

Carboniferous Coral and Foraminifers from Huancavelica, Central Peru*

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(Communicated by Ikuwo OBATA)

Introduction

Recently, interesting fossils containing corals, foraminifers, bryozoans and echinoderm spines were collected by Eng. Senén De La Cruz from oolitic sparite type limestone in the Upper Paleozoic outcropping at the tunnel of Gandolini near Lircay, Huancavelica Department, Central Peru. The tunnel is located about 11 km west of Lircay. The geological map of the Huancavelica region were formerly made by NARVAEZ and GUEVARA (1965). According to them, the Upper Paleozoic exposed at the tunnel of Gandolini corresponds to the continental Mississippian Ambo Group. In this article, *Corwenia? lircayensis*, a new coral species is described, and the age of the limestone is discussed on the basis of coral and foraminifers.

Paleontology and correlation

The writers identify the following coral and foraminifers.

Coral	<i>Corwenia? lircayensis</i> n. sp.
Foraminifers	<i>Eostaffella</i> aff. <i>inflecta</i>
		<i>E. sp.</i>
		<i>Endothyra</i> spp.
		<i>Glovivalvulina</i> sp. A
		<i>G. sp. B</i>
		<i>Tuberitina</i> sp.

* Read at the Annual Meeting of the Palaeont. Soc. Japan, at Chiba University, January 23, 1982

Palaeotextularia sp.

Tetrataxis sp.

Corwenia? lircaeyensis n. sp. is allied to the species of *Corwenia* indicating late Visean and Atokan in age from the following data. The present new species resembles *Corwenia jagoensis*. The latter was found within the Wahoo limestone, Arctic Araska in a biostratigraphic zone of Atokan age (ARMSTRONG, 1972). It is similar to *Corwenia minor* YÜ (1937) from the *Yuanophyllum* zone (Upper Visean) in the Fengningian, South China. It also somewhat resembles a specimen described by MEYER (1914) as *Lonsdaleia floriformis* from the Atokan Tarma Group, Peru.

The present foraminifers are characterized by *Endothyra-Eostaffella* fauna including *Eostaffella*, *Endothyra*, *Glovivalvulina*, *Palaeotextularia* and others. *Eostaffella* aff. *inflecta* much resembles *E. inflecta*. The latter has been discovered from the lower part of the *Millerella* zone (Morrowan) at Powwow Canyon, Texas (THOMPSON, 1948). *Endothyra* spp. may belong to *E. bradyi* group indicating Visean-Bashkirian age in Russia (OKIMURA, 1966). *Glovivalvulina* sp. A and *G.* sp. B show affinity with those from the post Visean rather than the Visean. *Glovivalvulina* in Visean age is very few in specific number in the world, and rather *Glovivalvulina* of Huancavelica indicates the character of the post Visean. Index fossils of Atokan age such as *Profusulinella* and *Fusulinella* are not found in the present *Endothyra-Eostaffella* fauna. Moreover, *Mediocris mediocris* indicating Namurian age is not found in this fauna.

Judging from the paleontological data mentioned above, the age of the present limestone indicates probably early Morrowan.

According to NEWELL, CHRONIC and ROBERTS (1958), the marine Upper Paleozoic in Central Andes is composed of the Middle Carboniferous Tarma Group and the Lower to Middle Permian Copacabana Group. They reported that *Profusulinella manuensis*, *Prof.* sp. A and *Fusulinella peruana* indicating middle Carboniferous (Atokan) age have been found in the Tarma Group. Therefore, the present limestone is older than the Tarma Group.

Acknowledgements

The writers wish to express their hearty thanks to the following gentlemen, Eng. Senén De La CRUZ (Instituto de Geologico, Minero y Metalurgico, Lima) who permitted them to study the present interesting fossils, Prof. Shiro MAEDA (Chiba University), Director Francisco SOTILLO P. (Instituto de Geologico, Minero y Metalurgico, Lima) and Dr. Ienori FUJIYAMA (National Science Museum, Tokyo) for their kind advices and suggestions. Acknowledgements are also due to Dr. Yûji OKIMURA (Hiroshima University) and Eng. César RANGEL Z. (Instituto de Geologico, Minero y Metalurgico, Lima) for their fruitful discussions and valuable suggestions.

Systematic description

By YAMAGIWA and VILLAVICENCIO

Genus *Corwenia* SMITH et RYDER, 1926*Corwenia? lircayensis* n. sp.

Plate 1, Figs. 1-7

Corallum fasciculate, composed of cylindrical corallites. Neighbouring Corallites sometimes in contact. Increase of corallites is lateral type (lateral increase) (Pl. 1, Fig. 7a).

