

日本古生物學會
報告・紀事

Transactions and Proceedings
of the
Palaeontological Society of Japan

New Series

No. 30



日本古生物學會
Palaeontological Society of Japan
June 20, 1958

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335. *SABALITES* AUS DEN WAKATA SCHICHTEN
VON TSUSHIMA, NORDKYUSHU*

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Geologisches Institut, Kyushu Universität

対馬若田層産 *Sabalites*: この標本は、以前、岡部虎男氏により、硯石材料としている所謂『若田石』中から発見され、対馬高等学校に保管されていた。所謂『若田石』の層準は若田層下部に属する。この標本を、従来、東亜から報告されている *Sabalites nipponicus* および *S. chinensis* と区別し、*S. taishuensis* なる新種名を付して報告する。地質時代はおそらく漸新世とみなしうる。高橋 清

Einleitung

Bis heute wurde schon von einigen Forschern eine ziemliche Anzahl von *Sabalites nipponicus* (KRYSHTOFOVICH) aus den paläogenen Formationen in den Kohlenfeldern von Hokkaido, Ube, Nordkyushu u. a. veröffentlicht. Zuerst wurden von A. KRYSHTOFOVICH (1918) die palmartigen Pflanzenfossilien aus den Kohlen eingelagerten Schichten von Bibai, Hokkaido und Takashima, Kyushu als *Sabal nipponica* n. sp. beschrieben. Nach ihm haben S. ENDO, T. NAGAO, H. YABE, H. MATSUSHITA, T. YAMASAKI u. a. über *Sabalites nipponicus* (KRYSHTOFOVICH) aus den alttertiären Schichten von Ishikari, Ube und Nordkyushu berichtet. S. ENDO (1934) hat noch eine andere fossile Art, *Sabalites chinensis* ENDO, aus dem Fu-shun Kohlenbergwerke der Südmandschurei (Fushun Schichten-Gruppe; oberes Eozän) beschrieben. Der Verfasser berichtet hier von einer neuen Art von *Sabalites* aus den Wakata Schichten von Tsushima.

* Received June 11, 1957; read June 15, 1957.

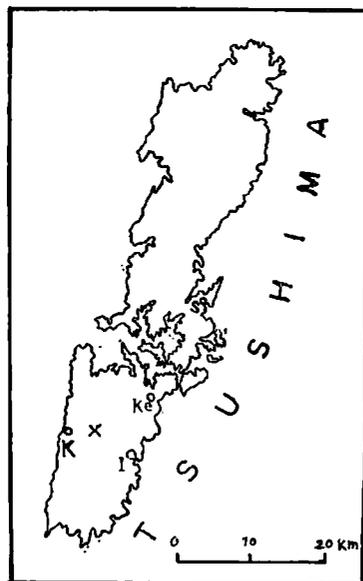


Abb. 1. X: Fundort (Wakata) von *Sabalites taishuensis* TAK. I: Izuhara, K: Komoda, Ke: Kechi, S: Shiohama.

Das vorliegende Fossil wurde vor langer Zeit von T. OKABE im sog. „Wakata-Stein“ gefunden. Seitdem war es lange in der Höheren Schule Tsushima bewahrt, bis Dozent Y. OKAMOTO es zur Forschung zu mir gebracht hat.

Bei dieser Veröffentlichung ist der Verfasser Herren Prof. Dr. T. MATSUMOTO, Prof. Dr. R. TORIYAMA und Dozent Y. OKAMOTO an dem geologischen Institut der Universität Kyushu und Herrn Y. UTANO an der Höheren Schule Tsushima für ihre freundlichen Anregungen zu grossem Dank verpflichtet. Er muss auch hier Herrn Dr. S. ENDO, der bei der Bestimmung der Art freundliche Ratschläge gegeben hat, von ganzem Herzen danken.

Dieses Spezimen befindet sich im Heimat-Museum (Kyôdo-Kan) von Izuhara, Tsushima.

