Palynology of Langrin Coalfield, South Shillong Plateau, Meghalaya

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Palynology of Langrin Coalfield, Khasi Hills, Meghalaya is reported here. The spore-pollen assemblage recovered from five coal seams associated with Tura Formation comprises 30 genera and 56 species. Presence of dinoflagellate cysts and fungal remains has also been observed. Five new species, viz., *Gemmamonocolpites dimorphous, Clavamonocolpites indicus, Spinizonocolpites indicus, S. wodehousei* and *S. bulbospinosus* are described. Quantitative assessment of the assemblages for each seam has been done. Pteridophytic spores dominate in coal seams 1 and 2 but gradually decrease in the upper seams, while angiospermic pollen behave in more or less *vice-versa* with that of pteridophytic spores. Ecological grouping of palynofossils suggests the occurrence of coastal swamp and brackish-water mangrove communities during the deposition of coal seams. Absence of gymnospermic pollen in the assemblage indicates a flat topography of the basin. Palaeocene age has been assigned to this palynological assemblage.

Key-words—Palynology, Langrin Coalfield, Tura Formation, Palaeocene (India).

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सारांश

मेघालय में दक्षिण शिलांग पठार में लैंग्रिन कोयला-क्षेत्र का परागाणविक अध्ययन

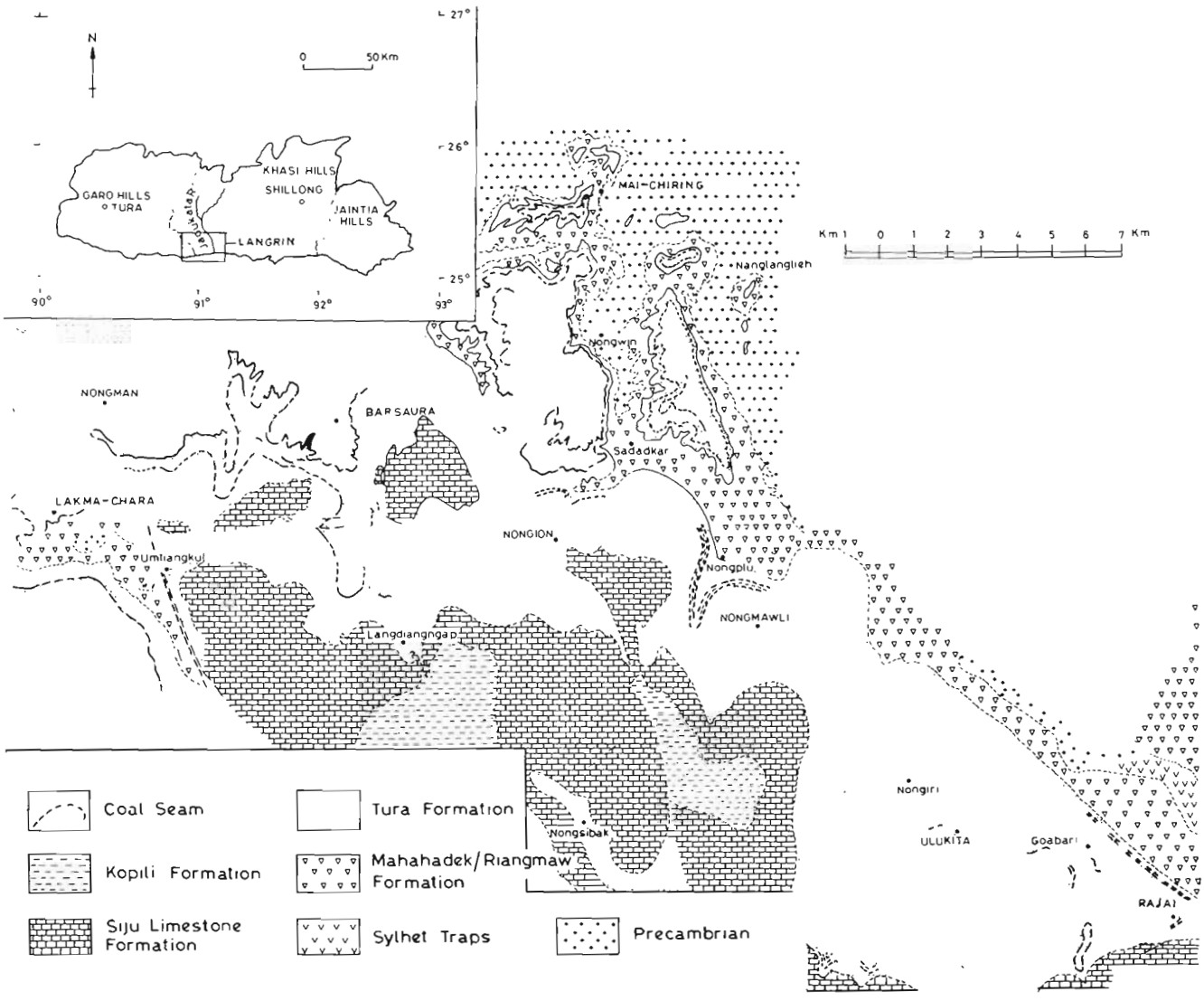
रमा शंकर सिंह

मेघालय में खासी पहाड़ियों में लैंग्रिन कोयला-क्षेत्र का परागाणविक अध्ययन किया गया है। तुरा शैल-समूह से सहयुक्त पाँच कोयला सीमों से उपलब्ध परागकण-बीजाणु समुच्चय में 30 प्रजातियाँ एवं 56 जातियाँ विद्यमान हैं। **जेमामोनोकॉल्पाइटिस डाइमोर्फस, क्लेवामोनोकॉल्पाइटिस इंडिकस, स्पाइनीजोनोकॉल्पाइटिस इंडिकस, स्पा० वॉडहाउसाई** एवं **स्पा० बल्बोसस** नामक पाँच नई जातियाँ वर्णित की गई हैं। प्रत्येक सीम का भारात्मक विश्लेषण किया गया है। कोयला-सीम 1 व 2 में टेरीडोफ़ाइटी बीजाणुओं की बाहुल्यता है लेकिन ऊपरी सीमों में ये शनैः शनैः कम हो जाते हैं जबकि आवृतबीजी परागकण इसके विपरीतं प्रवृत्ति व्यक्त करते हैं। अश्मित परागकणों के पारिस्थितिकीय समूहों से इन कोयला-समूहों के निक्षेपण के समय तटीय दलदली एवं खारे जल वाली मैंग्रोव वनस्पति का होना प्रस्तावित होता है। अनावृतबीजी परागकणों की अनुपस्थिति से चपटी द्रोणी का होना इंगित होता है। इस परागाणविक समुच्चय की पुरानूतन आयु प्रस्तावित की गई है।

LANGRIN Coalfield lies in the western extremity of Khasi Hills between latitudes 25° 12′ : 25° 19′ and longitudes 91° 0′ : 91° 14′, in the state of Meghalaya. Palynologically this coalfield was unattended so far but geologically it was studied by La Touch (1883), Medlicott (1869), Palmer (1924), Fox (1937), Ghosh (1940), Biswas (1962) and Rao (1981). The generalised rock succession in this coalfield is as follows (modified after Rao, 1981):

AGE	FORMATION & LITHOLOGY
Eocene	Siju Limestone: Limestone, marls, silts & shales.
Palaeocene	Tura Formation: Sandstone, coal, shale & clay.
	Unconformity
Late Cretaceous	Jadukata Formation. Sandstones conglomerate alterations.
	Unconformity
Jurassic (?)	Sylhet Trap: Basalt, Alkali basalt rhyolite, acid tuff.
	Unconformity
Pre-Cambrian	Coarse grained granite, granodiorites, banded gneiss & quartzite.