Transverse section:— Corallites show round to subround outlines. Mature specimens medium size, usually 8 to 14 mm in diameter. External wall relatively thin. Dissepiments usually pseudoherring bone or herring bone in arranged in late mature stage (Pl. 1, Figs. 1a, 2a), while usually concentric in early mature stage (Pl. 1, Figs. 3a, 4a). In late mature stage, lonsdaleoid dissepiments present in part (Pl. 1, Fig. 1a). Septa of two orders, major and minor in alternation. Those slightly thick in middle part and thinner towards both ends, but become thick at proximal end, being nearly straight or slightly sinuous; those often discontinuou for the presence of lonsdaleoid dissepiments in late mature stage (Pl. 1, Fig. 1a). In mature stage, major ones 24 in a section of 14 mm in diameter, 23 in a section of 13 mm, 22 in a section of 12 mm, 20 in a section of 11 mm and 20 in a section of 8 mm. Most of them reach near the axial structure. Counter and cardinal ones united with a median plate in the axial structure in early mature stage (Pl. 1, Figs. 3a, 4a). In late mature stage, the cardinal one not united with the median plate and become short (Pl. 1, Figs. 1a, 2a). Minor ones very short in length, sometimes lacking. Both major and minor ones show the fine structure of the diffuso-trabecular or fibro-normal types. In mature stage, axial structure shows relatively compact subfusiform in shape and small in size, ranging usually 1/4 to 1/6 the diameter of the corallites. It consists of a distinct long median plate, axial tabellae and septal lamellae. Axial tabellae sometimes irregular in shape. Septal lamellae poorly developed.

Longitudinal section:— Dissepimentarium occupies 2/7 to 2/5 the width of corallites. It consists of globose dissepiments with their convex sides inwards or inwards and upwards; elongate ones occasionally present. Globose ones generally arranged in two to five rows. Outer tabularium occupied by wide tabellae, periaxial tabllae, peripheral tabellae and clino tabellae. Inner tabularium composed of a distinct median plate and axial tabellae sharply ascending to the median plate.

Remarks: The present specimens are similar to the species of *Corwenia* in their relatively compact axial structure containing a distinct long median plate in transverse section, very short minor septa, structure of the tabellae in outer tabularium in longitudinal section and fasciculate corallites. However, the present writers consider that those belong to *Corwenia* with some doubt in the following characters, 1) poorly developed septal lamellae, 2) lonsdaleoid dissepiments in the late mature stage. The

present form resembles *Corwenia jagoensis* ARMSTRONG (1972, pp. 10–14, Pl. 1, Figs. 1–6, Pl. 2, Figs. 1–5, Pl. 3, Figs. 1–4, Pl. 4, Figs. 1–4, Pl. 5, Figs. 2–4) in its size of the corallites, number of the septa, rows of the globose dissepiments in longitudinal section and structure of the tabellae in outer tabularium in longitudinal section. It differs, however, from the latter in having very shorter minor septa and lonsdaleoid dissepiments developed in part in transverse section. It is similar to *Corwenia minor* YÜ (1937, pp. 45–46, Pl. 10, Figs. 2–4) in many respects, but differs from the latter in having less numerous septa, lonsdaleoid dissepiments and more numerous rows of globose dissepiments in longitudinal section. It somewhat resembles a specimen described by MEYER (1914, p. 629, Pl. 14, Fig. 4) as *Lonsdaleia floriformis*. However, the former has smaller axial structure, less numerous septal lamellae and lonsdaleoid dissepiments. The longitudinal section of the latter is not illustrated and described. Later, MINATO and KATO (1965, p. 42) reported the latter as *Durhamina?* sp. It differs from *Durhamina? andensis* YAMAGIWA & RANGEL (1979, pp. 140–141, Pl. 20, Figs. 1–6) from the Lower Wolfcampian, Peru in having smaller corallites, less numerous septa and axial tabellae sharply ascending to the median plate in longitudinal section.

Occurrence: Limestone outcropping at the tunnel of Gandolini near Lircay, Huancavelica Department, Central Peru.

Collector: Senen De La CRUZ.

Repository: Reg. nos. NSM-PA 12152 (holotype), 12153 (paratype), 12154 (paratype), 12155 (paratype) (National Science Museum, Tokyo).

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Explanation of Plates

Plate 1

Figs. 1–7. *Corwenia? lircayensis* n. sp.

1. Transverse section × 3 (NSM-PA 12152a)
2. Transverse section × 3 (NSM-PA 12152b)
3. Transverse section × 3 (NSM-PA 12152c)
4. Transverse section × 3 (NSM-PA 12152d)
5. Longitudinal section × 3 (NSM-PA 12153)
6. Longitudinal section × 3 (NSM-PA 12154)
7. Transverse section × 3 (NSM-PA 12155)

Plate 2

Figs. 1–3. *Eostaffella* aff. *inflecta* (THOMPSON)

1. Axial section × 100 (NSM-MPC 2718)
2. Parallel section × 100 (NSM-MPC 2719)
3. Sagittal section × 100 (NSM-MPC 2720)

Fig. 4. *Eostaffella* sp.

4. Axial section × 100 (NSM-MPC 2721)

Figs. 5–7. *Endothyra* spp.

5. Vertical section × 100 (NSM-MPC 2722)
6. Vertical section × 100 (NSM-MPC 2723)
7. Vertical section × 100 (NSM-MPC 2724)

Figs. 8–9. *Glovivalvulina* sp. A

8. Nearly sagittal section × 100 (NSM-MPC 2725)
9. Oblique section × 100 (NSM-MPC 2726)

Fig. 10. *Glovivalvulina* sp. B

10. Oblique section × 100 (NSM-MPC 2727)

Figs. 11–12. *Tetrataxis* sp.

11. Longitudinal section × 60 (NSM-MPC 2728)
12. Longitudinal section × 60 (NSM-MPC 2729)

Fig. 13. *Palaeotextularia* sp.

13. Longitudinal section × 60 (NSM-MPC 2730)

Fig. 14. *Tuberitina* sp.

14. Cross section × 100 (NSM-MPC 2731)



