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CORWENIA HASIMOTOI, A NEW TETRACORAL FROM THE UPPER PALAEOZOIC OF SIKOKU

By

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With 1 Plate

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Tetracorals are common at places in the Upper Palaeozoic, especially in the Lower Carboniferous, of the Inner Zone of Southwest Japan, while they are very rarely⁽¹⁾ met with in both Carboniferous and Permian deposits of the Outer Zone. Lately a few pieces of limestone containing a species of tetracoral treated in the present note were kindly donated to the senior author by Mr. K. HASIMOTO, teacher of Kôti Commercial School at Kôti in Sikoku.

The material was collected by Mr. HASIMOTO at the limestone quarry near Tosayama, about 14 km. north of Kôti. The coral is firmly imbedded in the matrix and, moreover, unfortunately much deformed. However, from the general features as will be stated below, it belongs to, and is the first representative from Japan⁽²⁾ of the genus *Corwenia*.

(1) Besides a species of *Waagenophyllum* from the Permian limestone at Mimikiri, Sakawa, prov. Tosa, only two occurrences of Lower Carboniferous corals have been reported from the Outer Zone of Southwest Japan. H. YABE and T. SUGIYAMA: Discovery of Lower Carboniferous Corals from the Yatusiro District in Kyusyu. Proc. Imp. Acad. Tokyo, Vol. XV, 1939, p.300.

(2) *Dibunophyllum rugosum* var. *ofukuensis* OZAWA (Palaeontological and Stratigraphical Studies on the Permo- Carboniferous Limestone of Nagato, Pt. II. Paleontology. Jour. Coll. Sci. Imp. Univ. Tokyo, Vol. XLV, art. 6, 1925, p. 77, pl. XII, figs. 6, 7) seems to be a solitary corals; then it belongs to *Dibunophyllum*, not to *Corwenia*.

Corwenia SMITH and RYDER, 1926*Corwenia hasimotoi* sp. nov.

Pl. XXVII

Holotype: A few pieces of limestone with more than ten corallites, Department of Geology and Mineralogy, Faculty of Science, Hokkaido Imperial University, rg. no. 8964.

The corallites are deformed and almost always so much crushed that the precise features of the columnal area have been more or less obliterated.

Corallum compound, fasciculated and phaceloid. Corallites variable in size with age, mature ones ranging from 15 to 17 mm. in diameter, and sometimes attaining 21 mm.

Transverse section: Major septa numerous, numbering 38 in larger corallites (maximum number 39), originating from the outer wall, rather thin, and reaching the central area (columnal area), slightly thickened at the theca. Minor septa alternated with the major ones, almost always shorter than a half of the length of the latter, and restricted to external area (extrathecal area). Columnal area large, loosely constructed with (?) a mesial plate, axial tabellae and septal lamellae, forming a spider-web structure. Mesial plate probably thin and (?) flexuous. No peripheral non-septate area.

Dissepiments rather crowded, small, arranged generally in 7 to 11 or more subconcentric rows, forming a more or less definite inner wall (theca). In intrathecal area dissepiments less crowded than in the extrathecal area; in young corallites dissepiments arranged somewhat concentrically, but they form an angulo-concentric or pseudo-herring bone pattern in larger ones.

Longitudinal section: Triareal arrangement quite clear, although all the corallites have been more or less deformed, so that the features of the central column are not definitely determinable. Central column broad. Mesial plate very difficult to detect, but in some sections its presence is indicated, though obscurely. Columnal tabellae apparently crowded, steeply inclined outward. Tabulated area conspicuously broad, occupied by very crowded tabulae which are most probably only a little inclined outward, and number 14-15 in 6 mm. Outer area consisting of rather small, inwardly inclined, and arched dissepiments of unequal size and arranged in a few rows.

Locality: The limestone quarry south of Tosayama, Tosayamamura, Kôti-gun, Tosa Province, Sikoku.

Horizon: Probably Carboniferous (Moscovian ?).

The genus *Corwenia* was established in 1926 by SMITH and RYDER⁽¹⁾ with *Lonsdaleia rugosa* MCCOY⁽²⁾ from the Visean of England as the genotype. According to these authors, the genus is quite identical in many features of corallites with *Dibunophyllum*, but differs in being fasciculated, although SMITH later⁽³⁾ suspected a probably homaeomorphy of these genera. The genus ranges, as far as known, from Visean to Lower Artinskian in age, its species having been reported from the Visean of Europe⁽⁴⁾, the Moscovian of China⁽⁵⁾, the Sakmarian (Schwagerinenkalk) of the Carnic Alps⁽⁶⁾ and the Lower Artinskian of China⁽⁷⁾.

