PALYNOLOGICAL CORRELATION OF MIKIR FORMATION WITH LOWER PALAEOGENE SEDIMENTS OF SHILLONG PLATEAU

N. C. MEHROTRA

**Wadia Institute of Himalayan Geology, Dehra Dun*

ABSTRACT

Mikir Formation forms the base of Tertiary in Mikir and North Cachar Hill region at the eastern part of the Assam autochthon. It is best developed in the Garampani—the type area. This sedimentary sequence corresponds with the stratigraphic succession represented by the Therria (=Cherra) Formation and Lakadong Member of the Sylhet Limestone Formation of Khasi and Jaintia Hills, and Tura Formation of Garo Hills—both in lithology and stratigraphic position. The palynofloral subdivisions also agree with litho-stratigraphy. It is concluded that the Mikir Formation represents the easterly extension of the Lower Palaeogene stratigraphic sequence of Garo, Khasi and Jaintia Hills in North Cachar Hills.

INTRODUCTION

The name 'Mikir Formation' has been given by Samanta (1971) for a predominantly sandstone shale sequence constituting the base of Tertiary succession in the Mikir and North Cachar Hill region of Assam Basin. The formation is best exposed at the confluence of Kopili and Kharkor rivers in Garampani (25°30′40″ N : 92°38′00″ E) area of North Cachar Hills—its type section (Mehrotra, 1977). Samanta (1971) correlated the Mikir Formation with the Tura Formation of Garo Hills based on physical features, like lithology and stratigraphic position. Singh and Mehrotra (1977) recorded palynological fossils from this litho-unit, which compare with those of the Tura Formation. The present palynological study is intended to provide precise basis for correlating this stratigraphic unit with equivalent horizons of lower Assam.

The Therria (=Cherra) Formation, forming base of Tertiary succession in Khasi and Jaintia Hills, unconformably overlies a thick succession of Upper Cretaceous sediments represented by Gumaghat, Mahadek and Langpar formations in ascending order (Dutta & Sah, 1970). Recently, Sah and Singh (1980) on the basis of palynofossils have considered Langpar Formation to be of Danian (=lowermost Palaeocene) age. Baksi (1974) has already suspected that the basal part of Cherra Formation is a vertical facies variant of Langpar sediments. The stratigraphical break observed between the two lithounits at few places is only of a local nature. The Tura Formation represents the base of the Tertiary succession in Garo Hills. It generally unconformably overlies the basement complex except at one place along the Jadukata river-section where it overlies the Cretaceous sediments. In the south-eastern part, it is also seen to rest unconformably over the Sylhet Trap. The Mikir Formation on the other hand, rests solely over the Precambrian granites and gneisses. Not a single outcrop or subcrop of Cretaceous sediments has been so far reported from this area. In the Garampani area of North Cachar Hills, however, a very poor outcrop of trap rock is exposed. Smith (1898) reported a better (6 m thick) exposure of trap rock from Mikir Hills at Pangso in the Nambor river section. There is no other known record of these lava flows from the Mikir and North Cachar Hills. A distinct conglomeratic zone at the base of the

**Present address : K.D.M. I.P.E., Oil & Natural Gas Comm., Dehra Dun.*

Table 1—Lithological correlation of Mikir Formation with Lower Palaeogene Sediments of Meghalaya

Garo Hills (Sah & Singh, 1974)		Khasi and Jaintia Hills (Dutta & Sah, 1970)		North Cachar Hills	
Stratigraphic Unit	Lithology	Stratigraphic Unit	Lithology	Stratigraphic Unit	Lithology
Siju Limestone Formation	Reddish-buff-coloured *Nummulitic* limestone, bearing *Assilina* (90 m)	Sylhet Limestone Formation (236 m)	Prang Limestone Narpuh Sandstone Umlatdoh Limestone Lakadong Sandstone Lakadong Limestone	Garampani Limestone Formation (127 m)	Foraminiferal limestone with marl and calcareous shale partings
	False bedded ferruginous sandstones with pebble band near the base				Medium to fine-grained sandstones, sometimes ferruginous in nature, intercalated with carbonaceous shales, siltstones and coal.
Tura Formation (170 m)	White or grey shales or lithomargic clays with two or three bands of coal. Coarse-grained white, clayey sandstones with thin pebble band, generally at the base	Cherra Formation (213 m)	Coal bearing medium to fine-grained sandstones, intercalated with carbonaceous shale and clay partings. The basal conglomerate is exposed at a few places	Mikir Formation (70 m)	In the upper part the sandstone is calcareous with bands of argillaceous limetone, carbonaceous shale and siltstone. The base is often marked by a conglomerate band.
UNCONFORMITY					
Precambrian	Granites and granite-gneisses	Upper Cretaceous sediments			Precambrian granites and granite-gneisses

