



SOME MOLLUSCAN FOSSILS FROM THE UPPER DISANG FORMATION OF CHANGAMDABI, EAST IMPHAL DISTRICT, MANIPUR

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ABSTRACT

This paper deals with the systematic description of bivalves and gastropods from the Upper Disang Formation exposed at Changamdabi, Imphal East District, Manipur. Out of nineteen species, six species belonging to order Pterioida are recorded from this region.

Keywords: Disang Group molluscs, IMR, Changamdabi, Manipur.

INTRODUCTION

The succession of the Disang Group is well exposed in the Imphal valley, Manipur which is in the form of intermontane depression within the Indo-Myanmar Range (IMR). It attains its maximum development towards eastern part of Manipur and is lithologically made up of the dark grey splintery shales interbedded with siltstones and fine-grained sandstones (Soibam, 1998). The grey splintery shales, regular grey shale-siltstone alternation and medium-grained sandstones of the Disang sediments are exposed, in ascending order, in the study area. Of these, the medium-grained sandstone of the middle part of this succession which is about 1.3 meter in thickness, has yielded a good number of bivalves and gastropods.

Published literature on the bivalves of the upper Disang Group of Manipur includes a few publications. Biwas (1962) recorded fossils from the area near Toupokpi, Manipur for the first time. Subsequently, Satsangi and Chatterjee (1979), Mitra *et al.* (1986), Bhattarcharya and Bhattacharya (1987) and Mishra (1990) reported bivalves, gastropods and foraminifers without giving any illustration and descriptions of the forms from different areas of Manipur. Kachhara *et al.* (2000) assigned an age of Upper Eocene to the Disang Group. Recently, bivalves, gastropods and larger foraminifers have also been reported from the Upper part of the Disang sediments of Changamdabi in the Imphal valley region (Singh *et al.*, 2010).

A rich assemblage of bivalve is documented in the present study from a measured stratigraphic section of the medium-grained sandstone of the Disang Group. The section is located at Changamdabi road section between Lat. 24° 41' 54" N-24° 41' 34" N and Long. 94° 06' 00" E - 94° 05' 07" E (Fig. 1). Nineteen species of bivalves and gastropods belonging to 14 genera have been identified. Out of these, six species belonging to the order Pterioida are described systematically in the present study. These are: *Chlamys wynnei*, *Chlamys* sp. cf. *multistriata*, *Spondylus (Spondylus) rouaulti*, *Flemingostrea haydeni*, *Venericardia (Venericardia) hollandi* and *Nemocardium thetregyninense* are newly recorded from the study area. The remaining species of mollusca are represented by *Sunetta yethama*, *Meretrix yawensis*, *Latirus pseudohynchoides*, *Clavilithes* cf. *arakanensis*, *Bela* cf. *orientalis*, *Globularia brevispira*, *Rimella fissurrella*, *Tetrastromella pseudohumities*, *Titha* sp., *Cassidaria archiaci*, *Rimella pakistanica*, *Marginella rakhienis*, *Turricula* cf. *thangaensis*.

Additionally, echinoids, foraminifera, corals are also present in the assemblage.

The classification of Bivalvia as suggested by Newell (in Moore *et al.*, 1969-71 and Davies, 1975) has been adopted in present work. Fossils are mostly in the form of moulds and casts. Identification of the genera and species is based mainly on the external features.

SYSTEMATIC DESCRIPTION

Phylum **Mollusca** (B) Linne', 1758

Class **Bivalvia** (B) Linne', 1758

Subclass **Paleotaxodonta** Korobokov, 1958

Order **Pterioida** (B) Newell, 1965

Suborder **Pteriina** Newell, 1965

Superfamily **Pectinacea** Rafinesque, 1815

Family **Pectinidae** Rafinesque, 1815

Genus **Chlamys** Roding, 1798

Subgenus **Chlamys** s. str.

Type species **Pecten islamdicus** Muller, 1776; SD Herrmannsen, 1847; Recent, North Atlantic.

