New Occurrence of Lyttonia from the Environs of Hiroshima, Japan.* **

by

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[with 1 Plate and 3 Text-Figures]

Brachiopod genus *Lyttonia* is an important characteristic Permian fossil of the so-called Indo-Pacific region.

In Japan, it was first described by H. YABE[1] to occur from the Chichibu Palaeozoic formation at Matsukawa, Tsuitate-mura and Yakejima, Jiugohama-mura, Province of Rikuzen, in the South Kitakami Mountainland.

Among the materials from there, he distinguished following two species; *Lyttonia* cf. *nobilis* WAAGEN & L. sp. nov. YABE. Afterwards, on examining many more examples from the above localities and others, I. HAYASAKA,[2] however, considered them to be a single species, namely *Lyttonia richthofeni* (KAYSER) em. HAYASAKA. In 1919 late D. SATO[3] reported an occurrence of the same fossil species from a limestone at Kinshô-zan, Akasaka, Gifu Prefecture, and then in 1934, K. Mashiko[4] also discovered it in a limestone klippe on Triassic Hegi formation at Naka-yakuno-mura, Kyôto Prefecture. Quite recently I. HAYASAKA[5] and his collabolators obtained the same fossil from a calcareous shale of Middle Permian Nojiri (野尻) group at Kami-anama-mura, (上穴馬村) Fukui Prefecture.

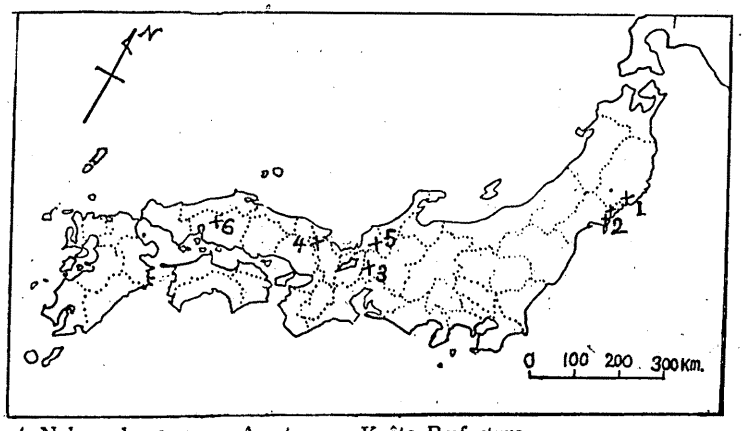

Fig. 1. Map showing the distribution of *Lyttonia* in *Japan*.

1. Yahagi-mura, Kesen-gun, Iwate Prefecture.
2. Jiugohama-mura, Mono-gun and Matsukawa, near Kesennuma-machi, Motoyoshi-gun, Miyagi Prefecture.
   (Both 1 and 2 are in the South Kitakami Mountainland.)
3. Kinshôzan, Akasaka-machi, Fuwa-gun, Gifu Prefecture.
4. Naka-yakuno-mura, Amata-gun, Kyôto Prefecture.
5. Kami-anama-mura, Ono-gun, Fukui Prefecture.
6. Karita-mura, Takata-gun Hiroshima Prefecture.

\+ locality ····· Prefectural boundary

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The fossil *Lyttonia* hitherto discovered in Japan are all confined to a single species i. e. *Lyttonia richthofeni* (KAYSER) em. HAYASAKA and their stratigrafical horizons are considered mainly to represent Middle Permian in age.[6]

M. Minato[7] believes that in the Kitakami Mountainland *Lyttonia* is found in any of the three Permian serieses i. e. Lower Permian Sakamoto-zawa series, Middle Permian Kanôkura series and Upper Permian Toyoma series.

The present materials now referred to by the writer were found at Omata-dani (小又谷), 2.5 km. south of the village-office, Katsuda (勝田) (about 30 km. NE of Hiroshima City on the highway from there to Miyoshi-machi (三次町)), Karita-mura (刈田村), Hiroshima Prefecture.

