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A TOURNAISIAN CORAL FROM THE MEMBI-PEAK, KITAKAMI MOUNTAINS, JAPAN

by

Masao Minato and Toru Ogata

(with 2 plates and 2 figures)

(Contribution from the Department of Geology and Mineralogy,
Faculty of Science, Hokkaido University, No. 1485)

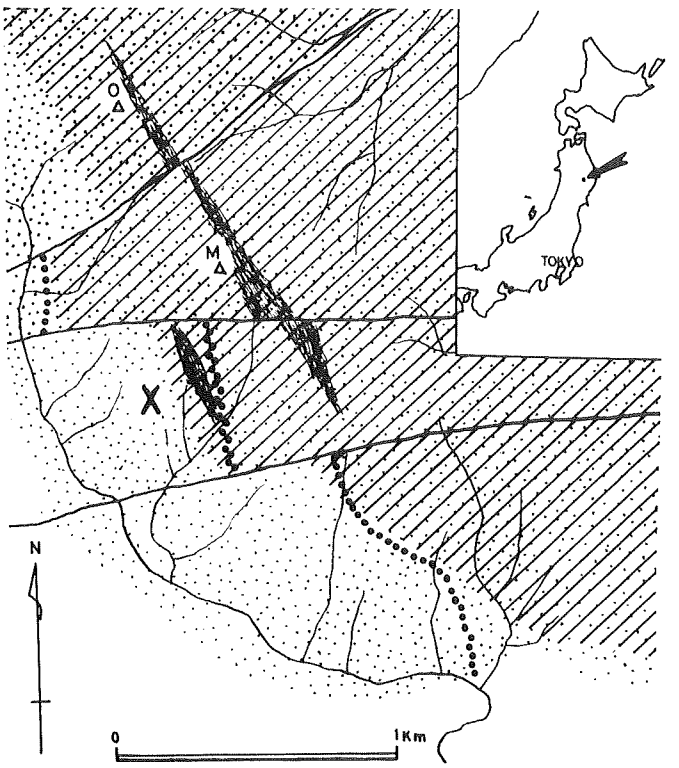
Abstract

In a rather narrow strip including Membi-Peak, northern part of the Setamai district, Kitakami mountains, very thick sedimentary rocks with or without the influence of metamorphism are developed. There sediments have not been dated yet since a long time ago, because of almost barren in fossils. The junior author, however recently succeeded in finding fossils from this formation. Among them, there is a coral which resembles some hitherto known species of *Palaeosmilia* of the Tournaisian, namely *Palaeosmilia tschumyschensis* Dobrolyubova and *Palaeosmilia aquisgranensis* (Frech). If this estimation is correct, the thick formation developed around the Membi-Peak might as well be correlated with the Lower Tournaisian.

Introduction

The Membi-Peak belongs to the area with steep slopes, narrow ridges and deep valleys with thick cover of vegetation. The result of detailed mapping of the junior author in this area is diagramatically shown in Fig. 1: in which M means the top of the Membi-Peak, 852.9 m in altitude. O represents the Ombi-Peak which is 878 m in high facing the Membi-Peak. Dotts indicate rather fine grained sandstone with intercalations of thin slaty rocks. Black circle means conglomerate layers with large or smaller sized pebble, mostly composed of sedimentary rocks, with a smaller amount of dyke rocks in origin. Including hatched lines indicate the area where rocks more less altered or metamorphosed are cropping out. Large plagioclase porphyroblasts, andalusite, cordierite and various chloritoids are locally developed in the hatched area.

Fossils were found from calcareous sandy slate. Of the fossils, a considerably well preserved coral will be described below. The locality (X) of the fossils: 39°12′30″N, and 140°30′30″E.



Text-fig. 1 Geological map of the area around the Membi peak, northern part of the Setamai district, S. Kitakami mountains, Northeast Japan. X: Locality where fossils were collected by Ogata.

Genus *Palaeosmilia* Edwards et Haime 1848

Type species: *Palaeosmilia murchisoni* Edwards et Haime, 1852, Viséan of England.