Mikir Formation was seen in the Kopili-Kharkor river-section in Garampani area but this was not observed continuously throughout the section, similar to the conglomerate band at the base of Cherra and Tura formations. The lateratization or kaolinization seen at the base of Cherra and Tura formations respectively, has not been observed anywhere at the base of the Mikir Formation.

The Mikir Formation is overlain by a marine calcareous facies, the Garampani Limestone, throughout the North Cachar Hills and is comparable to the Siju Limestone and Umlatdoh Limestone in Garo and Khasi-Jaintia Hills, respectively.

The Mikir Formation is characterized by coarse to fine-grained sandstones, sometimes ferruginous in nature, with a number of carbonaceous shale, coal, siltstone and argillaceous limestone bands. This lithology is more or less identical to that of Cherra and Tura formations (Table-1). Like Tura and Cherra formations, the Mikir sediments, in general, exhibit a low dip of 2-6° in south-east direction.

Palynostratigraphic correlation of Tura Formation with the Cherra and Lakadong sequence of Khasi and Jaintia hills is now well established (SAH & SINGH, 1974). They distinguished four cenozones within the Tura Formation. These zones in ascending order are—*Assamialetes* (*Retialetes*) *emendatus* Cenozone, *Dandotiaspora telonata* Cenozone, *Palmidites plicatus* Cenozone, and *Proxapertites* (*Nymphaeoipollis*) *assamicus* Cenozone. The Lower Palaeogene succession of Khasi and Jaintia Hills has also been divided into four cenozones (DUTTA & SAH, 1970 ; SAH & DUTTA, 1974), which, in ascending order, are—*Proxapertites* (*Nymphaeoipollis*) *crassimurus* Cenozone, *Araliaceoipollenites reticulatus* Cenozone, *Tricolpites reticulatus* Cenozone, and Lakadong Palynological Zone. The palynological correlation of the corresponding biozones of Tura and Cherra-Lakadong stratigraphic sequences, based on common occurrence of marker palynomorphs, as established by SAH AND SINGH (1974) has been compiled in Table-2.

Table 2—Biostratigraphic correlation of Tura Formation and Lower Palaeocene sediments of Khasi and Jaintia Hills

Lower Palaeogene Sediments of Khasi and Jaintia Hills (Sah & Dutta, 1974)	Tura Formation of Garo Hills (Sah & Singh, 1974)	Common Significant Forms
Lakadong Palynological Zone	*Proxapertites assamicus* Cenozone	*Proxapertites assamicus*, *Dandotiaspora dilata*, *Couperipollis brevispinosus*, *C. rarispinosus*, *Palmaepollenites eocenicus*, *Lycopodiumsporites palaeocenicus*, *Cyathidites minor*, *Triporopollenites vimalli* and *Polycolpites cooksonii*
Tricolpites reticulatus Cenozone	*Palmidites plicatus* Cenozone	*Palmaepollenites eocenicus*, *Triporopollenites vimalii*, *Cyathidites minor*, *Polycolpites cooksonii*, *Palmaepollenites communis* and *Couperipollis brevispinosus*.
Araliaceoipollenites reticulatus Cenozone	*Dandotiaspora telonata* Cenozone	*Dandotiaspora telonata*, *Lycopodiumsporites palaeocenicus*, *Assamialetes emendatus*, *Palmaepollenites eocenicus* and *Dandotiaspora densicorpa*
Proxapertites crassimurus Cenozone	*Assamialetes emendatus* Cenozone	*Assamialetes emendatus*, *Proxapertites crassimurus*, *Couperipollis brevispinosus*, *C. rarispinosus*, *Dandotiaspora dilata* and *D. telonata*

