A PLIOCENE MOLLUSCAN FAUNULE FROM TRINIDAD

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INTRODUCTION

A report on Miocene and Pliocene mollusks from Trinidad (Jung, 1969) was completed when the writer undertook the identification of a small molluscan fauna from the Talparo Formation of Trinidad. This faunule had been collected by Karl Rohr (KR 13900) in the Mahaica District, which is situated on the northern slope of the Central Range of Trinidad, about 14 kilometers south of Arima. The fossiliferous outcrop had been found in a branch stream of the Cunupia River (coordinates: N 360′ 060 links, E 445′ 260 links). The exact geographic location of this outcrop is shown on a detailed map to be published by H. G. Kugler, Basel. According to Kugler (1961, map) this locality (= Naturhistorisches Museum Basel locality 10437), which is situated on the axis of the Mahaica anticline, belongs to the Caparo Clay Member of the Talparo Formation and has been selected as the type locality for mollusks of the Caparo Clay Member (Kugler MS).

According to Rohr (private report, 1937) the faunule came from a 15 feet thick lens of limonitic or glauconitic conglomeratic sandstone situated in the uppermost part of the Caparo Clay Member. The lithological and faunistical aspects of the faunule are strikingly similar to those of the fauna from the Matura shell bed. Their correlation, therefore, seems highly probable.

FAUNA

All the specimens contained in this faunule are strongly rolled, a feature observed frequently in material from the Matura shell bed as well. A number of forms cannot be identified specifically, because they are represented by small fragments only. The following 22 forms have been recognized from NHMB locality 10437:

Pelecypoda:

Barbatia (*Obliquarca*) cf. *B. cancellaria* (Lamarck)
Noetia (*Eontia*) *centrota* (Guppy)
Brachydontes species
Ostrea species
Aequipecten (*Plagioctenium*) species
Anomia simplex d'Orbigny
Crassinella species
Trachycardium (*Dallocardia*) *sanctidavidis* (Maury)
Semele purpurascens (Gmelin)
Strigilla (*Pisostrigilla*) *pisiformis* (Linné)
Donax cf. *D. striatus* Linné
Juliacorbula aequivalvis (Philippi)

Gastropoda:

Diodora cayenensis (Lamarck)
Neritina species
Turritella (*Broderiptella*) aff. *T. planigyrata* Guppy
Cerithiopsis species
Modulus species
Triphora species
Natica (*Naticarius*) aff. *N. canrena* (Linné)
Crucibulum (*Crucibulum*) *piliferum* Guppy
Olivella (*Niteoliva*) cf. *O. verreauxii* (Ducros)
Prunum (*Prunum*) aff. *P. dallianum* (Maury)

Of these 22 forms there are 12 species occurring in the Matura shell bed as well. The remaining 10 forms belong to genera represented also at Matura. But unfortunately they are not determinable specifically, although it is probable that they are conspecific with those found at Matura. *Barbatia* (*Obliquarca*) cf. *B. cancellaria* (Lamarck) and *Prunum* (*Prunum*) aff. *P. dallianum* (Maury) are the only species not recorded from Matura. In addition the form listed above as *Modulus* species is represented by a single, fragmentary, worn specimen, and is not conspecific with *M. carchedonius* (Lamarck) recorded from the Matura shell bed (Jung, 1969, p. 452).

Genus BARBATIA Gray

Gray, 1842, Synopsis of the contents of the British Museum, ed. 44, p. 81.

Type species (by subsequent designation, Gray, 1847, Proc. Zool. Soc. London, pt. 15, p. 197), *Arca barbata* Linné. Recent, Mediterranean Sea.

Subgenus OBLIQUARCA Sacco

Sacco, 1898, I Molluschi dei terreni terziarii del Piemonte e della Liguria, pt. 26, p. 16.

Type species (by original designation), *Arca modioliformis* Deshayes. Eocene, Paris Basin.

BARBATIA (OBLIQUARCA) cf. B. CANCELLARIA (Lamarck)

Plate 1, figs. 1,2

This species is represented by a few incomplete and strongly worn shells. The lack of reduced denticles at the center of the hinge may be due to erosion. The ligament is narrow and restricted to the area behind the beaks. The external sculpture is hardly recognizable, but consists of numerous radials.