Diagnosis: Large solitary corals, with numerous septa, of which the major ones reach almost the axis, while the minors may be 1/2 – 1/3 the length of the former. Thus intrathecal area is usually wide. Wall is generally thin. At the peripheral part, septa become locally thinner or interrupted where somewhat large vesicles appear, although interseptal dissepiments of the peripheral area are usually concentric. The tabulae are incomplete, gently convex with central depression. The so-called compound forms of *Palaeosmilia* would be better excluded from the present genus, although the former has been currently included in the same genus (Hill, 1956).

Remarks: In Japan *Palaeosmilia* is rather common in the Upper Viséan limestones. *Palaeosmilia kitakamiensis* Minato 1955 was described from the Kitakami mountains, while *Palaeosmilia murchisoni* was reported by T. Sato

(1956) from the northern part of the Abukuma mountains. Kato (1959) described *Palaeosmilia cfr. murchisoni* from the Hida Mountains.

However, the present coral of *Palaeosmilia* is specifically quite distinct from the Japanese Upper Viséan species but rather nearly akin to the Tournaisian *Palaeosmilia*, such as *Palaeosmilia tschumyshensis* Dobrolyubova from the Kuznetsk (Kuznets) basin, or *Palaeosmilia aquisgranensis* (Frech) from the Central France. Details in this regard will be later on stated.

Palaeosmilia membiensis Minato and Ogata, sp. nov.

(Pl. 1, figs. 1, 2; Pl. 2 figs. 3, 4; text-fig. 2)

Material: As a matter of fact, the fossils were firmly embedded in a large block of slate, about (30 x 20 x 15) cm in size. Several cross sections of corallite were exposed here and there. The authors tried to make four thin sections, four polished sections, and four replicating films from the single specimen. They are now registered as UHR 30188b, c, e, g (thin sections), 30188a, d, f, i (polished specimens) and 30188h, j, k, l (replica films).

Collector: Toru Ogata

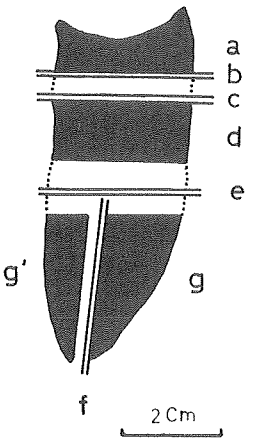
Locality: About 600 m southwest of the small peak called Membiyama; southwestern ridge. The specimens were however not collected from the rock *in situ*, but from the debris in association with large and small crinoid stem joints. Nevertheless the coral specimens look like to have been moved not far from the original outcrop, because of the lithologic nature of the matrix of fossils seems to be so similar with the rocks cropped out immediately upper courses of the locality. This may be well suggested in the geological map made by the junior author (Text-fig. 1).

Description of species:

Outer form of the coral is not directly visible, but may be cylindro-ceratoid in form. Three serial cross sections – actually very obliquely cut, show the maximum width of corallite reaches almost 26–27 mm, while it may be more than 76 mm in length, as far as the restored part is concerned.

Septa are numerous, composed of major and minor ones in alternation. The major septa are counted as many as 45 or so. They are very long, nearly reaching the center of corallite. They are thick in the dissepimental area and gradually thinner towards their distal end in the intrathecal area, although a very few major septa show to be rhopaloid.

Locally, major septa are a little thicker, or irregularly curved in the tabularium. Sometimes they become very thin or locally interrupted near the wall.



Text-fig. 2 *Palaeosmilia membiensis* Minato and Ogata sp. nov. Restored form of corallite in which the position of thin sections made is shown. a, b-f correspond to the number of thin sections. Part of corallite showing in black colour is still preserved.

In such an area, minor septa and concentric dissepiments are also locally lacking and lonsdaleoid dissepiments of irregular form and size become to occupy the margin of dissepimentarium.

Minor septa are usually about one half the length of the majors or only a little exceed the half length of the majors. The minor septa are locally irregularly sinuous, or sometimes their distal ends including towards the neighbouring major ones.

Fossula is usually prominent, long but varies in width at different growth stages. Cardinal septum is very short, which occupies the central part of the fossula.

Distribution of dissepiments are rather irregular, but locally dense, arranged not in concentric but more or less angular. In addition, the dissepiments are thickly covered by organic deposits at places.