The coal seams in Langrin Coalfield are associated with Tura Formation and are exposed in widely separated patches (Map 1). Rao (1981) reported six coal seams in this coalfield within a thickness ranging from 77 to 126 m, but in the present study only five coal seams could be traced In most part of the coalfield, the top portion of Tura Sandstone is being eroded away exposing seams no.

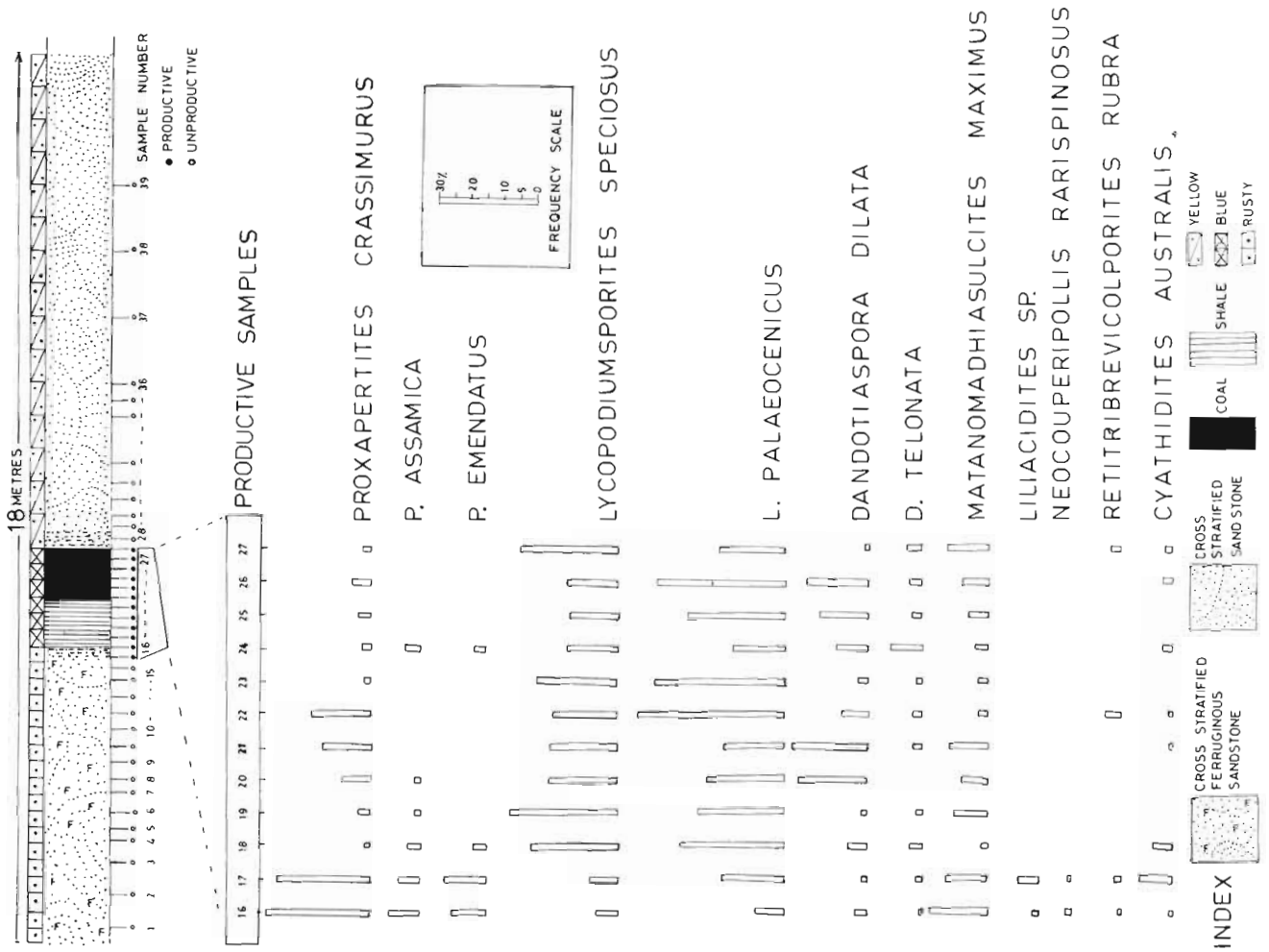


Map 1—Geology of Langrin Coalfield (after Rao, 1981).

3 and 4. Barsaura nala section containing five coal seams is considered to be a reference section whose lithology and location of each sample are plotted in Text-figures 1 to 5. Generally, the coal seams dip at an angle of about 35° south but in the reference section they are almost horizontal. In Jadukata area only one coal seam (seam 5) is encountered which is exposed near Rajai Village Seams 1 and 2 are also exposed near Goabari Village where they are 0.7-1.5 m thick respectively, with an intervening 40 m thick sandstone parting. In the eastern part, Lakma Chara section contains all the seams, except the bottom seam; here seam 3 is locally 3-3.6 m thick. In Mai-Chiring the lowermost coal seam occurs at about 50-60 m above the contact of Jadukata and Tura formations. The samples were collected from Rajai, Goabari, Mai-Chiring, Lakma-Chara and Barsaura (Map 1). The figured and type slides of palynotaxa are housed in the Museum of Birbal Sahni Institute of Palaeobotany, Lucknow.

SPORE AND POLLEN CHECK-LIST

Cyathidites australis Couper 1953
C. minor Couper 1953
Todisporites major Couper 1958
T. minor Couper 1958
Dictyophyllidites kyrtomatus Kar & Kumar 1986
Lygodiumsporites lakiensis Sah & Kar 1969
Dandotiaspora dilata Sah, Kar & Singh 1971
D. telonata Sah, Kar & Singh 1971
D. plicata (Sah & Kar) Sah, Kar & Singh 1971
Lycopodiumsporites palaeocenicus Dutta & Sah



Text-figure 1—Histogram illustrating relative abundance of spore-pollen species in coal seam 1.

