

EOCENE OSTRACODA FROM THE SUBSURFACE SECTIONS OF GARO HILLS, MEGHALAYA AND ASSAM, INDIA

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ABSTRACT

Fifty-nine ostracode taxa from the Palaeogene (Jaintia Group) subsurface sequence of Garo Hills, Meghalaya and Assam, India are described. A genus-*Siddiquicythere* and 29 species-*Alocopocythere borhollaensis*, *A. garoensis*, *A. gopinathkillaensis*, *A. indica*, *A. meghalayaensis*, *Bairdoppilata chaudharii*, *Cytherella govindani*, *C. shahi*, *c. siddiquii*, *Cytherelloidea alfuraihi*, *C. choubeyi*, *C. sinhai*, *Echinocythereis guptai*, *Cyrococythere raoi*, *Hermanites basanti*, *Neonesidea shillongensis*, *Occultocythereis raivermani*, *O. turanensis*, *Paijenborchella pandeyi*, *P. (Eopaijenborchella) bhandarii*, *P.(E.) bhatiai*, *P.(E.) dattai*, *P.(E.) khoslai*, *Paracypris sahui*, *P. samantai*, *P. striata*, *Propontocypris (Ekpontocypris) meghalayaensis*, *Semicytherura nealei* and *Siddiquicythere mohani*-are new. The identification of 2 taxa, previously described from Assam and also recorded in this work, are revised and brought up-to-date.

On the basis of ostracodes, five zones are recognised. Of these, one zone is proposed for the beds of Siju/Sibsagar Formation (Middle Eocene): I-*Alocopocythere gopinathkillaensis*-*Paijenborchella (Eopaijenborchella) bhatiai*-*Cytherella siddiquii* Assemblage Zone and four zones, in ascending order, for the Kopili Formation (Late Eocene): II-Poorly Fossiliferous Zone, III-*Alocopocythere garoensis*-*Hermanites basanti* Assemblage Zone IV-Poorly Fossiliferous / Barren Zone, and V-*Alocopocythere meghalayaensis*-*Paijenborchella (Eopaijenborchella) swaraswatiae* Assemblage Zone. All the new taxa are systematically described and illustrated.

INTRODUCTION

The Assam-Arakan Basin is the northeastern extension of Indian Peninsular shield. The paleogene sediments are exposed along the southern margin of Shillong Plateau and Mikir Hills. The hydrocarbon exploration in Assam Valley has revealed that the Paleogene shelf facies extend under thick alluvial cover. The Paleogene sediments are divisible into shelf and geosynclinal facies. The shelf facies designated as Jaintia Group is commonly divided into Therria/Tura, Sylhet and Kopili Formations. Of these, only the last two are marine and contain abundant microfauna.

A survey of the literature reveals that considerable work has been done on foraminifers of these beds. It is, however, surprising to note that the ostracodes have not received much attention from the micropalaeontologists. As far as known to the author, only works on the ostracodes are those by Srivastava (1968), Guha (1970), Sarma (1973), Mathur *et al.* (1978), Bhandari (1981), and Neale and Singh (1985). These works deal mostly with the ostracodes of Sylhet Formation of Shillong Plateau and Mikir Hills. Little or no work has so far been done on the ostracodes of Kopili Formation of Shillong Plateau and Paleogene beds of Assam Valley. In order to fill in this lacuna in our knowledge the author took up the study of Eocene Ostracoda from the Garo Hills, Meghalaya and Assam Valley.

In all, three subsurface well sections were selected for the present investigations. They are Gopinathkilla well-A, Baghmara well-B and Borholla well-C (Fig.1). The first two well sections are in the Garo Hills, Meghalaya, while the third falls in the Assam Valley.

Ostracodes are recovered from all the three sections, though their frequency varies from medium to low. They are represented, in all, by 59 taxa belonging to 12 families. Twenty-nine taxa are new. Twenty taxa have been assigned to previously known taxa. Ten taxa are left under open nomenclature.

The ostracode assemblage is interesting and important to warrant publishing a systematic account.

PREVIOUS WORK

The earliest work on the ostracodes of the Paleogene sequence of Assam-Arakan Basin is by Srivastava (1968), who recorded three species from the Eocene beds of South Shillong which he tentatively identified as : *Cytherella protuberantis* Lubimova and Guha, *Cytherelloidea* sp. aff. *C. tewarii* Bold, *Trachyleberis* sp. and assigned an early Upper Eocene age.

Subsequently, Guha (1970) reported Middle Eocene ostracoda i.e. *Bairdia* sp., *Paracypris* sp., *Schizocythere* sp., and *Uroleberis* sp. from the subsurface samples of Sylhet Limestone of Teok, Assam.

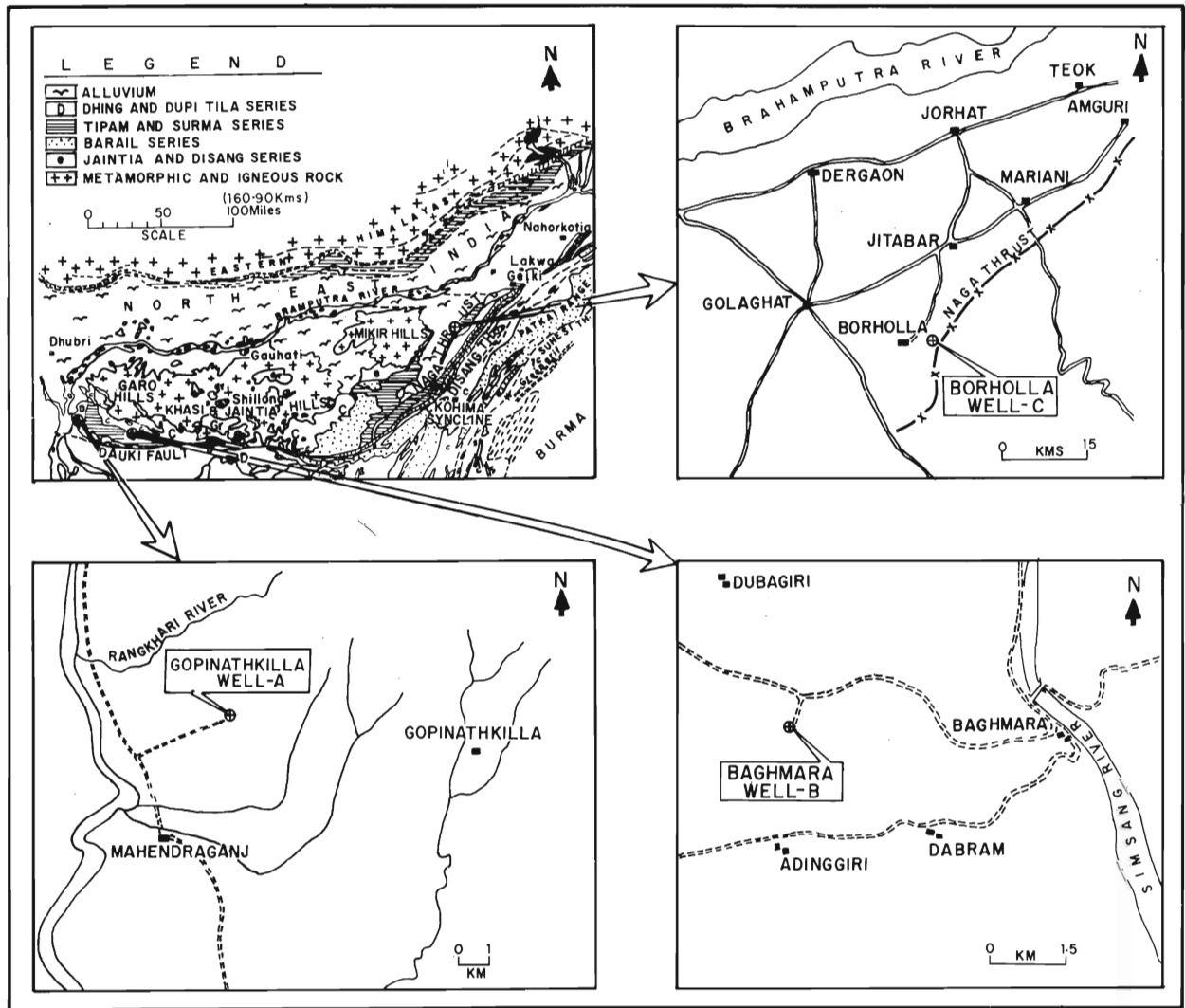


Fig. 1 Geological map of the northern part of the Assam-Arakan region showing locations of Gopinathkilla Well-A, Baghmara Well-B, and Borholla Well-C.

Sarma (1973) recorded six new species of *Paijenborchella* from the Eocene beds of Garo Hills, Meghalaya. Of these, four species, *P. assamensis*, *P. indigena*, *P. polycostata* and *P. reticulata*, were reported from the Siju Stage, while two species, *Paijenborchella nirmalai* and *P. swaraswatiae*, from the Kopili (Rewak) Stage. Descriptions and illustrations, however, were given only of *P. assamiensis*, *P. indigena* and *P. swaraswatiae*.

Mathur *et al.* (1978) recorded 16 species from the subsurface samples of Upper Sylhet Limestone Member, Shella Formation (Jaintia Group) near Tura, Garo Hills, Meghalaya. The check list of these taxa is as follows: "*Archicythereis*" sp., *Bairdia beraguaensis* Singh and Tewari, *B. kirtharensis* Tewari and Tandon, *Bun-*

tonia sp., *Cushmanidea* sp., *Cytherella protuberantis* Lubimova and Guha, *C. tawica* Singh and Tewari, *Cytherelloidea* sp., *Cytheropteron* sp., *Echinocythereis fosularis* (Lubimova and Guha), *E. palanaensis* Khosla, *Leguminocythereis mutata* (Lubimova and Guha), *Paijenborchella (Eopaijenborchella)* sp., (subgeneric name misspelt as *Eupaijenborchella*), *Paracypris* sp., *Xestoleberis subglobosa* (Bosquet), *Xestoleberis* sp. On the basis of above assemblage, they assigned a Middle Eocene age for the Upper Sylhet Limestone Member of the Shella Formation.

Bhandari (1981) recorded eighteen ostracode taxa including two new species, *Alococythere dattai* and *Neonesidea khoslai*, from the subsurface sequence (Jaintia Group) of Baghmara well, Garo Hills,

Meghalaya and assigned Eocene age.

Neale and Singh (1985) described and illustrated 29 species from the Middle Eocene part of Sylhet Formation in the Deopani region, Assam. The following 22 species of these are new: *Alocopocythere bhandarii*, *A. dhansariensis*, *A. polygona*, *A. talukdari*, *Buntonia royi*, *Cytherella antheriformis*, *C. assamensis*, *C. barpatharensis*, *C. deopanica*, *C. hastata*, *C. ventroconcaava*, *Cushmanidea distincta*, *Cytherura eocaenica*, *Cytheropteron reticuloradiata*, *Krithe oryza*, *Paijenborchella ? enigma*, *P. (Eopaijenborchella) assamensis*, *Pararacytheridea ? superdimorphica*, *Propontocypris eocaenica*, *Schizocythere deopanica*, *Semicytherura indica*, *Uroleberis armenica*. The other recorded species are: *Bairdia beraguaensis* Singh and Tewari, *Cytherella* sp., *Cytherelloidea* sp. Juv., *Krithe* cf. *K. oryza*, *Loxococoncha? sp.*, *Paijenborchella (Eopaijenborchella) sp.*, and *Xestoleberis? sp.*

Perhaps, it may not be out of context to mention here that important works from Eocene beds of other parts of India and neighbouring countries are known in considerable detail mainly through the works of Lubimova *et al.* (1960) Tewari and Tandon (1960), Guha (1961, 1965, 1968, 1970, 1971, 1974), Tewari and Singh (1966), Singh and Misra (1968), Sohn (1970), Siddiqui (1971, 1981), Khosla (1972), Gramman (1975), Al-Furaih (1980, 1983) Khosla and Pant (1982a, 1982b, 1988, 1989), and Bhandari (1989).

STRATIGRAPHY

The Palaeogene shelf sediments of Shillong Plateau were initially classified by Medlicott (1869) into two units, namely Nummulitic Series and Supra-Nummulitic deposits in ascending order. Evans (1932) gave comprehensive classification of the entire Assam-Arakan Basin. In this classification, he designated the shelf facies of Paleocene-Eocene beds as Jaintia Series and further subdivided it into lower Sylhet Limestone Stage and upper Kopili Stage. Thereafter, Wilson and Metre (1953) proposed detailed classification. This classification with some modifications and additions have been followed by many workers including Nagappa (1959), Biswas (1962), murthy *et al.* (1976) and Dasgupta (1977).

The classification proposed by above workers is applicable *sensu stricto* only in Khasi and Jaintia Hills of Shillong Plateau where all the units are developed. In the area of Garo Hills and Assam Valley from where three subsurface sections have been studied by the present author, only a part of the succession is found, therefore, above classification cannot be extended.

In the present work, the author has followed Samanta (1968) for the classification of the Eocene succession of Garo Hills and Mohan and Pandey (1973) for the Eocene succession of Assam Valley. A tentative correlation of Paleocene-Eocene succession of Garo Hills, Khasi-Jaintia Hills and Assam Valley is given in table-1.

Table 1: Tentative correlation of Palaeocene-Eocene beds of Garo Hills, Khasi-Jaintia Hills and Assam Valley.

Garo Hills (Samanta, 1968)	Khasi-Jaintia Hills (Wilson and Metre, 1953)	Assam Valley (Mohan and Pandey 1973)
Kopili Formation	Kopili Alternations	Kopili Formation
Siju Limestone	Prang Limestone	Sibsagar Formation
Tura Formation	S Y L H E T L S T.	Tura Formation
TURA SANDSTONE	Narpuh Sandstone Umlatdoh Limestone Lakadong Sandstone Lakdong Limestone Upper Therria Substage Lower Therria Substage	

COMPOSITION, AGE AND AFFINITY OF THE OSTRACODE FAUNA

The ostracode fauna of the Siju/Sibsagar and Kopili Formations of South Shillong Shelf and Assam, comprises 59 taxa. These belong to 12 families. Sixteen taxa to the family Trachyleberidae, 13 taxa to the family Cytherellidae, 10 taxa to the family Cytheridae, 4 taxa to the family Bairdiidae, 3 taxa each to the families Hemicytheridae, Xestoleberidae, Candonidae, and Cytheruridae, two taxa to the family Bythocytheridae and one taxon each to the families Cytheridae, and Krithidae. Twenty-nine taxa are considered as new. Twenty taxa are assigned to the taxa already known and 10 taxa are left under open nomenclature. Of the 59 taxa, 28 taxa are confined to the Siju/Sibsagar Formation and 19 taxa to the Kopili Formation, while remaining 12 taxa are long ranging. An analysis of the ostracode fauna is given below.

SIJU/SIBSAGAR FORMATION

1. Three taxa are left under open nomenclature. Of these, two taxa-*Cytherella* sp. A., and *Gyrocythere* sp. A- occur only in the present formation, while

the third taxon-*Xestoleberis* sp. - continues in the overlying Kopili Formation.

