

PALYNOLOGY OF THE KOPILI FORMATION (UPPER EOCENE) EXPOSED ALONG JOWAI-BADARPUR ROAD, MEGHALAYA.¹

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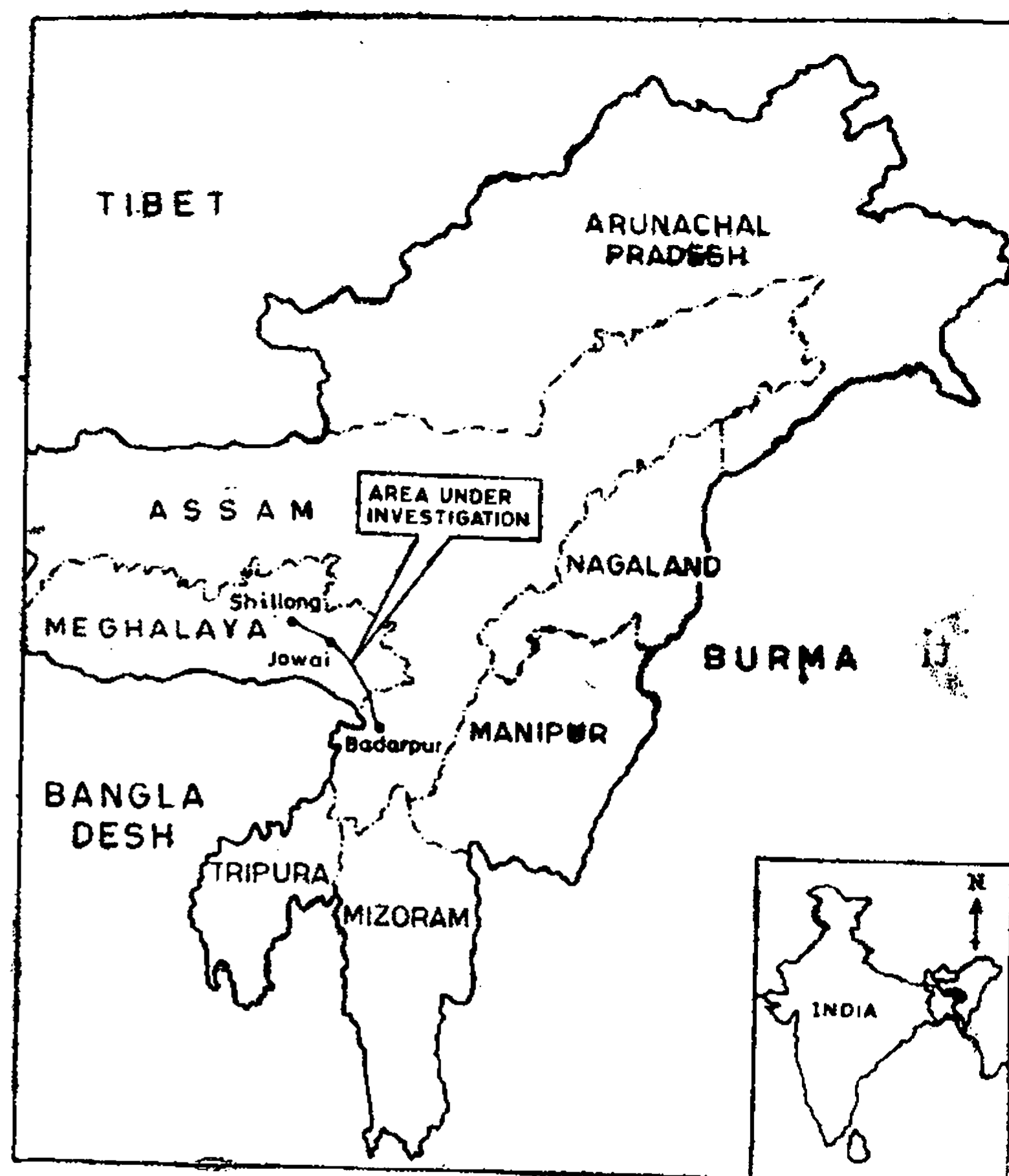
ABSTRACT

A rich palynological assemblage recovered from the Kopili Formation exposed near Sonapur on the Jowai-Badarpur Road, Meghalaya, is described here. The pteridophytes are found in dominance and genera like *Striatriletes*, *Cyathidites*, *Lygodiumsporites*, *Polypodiisporites*, *Polypodiaceasporites* are common. The gymnospermous genera found are : *Podocarpidites*, *Pinuspollenites* and *Abiespollenites*. The angiosperms are rare and represented by *Margocolporites*, *Pelliceroipollis* and *Tricolpites*. Besides some reworked Palaeozoic genera e.g. *Parasaccites*, *Cannanoropollis*, *Platysaccus*, *Striatites*, *Lahirites* and *Scheuringipollenites* also occur frequently. Further, occurrence of Gondwana palynomorphs in the Upper Eocene sediments has been discussed.

