

Study on the Gymnospermous Fossil Woods from the King George Island

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Abstract : Several pieces of permineralized fossil woods have been examined and classified into the Araucariaceae-like plants. These woods temporarily have been named as *Dadoxylon* sp. and these indicate the Early Tertiary age. Its occurrence suggests a cold habitat in the high altitude vegetation and interglacial areas. It also generally recognized subalpine-alpine rain-forest in the southern hemisphere.

Key words : Araucariaceae-like plants, early Tertiary, antarctic fossil

Introduction

Floristic characters have been investigated in many ways by many researchers, but it is very difficult to determine the exact age and environment of the Antarctic areas.

Several researchers have reported the provisional age of the endemic flora which had been discussed by many other authors.

In general, this is the provisional result about fossil woods which have been collected by the Korea Antarctic research members. Actual site and stratigraphic sequences are not completely studied at this level.

Geologic Settings of the Site

Barton Peninsula is situated at the south-western end of Barton Horst on King George Island. According to the former researchers, the stratigraphic sequences are very complicated. But the general geology of the Barton Peninsula can be separated into 3 major formations, Fildes Formation, Hennequin Formation, and the Lower Volcanic rocks as shown on the geological map(Fig. 1). From

the Hennequin Formation, mainly composed of glassy hypersthene-augite-andesite, agglomerate and tuffaceous rocks, petrified woods have been collected from the clastic-rocks bed, and carbonized plant remains have been found from shale bed which are layered between andesitic lava beds. And the Lower Tertiary Volcanic Rocks also produced some plant remains. Fildes Formation is mainly composed of porphyritic-lava, basaltic-lava and interbedded pyroclastic rocks. Plant remains have been detected from the shale beds and from the tuffaceous rocks of the Fildes Formation.

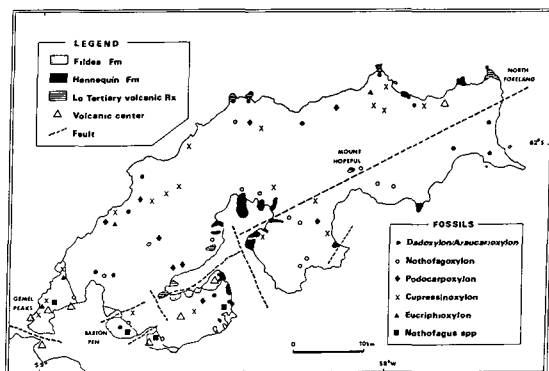


Fig. 1. Geological and fossil plants tributary map of King George Island.

Investigation of fossil woods

Several parts of coniferous fossil woods have been collected from the Barton Peninsula, King George Island by the Korea Antarctic research members. And some fragmentary deciduous leaf remains which can be classified as a species of *Nothofagus* also have been collected by other members from the Barton Peninsula. But the stratigraphic sequences must be reexamined for the interpretation of assemblages. Identification of the petrified woods is very difficult and is correlated with the identification of modern woods. For the study of fossil woods, three different dimensional section planes are needed (such as cross transverse, radial and tangential sections) with these thin sections, and peeling sections. Annual growth rings, resin canals, wood parenchyma, pittings and ray structures must be examined under the microscope for identification of fossil woods.

The generic names of the specimens are used for materials in which only secondary wood with pittings and ray structures. Actually, it is very difficult to separate coniferous woods with *Araucarioxylon* and *Dadoxylon* without direct affinity with the living genus *Araucaria*. In the specimens, growth rings, uniseriate rays and tracheid pittings are observable in each crossfield. Region of small cells are formed at the end of season. Secondary xylem are composed of tracheids and ray parenchyma. The ray parenchyma (horizontal ray tracheid) are also observable and the tapered end walls are detected. In the sections, ruptures which were produced during fossilization are also present. These are not enough to classify with specific level at this moment, but most of the characters are quite comparable with genus *Dadoxylon*. From the southern hemisphere, these kinds of coniferous fossil woods have been reprinted in Tertiary (probably Early Tertiary) deposits of Argentina, New Zealand and other Antarctic

areas (Sewards, 1919; Krausel, 1924; Stopes, 1914 et al.). It seems probable that the fossil woods from the Barton Peninsula are likely to be contemporary with those materials from other areas of the southern hemisphere.