2. Twenty-one taxa are new. Of these, the following thirteen taxa- *Alocopocythere borhollaensis*, *A. gopinathkillaensis*, *Cytherella shahi*, *Cytherelloidea alfuraihi*, *C. choubeyi*, *Echinocythereis guptai*, *Paijenborchella pandeyi*, *P. (Eopaijenborchella) bhandarii*, *P. (E.) dattai*, *P. (E.) khoslai*, *Paracypris sahui*, *P. samantai* and *Semicytherura nealei*-are confined to this formation. The remaining 8 taxa-*Cytherella siddiquii*, *Cytherelloidea sinhai*, *Neonesidea shillongensis*, *Occultocythereis raivermani*, *Paijenborchella (Eopaijenborchella) bhatiai*, *Paracypris striata*, *Propontocypris (Ekpontocypris) meghalayaensis* and *Siddiquicythere mohani*-extend to the Kopili Formation.
3. Three taxa-*Cytherella assamensis* Neale and Singh, *Krithe oryza* Neale and Singh, and *Neonesidea khoslai* Bhandari — previously described from the Middle Eocene beds of Assam and Meghalaya occur both in the Siju/Sibsagar and Kopili Formations.
4. Two taxa- *Schizocythere gujeratensis* Guha, and *Uroleberis kutchensis* Guha - have been described from the Middle Eocene beds elsewhere and occur in the equivalent horizon in Assam and Meghalaya.
5. Eleven taxa - *Alocopocythere bhandarii* Neale and Singh, *Buntonia royi* Neale and Singh, *Cytherella antheriformis* Neale and Singh, *C. barpatharensis* Neale and Singh, *C. hastata* Neale and Singh, *Cytherura eocaenica* Neale and Singh, *Paijenborchella ? enigma* Neale and Singh, *P. (Eopaijenborchella) assamensis* Sarma, *Siddiquicythere dhanariensis* (Neale and Singh) — have so far been described from the Middle Eocene beds of Assam. They are restricted in the present formation and appear to be characteristic of the Middle Eocene.

The overall ostracode assemblage confirms a Middle Eocene age for the beds of Siju/Sibsagar Formation.

KOPILI FORMATION

1. One taxon is compared with previously known taxon.
2. Eight taxa are left under open nomenclature. Of these, one taxon- *Xestoleberis* sp. - continues from the underlying Siju/Sibsagar Formation into the present formation, while the remaining 7 taxa are restricted to the Kopili Formation.
3. One taxon-*Neocyprideis bhupendri* (Singh and

Misra) — previously recorded from the Lower Eocene beds of Rajasthan occur in the present formation.

4. Sixteen taxa are new. Of these 8 taxa - *Alocopocythere garoensis*, *A. indica*, *A. meghalayaensis*, *Bairdoppilata chaudharii*, *Cytherella govindani*, *Gyrocythere raoi*, *Hermanites basanti*, *Occultocythereis turaensis* - are confined to the Kopili Formation, while the remaining taxa extend from the Siju/Sibsagar formation to the present formation.
5. Two taxa - *Alocopocythere dattai* Bhandari, and *Paijenborchella (Eopaijenborchella) swaraswatiiae* Sarma - have so far been described from the Kopili Formation and appear to be characteristic of the Late Eocene.

Although majority of the ostracode taxa are either new or morphologically indistinct, none of them are indicative of the Late Eocene age assigned to the Kopili Formation on other criteria.

OSTRACODE ZONATION

The Gopinathkilla well-A has been taken as type section for the ostracode biozonation. On the basis of ostracodes, one assemblage zone is recognised in the Siju Formation and two assemblage and two poorly fossiliferous zones in the Kopili Formation. They are briefly described in the ascending order.

SIJU LIMESTONE

Zone I: *Alocopocythere gopinathkillaensis* — *Paijenborchella (Eopaijenborchella) bhatiai*- *Cytherelloidea siddiquii* Assemblage Zone (540 to 565 metres) : This zone is 25 metres thick and extends from 540 to 565 metres depth below the surface. It consists of calcareous sandstone, shale and marl bands. A moderately diverse and rich ostracode assemblage has been recorded from this zone. *Alocopocythere gopinathkillaensis*, *Paijenborchella (E.) bhatiai* and *Paijenborchella (E.) swaraswatiiae* Sarma are the most dominant and restricted species in this zone and on account of which it is named as such. The other ostracodes restricted to this zone are as follows : *Buntonia royi* Neale and Singh, *C. shahi* n.sp., *C. hastata* Neale and Singh, *Cytherelloidea alfuraihi* n.sp., *C. choubeyi* n.sp., *Cytherura eocaenica* Neale and Singh, *Paijenborchella pandeyi* n.sp., *P. (E.) bhandarii* n.sp., *P. (E.) indigena* Sarma, *P. (E.) khoslai*

n.sp., *Paracypris sahui* n.sp., *P. samantai* n.sp., *Schizocythere gujeratensis* Guha, *Siddiquicythere dhansariensis* (Neale and Singh), *Semicytherura nealei* n.sp., *Urolebris armeniaca* Neale and Singh, *U. kutchensis* Guha.

KOPILI FORMATION

Zone II: Poorly Fossiliferous Zone (525 to 540 metres) : This zone is 15 metres thick and consists of medium to fine grained sandstone with minor shale bands. It is poorly fossiliferous and yielded a few

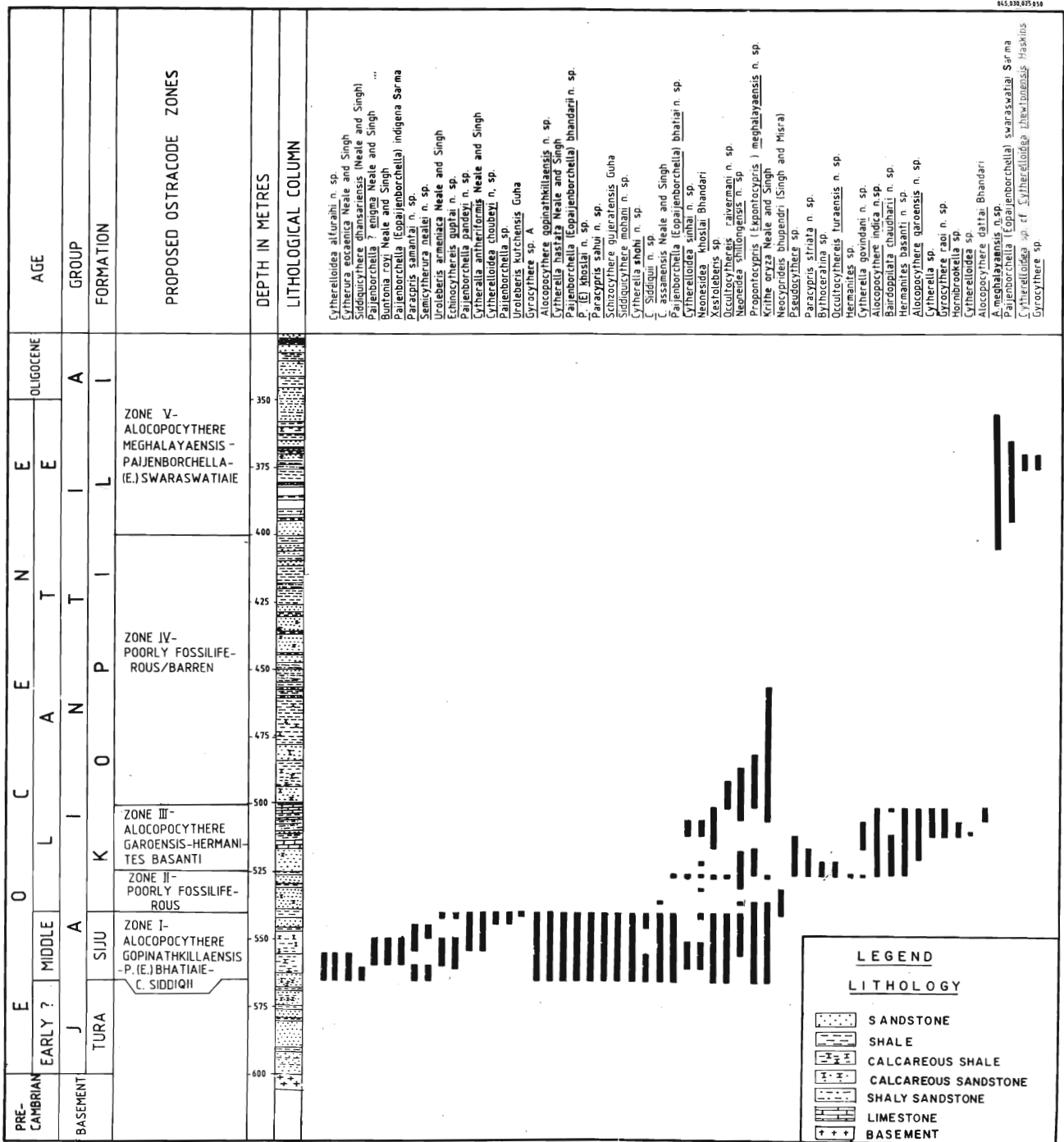


Fig. 2 Biostratigraphic zonation and distribution of Ostracodes in the Palaeogene beds of Gopinathkilla Well-A.

ostracodes namely : *Krithe oryza* Neale and Singh, *Neocyprideis bhupendri* (Singh and Misra), *Neonesidea khoslai* Bhandari, and *N. shillongensis* n.sp.

Zone III: *Alocopocythere garoensis* - *Hermanites basanti* Assemblage Zone (500 to 525 metres): This zone is 25 metres thick and comprises chiefly calcareous sandstone, shale and thin limestone bands. *Alocopocythere garoensis* n.sp., and *Hermanites basanti* n.sp., are the most significant and restricted species in this zone and hence it has been named as such. The other commonly occurring and restricted ostracodes of this zone are : *Alocopocythere dattai* Bhandari, *A. indica* n.sp., *Bairdoppilata chaudharii* n.sp., *Bythoceratina* sp., *Hermanites* sp., *Hornibrookella* sp., *Occultocythereis turaensis* n.sp.

Zone IV: Poorly fossiliferous/Barren Zone (400-500 metres) : This zone is 100 metres thick. The lower 40 metres consist of shale with sandstone bands and yielded a few ostracodes and smaller benthic foraminifers, while the upper 60 metres consist essentially of sandstones and are devoid of any microfauna.

The ostracodes recorded from the lower 40 metres include : *Krithe oryza* Neale and Singh, *Neonesidea shillongensis* n.sp., *Occultocythereis raivermani* n.sp., *Propontocypris* (*Ekpontocypris*) *meghalayaensis* n.sp.

Zone V: *Alocopocythere meghalayaensis* - *Paijenborchella* (*Eopaijenborchella*) *swaraswatiae* Assemblage Zone (350 to 400 metres) : The zone is 50 metres thick and comprises essentially greenish grey shale with intercalations of sandstone bands. *Alocopocythere meghalayaensis* n.sp and *Paijenborchella* (*E.*) *swaraswatiae* Sarma are the most dominant and restricted ostracode of this zone and hence it is named as such. The other ostracodes confined to this zone include : *Cytherelloidea* sp.cf. *C. chewtonensis* (Has-

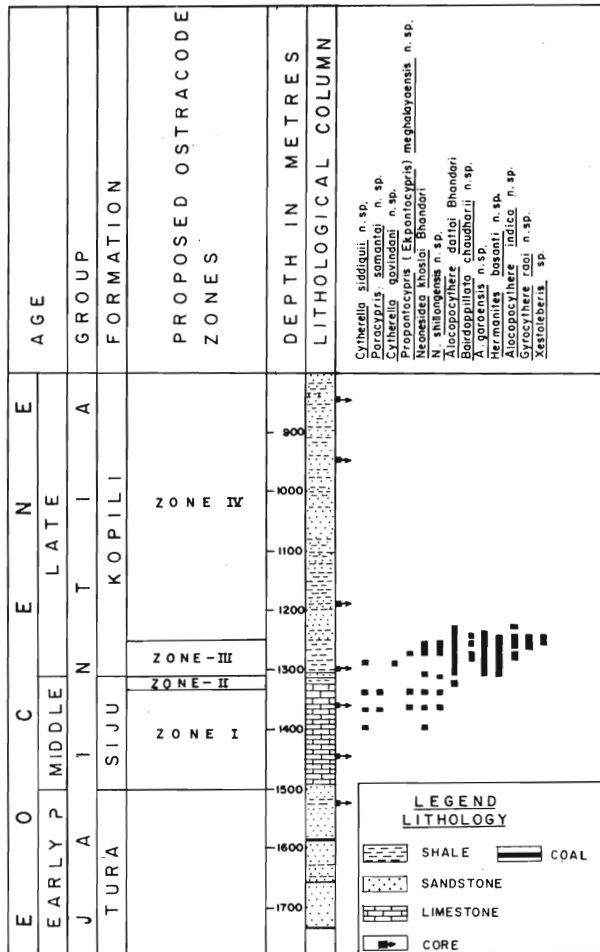


Fig. 3 Biostratigraphic zonation and distribution of Ostracodes in the Paleogene beds of Baghmara Well-B.

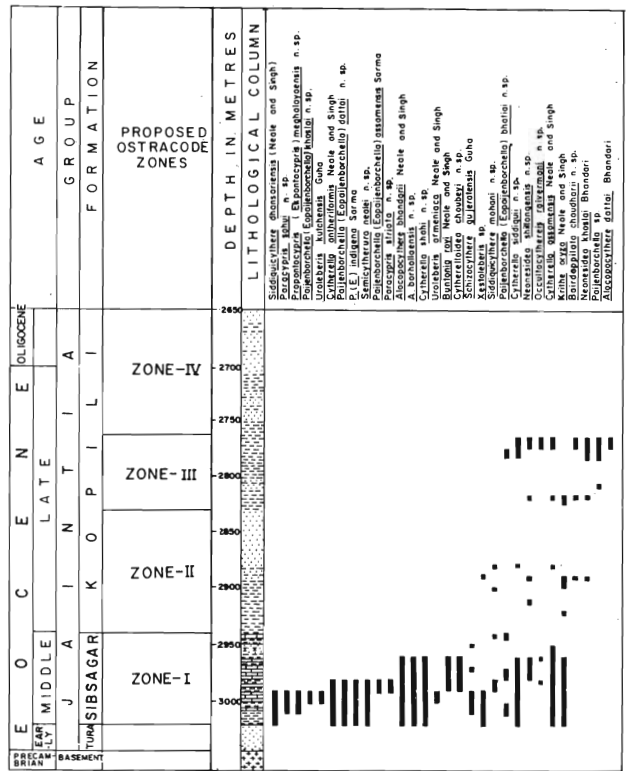


Fig. 4 Biostratigraphic zonation and distribution of Ostracodes in the Paleogene beds of Borholla Well-C.

kins), and *Gyrocythere* sp.

Like Gopinathkilla well-A, the Jaintia Group in Baghmara well-B is divisible into four zones. Zone 1 (1330 to 1500 m), Zone II (1310 to 1330 m), Zone III (1270 to 1310 m) and Zone IV (850 to 1270 m).

Similarly, the Jaintia Group in Borholla well-C, Upper Assam, is divisible into four zones. They are : Zone 1 (2940 to 3030 m), Zone II (2830 to 2940 m), Zone III (2760 to 2830 m) and Zone IV (2700 to 2710 m).