INTRODUCTION

The Jowai-Badarpur Road section is situated in the South Shillong plateau; it represents a good stratigraphic sequence comprising sediments of Jaintia Group (Eocene), Barail Group (Oligocene) and Surma Group (Miocene). The Kopili Formation represents the top most part of Eocene succession of Shillong plateau and also the top most lithological unit of the Jaintia Group. The samples for the present investigation were collected from a road cutting near Lumshnong (25° 10' 16" N 92° 22' 52" E and 125 km from Shillong) about 6.5 km away from Lumshnong towards Badarpur on the South Eastern slope of the Shillong plateau in the Jaintia Hills, Meghalaya.

Kopili Formation is best exposed in the Southern and South Eastern parts of the Shillong plateau i.e. Jowai-Badarpur



Map Showing the area from where Samples were Collected in Meghalaya

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road section, National Highway number 44 in the Jaintia Hills, Meghalaya. But on this road section, Kopili Formation is confined between 131.5 km post to 140 km post (distances are from Shillong) i.e. it occurs at a stretch of about 8.5 km. In the Khasi hills it is well exhibited at Isamati, Kommoroh and in Shella river section. In upper Assam the outcrops of Kopili Formation are seen in Karbi-Anglong along the river Kailajan. In Sibsagar and Dibrugarh districts it has been recorded in many bore holes. The general stratigraphic sequence is as follows :—

(After Mathur & Evans, 1964)

Group	Formation	Age	
Surma		Miocene	
Barail		Oligocene	
	Kopili	Upper Eocene	E
			O
Jaintia	Sylhet	Middle Eocene	C
	Prang Lst. Nurpuh Sst. Umlatodoh Lst. Lakadong Sst. Lakadong Lst.	Lower Eocene	E
			N
	Therria	Palaeocene	E

Kopili Formation is developed in shelf sediments in this part and is overlain by Laisong Formation of Barail Group (geosynclinal sediments) and is underlain by Prang Limestone Formation—the top most lithologic unit of Sylhet Formation (shelf sediments). Kopili Formation has a very typical lithology i.e. it is made up of alternations of sandstones and thin bands of khakhi grey to marly shale bands. Because of its very characteristic lithology it is also sometimes referred to as “Kopili alternation stage.” The name of this formation was instituted by Evans (1932) and the Kopili river section of the Kopili-

Khorugma (Khorugma 25° 28' : 92° 5') area has been considered as the type section.

One hundred and twentytwo samples were collected in one exposure covering all the lithologies from top to bottom. Of them 100 samples yielded spores and pollen grains.

Previous palynological work: Palynological investigation of the lower Tertiary sediments of South Shillong plateau has been done by number of workers namely, Baksi (1962, 1965, 1974a, 1974b), Biswas (1962), Dutta and Jain (1980), Dutta and

Sah (1970, 1974), Sah (1974), Sah and Dutta (1966, 1968, 1974), Sah and Singh (1980), Salujha and Kindra (1981), Salujha, Kindra and Rehman (1972, 1974), Sein and Sah (1974), Singh, Singh and Sah (1975), Singh and Singh (1978) and Tripathi and Singh (1984).