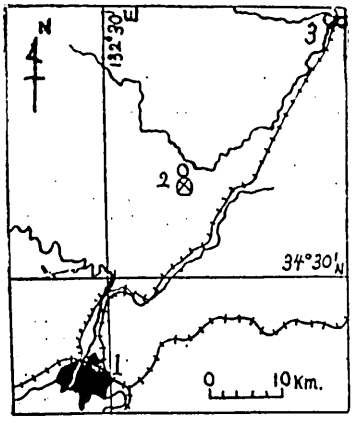

Fig. 2. Index map of Karita-mura.
1. Hiroshima City
2. Karita-mura.
3. Miyoshi-machi
⊗ Fossil locality

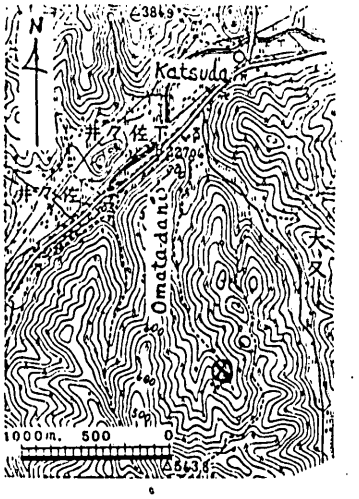

Fig. 3. Locality map of *Lyttonia*, in Karita-mura.

About 60 years ago, B. Suzuki made a geological survey of Hamada sheet, a geological map of Japan (Scale: 1/200.000), in which Karita-mura area is located. Long after that time, any other geological investigations on the above district has not yet been reported. According to Suzuki, the geology of Karitamura is composed of unknown Mesozoic formation, then regarded as Misaka Series, now considered as "Inkstone" group, and granite~porphyrite intrusieves. However, by the writer's recent observations, the area consists of non-calcareous Chichibu Palaeozoic formation and post-Palaeozoic igneous intrusieves of granite • granite-porphyry • quartz-porphyry and porphyrite. The Palaeozoic is composed of fine- to medium-grained sandstone, black shale and their alternation with intercalation of thin conglomerate in several horizons and a few small limestone lenses in the lower part. The Limestone contains the same abundant crinoid stems as usually observed in limestone of Chichibu Palaeozoic.

The general trend of the sedimentary formation seems to be NNW-NW direction, dipping 30°-50° to NNE-NE and the structure is apparently a monoclinal.

The Lyttonia now under consideration is found in a hard fine calcareous sandstone of dark grey colour lying conformably over a crinoid limestone lens exposed on the western side of Omata-dani (小又谷) valley. Besides this, it contains various forms of brachiopods, pelecypods, gastropods and crinoids.

Some well preserved specimens and several fragmental ones of *Lyttonia* are collected from there and the former ones are figured here to substantiate the writer's identification.

The size of the specimen shown in fig. 1 of the accompanying plate, is very large, the width reaching 57 mm. and the length 43 mm. though lacking both ends of posterior and anterior side (estimated length of a restored specimen over 80 mm.). 6 lateral septa are counted in a space of 20 mm. and 12-13 of them are found on each side of the medial furrow. They are characteristically convex toward anterior. Moreover, on the specimen shown in fig. 4, the maximum length of the lateral lobe reaches to 34 mm. Owing to the above stated features ouer forms coincide very much with the specimens from Pichiehhsien, Kueichow, South China described and illustrated as *Lyttonia nobilis* WAAGEN by T. K. HUANG.[8]

I. HAYASAKA[2] considers that there is no important difference sufficient for separating *Lyttonia nobilis* WAAGEN from *L. richthofeni* (KAYSER) em. HAYASAKA and that the former is specifically nothing but the latter.

From above stated reasons the writer regards the Karita-mura form as identical with *Lyttonia nobilis* WAAGEN of HUANG that is *Lyttonia richthofeni* (KAYSER) em. HAYASAKA in wider sense.

Though the palaeontological study on the Karita fauna has not yet been completed, the following species are found among them.

