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Notes on Some Lower Carboniferous Fossils from the Kirin Formation in Mincheng, Panshih-hsien, Prov. Kirin, Manchoukuo

By

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With 1 Plate

(Contribution from the Department of Geology and Mineralogy, Faculty of Science, Hokkaidô Imperial University, Sapporo. No. 309).

Fossil occurrence of a definite Lower Carboniferous type has recently been known through the discovery by Mr. S. OKADA¹⁾, a geologist of the Geological Institute of Manchoukuo in Hsin-ching, of some fossils in Mincheng,* Prov. Kirin. Later, Mr. I. YOSIMURA in the Institute visited the same locality for the purpose of collecting fossils, but the result has not yet been brought the publication. The same locality was again visited by Mr. R. SAITO²⁾ in the Institute who brought back a number of specimens and determined following genera:

Diphyphyllum sp.
Plicatifera sp.
Cribrogenerina sp.
Spirifer sp.
Fenestella sp.
Productus sp.
Orthotetes sp.

Thus SAITO suggested the Lower Carboniferous age of the fauna.

Stimulated by this unexpected discovery of interesting fauna quite distinct from those heretofore known to us in Manchoukuo, the

1) S. OKADA: Limestone in Chilin Formation near Mincheng, Panshih-hsien, Chilin Province. Mem. Geol. Inst. Manchoukuo, no. 15, p. 1, 1940.

2) R. SAITO: One some fossils from Chilin Formation near Mincheng. Mem. Geol. Inst. Manchoukuo, no. 15, 1940, p. 65.

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writer also visited the same locality in July, 1941, for the purpose of collecting fossils and stratigraphical survey of the district. The preliminary report on the fossil zones and the short description of the fossils then collected are now ready in print on the Bulletin of the Geological Institute of Manchoukuo.¹⁾ In the present short note, however, the writer selected one species of coral and two species of Brachiopods which are of utmost importance in determining the geological age of the fauna and gave description more in detail. The fossils treated in this note are as follows:

Siphonodendron asiatica (YABE and HAYASAKA) var. *minor*
var. nov.

Productus (Gigantella) latissimus (SOWERBY)

P. (G.) manchuriensis sp. nov.

Of these, *S. asiatica* var. *minor* is a new variety, but is a type very close to *S. asiatica* which is entirely of Upper Viséan; (*G.*) *latissimus* is a wide spread species of Upper Viséan; *P. (G.)* is a new species, but is closely related to *P. (G.) edelburgensis* (PHILLIPS) which is also a well-known species of the Upper Viséan. Thus the affinity to the Upper Viséan of the present fauna is very strong. It may further be noted that the discovery of the present fauna in Manchoukuo is pretty worthy of note as the fauna which suggest the Lower Carboniferous age have not yet been known from Manchoukuo, and even from Tyôsen and northern China.

Before going on the description of the species, the writer wishes to express his indebtedness to Professor T. NAGAO of the Institute of Geology and Palaeontology, Tôhoku Imperial University, and to Professor S. ÔISHI of our Department, who have given him valuable advices throughout the course of the present study. The writer wishes also to acknowledge his sincere thanks to Dr. M. HUKUDA in the Geological Institute of Manchoukuo for the economic support in visiting the locality, and R. SAITO of the Institute who have given him valuable suggestions during his stay in Hsin-ching.

Productus (Gigantella) latissimus (SOWERBY)

Pl. VII, Figs. 1, 1a, 1b.

1836. *Productus latissimus*, PHILLIPS: Geology of Yorkshire, pt. II, p. 214, pl. VIII, fig. 1.

1) M. MINATO: Unterkarbonfauna in der Mandschurei. Bull. Geol. Inst. Manchoukuo (in preparation).