In Baghmara and Borholla area, the Zone V, which is present in Gopinathkilla-A, is probably absent. The biostratigraphic zonation and distribution of ostracodes in the Jaintia Group of Gopinathkilla well-A, Baghmara well-B and Borholla well-C, are given in Figs. 2, 3, and 4. Tentative biostratigraphic correlation of these three wells is given in Fig. 5.

SYSTEMATIC DESCRIPTION

The classification of ostracodes followed is that of Hartmann and Puri (1974) with slight modification. The descriptions are given for the new taxa. The taxa with emended generic diagnoses and those left under open nomenclature have been described. Routine descriptions have been omitted in already known and well established taxa for the sake of brevity. All the

illustrated specimens are deposited in the museum of Regional Geology Laboratory, Oil and Natural Gas Commission, Baroda and references to them are designated by BOS catalogue numbers in text and plate explanations.

- Subclass **Ostracoda** Latreille, 1806
- Order **Podocopida** Muller, 1894
- Suborder **Platycopa** Sars, 1866
- Family **Cytherellidae** Sars, 1866
- Genus **Cytherella** Jones, 1849

Cytherella antheriformis Neale and Singh
(Pl. I, figs. 1-2)

Cytherella antheriformis Neale and Singh, 1985, p. 362, pl.41, figs. 6-9.

Material : Twenty-eight complete carapaces from Gopinathkilla well-A. Twelve complete carapaces from Borholla well-C.

Dimensions (mm) :	Length	Height	Width
A complete carapace (BOS No.1)	0.46	0.29	0.27
A complete carapace (BOS No.2)	0.50	0.29	0.25

Remarks : The present specimens from Meghalaya

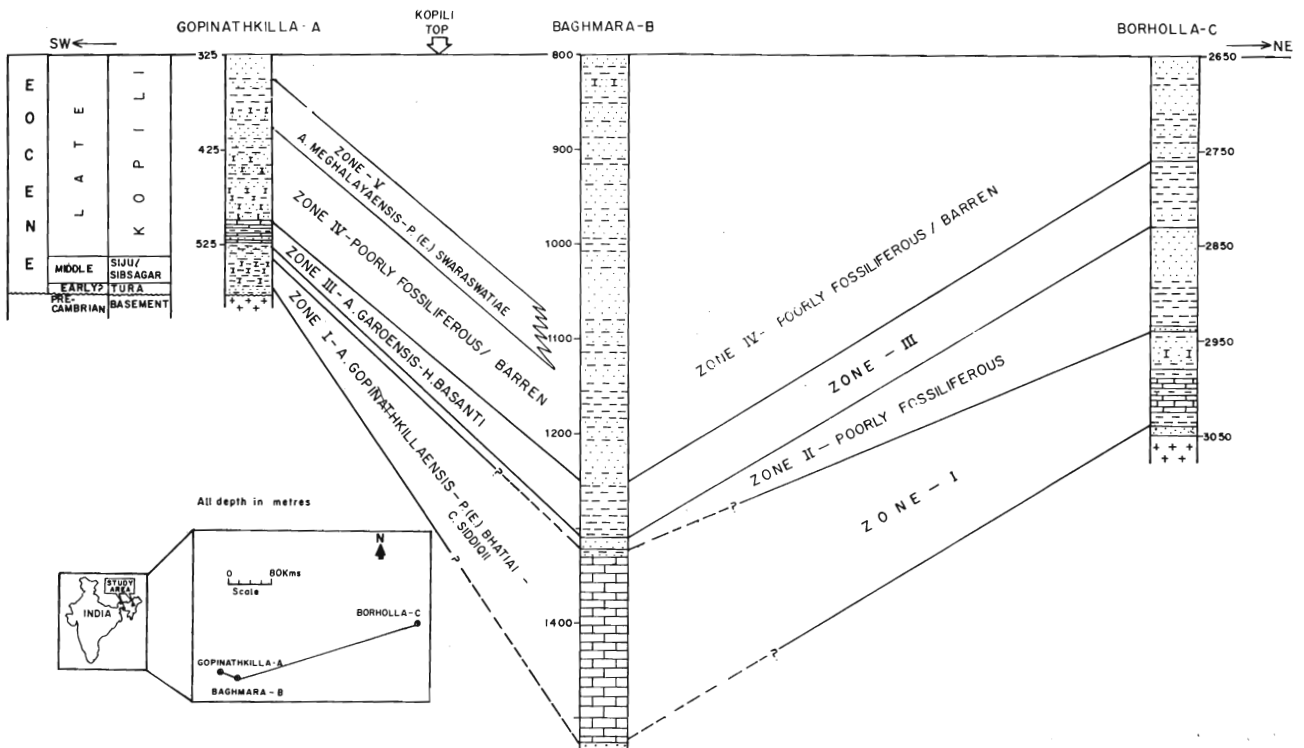


Fig. 5 A tentative correlation of Palaeogene of Gopinathkilla Well-A, Baghmara Well-B and Borholla Well-C.

and Assam are identical with *Cytherella antheriformis* described by Neale and Singh (1985) from the Middle Eocene of Mikir Hills, Assam (Dr. Pratap Singh, personal communication).

Cytherella assamensis Neale and Singh
(Pl. I, fig. 3)

Cytherella assamensis Neale and Singh, 1985, p. 359, pl. 40, figs 6-9.

Material : Forty complete carapaces from Gopinathkilla well-A. Fifty-seven complete carapaces from Bortholla well-C.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (BOS No.3)	0.54	0.37	0.29

Remarks : : The specimens recorded herein from Meghalaya and Assam are identical with *Cytherella assamensis* described by Neale and Singh (1985) from the Sylhet Formation, Middle Eocene, Assam (Dr. Pratap Singh, personal communication).

Cytherella barpatharensis Neale and Singh
(Pl. I, fig. 4)

Cytherella barpatharensis Neale and Singh, 1985, p. 360 pl. 40, figs. 10-12.

Material : Six complete carapaces from Gopinathkilla well-A.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (Bos No.4)	0.54	0.29	0.17

Remarks : The present specimens from Meghalaya are indential with *Cytherella barpatharensis* described by Neale and Singh (1985) from the Sylhet Formation, Middle Eocene, Assam, (Dr. Pratap Singh, personal communication).

Cytherella govindani n.sp.
(Pl. I, figs. 7-8)

Derivation of Name : The species is named in honour of Dr. A. Govindan, Chief Geologist, Oil and Natural Gas Commission, Madras.

Material : Eighteen complete carapaces and five open valves from Gopinathkilla well-A. One complete carapace from Baghmara well-B.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 500-505 metres below surface, grey, fossiliferous limestone, Kopili Formation, Late Eocene.

Description : Carapace subrectangular in lateral

outline, with height more or less equal in both halves; right valve larger than left valve, overlapping all along margin; dorsal and ventral margins nearly straight and parallel, showing slight concavity in middle; anterior margin broadly rounded; posterior margin sloping down in upper part and rounded in lower part; in dorsal view carapace cuneiform, with maximum width close to posterior end. Surface of each valve densely pitted near margin and sparsely so in median region; a faint depression in mid-dorsal region.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No.5) a complete carapace	0.54	0.33	0.25
Paratype (BOS No.6) a complete carapace	0.46	0.29	0.21

Discussion : *Cytherella govindani* n.sp. resembles *Cytherella tawaica* described by Singh and Tewari (in Tewari and Dingh, 1966) from the Eocene beds of Kalakot, Jammu, in lateral outline, but differs in having densely pitted surface and smaller size. The present species also resembles *Cytherella* sp. A, described here from the Kopili Formation in lateral outline, but differs in surface ornamentation and length/height ratio.

Cytherella shahi n.sp.
(Pl. I, figs. 5-6)

Derivation of Name : The species is named in honour of Mr. D.C. Shah, Geologist, Mineral Exploration Corporation, Khetri, Rajasthan.

Material : Forty-two complete carapaces from Gopinathkilla well-A. Thirty-five complete carapaces from Borholla well-C.

Type locality and horizon : Borholla well-C, Sibsagar, Assam, India. Sample 2990-2995 metres below surface, light grey limestone, Sibsagar Formation, Middle Eocene.

Description : Carapace subovate in lateral outline, with greatest height at middle; right valve larger than left valve, distinctly overlapping along ventral, anterior and anterodorsal margins and inconspicuously along other margins; dorsal margin gently sloping down towards anterior end and comparatively steeply sloping towards posterior end; ventral margin nearly straight, anterior margin broadly rounded; posterior margin less so; in dorsal view carapace roughly biconvex, with maximum width posterior to middle. Surface of each valve

smooth; a faint shallow depression in mid-dorsal region; a faint rim along anterior margin.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No.7) a complete carapace	0.68	0.43	0.31
Paratype (BOS No.8) a complete carapace	0.68	0.46	0.34

Discussion : *Cytherella shahi* n.sp. differs from *Cytherella siddiquii* n.sp. in both lateral as well as in dorsal views. Posterior margin in the present species is narrower, while in the latter species is broader. *Cytherella deoponica* described by Neale and Singh (1985) from the Sylhet Formation of Deopani Traverse, Assam, differs from the present species in having a distinct dorsal angle, a narrow anterior margin and a broad posterior margin.

Cytherella hastata Neale and Singh
(Pl. II, figs. 1-2)

Cytherella hastata Neale and Singh, 1985, pp.360-362, pl.41, figs. 1-5.

Material : Fifty-five complete carapaces from the Gopinathkillla well-A.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (BOS No.9)	0.46	0.25	0.21
A complete carapace (BOS No. 10)	0.46	0.27	0.21

Remarks : The present specimens from Meghalaya are identical with *Cytherella hastata* described by Neale and Singh (1985) from Sylhet Formation, Middle Eocene, Assam (Dr. Pratap Singh personal communication).

Cytherella siddiquii n.sp.
(Pl. II, figs. 3-4)

Derivation of Name : The species is named in honour of Dr. Q.A. Siddiqui, Department of Geology, Saint Mary's University, Halifax, Nova Scotia, Canada.

Material : Fifty-two complete carapaces and 6 open valves from Gopinathkillla well-A. thirty-three complete carapaces from Borholla well-C. Two complete carapaces from Baghmara well-B.

Type locality and horizon : Gopinathkillla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 560-565 metres below surface, grey calcareous sandstone with shale, Siju Formation, Middle Eocene.

Description : Carapace ovate in lateral outline, with greatest height about two-third of length slightly posterior to middle; right valve considerably larger than left valve and except for the anterior overlaps all along margin; dorsal margin asymmetrically convex, sloping towards anterior and posterior ends and gradually merging with them; ventral margin slightly convex in right valve and straight in left valve; anterior margin evenly rounded; posterior margin high, gently sloping in upper part and rounded in lower part; in dorsal view carapace wedge-shaped, narrow anteriorly and inflated posteriorly. Surface of each valve smooth; a broad shallow depression in mid-dorsal region; a faint rim along anterior margin. Interior of right valve with a distinct contact groove all along periphery.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 11) a complete carapace	0.65	0.46	0.34
Paratype (BOS No. 12) a complete carapace	0.68	0.43	0.34

Discussion : *Cytherella siddiquii* n.sp. resembles *Cytherella protuberans* described by Lyubimova and Guha (in Lyubimova, Guha and Mohan, 1960) from the Tertiary beds of Kachchh in general appearance, but differs in lateral outline and length/height ratio. *C. protuberans*, unlike the present species, is more elongated and has pitted anterior and posterior regions, greatest height at about one-fourth of length from posterior end and dorsal margin gradually sloping down towards anterior end.

Cytherella sp.
(Pl. II, figs. 5-6)

Material : Eight complete carapaces from Gopinathkillla well-A.

Description : Carapace elongate, subrectangular in lateral outline, with height almost equal in anterior and posterior halves; right valve larger than left valve, overlapping distinctly along ventral margin; dorsal margin nearly straight, sloping posterodorsally; ventral margin slightly concave in middle; anterior and posterior margins evenly rounded; in dorsal view carapace cuneiform, with maximum width close to posterior end. Surface of each valve smooth.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (Bos No. 13)	0.56	0.28	0.22

A complete carapace 0.56 0.29 0.22
(Bos No. 14)

Remarks : *Cytherella* sp. resemble *Cytherella Tawaica* Singh and Tewari, 1966, in lateral outline, but differs in being more elongate, having nearly straight dorsal margin, and lack of surface pits. The length/height ratio of *C. tawaica* is 1.6 as compared to 2.0 of the present species. The species is left under open nomenclature for want of better preserved specimens.

Genus Cytherelloidea Alexander, 1929

Cytherelloidea alfuraihi n. sp.
(Pl. II, figs. 7-8)

Derivation of Name : The species is named in honour of Dr. Ali A.F. Al-Furaih, Department of Geology, King Saud University, Riyadh, Saudi Arabia.

Material : Fifteen complete carapaces and 1 open valve from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 560-565 metres below surface, grey calcareous sandstone with shale, Siju Formation, Middle Eocene.

Description : Carapace subrectangular in lateral outline; right valve larger than left valve, overlapping distinctly along dorsal, anterior and ventral margins; anterior and posterior end nearly of same height; dorsal and ventral margins nearly straight; anterior margin evenly rounded; posterior margin sloping in upper part and rounded in lower part; in dorsal view carapace wedge-shaped, with maximum width near posterior end and tapering anteriorly. Valve surface with a distinct crescent-shaped ridge along posterior end; a less developed ridge along anterior end; sparsely disposed pits; and a broad shallow depression in mid-dorsal region.

Dimensions (mm) : Length Height Width
Holotype (BOS No. 15) 0.56 0.28 0.22
a complete carapace

Discussion : The present species resembles *Cytherelloidea chaasraensis* described by Guha (1961) from the Lower Miocene beds of Chaasra, Kachchh in ornamentation, but differs in lateral outline and length/height ratio. *C. chaasraensis* is a more elongated form with concave dorsal and ventral margins.

Cytherelloidea sp. cf. *C. chewtonensis* Haskins

(Pl. III, fig. 5)

cf. *Cytherelloidea chewtonensis* Haskins, 1968, pp. 254-255, pl. Z, figs. 11-16.

Material : Single left valve from Gopinathkilla well-A.

Description : Valve subrectangular in lateral outline; dorsal and ventral margins nearly straight and parallel; anterior margin evenly rounded; posterior margin sloping in upper part and rounded in lower part. Valve surface ornamented by three longitudinal ridges, of which dorsal and ventral ridges nearly straight, median ridge downwardly convex; a vertical ridge joining median and ventral ridges near posterior end; an arcuate ridge along anterior margin meeting ventral ridge in anteroventral region; rest of area smooth.

Dimensions (mm) : Length Height
A left valve 0.43 0.25
(BOS No. 16)

Remarks : Except for having slightly longer ventral longitudinal ridge joining anterior arcuate ridge, present specimen from Gopinathkilla well-A, is similar to *Cytherelloidea chewtonensis* described by Haskins (1968) from the Late Eocene beds of England.

Cytherelloidea choubeyi n.sp.
(Pl. III, figs. 1-2)

Derivation of Name : The species is named in honour of Mr. M.S. Choubey, Senior Geologist, Oil and Natural Gas Commission, Madras.

Material : Sixteen complete carapaces and 2 open valves from Gopinathkilla well-A. Five complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 540-545 metres below surface, light grey calcareous sandstone, Siju Formation, Middle Eocene.