Taishu Schichten-Gruppe

Veröffentlichungen bezüglich der Geologie und Stratigraphie von Tsushima sind verhältnismässig wenig. D. SATO (1908) hat zuerst darüber veröffentlicht. Er setzte ihr geologisches Zeitalter in das Mesozoikum. I. TATEIWA (1934) hat die Ablagerungen von Tsushima im ganzen als Taishu Schichten-Gruppe bezeichnet, ihr geologisches Zeitalter dem Dan angeordnet, und die Tätigkeit der Laramid-Bewegung in Ostasien betont. E. KON'NO* und T. MATSUMOTO* haben im Jahre 1943 den Überblick der Taishu Schichten-Gruppe gemacht und sind zu dem Schluss gelangt, dass die Taishu Schichten-Gruppe durch die gesammelten Fossilien dem Tertiär zuzuteilen ist. S. KANNO (1955) hat geschlossen, dass das Zeitalter der Taishu Schichten-Gruppe durch die Muschelschalereste, die im Inneren einer Grube der Taishu Mine

* Ihr Erforschungsergebnis der Taishu Schichten-Gruppe ist unveröffentlicht.

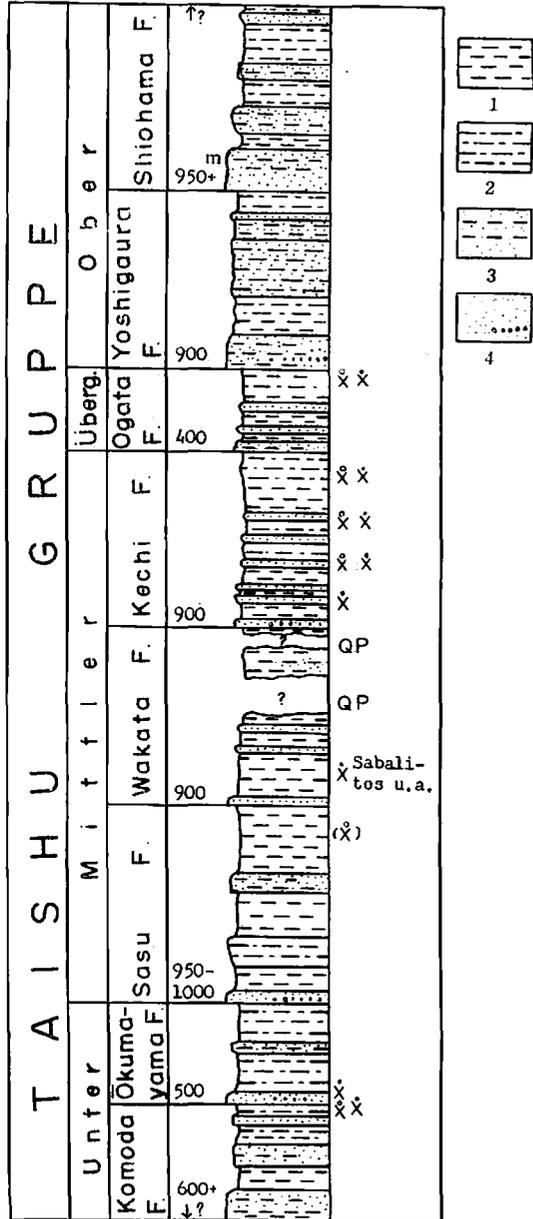


Abb. 2. Begriffliches Profil der Taishu Schichten-Gruppe.

1: Schieferton und Schlammgestein. 2: Sandiges Gestein. 3: Wechsellagerung von Sandsteins und Schieferton. 4: Sandstein und Konglomerat. QP: Quarz-Porphyr (Sill). X: Mollusken- oder Echinusrest. x: Pflanzenrest. [Ann.]: Gruppe bedeutet Schichten-Gruppe und F. steht für Schichten.

gefunden wurden, Oligomiozän ist. Der Verfasser untersucht seit dem Jahre 1951 die Geologie von Tsushima. Er hat die Schichtenfolge der Taishu Schichten-Gruppe festgestellt. Ihr begrifflicher Durchschnitt ist in der Abb. 2 gegeben.

Im Unter- und Oberteil der Taishu Schichten-Gruppe sind Sandsteine und sandige Gesteine verhältnismässig grösser als Schiefertone. Ihr mittlerer Teil zeigt mehr Schlammsteine oder Schiefertone als sandige Gesteine. Sandsteine stellen zuweilen dünne linsenartige Konglomerate, die hauptsächlich aus den Kiesel von schwarzem Schiefertone, Sandstein und Chert bestehen, und dazwischen zeigen sie bemerkenswerte Verschiedenheit in der Mächtigkeit. Das kommt oft vor, dass ein etwa 5 cm zu 20 cm dichter bretartiger Sandstein mit dem schwarzen dünnen Schiefertone aufeinander alteriert und an der Ober- und Unterfläche solches Sandsteins Rippel- oder Rill-Marke gedruckt ist. Man kann auch zuweilen Lebensspuren im Sandstein finden. Nach K. FUMI ist Sandstein von Tsushima ein Subgrauwacke-Typus.

