

SOME SPORES AND POLLEN GRAINS FROM A TERTIARY BROWN COAL DEPOSIT IN KASHMIR

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INTRODUCTION

THE present paper shall represent a preliminary information of some spores and pollen grains that are preserved in a Tertiary deposit of brown coal in Kashmir. The deposit is situated 1 mile from Baramulla and 30 miles from Srinagar. The material was kindly supplied by Dipl. Ing. W. Riedel of the Pintsch Bamag A. G. as a single sample. It was subjected to nitric acid followed by alkali-hydrofluoric acid-alkali treatment and the residues were mounted in glycerin jelly.

RESULTS

In the preparations of this sample fern-spores of the Polypodiaceae type prevail in number. A striking feature is the "anulus-cells" of the "sporangii" which are well preserved and can often be found. According to their structure they also point to the Polypodiaceae or might be brought into connection with them.

The second group of pollen grains found in a rather important quantity are "Abies-pollenites" ones, which originate from conifers. Out of the sporomorphae which show up sporadically 3-colpate and 3-colporate types of pollen grains should be mentioned. These are designated as "quercoïd". Pollen grains of the Chenopodiaceae type with many pores can be seen as well. This coal we suppose to belong to the Pliocene Era.

DESCRIPTION OF MICROFOSSILS

PTERIDOPHYTA

Polypodiaceasporites (Thierg.) *haardtii* subsp. *indica*

Organgattung — *Polypodiaceae*

Figs. 4, 6-10

Holotypus — Fig. 6.

Locus typicus — Kashmir.

Stratum typicum — Tertiary.

Spores monolete, bilateral, 35-50 μ . Scar half to three-quarters of the length of the longest axis; spores without perispore.

Spores like these are known in the family of the Polypodiaceae.

Pseudoschizaea ozeanica n.g., n. sp.

Fig. 12

Holotypus — Fig. 12.

Locus typicus — Kashmir.

Stratum typicum — Tertiary.

Exospore ornamented with striates which run parallel to the wall of the spore. The spore looks like those of the Schizaeaceae, but is neither monolete nor trilete. Perhaps this sporomorph belongs to the "algae".

Intertricolatus thiergarti n.g., n. sp.

Fig. 11

The spore primary was global, the folds which run from pore to pore are secondary. Equatorial diameter about 45 μ , diameter of the pores about 10 μ .

Holotypus — Fig. 11.

Locus typicus — Kashmir.

Stratum typicum — Tertiary.

Cyathidites (Couper) *kashmirensis* n. sp.

Organgattung: *Cyatheaceae*

Fig. 5

Holotypus — Fig. 5.

Locus typicus — Kashmir.

Stratum typicum — Tertiary.

Spore trilete, convex-triangular nearly round, branches of the tetrad-scar not reaching the equator.

Affinity to *Cyatheaceae* probable.

GYMNOSPERMAE

Abiespollenites (Thierg.) *kashmirensis* n. sp.

Organgattung: *Abies*

Figs. 1, 2, 3

Holotypus — Fig. 1.

Locus typicus — Kashmir.

Stratum typicum — Tertiary.

Two-winged pollen grains which probably represent the family of the Pinaceae and the Genus *Abies*

***Pseudorondites asiatica* n. g., n. sp.**

Fig. 23

Organgattung: *Taxodiaceae**Holotypus* — Fig. 23.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

Small round pollen grain of about 14 μ , one thickened list formed like a "nose". A distant similarity to "Sequoiapollenites Thierg." can be established.

ANGIOSPERMS**Dicotyledonae*****Polyporina* (Naum.) *kashmirensis* n. sp.**

Fig. 14

Organgattung: *Chenopodiaceae**Holotypus* — Fig. 14.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

Pollen grain polyporate, diameter about 20 μ . Affinity to *Chenopodiaceae*.

***Quadratus indicus* n. g., n. sp.**Organgattung: *Betulaceae*

Figs. 15, 16

Holotypus — Fig. 15.*Paratypus* — Fig. 16.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

Pollen grains 4-porate; locally thickened streaks of sexine (arci) swing in pairs from pore to pore. This circumstance points to the affinity to *Aluns* sp.

Tripocolpatus indicus

Figs. 17-19

Organgattung: *Dicotyledonae*Grains 3-colpate or 3-colporoidate. 10-40 μ .***Umbelliferoidaepollenites kashmirensis* n. sp.**

Fig. 20

Organgattung: *Umbelliferae* or *Borraginaceae**Holotypus* — Fig. 20.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

This type of pollen grains is known in the family *Umbelliferae*.

***Triporatus kashmirensis* n. g., n. sp.**

Fig. 21

Organgattung: *Betulaceae**Holotypus* — Fig. 21.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

Pollen grain 3-porate, poroid apertures equatorial, diameter ca. 20 μ . This type is similar to *Betulaepollenites* R. Potonié, belonging probably to *Nyssaceae* or *Betulaceae*.

***Tubulifloridites* (Cookson) *kashmirensis* n. sp.**

Fig. 22

Organgattung: *Compositae**Holotypus* — Fig. 22.*Locus typicus* — Kashmir.*Stratum typicum* — Tertiary.

Grain tricolpate, provided with numerous prominent spines. The spines have a broad base and taper to a sharp point.

Affinity to the *Compositae*.

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EXPLANATION OF PLATE 1

(Magnification of the microfossils 1: 750 Leica, Agfa Isopan IFF 13/10 Din. Photographed by Dr. U. Frantz)

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| 1. <i>Abiespollenites</i> (Thierg.) <i>kashmirensis</i> n. sp. | 14. <i>Poliporina</i> (Naum.) <i>kashmirensis</i> n. sp. |
| 2. <i>Abiespollenites</i> (Thierg.) <i>kashmirensis</i> n. sp. | 15. <i>Quadratus indicus</i> n.g., n. sp. |
| 3. <i>Abiespollenites</i> (Thierg.) <i>kashmirensis</i> n. sp. | 16. <i>Quadratus indicus</i> n.g., n. sp. |
| 4. <i>Polypodiaceasporites</i> (Thierg.) <i>haardti</i> subsp. indica. | 17. <i>Tripocolpatus indicus</i> . |
| 5. <i>Cyathidites</i> (Couper) <i>kashmirensis</i> n. sp. | 18. <i>Tripocolpatus indicus</i> . |
| 6, 7, 8, 9, 10. <i>Polypodiaceasporites</i> (Thierg.) <i>haardti</i> subsp. indica. | 19. <i>Tripocolpatus indicus</i> . |
| 11. <i>Intertricolatus thiergarti</i> n.g., n. sp. | 20. <i>Umbelliferoidaeipollenites kashmirensis</i> n. sp. |
| 12. <i>Pseudoschizaea ozeanica</i> n.g., n. sp. | 21. <i>Triporatus kashmirensis</i> n.g., n. sp. |
| 13. cf. <i>Hystriospheraeidae</i> . | 22. <i>Tubulifloridites</i> (Cookson) <i>kashmirensis</i> n. sp. |
| | 23. <i>Pseudorondites asiatica</i> n.g., n. sp. |