1970

L. speciosus Dutta & Sah 1970

L. umstewensis Dutta & Sah 1970

Pteridacidites robustus Kar & Kumar 1986

Schizaeoisporites crassimurus Dutta & Sah 1970

Polypodiisporites mawkmaensis Dutta & Sah 1970

Palmidites plicatus Singh 1974

P. aplicatus Singh 1974

Retimonosulcites ovatus (Sah & Kar) Kar 1985

Liliacidites sp. in Kar & Kumar 1986

Matanomadhiasulcites maximus (Saxena) Kar 1985

M. kutchensis (Saxena) Kar 1985

Clavamonocolpites indicus sp. nov.

Gemmamonocolpites dimorphous sp. nov.

Neocouperipollis kutchensis (Venkatachala & Kar) Kar & Kumar 1986

N. rarispinosus (Venkatachala & Kar) comb. nov.

N. echinatus (Sah & Kar) Kar & Kumar 1986

N. magnus (Dutta & Sah) comb. nov.

Proxapertites assamica (Sah & Dutta) Singh 1975

P. crassimurus (Sah & Dutta) Singh 1975

P. emendatus (Sah & Dutta) Kar & Kumar 1986

Spinizonocolpites echinatus Muller 1968

S. baculatus Muller 1968

S. intrarugulatus Muller, de Di Giacomo & Van Erve 1987

S. bulbospinosus sp. nov.

S. indicus sp. nov.

S. wodehousei sp. nov.

Spinizonocolpites sp. A.

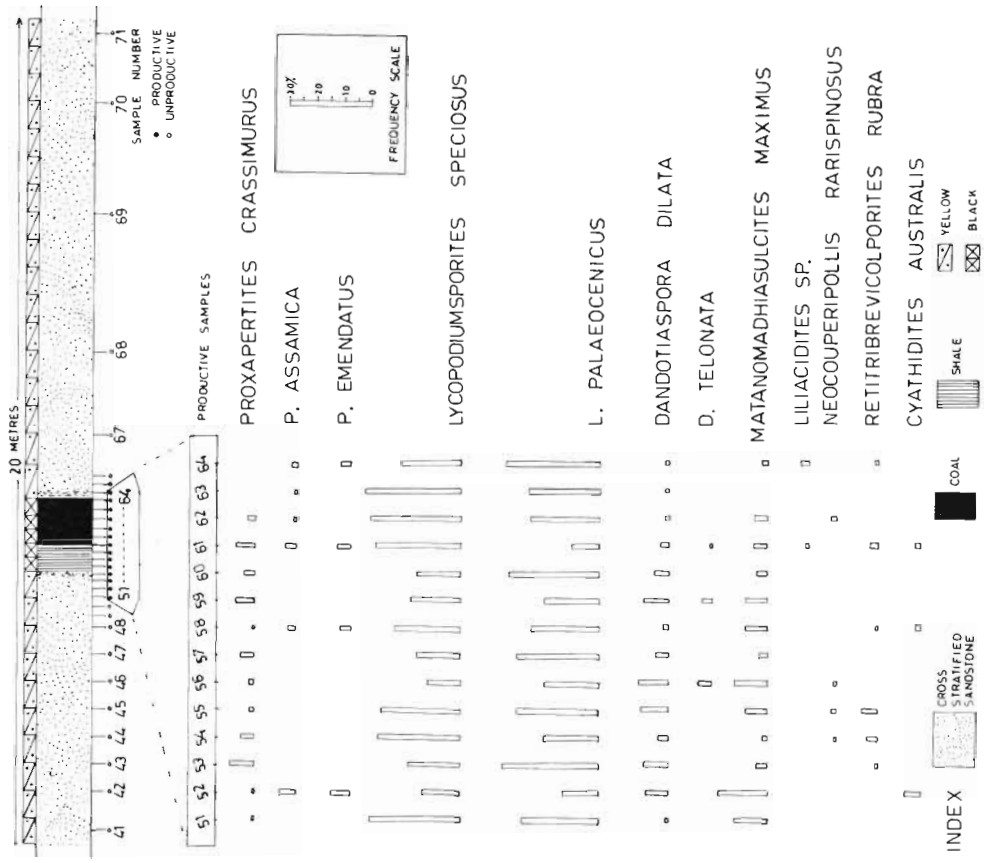
Tricolpites reticulatus Cookson 1947

T. crassireticulatus Dutta & Sah 1970

T. baculatus Kar & Jain 1981

Sastriipollenites trilobatus Venkatachala & Kar 1969

Retistephanocolpites multirimatus (Dutta & Sah)



Text-figure 2—Histogram showing relative abundance of spore pollen species in coal seam 2.

Saxena 1981

Psilastephanocolporites psilatus Kar & Kumar 1986

Polymargocolporites mawlensis Kar & Kumar 1986

Retitribrevicolporites matanomadhensis (Venkatachala & Kar) Kar 1985

R. rubra (Dutta & Sah) Kar & Kumar 1986

Meliapollis navalei Sah & Kar 1970

M. minutus Singh 1974

Triangulorites bellus (Sah & Kar) Kar 1985

T. pachyexinus Kar & Kumar 1986

Kielmeyerapollenites eocenicus Sah & Kar 1972

K. syncolporatus Kar & Kumar 1986

PLATE 1 →

(England Finder reading and magnification are given for each figure).

1,2. *Gemmamonocolpites dimorphous* sp. nov., Slide no. BSIP 9962, × 25/0, × 1000; Slide no. BSIP 9946, × 52/0, × 1000.

5. *Clavamonocolpites indicus* sp. nov., Slide no. BSIP 9968, Y40/2, × 1000; Slide no. BSIP 9969, 022/2, × 1000.

3,6. *Spinizonocolpites bulbospinosus* sp. nov., Slide no. BSIP 9946, × 044/0, 1000; Slide no. BSIP 9947, G49/3, × 1000.

7,8. *Diporites* sp. A, Slide no. BSIP 9949, W62/1, × 500; Slide no. BSIP 9978, T38/0, × 500.

9. *Lycopodiumsporites palaeocenicus* Dutta & Sah 1970, Slide no. BSIP 9988, P24/0, × 500.

10. *Proxapertites assamica* (Sah & Dutta) Singh 1975, Slide no. BSIP 9976, × 44/3, × 500.

11. *Tricolpites baculatus* Kar & Jain 1981, Slide no. BSIP 9957, E 49/1, × 500.

12. *Sastriipollenites trilobatus* Venkatachala & Kar 1969, Slide no. BSIP 10099, N42/1, × 500.

13. *Proxapertites emendatus* (Sah & Dutta) Kar & Kumar 1986, Slide no. BSIP 9967, D49/0, × 500.

14,15. *Spinizonocolpites wodehousei* sp. nov., Slide no. BSIP 9965, U46/2, × 1000; Slide no. BSIP 9965, F68/3, × 1000.

16. *Tricolpites crassireticulatus* Dutta & Sah 1970, Slide no BSIP 9977, J36/1, × 500.

17. *Triangulorites bellus* (Sah & Kar) Kar 1985, Slide no. BSIP 9965, G47/4, × 500.