Man kann allgemein viele Muschel-schalerechte im schwarzen Schiefertone oder Schlammstein finden und auch die Echinusreste, die von A. MORISHITA als *Pericosmus* cf. *spatangoides* LORIOLE* bestimmt wurden, finden sich meistens in sandigem Schiefertone oder Feinsandstein.

Beschreibung von *Sabalites*

Sabalites taishuensis n. sp.

Tafel 27a, Figur 1.

Beschreibung:—Das vorliegende Blatt

* A. MORISHITA, geol.-mineral. Inst. der Univ. Kyoto, hat die Echinusreste aus der Taishu Schichten-Gruppe untersucht.

ist nicht so gut erhalten, aber stark eingeschlagen. Der grösste Teil der Blattlamina ist zerstört; die Form vielleicht fächerförmig, über 50 cm im Durchmesser. Die Rachis etwas stark, ca. 1.4 cm breit, sich an der Blattbasis nicht vergrössernd, allmählich nach oben schmaler werdend. Der Blattstiel ist relativ stämmig, ca. 3 cm breit, Blattstieleränder ohne Dornen. Die strahlenförmigen Fieder reichen bis zur Rachis, etwa 50 an der Zahl, linear-lanzettförmig, gemessenes Maximum ihrer Breite 1.3 cm. Der Mittelnerv regelmässig stark, der Seitennerv parallel dem Mittelnerv, undeutlich. Ihre Textur relativ dünn, aber steif.

Vergleich:—Der vorliegende Rest ist der japanischen paläogenen Art *Sabalites nipponicus* (KRYSHTOFOVICH) und der chinesischen obereozänen *Sabalites chinensis* ENDO sehr ähnlich, aber sie haben einige verschiedene Merkmale.

Der bestehende Rest hat mehr zahlreiche Strahlen, stärkere Rachis und stämmigeren Blattstiel als *Sabalites nipponicus* (KRYSHTOFOVICH) und stärker carinierte Strahlen, stärkere Rachis und weniger Maximum der Blattbreite als *Sabalites chinensis* ENDO. Zahlreiche Berichte von *Sabalites* aus den oberkreiden und paläogenen Formationen Nordamerikas sind bekannt. Eine amerikanische Art *Sabalites vicksburgensis* BERRY hat geringere Zahl der Strahlen und mehr breiten Blattstrahl als vorliegende neue Art. Die vorliegende Form ist nicht genug erhalten, aber sie wird durch oben erwähnte Merkmale als selbständige Spezies betrachtet.

Geologisches Zeitalter:—Vielleicht Oligozän.

Fundort:—Izuhara, Wakata, Provinz Nagasaki (Tsushima-Inseln).

Aufbewahrungsstelle:—Heimat-Museum

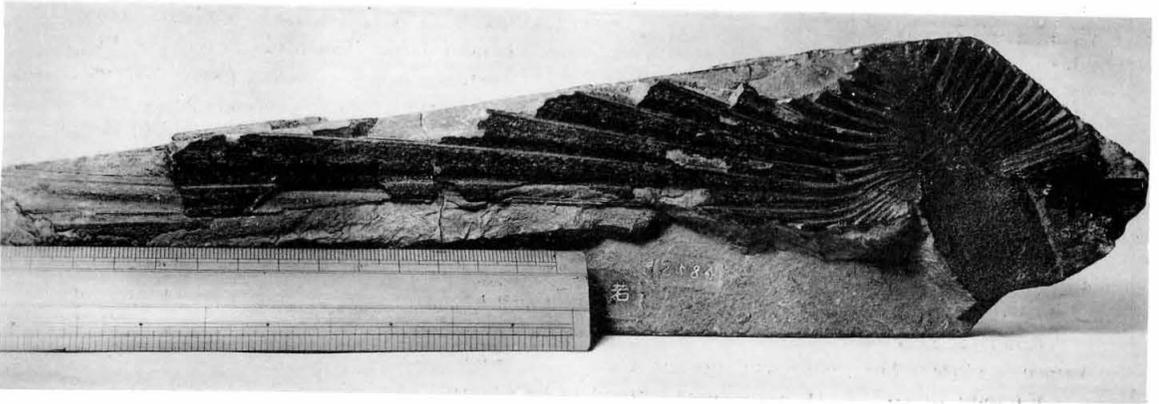
(Kyôdo-Kan), Izuhara, Provinz Nagasaki
(Tsushima-Inseln).