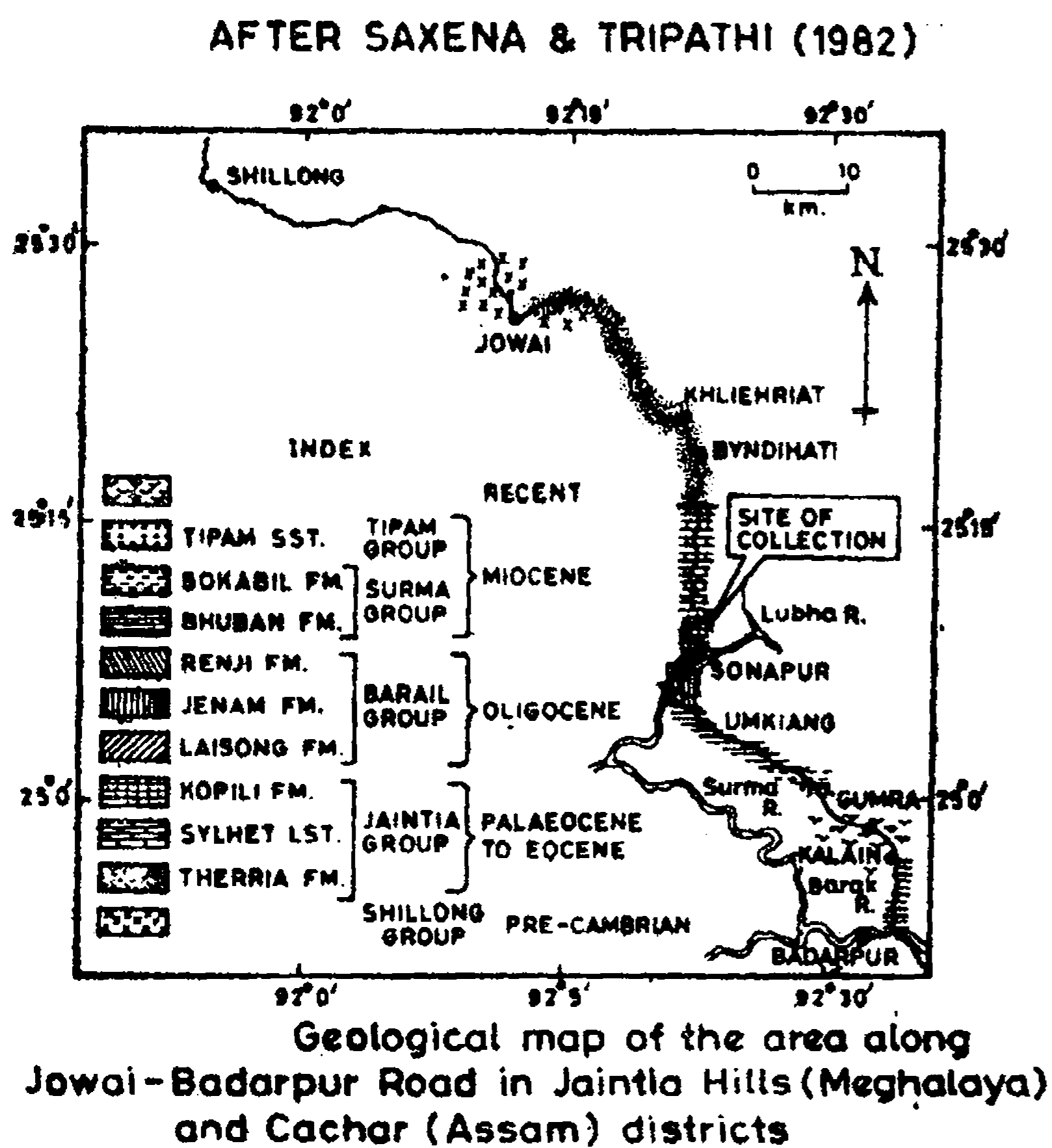
The rich palynological assemblage obtained from the Kopili Formation, has been placed under 14 dispersed genera and 11 species.

Podosporites tripakshi Rao

Podocarpidites khasiensis Dutta & Sah

Pinuspollenites sp.

Pelliceroipollis langenhaemii Sah & Kar



Striatriletes microverrucosus Kar & Saxena
Osmundacidites cephalus Saxena
Cyathidites minor Couper
Polypodiaceasporites chatterjii Kar
Laevigatosporites lakiensis Sah & Kar
Polypodiisporites sp.
Dictyophyllidites granulatus Saxena
Lygodiumsporites lakiensis Sah & Kar
Foveotriletes sp.
Verrutrilletes sp.
Striatriletes susannae (Van der Hammen)
 Kar

Besides the typical Upper Eocene palynomorphs there are also reworked Palaeozoic and Mesozoic spores and pollen in the assemblage. *Densipollenites*, *Parasaccites*, *Striatopodocarpidites*, *Corisaccites*, *Striatites*, *Lahirites* and *Indotriradites* represent the Permian while *Callialasporites* and *Jansoniaspora* represent the Mesozoic. Palynological assemblage in the material consists of pteridophytic spores, gymnospermous and angiospermous pollen grains. The pteridophytes are found in dominance and are generally represented by *Striatriletes*,

Dictyophyllidites and *Cyathidites*. The gymnospermous pollen like *Podocarpidites* and *Pinuspollenites* are also occasionally found. Among the angiosperms, tricolporate genera like *Margocolporites* and *Pellicieripollis* are occasionally met with.