18. *Retistephanocolporites multirimatus* (Dutta & Sah) Saxena 1981, Slide no. BSIP 9956, H43/3, × 500.

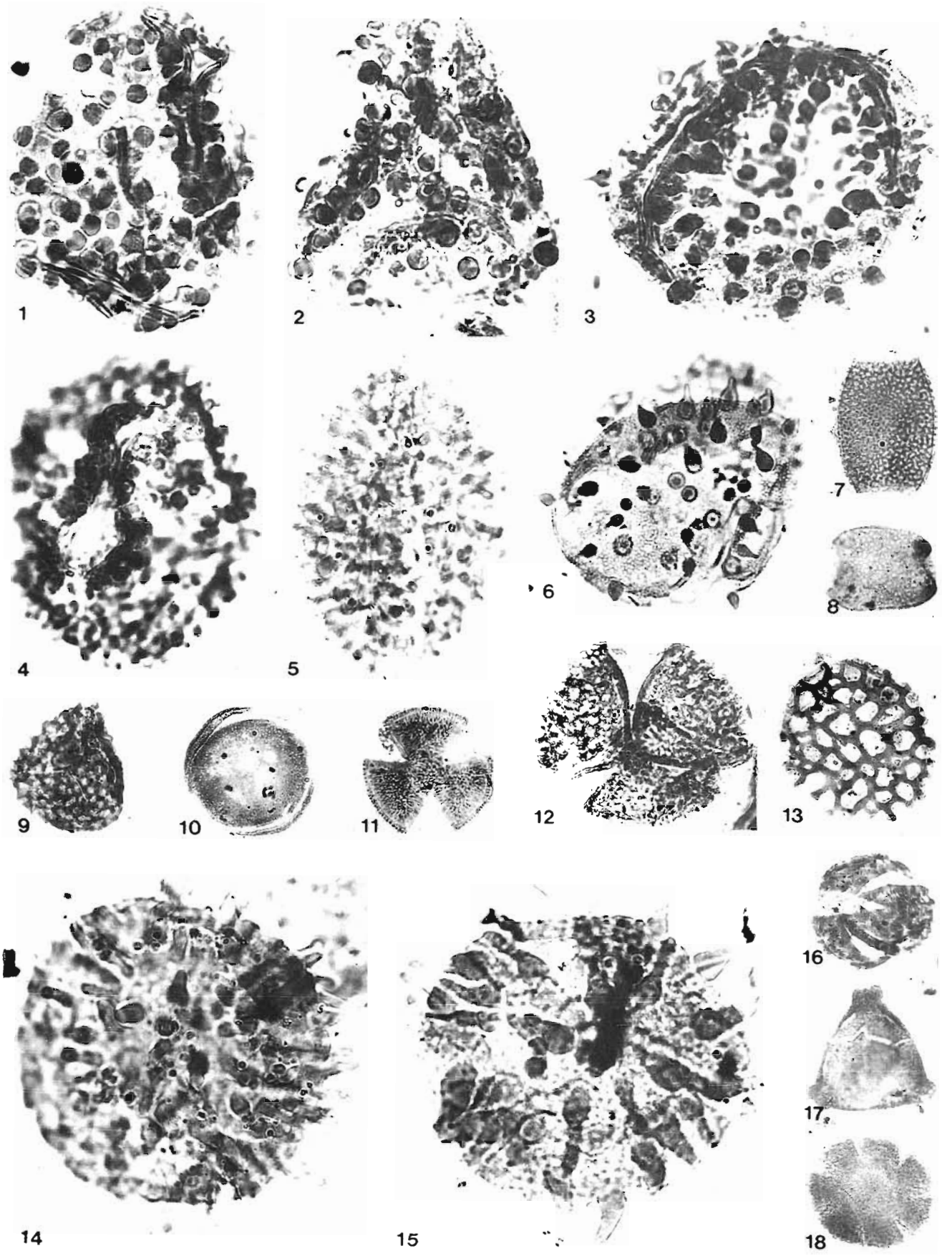
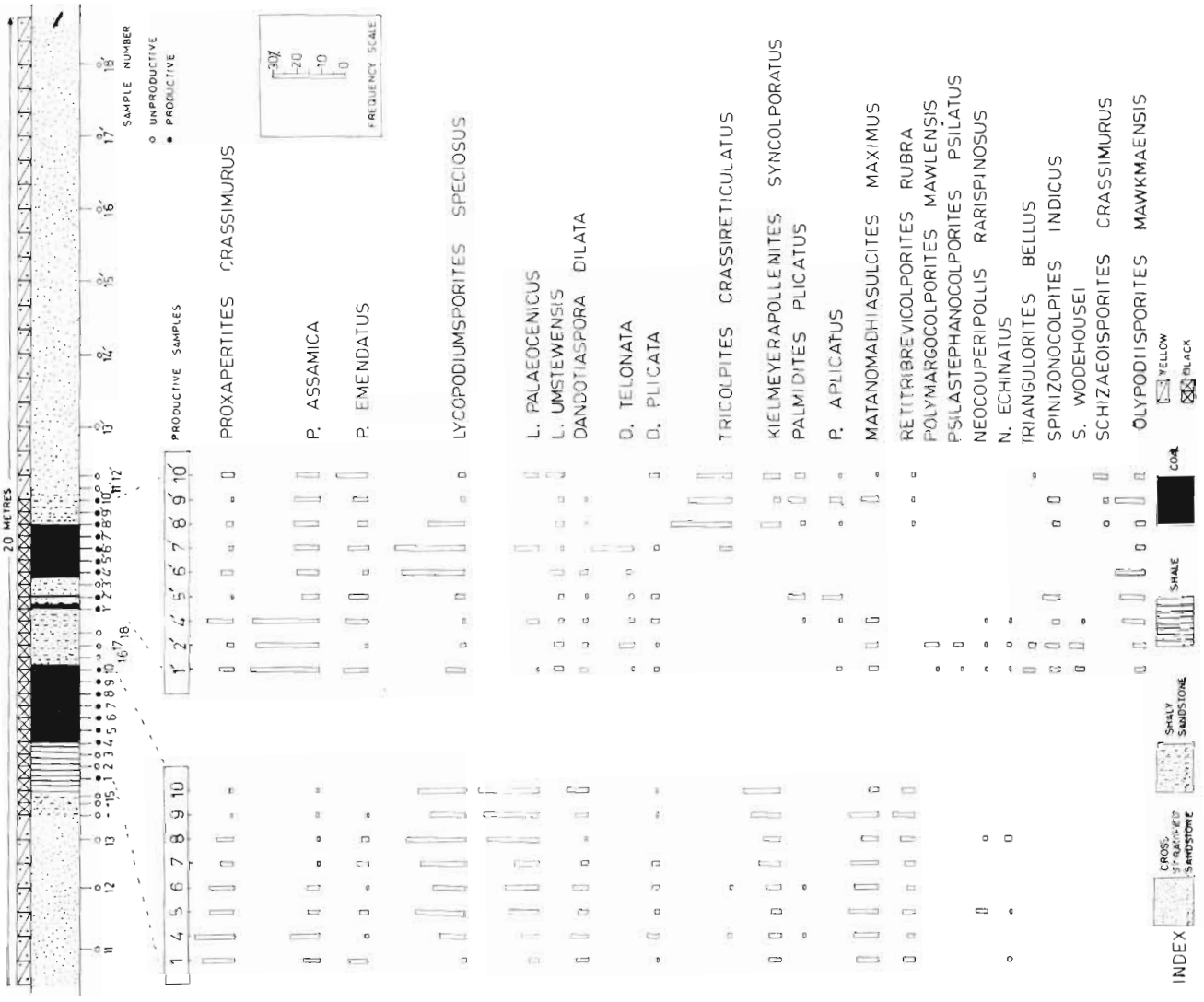