1. *Chonetes* sp.
2. *Productus* sp.
3. *Camarophoria* sp.
4. *Spiriferina* sp. (aff. S. *cristata Schlotheim*)
5. *Schellwienella* cf. *ruber* (FRECH)
6. S. aff. *acutangulata* HAUNG
7. *Hustedia* cf. *grandicosta* mut. *lata* GRABAU
8. *Pseudamussium*? sp. (aff. P. *auriculata* GRABAU)
9. *Bellerophon*? sp.
10. *Dentalium* sp.
11. Crinoid stem.

On the above specifically determined forms, the writer will remark the

following lines.

Spiriferina cristata SCHLOTHEIM — reported by I. HAYASAKA[9] from the *Lyttonia* bed of Yahagi-mura, South Kitakami Mountainland and it's horizon seems to represent the Minato's Kanôkura series of Middle Permian.

Schellwienella ruber (FRECH) — reported by T. K. HUANG[10] from the *Lyttonia* bed of Tsunyihsien, Kueichow, South China, horizon Lopingian; by A. W. GRABAU[12] from the *Streptorhynchus* bed (lower horizon than *Lyttonia*) of the Jisu Honguer limestone, at Jisu Honguer, Mongolia.

Schellwienella acutangulata HUANG — reported by T. K. HUANG[10] from the *Lyttonia nobilis* bed of Pichiehhsien and Kuomaya, Tsunyihsien, Kueichow etc., South China, occasionally associated with S. *ruber* (FRECH), horizon Lopingian.

Hustedia grandicosta mut *lata* GRABAU — described by A. W. GRABAU[12] from the *Orthotychia* bed, (a little upper horizon than *Lyttonia*) of the Jisu Honguer limestone, Mongolia.

Pseudammusium auriculatum GRABAU — also described by A. W. GRABAU[12] from *Enteletes* bed (lower horizom than *Lyttonia*) of the Jisu Honguer limestone, Mongolia.

Judging from the above data, it is not improbable that the *Lyttonia*-bearing Karita formation may be an equivalent of *Lyttonia* horizon in many of the other Japanese regions, representing Middle Permian Kanôkura series, This problem of the geological age, however, will fully be discussed in near future after detailed stratigraphical and palaeontological studies are made.

Finally, the writer wishes to offer his sincere thanks to Dr. ICHIRO HAYASAKA, Prof. of Hokkaidô University, for his kind suggestion on *Lyttonia*, and to Mr. KIYOSHI MATSUDA, a forth-year (senior) student of Hiroshima University, for his assistance in this study. Thanks are also due to Mr. SHÔZÔ MIZUYOSHI for his donation of a good specimen to the writer.

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(ii) Ditto. (1922) : Palaeozoic Brachiopoda from Japan, Korea & China. Part 1, Middle & South China. *Sci. Rep. Tohoku Univ. Vol. 6, pp. 103-109 pl. 4. figs. 12-13.*

(iii) Since then, following new localities were added to the list in the South Kitakami region.

1. Yahagi-mura, Hikoroichi-mura, Kesen-gun &
2. Maikawa-mura, Higashi-iwai-gun, Iwate Prefecture.
3. Kesen-numa-machi, Motoyoshi-gun, &
4. Maiya-machi, Toyoma-gun, Miyagi Prefecture. etc..

3) SATO, D., (1934) : A New Locality of *Lyttonia* (in Japanese) *Jour. Geol. Soc. Tokyo, Vol. 26, pp. 276-277, Text-fig. 1.*

4) MASHIKO, K., (1934) : Discovery of *Lyttonia* in a Limestone exposed at Takauchi, Nakayakuno-mura, Amata-gun, Kyoto Prefecture. *Jap. Jour. Geol. Geogr. Vol. 2, Nos. 3-4, pp. 181-183, Text-fig. 1.*

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6) Personal information from Dr. I. HAYASAKA to the writer.