(1) S. SMITH and T. A. RYDER: The Genus CORWENIA, gen. nov. Ann. and Mag. Nat. Hist.; 9th ser. Vol. XVIII, 1926, p. 140.

(2) F. MCCOY: On Some New Genera and Species of Palaeozoic Corals and Foraminifera. Ibid., 2nd ser. Vol. III, 1849, p. 13; British Palaeoz. Foss. p. 150, pl. III, B, figs. 6a-c. MILNE EDWARDS and J. HAIME: Polif. Foss. Terr. Palaeozoic, 1851, pl. 461; Monogr. British Foss. Corals, 1851, p. 209, pl. XXXVIII, fig. 5.

Furthermore, this species is precisely described and well illustrated in the following papers:

S. SMITH: The Genus *Lonsdaleia* and *Dibunophyllum rugosum* (MCCOY). Quart. Jour. Geol. Soc. vol. LXXI, 1915, p. 264, pl. XXI, figs. 3-16. S. SMITH and T. A. RYDER: The Genus CORWENIA, gen. nov. Op. cit., 1926, p. 150, pl. V, figs. 1-5.

(3) S. SMITH: Two Anthracolithic Corals from British Columbia and Related Species from the Tethys. Jour. Paleont. Vol. IX, no. 1, 1935, p. 34.

(4) Besides the genotype, *C. vaga* SMITH and RYDER is reported from the Visean of England. S. SMITH and T. A. RYDER: The Genus *Corwenia*, gen. nov. Op. cit., 1926, p. 153, pl. V, figs. 6-15.

(5) From the Weiningian (Moscovian) of China, *C. chiütsingensis* CHI is described. Y. S. CHI: Weiningian (Middle Carboniferous) Corals of China. Palaeont. Sinica, ser. B, Vol. XII, fasc. 5, 1931, p. 45, pl. III, figs. 3a-b, ?2.

(6) F. HERITSCH: Korallen der Moskauer-, Gshel- und Schwagerinen-Stufe der Karnischen Alpen. Palaeontogr. Vol. 83(A), 1936, p. 128, Text-fig. 32. (*C. sp.*)

(7) T. K. HUANG: Permian Corals of Southern China. Pal. Sinica, ser. B. Vol. VIII, fas. 2, 1932. The following species are reported from the Chitsia limestone and equivalent deposits:

C. parachihsiaensis HUANG

C. diphyphylloides HUANG

C. chuyaoashanensis HUANG

C. sp.

Besides, *C. chihsiaensis* HUANG, *C. chiuyaoashanensis* HUANG and *C. sp. nov.* are also described from the same formation of the Lower Yangtze Valley. T. K. HUANG: The Coral Fauna of the Lower Yantze Valley. Pal. Sinica, Vol. VIII, fas. 1, 1932.

Among these foreign species, the Permian ones from China, which, according to SMITH⁽¹⁾, are rather closely related to *Waagenophyllum*⁽²⁾, differ distinctly from the Japanese form. The latter is more closely similar to *C. chiütsingensis* CHI⁽³⁾ of the Moscovian age, as far as the description and figures of this Chinese species given by CHI are concerned. A close comparison of the columnal area in these two is somewhat prevented owing to the bad state of preservation of this part in the new species, but the latter has larger corallites with more numerous septa and a wider tabulated zone which is provided with far denser tabulae.

On the other hand, the present species has many points in common with the Lower Carboniferous ones, *C. rugosa* MCCOY⁽⁴⁾ and *C. vaga* SMITH and RYDER⁽⁵⁾; small crowded dissepiments and a broad tabulated zone occupied by densely arranged tabulae. The tabulae are nearly horizontal as in *C. vaga*, not oblique as in *C. rugosa*. In the European forms, the medial plate is straight and very distinct, while in the Japanese one it is not well preserved as a result of crushing. But in one of the sections at hand, this plate is, though obscurely, shown to be present, and presumably rather weak and flexuous, the last feature being probably more or less attributable to deformation. Thus the new species under consideration is doubtless more closely akin to the Carboniferous forms than to the Permian ones⁽⁶⁾.

The geological age of the present coral is difficult to determine. Since no other fossil has been found with it, no positive evidence is available but only its similarity with known species. As has been

(1) S. SMITH: Two Anthracolithic Corals from British Columbia and Related species from the Tethys. Op. cit., 1935, p. 34.