1854. *Productus latissimus*, SEMNOW: Fauna des schlesischen Kohlenkalkes. Zeitsch. deutsch. geol. Gesell., Bd. VI, p. 353.
1861. *Productus latissimus*, DAVIDSON: Carboniferous Brachiopoda. Palaeontogr. Soc., Vol. XIII, p. 145, pl. XXXV, figs. 1a, 2a, 3, 4.
1909. *Productus latissimus*, ZIMMERMANN: Kohlenkalk und Culm des Verbreiter Sattels in Süden des westfälischen usw. J. k. preuss. Landesanst., Bd. XXX, teil II, p. 399.
1912. *Productus giganteus*, CRAMER: Die Unterkarbonfauna von Gaablaw in Nieder-Schlesien. J. k. preuss. Landesanst., Bd. XXXIII, teil I, p. 45, pl. III, fig. 6a (? 6b).
1931. *Productus (Gigantella) latissimus*, PAECKELMANN: Die Brachiopoden des deutschen Unterkarbons, Teil 2; Die Productinae und *Productus* ähnlichen Chonetinae. Abhand. preuss. geol. Landesanst., N. F., Heft 136, p. 261, pl. XXVI, figs. 3a-c; pl. XXIX, figs. 2, 3; pl. XXXI, figs. 2a-3.
1942. *Productus (Gigantella) latissimus*, MINATO: Unterkarbonfauna in der Mandschurei. Bull. Geol. Inst. Manchoukuo (in preparation).

This species is represented by an ill preserved ventral valve. The shell is elongated transversely, the breadth being more than twice of the length which is about 30 mm., strongly inflated in the umbonal region, but more or less flattened anteriorly. The hinge line is straight and possibly represents the greatest width of the shell. The beak is strongly incurved, but only slightly turned over the hinge line. The ear is prominent. There is no trace of median sinus. The surface is marked by numerous fine radiating striae. There are 5 in the space of 5 mm. in the median portion of the shell. There is no concentric markings.

Remarks: The characteristic small size and the transversely elongated form of the shell in the present specimen show that it represents a form closely allied to *Productus (Gigantella) latissimus* (Sow.), one of the characteristic species of the Upper Viséan. As the figure shows, the specimen has no trace of the median sinus, as is the case in the specimens figured by PAECKELMANN from Germany, while one of the specimens figured by DAVIDSON from Derbyshire in England shows a definite median sinus. Although it is unable to refer the original literature of SOWERBY, it may be of little importance in the specific determination whether the median sinus exists or not.

The existence or absence of the median sinus appears to be of minute importance in the specific distinction of the present species from the other species of Productidae. For instance, also in the case of *Linoproductus lineatus* (WAAGEN) and *L. cora* (D'ORB.) such a

feature has no essential value in the specific separation of these species from others.

One of the most characteristic features of this species is indeed the shape of the shell which is transversely elongated as mentioned above, through this feature the present species can be distinguishable specifically from other species of Productidae. In size and shape of the specimen, the Manchurian one may be identical with that figured by PAECKELMANN in his Pl. XXVIII, fig. 3a.

Geological horizon: *Productus (Gigantella) latissimus* is one of the characteristic species of the Lower Carboniferous indicating especially its upper horizon in Ireland, England, Belgium and Germany. Therefore, the occurrence of this species in the Kirin formation is significant.

Productus (Gigantella) manchuriensis sp. nov.

Pl. VII, Figs. 2, 2a.

1942. *Productus (Gigantella) manchuriensis*, MINATO: op. cit.,

This species is represented by a single imperfect ventral valve which is somewhat deformed in the anterior portion of the shell. The shell is large, and thick attaining 5 mm. measured in the median portion in the longitudinal section of the shell, about 80 mm. in length and 120 mm. in breadth, and is lightly inflated in both directions. The beak is distinctly protruded above the hinge line which appears to be straight. The median sinus is entirely lacking. The surface is marked by numerous straight radiating coarse striae generally 3-4 in number in the space of 5 mm. There is no concentric markings.