Outer wall is not thick. In longitudinal section (UHR 30188g) triareal arrangement is obvious: tabularium and dissepimentarium of both sides. Tabulae incomplete, slightly or rather highly arched in general, but gently sagging in the central part. In other words, the tabulae of the present coral is arched with central depression.

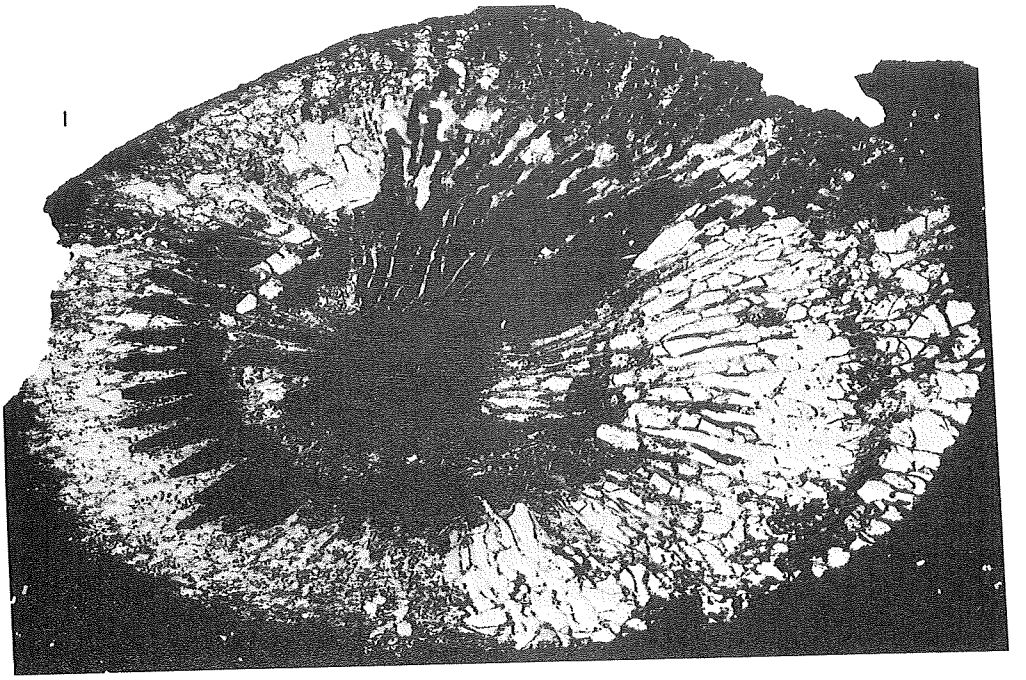
Explanation of plate 1

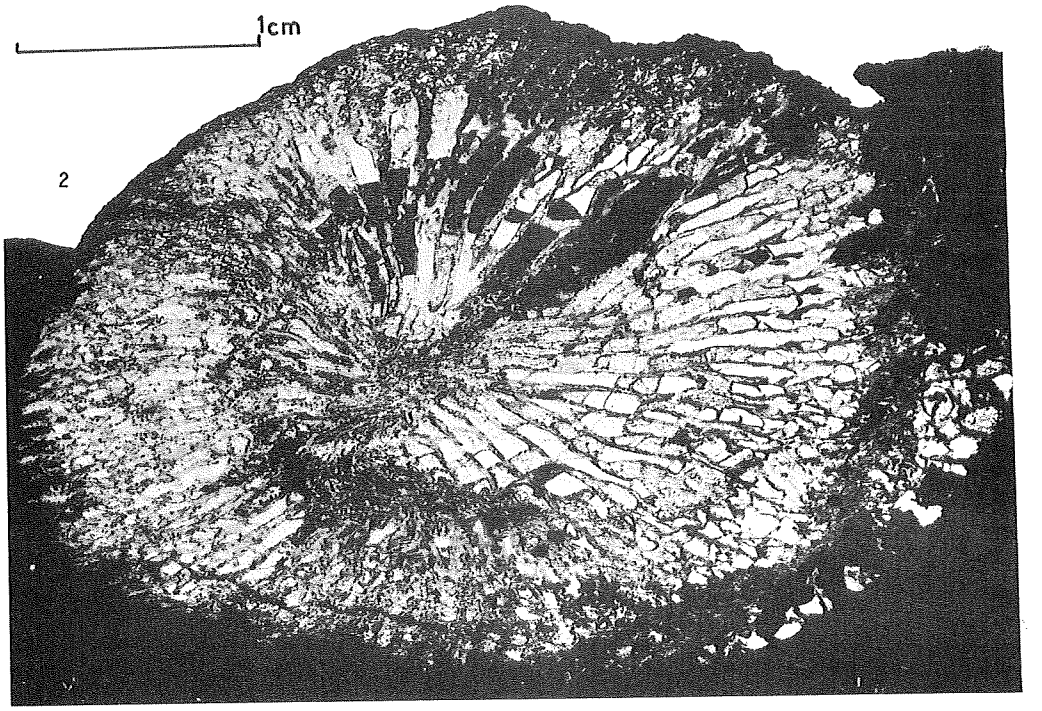
Palaeosmilia membiensis Minato and Ogata sp. nov. Figs. 1, 2, Oblique cross section