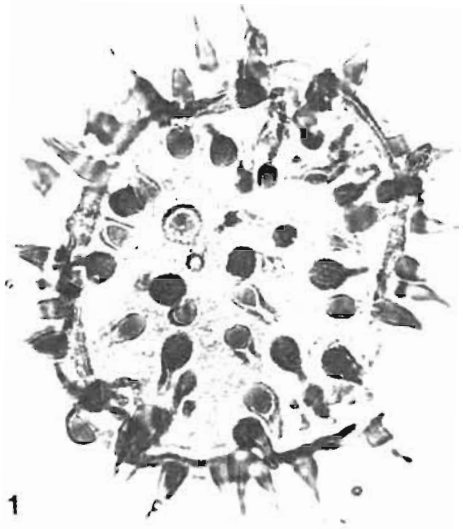
PLATE 1



Text-figure 3—Histogram illustrating relative abundance of spore pollen species in coal seams 3 and 4.

PLATE 2 →

1,2. *Spinizonocolpites indicus* sp. nov., Slide no. BSIP 9979, U33 0, × 1000; Slide no. BSIP 9980, S31 0, × 1000.
3. *Dandotiaspora dilata* Sah, Kar & Singh 1971, Slide no. BSIP 9983, Z45 3, × 500.
4. *Spinizonocolpites intrarugulatus* Muller, de Di Giacomo Van & Erve 1987, Slide no. BSIP 9973, O44 2, × 1000.
5. *Spinizonocolpites* sp. A, Slide no. BSIP 9986, × 47 4, × 1000.
6. *Neocouperipollis magnus* (Dutta & Sah) comb. nov., Slide no. BSIP 9972, H44 0, × 500.
7. *N. echinatus* (Sah & Kar) Kar & Kumar 1986, Slide no. BSIP 9966, H36 3, × 500.
8. *Tricolpites baculatus* Kar & Jain 1981, Slide no. BSIP 9953, W 30 1, × 500.
9. Pollen type B, Slide no. BSIP 9949, R59 1, × 1000.
10. Dinoflagellate, Slide no. BSIP 10100, Y35 0, × 500.
11. *Cyathidites minor* Couper 1953, Slide no. BSIP 9970, D34 1, × 500.
12. *Meliapollis minutus* Singh 1974, Slide no. BSIP 9971, Y 23 4, × 500.
13. *Retitribrevicolporites matanomadhensis* (Venkatachala & Kar) Kar 1985, Slide no. BSIP 9959, E58 0, × 750.
14. *Neocouperipollis rarispinosus* (Sah & Dutta) comb. nov., Slide no. BSIP 9949, W61 0, × 1000.
15. Pollen type A, Slide no. BSIP 9959, F28 2, × 1000.
16. *Spinizonocolpites echinatus* Muller 1968, Slide no. BSIP 9949, Q33 3, × 1000.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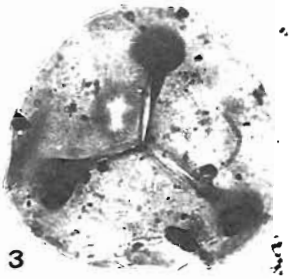
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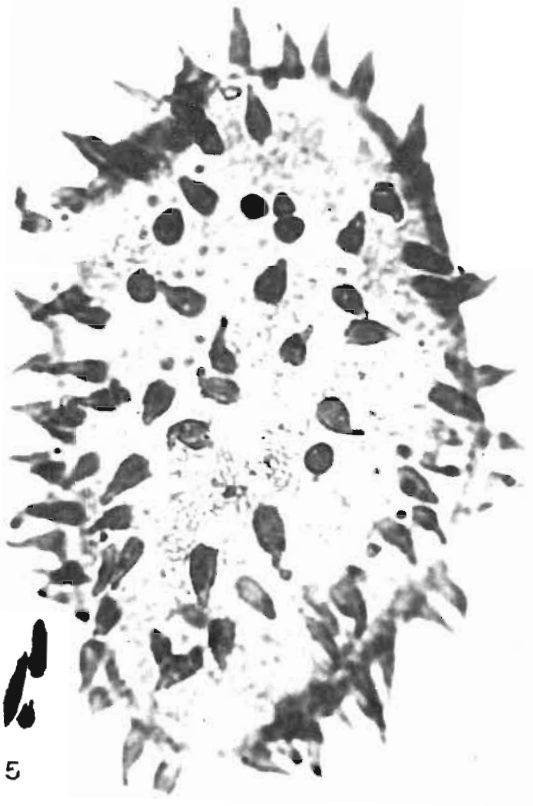
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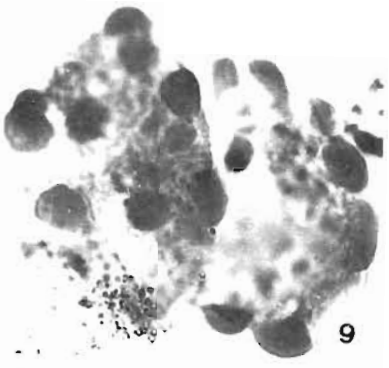
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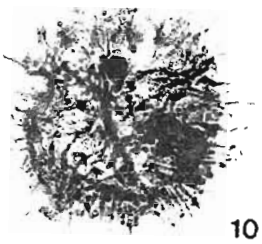
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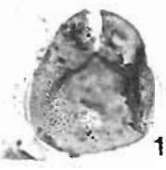
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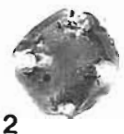
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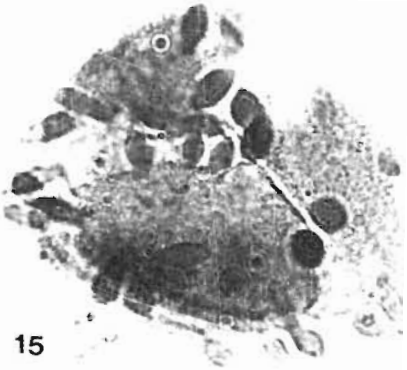
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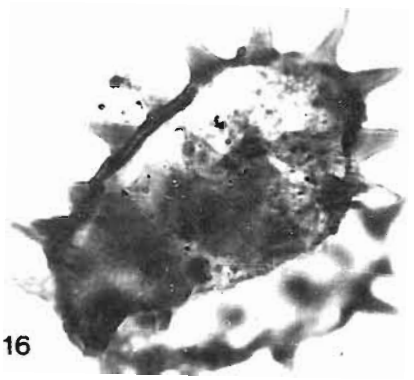
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PLATE 2

Diporites sp. A
Droseridites sp. in: Kar & Kumar 1986
Inapertusporites kedvesii Elsik 1968

SYSTEMATIC DESCRIPTION

Genus—*Neocouperipollis* (Venkatachala & Kar) Kar & Kumar 1986

Neocouperipollis rarispinosus (Sah & Dutta) comb. nov.
Pl. 2, fig. 14

1966 *Monosulcites rarispinosus* Sah & Dutta, pl. 1, figs 26-28, p. 76.
1969 *Couperipollis rarispinosus* (Sah & Dutta) Venkatachala & Kar, p. 161.