Conclusion

Consequently, a probable Early Tertiary age is suggested for these materials and these kinds of plants can be grouped (Axelrod's) into the Antarcto-Tertiary geoflora and these suggest cold habitat in the high altitude vegetation and interglacial areas. It is also recognized from subalpine-alpine rainforest in the southern hemisphere during those times. And these permineralized woods are related to the eruption of the volcanoes.

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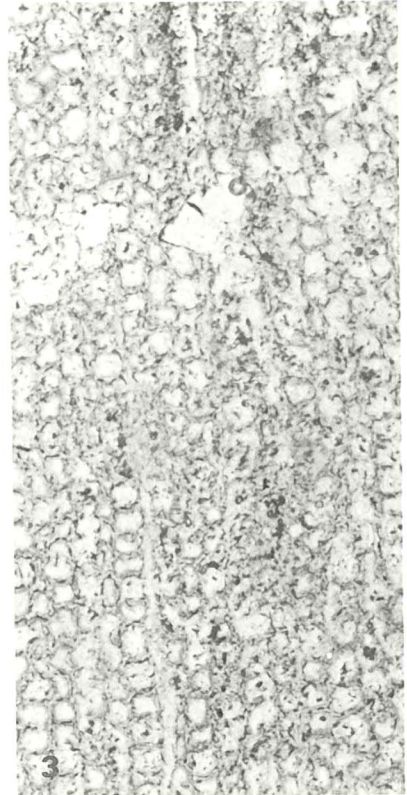
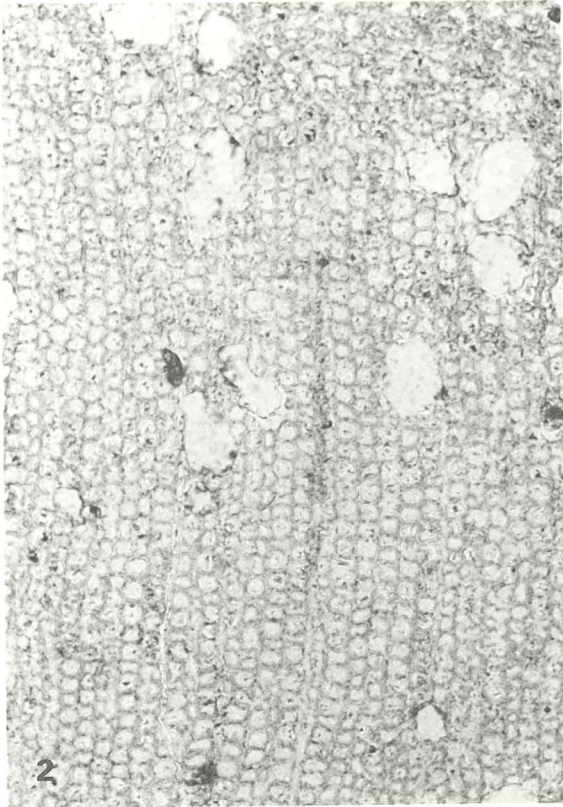
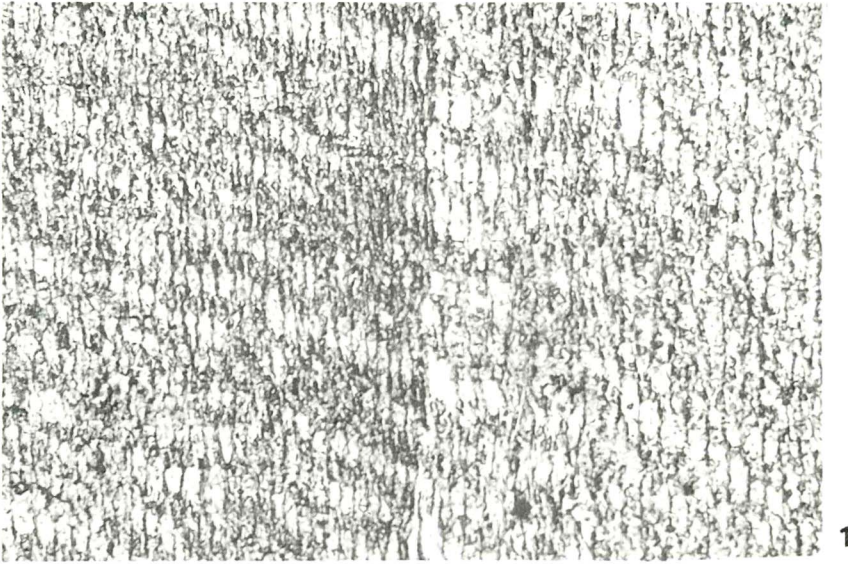
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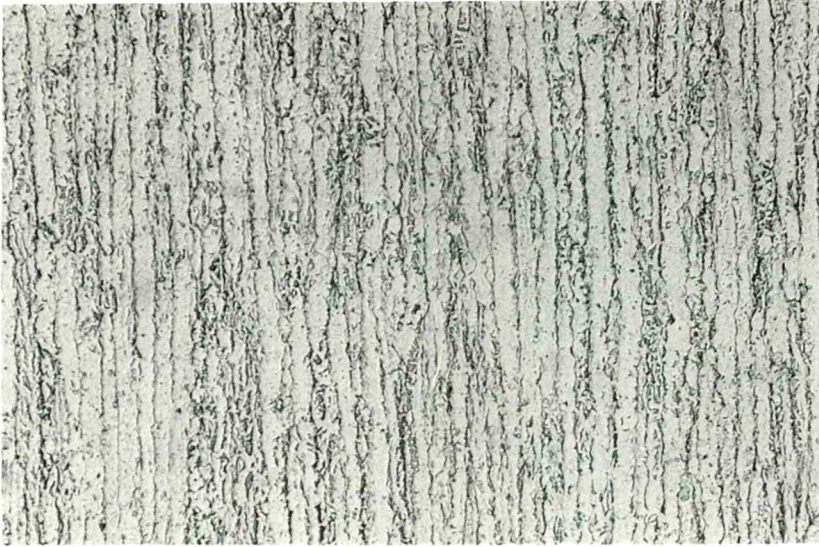
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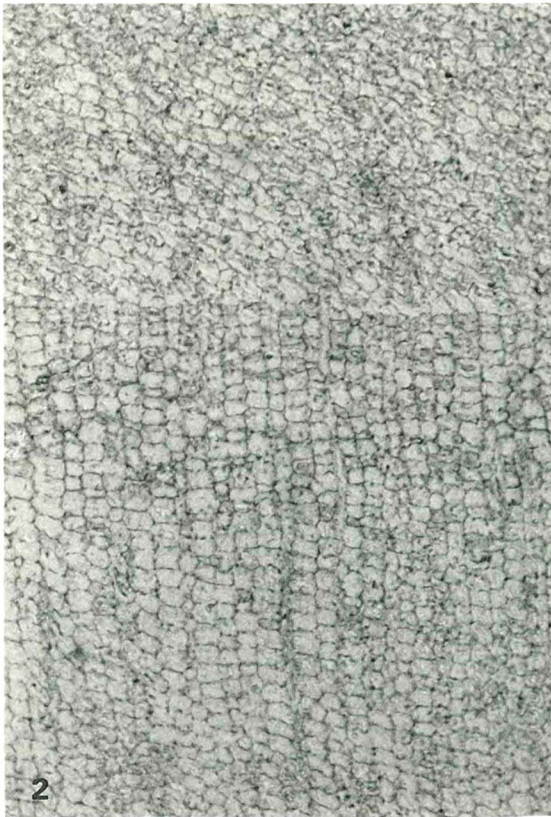


