FOSSIL PLANT REMAINS FROM LAITRYNGEW, ASSAM

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ABSTRACT

The present paper records a species each of ? *Bombacites* and ? *Sabalites* and a few spores and pollen grains from Laitryngew, Assam.

INTRODUCTION

A SMALL collection of megafossils preserved in four carbonized shale pieces was kindly sent to one of us (BOSE) for investigation by Mr. S. K. Borooah, Director, Directorate of Geology and Mining, Government of Assam. These specimens were collected from one of the coal pits at Laitryngew about 800 metres S. W. of 28th mile post from Shillong along the Shillong-Cherrapunji road. The exact locality falls between Latitude 25°15′ to 25°20′ and Longitude 91°45′ to 91°48′.

Among the megafossils a species of ? *Bombacites* and a palm leaf ? *Sabalites* (PL. 1, FIG. 1) have been recognized. Further collections from the area are necessary to give a more precise identification and description of these fossils.

A few shale pieces (20 grams) were macerated for their microfossil contents. The shale proved to be fairly rich in organic matter and contains a large number of spores and pollen grains.

A preliminary examination of a few slides shows that the commonest element in the microfloral assemblage consists of Angiospermic pollen grains. Pteridophytic grains, though not as richly represented, are also not rare, while not a single two-winged coniferous grain was recovered.

Different type of spores and pollen grains have been distinguished within the present assemblage. Apart from a number of unidentifiable forms, the following 20 types, belonging to about 16 genera have so far been recognized.

DESCRIPTION

PTERIDOPHYTIC SPORES:

I. Lycopodiaceae

Type 1 (PL. 1, FIG. 3) — Tetrahedral, triangular, 36 μ; trilete distinct, laesurae reaching periphery; exine thin, exospore reticulate, muri having short irregularly-shaped ridges.

In form and ornamentation this type resembles the spores of *Lycopodium clavatum* group figured and described by Knox (1950).

Type 2 (PL. 1, FIG. 5) — Tetrahedral, sub-triangular to ± oval in outline, 37 μ; trilete distinct, laesurae ± reaching the periphery; exine wall 2-3 μ thick, exospore pitted, pits small, regularly spaced. Spores similar in form and ornamentation have been figured and illustrated by Knox (1950) under *Lycopodium phlegmaria* group.

Type 3 (PL. 1, FIG. 2) — Tetrahedral, triangular, 50 μ; trilete distinct, laesurae ± reaching periphery; exine thin, exospore densely covered with short, broadly-based spinules.

Somewhat similar spores under *Apiculatisporis asymmetricus* have been figured and described by Cookson (1958) from the Upper Mesozoic deposits of Eastern Australia. This type also resembles some of the spores of *Lycopodium*.

Type 4 (PL. 1, FIG. 4) — Tetrahedral, ± subtriangular to oval, 38 μ; trilete faint, laesurae extending to 1/2 of radial distance; exine thin, exospore finely granular around the apical crest and inconspicuously reticulate elsewhere.

In its general form and ornamentation this spore may also be compared to some of the spores met within the Lycopodiales.

FILICALES:

II. ? Cyatheaceae

Type 1 (PL. 1, FIG. 6) — Tetrahedral, broadly sub-triangular to ± oval, 52 μ; trilete distinct, laesurae extending to 3/4th of radial distance; wall thin, exine smooth.

Resembles some of the spores of *Cyathea*.

III. Polypodiaceae

Type 1 (PL. 1, FIG. 7) — Bilateral, outline elongate-oval, extremities broadly rounded, 51 μ; monolete, laesurae with thin lips, about 3/4th length of the longer axis; wall fairly

thick, exine rugose or with a weak reticulum, if so muri sinuous.

The spores show certain resemblance in form with *Polypodiidites senonicus* Ross (1949, p. 33) from the Cretaceous of Scania.

IV. Schizeaceae

Type 1 (PL. 1, FIG. 8) — Outline ± oval, 42 μ; suture not seen; wall thin, exine ornamented by a series of thin parallel striations, some of which distinctly appear to anastomose.