Remarks: This species is certainly a type of *P. (G.) edelburgensis* PHILLIPS¹⁾ from which this may be almost indistinguishable. But in the careful comparison with PHILLIP's species heretofore described the writer found that in the Manchurian specimen the shell is less inflated than the other. Therefore, if the present specimen were not so much flattened owing to the deformation of the shell after the fossilization, there may a distinction in regard to the curvature of the shell between this and PHILLIP's species. On the same way, the present species can be distinguishable from *P. (G.) edelburgen-*

1) J. PHILLIPS: Geology of Yorkshire, pt. II, 1836, p. 214, pl. VII, fig. 5.

sis ? var. *shajenwaensis* OZAKI²⁾ from the Lower Carboniferous of China. There are some other comparable species, namely, *P. (G.) gigantoides* var. *appalanta* PAECKELMANN³⁾ and *P. (G.) gigantoides* var. *regularis* PAECKELMANN⁴⁾ from Germany. These European species appear to be almost indistinguishable from the Manchurian species especially in the gibbosity of the shell, but in the former the radiating striae are less coarser than those in ours.

Siphonodendron asiatica (YABE and HAYASAKA)

var. *minor* var. nov.

Pl. VII, Figs. 3, 4, 5, 6.

1942. *Siphonodendron irregulare* var. *asiatica*, Minato: op. cit.

Corallum composite, fasciculate, consisting of numerous sub-parallel cylindrical corallites which are slightly flexuous. Each corallite is rarely in contact, usually separated from one another in a very short distance which is generally slightly beyond the diameter of the corallites, but not more than the twice of their diameter. External wall is thin, encircled by the annulations of the wrinkles and fine striae. The diameter of the corallites in the full grown stage do not exceed 2.5 mm. The major septa are also thin, generally numbering 14 and rarely 15, alternating with the same number of minor ones. The major septa reach partly the columella. Columella is slightly compressed, but usually take fusiform, continuous almost always with both two major septa in opposition, and also with some other major septa. The minor septa do not exceed 1/2 of the length of the major ones. Near the wall, there is only one concentric ring of dissepiments, beyond which the minor septa extend for some distance further. At about one third way from the center towards the periphery, there is sometimes an ill-defined inner wall formed by the cut edges of the tabulae.

In longitudinal section, the columella is continuous and very thick. The dissepimental zone is occupied by only one rarely two,

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- 1) K. OZAKI: On Some Lower Carboniferous Brachiopods from Central Hunan, China. Journ. Shanghai Sci. Inst., Sect. II, vol. II, 1939, p. 242, pl. XXXVII, figs. 4a-a, pl. XXXVIII, figs. 1a-d; pl. XXXIX, figs. 2a-b.
 - 2) W. PAECKELMANN: Op. cit., p. 255, pl. XXVIII, figs. 1a-c.
 - 3) W. PAECKELMANN: Op. cit., p. 254, pl. XXX, figs. 1a-d.

rows of dissepiments, which are almost subequal in size. The tabulae are dense, about 10–11 in number per 3 mm, horizontal in the middle portion and slightly ascending towards the columella; some of them are complete, some others incomplete, in the latter case usually coalescing with the complete ones at about one third way from the periphery towards the center.

Remarks: There is a number of species with which the present specimens are comparable. First, *Lithostrotion junceum* (FLEMING) agrees with ours in the size of corallites and in the number of major septa which are usually 14 in number. EDWARDS and HAIME¹⁾ describes that number of septa of this species is 16–18, but in their figure, Pl. XL, fig. 1a, the corallite has 14 major septa, but in this European species the dissepiments are absent and moreover the tabulae are almost always complete. Next, *Lithostrotion pauciradiale* (MCCOY)²⁾ also resembles ours more or less, but can be easily distinguishable in the far larger corallites, numerous septa and comparatively shorter minor septa. Lastly, the most comparable species is that described by YABE and HAYASAKA³⁾ from China under the name *Lithostrotion irregulare* var. *asiatica* which may hereafter be called *Siphonodendron asiatica* YABE and HAYASAKA.

