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DISCOVERY OF LATE CRETACEOUS PALYNOFLORA FROM FILDES PENINSULA, KING GEORGE ISLAND, ANTARCTICA AND ITS SIGNIFICANCE

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Summary

This paper makes an analysis and study on altogether 8 palyniferous samples from the volcano-sedimentary rock series in the Half Three Point area of the Fildes Peninsula, King George Island, Antarctica, the rock series being grey tuffaceous siltstone in lithological characters, about 5 m in thickness. Only after making a number of analyses, could we find the relatively abundant sporopollen fossils from 4 samples (Nos. GWP 4—7). But the fossils are poorly preserved, and most of them can hardly be identified; this might be related to the pyrometamorphism resulting

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from the later volcanic heating at the place. Although only a small part of the fossils in the assemblage are available for identification, they include some genera and species which are of significance to the determination of stratigraphical ages.

The palynoflora from the Half Three Point studied in this paper includes the pteridophyte spores *Gleicheniidites senonicus, Gleicheniidites* spp., *Clavifera triplex, Clavifera* spp., *Alsophilidites* cf. *kerguelensis, Cyathidites minor, Cyathidites* sp., *Osmundacidites wellmanii, Asterisporites* sp., *Biretisporites* sp., *Deltoidospora* spp., *Verrucosisporites* sp., *Echinosporis* sp., *Klukisporites* sp., *Extrapunctatosporis* sp. *Polypodiisporites* spp., etc., accounting for 90% of the total sporo-pollen content; the gymmospermous pollen (3%) *Dacrydium* sp., *Podocarpidites* sp., *Araucariacites* sp., the angiospermous pollen (5%) *Nothofagidites senectus, N. nanus, N.* sp., *Cranwellia* sp., *Tricolporites* spp., etc., and the fungal spores (2%) *Dicellaesporites* sp., *Multicellaesporites* sp., *Fractisporonites* sp., *Pluricellaesporites* sp., *Dyadosporonites* sp., *Diporicellaesporites* sp. The present palynoflora under study is mainly characterized by the large content of fossil Gleicheniaceae spores, such as *Gleicheniidites senonicus, Gleicheniidites* spp., *Clavifera triplex, Clavifera* spp., etc., which account for more than 50% of the total sporo-pollen content, forming a predominant fossil population. During the Middle Jurassic, the fossil spores of this family still remained rather poor; up to the Late Jurassic and Cretaceous, they became more diversified in taxa, with a wide distribution, and many forms similar to the spores of the modern Gleicheniaceae can be found in the Cretaceous continental facies sediments both in Eurasia and in the Southern Hemisphere. For the convenience of exploring and determining its geological age, here is a brief account on the stratigraphical distribution of some principal genera and species in this palynoflora.

The genus *Gleicheniidites* has an extremely wide distribution, and can be found from the Cretaceous of South and North Americas, Upper Jurassic-Lower Cretaceous of Britain, Lower Cretaceous of West Germany and USSR, Upper Cretaceous of Sweden, Lower Palaeocene Series of East Germany and the Eocene Series of France, but mainly appearing in the Cretaceous.

Clavifera represents an important element of the Mesozoic palynoflora in USSR and Australia; while *C. triplex* has been taken as the index fossil for the key zone of the Upper Cretaceous in Australia, and is now emended as the main component of the *Phyllodadidites mawsonii* zone, which is Turonian to basal Santonian in age (Jell, 1987). The existence of the present *Clavifera triplex* has provided evidence for determining the age of the fossil sporo pollen-bearing strata.

The form genus *Deltoidospora* which is allied to the family Gleicheniaceae, has been found in the Cretaceous of USA. There is also a considerable quantity of such spores occurring in the Half Three Point area.

Cyathidites represents a kind of the richest pteridophyte spores from Albian to Cenomanian and can be found from the Jurassic to Cretaceous in different parts over the world, including the Cretaceous of the Antarctic Peninsula. The modern plant of this genus is represented by the tree fern, which is mainly distributed in the tropical humid areas, and also can be found in Chile, New Zealand and South Africa.