7) MINATO, M., (1944) : Stratigraphic Division of the Permian in South Kitakami Mountainland. (in Japanese) *Jour. Geol. Soc. Japan. Vol. 51, pp. 86-87,*

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9) HAYASAKA, I., (1922) : Some Permian Brachiopods from the Kitakami Mountains *Jap. Jour. Geol. Geogr. Vol. 1, No. 2, p. 66, pl. 9, figs. 5-9.*

10) HUANG, T. K., (1933) : Late Permian Brachiopoda of Southwestern China, Part 2, *Pal. Sinica, Ser. B. Vol. 9, Fasc. 2, pl. 3, fig. 8.*

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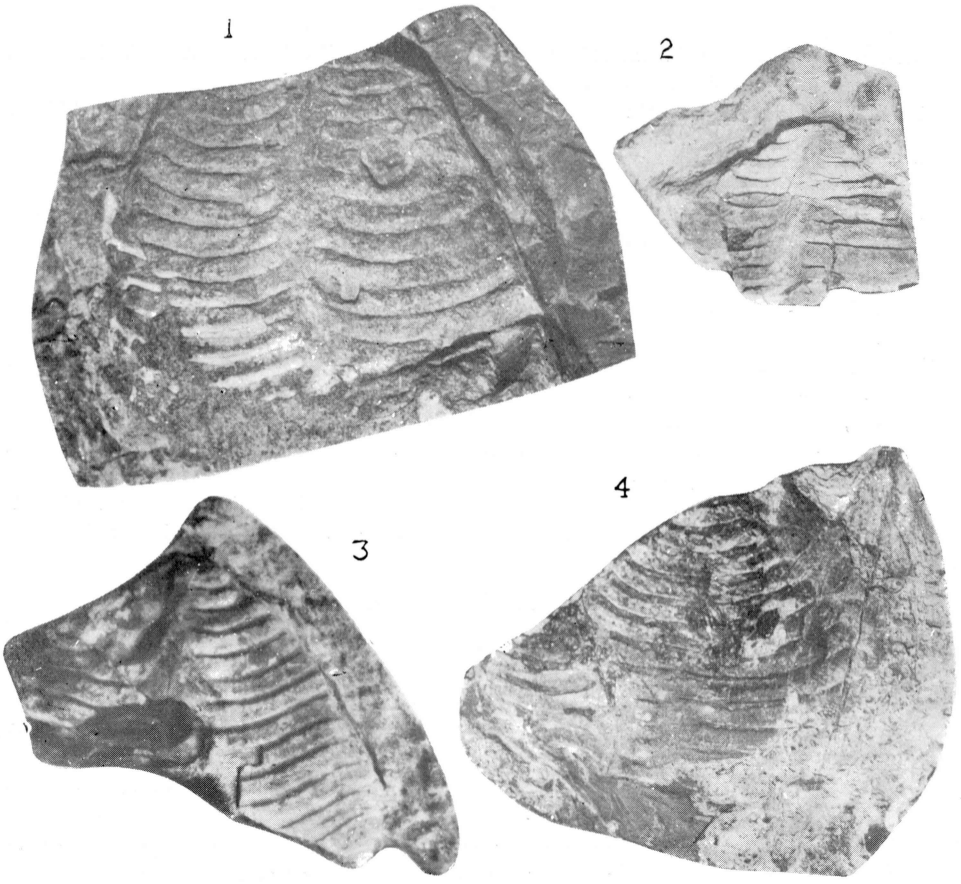
11) Ditto pl. 3, figs. 12-18,

12) GRABAU, A. W., (1931) : Permian of Mongolia, *Nat. Hist. Central Asia, Vol. 4, pl. 5, fig. 5.*

13) Ditto *pl. 32, figs. 9-10.*



Explanation of Plate 1 (All figures in natural size)
(Photo. by K. MATSUDA)
Lyttonia richthofeni (KAYSER) em HAYASAKA.

Fig. 1, A cast of inner side of a ventral valve with a fragement of the shell remaining attached. Coll. SHŌZŌ MIZUYOSHI.
Fig. 2, A internal cast of cardinal portion of a ventral valve Coll. K. MATSUDA.
Fig. 3, A cast of inner side of a ventral valve. Coll. K. MATSUDA.
Fig. 4, A cast of inner side of a ventral valve. Coll. K. MATSUDA.

All specimens figured here are kept in the Geological Institute, Hiroshima University.