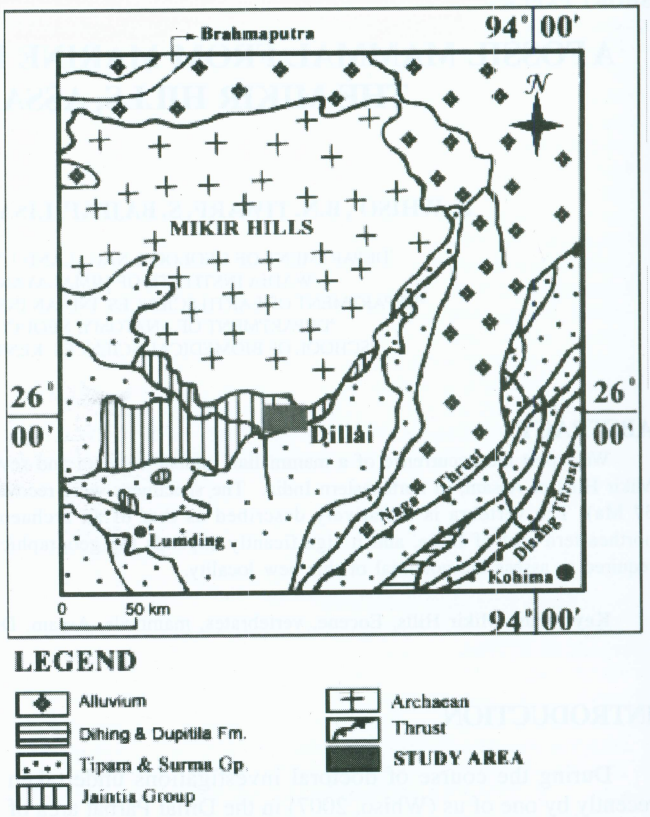


Fig. 2. Geological map of the Dillai area presenting disposition of different stratigraphic units of the Mikir Hills.

into two lobes by a furrow.

Class ***Mammalia***
Order ***Cetacea?***
(Pl. 1, figs. A-D).

Material: WIF/A 1095, a vertebral centrum

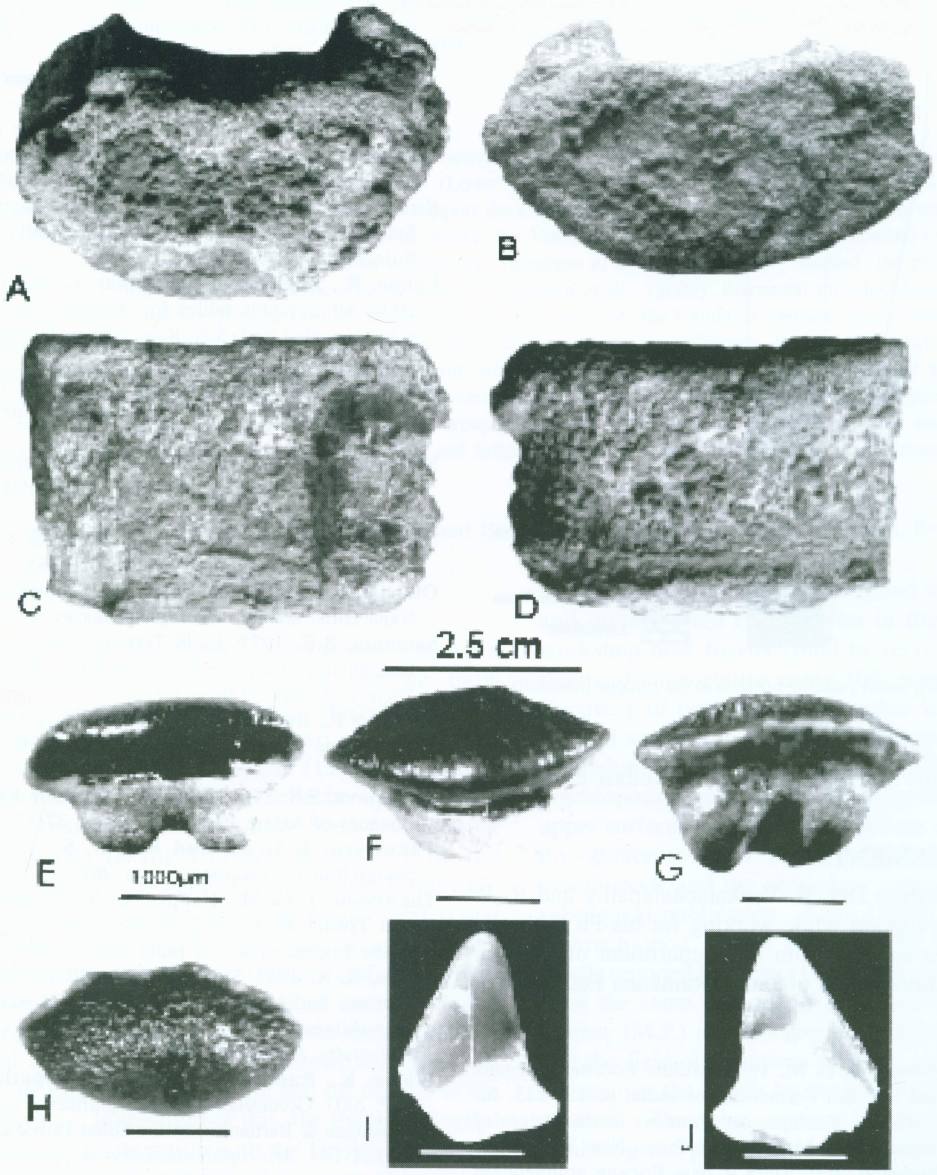
Description: The specimen is an incomplete lumbar vertebra, represented by a vertebral body, or centrum. The anterior and posterior surfaces of the centrum are elliptical in shape and flat. The (presumed) posterior surface is larger. The anterior epiphysis is incompletely fused, while the posterior epiphysis is completely ankylosed and no suture remains. The dorsal and lateral aspects display the remains of the pedicles. The neural canal is flattened along the length of the centrum and indents the dorsal surface of the anterior and posterior faces of the vertebra. The ventral surface of the vertebra is slightly concave along the vertebral body. The vertebral dimensions are as follows: anteroposterior length 37 mm, mediolateral width 50 mm, dorsoventral height 36 mm.