All the slides concerning this investigation have been deposited in the Museum of the Birbal Sahni Institute of Palaeobotany, Lucknow.

Comparison with other assemblage: The Upper Eocene assemblage described by Sein and Sah (1974) consists of *Polycopites*, *Lygodiumsporites*, *Retitricolporites*, *Todisporites*, *Osmundacidites*, and *Striatriletes* (*Cicatricosisporites*). The dominance of *Striatriletes* was also noted by them. The palynomorphs described here are, however, more varied than those described by Sein and Sah (1974).

Baksi (1962) proposed Simasang palynological Zone II for the Kopili microflora on the Simsang river, Garo Hills. He observed the first appearance of *Simangia trispinosa* as a marker for the Kopili Formation. The frequent occurrence of *Laevigatosporites kopilia* and *Acolporipites spinulosa* is also characteristic of Kopili Formation in Garo Hills. All these 3 taxa are, however, absent in the present assemblage. It seems that the two assemblages were deposited in different types of environment.

Palaeoecological interpretation: The abundance of *Striatriletes* which are supposed to be the dispersed spores of *Ceratopteris* of the family Parkeriaceae points out that during the time of deposition it was a coastal plain enjoying heavy rain fall, warm and humid climate. *Ceratopteris*, it may be recalled here, is a fresh water fern and can thrive only in this type of environment. The basin was very clear and quiet without much influence of heavy flood. This is evidenced by the fine nature of the sediments and very close al-