The entire stratal succession of the Mikir Formation has been divided into five distinct biozones (MEHROTRA, 1977). The lowermost is *Assamialetes macroluminus* Cenozone, showing close similarity with the *Assamialetes* (*Retialetes*) *emendatus* Cenozone of Tura Formation. *Assamialetes emendatus, Proxapertites assamicus, P. crassimurus, Dandotiaspora dilata, D. telonata, Liliacidites major, Lycopodiumsporites palaeocenicus* and *Foveotriletes palaeocenicus* are the important taxa common to both the cenozones. *Dandotiaspora dilata* Cenozone—the next higher biozone of the Mikir Formation, shows close correspondence in miofloral composition with the *Dandotiaspora telonata* Cenozone of the Tura Formation. The stratigraphically significant forms common to both the cenozones are—*Dandotiaspora telonata, D. dilata, Proxapertites assamicus, Polycolpites cooksonii,* and *Assamialetes emendatus.* Stratigraphically valuable elements of the third higher level, i.e. the *Palmidites plicatus* Cenozone of the Tura Formation are identical to the lithologically corresponding horizon in Mikir Formation. The corresponding levels of both the formations show a high frequency of *Palmidites plicatus.* Hence, in Mikir Formation also, this level is designated as *Palmidites plicatus* Cenozone. Beside *Palmidites plicatus,* other significant forms of this assemblage zone are—*Palmidites maximums, Polycolpites cooksonii, Lycopodiumsporites palaeocenicus, Foveotriletes palaeocenicus, Dandotiaspora dilata, Tricolpites levis* and *Laricoidites magnus.* The upper two cenozones of the Mikir Formation, viz : *Foveotriletes palaeocenicus* Cenozone and *Palmaeopollenites eocenicus* Cenozone are quite distinct from each other. The *Palmaepollenites eocenicus* Cenozone can be distinguished from the underlying *Foveotriletes palaeocenicus* Cenozone by the presence of fossil dinoflagellates. These marine elements in the Mikir Formation are restricted to its topmost biozone. All the important palynofossils of the *Proxapertites* (*Nymphaeoipollis*) *assamicus* Cenozone, which is the uppermost biostratigraphic unit of the Tura Formation are well represented in the *Foveotriletes palaeocenicus* Cenozone and *Palmaeopollenites eocenicus* Cenozone of the Mikir Formation. These forms are—*Proxapertites assamicus, Foveotriletes palaeocenicus, Palmaepollenites eocenicus, P. communis, Palmidites plicatus, P. maximus, Liliacidites major, Lycopodiumsporites palaeocenicus* and *Polypodiisporites oligocenicus.* The above comparison clearly indicates that the *Proxapertites* (*Nymphaeoipollis*) *assamicus* Cenozone of Tura Formation is equivalent to the *Foveotriletes palaeocenicus* and *Palmaepollenites eocenicus* Cenozones of the Mikir Formation.

Thus, it becomes very clear that the different biostratigraphic divisions of Tura and Mikir formations closely correspond with each other. The differences observed between the palynological assemblages of the two litho-units are minor (Table-3) and may be of only local significance.

All the four biozones distinguished in the Tura Formation of Garo Hills represent the westerly continuation of the four biozones established in the Lower Palaeogene sediments of Khasi and Jaintia Hills. Therefore, the latter should also extend further towards east in North Cachar Hills. This is proved by the close comparison of the palynological assemblages of Mikir Formation and Lower Palaeogene succession of Khasi and Jaintia Hills. The lower three zones of Mikir Formation, viz., *Assamialetes macroluminus* Cenozone, *Dandotiaspora dilata* Cenozone, and *Palmidites plicatus* Cenozone show close correspondence with *Proxapertites* (*Nymphaeoipollis*) *crassimurus* Cenozone, *Araliaceoipollenites reticulatus* Cenozone and *Tricolpites reticulatus* Cenozone of Cherra Formation, respectively. The upper two zones of the Mikir Formation, viz., *Foveotriletes palaeocenicus* Cenozone and *Palmaeopollenites eocenicus* Cenozone contain a number of stratigraphically significant forms which characterize the Lakadong palynological assemblage. The detailed miofloral comparison of the different biozones of Mikir Formation with corresponding zones