Chlamys wynnei Cox, 1931

(Pl. I, fig. 3)

Chlamys wynnei Cox, 1931, p.66-67, pl.3, figs. 9-10. - Mathur & Juyal, 2000, p.61, pl.2, fig. 8.

Material: Two left valves

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/55	18.0	17.5 (97%)	1.6 (88%)
US2/22	16.5	15.5 (93.9%)	1.3 (78%)

Remarks: This species has been discussed at length by Cox (1927, 1929 and 1930) and Douglas (1927). Following them, it has two mutations, one with suborbicular outline and bearing around 24 depressed ribs and the other with distinctly tall outline with 23 to 24 squamose radial ribs. Our specimens fit into the first category owing to their suborbicular outline and similarity in the nature of auricles and ribs. This species has also been reported from the Bhuban Formation of Mizoram by Tiwari and Kachhara (2003) and the Garo Group of Meghalaya by Lyndoh *et al.* (1999) and Lyndoh (2004).

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill

Chlamys sp. cf. *multistriata* Deshayes, Cotter

(Pl. I, fig.2)

Chlamys sp. cf. *multistriata* Deshayes; Cotter, 1923, p.36, Pl.VI, figs. 2-3.

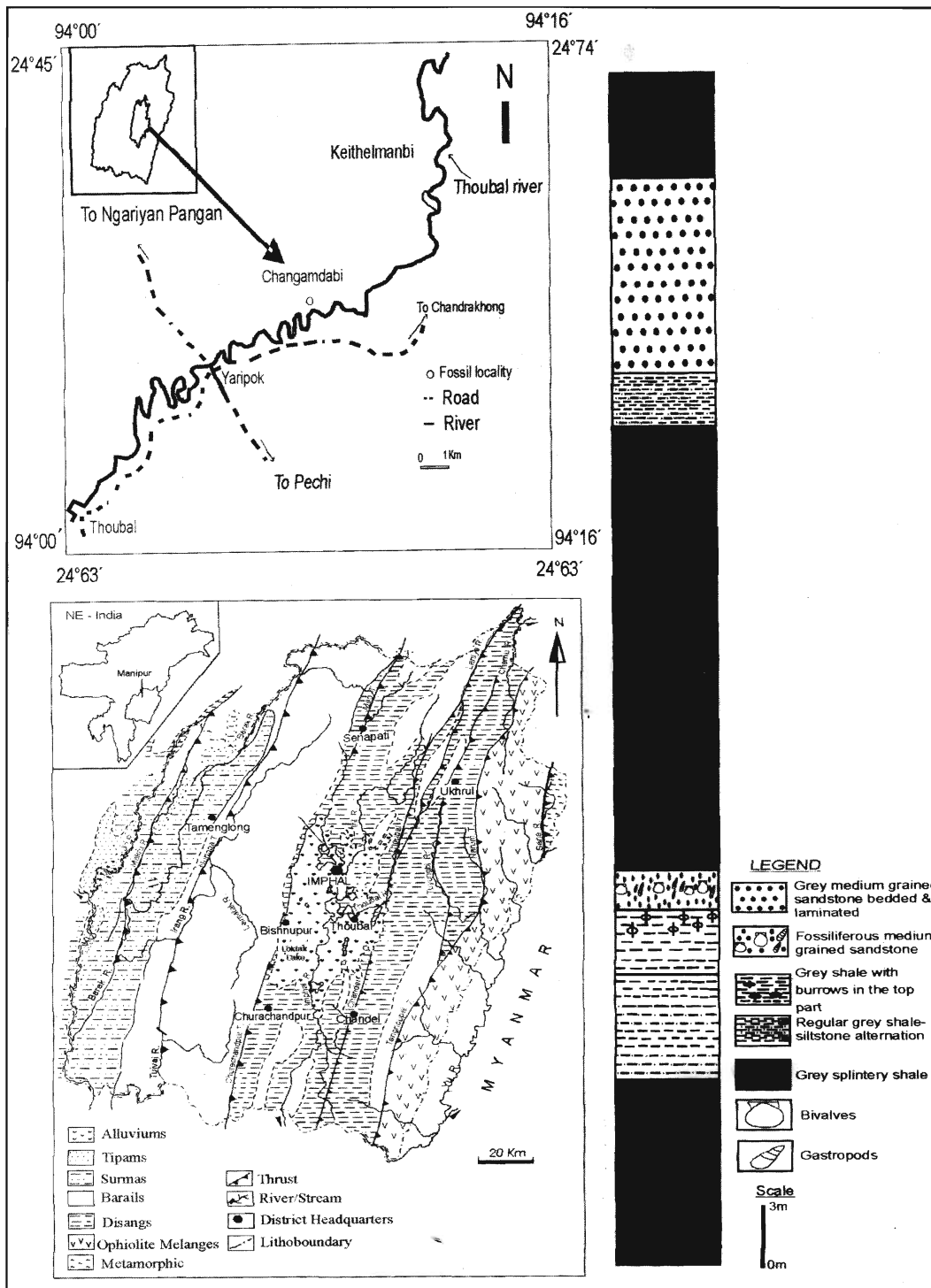
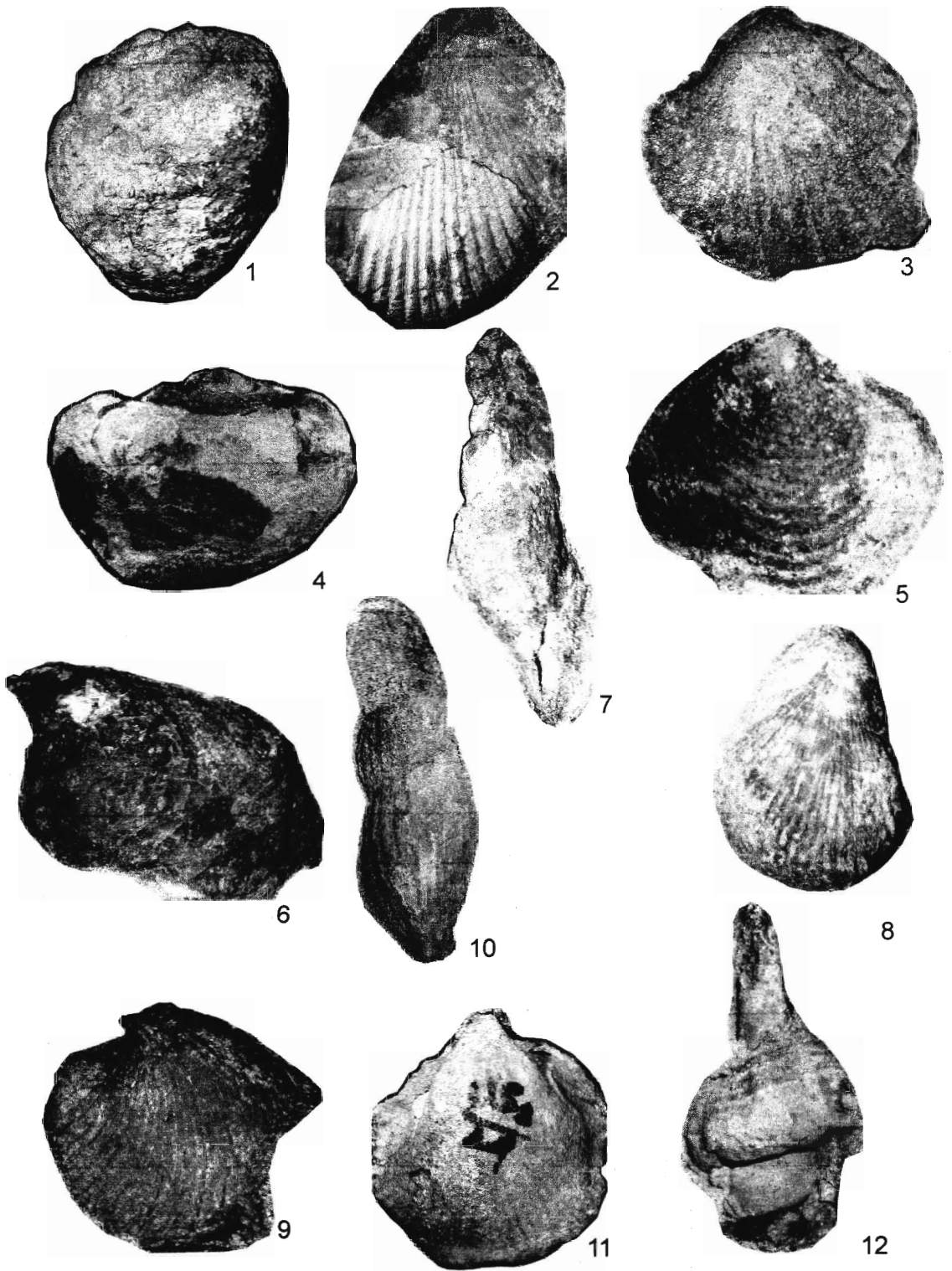