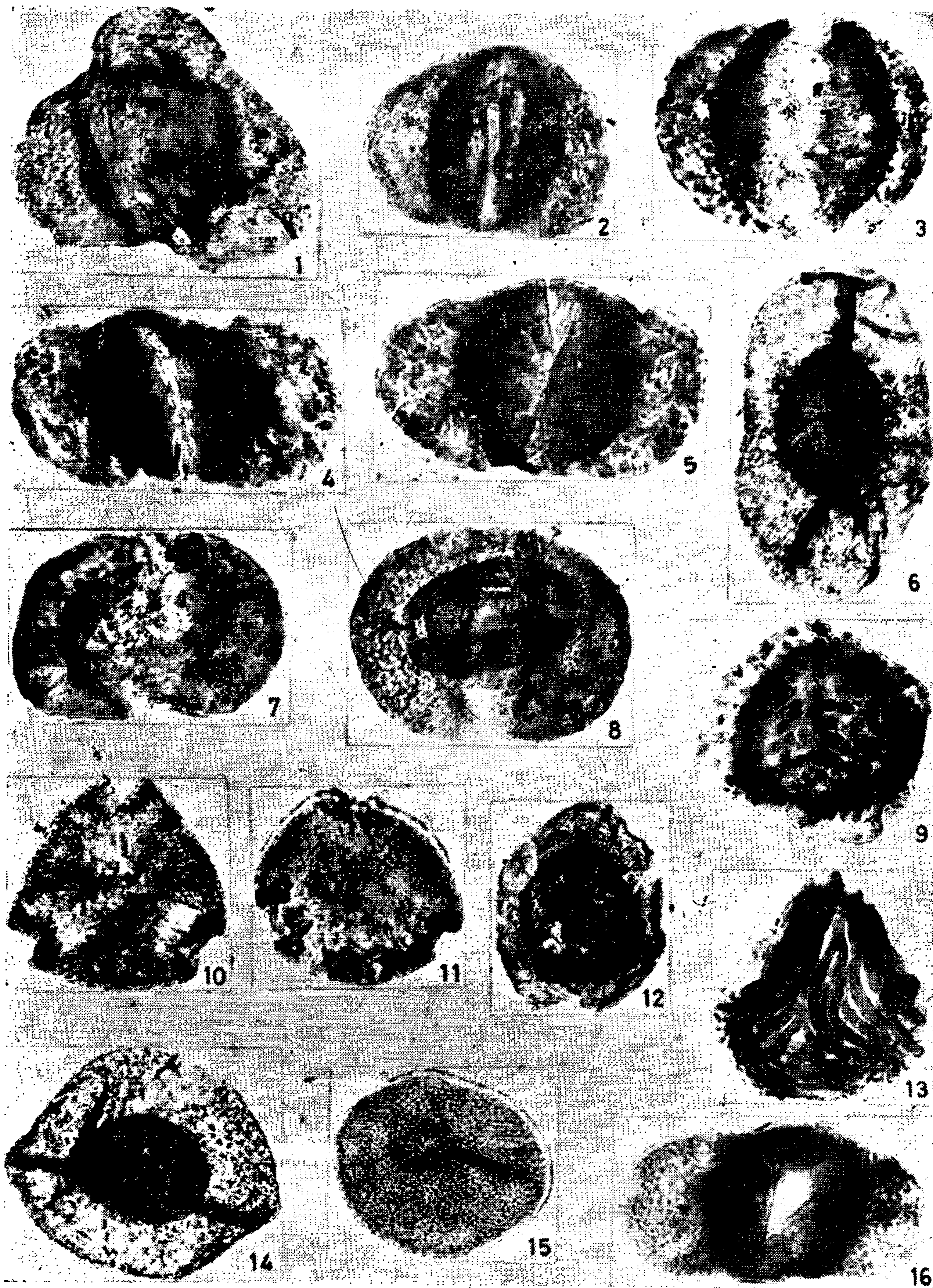


Plate-1. Fig. 1. *Podosporites tripakshi* Rao. Slide no. 9127. 2 & 3. *Podocarpidites khasiensis* Dutta & Sah. Slide nos. 9128 & 9129. 4, 5 & 16. *Pinsupollenites* sp. Slide nos. 9130, 9131, & 9141. 6 & 14. *Densipollenites* (reworked). Slide nos. 9132 & 9136. 7 & 8. *Corisaccites* sp. (reworked). Slide no. 9133, 9134. 9. *Indotriletes* sp. (reworked). Slide no. 9135. 10 & 11. *Pellicieraipollis langenheimii* Sah & Kar. Slide no. 9136 & 9137. 12. *Densipollenites* sp. (reworked). Slide no. 9138. 13. *Striatriletes microverrucosus* Kar & Saxena. Slide no. 9139. 15. *Osmundacidites cephalus* Saxena. Slide no. 9140.

(All \times Ca 425)