Now YABE and HAYASAKA first described the named Chinese species under the name *Lithostrotion irregulare* PHILLIPS var. *asiatica* Y. and H. But later HILL pointed out that PHILLIP's original description was incorrectly made on figured specimens which do not coincide in morphological characters with his own description, and that PHILLIP's specimen was now misplaced, thus the reexamination of the original specimen being impossible. Further HILL pointed out that specimens identified by EDWARDS and HAIME and following authors with PHILLIP's species were nothing but *L. pauciradiale* (McCOY), thus PHILLIP's specific name should be elapsed until syn-type may be found. Such being the case, if YABE and HAYASAKA's

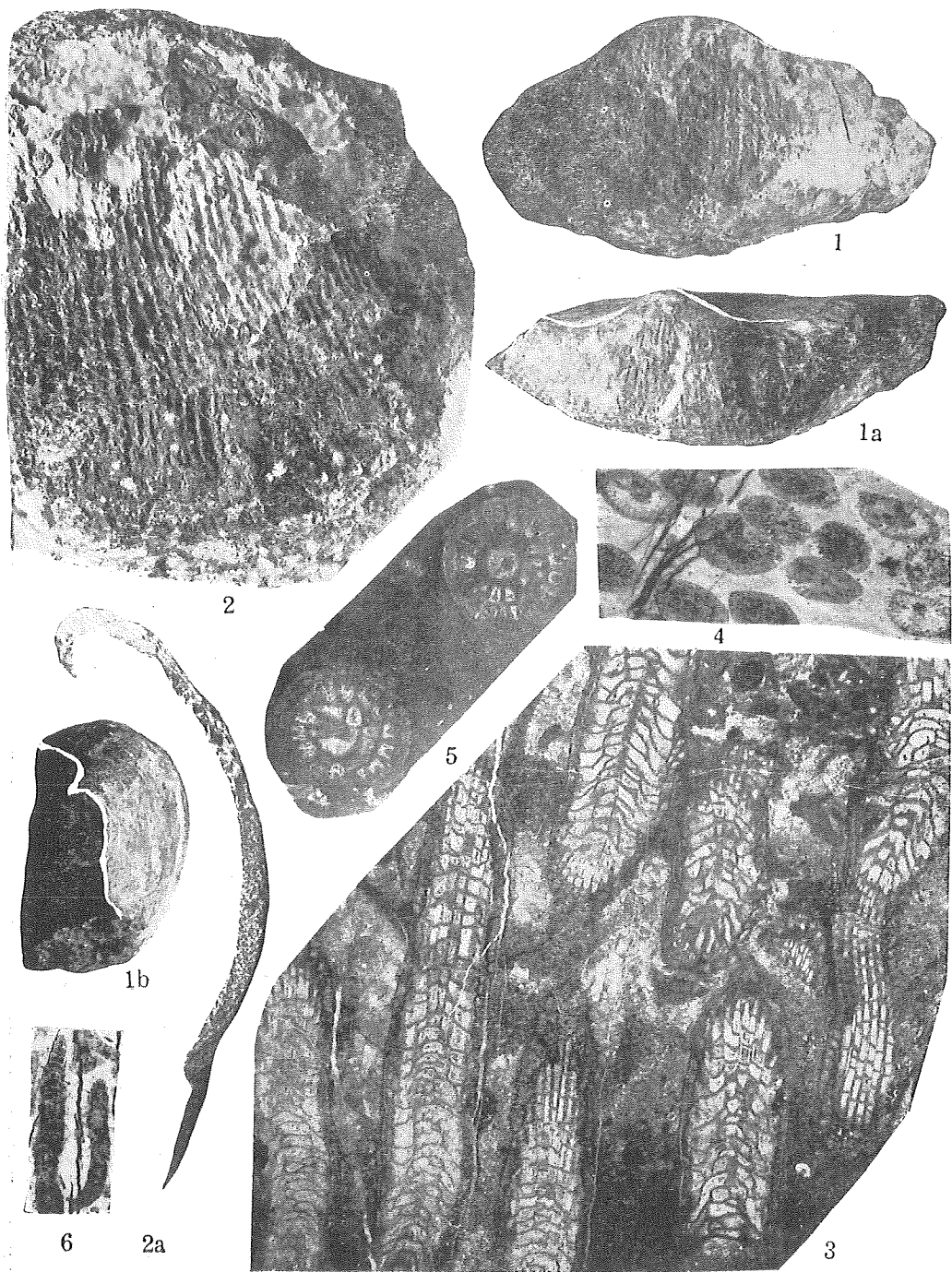
- 1) H. M. EDWARDS and J. HEIME: A Monograph of the British Fossil Corals. Palaeontogr. Soc., vol. VI, 1852, p. 196, pl. XL, figs. 1, 1a, 1b.
- 2) D. HILL: Carboniferous Rugose Corals of Scotland. Ibid., Vol. XLIV, 1940, p. 169, pl. IX, figs. 1, 2, text-fig. C.
- 3) H. YABE and I. HAYASAKA: Palaeozoic Corals from Japan, Korea and China. Journ. Geol. Soc. Tôkyô, vol. XXIII, 1916, p. 57, H. YABE and I. HAYASAKA: Geographical Research in China, Atlas of Fossils, 1920, pl. X, figs. 2a, 2b; pl. XI, figs. 7a, 7b.