B. cancellaria sometimes occurs abundantly in the Recent Caribbean fauna (Abbott, 1958, p. 110). It is usually assigned to the subgenus *Barbatia.* Sacco originally included only modioliform species in his subgenus *Obliquarca,* but Woodring (1925, pp. 38-40) described three species from the Bowden Formation of Jamaica, two of which are not modioliform at all. According to Reinhart (1935, p. 25) *Obliquarca* is distinguished from *Barbatia s. str.* by having its ligament entirely behind the umbones. As stated by Olsson (1961, p. 81) "the ligament covers only the posterior part of the cardinal area" in *B. cancellaria.*

Genus NOETIA Gray

Gray, 1857, Ann. Mag. Nat. Hist., (ser. 2) vol. 19, p. 371.

Type species (by monotypy), *Noetia triangularis* Gray (= *Arca reversa* G. B. Sowerby I). Recent, eastern Pacific.

Subgenus EONTIA MacNeil

MacNeil, 1938, U. S. Geol. Survey, Prof. Paper 189-A, p. 11.

Type species (by original designation), *Arca ponderosa* Say. Recent, east coast of the United States.

NOETIA (EONTIA) CENTROTA (Guppy)

Plate 1, figs. 3,4

1867 *Arca centrota* Guppy, Proc. Sci. Assoc. Trinidad, pt. 3, p. 175. (Reprint, Harris, 1921, Bulls. Amer. Paleontology, vol. 8, no. 35, p. 54.)
1938 *Eontia centrota* (Guppy), MacNeil, U. S. Geol. Survey, Prof. Paper 189-A, p. 12, pl. 1, figs. 11,12. Lectotype figured. For additional citations see this publication.
1942 *Eontia centrota* (Guppy), Rutsch, Verh. Naturf. Ges. Basel, vol. 54, p. 110.
Lectotype: USNM 496508.
Type locality: Matura, Trinidad.

Although most abundant at its type locality, this species is represented only by a few valves in the faunule under study. They do not reach the size of valves from the Matura shell bed.

N. centrota has not been found outside Trinidad yet. It has been collected from deposits of late Miocene to Pliocene age.

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EXPLANATION OF PLATE 1

Figure — Page

All the specimens are from Naturhistorisches Museum Basel locality 10437.

1,2 *Barbatia* (*Obliquarca*) cf. *B. cancellaria* (Lamarck) (X 2) 86
Length 22.3 mm; height 12.8 mm. Nat. hist. Mus. Basel No. G 14061.

3,4 *Noetia* (*Eontia*) *centrota* (Guppy) (X 2) 86
Length 22.2 mm; height 14.3 mm. Nat. hist. Mus. Basel No. G 14062.

5 *Juliacorbula aequivalvis* (Philippi) (X 5) 88
Length 6.7 mm; height 5.1 mm. Nat. hist. Mus. Basel No. G 14063.

6 *Crucibulum* (*Crucibulum*) *piliferum* Guppy (X 2) 88
Maximum diameter 16.7 mm. Nat. hist. Mus. Basel No. H. 15402.

7 *Turritella* (*Broderiptella*) aff. *T. planigyrata* Guppy (X 2) 88
Height 32.0 mm; maximum diameter 14.2 mm. Nat. hist. Mus. Basel No. H. 15401.

8 *Prunum* (*Prunum*) aff. *P. dallianum* (Maury) (X 2) 88
Height 21.2 mm; width 17.2 mm. Nat. hist. Mus. Basel No. H. 15403.