Table 3—Miofloral comparison of Tura and Mikir Formations

Tura Formation (Sah & Singh, 1974)		Mikir Formation		Common Elements	Differences
Zones	Characteristic/Marker species	Zones	Characteristic/Marker species		
Proxapertites assamicus Cenozone	*Proxapertites assamicus*, *Cicatricosisporites macrocostatus*, *Stephanocolpites tertiarus*, *Meliapollis ramanujamii*, *Polypodiisporites oligocenicus*, *Foveotriletes palaeocenicus*, *Palmidites plicatus*, *Liliacidites major* and *Lycopodiumsporites palaeocenicus*	*Palmaepollenites eocenicus* Cenozone	*Palmaepollenites eocenicus*, *P. communis*, *Polysphaeridium assamicus*, *Oligosphaeridium complex* and *Impletosphaeridium tinsolitum*.	*Proxapertites assamicus*, *Foveotriletes palaeocenicus*, *Palmaepollenites eocenicus*, *P. communis*, *Palmidites plicatus*, *P. maximus*, *Lycopodiumsporites palaeocenicus* and *Polypodiisporites oligocenicus*.	(a) In Tura Formation the microplanktons are distributed throughout the formation while in Mikir Formation these brackish-water forms are restricted only to the topmost part of the formation which is represented by the *Palmaepollenites eocenicus* Cenozone.
		Foveotriletes palaeocenicus Cenozone	*Foveotriletes palaeocenicus*, *Dandotiaspora dilata*, *D. telonata*, *Assamiasporites tertiarus*, *Proxapertites assamicus*, *Palmidites plicatus*, *P. maximus*, *Lycopodiumsporites palaeocenicus* and *Polypodiisporites oligocenicus*.		
Palmidites plicatus Cenozone	*Palmidites plicatus*, *P. maximus*, *Polycolpites cooksonii*, *Tricolpites levis*, *Laricoidites magnus*, *Couperipollis brevispinosus*, *C. rarispinosus*, *Dandotiaspora dilata*, *Lycopodiumsporites palaeocenicus* and *Foveotriletes palaeocenicus*.	*Palmidites plicatus* Cenozone	*Palmidites plicatus*, *P. maximus*, *Foveosporites eocenicus*, *Tricolpites levis*, *Dandotiaspora dilata*, *D. telonata*, *Proxapertites assamicus*, *Assamiasporites tertiarus*, *A. macroluminus*, *Foveotriletes pachyexinous*, *F. palaeocenicus*. *Lycopodiumsporites palaeocenicus*, *Polycolpites cooksonii*, *Laricoidites magnus* and *Margotriletes foveoreticulatus*	*Palmidites plicatus*, *P. maximus*, *Polycolpites cooksonii*, *Lycopodiumsporites palaeocenicus*, *Foveotriletes palaeocenicus*, *Dandotiaspora dilata*, *Tricolpites levis* and *Laricoidites magnus*.	(b) Absence of significant species of Mikir Formation like— *Assamialetes macroluminus*, *Polycolporites indicus* and *Polysphaeridium assamicus* in Tura assemblage.
Dandotiaspora telonata Cenozone	*Dandotiaspora telonata*, *D. dilata*, *Polycolpites cooksonii*, *Lycopodium sporites palaeocenicus*, *Proxapertites assamicus*, *Assamialetes emendatus*, and *Foveotriletes palaeocenicus*.	*Dandotiaspora dilata* Cenozone	*Dandotiaspora dilata*, *D. telonata*, *Proxapertites assamicus*, *Assamialetes emendatus*, *Polycolporites indicus*, *Palmidites granulatus* and *Polycolpites cooksonii*.	*Dandotiaspora telonata*, *D. dilata*, *Proxapertites assamicus*, *Assamialetes emendatus* and *Polycolpites cooksonii*.	(c) *Cicatricosisporites macrocostatus* and *Margocolporites complexum* which are the restricted and significant forms of topmost level of Tura Formation, are completley absent in the Mikir Formation.
Assamialetes emendatus Cenozone	*Assamilaetes emendatus*, *Proxapertites crassimurus*, *P. assamicus*, *Triorites communis*, *Dandotiaspora dilata*, *D. telonata*, *Lycopodiumsporites palaeocenicus*, *Foveotriletes pachyexinous* and *Liliacidites major*.	*Assamialetes macroluminus* Cenozone	*Assamialetes macroluminus*, *A. emendatus*, *Lycopodiumsporites palaeocenicus*, *Dandotiaspora dilata*, *D. telonata*, *Proxapertites assamicus*, *P. crassimurus*, *Foveotriletes pachyexinous*, *F. palaeocenicus*, *Assamiasporites tertiarus* and *Cyathidites australis*.	*Assamialetes emendatus*, *Proxapertites assamicus*, *P. crassimurus*, *Dandotiaspora dilata*, *D. telonata*, *Liliacidites major*, *Lycopodiumsporites palaeocenicus* and *Foveotriletes palaeocenicus*.	