Asterisporites represents a kind of pteridophyte spores which is unclear in taxonomical position. Its occurrence at Half Three Point is most significant stratigraphically. There are also some spores bearing a very strong resemblance in morphology to this genus, including *Nevesisporites* and *Trisolissporites*. Judged from the currently known stratigraphical records, all of these three genera can be only found from the Mesozoic strata, but have not yet been found from the Tertiary strata so far. Among these three genera, *Asterisporites* represents a kind of characteristic elements in the Cenomanian—Turonian palyno-assemblage of W. Siberia, USSR, and also has been discovered from Upper Jurassic—Lower Cretaceous in western India; while *Nevesisporites* was first reported from the Juras-

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sic of Australia. *Trisolissporites* can be found from Cenomanian—Turonian of USSR, Upper Jurassic of Canada, Lower Cretaceous of Germany, Maastrichtian Stage of Upper Cretaceous in Montana, U. S. A., and Lower Cretaceous of Europe. In China, such kind of spores also can be found from the Cretaceous of Jiangxi. Based on the distribution of these spores in the strata in different parts of the world, the existence of *Asterisporites* in the Half Three Point area would help infer that its geological age should belong to the Mesozoic.

Among the gymnospermous pollen available for making identification, there is only the *Araucariacites*, which is distributed in the Southern Hemisphere, including both the Cretaceous and the Tertiary of the Antarctic Peninsula, and has become a frequent element of the community at that time in the Cretaceous of the Antarctic Peninsula.

The appearances of angiospermous pollen grains in this palynoflora, such as *Nothofagidites*, *Tricolporites*, etc., have ruled out the possibility of belonging to Jurassic or Early Cretaceous in the geological age of this flora, because the pollen grains of *Nothofagidites* made their earliest appearance in the Late Cretaceous strata of the Southern Hemisphere including the Antarctic Peninsula, and their appearance in abundance was only in the middle-late stage, at least Campanian of the Late Cretaceous. The pollen grains of the 3 species, namely, *Nothofagidites senectus*, *N. nanus* and *N.* sp. appearing in the Half Three Point area have demonstrated some characteristic features of the vegetation in the Southern Hemisphere during the middle-late stage of Late Cretaceous. On the other hand, it is generally considered that the *Tricolporites* with simple texture did not appear until the latest stage of Early Cretaceous, and its appearance in abundance was actually later than the early stage of the Late Cretaceous. Therefore, the appearance of *Tricolporites* with complicated ornamental textures in the Half Three Point area also demonstrates the characteristics of this palynoflora after the early stage of the Late Cretaceous.

To sum up, the existence of *Asterisporites* indicates that the palynoflora-bearing bed of the Half Three Ponit area should belong to the Mesozoic in geological age. However, the existence of *Nothofagidites senectus* has ruled out the possibility of belonging to the Early Cretaceous or even to a still older age. On the other hand, the discovery of *Tricolporites* with complicated ornamental textures demonstrates that the age of this stratum not very likely belongs to the late stage of Early Cretaceous, either, and that it can only belong to a stage later than the early stage of Late Cretaceous. Therefore, based on the component analysis of this palyno-assemblage, it would be more appropriate to assign the age of the Half Three Point area to the middle-late stage of Late Cretaceous, and very possibly to Campanian.

The principal elements of the palynoflora in the Half Three Point area are Mesozoic terrestrial plants, reflecting the vegetation features of certain tropical-subtropical rain forest community in the medium- to low-altitude mountain areas and plains; the modern plants of these main genera and species are now growing in tropical-subtropical areas, especially the land-derived members of Gleicheniaceae, as the predominant group in the present assemblage (up to 50% in content), are mainly distributed in tropical areas. This rain forest community is probably composed of *Arucaria, Podocarpus, Dacrydium, Nothofagus* and various taxa of Pteridophytes, and the palaeoclimate reflected belongs to the tropical-subtropical type. Since neither planktons nor fossils of marine facies or alternating marine and continental faceis have ever been discovered from the sporo-pollen-bearing rock formations in the Half Three Point area, it is very likely that they belong to the continental facies sedimentation.