Description : Sexual dimorphism observed, males being elongate and less wide than females; carapace subrectangular in lateral outline, with greatest height anteriorly; right valve larger than left valve, overlapping all along margin; dorsal margin nearly straight; ventral margin with slight concavity in middle; anterior margin broadly rounded; posterior margin less so; in dorsal view carapace wedge-shaped with maximum width posteriorly. Surface of each valve ornamented by a costa forming single continuous band all along margin, intercostal

area smooth to punctate. The outer border of left valve fits into a shallow groove of right valve around entire margin.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 17) a male complete carapace	0.43	0.25	0.12
Paratype (BOS No. 18) a female complete carapace	0.37	0.25	0.19

Discussion : *Cytherelloidea Choubeyi* n.sp. resembles *Cytherelloidea mitra* described by Sohn (1970) from the Upper Clay (Late Eocene) of Pakistan in lateral outline, but differs in length/height and length/width ratios. Moreover, *C. Mitra* has scattered spinelets, which are absent in the present species. The form described as *Cytherelloidea* sp. by Neale and Singh (1985, pl. 42, fig. 3) from the Sylhet Formation, Deopani Traverse, Assam possibly belongs to this species.

Cytherelloidea sinhai n.sp.
(Pl. III, figs. 3-4)

Derivation of Name : The species is named in honour of Mr. R. N. Sinha, Senior Staff Geologist, National Oil Company, Tripoli, Libya.

Material : Eighteen complete carapaces and 5 open valves from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 560-565 metres below surface, grey calcareous sandstone with shale, Siju Formation, Middle Eocene.

Description : Carapace subrectangular in lateral outline, with height equal in both halves; right valve larger than left valve, overlapping along entire margin, but more distinctly along dorsal and ventral margins; dorsal margin nearly straight, ventral margin slightly concave in middle; anterior margin evenly rounded; posterior margin somewhat truncated; in dorsal view carapace wedge-shaped, widest towards posterior end and gradually tapering towards anterior end. Surface of each valve ornamented by a thick costa all along margin, following the shape of carapace; in posterodorsal and posteroventral regions, costa considerably thickened and forming two protuberances; intercostal region smooth.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 19) a complete carapace	0.49	0.28	0.25

Paratype (BOS No. 20) 0.46 0.28 0.25
a complete carapace

Discussion : *Cytherelloidea sinhai* n.sp. resembles *Cytherelloidea costatruncata* described by Lyubimova and Mohan (in Lyubimova, Guha and Mohan 1960) from the Lower Miocene beds of Chaasra, Kachchh, in overall outline and ridge pattern. The present species, however, unlike *C. costatruncata*, lacks surface reticulation in intercostal region and is smaller in size.

Cytherelloidea sp.
(Pl. III, figs. 6)

Material : Single complete carapace from Gopinathkilla well-A.

Description : Carapace elongate, subquadrate in lateral outline, with greatest height at 1/4th of length from anterior end; right valve slightly larger than left valve, overlapping distinctly along ventral margin; dorsal margin nearly straight, sloping down posteriorly; ventral margin sinuate; anterior margin broadly rounded; posterior margin obliquely truncated; in dorsal view carapace cuneiform, with maximum width at posterior end. Valve surface ornamented by two longitudinal ridges; a short inclined posterior ridge joining two longitudinal ridges; a thick anterior marginal ridge.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No.21)	0.53	0.28	0.16

Remarks : The species differs from *Cytherelloidea* sp.cf.*C. chewtonensis* Haskins, 1968, in details of surface ornamentation.

Suborder **Podocopa** Sars, 1866

Superfamily **Bairdiacea** Sars, 1866

Family **Bairdiidae** Sars, 1888

Genus **Bairdoppilata** Coryell, Sample
and Jennings, 1935

Bairdoppilata chaudharii n.sp.
(Pl. III, figs. 7-8)

Derivation of Name : The species is named in honour of Professor M.W. Chaudhari, formerly of the Department of Geology, Mohan Lal Sukhadia University, Udaipur.

Material : Fifteen complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Borholla well-C. Three complete carapaces from Baghmara well-B.

Type locality and horizon : Gopinathkilla well-A Mahendraganj, Garo Hills, Meghalaya, India. Sample 515-520 metres below surface, greenish-grey silty shale, Kopili Formation, Late Eocene.

Description : Carapace subdeltoid in lateral outline, with greatest height near middle; left valve larger than right valve, overlapping distinctly along dorsal and ventral margins; dorsal margin arched; ventral margin convex in left valve and concave in right valve; anterior margin broadly rounded downwardly; posterior margin narrowly rounded; posterodorsal margin concave; anterodorsal and posterodorsal angles below mid-height; in dorsal view carapace biconvex with maximum width near middle; valve surface smooth.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 22) a complete carapace	0.81	0.52	0.42
Paratype (BOS No. 23) a complete carapace	0.90	0.58	0.45

Discussion : *Bairdoppilata rajnathi* described by Tewari and Tandon (1960) from the Lower Miocene beds of Kachchh resembles the present species in lateral outline, but differs in being more drawn out posteriorly and in length/height ratio.

Genus Neonesidea Maddocks, 1969

Neonesidea khoslai Bhandari
(Pl. IV, figs. 3-4)

Neonesidea khoslai Bhandari, 1981, p. 41, pl. 1, figs. 7-8

Material : Eighteen complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Baghmara well-B. Ten complete carapaces from Borholla well-C.

<i>Dimensions (mm):</i>	Length	Height	Width
A complete carapace (BOS No. 24)	0.99	0.65	0.50
A complete carapace (BOS No. 25)	0.98	0.62	0.48

Remarks : The species has previously been described by the author from the Late Eocene beds of Baghmara well-B, Garo Hills, Meghalaya.

Neonesidea shillongensis n. sp.
(Pl. IV, figs. 5-6)

Derivation of Name : After Shillong Plateau, Meghalaya, India.

Material : Seventy-nine complete carapaces from Gopinathkilla well-A. Eighteen complete carapaces from Baghmara well-B. Twenty complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 555-560 metres below surface, dark grey calcareous shale with calcareous sandstone, Siju Formation, Middle Eocene.

Description : Carapace elongate, subtrapezoidal in lateral outline, with greatest height slightly anterior to middle; left valve larger than right valve, overlapping distinctly along dorsal and anterior margins and inconspicuously along ventral margin; dorsal margin arched, angulated, sloping towards ends from greatest height; ventral margin straight; anterior margin broadly rounded; posterior margin narrowly rounded; anterodorsal angle above mid-height; posterodorsal angle below mid-height; in dorsal view carapace biconvex, with maximum width anterior to middle. Valve surface smooth.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 26) a complete carapace	0.74	0.40	0.34
Paratype (BOS No. 27) a complete carapace	0.77	0.43	0.37

Discussion : *Neonesidea shillongensis* n. sp. resembles *Neonesidea khoslai* Bhandari, 1981 described from the Kopili Formation, in lateral outline, but differs in being more elongate, having gently arched dorsal margin and straight ventral margin. The length/height ratio of *N. khoslai* is 1.6 and of *N. shillongensis* is 1.85.

Superfamily Cytheracea Baird, 1850

Family Cytheridae Baird, 1850

Subfamily Cytherinae Baird, 1850

Tribe Schizocytherini Mandelstam, 1960

Genus Schizocythere Triebel, 1950

Schizocythere gujeratensis Guha
(Pl. IV, figs. 1-2)

Schizocythere gujeratensis Guha, 1968, p. 84 pl. 1, figs. 11-14, 16 and 20. Siddiqui, 1981, p. 235, pl. 18.2, figs. 5-12.

Material : Twenty-three complete carapaces, 1 open valve from Gopinathkilla well-A. Ten complete carapaces from Borholla well-C.

<i>Dimensions (mm)</i> :	Length	Height	Width
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A complete female carapace 0.37 2.25 0.21
(BOS No. 28)

A complete male carapace 0.37 0.21 0.19
(BOS No. 29)

Remarks : The specimens recorded from Assam and Meghalaya are identical with *Schizocythere gujeratensis* described by Guha (1968) and Siddiqui (1981) from the Middle Eocene beds of Kachchh and Pakistan.

Tribe **Paijenborchellini** Deroo, 1960

Genus **Paijenborchella** Kingma, 1948

Paijenborchella? engima Neale and Singh
(Pl. VI, fig. 8)

Paijenborchella? engima Neale and Singh, 1985, p. 368, pl. 43, fig. 5

Material : Eight complete carapaces from Gopinathkilla well-A.

Dimensions (mm) : Length Height Width
A complete carapace 0.38 0.19 0.19
(BOS No. 30)

Remarks : The present specimens are identical with *Paijenborchella? engima* described by Neale and Singh (1985) from Middle Eocene of Assam (Dr. Pratap Singh, personal communication).

Paijenborchella pandeyi n. sp.
(Pl. IV, figs. 7-8)

Derivation of Name : The species is named in honour of Dr. J. Pandey, Deputy General Manager, Keshava Deva Malaviya Institute of Petroleum Exploration, Dehra Dun, India.

Material : Twenty-six complete carapaces from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 555-560 metres below surface, dark grey calcareous shale with calcareous sandstone, Siju Formation, Middle Eocene.

Description : Carapace elongate, pear-shaped in lateral outline, with greatest height at anterior cardinal angle; left valve slightly overlaps right valve; dorsal margin nearly straight sloping down backwardly; ventral margin obscured by overhanging surface ridge; anterior margin obliquely rounded; posterior margin drawn out into a long caudal process subventrally; posterodorsal margin concave; posteroventral margin straight; in dorsal

view carapace biconvex, with maximum width near middle, ends compressed.

Surface of each valve marked by a vertical sulcus, extending from anterodorsal region to ventromedian region and three longitudinal ridges, one median and two ventral; median ridge (short) traverses sulcus; upper ventral ridge (alate), runs from anteroventral margin to ventromedian region; lower ventral ridge weakly developed, just above margin; rest of area smooth.

Dimensions (mm) : Length Height Width
Holotype (BOS No. 31) 0.52 0.22 0.22
a complete carapace

Discussion : *Paijenborchella pandeyi* n. sp. resembles *Paijenborchella reversa* described by Sohn (1970) from the Upper Chocolate Clay (Late Eocene), Pakistan, in overall outline and surface ornamentation, but differs in having normal overlap and vertical sulcus situated at anterior 1/4th of length. In *P. reversa* right valve is larger than left valve and vertical sulcus is situated at anterior 1/3rd of length.

Subgenus **Eopaijenborchella** Keij, 1966

Paijenborchella (Eopaijenborchella) assamiensis Sarma
(Pl. V, figs. 1-2)

Paijenborchella assamiensis Sarma 1973, pp. 129-133, pl. 1, figs. 3-4.

Material : Eight complete carapaces from Borholla well-C, Assam, Sibsagar Formation Middle Eocene.

Dimensions (mm) : Length Height Width
A complete carapace 0.45 0.20 0.20
(BOS No. 32)

Remarks : The specimens recorded herein are identical with *Paijenborchella assamiensis* described by Sarma (1973) from the Middle Eocene beds of Garo Hills, Meghalaya.

Paijenborchella (Eopaijenborchella) bhandarii n. sp.
(Pl. V, figs. 3-4; Pl. XIV, fig. 8)

Derivation of Name : The species is named in honour of Mr. L.L. Bhandari, Member (Drilling), Oil and Natural Gas Commission, Dehra Dun, India.

Material : Sixty complete carapaces, 5 open valves from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 555-560 metres below surface, dark grey calcareous

shale with medium to fine grained calcareous sandstone, Siju Formation, Middle Eocene.

Description : Carapace elongate, subovate in lateral outline, with greatest height anterior to middle; left valve slightly larger than right valve, overlapping along dorsal and ventral margins; anterior margin obliquely rounded; posterior margin drawn out into a short caudal process below mid-height; dorsal and ventral margins convex, converging backwardly, in dorsal view carapace biconvex, anterior end compressed. Valve surface distinctly reticulate, reticules being coarse in anterior and median regions and fine elsewhere, and with a vertical sulcus and three longitudinal ridges; median ridge long extending from anteromedian region, traversing sulcus to posteromedian region; upper ventral ridge alate; lower ventral ridge less developed.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 33) a complete carapace	0.46	0.22	0.22
Paratype I (BOS No. 34) a complete carapace	0.45	0.22	0.20
Paratype II (BOS No. 35) a right valve	0.43	0.22	-

Discussion : *Paijenborchella (Eopaijenborchella) bhandarii* n. sp. resembles *Paijenborchella longicosta* described by Keij (1957) from the Eocene beds of Belgium in general appearance and ornamentation, but differs in their details. Unlike the present species, *P. longicosta* has well developed posterior cardinal angle, denticulate posteroventral margin, a well developed ventral ridge which overhangs the margin.

Paijenborchella (Eopaijenborchella) bhatiai n. sp.
(Pl. V, figs. 5-8)

Derivation of Name : The species is named in honour of Professor S.B. Bhatia, Centre of Advance Studies in Geology, Panjab University, Chandigarh, India.

Material : Thirty-seven complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 555-560 metres below surface, dark grey calcareous shale with medium to fine grained calcareous sandstone, Siju Formation, Middle Eocene.

Description : Sexual dimorphism distinct, males being more elongate and less high and wide than females: carapace subtriangular in lateral outline, with greatest height anterior to middle; left valve overlapping right valve along dorsal and ventral margins; dorsal margin gently convex in males and strongly arched in females; ventral margin slightly convex due to overhanging ventral ridge, otherwise straight; anterior margin obliquely rounded; posterior margin drawn out in an acute subventral caudal process; posterodorsal margin concave; in dorsal view carapace biconvex, compressed posteriorly. Valve surface finely reticulate and with a deep vertical sulcus and three longitudinal ridges; median ridge long, extending from anteromedian region, traversing sulcus to posteromedian region; upper ventral ridge well developed, convex downwardly in middle, running from anteroventral region to posteroventral region; lower ventral ridge faint.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 36) a male complete carapace	0.39	0.19	0.19
Paratype I (BOS No. 37) a male complete carapace	0.40	0.19	0.19
Paratype II (BOS No. 38) a female complete carapace	0.32	0.19	0.20
Paratype III (BOS No. 39) a female complete carapace	0.31	0.19	0.19

Discussion : The present species has been described earlier as *Paijenborchella (Eopaijenborchella) assamensis* by Neale and Singh (1985) from the Sylhet Formation, Deopani Traverse, Assam. However, as the name is preoccupied by *Paijenborchella assamiensis* Sarma, 1973, a new name is proposed here to accommodate this species. *Paijenborchella (Eopaijenborchella) bhatiai* n. sp. also resembles *Paijenborchella (Eopaijenborchella) bhandarii* n. sp. in lateral outline and ornamentation pattern, but differs in having subventral caudal process, well developed ventral ridge and fine reticulation.

Paijenborchella (Eopaijenborchella) dattai n.sp.
(Pl. VI, figs. 1-2)

Derivation of Name : The species is named in honour of Dr. A.K. Datta, General Manager, Oil and Natural Gas Commission, Dehra Dun, India.

Material : Fifteen complete carapaces from Borholla well-C, Assam.

Type locality and horizon : Borholla well-C, Sibsagar district, Assam, India. Sample 3030-3025 metres below surface, grey fossiliferous limestone, Sibsagar Formation, Middle Eocene.