Fig. 1. Showing fossil locality, geological map of Manipur (after Soibam, 1998) and lithostratigraphic section of the Changamdabi area.

EXPLANATION OF PLATE I

- | | |
|---|---|
| 1. <i>Globularia brevispira</i> (X 2) | 7. <i>Rimella fissurrella</i> (X 2.5) |
| 2. <i>Chlamys</i> sp. cf. <i>Multistriata</i> (X 2) | 8. <i>Spondylus rouaulh</i> (X 3) |
| 3. <i>Chlamys wynnei</i> (X 2) | 9. <i>Venericardia hollandi</i> (X 2) |
| 4. <i>Cassidaria archiaci</i> (X 2) | 10. <i>Rimella pakistanica</i> (X 2.5) |
| 5. <i>Sunetta yethama</i> (X 5) | 11. <i>Nemocardium thetreyinense</i> (X 2) |
| 6. <i>Ostrea (Flemingostrea) haydeni</i> (X 3) | 12. <i>Clavilithes</i> cf. <i>Arakanensis</i> (X 3) |



Material: Partially incomplete external mould.

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/57	1.32	1.16	0.8(60%)

Description and Remarks: The specimen is in the form of external mould, with partial ornamentation preserved especially in the posterior half. On comparison with the figures 2 and 3 on Pl. VI of GSI type No. 12378 and 79 (Cotter, 1923), the recorded specimen is found to be similar in view of its trigonally ovate outline and nature of ribs. However, the figured specimens are sculptured with 26 radial ribs instead of 15 in the present one. Lesser numbers of ribs in our specimen may be due to its poor preservation. But this is not of much significance because of incomplete nature.

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill.

Family Spondylidae Gray, 1826

Genus Spondylus Linne', 1758

Subgenus Spondylus s. str.

Type species *Spondylus gaederopus* Linne', 1758; SD Schmidt, 1818

Spondylus (Spondylus) rouaulti d'Archaic
(Pl. I, fig. 8)

Spondylus (Spondylus) rouaulti d'Archaic; d'Archaic and Haime, 1853, p.171, Pl XXIV, figs. 6a & b, 7 and 8.

Spondylus alexandrae Vredenburg, 1927, in Cossmann & Pissarro, p. 11, Pl. II, figs. 11-13.

Spondylus rouaulti d'Archaic & Haime; Eames, 1951, p. 352. - Mukherjee, 1927, p.80, Pl. XIII, figs. 13-16.

Material: One right valve.

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/67	15.2	16(105%)	1.5(98%)

Remarks: The isolated right valve is slightly ill-preserved but very much similar to the figure 13 of *Spondylus alexandrei* Vredenburg (Cossmann and Pissarro 1927 p.11, Pl. II, figs. 11-13) in number of ribs, i.e. 30, nature of primary and secondary ribs, auricular nature, umbonal angle, (75°) and prominent upright umbo. The recorded specimen is no doubt very small but corresponds well to first stage of growth line; the only character which could not be marked out well is the rapidly rising ventral margin towards posterior due to slightly broken nature of specimen. In view of the above, the form at hand merges very well with *Spondylus alexandrei*. However, Eames (1951) considered this species as the synonym of *Spondylus rouaulti* d'Archaic.