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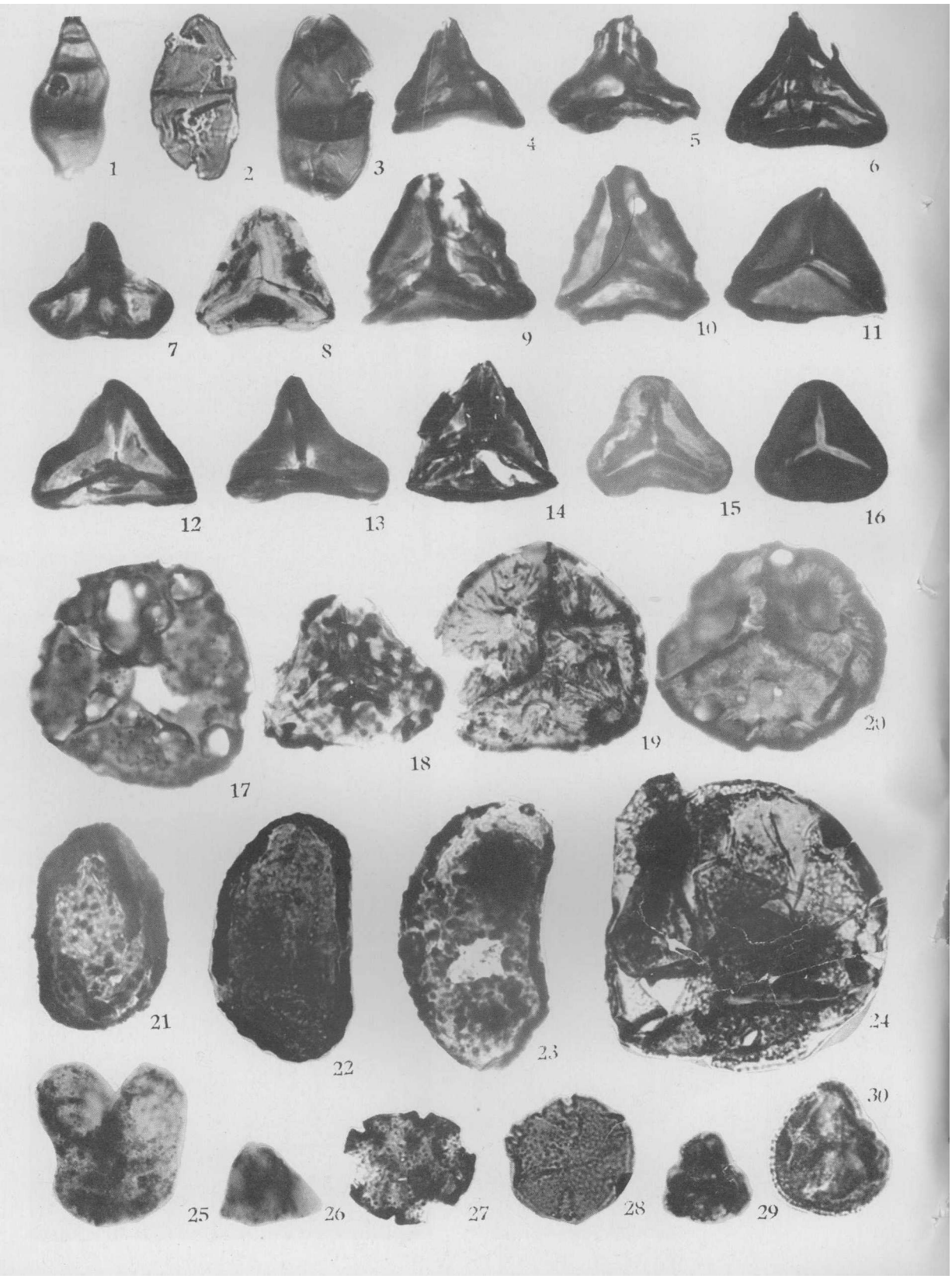

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