Description : Carapace subtriangular in lateral outline with greatest height at anterior cardinal angle; left valve larger than right valve, overlapping distinctly along dorsal and posterodorsal margins; dorsal margin nearly straight, gently sloping down backwardly, posterior cardinal angle distinct; ventral margin slightly convex; anterior margin broadly rounded; posterior margin drawn out in a subventral caudal process; in dorsal view carapace biconvex, with maximum width slightly anterior to middle. Surface of each valve marked by a vertical sulcus; a short median ridge traversing sulcus; a faint ventral ridge; rest of area sparsely pitted.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 40) a complete carapace	0.51	0.26	0.26

Discussion : The species resembles *Paijenborchella (Eopaijenborchella) bhatiai* n. sp. in lateral outline, but differs in ridge pattern. *P. (E.) bhatiai* unlike the present species, has a long median ridge and a well developed upper ventral ridge which is convex downwardly in the middle.

Paijenborchella (Eopaijenborchella) indigena Sarma
(Pl. VI, figs. 3-4)

Paijenborchella indigena Sarma, 1973, pp. 131-132, pl. 1, figs. 1-2.

Material : Fifteen complete carapaces from Gopinathkilla well-A. Ten complete carapace from Borholla well-C.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (BOS No. 41)	0.45	0.19	0.19
A complete carapace (BOS No. 42)	0.42	0.19	0.19

Remarks : The specimens recorded herein are identical with *Paijenborchella indigena* described by Sarma (1973) from the Middle Eocene beds of Garo Hills, Meghalaya.

Paijenborchella (Eopaijenborchella) khoslai n. sp.
(Pl. VI, figs. 5-6; Pl. XIV, fig. 7)

Derivation of Name : The species is named in honour of Dr. S.C. Khosla, Department of Geology, Mohal Lal Sukhadia University, Udaipur, India.

Material : Twenty-one complete carapaces and 2 open valves from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 545-550 metres below surface, calcareous sandstone, Siju Formation, Middle Eocene.

Description : Carapace subtriangular in lateral outline with greatest height anterior to middle; left valve larger than right valve, overlapping distinctly along dorsal and posteroventral margins; dorsal margin straight sloping posteriorly; ventral outline convex due to overhanging ventral ridge; anterior margin obliquely rounded; posterior margin produced in a short, blunt caudal process subventrally; posterodorsal margin slightly concave, posteroventral margin convex and finely denticulate; posterior cardinal angle well marked; in dorsal view carapace inflated, roughly arrow-shaped, with maximum width slightly posterior to middle. Valve surface marked by a vertical sulcus, extending from mid-dorsal region to ventromedian region and three longitudinal ridges, one median and two ventral; median ridge short, traversing sulcus; upper ventral ridge strongly alate; lower ventral ridge weakly developed; intercostal area sparsely reticulate.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 43) a complete carapace	0.45	0.26	0.26
Paratype I (BOS No. 44) a complete carapace	0.45	0.22	0.26
Paratype III (BOS No. 45) a left valve	0.39	0.19	-

Discussion : The present species resembles *Paijenborchella (Eopaijenborchella) assamiensis* described by Sarma (1973) from the Middle Eocene beds of Garo Hills, Meghalaya, in overall outline, but differs in having a short blunt caudal process, a strongly alate ventral ridge and in being more inflated in dorsal outline. *Paijenborchella (Eopaijenborchella) assamiensis* on the other hand has acutely pointed subventral caudal process and elliptical dorsal outline.

Paijenborchella (Eopaijenborchella) swaraswatiae Sarma
(Pl. VI, fig. 7)

Paijenborchella swaraswatiae Sarma, 1973, pp. 132-133, pl. 1, figs. 5-8.

Material : Eight complete carapaces from Gopinathkilla well-A.

<i>Dimensions (mm)</i> :	Length	Height	Width
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A complete carapace 0.53 0.25 0.22
(BOS No. 46)

Remarks : The present specimens are identical with *Paijenborchella swaraswatiae* described by Sarma (1973) from the Kopili Formation of Garo Hills.

Family **Cytherideidae** Sars, 1925

Subfamily **Cytherideinae** Sars, 1925

Genus **Neocyprideis** Apostolescu, 1956

Neocyprideis bhupendri (Singh and Misra)
(Pl. VII, fig. 1)

Shulredia bhupendri Singh and Misra, 1968, p. 32, pl. 8, figs. 7-9.

Neocyprideis bhupendri (Singh and Misra). Khosla, 1972, p. 486, pl. 1, fig. 15, pl. 4, fig. 2.

Material : Thirty five complete carapaces and two open valves from Gopinathkilla well-A.

Dimensions (mm) : Length Height Width
A complete carapace 0.64 0.39 0.32
(BOS No. 47)

Remarks : The present specimens from Methalaya are identical with *Neocyprideis bhupendri* (Singh and Misra, 1968) described from the Lower Eocene beds of Rajasthan.

Family **Krithidae** Mandelstam, 1960

Genus **Kritha** Brady, Crosskey and Robertson, 1874,

Kritha oryza Neale and Singh
(Pl. VII, fig. 2)

Kritha oryza Neale and Singh, 1985, p. 370, pl. 43, figs. 10, 12, pl. 46, fig. 13.

Material : Fifty-eight complete carapaces from Gopinathkilla well-A. Twenty-eight complete carapaces from Borholla well-C.

Dimensions (mm) : Length Height Width
A complete carapace 0.62 0.31 0.31
(BOS No. 48)

Remarks : The specimens recorded herein are identical with *Kritha oryza* described by Neale and Singh (1985) from the Sylhet Formation, Mikir Hill, Assam.

Family **Trachyleberididae** Sylvester-Bradley, 1948

Genus **Occultocythereis** Howe, 1951

Occultocythereis raivermani n. sp.
(Pl. VII, figs. 5-6)

Derivation of Name : The species is named in honour of Mr. V. Raiverman, General Manager, Keshava Deva Malaviya Institute of Petroleum Exploration, Oil and Natural Gas Commission, Dehra Dun, India.

Material : Eighteen complete carapaces and 2 open valves from Gopinathkilla well-A. Eight complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 550-555 metres below surface, calcareous shale, Siju Formation, Middle Eocene.

Description : Carapace subrectangular in lateral outline, with greatest height at anterior cardinal angle; left valve slightly larger than right valve; dorsal and ventral margins nearly straight, slightly converging posteriorly; anterior margin broadly rounded; posterior margin narrow, subangular, posterodorsal slope slightly concave, posteroventral margin rounded and fringed with 7-8 denticles; in dorsal view carapace compressed. Eye tubercle present. Valve surface marked by anteromedian swelling, three longitudinal ridges, dorsal, median and ventral; dorsal ridge extends from mid-dorsal region to posterodorsal region where it turns downward at right angle; median ridge runs from anteromedian swelling, sloping upward posteriorly and joins dorsal ridge; ventral ridge short lobe like in ventromedian region; a distinct marginal rim bearing tubercles, along anterior, ventral and posterior margins; faint reticulations over rest of area.

Dimensions (mm) : Length Height Width
Holotype (BOS No. 49) 0.42 0.19 0.20
a complete carapace
Paratype (BOS No. 50) 0.42 0.22 0.22
a complete carapace

Discussion : *Occultocythereis raivermani* n. sp. resembles *Occultocythereis peristicta* described by Siddiqui (1971) from the Early Eocene beds of Pakistan in overall shape and ornamentation. *O. peristicta*, however, differs from the present species in being more elongated and lack of dorsal ridge.

Occultocythereis turaensis n. sp.
(Pl. VIII, figs. 3-4)

Derivation of Name : After the Tura range, Garo Hills, Meghalaya, India.

Material : Nine complete carapaces from

Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 520-525 metres below surface, ferruginous silty shale, Kopili Formation, Late Eocene.

Description : Carapace elongate, subrectangular in lateral outline, with greatest height at anterior cardinal angle; left valve slightly overlaps right valve along posterodorsal margin; dorsal margin nearly straight; ventral margin slightly concave anteriorly, otherwise straight, anterior end high, broad and evenly rounded, fringed with 13-14 denticles; posterior end relatively low, angulated, posterodorsal margin concave and posteroventral convex; in dorsal view carapace compressed, with maximum width posterior to middle. Eye tubercle and subcentral tubercle present. Valve surface ornamented by a short dorsal ridge with a distinct tubercle at posterodorsal region; a less prominent ventral longitudinal ridge, slightly sloping upward posteriorly; a high rim along anterior margin; a broad rim along posteroventral margin, bearing 4-5 tubercles; rest of area indistinctly reticulate.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 51) a complete carapace	0.64	0.32	0.20
Paratype (BOS No. 52) a complete carapace	0.59	0.26	0.20

Discussion : *Occultocythereis turaensis* n. sp. resembles *Occultocythereis indistincta* described by Siddiqui (1971) from the Middle Eocene beds of Pakistan in overall ornamentation, but differs in lateral outline. The posterior margin in the present species is more angulate and drawn out as compared to *O. indistincta*.

Subfamily **Trachyleberidinae** Sylvester-Bradley, 1948

Tribe **Costaini** Hartmann and Puri, 1974

Genus **Gyrocythere** Siddiqui, 1971

Gyrocythere raoi n. sp.
(Pl. VIII, figs. 7-8)

Derivation of Name : The species is named in honour of Mr. K.L.N. Rao, General Manager (Exploration), Oil and Natural Gas Commission, Baroda, India.

Material : Ten complete carapaces from Gopinathkilla well-A. Six complete carapaces from

Baghmara well-B.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 500-505 metres below surface, grey fossiliferous limestone, Kopili Formation, Late Eocene.

Description : Carapace subrectangular in lateral outline, with greatest height at anterior cardinal angle; left valve larger than right valve, overlapping along anterior and posterior margins; dorsal margin almost straight, but appears slightly convex due to overhanging of ridge; ventral margin concave anteroventrally; anterior margin broadly rounded; posterior margin angulate and fringed with six spines; anterior and posterior cardinal angles well marked particularly in left valve; in dorsal view carapace sagittate. Subcentral tubercle raised; eye tubercle present. Valve surface ornamented by deep trefoil type reticulation arranged concentrically; three longitudinal ridges and a narrow rim along anterior, ventral and posterior margins; dorsal ridge well developed, convex upwards overhanging margin; median ridge short, posterior to subcentral tubercle; ventral ridge prominent, extends from anteroventral region, sloping upward posteriorly.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 53) a complete carapace	0.72	0.36	0.39
Paratype (BOS No. 54) a complete carapace	0.74	0.38	0.39

Discussion : *Gyrocythere raoi* n. sp. resembles *Gyrocythere mitigata* described by Siddiqui (1971) from the Middle Eocene beds of Pakistan, the latter species, however, differs in having weakly developed median longitudinal ridge. *Gyrocythere* sp. A differs from the present species in having more arcuate median ridge and smooth area behind anterior marginal rim.

Gyrocythere sp. A.
(Pl. VIII, fig. 1; Pl. XIV, fig. 2)

Material : Single right valve from Gopinathkilla well-A.

Description : Valve subrectangular in lateral outline, with greatest height at anterior cardinal angle; dorsal margin obscured by overhanging ridge otherwise straight; ventral margin concave anteriorly and convex posteriorly; anterior margin broadly rounded, fringed with six spines; posterior margin narrowly rounded. Subcentral tubercle prominent,

stands out in lateral view; eye tubercle weakly developed. Valve surface ornamented with concentrically arranged reticulation, three longitudinal ridges and a low narrow rim along anterior, ventral and posterior margins; dorsal ridge commences a little below eye tubercle, making an arc, overhangs margin; median ridge arcuate, extending backward, from subcentral tubercle; ventral ridge starting from anteroventral region sloping up posteriorly. Inner lamella of moderate width; line of concrescence and inner margin coincides; marginal pore canal simple, straight and some bifurcating, approximately 18-20 anteriorly and 5 posteriorly; selvage well marked. Hinge amphidont/heterodont.

<i>Dimensions (mm) :</i>		
	Length	Height
A right valve (BOS No. 55)	0.75	0.44

Remarks : The *Gyrocythere* sp. A resembles *Gyrocythere perfecta* described by Siddiqui (1971) from the Middle Eocene beds of Pakistan in ornamentation and general appearance, but differs in having prominent subcentral tubercle, more arcuate median ridge, a low rim along anterior margin and absence of posteroventral spine.

Gyrocythere sp. B
(Pl. VIII, fig. 2; Pl. XIV, fig. 1)

Material : Two complete carapaces and one open valve from Gopinathkillla well-A.

Description : Carapace subrectangular in lateral outline, with greatest height at anterior cardinal angle; dorsal margin weakly convex, obscured by overhanging ridge; ventral margin nearly straight; anterior margin broadly rounded, fringed with five spines; posterior margin narrow upwardly, rounded. Eye tubercle present, subcentral tubercle distinct. Valve surface ornamented by reticulation, three longitudinal ridges, and a low narrow rim along anterior, ventral and posterior margins; anterior marginal zone flat without reticulation; dorsal ridge commences near eye tubercle, making an arc, overhangs margin; median ridge convex upwards extending backwards from subcentral tubercle; ventral ridge starting from anteroventral region slopes upwards posteriorly; area between median and ventral ridges occupied by 4-5 inclined ridges. Inner lamella of moderate width; line of concrescence and inner margin coincide; marginal pore canals simple and straight, some bifurcating, approximately 22 anteriorly and 7 posteriorly; selvage well marked.

Hinge amphidont/heterodont.

<i>Dimensions (mm) :</i>		
	Length	Height
A left valve (BOS No. 56)	0.81	0.5

Remarks : The present species resembles *Gyrocythere* sp. A described from the Siju Formation in overall outline and surface ornamentation, but differs in the outline of the posterior margin and having inclined ridges between ventral and median ridges.

Tribe Echinocythereidini Hazel, 1967
Genus Alocopocythere Siddiqui, 1971

Alocopocythere bhandarii Neale and Singh
(Pl. VIII, fig. 8)

Alocopocythere bhandarii Neale and Singh, 1985, pp. 371-372, pl. 44, figs. 2-4.

Material : Twenty-one complete carapaces from Borholla well-C.

<i>Dimensions (mm) :</i>			
	Length	Height	Width
A complete carapace (BOS No. 55)	0.56	0.34	0.31

Remarks : The specimens recorded herein are identical with *Alocopocythere bhandarii* described by Neale and Singh (1985) from the Sylhet Formation, Middle Eocene of Mikir Hills, Assam.

Alocopocythere borhollaensis n. sp.
(Pl. VIII, figs. 3-4; Pl. XIV, fig. 4)

Derivation of Name : After oil field Borholla, Assam, India.

Material : Twenty-one complete carapaces and 2 open valves from Borholla well-C.

Type locality and horizon : Borholla well-C, district Sibsagar, Assam. Sample 2990-3000 metres below surface, grey limestone, Sibsagar Formation, Middle Eocene.

Description : Carapace bean-shaped in lateral outline, with greatest height anteriorly; valves more or less equal; dorsal margin convex with protruding angles; ventral margin straight, posteroventral curved; anterior margin broad and evenly rounded; posterior margin narrowly rounded; in dorsal view carapace strongly inflated, biconvex with maximum width posterior to middle; anterior marginal zone compressed and flat. Eye tubercle distinct; subcentral tubercle faintly developed. Valve surface ornamented

with coarse reticulation; an anterodorsal furrow, bounded anteriorly by a small vertical ridge joining eye tubercle; a low marginal rim along anterior, ventral and posterior margins. Hinge amphidont/heterodont; other internal characters not known.