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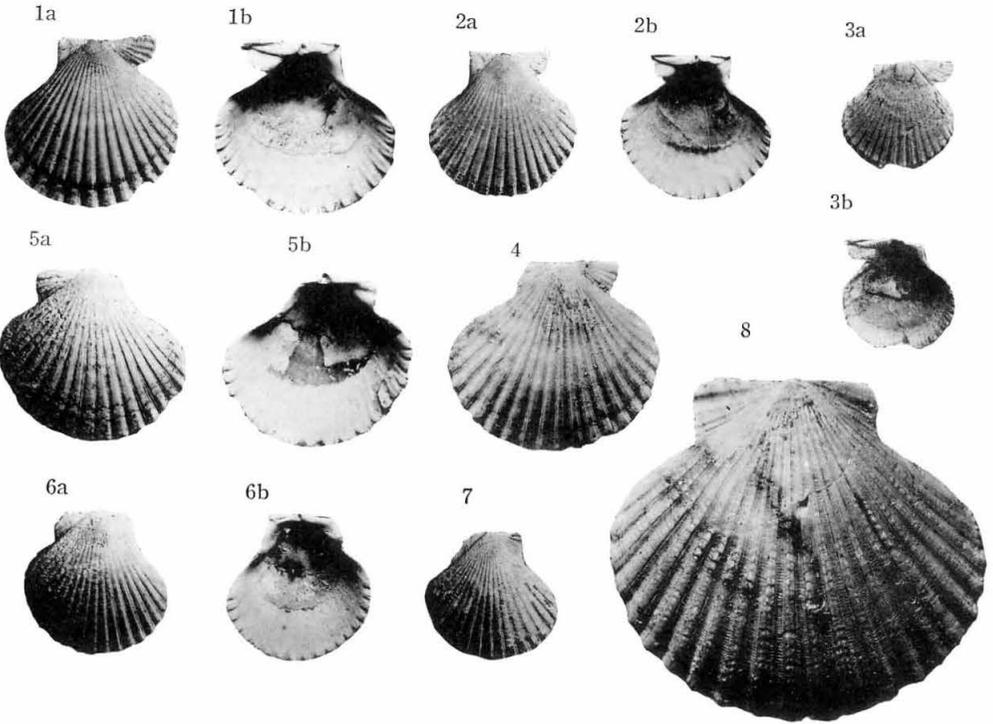
Erklärung der Tafel 27a

Fig. 1. *Sabalites taishuensis* TAKAHASHI, n. sp. p. 187
× ca. 1/2. Fundort: Izuhara, Wakata, Provinz Nagasaki.



MASUDA: Miocene Pectinidae

Plate 27b



336. ON THE MIOCENE PECTINIDAE FROM THE ENVIRONS OF
SENDAI; PART 10, ON *PECTEN (AEQUIPECTEN)*
YANAGAWAENSIS NOMURA AND ZINBO*

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仙台附近中新統産 Pectinidae: その 10. *Pecten (Aequipecten) yanagawaensis* NOMURA and ZINBO について: 茂庭哲より採集した多数の標本、横式標本等を検討して再記載を行った。

増田孝一郎

Pecten (Aequipecten) yanagawaensis was first described by S. NOMURA and N. ZINBO from the Yanagawa formation at Yanagawa-machi, Date-gun, Fukushima Prefecture in 1936, and subsequently it was reported from the Moniwa formation at Moniwa, Sendai City, by S. NOMURA in 1940. As the type specimen was imperfect and some important features were not described at the time of its proposal, thus writer wishes to redescribe the characteristics of this species based upon the specimens which were collected from the Moniwa formation by the writer, and to clarify its relationship with certain other species mentioned in this article.

Numerous specimens of this species and a related species which are preserved in the collections of the Department of Geology, Faculty of Education, of the Institute of Geology and Palaeontology, Faculty of Science, both of Tohoku University, and the

* Received Aug. 8, 1957; read at the 66th meeting of the Society at Akita, June 19, 1957.

type specimen and the others of the Saito Ho-on Kai Museum, all in Sendai City, were studied, and the results of examination are presented herein.

Acknowledgements are due to Dr. Kotori HATAI of the Department of Geology, Faculty of Education, Tohoku University, for his kind supervision.