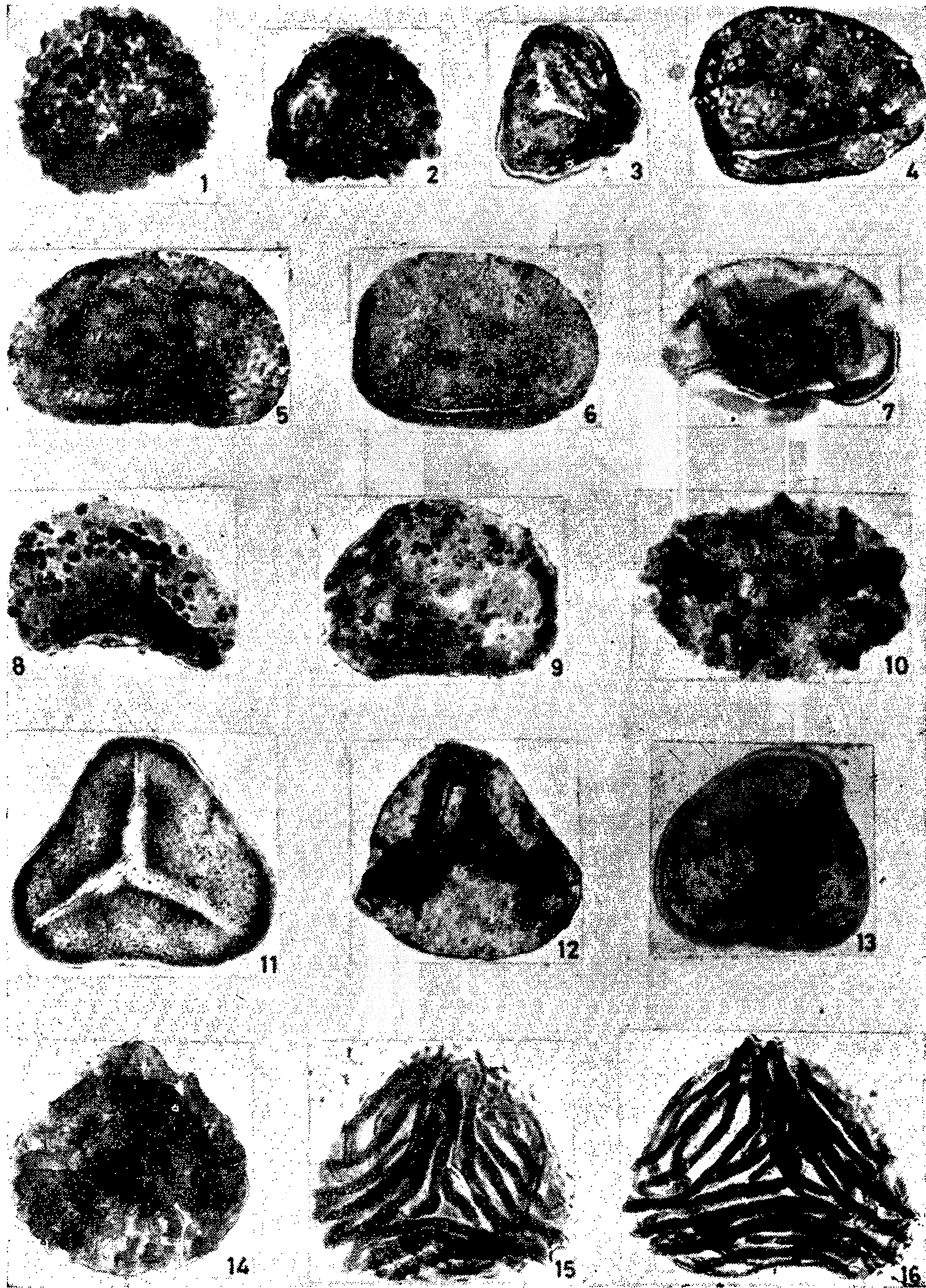


Plate-2 Fig. 1, 2, & 14. *Verrutrites* sp. Slide nos. 9142, 9143, & 9153. 3. *Cyathidites minor* Couper. Slide no. 9143. 4, 5 & 6. *Polypodiaceasporites chatterjii* Kar Slide nos. 9131, 9144 & 9145. 7. *Laeigiatosporites lakiensis* Sah & Kar. Slide no. 9146. 8, 9 & 10. *Polypodiisporites* sp. Slide nos. 9147, 9148 & 9149. 11. *Foveotritetes* sp. Slide no. 9150. 12. *Dictyophyllidites granulatus* Saxena. Slide no. 9151. 13. *Lygodiumsporites lakiensis* Sah & Kar. Slide no. 9152. 15 & 16. *Striatritetes susannae* V. D. Hammen emend Kar. Slide nos. 9154 & 9131.

(All \times ca 425).

ternation of thin shales and sandstones.

The occurrence of Permian palynofossils in Upper Eocene sediments of Meghalaya suggests that the Permian exposures were quite extensive in this region. Perhaps, with the Himalayan orogeny, the Gondwana sediments hitherto submerged, were exposed and eroded to deposit again with the Tertiary sediments. It may be stated here that the Lower Gondwana exposures at present are found only at Singrimari in Garo hills of Meghalaya. They however, also occur at the foothills of the Himalayas in West Bengal and Arunachal Pradesh. Dutta (1982) worked extensively on Tertiary sediments of Assam and Meghalaya. He remarked "It is interesting to note that Kopili Formation of Meghalaya contains reworked Permian palynomorphs while the same are not encountered in any lithology belonging to the Kopili of Upper Assam".

Age of the Kopili Formation: The occurrence of *Pelliceroipollis*, *Margocolporites*, *Striatriletes*, *Polypodiisporites* and *Verrutrilletes* are indicative of Upper Eocene age of the sediments. *Striatriletes* is, however, very common in Oligocene and Miocene but they appear for the first time in the Upper Eocene of Meghalaya. *Pelliceroipollis* is common in Palaeocene and Lower Eocene sediments of Meghalaya and Kachch and it disappears after Upper Eocene. The first appearance of bisaccate pollen grains in these sediments also points towards the end of Upper Eocene.

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