The ornamentation of this species considerably resembles to that found among certain schizeaceous ferns. It is somewhat comparable to those of *Sporites dorogensis* Pot. & Gell. (1933) from the Eocene lignites of Dorog, Ungarn.

EPHEDRALES:

Type 1 (PL. 1, FIGS. 9-10) — Lateral view, prolate, 38 μ × 19 μ; exine ornamented by 8-10 parallel rounded ridges, some of whom distinctly appear to bifurcate, ends distinctly thinner than the rest of the body.

The shape and ornamentation of the grains compares well with some of the grains of *Ephedra*. The only known record of fossil *Ephedra*, from the Indian Cenozoic deposits is from the Pleistocene deposits of Kashmir (WODEHOUSE, 1935).

ANGIOSPERMAE

DICOTYLEDONEAE:

I. Triorate Grains

Type 1 (PL. 1, FIG. 12) — Grain angulaperturate, triangular in polar view, 22 μ; 3-porate, pore diameter 2-3 μ, apertures ± lalongate, concave, exine moderately thick, finely granulate.

Comparable grains are met with in some of the members of Moraceae. The grain shows considerable resemblance to some species of *Ficus*.

II. Tricolporate Grains

Type 1 (PL. 1, FIG. 11) — Grain angulaperturate, triangular, 16 μ; 3-colpoidorate, inner part of aperture ringed by a thickening, colpae short; exine faintly reticulate.

In form and shape this grain shows considerable similarity to *Tricolporites protrudens* illustrated and described by Erdtman (1952, FIG. 3) from a Quaternary clay of Scania. Ross (1949, p. 35) has also figured and described similar pollen grains from a Cretaceous clay of Scania.

Amongst the living genera similar grains are met within the family Rubiaceae, Myrtaceae, etc.

Type 2 (PL. 1, FIG. 13) — Grains oblate-spheroidal, 24 μ; 3-colporate, brevicolpate; exine thin, finely reticulate.

Resembles somewhat the pollen of *Rumex*.

Type 3 (PL. 1, FIGS. 14 & 15) — Equatorial view, subprolate, 23 μ to 25 μ; 3-colporate, trizoni-colpate, colpi faint, extending the length of polar axis; exine faintly reticulate.

In shape and size resemble some members of Rhamnaceae.

Type 4 (PL. 1, FIG. 17) — Equatorial view, prolate, 34 μ × 18 μ; 3-colporate, the three colpi extending the length of the body; exine faintly striate.

Resembles to some grains met within the family Leguminosae.

Type 5 (PL. 1, FIGS. 16, 18) — Grains angulaperturate, subprolate, 24 μ × 32 μ; 3-colporate, brevicolpate: sexine thickened below the ora, ora lalongate; exine very faintly reticulate.

In shape, size and form the grain shows some resemblance to some pollen of the family Araliaceae.

III. Tetracolporate Grains

Type 1 (PL. 1, FIGS. 19-20) — Equatorial view, suboblate, 33 μ to 38 μ; 4-colporate, zonicolpate, colpi extending the length of the polar axis, ora lalongate, fusing together along the equatorial axis, exine moderately thick, finely granulate.

Pollen grains show very close similarity to some of the pollen grains of Rutaceae.

IV. Polycolporate Grains

Type 1 (PL. 1, FIG. 24) — Subprolate, 45 μ × 34 μ; 8-zonicolporate, longicolpate, ora lalongate; exine ornamentation obscure.

In its shape, size and constructional details this grain appears to show resemblance to some of those found in Polygalaceae and Bruniaceae.

V. Tricolpate Grains

Type 1 (PL. 1, FIG. 23) — Prolate-spheroidal, 43 μ × 39 μ; 3-zonicolpate, colpi

tenuimarginate, ends pointed; sexine thicker than nexine, columella distinct, exine finely reticulate.