Pl. 1 1. Radial section of the specimen A showing growth rings and rays.

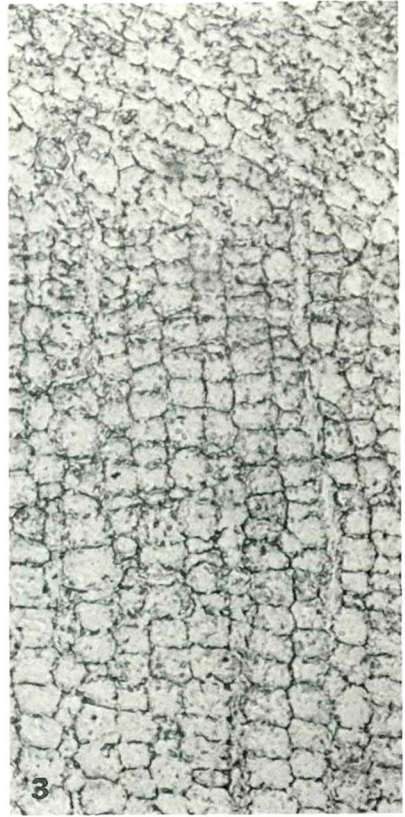
2,3. Transverse section of the same specimen of the Pl. 1-1 showing well preserved rays.



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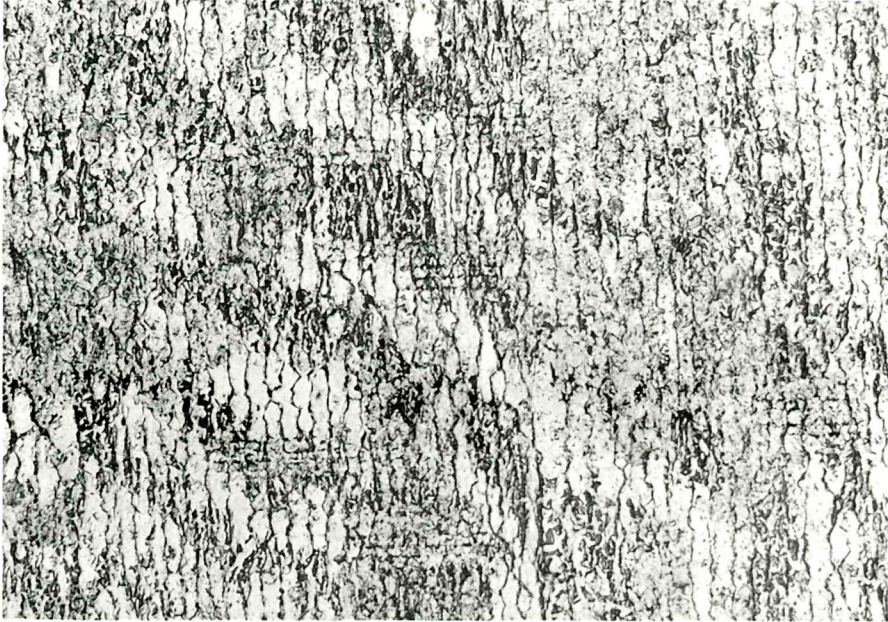
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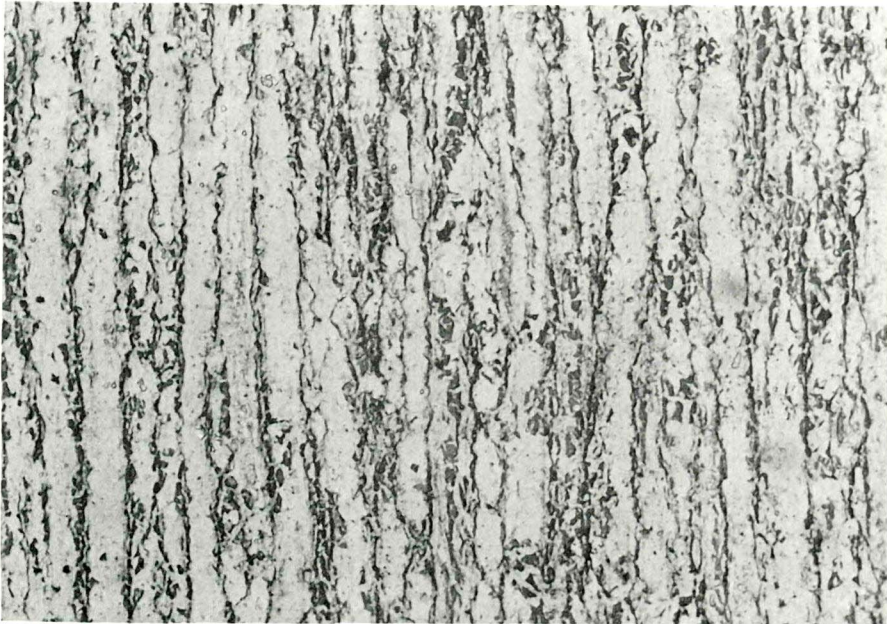
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Pl. 2 1. Tangential section of the same specimen of the Pl. 1-1 showing septate fibres.