specimens were certainly in accordance with PHILLIP's specimen, then the specimens should be called *L. pauciradiale* or *L. pauciradiale* var. *asiatica*. However, in the writer's opinion, YABE and HAYASAKA's specimens from China differ considerably from the general features of *L. pauciradiale*, having features not agreeing with this species. On this reason, the writer wishes to call their specimens under the name *Siphonodendron asiatica* YABE and HAYASAKA. Now, the present specimens from Manchoukuo agree in several points with *S. asiatica*, but differ in having smaller corallite and slightly less number of major septa. Therefore the writer wishes to call our specimen *S. asiatica* var. *minor* var. nov. Some Chinese specimens which YÜ¹⁾ described from Kuangsi and Anhuei provinces as *L. irregularare* var. *asiatica* are indeed very close to the original specimens described by YABE and HAYASAKA, but in the former the minor septa are decidedly shorter though otherwise almost indistinguishable. CHI²⁾ described an imperfect specimen from Sinkiang as *Lithostrotion irregularare* var. *asiatica* YABE and HAYASAKA.

- 1) C. C. YÜ: Lower Carboniferous Corals from China. Pal. Sinica, Ser. B, vol. XII, fasc. 3, 1933, p. 95, pl. XIX, figs. 3, 4a-d; pl. XX, figs. 1a-c.
- 2) Y. S. CHI: Notes on Carboniferous and permian Corals. Bull. Geol. Soc. China, vol. XIV, 1936, p. 30, pl. I, fig. 5.

EXPLANATION OF THE PLATE

- Figs. 1, 1a, 1b. *Productus (Gigantella) latissimus* (SOWERBY). $\times 1$; fig. 1, ventral side; fig. 1a, apical view; fig. 1b, lateral view.
- Figs. 2, 2a. *Productus (Gigantella) manchuriensis* sp. nov. $\times 1$; fig. 2, ventral side; fig. 2a a longitudinal section of the ventral valve, the anterior portion somewhat deformed.
- Figs. 3, 6. *Siphonodendron asiatica* (YABE and HAYASAKA) var. *minor* var. nov. Fig. 3, a longitudinal section, $\times 8$; fig. 4, a transverse section, $\times 3$; fig. 5, a transverse section showing two coralites, $\times 8$; fig. 6, a longitudinal section, $\text{ca} \times 2$.



Kumano photo.

M. Minato : Lower Carboniferous Fossils from the Kirin Formation.