Neocouperipollis magnus (Dutta & Sah) comb. nov
Pl. 2, fig. 6

1970 *Monosulcites magnus* Dutta & Sah, pl. 5, figs 1, 2, p. 28.
1986 *Couperipollis magnus* (Dutta & Sah) Kar & Kumar, pl. 4, figs 4, 5, p. 195.

Remarks—Couperipollis Venkatachala & Kar 1969 is *nomen nudum*. *Couperipollis rarispinosus* (Sah & Dutta) Venkatachala & Kar 1969 and *Couperipollis magnus* (Dutta & Sah) Kar & Kumar 1986 are transferred to *Neocouperipollis* Venkatachala & Kar emend. Kar & Kumar 1986.

Gemmamonocolpites Van der Hammen & Garcia 1965

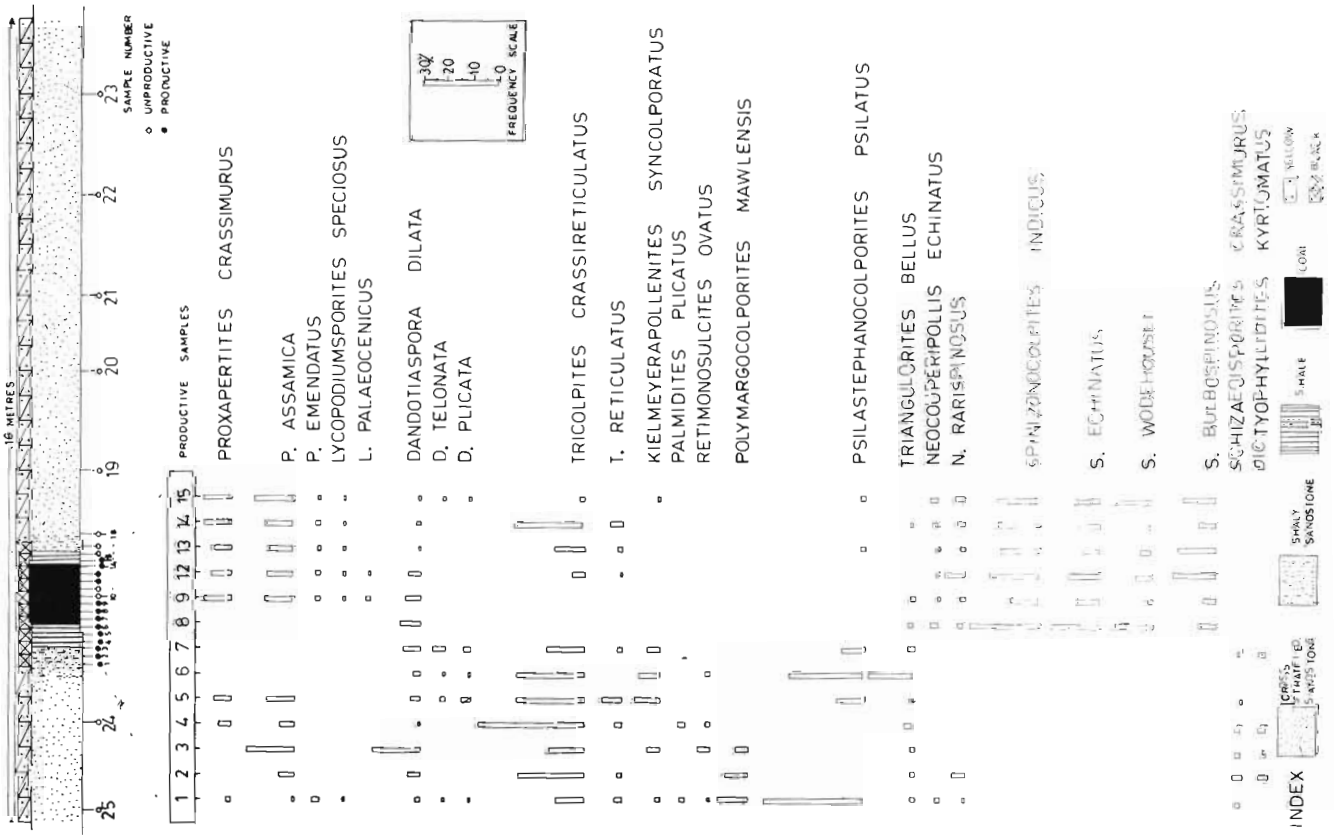
Gemmamonocolpites dimorphous sp. nov.
Pl. 1, figs 1, 2

Holotype—Pl. 1, fig. 1; slide no. BSIP 9962.
Type Locality—Langrin Coalfield, Meghalaya.