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill.

Family Ostreidae Rafinesque, 1815

Subfamily Ostreinae Rafinesque, 1815

Tribe Flemingostreini Stenzel, 1971

Genus Flemingostrea Vredenburg, 1916;
d'Archaic & Haime 1853; OD

Ostrea (Flemingostrea) haydeni Cossmann & Pissarro
(Pl. I, fig.6)

Ostrea (Flemingostrea) haydeni Cossmann & Pissarro, 1923, p.9, Pl. II, figs. 15-22.

Material: One left valve.

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/35	14	18(128.5%)	0.5(35%)

Remarks: Shell is tall and sub-quadrangular in shape with irregular growth-lamellae. Moreover, it resembles very well the figure 20 of Cossmann and Pissarro (1927, p.9, Pl. II). Besides,

GSI type No. 10987 bearing the name *Flemingostrea haydeni* is very much similar with the present specimen in shape and irregular growth-lamellae. Therefore, in spite of its smaller size, the present specimen is identified as *Flemingostrea haydeni*.

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill.

Superfamily Carditacea Fleming, 1820

Family Carditidae Fleming, 1828

Subfamily Venericardiinae Chavan, 1969

Genus Venericardia Lamarck, 1801

Type species *Venericardia imbricate* Lamarck; SD Schmidt, 1818

Subgenus Venericardia s. str.

Venericardia (Venericardia) hollandi Cossmann & Pissarro
(Pl. I, fig. 9)

Venericardia hollandi Cossmann & Pissarro, 1927, p. 15. Pl. II, figs. 27-34, 37-38.

Material: One external mould.

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/4	16	15	8.6(53.7%)

Remarks: The species is characterized by its medium size, sub-orbicular outline, much inequilateral valve, i.e. umbo is placed at anterior-sixth of the length, short and slightly curved anterior margin, long and moderately sloping posterior margin and 32 crenulated, equally spaced radial ribs. All these characters are well seen in the recorded specimen. Further, it resembles very well the figure 37 recorded from a horizon in the uppermost Ranikot of Jhirak, Pakistan (Cossmann and Pissarro, 1927, p. 15, Pl. II, figs. 27-34, 37, 38). Moreover, it is similar to GSI type specimen No. 10933. Therefore, its identity as *Venericardia hollandi* Cossmann & Pissarro is confirmed.

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill.

Superfamily Cardiacea Lamarck, 1809

Family Carditidae Lamarck, 1809

Subfamily Protocardinae Keen, 1951

Genus Nemocardium Meek, 1876

Type species *Cardium semiasperum* Deshayes, 1858; SD Sacco, 1899

Subgenus Nemocardium s. str.

Nemocardium thetregyinense Cotter
(Pl. I, fig. 11)

Cardium thetregyinense Cotter, 1923, p. 32, Pl. IV, fig. 2.

Material: One left valve and five right valves.

Measurements in mm:

Specimen No.	Length	Height	Inflation
US2/15	14	15(107%)	9.4(67%)
US2/75	12.1	12.1(100%)	4.2(34.7%)
US2/95	7	8.1(114%)	10.4(63%)
US2/24	18.6	17(91%)	11.4(77.5%)
US2/34	11.3	15(132%)	7(61.9%)
US2/44	12.7	18.6(146%)	13(102%)

Remarks: The recorded specimens are all smaller in size but undoubtedly belong to *Nemocardium thetregyinense* (Cotter) as Specimen No. US2/24 and US2/15 bear close resemblance with the GSI type No. 12369 of Myanmar (Cotter, 1923, p.32, Pl. IV, fig. 2a).

Horizon: Upper Disang Formation (Eocene).

Locality: Changamdabi hill.

REPOSITORY

All the specimens described and illustrated here are housed in the Palaeontology Museum, Department of Earth

Sciences, Manipur University Canchipur-795003, Manipur.

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