(2) I. HAYASAKA: On the Fauna of the Anthracolithic Limestone of Ômimura in the Western Part of Echigo. Sci. Rep. Tohoku Imp. Univ., 2nd ser. Vol. VIII, 1927, p. 21. HAYASAKA proposed this generic name in place of *Waagenella* YABE and HAYASAKA (Palaeozoic Corals from Japan, Korea and China. Jour. Geol. Soc. Tokyo, Vol. XXII, p. 96).

(3) Y. S. CHI: Weinigian (Middle Carboniferous) Corals from Southern China. Op. cit., 1931, p. 45, pl. III, figs. 3a, b, ? 2.

(4) See foot-note 2 on p. 3.

(5) S. SMITH and T. A. RYDER: The Genus *Corwenia*, gen. nov. Op. cit., 1926, p. 153, pl. V, figs. 6-15.

(6) The specimen (without a specific name) described by HERITISCH from the Schwagerina limestone of the Carnic Alps is very imperfect, but apparently quite unlike the new species from Japan.

stated before, the new species from Sikoku is very different from the Permian forms but is akin to the Carboniferous ones. For this reason, the writers are inclined to consider this coral as Carboniferous, especially Moscovian, if not Viséan, in age.

According to Mr. T. SUZUKI⁽⁴⁾, the Upper Palaeozoic complex in the vicinity of Tosayama consists mainly of sandstone, clay slate and schalstein, the last being intercalated with a few limestone beds. Some of the limestones are thought⁽²⁾ to be Lower Uralian and some others to be Lower Permian (Artinskian in this case) on the evidence of fusulinids contained in them. It is urgently needed to clear the relation between the fusulinid limestone and the coral limestone under consideration. The present new coral from Sikoku shows, as stated above, affinity with those of the Carboniferous, but since it is now believed that the genus *Corwenia* ranges, though with some doubt, up to the Lower Artinskian⁽³⁾, it is not improbable that the geological age of the present coral is younger than here presumed.

EXPLANATION OF THE PLATE XXVII

Corwenia hasimotoi Nagao and Minato nov.

Locality: Tosayama, Tosayama-mura, province of Tosa.

Figs. 1, 4, 6. Transverse sections.

Figs. 2, 3, 5. Longitudinal sections.

(1) T. SUZUKI: Explanatory text to the geological map of Kôti in 1:75000, p. 8.

(2) S. MATSUSHITA: Notes on the Geology and Palaeontology of a Southern Portion of Central Shikoku. 1932(MS.) (cited from T. KOBAYASHI and S. IZURI: The Stratigraphy and Structure of the Mesozoic Strata in the Vicinity of Kôti, prov. Tosa. Jour. Geography, no. 571, 1936, p.415). G. IZAKA: On the Japanese Species of Doliolina. Jour. Geol. Soc. Japan, Vol. XL, 1933, p. 356.

(3) The Permian species from China are, as before stated, more closely similar to *Waagenophyllum* than *Corwenia*, according to SMITH. S. SMITH: Two Anthracolithic Corals from British Columbia and Related Species from the Tethys. Op. cit., 1935, p. 34.

On the other hand, among the species reported by SMITH under the genus *Waagenophyllum*, *W. columbicum* SMITH from the Permian of British Columbia has a more or less distinct, though not very broad, tabulated zone with nearly horizontal tabulae, peripheral zone occupied by only small dissepiments and pseudo-herring-bone pattern formed by the dissepiments; all these features are seen in *Corwenia*. S. SMITH: Two Anthracolithic Corals from British Columbia and Related Species from the Tethys. Op. cit., 1935, p. 38, pl. VIII, fig. 9; pl. IX, figs. 1-10.