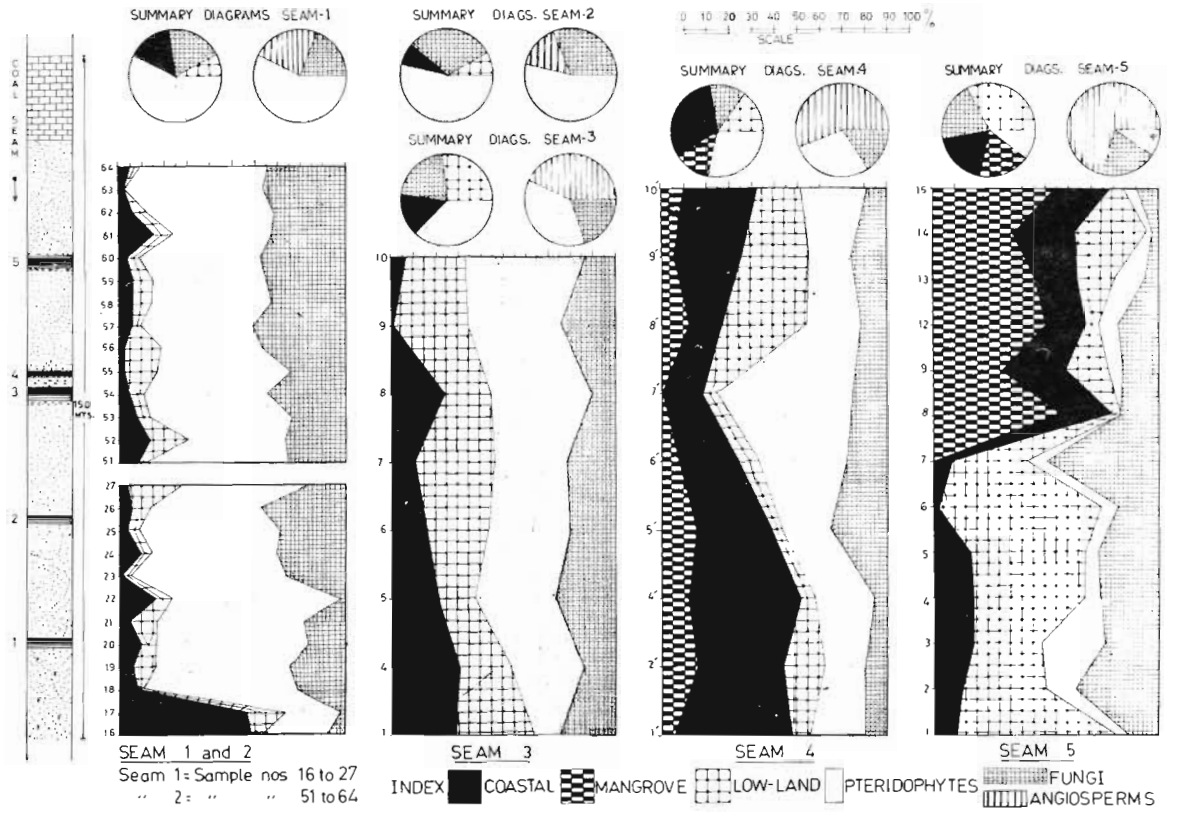
Diagnosis—Pollen monocolpate or trichotomocolpate, monocolpate grains oval, trichotomocolpate broadly triangular; exine gemmate, few gemmae with small accuminated tips; tectum finely reticulate, infratectum columellate.

Description—Monocolpate pollen 52-62 μm long, 40-48 μm wide, trichotomocolpate grains 49-55 μm long from corner to base. Colpus in both monocolpate and trichotomocolpate grains reaches up to equator or corner, distinct; exine between sculptural elements about 1 μm thick; gemmae 2-4 μm wide, few gemmae with about 1 μm long accuminated tips; tectum finely reticulate, lumina less than 0.5 μm wide.

Remarks—Gemmamonocolpites gemmatus Van der Hammen & Garcia 1965 and *G. barbatus*



Text-figure 4—Histogram illustrating relative abundance of spore-pollen species in coal seam-5.



Text-figure 5—Histograms showing ecological and botanical groups of palynomorphs in the assemblages of Langrin Coalfield.

Guzmán 1967 have much smaller gemmae. *G. amicus* Guzmán 1967 and *G. ovatus* Guzmán 1967 are smaller and have sparsely placed gemmae. The new species can be distinguished from all the other known species by accuminate tips on few gemmae and the mono-trichotomocolpate condition of the aperture.

Clavamonocolpites Guzmán 1967

Clavamonocolpites indicus sp. nov.
Pl. 1, figs 4, 5

Holotype—Pl. 1, fig. 4; slide no. BSIP 9968.

Type locality—Langrin Coalfield, Meghalaya.

Diagnosis—Pollen oval, monocolpate, colpus distinct; exine sculpture mixed with pila and clava, tectum scabrate.

Description—Pollen 58-70 μm long and 42-48 μm wide; colpus extending almost up to the equator; exine sculpture (ectexine) mixed with pila and clava but pila dominates, 2-3 μm long, head 1.5-2.0 μm wide; thickness of exine between sculptural elements 1-1.5 μm; interspinal area scabrate.

Remarks—*Clavamonocolpites terrificus* Guzmán 1967 differs by having only clavate exinal sculpture. The exinal sculpture with mixed pila and clava is the distinguishing feature of this species.

Spinizonocolpites Muller 1968
Spinizonocolpites wodehousei sp. nov.
Pl. 1, figs 14, 15

Holotype—Pl. 1, fig. 15; slide no. BSIP 9965.

Type locality—Langrin Coalfield, Meghalaya.

Diagnosis—Pollen subcircular, medium-sized, annulocolpate; exine sculpture spinose, spine long-beaked flask-shaped with swollen base and rounded apex; tectum microreticulate, infratectum columellate.

Description—Pollen more or less subcircular in meridional and polar views; 46-65 μm long at longer axis, 34-46 μm wide at shorter axis; tend to divide into two halves through colpus suture; spine 8-18 μm long, 4-7 μm wide at base, exine 1-1.5 μm thick between the spines; tectum microreticulate, lumina uniform, polygonal, 1-1.5 μm wide, muri 0.5 μm thick.

Remarks—*Couperipollis wodehousei* (Biswas) Venkatachala & Kar 1969 is described from the Tertiary of Meghalaya as monocolpate pollen having exinal characters similar to that of present species, but in this study no grain with such morphology was found to be monocolpate. *Spinizonocolpites baculatus* Muller 1968 is comparable with this new taxon but has baculate sculpture. *S. intrarugulatus*

Muller *et al.* 1987 is smaller in size and has 2.5-3 μm thick exine between the spines.

Spinizonocolpites bulbospinosus sp. nov.
Pl. 1, figs 3, 6

Holotype—Pl. 1, fig. 3; slide no. BSIP 9946.

Type locality—Langrin Coalfield, Meghalaya.

Diagnosis—Pollen subcircular, annulocolpate; exine sculpture bulbospinosus, spine with small accuminate protruding tips, tectum microreticulate, infratectum columellate.

Description—Pollen 47-63 μm long at longer axis and 33-51 μm wide at shorter axis; colpus annulate or partially attached over one-fourth of the circumference, grains tend to divide through colpus suture, spine base swollen like gemmae, small accuminate protruding apex, 3.5-6 μm long, 2-5 μm wide at base, apex 1-1.5 μm; exine between sculpture about 1 μm thick; lumina less than 1 μm wide, uniform, muri thin.

Remarks—*Gemmamonocolpites dimorphous* sp. nov. described above whose sculptural elements are dominantly gemmate with few transitional bulbospines is comparable with the new species in only sculptural morphology.

Spinizonocolpites indicus sp. nov.
Pl 2, figs 1, 2

Holotype—Pl 2, fig. 1, slide no. BSIP 9979.

Type locality—Langrin Coalfield, Meghalaya.

Diagnosis—Pollen subcircular, annulocolpate; exine sculpture spinose, spine base swollen with gradually tapering pointed apex, tectum microreticulate, infratectum columellate.