2,3. Transverse section of the specimen B showing distinct growth rings.



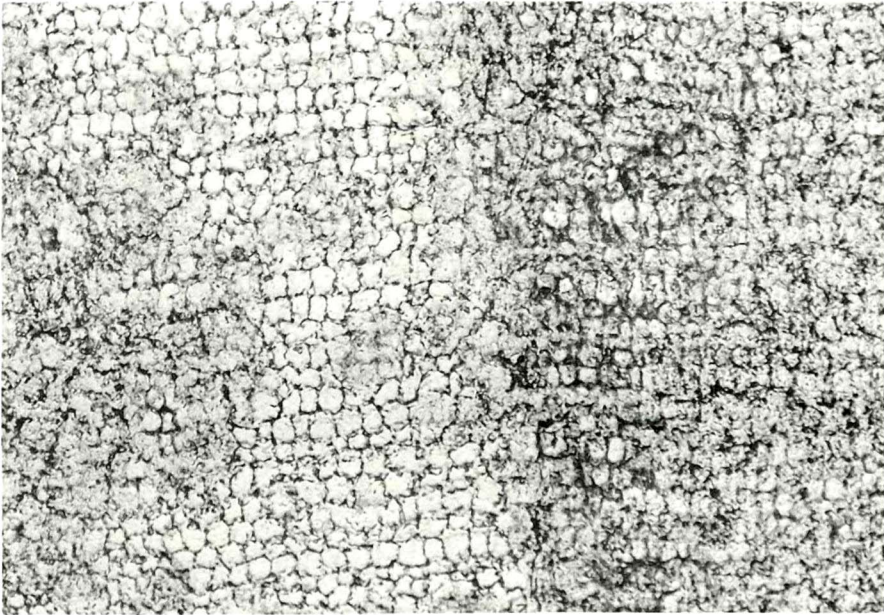
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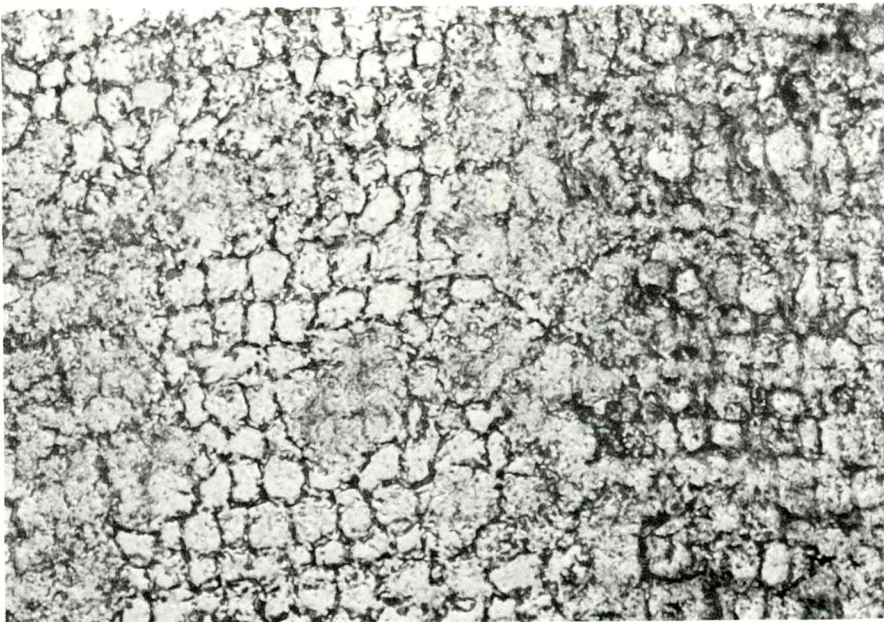
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Pl. 3 1. Radial section of the specimen B showing rays and thin horizontal walls.
2. Tangential section of the specimen B showing bordered pits.

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Pl. 4 1,2. Transverse section of the specimen C showing abrupt transition of the growth rings and possible bordered pits.