This fossil grain compares well with some of the pollens of Ranunculaceae (? *Clematis*).

VI. Pentacolpate Grains

Type 1 (PL. 1, FIG. 21) — Subprolate, 33 $\mu \times 29$ μ; 5-zonicolpate, brevicolpate, narrow, tenuimarginate; exine weakly reticulate.

Resembles to some grains of the family Labiateae.

VII. Polyforate Grains

Type 1 (PL. 1, FIG. 22) — Outline circular, diameter 25 μ; polyforate, pore diameter 1·5 to 2·5 μ; sexine considerably thicker than nexine, tegillate, tegillum thin, bacula distinct and fairly long.

This grain may be referred to the Chenopodiaceae or Amaranthaceae.

Non-Aperturate Grains

Type 1 (PL. 1, FIG. 25) — Outline subspheroidal, 48 $\mu \times 41$ μ; non-aperturate; sexine thicker than nexine, finely granulate.

DISCUSSION

The fossiliferous beds at Laitryngew is of doubtful age. According to Medlicott (1869) they are either Upper Cretaceous or of Lower Tertiary age. Sen (1948) has figured and described some microfossils from a coal seam at Laitryngew and he is of the opinion that the microfloral assemblage suggests a Tertiary age for the Laitryngew coal. Mr. Borooah informs us that the present shale-pieces probably come from the Upper Cretaceous. On the evidence of the present studies it is too early to discuss the bearing of these mega- and microfossils on the geological age of the shales. However, it may be mentioned here that the microflora, though at present very incomplete, tends to confirm the Upper Cretaceous or Early Eocene age for the shales. More detailed investigation on the micro- and megafossils is in progress.

ACKNOWLEDGEMENT

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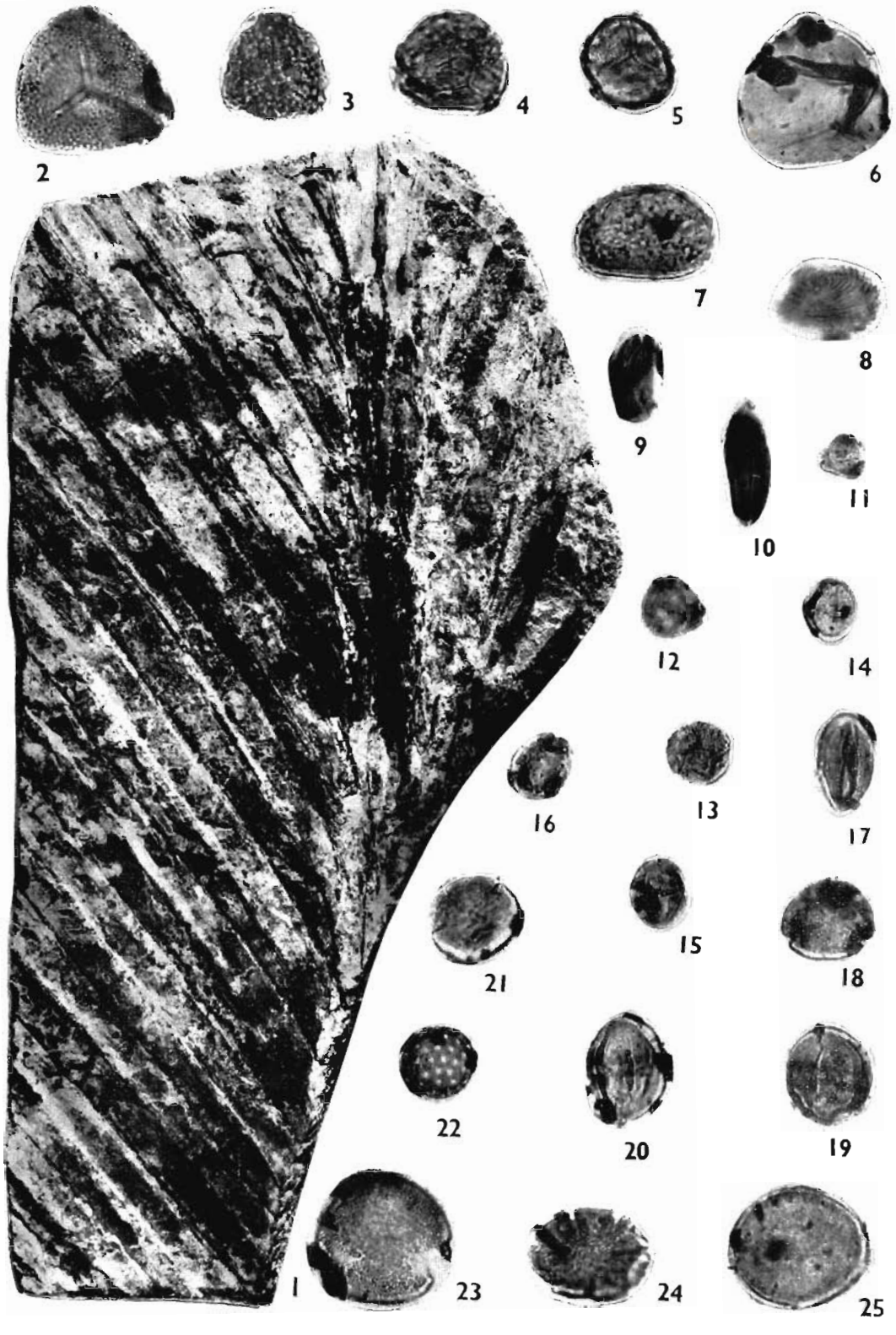
EXPLANATION OF PLATE 1