Table 4—Miofloral comparison of Mikir Formation with Lower Palaeocene sediments of Khasi and Jaintia Hills

Lower Palaeogene Sediments of Khasi-Jaintia Hills (Sah & Dutta, 1974)		Mikir Formation		Common Elements	Differences
Zones	Characteristic/Marker Species	Zones	Characteristic/Marker Species		
Lakadong Palynological Zone	*Assamialetes dubius*, *Couperipollis brevispinosus*, *C. rarispinosus*, *Palmaepollenites eocenicus*, *P. communis*, *Triorites communis*, *Assamiasporites tertiarus*, *Dandotiaspora dilata*, *D. telonata* and *Lycopodiumsporites palaeocenicus*.	*Palmaeopollenites eocenicus* Cenozone	*Palmaepollenites eocenicus*, *P. communis*, *Polysphaeridium assamicus*, *Oligosphaeridium* complex and *Impletosphaeridium insolitum*.	*Palmaepollenites eocenicus*, *P. communis*, *Dandotiaspora telonata*, *D. dilata*, *Assamiasporites tertiarus*, *Proxapertites assamicus*, *Polypodiisporites oligocenicus* and *Lycopodiumsporites palaeocenicus*.	(*a*) In the Lower Palaeogene assemblages of Khasi and Jaintia Hills angiosperms dominate over the pteridophytes while in the Mikir assemblage, pteridophytes dominate over the angiosperms.
		Foveotriletes palaeocenicus Cenozone	*Foveotriletes palaeocenicus*, *Dandotiaspora dilata*, *D. telonata*, *Assamiasporites tertiarus*, *Corrugatisporites formosus*, *C. triangulus*, *Proxapertites assamicus*, *Lycopodiumsporites palaeocenicus* and *Polypodiisporites oligocenicus*.		(*b*) The genus *Dandotiaspora*, which is among the most significant and dominant taxa of the Mikir palynological assemblage, is rather poorly represented in the Cherra Formation. Similarly, the *Proxapertites assamicus* which occurs abundantly in all the lower four cenozones of the Mikir Formation, is not so well represented in the Cherra Formation.
Tricolpites reticulatus Cenozone	*Tricolpites reticulatus*, *Trifossapollenites constatus*, *Triporopollenites vimalii*, *Assamiasporites tertiarus*, *Polycolpites cooksonii*, *Dandotiaspora telonata*, *D. dilata*, *Foveotriletes pachyexinous* and *Lycopodiumsporites palaeocenicus*.	*Palmidites plicatus* Cenozone	*Palmidites plicatus*, *Foveosporites eocenicus*, *Lycopodiumsporites palaeocenicus*, *Dandotiaspora dilata*, *D. telonata*, *Proxapertites assamicus*, *Assamiasporites tertiarus*, *Todisporites major*, *Foveotriletes pachyexinous*, *Assamiasporites macroluminus*, *Polycolpites cooksonii*, *Laricoidites magnus*, *Margotriletes foveoreticulatus* and *Tricolpites levis*.	*Polycolpites cooksonii*, *Tricolpites levis*, *Assamiasporites tertiarus*, *Foveotriletes pachyexinous*, *Proxapertites assamicus*, *Dandotiaspora dilata*, *D. telonata* and *Lycopodiumsporites palaeocenicus*.	

Table 4 (contd.)