Dimensions (mm) :	Length	Height	Width
Holotype (BOS No. 58) a complete carapace	0.64	0.39	0.42
Paratype (BOS No. 59) a right valve	0.64	0.39	-

Discussion : *Alocopocythere borhollaensis* n. sp. resembles *Alocopocythere abstracta* described by Siddiqui (1971) from the Lower Eocene beds of Pakistan in appearance, but differs in being more inflated, lack of high anterior marginal rim and dorsal ridge. The present species also resembles *Alocopocythere bhandarii* Neale and Singh (1985) in general appearance; however, the latter species differs in having a short, distinct oblique rib just behind mid-length.

Alocopocythere dattai Bhandari
(Pl. VIII, figs. 5-6)

Alocopocythere dattai Bhandari, 1981, p. 140, pl. 1, figs. 2-3.

Material : Eight complete carapaces from Gopinathkilla well-A. Twelve complete carapaces from Baghmara well-B. Eight complete carapaces from Borholla well-C.

Dimensions (mm) :	Length	Height	Width
A complete carapace (BOS No. 60)	0.77	0.45	0.40

Remarks : The species has so far been described from the Late Eocene beds of Meghalaya, Assam.

Alocopocythere garoensis n. sp.
(Pl. IX, figs. 1-2)

Derivation of Name : After Garo Hills, Meghalaya, India.

Material : Eighteen complete carapaces from Gopinathkilla well-A. Nine complete carapaces from Baghmara well-B.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 515-520 metres below surface, greenish-grey silty shale, Kopili Formation, Late Eocene.

Description : Carapace subovate in lateral outline,

with greatest height anteriorly; left valve slightly larger than right valve; dorsal margin weakly convex, sloping downward posteriorly; ventral margins straight anteriorly and evenly curved posteriorly; anterior margin broad and evenly rounded; posterior margin narrow, posterior extremity rounded; in dorsal view carapace biconvex with maximum width in middle; anterior marginal zone compressed and flat. Eye tubercle and subcentral tubercle weakly developed. Valve surface strongly reticulate, reticulation meshes arranged in rows, radiating from mid-dorsal region in upper half, and three to four longitudinal rows parallel to ventral margin in lower half, reticules being coarse in middle and fine towards margin; marginal rim low.

Dimensions (mm) :	Length	Height	Width
Holotype (BOS No. 61) a complete carapace	0.65	0.37	0.34

Discussion : *Alocopocythere garoensis* n. sp. resembles *Alocopocythere borhollaensis* n. sp. in general appearance, but differs in reticulation pattern and length/height and length/width ratios. The present species is more elongate and less inflated as compared to *A. borhollaensis*.

Alocopocythere gopinathkillaensis n. sp.
(Pl. IX, figs. 3-6; Pl. XIV, fig. 3)

Derivation of Name : After Gopinathkilla, Garo Hills, Meghalaya.

Material : Two hundred and seventy complete carapaces and 6 open valves from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 550-555 metres below surface, calcareous shale, Siju Formation, Middle Eocene.

Description : Sexual dimorphism pronounced, males being more elongate, less high and wide than females; carapace bean-shaped in lateral outline, with greatest height at anterior cardinal angle; left valve slightly larger than right valve, overlapping distinctly at anterodorsal and posterodorsal margins; dorsal margin with a distinct hump in middle and concavity on sides, anterior and posterior cardinal angles protruding more particularly in left valve, ventral margin nearly straight, sloping upwards posteriorly; anterior margin broadly rounded; posterior margin narrow, angulate in right valve and rounded in left valve; in dorsal view carapace inflated, biconvex,

with maximum width posterior to middle; anterior marginal zone compressed and flat. Eye tubercle and subcentral tubercle distinct. Valve surface ornamented with strong reticulation; 5-6 vertical ridges in posterior half; a prominent ventral ridge sloping upwards posteriorly; a distinct anterodorsal furrow bounded anteriorly by a short vertical ridge joining eye tubercle; a narrow low rim along anterior, ventral and posterior margins. Inner lamella of moderate width; line of concrescence and inner margin coincide. Hinge amphidont/heterodont; in left valve it consists of a deep anterior socket, followed by an anteromedian tooth, a long bar and then a deep elongate posterior socket; hinge complementary in right valve.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 62) a female complete carapace	0.71	0.42	0.42
Paratype I (BOS No. 63) a female complete carapace	0.77	0.45	0.48
Paratype II (BOS No. 64) a male complete carapace	0.71	0.39	0.39
Paratype III (BOS No. 65) a male complete carapace	0.77	0.42	0.42
Paratype IV (BOS No. 66) a left valve	0.62	0.34	-

Discussion : *Alocopocythere gopinathkillaensis* n. sp. resembles *Alocopocythere transversa* described by Siddiqui (1971) from the Middle and Upper Eocene beds of Pakistan in general appearance. However, unlike the present species, *A. transversa* has three posterior concentric ridges, a short anteroventral ridge and a high anterior marginal rim.

Alocopocythere indica n. sp.
(Pl. IX, figs. 7-8)

Derivation of Name : After the name of the country India.

Material : Forty-one complete carapaces from Gopinathkilla well-A. Twelve complete carapaces from Baghmara well-B.

Type locality and horizon : Baghmara well-B, Mahendraganj, Garo Hills, Meghalaya, India. Sample 1310 metres below surface, grey shale, Kopili Formation, Late Eocene.

Description : Sexual dimorphism well marked, males being more elongate, less high and wide than females; carapace bean-shaped in lateral outline, with

greatest height at anterior cardinal angle; left valve slightly larger than right valve, overlapping at anterodorsal, posterodorsal and ventral margins; dorsal margin with a hump near middle and concavity on sides, anterior and posterior cardinal angles protruding; ventral margin straight in right valve and evenly curved in left valve; anterior margin broadly rounded and fringed with 10-12 short spines; posterior margin narrowly rounded, in dorsal view carapace inflated, biconvex with maximum width posterior to middle; anterior marginal zone compressed. Eye tubercle and subcentral tubercle present. Valve surface ornamented with concentric reticulation; a prominent ventral ridge, convex downwardly; an anterodorsal furrow bounded anteriorly by a short vertical ridge; a low ridge along anterior, ventral and posterior margins.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 67) a female complete carapace	0.71	0.45	0.39
Paratype (BOS No. 68) a female complete carapace	0.68	0.42	0.39

Discussion : *Alocopocythere indica* n. sp. resembles *Alocopocythere gopinathkillaensis* n. sp. in overall lateral outline and ornamentation, but clearly differs in the absence of vertical ridges in posterior region. The species also resembles *Alocopocythere transcendens* described by Siddiqui (1971) from the Eocene beds of Pakistan in general appearance. *A. transcendens*, however, differs in having deep reticulation, a high anterior marginal rim and absence of a ventral ridge.

Alocopocythere meghalayaensis n.sp.
(Pl. VIII, fig. 7)

Derivation of Name : After the Indian State of Meghalaya.

Material : Twelve complete carapaces from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 365-370 metres below surface, bluish-green shale, Kopili Formation, Late Eocene.

Description : Carapace subrectangular in lateral outline, with greatest height anteriorly; valves almost equal; dorsal margin sinuate; ventral margin straight in anterior 2/3 of length and then curved upwards posteriorly; anterior and posterior cardinal angles well developed; anterior margin broadly rounded; posterior margin upwardly rounded; in dorsal view

carapace biconvex with maximum width posteriorly; anterior marginal zone flat and compressed. Eye tubercle and subcentral tubercle well developed. Valve surface ornamented with reticulation, meshes more prominent in ventral and posterior regions and fine in anterior region; 4-5 oblique, curved ridges with grooves in between in posterior half; a prominent ventral ridge sloping upwards posteriorly; an anterodorsal furrow bounded on anterior side by a short almost vertical ridge, running downward from eye tubercle; a low marginal rim along anterior, ventral and posterior margins.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 69) a complete carapace	0.81	0.39	0.34

Discussion : *Alocopocythere meghalayaensis* n. sp. resembles *Alocopocythere gopinathkillensis* n. sp. in overall lateral outline and ornamentation, but differs in having distinct, oblique, curved ridges in posterior half, instead of vertical ridges as in the case of latter species. *Alocopocythere curvicostata* described by Gramann (1975) from the Oligocene beds of Burma differs from the present species in having much stronger costate ornamentation in posterior half protruding over dorsal outline.

Genus Echinocythereis Puri, 1954

Echinocythereis guptai n. sp.
(Pl. X, figs. 1-2)

Derivation of Name : The species is named in memory of the late Mr. S.C. Gutpa Deputy Superintending Geologist, Oil and Natural Gas Commission, Sibsagar, Assam.

Material : Eight complete carapaces from Gopinathkill well-A.

Type locality and horizon : Gopinathkill well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 560-565 metres below surface, grey calcareous sandstone with shale, Siju Formation, Middle Eocene.

Description : Carapace subquadrate in lateral outline, with greatest height at anterior cardinal angle; left valve slightly overlaps right valve along ventral and posterior margins; dorsal and ventral margins straight, somewhat converging posteriorly; cardinal angles well developed; anterior margin broad and evenly rounded; posterior margin narrowly rounded with upturned end; in dorsal view carapace biconvex, with maximum width posterior to middle. Eye tubercle prominent, rounded, raised,

standing out from valve surface in lateral and dorsal views. Surface ornamented with tubercles superimposed on reticulation arranged in concentric pattern.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 70) a complete carapace	0.67	0.39	0.32
Paratype (BOS No. 71) a complete carapace	0.58	0.32	0.36

Discussion : The present species resembles *Echinocythereis jaini* described by Khosla (1972) from the Lower Eocene beds of Rajasthan in overall shape and surface ornamentation, but differs in having thick tubercles instead of spines, superimposed on reticulation. *Echinocythereis guptai* also differs from *Echinocythereis contexta* described by Siddiqui (1971) from the Upper Palaeocene beds of Pakistan in ornamentation.

Genus Siddiquicythere n. gen.

Derivation of Name : The genus is named in honour of Dr. Q.A. Siddiqui, Department of Geology, Saint Mary's University, Halifax, Nova Scotia, Canada.

Type species : *Alocopocythere dhansariensis* Neale and Singh

Diagnosis : A genus of Trachyleberididae in which two ridges originate from eye tubercle, one to form an anterior marginal rim and other extending downward to anteroventral region; rest of the valve surface marked by number of longitudinal ridges, intercostal area reticulate; in dorsal view posterior end strongly compressed, sides parallel for posterior 2/3 of length and then converging forward.

Discussion : *Siddiquicythere* closely resembles *Alocopocythere* Siddiqui, 1971, in lateral outline and possessing two ridges springing from eye tubercle. *Alocopocythere*, however, is easily differentiated from the present genus in having a very short vertical ridge extending down from eye tubercle, biconvex outline in dorsal view and valve surface ornamented by strong reticulation and or papillose. Eye tubercle and subcentral tubercle are often well marked in *Alocopocythere* in contrast to *Siddiquicythere* in which eye tubercle is low and subcentral tubercle is indistinct.

Siddiquicythere also resembles *Soudenella* Apostolescu, 1961, in lateral outline and ornamentation pattern but clearly differs in outline in dorsal view.

Siddiquicythere dhansariensis (Neale and Singh)
(Pl. X, figs. 3-6)

Alocopocythere dhansariensis Neale and Singh, 1985, p. 372, pl. 44, figs. 5-7 and 9.

Material : Fifty-one complete carapaces from Gopinathkilla well-A. Fifteen complete carapaces from Borholla well-C.

Description : Sexual dimorphism pronounced, males being more elongate and less wise than females; carapace subovate in lateral outline, with greatest height at anterior cardinal angle; left valve slightly larger than right valve, overlapping along anterodorsal and posterodorsal margins, dorsal margin sinuate, sloping down posteriorly; ventral margin nearly straight; anterior margin broadly rounded; posterior margin subangulate in right valve and rounded in left valve; anterior and posterior cardinal angles well developed particularly in left valve; in dorsal view carapace somewhat spindle-shaped, with maximum width near middle, posterior ends strongly compressed and flat, sides parallel for posterior 2/3 of length and then converging forward. Eye tubercle low; subcentral tubercle indistinct. Valve surface ornamented with 6-7 longitudinal ridges extending for most of length which tend to be smoothed out in posteroventral part of valve; intercostal area reticulate; two ridges springing from eye tubercle, one forming rim along anterior, ventral and posterior margins, other extending downward to anteroventral region.

<i>Dimensions (mm) :</i>	Length	Height	Width
A female complete carapace (BOS No. 72)	0.56	0.25	0.22
A female complete carapace (BOS No. 73)	0.46	0.25	0.25
A male complete carapace (BOS No. 74)	0.48	0.22	0.19
A male complete carapace (BOS No. 75)	0.49	0.23	0.19

Remarks : The species has recently been described as *Alocopocythere dhansariensis* by Neale and Singh (1985) from the Sylhet Formation, Deopani Traverse, Assam. However the presence of long vertical ridge extending from eye tubercle to anteroventral region and strongly compressed posterior end shows that it can no longer be placed in *Alocopocythere*. A new genus has been diagnosed and described in this work to accommodate this species.

Siddiquicythere mohani n. sp.
(Pl. X, figs. 7-8)

Derivation of Name : The species is named in honour of Mr. Madan Mohan, General Manager, Keshava Deva Malviya, Institute of Petroleum Exploration, Oil and Natural Gas Commission, Dehra Dun, India.

Material : Twelve complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Garo Hills, Methalaya, India. Sample 505=510 metres below surface, grey shale, Kopili Formation, Late Eocene.

Description : Carapace elongate, subrectangular in lateral outline, with greatest height at anterior cardinal angle; left valve overlapping right valve along anterodorsal and posterodorsal margins; dorsal margin nearly straight, sloping down posteriorly; ventral margin slightly concave in middle; anterior margin broadly rounded and fringed with 11-12 fine denticles; posterior margin narrow, angulate; anterior and posterior cardinal angles well marked in left valve; in dorsal view posterior margin compressed, sides parallel for 2/3rd of length and then converging forward, maximum width near middle; anterior and posterior marginal zones compressed and flat. Eye tubercle low, elongate, subcentral tubercle weakly developed; valve surface ornamented with 3-4 ridges radiating from mid-dosal region in upper half and subdued longitudinal ridges in median region, intercostal area coarsely reticulate; two ridges springing from eye tubercle, one forming a low rim along anterior, ventral and posterior margins, other extending downward to anteroventral region.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 76) a male complete carapace	0.54	0.22	0.22
Paratype (BOS No. 77) a male complete carapace	0.50	2.21	0.19

Discussion : *Siddiquicythere mohani* n. sp. resembles *Siddiquicythere dhansariensis* (Neale and Singh, 1985) in general appearance, but differs in details of ornamentation and in dorsal view. Unlike the present species, *S. dhansariensis* has 6-7 longitudinal ridges extending for most of length and more compressed and flat posterior marginal zone.

Subfamily **Buntoniinae** Apostolescu, 1961

Genus **Buntonia** Howe, 1935

Buntonia royi Neale and Singh

(Pl. XI, figs. 1-2)

Buntonia royi Neale and Singh, 1985, pp. 374-375, pl. 45, figs. 4-7.

Material : Ten complete carapaces from Borholla well-B. Eight complete carapaces from Gopinathkilla well-A.