Family Pectinidae

Subfamily Pectininae

Genus *Cryptopecten* DALL., BARTSCH
and REHDER, 1938

Cryptopecten yanagawaensis
(NOMURA and ZINBO)

Plate 27b, Figures 1-8.

1936. *Pecten (Aequipecten ?) yanagawaensis* NOMURA and ZINBO, *Saito Ho-on Kai Mus. Res. Bull.*, No. 10, p. 337, pl. 20, figs. 2a-b.
1940. *Pecten (Aequipecten) yanagawaensis* NOMURA and ZINBO, NOMURA, *Sci. Rep., Tohoku Imp. Univ., Ser. 2, Vol. 21, No. 1*, pp. 19-20, pl. 1, figs. 10-13.

Original description is as follows:

"Shell small, suborbicular in outline, inflated, nearly as long as high, equilateral; side of disc more or less concave, apical angle about 110° , ventral margin regularly curved. Surface ornamented with subequal, rounded radial ribs which are accompanied with a thread on both sides and close to their base; interspaces rather deep, broader than ribs themselves, sculptured by fine transverse lines. Ears imperfect, preserved one ornamented with unequal radial riblets crossed by fine growth-lines. Height 20 mm., length 21.5 mm., depth 5 mm."

The specimens collected by the writer from the Moniwa formation at Moniwa take the following description.

Shell small in size, moderately thick, suborbicular in outline, subequivalve, the right valve being a little more convex than the left, inequilateral, the length of posterior side being longer than that of anterior side, and posterior submargins longer than anterior

and regularly concave; valves radiately ribbed, and forming an angle of about 90° at apex.

Right valve with about 21 elevated, more or less squarish, rounded radial ribs accompanied with a fine thread on both sides of radial ribs; interspaces nearly equal to or a little broader than the ribs themselves, and sculptured with numerous, transverse, fine lamellae; anterior auricle larger than posterior, sculptured with a few distinct radial threads and concentric lines, and furnished with deep byssal area; posterior auricle triangular in form, truncated behind at about right angle, and similar to anterior in sculpture, though radial threads less distinct than anterior; hinge with narrow and shallow resilial pit, ctenolium, and conspicuous cardinal crura ornamented by fine transverse incision. Left valve with sculpture similar to the right. Internal surface of valves rather smooth except for characteristic marginal serration.

Dimension (in mm.) :—

Valve	Right	Right	Right	Right	Left	Left	Left	Left
Height	25	22.5	19.3	14.5	29	23	22	19.5
Length	27	23	19.5	14.7	32	24.5	22	18.5
LAS*	12.5	11	9	6.7	15	11.8	10.5	8.5
LPS*	14.5	12	10.5	8	17	12.7	11.5	10
Hinge-length	12.5	12.5	10.6	10.5	15	11	10.5	10
Depth	5	6	4.7	3.6	8	6	6	5.5
Apical angle	95°	90°	90°	90°	95°	95°	90°	90°
Growth angle	110°	105°	100°	95°	110°	105°	100°	95°

* LAS=abbreviation for length of anterior side.

LPS=abbreviation for length of posterior side.

Type locality, Formation and Age:—River cliff of the Hirose-gawa, at the south-

east end of Yanagawa Park, Yanagawa-machi, Date-gun, Fukushima Pre-

fecture. Yanagawa formation. Early Miocene.

Remarks:—This species is characterized by its small inequilateral shell, about 21 elevated, more or less squarish, rounded radial ribs which are accompanied with a fine thread on both sides, interspaces which are ornamented by transverse fine lamellae, triangular posterior auricle of the right valve which is truncated behind at about right angle, conspicuous cardinal crura ornamented by fine transverse incision, and characteristic inner marginal serration. Usually the radial ribs are round-topped, but in very well preserved specimens the radial ribs are sometimes ornamented by very fine transverse lamellae. The number of radial ribs varies from 16 to 26, but among them the most frequent number is 21.

This species resembles *Cryptopecten vesiculosus* (DUNKER) which occurs as Recent in the Southwestern Pacific and as fossil in the Pliocene and Pleistocene of Japan, but it differs therefrom in having a less number of lamellated radial ribs which are separated into two parts by a furrow near the ventral margin in adult specimens, by the interspaces sculptured with a few imbricated radial threads at about the lower half of disc, and by the radial ribs being much narrower than the interspaces in the left valve.