Fig. 1 $\times 3$

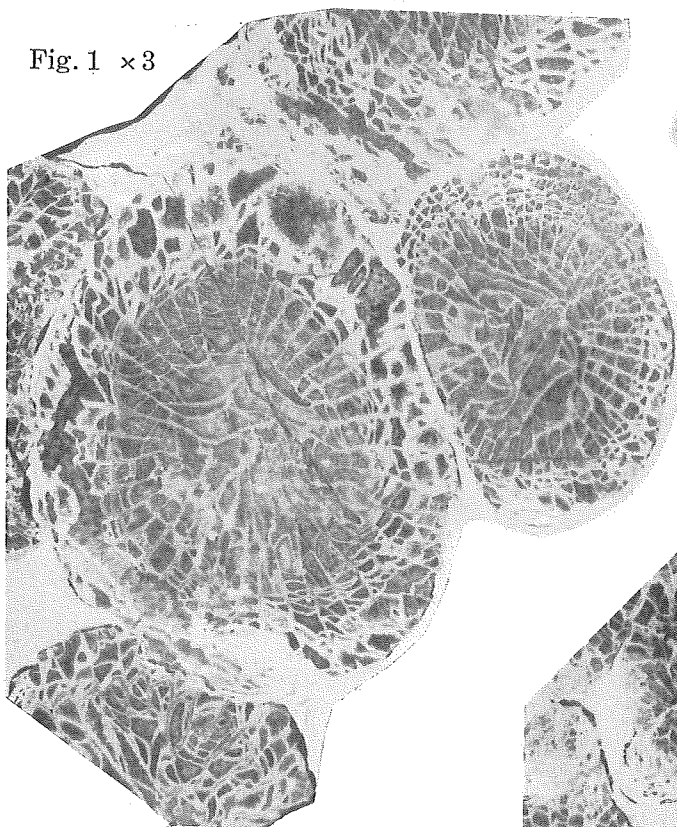


Fig. 2 $\times 3$

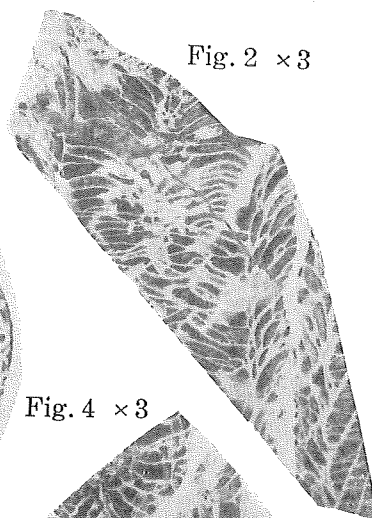


Fig. 4 $\times 3$

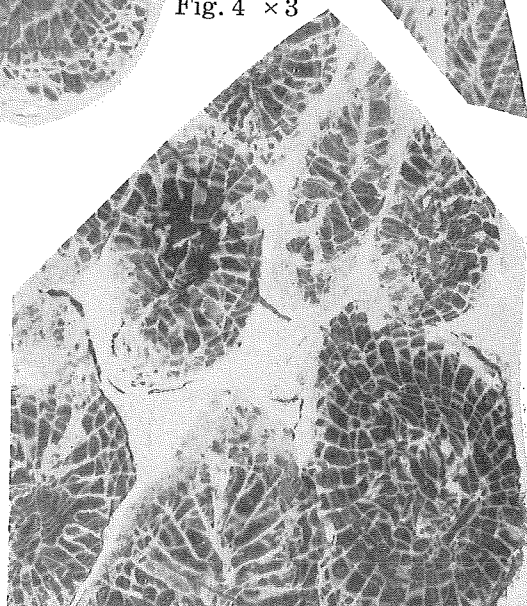


Fig. 3 $\times 3$

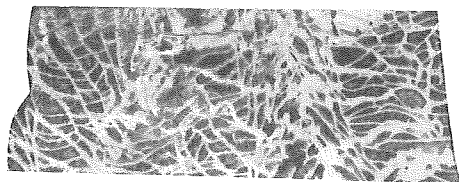


Fig. 6 $\times 4$

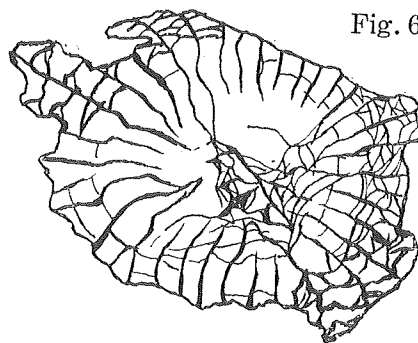
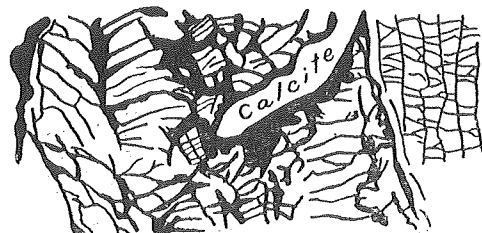


Fig. 5 $\times 5$



Kumano photo. and Minato del.