Dimensions (mm) : Length Height Width
A complete male carapace 0.47 0.24 0.22
(BOS No. 78)

Remarks : The present specimens are identical with *Buntonia royi* described by Neale and Singh (1985) from the Sylhet Formation, Assam.

Family **Hemicytheridae** Puri, 1953

Subfamily **Thaerocythereinae** Hazel, 1967

Tribe **Thaerocytherini** Hazel, 1967

Genus **Hermanites** Puri, 1955

Hermanites basanti n. sp.
(Pl. XI, figs. 3-4; Pl. XIV, fig. 5)

Derivation of Name : This species is named in honour of author's elder brother, Dr. Basant Bhandari, Department of Medicine, VA Medical Centre, Cleveland, Ohio, U.S.A.

Material : Twenty-eight complete carapaces and one open valve from Gopinathkilla well-A. Eighteen complete carapaces from Baghmara well-B.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 505-510 metres below surface, grey shale, Kopili Formation, Late Eocene.

Description : Carapace subrectangular in lateral outline, with greatest height at anterior cardinal angle; left valve over reaches right valve along anterodorsal and posterodorsal margins; dorsal margin straight, sloping down backwardly; ventral margin also straight; anterior margin broadly rounded and fringed with 18-20 minute denticles; posterior margin subangulate, sloping down in upper part and convex in lower part, bearing 5-6 spines; in dorsal view, carapace spindle-shaped, ends compressed, maximum width at two points, one near anterior to middle (near subcentral tubercle) and other posterior to middle. Eye tubercle distinct, subcentral tubercle raised. Valve surface ornamented

with deep trefoil-type reticulation, meshes arranged concentrically, a weakly developed dorsal ridge, a prominent ventral ridge extending from anteroventral region sloping upwards posteriorly; a narrow rim along anterior, ventral and posterior margins. Hinge amphidont/ heterodont.

Dimensions (mm) : Length Height Width
Holotype (BOS No. 79) 0.84 0.46 0.46
a complete carapace
Paratype I (BOS No. 80) 0.85 0.46 0.39
a complete carapace
Paratype II (BOS No. 81) 0.82 0.40 -
a right valve

Discussion : *Hermanites basanti* n. sp. resembles *Hermanites mathuri* described by Khosla (1972) from the Lower Eocene beds of Rajasthan in overall shape, but differs in having characteristic trefoil-type of reticulation, well developed subcentral tubercle and ventral ridge. *H. mathuri* has a faint subcentral tubercle, fine reticulation and less developed ventral ridge.

Hermanites sp.
(Pl. XI, fig. 5; Pl. XIV, fig. 6)

Material : Single right valve from Gopinathkilla well-A.

Description : Valve subrectangular in lateral outline, with greatest height at anterior cardinal angle; dorsal margin obscured by overhanging ridge, otherwise straight; ventral margin sinuate; anterior margin broadly rounded, fringed with 16 minute denticles; posterior margin subangulate bearing five denticles in lower half. Eye tubercle distinct; subcentral tubercle well developed. Valve surface ornamented with coarse reticulation, meshes arranged concentrically around subcentral tubercle; a dorsal ridge starting from mid-dorsal region and making an arc overhangs margin, in posterodorsal region turns downward and then after a short distance it again turns diagonally towards subcentral tubercle; a pronounced ventral ridge extending from anteroventral region sloping upwards posteriorly; a distinct rim along anterior, ventral and posterior margins. Inner lamella moderately wide; line of conrescence and inner margin coincide; marginal pore canals straight, about 25 along anterior margin and 15 posteroventrally. Hinge amphidont/ heterodont; consisting in right valve of a high conical anterior tooth, a postjacent socket, followed by a long, straight, faintly crenulate groove and then a high,

distinctly lobed posterior tooth.

<i>Dimensions (mm) :</i>	Length	Height
A right valve (BOS No. 82)	0.61	0.32

Remarks : *Hermanites* sp. resembles *Hermanites batei* described by Omatsola (1972) from the Nigar delta, in lateral outline, but differs in ornamentation pattern. Unlike the present species, *M. batei* has notched dorsal, anteromarginal and ventrolateral ridges and lacks a diagonal posterodorsal ridge.

The species also resembles *Hermanites foveolata* Omatsola (1972) in lateral outline and ornamentation, however, the latter species differs from the present species in having less developed ventrolateral and dorsal ridges.

Tribe Bradleyini Benson, 1972

Genus Hornibrookella Moos, 1966

Hornibrookella sp.
(Pl. XI, fig. 6)

Material : Three complete carapaces from Gopinathkilla well-A.

Description : Carapace subrectangular in lateral outline with greatest height at anterior cardinal angle; left valve overlapping right valve along posterodorsal slope and at anterior cardinal angle; dorsal and ventral margins concave in middle, obscured posteriorly by overhanging ridge; anterior margin broadly rounded; posterior margin drawn out in caudal process in lower half; in dorsal view carapace spindle-shaped, with maximum width posterior to middle. Eye tubercle low; subcentral tubercle present. Valve surface ornamented with concentrically arranged reticulation; dorsal ridge overhanging posterodorsal margin; ventral ridge extending from anteroventral region to posteroventral region, where it thickens considerably and overhangs margin.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 83)	0.68	0.37	0.37

Remarks : *Hornibrookella* sp. resembles *Hornibrookella subquadra* described by Siddiqui (1971) from the Middle Eocene beds of Pakistan in overall lateral outline and ornamentation. The latter species, however, differs in having straight dorsal and ventral margins, a high eye tubercle and in length/height ratio.

Hornibrookella abdulrazzaqui Al-furaih, 1983, also resembles present species in lateral outline and ornamentation but differs in having coarsely reticulate valve surface, well developed caudal process and well marked posterodorsal slope.

Family Cytheruridae Müller, 1894

Subfamily Cytherurinae Müller, 1894

Genus Cytherura Sars, 1866

Cytherura?eocaenica Neale and Singh
(Pl. XI, fig. 8)

Cytherura eocaenica Neale and Singh, 1985, pp. 376-378, pl. 46, fig. 10.

Material : Eight complete carapaces from Gopinathkilla well-A.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 84)	0.37	0.14	0.10

Remarks : The present specimens from Meghalaya show resemblance with *Cytherura eocaenica* described by Neale and Singh (1985) from the Middle Eocene beds of Assam. The generic assignment of the species appears to be questionable as the species lacks the clear caudal process and no internal characteristics have been studied.

Genus Paijenborchellina Kuznetsova, 1957

Paijenborchellina sp.
(Pl. XI, fig. 7)

Material : Two complete carapaces from Gopinathkilla well-A.

Description : Carapace pear-shaped in lateral outline, with greatest height anteriorly; left valve slightly larger than right valve; dorsal margin convex, sloping down posteriorly; ventral margin slightly convex in middle and concave posteroventrally; anterior margin obliquely rounded; posterior margin narrow produced in a downwardly directed caudal process; in dorsal view carapace biconvex, maximum width near middle, ends compressed. Valve surface finely reticulate, reticulation meshes arranged in concentric pattern, and with a shallow vertical sulcus traversed by a short median ridge; two faint longitudinal ridges in ventral part.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 85)	0.37	0.19	0.19

Remarks : The present species closely resembles *Paijenborchellina mohani* (Khosla, 1972) described from the Lower Eocene beds of Rajasthan in overall shape, but differs in surface ornamentation. *P. mohani* lacks median and ventral ridges. The species is left under open nomenclature for want of sufficient material.

Genus *Semicytherura* Wagner, 1957

Semicytherura nealei n. sp.
(Pl. XII, fig. 1)

Derivation of Name : The species is named in honour of Professor J.W. Neale, Department of Geology, The University, Hull, England.

Material : Eight complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 545-550 metres below surface, calcareous shale, Siju Formation, Middle Eocene.

Description : Carapace subovate in lateral outline with greatest height posteriorly; left valve slightly overlaps right valve along anterodorsal and posterodorsal margins, however, in mid-dorsal region right valve overreaches left valve; dorsal margin arched; ventral margin nearly straight but appears to be convex due to overhanging of ventral wing; anterior margin narrow and rounded; posterior margin drawn out in a short caudal process at mid-height; in dorsal view carapace biconvex, with maximum width just posterior to middle. Eye tubercle distinct. Valve surface reticulate and with a ventral ridge forming edge of wing.

<i>Dimensions (mm)</i> :	Length	Height	Width
Holotype (BOS No. 86)	0.34	0.17	0.19
a complete carapace			

Discussion : *Semicytherura nelei* n. sp. resembles *Semicytherura rameshi* described by Singh and Misra (1968) from the Lower Eocene of Rajasthan in lateral outline, but differs in details of ornamentation and length/height ratio.

Semicytherura indica described by Neale and Singh (1985) from the Sylhet Formation also differs from this species in the presence of fine longitudinal ribs.

Family *Xestoleberididae* Sars, 1928
Genus *Uroleberis* Triebel, 1958

Uroleberis armeniaca Neale and Singh
(Pl. XII, figs. 3-4)

Uroleberis armeniaca Neale and Singh, 1985, p. 381, pl. 46, figs. 7-9

Material : Nine complete carapaces from Gopinathkilla well-A.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (BOS No. 87)	0.46	0.31	0.28
A complete carapace (BOS No. 88)	0.43	0.28	0.25

Remarks : The present specimens from Meghalaya are identical with *Uroleberis armeniaca* described by Neale and Singh (1985) from the Middle Eocene beds of Assam.

Uroleberis kutchensis Guha
(Pl. XII, fig. 2)

Uroleberis kutchensis Guha, 1968, p. 88, pl. 1, figs. 4,8, 12- Khosla, 1972, p. 496, pl. 3, fig. 23.

Material : Six complete carapaces from Borholla well-C. Three complete carapaces from Gopinathkilla well-A.

<i>Dimensions (mm)</i> :	Length	Height	Width
A complete carapace (BOS No. 89)	0.46	0.34	0.31

Remarks : The present specimens from Assam and Meghalaya are identical with *Uroleberis kutchensis* described by Guha (1968) from the Middle Eocene beds of Kachchh. The other recorded occurrence of the species is from the Middle Eocene beds of Rajasthan by Khosla (1972).

Genus *Xestoleberis* Sars, 1866

Xestoleberis sp.
(Pl. XII, figs. 5-6)

Material : Forty complete carapaces from Gopinathkilla well-A. Twenty-eight complete carapaces from Borholla well-C.

Description : Carapace egg-shaped in lateral outline, with greatest height posterior to middle; left valve larger than right valve, distinctly overlapping along anterior and ventral margins; dorsal margin strongly arched, steeply sloping towards anterior end and less so towards posterior end; ventral margin nearly straight in left valve and slightly concave in right valve; anterior margin narrowly rounded; posterior margin broadly rounded; in dorsal view

carapace biconvex, with maximum width near middle; posterior end broad, anterior end narrow, Valve surface smooth.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 90)	0.34	0.23	0.21
A complete carapace (BOS No. 91)	0.35	0.21	0.21

Remarks : *Xestoleberis* sp. resembles *Xestoleberis tumefecta* Brady, 1880, a recent species, in lateral outline, but, differs in length/height ratio. The present species is more in height than *X. tumefecta*.

Family **Bythocytheridae** Sars, 1866
Genus **Bythoceratina** Hornibrook, 1952

Bythoceratina sp.
(Pl. XII, fig. 7)

Material : Eight complete carapaces from Gopinathkilla well-A.

Description : Carapace subquadrate in lateral outline, with greatest height posteriorly; left valve slightly overlaps right valve along posterodorsal slope; dorsal margin straight; posterior cardinal angle well marked; ventral margin straight, posteroventral margin sloping upwards backwardly; anterior margin obliquely rounded; posterior margin drawn out in a short caudal process at mid-height, posterodorsal margin concave. Valve inflated, produced laterally, wing terminating in a spine in posteroventral region. Surface marked by a shallow vertical sulcus, extending from mid-dorsal region and with fine reticulation.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 92)	0.46	0.25	0.31

Remarks : Only closed specimens were found, so internal character could not be studied. However, on the basis of external characters the species is questionably assigned to the genus *Bythoceratina*.

Genus **Pseudocythere** Sars 1866

Pseudocythere? sp.
(Pl. XII, fig. 8)

Material : Eight complete carapaces from Gopinathkilla well-A.

Description : Carapace drop-shaped in lateral

outline, with greatest height posterior to middle; left valve slightly larger than right valve; dorsal margin nearly straight; ventral margin straight near anterior and swinging upward posteriorly; anterior margin rounded; posterior margin drawn out in a short caudal process subdorsally. Valve inflated in median region, laterally compressed at caudal process and posteroventral region; in dorsal view carapace lanceolate, with maximum width in middle, ends pointed. Valve surface marked by a vertical sulcus, extending downward from mid-dorsal region, rest of area smooth or with faint striations.

<i>Dimensions (mm) :</i>	Length	Height	Width
A complete carapace (BOS No. 93)	0.58	0.26	0.29

Remarks : The species is questionably assigned to the genus *Pseudocythere* on the basis of outline and other external characters.

Superfamily **Cypridacea** Baird, 1845

Family **Pontocyprididae** Müller, 1894

Genus **Propontocypris** Sylvester-Bradley, 1847

Subgenus **Ekpontocypris** Maddocks, 1969

Propontocypris (Ekpontocypris) meghalayaensis n. sp.
(Pl. XII, figs. 5-6)

Derivation of Name : After the Indian State of Meghalaya.

Material : Fifty-one complete carapaces from Gopinathkilla well-A. Eight complete carapaces from Baghmara well-B. Six carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 545-555 metres below surface, calcareous sandstone, Siju Formation, Middle Eocene.

Description : Carapace subtriangular in lateral outline with greatest height slightly in front of middle; right valve larger than left valve, overlapping inconspicuously along ventral and anterodorsal margins, however, along mid-dorsal margin left valve over-reaches right valve; dorsal margin broadly arched, sloping down steeply anteriorly and less so posteriorly; ventral margin nearly straight; anterior margin rounded; posteroventral angle narrowly rounded; in dorsal view carapace lanceolate, with maximum width anterior to middle. Valve surface smooth.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 94) a complete carapace	0.56	0.28	0.25
Paratype (BOS No. 95) a complete carapace	0.55	0.27	0.25

Discussion : The present species resembles *Propontocypris eocaenica* described by Neale and Singh (1985) in overall lateral outline, but differs in having broadly arched dorsal margin which is distinctly angulated in *P. eocaenica*.

Family **Candonidae** Kaufmann, 1900

Subfamily **Paracypridinae** Sars, 1920

Genus **Paracypris** Sars, 1866

Paracypris sahui n. sp.
(Pl. XIII, figs. 1-2)

Derivation of Name : The species is named in honour of Mr. Anand Sahu, Deputy Superintending Geologist, Oil and Natural Gas Commission, Dehra Dun, India.

Material : Fifteen complete carapaces and one open valve from Gopinathkilla well-A. Five complete carapaces from Borholla well-C.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 560-565 metres below surface, grey calcareous sandstone with shale, Siju Formation, Middle Eocene.