fig. 1: UHR (30188b)

fig. 2: UHR (30188c) see text-fig. 2.

Plate 1





Fine structure of any skeletal element is hardly observable through a recrystalization of the material.

Comparison

The present form closely akins to *Palaeosmilia tschumyshensis* Dobrolyubova described by her 1966 from the Tournaisian (C_1^t td) developed along the Tshumysch river, in the Kuznetsk basin.

However Dobrolyubova's species has shorter minor septa than the Japanese form, and has more numerous septa. In addition to this, structure of dissepimentarium is observed to be more regular, which is composed of regularly spaced concentric dissepiments and straight major and minor septa. There seem to lack lonsdaleoid dissepiments. Thus, the Japanese form is specifically distinct from the Kuznetsk form.

From the view point that the minor septa are longer, and septa are not always straight, the Japanese form may more nearly resemble *Palaeosmilia aquisgranensis* (Frech) (in Ma, 1955). However general construction of skeletons in the latter seems to be more slender than the Japanese form. Especially septa are thinner. Furthermore, septa are more numerous in *Palaeosmilia aquisgranensis*. The central depression of tabulae in *aquisgranensis* may be weak. Therefore the Membi coral may be specifically also distinct from the Frech's Tournaisian form.

Age: The present form may be a new species and cannot be regarded to be a good horizon indicator. Nevertheles, the present form really resembles the Tournaisian *Palaeosmilia* than the Viséan species. The formation from which the present coral was found may be safely assigned into Tournaisian. The Tournaisian deposits widely developed in the area surrounding the Membi-Peak, are divided into the following nine lithologic units (-III, -II, -I, I, II, III, IV and V groups in ascending order). Among them, I or -II group may be most probably contemporoneous with the formation in which the present coral was found out, because of similarity of lithologic nature. It should be eventually Lower Tournaisian.