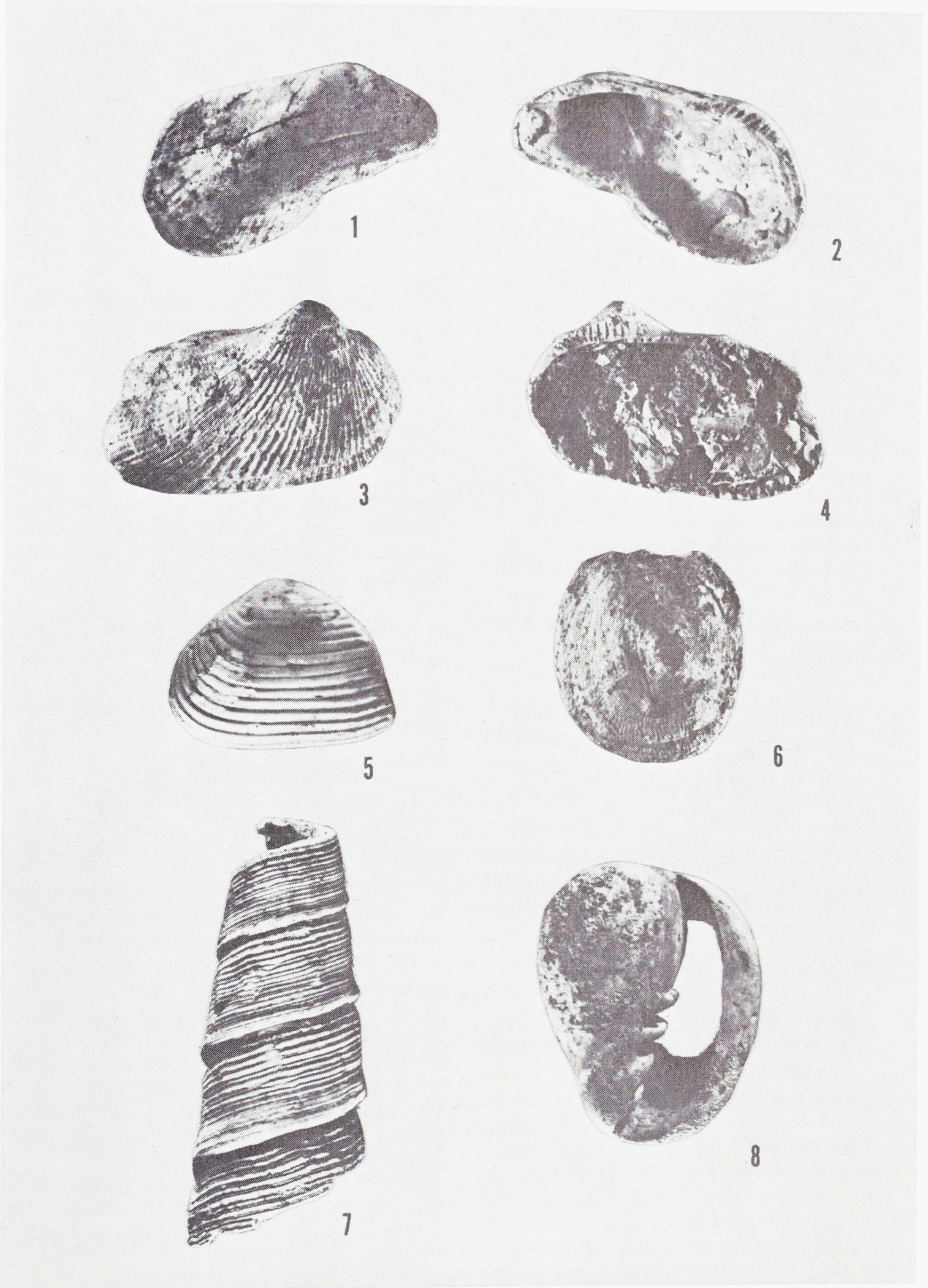

PLATE 1

Genus JULIACORBULA Olsson and Harbison

Olsson and Harbison, 1953, Acad. Nat. Sci. Philadelphia, Monograph no. 8, p. 148.

Type species (by original designation), *Corbula cubaniana* d'Orbigny (= *Corbula knoxiana* C. B. Adams = *Corbula aequivalvis* Philippi). Recent, Florida and Caribbean.

JULIACORBULA AEQUIVALVIS (Philippi)

Plate 1, fig. 5

1836 *Corbula aequivalvis* Philippi, Archiv für Naturg., vol. 2, p. 227, pl. 7, fig. 4.
1964 *Corbula* (*Juliacorbula*) *aequivalvis* Philippi, Weisbord, Bulls. Amer. Paleontology, vol. 45, no. 204, p. 393, pl. 57, figs. 3-6. For further citation see this publication.

J. aequivalvis occurs abundantly in the Matura shell bed, but is represented in the faunule under study by a few valves only. At Matura the specimens vary in shape from subquadrate to elongate. The same variability is shown by the Mahaica valves. Related forms are discussed elsewhere (Jung, 1969, p. 410).

Genus TURRITELLA Lamarck

Lamarck, 1799, Mém. Soc. Hist. Nat. Paris, p. 74.

Type species (by monotypy), *Turbo terebra* Linné. Recent, western Pacific.

Subgenus BRODERIPTELLA Olsson

Olsson, 1964, Neogene mollusks from northwestern Ecuador, p. 188. Paleont. Research Inst., Ithaca, N. Y.

Type species (by original designation), *Turritella broderipiana* d'Orbigny. Recent, eastern Pacific.