Araliaceoipollenites reticulatus Cenozone	*Araliaceoipollenites reticulatus, A. psilatus, ? Dorseridites parvus, Corrugatisporites formosus, Triorites communis, Assamialetes emendatus, Polycolpites cooksonii, Dandotiaspora dilata, D. telonata, Assamiasporites tertiarus* and *Lycopodiumsporites palaeocenicus.*	*Dandotiaspora dilata* Cenozone	*Dandotiaspora dilata, D. telonata, Proxapertites assamicus, Liliacidites major, Assamialetes emendatus, Polycolporites indicus, Palmidites granulatus* and *Polycolpites cooksonii*	*Dandotiaspora telonata, D. dilata, Assamialetes emendatus, Polycolpites cooksonii and Praxapertites assamicus.*	
Proxapertites crassimurus Cenozone	*Proxapertites crassimurus, Assamialetes emendatus, Polypodiisporites mawkmaensis, Polycolpites ornatus, Lakiapollis matanamadhensis, Dandotiaspora telonata, D. dilata, Cyathidites australis, Foveotriletes pachyexinous, Lycopodiumsporites palaeocenicus* and *Assamiasporites tertiarus.*	*Assamialetes macroluminus* Cenozone	*Assamialetes macroluminus, Lycopodiumsporites palaeocenicus, Foveotriletes pachyexinous, Assamiasporites tertiarus, Dandotiaspora telonata, D. dilata, Cyathidites australis, Assamialetes emendatus, Proxapertites assamicus* and *P. crassimurus.*	*Proxapertites crassimurus, P. assamicus, Lycopodiumsporites palaeocenicus, Foveotriletes pachyexinous, Assamiasporites tertiarus, Dandotiaspora telonata, D. dilata, Cyathidites australis* and *Assamialetes emendatus.*	(*c*) Absence of *Araliaceoipollenites reticulatus* and *Tricolpites reticulatus* in the Mikir Formation is a remarkable difference of the two assemblages.

of Lower Palaeogene sediments of Khasi and Jaintia Hills is shown in Table-4. It has been observed that there are certain differences also between the palynological assemblages of the lithologically corresponding horizons of Khasi-Jaintia and North Cachar Hills but these differences are not of much significance and may be due to the interference of local factors. The palynological correlation of the basal Tertiary units of Shillong Plateau, viz., Mikir Formation of North Cachar Hills, Cherra and Lakadong sequence of Khasi-Jaintia Hills and Tura Formation of Garo Hills, is represented in Table-5.

Thus, the palynological evidence is in agreement with lithological data indicating that the Mikir Formation could be correlated with the Lower Palaeogene succession of Khasi and Jaintia Hills, comprising Therria (=Cherra) Formation and clastic sediments of the Sylhet Limestone Formation. A more closer comparison is seen with the Tura Formation of Garo Hills. The close resemblance between these sediments, in stratigraphic position, lithology and biozone subdivision leads to the conclusion that the Mikir Formation is the lateral equivalent of the Therria (=Cherra) Formation of Khasi and Jaintia Hills, and Tura Formation of Garo Hills in North Cachar Hills.

The basin of deposition for the basal Tertiary units in Lower Assam was in the form of a long narrow trough bordering the southern slopes of the Shillong Plateau and running from its western margin in Garo Hills towards east and north-east in North Cachar and Mikir Hills, respectively. The basin was deepest in the middle in Khasi and Jaintia Hills where it was sinking more rapidly than towards its eastern and western margins in North Cachar and Garo Hills, under the enormous load of Cretaceous sediments. These sediments are completely absent in North Cachar and major part of the Garo Hills. Because of this deepening in the central part, the Therria sediments were laid down in Khasi and Jaintia Hills, attaining a thickness of 213 m while the shallower part of the basin in Garo Hills, where the Tura Formation is developed, represents a maximum thickness of 170 m. The North Cachar Hill area bordering the basin towards east was still a comparatively higher ground than the areas west of it. Therefore, the Mikir Formation deposited here is comparatively much thinner than the Cherra and Tura formations. Its maximum thickness in the type area is 70 m. The palaeoconfiguration of the southern fringes of Shillong Plateau is further reflected by the thickest development of Sylhet Limestone Formation (236 m) in Khasi and Jaintia Hills. The equivalent stratigraphic unit of Garo Hills, i.e. the Siju Limestone Formation, is only 90 m thick. Similarly, the Garampani Limestone, precipitated in North Cachar Hills, is also quite thin (127 m) due to the marginal relief of the sedimentary basin.

Biologically, Siju Limestone and Garampani Limestone formations abound in phytoplankton and foraminifera due to their origin on the continental shelf. The Sylhet Limestone being deposited in the open marine conditions encloses abundant foraminifera while the representation of the microplankton is comparatively meagre here. The deep sea conditions are further reflected by the fine crystalline nature of the limestone bands in Khasi and Jaintia Hills.