Description : Carapace elongate in lateral outline, with greatest height near middle; left valve larger than right valve, overlapping almost all along margin, being more pronounced along ventral margin; dorsal margin strongly arched, steeply sloping towards ends; ventral margin straight in left valve and slightly concave in right valve; anterior margin evenly rounded; posterior margin drawn out, and narrowly rounded ventrally; in dorsal view carapace biconvex with maximum width near middle. Valve surface smooth. Inner lamella widest along anterior margin, narrowing along ventral and posterior margins; marginal pore canals moderately numerous, mostly branching.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 96) a complete carapace.	0.74	0.31	0.25
Paratype (BOS No. 97) a complete carapace	0.73	0.31	0.24

Discussion : *Paracypris sahui* n. sp. resembles

Paracypris pandyai described by Khosla (1978) from the Lower Miocene beds of Gujarat in general appearance, but differs in details of lateral outline. In *P. pandyai* dorsal margin form wide arch having less anterodorsal slope in contrast to the present species, in which dorsal margin is strongly arched and have greater anterodorsal slope. The present species is also smaller in size than *P. pandyai*.

Paracypris wynnei described by Tewari and Tandon (1960) from the Middle Eocene beds of Kachchh, also shows resemblance to present species in lateral outline, but differs in being more elongate.

Paracypris samantai n. sp.
(Pl. XII, fig. 3)

Derivation of Name : The species is named in honour of Dr. Bimal K. Samanta, Department of Geology, Calcutta University, Calcutta, India.

Material : Ten complete carapaces from Gopinathkilla well-A.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 550-555 metres below surface, calcareous shale, Siju Formation, Middle Eocene.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 96) a complete carapace.	0.74	0.31	0.25

Description : Carapace subtriangular in lateral outline, with greatest height half of length near middle; left valve overlapping right valve along ventral margin; dorsal margin forming wide arch; ventral margin sinuate in right valve and slightly convex in left valve; anterior margin broad and evenly rounded; posterior margin narrow and subangulate ventrally; in dorsal view carapace biconvex, with maximum width near middle. Valve surface nearly smooth.

<i>Dimensions (mm) :</i>	Length	Height	Width
Holotype (BOS No. 98) a complete carapace.	0.62	0.31	0.22

Discussion : *Paracypris samantai* n. sp. resembles *Paracypris lakiensis* Guha, 1974, described from the Lower Eocene beds of Cambay basin, Gujarat in general appearance. Unlike the present species, *P. lakiensis* is more elongate and has maximum height at 1/4 of length from anterior end.

Paracypris striata n. sp.
(Pl. XIII, fig. 4)

Derivation of Name : After the latin term *striatus*, to mark with striae; with reference to number of fine lines.

Type locality and horizon : Gopinathkilla well-A, Mahendraganj, Garo Hills, Meghalaya, India. Sample 520-525 metres below surface, ferruginous silty shale, Kopili Formation, Late Eocene.

Description : Carapace elongate in lateral outline with greatest height 2/7th of length anteriorly; left valve slightly larger than right valve, overlapping distinctly along posterodorsal and ventral margins; dorsal margin moderately curved, steeply sloping down posteriorly; ventral margin slightly concave in middle; anterior margin evenly rounded; posterior margin drawn out and acutely pointed posteroventrally; in dorsal view carapace very much compressed, tapering posteriorly, maximum width anterior to middle. Valve surface ornamented with striations, more distinct posteriorly.

Dimensions (mm) : Length Height Width
Holotype (BOS No. 99) 0.78 0.28 0.25
a complete carapace.

Discussion : *Paracypris striata* n. sp. resembles *Paracypris sahui* in general appearance, but differs in details of lateral outline and ornamentation. *P. sahui*, unlike the present species, lacks surface striations and has greatest height at middle and strongly arched dorsal margin. *P. franquesi* Howe and Chambers, 1935, an Eocene species from Saithville, Texas, differs from the present species in having smooth surface.

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EXPLANATION OF PLATE

Plate I

- 1-2 *Cytherella antheriformis* Neale and Singh
1, a complete carapace (BOS No. 1), left valve-view, x 137;
2, a complete carapace (BOS No. 2), dorsal view, x 130.
- 3 *Cytherella assamensis* Neale and Singh
A complete carapace (BOS No. 3), left valve view, x 115.
- 4 *Cytherella barpatharensis* Neale and Singh
A complete carapace (BOS No. 4), left valve view, x 117.
- 5-6 *Cytherella shahi* n.sp.
5, holotype (BOS No. 7), a complete carapace, left valve view, x 94; 6, paratype (BOS No. 8), a complete carapace, dorsal view, x 94.
- 7-8 *Cytherella govindani* n. sp.
7 holotype (BOS No. 5), a complete carapace, left valve view, x 117; 8, paratype (BOS No. 6), a complete carapace, dorsal view, x 135.

Plate II

- 1-2 *Cytherella hastata* Neale and Singh
1, a complete carapace (BOS No. 9), left valve view, x 135;
2, a complete carapace (BOS No. 10), dorsal view, x 135;
- 3-4 *Cytherella siddiquii* n. sp.
3 holotype (BOS No. 11), a complete carapace, left valve view, x 94; 4,
paratype (BOS No. 12), a complete carapace, dorsal view, x 93.
- 5-6 *Cytherella* sp.
5, a complete carapace (BOS No. 13), left valve view, x 111;
6, a complete carapace (BOS No. 14), dorsal view, x 114.
- 7-8 *Cytherelloidea alfuraihi* n. sp.
Holotype (BOS No. 15), a complete carapace; 7, left valve view, x 107;
8, dorsal view, x 112.

Plate III

- 1-2 *Cytherelloidea choubeyi* n. sp.
1 holotype (BOS No. 17), a male complete carapace, right valve view,
x 156; 2, paratype (BOS No. 18), a female complete carapace, right
valve view, x 162.
- 3-4 *Cytherelloidea sinhai* n. sp.
3 holotype (BOS No. 19), a complete carapace, right valve view, x 124;
4, paratype (BOS No. 20), a complete carapace, dorsal view, x 130.
- 5 *Cytherelloidea* sp. cf. *C. chewtonensis* Haskins
A left valve (BOS No. 16), lateral view, x 139.
- 6 *Cytherelloidea* sp.
A complete carapace (BOS No. 21), left valve view, x 1198.
- 7-8 *Bairdoppilata chaudharii* n. sp.
7, holotype (BOS No. 22), a complete carapace, right valve view, x 76;
8, paratype (BOS No. 23), a complete carapace, dorsal view, x 68.

Plate IV

- 1-2 *Schizocythere gujeratensis* Guha
1, a female complete carapace (BS No. 28), right valve view x 162; 2, a
male complete carapace (BOS No. 29), right valve view, x 170.
- 3-4 *Neonesidea khoslai* Bhandari
3, a complete carapace (BOS No. 24), right valve view, x 66; 4, a
complete carapace (BOS No. 25), dorsal view, x 63.
- 5-6 *Neonesidea shillongensis* n. sp.
5 holotype (BOS No. 26), a complete carapace, right valve view, x 82;
6, paratype (BOS No. 27), a complete carapace, dorsal view, x 82.
- 7-8 *Paijenborchella pandeyi* n. sp.
Holotype (BOS No. 31), a complete carapace; 7, left valve view x 128;
8, dorsal view x 110.

Plate V

- 1-2 *Paijenborchella (Eopaijenborchella) assamiensis* Sarma
A complete carapace (BOS No. 32); 1, left valve view, x 158; 2, dorsal
view, x 153
- 3-4 *Paijenborchella (Eopaijenborchella) bhandarii* n. sp.
3, holotype (BOS No. 3), a complete carapace, right valve view, x 152;
4, paratype 1 (BOS No. 34), a complete carapace, dorsal view, x 155.

- 5-8 *Paijenborchella* (*Eopaijenborchella*) *bhatiai* n. sp.
5, holotype (BOS No. 36), a male complete carapace, right valve view, x 172; 6, paratype I (BOS No. 37), a male complete carapace, dorsal view, x 167; 7, paratype II (BOS No. 38), a female complete carapace, right valve view, x 219; 8, paratype III (BOS No. 39), a female complete carapace, dorsal view, x 226.

Plate VI

- 1-2 *Paijenborchella* (*Eopaijenborchella*) *dattai* n. sp.
Holotype (BOS No. 40), a complete carapace; 1, right valve view, x 131; 2 dorsal view, x 137.
- 3-4 *Paijenborchella* (*Eopaijenborchella*) *indigena* Sarma
3, a complete carapace (BOS No. 41), left valve view, x 158;
4, a complete carapace (BOS No. 42), dorsal view, x 159.
- 5-6 *Paijenborchella* (*Eopaijenborchella*) *khoslai* n. sp.
5, holotype (BOS No. 43), a complete carapace, right valve view, x 147;
6, paratype I (BOS No. 44), a complete carapace, dorsal view, x 149.
- 7 *Paijenborchella* (*Eopaijenborchella*) *swaraswatiae* Sarma
A complete carapace (BOS No. 46), right valve view, x 126.
- 8 *Paijenborchella* ? *engima* Neale and Singh
A complete carapace (BOS No. 30), right valve view, x 174.

Plate VII

- 1 *Neocyprideis bhupendri* (Singh and Misra)
A complete carapace (BOS No. 47), right valve view, x 109.
- 2 *Krithe oryza* Neale and Singh
A complete carapace (BOS No. 48), right valve view, x 108.
- 3-4 *Occultocythereis turaensis* n. sp.
3, holotype (BOS No. 51), a complete carapace, right valve view, x 109;
4, paratype (BOS No. 52), a complete carapace, dorsal view, x 118.
- 5-6 *Occultocythereis raivermani* n. sp.
5, holotype (BOS No. 49), a complete carapace, right valve view, x 164;
6, paratype (BOS No. 50), a complete carapace, dorsal view, x 166.
- 7-8 *Gyrocythere raoi* n. sp.
7, holotype (BOS No. 53), a complete carapace, right valve view, x 102;
8, paratype (BOS No. 54), a complete carapace, dorsal view, x 95.

Plate VIII

- 1 *Gyrocythere* sp. A
A right valve (BOS No. 55), lateral view, x 92.
- 2 *Gyrocythere* sp. B
A left valve (BOS No. 56), lateral view, x 83.
- 3-4 *Alocopocythere borhollensis* n. sp.
Holotype (BOS No. 58), a complete carapace; 3, right valve view x 106;
4, dorsal view, x 105.
- 5-6 *Alocopocythere dattai* n. sp.
A complete carapace (BOS No. 60), 5, right valve view, x 88, 6, dorsal view, x 91.
- 7 *Alocopocythere kopiliensis* n. sp.
Holotype (BOS No. 69), a complete carapace; left valve view, x 81.
- 8 *Alocopocythere bhandarii* Neale and Singh
A complete carapace (BOS No. 57), right valve view, x 125.

Plate IX

- 1-2 *Alocopocythere garoensis* n. sp.
Holotype (BOS No. 61), a complete carapace; 1, right valve view x 106;
2, dorsal view, x 101.
- 3-6 *Alocopocythere gopinathkillaensis* n. sp.
3, holotype (BOS No. 62), a female complete carapace; right valve view
x 96; 4, paratype I (BOS No. 63), a female complete carapace, dorsal
view, x 129; 5, paratype II (BOS No. 64), a male complete carapace,
right valve view, x 98; 6, paratype III (BOS No. 65), a male complete
carapace, dorsal view, x 87.
- 7-8 *Alocopocythere jaintiaensis* n. sp.
7, holotype (BOS No. 67), a female complete carapace; right valve view
x 98; 8, paratype (BOS No. 68), a female complete carapace dorsal view,
x 100.

Plate X

- 1-2 *Echinocythereis guptai* n. sp.
1, holotype (BOS No. 70), a complete carapace; right valve view x 106;
2, paratype (BOS No. 71), a complete carapace, dorsal view, x 117.
- 3-6 *Siddiquicythere dhansariensis* (Neale and Singh)
3, a complete male carapace (BOS No. 74), left valve view, x 146; 4, a
complete male carapace (BOS No. 75), dorsal view, x 143; 5, a complete
female carapace (BOS No. 72), right valve view, x 141; 6, a complete
female carapace (BOS No. 73), dorsal view, x 154.
- 7-8 *Siddiquicythere mohani* n. sp.
7, holotype (BOS No. 76), a male complete carapace, right valve view,
x 124; 8, paratype (BOS No. 77), a complete male carapace, dorsal view,
x 136.

Plate XI

- 1-2 *Buntonia royi* Neale and Singh
A complete carapace (BOS No. 78); 1, right valve view, x 132; 2, dorsal
view, x 130.
- 3-4 *Hermanites basanti* n. sp.
3, holotype (BOS No. 79), a complete carapace, left valve view, x 72; 4,
paratype I (BOS No. 80), a complete carapace, dorsal view, x 74.
- 5 *Hermanites* sp.
A right valve (BOS No. 82), lateral view, x 98.
- 6 *Hernibrookella* sp.
A complete carapace (BOS No. 83), left valve view, x 88.
- 7 *Paijenborchellina* sp.
A complete carapace (BOS No. 85), right valve view, x 176.
- 8 *Cytherea? eocaenica* Neale and Singh
A complete carapace (BOS No. 84), right valve view, x 173.

Plate XII

- 1 *Semicytherura nealei* n. sp.
Holotype (BOS No. 86), a complete carapace, right valve view, x 191.
- 2 *Uroleberis kutchensis* Guha
A complete carapace (BOS No. 89), right valve view, x 130.
- 3-4 *Uroleberis armeniaca* Neale and Singh
3, a complete carapace (BOS No. 87), right valve view, x 141; a
complete carapace (BOS No. 88), dorsal view, x 151.

- 5-6 *Xestoleberis* sp.
5, a complete carapace (BOS No. 90), right valve view, x 185; a complete carapace (BOS No. 91), dorsal view, x 188.
- 7 *Bythoceratina* sp.
A complete carapace (BOS No. 92), right valve view, x 137.
- 8 *Pseudocythere* sp.
A complete carapace (BOS No. 93), right valve view, x 103.

Plate XIII

- 1-2 *Paracypris sahui* n. sp.
1, holotype (BOS No. 96), a complete carapace, right valve view, x 95;
2, paratype (BOS No. 97), a complete carapace dorsal view, x 95.
- 3 *Paracypris samantai* n. sp.
Holotype (BOS No. 99), a complete carapace, right valve view, x 108.
- 4 *Paracypris striata* n. sp.
Holotype (BOS No. 99), a complete carapace, right valve view, x 90.
- 5-6 *Propontocypris (Ekpontocypris) Meghalayaensis* n. sp.
5, holotype (BOS No. 94), a complete carapace, left valve view, x 121;
6, paratype (BOS No. 95), a complete carapace dorsal view, x 127.

Plate XIV

All internal views

- 1 *Gyrocythere* sp. B
A left valve, (BOS No. 56), x 80
- 2 *Gyrocythere* sp. A.
A right valve, (BOS No. 55), x 75
- 3 *Alocopocythere gopinathkillaensis* n. sp.
Paratype IV (BOS No. 66), a left valve, x 90
- 4 *Alocopocythere borhollaensis* n. sp.
Paratype I (BOS No. 59), a right valve, x 84
- 5 *Hermanites basanti* n. sp.
Paratype II (BOS No. 81), a right valve, x 66
- 6 *Herminites* sp.
A right valve (BOS No. 82), x 88
- 7 *Paijenborchella (Eopaijenborchella) khoslai* n. sp.
Paratype II (BOS No. 45), a left valve, x 116
- 8 *Paijenborchella (Eopaijenborchella) bhandarii* n. sp.
Paratype II (BOS No. 35), a right valve, x 115