TURRITELLA (BRODERIPTELLA) aff. T. PLANIGYRATA Guppy

Plate 1, fig. 7

This species is fairly frequent at Matura and its affinities to *T. planigyrata* Guppy 1867, pp. 156,169) and to the Recent Caribbean *T. variegata* (Linné) have been described by the writer (Jung, 1969, p. 439). The Mahaica faunule contains only four fragmentary specimens. They are indistinguishable from Matura specimens. The figured shell is somewhat compressed laterally.

Genus CRUCIBULUM Schumacher

Schumacher, 1817, Essai d'un nouveau système des habitations des vers testacés, pp. 56,182.

Type species (by subsequent designation, Burch, 1946, Min. Conchological Club Southern California, No. 56, p. 19), *Crucibulum planum* Schumacher (= *Patella auricula* Gmelin). Recent, Florida and West Indies.

Subgenus CRUCIBULUM *s. str.*

CRUCIBULUM (CRUCIBULUM) PILIFERUM Guppy

Plate 1, fig. 6

1867 *Crucibulum piliferum* Guppy, Proc. Sci. Assoc. Trinidad, pt. 3, pp. 160,172. (Reprint, Harris, 1921, Bulls. Amer. Paleontology, vol. 8, no. 35, pp. 39,51.)

This species is represented by five specimens. Their spines are but poorly developed, or even absent on account of erosion. Unusually flat shells such as occur at Matura are missing.

Genus PRUNUM Herrmannsen

Herrmannsen, 1852, Indicis generum malacozoorum. Supplementa et corrigenda, p. 113.

Type species (by monotypy), *Voluta prunum* Gmelin. Recent, West Indies.

Subgenus PRUNUM *s. str.*

PRUNUM (PRUNUM) aff. P. DALLIANUM (Maury)

Plate 1, fig. 8

A single shell is available. It is damaged and somewhat worn, but its outer lip is preserved. *P. dallianum* (Maury) (1912, p. 67, pl. 10, figs. 5, 6) was originally described from the Courbaril beds (Pliocene) of the Pitch Lake area, Trinidad. Comparison with topotypes shows that the Mahaica specimen is stouter. The upper part of its body whorl is more inflated, the lower part more constricted, and its outer lip is more strongly arched. The columellar folds are heavier than in *P. dallianum.*

A few specimens from Matura have questionably been identified as *P. dallianum* (Jung, 1969, p. 533). They are more slender than the Mahaica shell.

CONCLUSIONS

The Talparo Formation consists of a rather heterogeneous sequence of deposits.

Its most prominent features are the large bodies of practically unconsolidated sands in predominantly clayey sediments. Occasional lenses yielding a fauna like the one discussed in this paper represent a marine near-shore environment with slight brackish water influence. The presence of *Cyanocyclas* or *Anadara* (*Larkinia*) *patricia* point to strong brackish water influence. Lignitic beds associated with sands containing possible traces of decayed mangrove roots suggest a coast swamp environment, whereas fossils like *Hyria* and *Hemisinus* prove the presence of fresh water.

The Talparo Formation represents part of the sediments filling the basin situated between the present Central and Northern Ranges (Caroni Syncline). The composition of the sediments as outlined above points to an unsteady environment with fluctuations of the sea. Kugler (1961, map) subdivided the Talparo Formation into seven members. The molluscan fauna recorded herein has been collected from a lens in the Caparo Clay Member, in the middle member of the formation. The Matura beds are considered by Kugler (1961, map) to be the top member of the Talparo Formation and the last marine transgression (Kugler, 1953, p.55).

According to field observations the marine lens of the Mahaica District represents a lens within the Caparo Clay Member, whereas the Matura beds can hardly be defined as a member due to lack of stratigraphic relations. It is suggested that the Matura beds be considered as a marine lens within the the Caparo Clay Member of the Talparo Formation on account of the striking faunistic and lithological similarity with the fauna recorded herein.

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RECENT BOOK

CYCLIC SEDIMENTATION, by P. McL. D. Duff, A. Hallam and E. K. Walton. Published by Elsevier Publishing Company, Amsterdam, London and New York, 1967, x + 280 pp., $23.50

Cyclic Sedimentation, the tenth volume in the *Developments in Sedimentology* series, is the first attempt at comprehensive treatment of this subject. Seven central chapters describe and evaluate the evidence of cyclic sedimentation from continental, transitional and marine environments, followed by chapters on flysch and turbidity currents and on faunal changes within sedimentary cycles. In the general conclusions, the authors state that cyclicity is inherent in sedimentation and that it is unrealistic to look for a single all-embracing mechanism. They conclude with discussion of sedimentary, tectonic, eustatic and climatic controls on cyclic development.