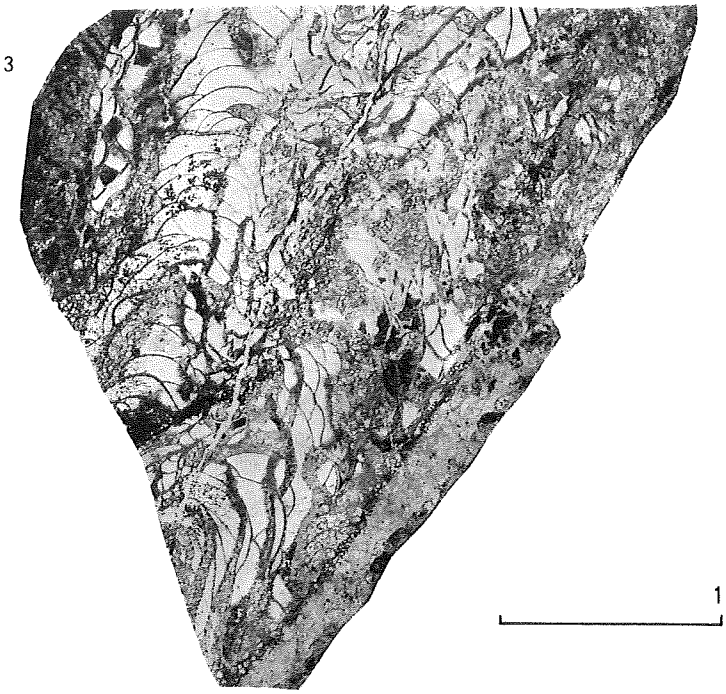
Explanation of plate 2

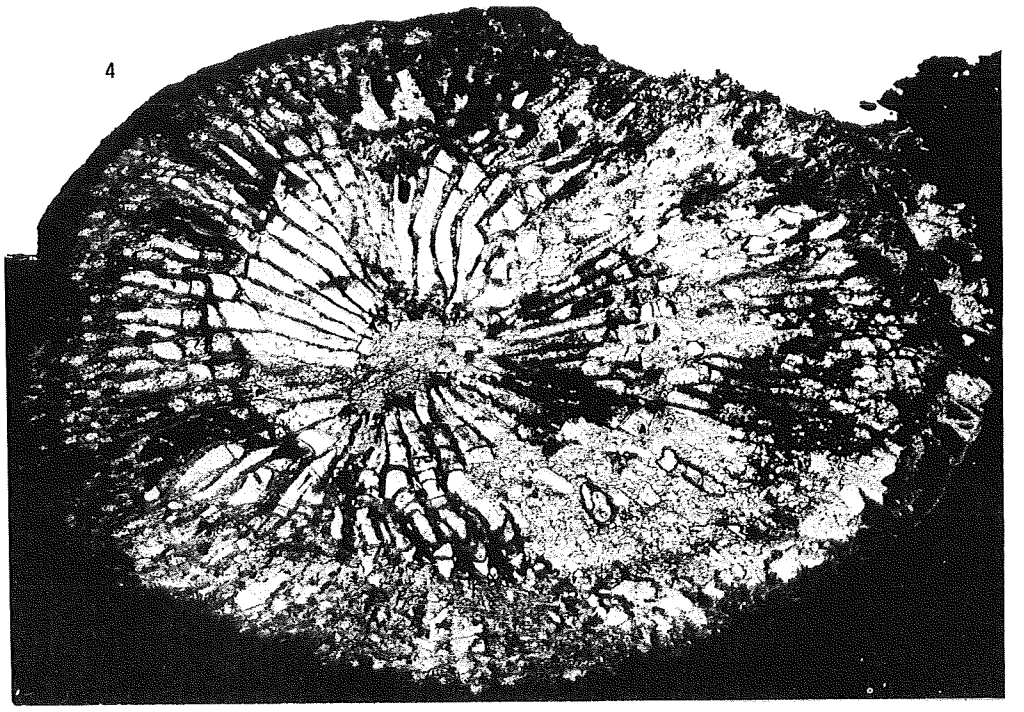
Palaeosmilia membiensis Minato and Ogata sp. nov.

Fig. 3 Longitudinal section UHR (30188g)
In the left upper corner, concentric or angular concentric dissepiments are especially well observable.

Fig. 4 Oblique cross section, UHR (30188e)

Plate 2





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References

Dobrolyubova, T.A., Kabakovitsch, I.V. and Sayutina, T.A., 1966. Lower Carboniferous corals of the Kuznetsk (Kuznets) basin. *Acad. Sci. USSR, Contribution, Palaeontology Inst.*, 117: 90-91 (in Russian).

Kato, M., 1959. Some Carbonifeous Rugose corals from the Ichinotani formation, Japan. *Jour. Fac. Sci., Hokkaido Univ.*, Ser. 4, 10(2): 263-287.

Ma Ting Ying, 1955. Climate and the relative positions of the continents during the Lower Carbonifeous period. *Research on the Past Climate and continetal Drift.* 9: 31, pl. 14, figs. 4 and 5.

Minato, M., 1955. Japanese Carbonifeous and Permian corals. *Jour. Fac. Sci., Hokkaido Univ.*, Ser. 4, 9(2): 202.

Hill, D., 1956. Rugosa. In: Moore (ed). *Treatise on Invertebrate Palaeontology*. F. 290.

Sato, T., 1956. On the Tateishi formation and its Carboniferous coral fauna, in the North-Eastern part of the Abukuma massif, Japan. *Sci. Rep. Tokyo Kyoiku Daigaku*, Ser. C, Geol. Mineral., Geograph., 4(36): 235-261, pls. 10-12.

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