Description—Pollen 52-58 μm long at longer axis, 41-49 μm wide at shorter axis; colpus annulate, tend to divide into two halves through colpus suture. Exine sculpture spinose, spine base swollen with gradually tapering pointed apex, 7-15 μm long and 2-4 μm wide at base, exine 1-1.5 μm thick between spines; lumina 1 μm wide, uniform, polygonal, muri thin.

Remarks—*Spinizonocolpites echinatus* Muller 1968 can be easily distinguished by its sparsely placed spines which are conical in shape and rounded apex rather than bulbospinosus sculpture.

Spinizonocolpites sp. A
Pl. 2, fig. 5

Description—Pollen oval or subcircular in shape, 68-92 μm long, 60-80 μm wide; colpus annulate, exine sculpture (ectexine) spinose, spine completely echinate or mixed with bulbous spines, 3-10 μm long, 2-5 μm wide at base; exine 1-2 μm thick between sculptural elements; tectum microreticulate; lumina polygonal, about 1 μm wide, muri thin; infratectum columellate.

Remarks—*Spinizonocolpites echinatus* Muller 1968 is comparable but can easily be distinguished by its size-range and comparatively longer spines. *Nypa*-pollen have similar morphology but are smaller (45-60 μm) in size.

Diporites Van der Hammen 1954
Diporites sp. A
Pl. 1, figs 7, 8

Description—Pollen barrel-shaped, 40-50 μm long, 28-40 μm wide; diporate, ora meridionally on the opposite sides, wide openings; exine 1.5 μm thick, surface reticulate; lumina irregular, 1-2 μm wide, muri about 1 μm thick, infratectum columellate.

Remarks—The pollen resembles the pollen of *Calamus walkeri* Hance 1874.

Pollen type A
Pl. 2, fig. 15

Description—Pollen broadly triangular, 48-52 μm in size; trichotomocolpate; exine bulbospinosus with few gemmae; gemmae sparse, 4-8 μm long, 2-4 μm wide at base, accuminated tips less than 1 μm long; exinal wall about 1.5 μm thick; infratectum columellate.

Remarks—The general morphology suggests its affinity with palm; however, such grains are not yet described.

Pollen type B
Pl. 2, fig 9

Description—Pollen subcircular, 35-41 μm in size, annulocolpate, tend to divide into two halves through colpus; exine sculpture gemmate, gemmae 4-9 μm wide, sparse, wall 1.5-2 μm wide, tectum reticulate, infratectum columellate.

Remarks—Annulocolpate pollen with gemmate sculpture are unknown. It shows relationship with *Nypa*-pollen.

DISCUSSION

The relative frequency of important palynotaxa based on frequency count for each sample is shown with the help of histograms. Coal seams 1 and 2 (Text-figs 1, 2) have similar microfloral composition marked by the dominance of *Lycopodiumsporites palaeocenicus, L. speciosus, Proxapertites* spp., *Dandotiaspora* spp., *Matanomadhiasulcites maximus* and *Retitribrevicolporites rubra.* Pteridophytic spores contribute more than half of

the population of palynotaxa. In coal seam 3 (Text-fig. 3) the angiospermic pollen are slightly dominant over the pteridophytic spores, probably due to the dominant representation of *Kielmeyerapollenites*; however, the dominant taxa of seams 1 and 2 also continue to remain dominant in this assemblage. The assemblage of coal seam 4 (Text-fig. 3) is characterised by the dominance of angiospermic pollen over the pteridophytic spores. *Lycopodiumsporites umstewensis, Schizaeoisporites mawkmaensis, Spinizonocolpites indicus, S echinatus, Psilastephanocolporites psilatus, Polymargocolporites mawlensis* and *Triangulorites bellus* appear for the first time. Some of the dominant species of seam 3, viz., *Lycopodiumsporites palaeocenicus, Kielmeyerapollenites syncolporatus, Matanomadhiasulcites maximus* and *Retitribrevicolporites rubra* are significantly reduced, though *Proxapertites* spp. and *Lycopodiumsporites speciosus* remain dominant as in seam 3. Coal seam 5 (Text-fig. 4) has more or less similar microfloral composition with that of seam 4, but the over-dominance of angiospermic pollen, particularly the species of *Spinizonocolpites*, makes the pteridophytic spores a minor constituent in the assemblage

Botanical grouping of the palynomorphs shows that the angiospermic pollen gradually increase from lower to upper coal seams, whereas the pteridophytic spores behave more or less *vice-versa* (Text-fig. 5). Assemblage of coal seams 1 and 2 are homotaxial, both quantitatively and qualitatively in which pteridophytic spores contribute about 55 per cent, angiospermic pollen about 20 per cent and rest are fungal spores. In coal seams 3, 4 and 5 the pteridophytic spores amount to 36, 29 and 9 per cent, and the angiospermic pollen contribute about 43, 57 and 70 per cent, respectively. Ecological grouping of the palynotaxa shows that during the deposition of lower three coal seams more or less similar ecological conditions prevailed. The pteridophytes contribute most in the assemblage; occurrence of coastal elements, viz., *Neocouperipollis, Proxapertites* and *Palmidites* in good number indicate near-shore swampy vegetation. Lowland tropical elements, viz., *Matanomadhiasulcites, Liliacidites, Retitribrevicolporites, Tricolpites crassireticulatus* and *Kielmeyerapollenites* with wide ecological niche indicates tropical climatic condition. It is interesting to observe that in the assemblages of upper two seams, *Nypa*-related pollen, *viz., Spinizonocolpites* occurs as a dominant element and also marine algae occur frequently which suggests a brackish-water mangrove type of floral community. The change from lower to upper seams from coastal swamp to mangrove type of vegetation is attributed to transgressive phase of the sea during the deposition of upper two coal seams. Dominant representation of fungal spores and fruiting bodies in the assemblages of all the coal seams indicates warm and humid climatic conditions. Absence of gymnosperms shows a low-land topographical feature of the sedimentary basin

Sah and Singh (1974) on the basis of subsurface samples of the Tura Formation in Garo Hills proposed *Dandotiaspora telonata* Cenozone for the coal seams. Singh, Singh and Sah (1975) further recognised four subzones, viz., *Polycolpites cooksonii* subzone, *Palmaeopollenites communis* subzone, *Lycopodiumsporites palaeocenicus* subzone and *Dandotiaspora telonata* subzone. In this study the assemblage shows more or less similar floral composition with that of Garo Hills (Sah & Singh 1974, Singh, 1977, Singh, Singh & Sah, 1975) but quantitatively the patterns are dissimilar. This assemblage interestingly is similar to that of the equivalent Palaeocene deposits, viz., Lakadong Sandstone and Therria Sandstone of Meghalaya (Baksi, 1962; Biswas, 1962; Sah & Dutta, 1967; Dutta & Sah, 1970; Kar & Kumar, 1986a). Palaeocene assemblage of Meghalaya and Matanomadh Formation (Saxena, 1978, 1980) of Kutch seems to be homotaxial with this assemblage, suggesting Palaeocene age to Langrin Coalfield assemblage.

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