Discussion: Compared to the vertebrae of other remingtonocetid archaeocetes (i.e. *Kutchicetus* and *Andrewsiphius*), the vertebral dimensions of the Dillai Parbat specimen are most similar to those of the lumbar vertebrae of the middle Eocene cetacean *Remingtonocetus* sp. from Kutch, Gujarat (IITR-SB 2653, 2906), both in width and height measurements. However, this specimen has a slightly smaller length in comparison to those of *Remingtonocetus*. Given that the specimen was found in marine strata, and is associated with a marine fauna, and that it does not resemble the vertebrae of other marine mammals (sirenians and anthracobunids), it is most likely that it represents a cetacean. However, this suggestion requires further testing.

CONCLUDING REMARKS

In India, extensive collections of fossil whales have been described from Kutch (Sahni and Mishra, 1975; Bajpai and Thewissen, 1998, 2001), and a few specimens are known from the western Himalayas. The latter include cetacean teeth from Kalakot, J&K (Kumar and Sahni, 1985), and from the Type Subathu Formation near Shimla (Bajpai and Thewissen, 1998; Bajpai and Gingerich, 1998). If the vertebral centrum described here indeed represents a cetacean, it expands the geographical range of Eocene cetaceans considerably (approximately 2000 km) since the nearest aquatic mammal horizon is in the Subathu Formation of NW Himalaya (Bajpai and Thewissen, 1998). Evidently, the Eocene shallow seas and adjacent coastal and terrestrial habitats on the northwestern part of the Indian subcontinent supported the evolving Cetacea (Thewissen et al., 2007). The record of a possible cetacean vertebra from a broadly contemporaneous northeasterly locality indicates the extension of similar

Plate I



EXPLANATION OF PLATE I

Different views of the recovered fossils from the locality: A-anterior, B-posterior, C-dorsal and E-ventral views of the WIF/A 1095, centrum of the incomplete **lumbar vertebra**; E-H views of the WIMF/A 602, isolated female tooth of ***Dasyatis*sp.**; I,J lateral views of WIMF/A 601, fragmentary tooth of SelachiiIndet.

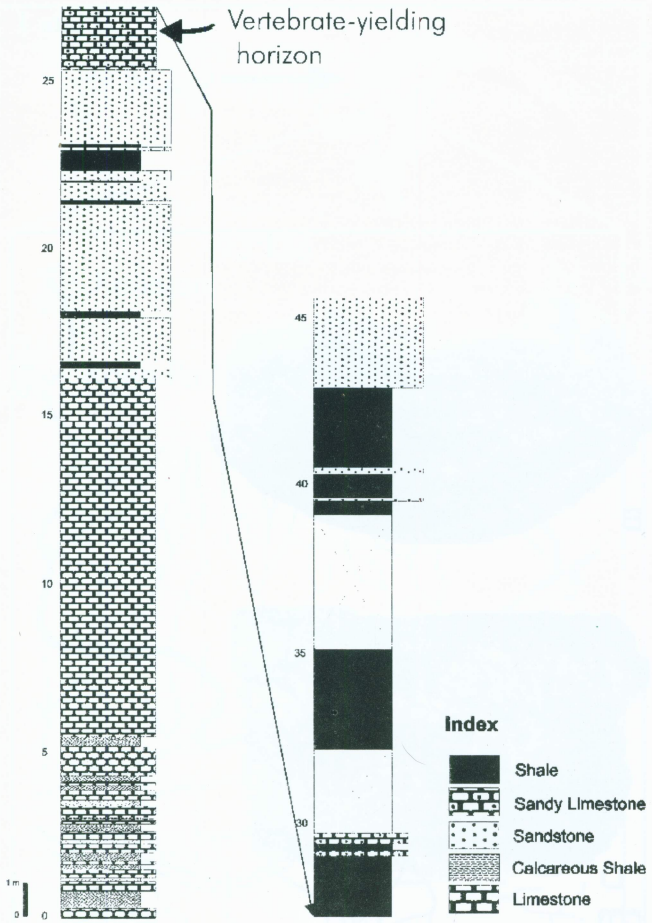


Fig. 3. Litholog showing fossil yielding horizon in the Eocene lithounits of the locality.

habitats where the early stages of cetacean evolution occurred.

ACKNOWLEDGEMENTS

K.W acknowledges Drs. R. Venkatachalapathy and R. P. Kachhara for their support while working for his Ph D thesis. S.B. acknowledges support from the Department of Science and Technology, Government of India (Ramanna Fellowship).

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Manuscript Accepted March 2009