ACKNOWLEDGEMENTS

The present work is a part of author's Ph.D. thesis, completed at the Birbal Sahni Institute of Palaeobotany, Lucknow. The author expresses his gratefulness to Dr. S. C. D. Sah, Directcr, Wadia Intsitute of Himalayan Geology, Dehra Dun for supervision and encouragement given by him throughout the course of work. Sincere thanks are also due to the authorities of the B.S.I.P. for proivding facilities.

Table 5—Palynological correlation of the basal Tertiary units of Shillong Plateau

	Garo Hills (Sah & Singh, 1974)		Khasi and Jaintia Hills (Sah & Dutta, 1974)		North Cachar Hills	Climatic Changes	Common Marker Forms
T U R	*Proxapertites assamicus* Cenozone	C H E R R A	Lakadong Palynological Zone	M I K I R	*Palmaepollenites eocenicus* Cenozone - *Foveotriletes palaeocenicus* Cenozone	Cold Phase	*Palmaepollenites eocenicus*, *P. communis*, *Dandotiaspora dilata*, *Proxapertites assamicus* and *Polypodiisporites oligocenicus*.
A	*Palmidites plicatus* Cenozone		*Tricolpites reticulatus* Cenozone		*Palmidites plicatus* Cenozone	Warm Phase	Palynofossils absent.
F O R		F O R		F O R		Cold Phase	*Polycolpites cooksonii*, *Dandotiaspora dilata*, *Lycopodiumsporites palaeocenicus* and *Tricolpites levis*.
M A T	*Dandotiaspora telonata* Cenozone	M A T	*Araliaceoipollenites reticulatus* Cenozone	M A T	*Dandotiaspora dilata* Cenozone	Warm Phase	*Dandotiaspora dilata*, *D. telonata*, *Assamialetes emendatus*, *Proxapertites assamicus* and *Polycolpites cooksonii*.
I O N	*Assamialetes emendatus* Cenozone	I O N	*Proxapertites crassimurus* Cenozone	I O N	*Assamialetes macroluminus* Cenozone	Cold Phase	*Assamialetes emendatus*, *Proxapertites crassimurus*, *P. assamicus*, *Dandotiaspora dilata*, *D. telonata* and *Lycopodiumsporites palaeocenicus*.

REFERENCES

BAKSI, S. K. (1974). Stratigraphical position of Cherra Formation of South Shillong Plateau :pp. 534-549 in Surange, K. R. *et al.* (Eds.), *Aspects and Appraisal of Indian Palaeobotany.*, Birbal Sahni Inst. Palaeobot. Lucknow.

DUTTA, S. K. & SAH, S. C. D. (1970). Palynostratigraphy of the Tertiary sedimentary formations of Assam: 5—Stratigraphy and palynology of South Shillong Plateau. *Palaeontographica*, **131B**(1-4) : 1-72.

MEHROTRA, N. C. (1977). A contribution to the palynostratigraphy of the Lower Eocene sediments of North Cachar Hills, Assam. *Ph. D. Thesis, Lucknow University.*

SAH, S. C. D. & DUTTA, S. K. (1974). Palynostratigraphy of the sedimentary formations of Assam : 3. Biostratigraphic zonation of the Cherra Formation of South Shillong Plateau. *Palaeobotanist*, **21**(1) : 42-47.

SAH, S. C. D. & SINGH, R. Y. (1974). Palynological biostratigraphy of the Tura Formation. *Symp. Strat. Palynol., Birbal Sahni. Inst. Palaeobot., Spec. Publs.* **3** : 76-98.

SAH, S. C. D. & SINGH, R. Y. (1980). Palynological demarcation of the Cretaceous-Tertiary sediments in Assam basin. *Proc. IV Int. Palynol. Conf., Lucknow* (1976-77), **2** : 691-707.

SAMANTA, B. K. (1971). Early Tertiary stratigraphy of the area around Garampani, Mikir-North Cachar Hills, Assam. *J. geol. Soc. India*, **12**(4) : 318-327.

SINGH, R. Y. & MEHROTRA, N. C. (1977). Palynological evidence on the age of Mikir Formation. *Curr. Sci.*, **46**(4) : 128-129.

SMITH, F. H. (1898). Geology of the Mikir Hills in Assam. *Mem. geol. Surv. India*, **28**(1) : 71-95.