(All figures are from untouched negatives. All the spores and pollen grains are $\times$ *ca.* 480. *Spores and pollen from specimen No. D.O.P.* 31. *Slides preserved at the B.S. Institute of Palaeobotany Museum.)*

1. ? *Sabalites* sp. Specimen No. 33071 $\times$ 1.
2. Pteridophytic spore Type 3. Note the distinct Y-mark and the baculate ornamentation of the exine. Slide No. 2/1.
3. Trilete spore Type 1. Note the ridged muri of reticulum. Slide No. 3/12.
4. Trilete spore Type 4. Y-mark faint. Slide No. 3/11.
5. Trilete spore Type 2. Note the minutely pitted exine. Slide No. 1/12.
6. ? Cyatheaceous spore. Note the distinct trilete and the laevigate exine. Slide No. 3/4.
7. A polypodiaceous spore. Note the distinctly rugose exine. Slide No. 4/1.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8. ? Schizeaceous spore. Note the characteristic ornamentation. Slide No. 2/14.

9-10. ? *Ephedra* grains, bifurcation in some of the ridges is distinctly seen.

11. Tricolporate grain Type 1. Slide No. 4/6.

12. Triorate grain. Note the typical lalongate apertures. Slide No. 1/9.

13. Tricolporate grain Type 2. A finely reticulate exine is clearly seen. Slide No. 1/16.

14-15. Tricolporate grain Type 3. Equatorial view. Note the 3-zonicolpae. Slide Nos. 3/1 and 1/14.

16. Tricolporate grain Type 5. Note the thickened sexine below the ora. Slide No. 2/13.

17. Tricolporate grain Type 4. Faintly striate exine is discernible at a corner. Slide No. 2/2.

18. Same as Fig. 16. Slide No. 2/11.

19-20. Tetracolporate grains. Note the lalongate ora fusing together at the equatorial axis. Slide Nos. 1/22 and 2/12.

21. A pentacolpate grain. Slide No. 1/20.

22. Polyforate grain. Note the thick sexine. Slide No. 2/5.

23. Tricolpate grain. Note the finely reticulate exine. Slide No. 1/10.

24. A 8-zonocolporate grain. Note the fairly deep colpae and the lalongate ora. Slide No. 1/13.

25. A nonaperturate grain with finely granular exine. Slide No. 2/15.