The geological formations from which *yanagawaensis* is known to occur are the Yanagawa formation in Fukushima Prefecture, and the Moniwa and Ôtsutsumi formations in Miyagi Prefecture. The rocks from where *yanagawaensis* has been collected or reported from consist of coarse-grained sandstone or granule conglomerate. The conditions of the sea bottom on

which *yanagawaensis* once lived may be interpreted from the nature of the rock which preserved it. The thermal conditions of the sea at the time of building of the Yanagawa, Moniwa and Ôtsutsumi formations are judged from the associated fauna of the present species. At Moniwa, this species occurs as isolated valves in granule conglomerate or coarse-grained sandstone in which abundant pectens, other pelecypods, some gastropods, echinoids, balanids, brachiopods, bryozoan-fragments and corals occur in association. The majority of them are arranged parallel with the bedding plane and with their convex side upwards, and the majority of the observed specimens are more or less water-worn. From the mode of occurrence and the state of preservation, it is inferred that the shells of this species may have been transported from the site of living to that of burial. However, it is thought that the distance of transportation was not great and also that the present species probably preferred a shallow water bottom free from muddy materials, and influenced by warm thermal conditions. The geological range of *yanagawaensis* is restricted to the Early Miocene in a twofold division.

As noticed in early lines, the present species is closely related to *Cryptopecten vesiculosus* (DUNKER), and it may be the ancestral form of *vesiculosus*, but further materials are necessary to settle this problem.

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Explanation of Plate 27b

- Figs. 1-8. *Cryptopecten yanagawaensis* (NOMURA and ZINBO)..... p. 189
- 1a, b. a, Right valve, $\times 1$. b, Internal view of fig. 1a, $\times 1$. DGS, Reg. no. 3545. Loc. Moniwa, Sendai City, Miyagi Prefecture.
- 2a, b. a, Right valve, $\times 1$. b, Internal view of fig. 2a, $\times 1$. DGS, Reg. no. 3545. Loc. Same as above.
- 3a, b. a, Right valve, $\times 1$. b, Internal view of fig. 3a, $\times 1$. DGS, Reg. no. 2140. Loc. Same as above.
4. Right valve, $\times 1$. DGS, Reg. no. 3546. Loc. About 400 m. west of Jyûnishindô, Kumano-dô, Natori-machi, Natori-gun, Miyagi Prefecture.
- 5a, b. a, Left valve, $\times 1$. b, Internal view of fig. 5a, $\times 1$. DGS, Reg. no. 3545. Loc. Moniwa, Sendai City, Miyagi Prefecture.
- 6a, b. a, Left valve, $\times 1$. b, Internal view of fig. 6a, $\times 1$. DGS, Reg. no. 3545. Loc. Same as above.
7. Left valve, $\times 1$. DGS, Reg. no. 2140. Loc. Same as above.
8. Left valve, $\times 1.5$. DGS, Reg. no. 3546. Loc. About 400 m. west of Jyûnishindô, Kumano-dô, Natori-machi, Natori-gun, Miyagi Prefecture.

Photo. by K. MASUDA

337. SUPPLEMENTARY DESCRIPTIONS OF THE LIASSIC
PELECYPODS FROM THE KURUMA AND
SHIZUKAWA GROUPS IN JAPAN*

(Studies on the Liassic Pelecypods in Japan. 9)

ITARU HAYAMI

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本邦ライアスの二枚貝の記載補足：志津川・来馬両層群にはなお未記載の二枚貝が相当数残されているが、採集品の中から *Protocardia*, *Pleuromya*, *Homomya*, *Thracia* の4新種を含む10種を識別したので記載する。未決定種が多いのはいずれも産出が稀で、材料も充分でないため、これらのより詳細な記載と同定は後日行われるべきものである。
速水 格

In this article are described the following Kuruma and Shizukawa species:-

- Parallelodon* sp. indet.
Grammatodon (?) sp. indet.
Protocardia kurumensis, HAYAMI,
new species
Pleuromya hashidatensis HAYAMI,
new species
Homomya satoi HAYAMI, new species
Homomya sp. indet.
Thracia subrhombica HAYAMI, new species
Thracia (?) sp. indet.
Cuspidaria (?) a sp. indet.
Cuspidaria (?) b sp. indet.

Most of them occur not commonly, and are represented poorly preserved specimens insufficient for specific identification. More than five pelecypod forms besides these are distinguishable among the Kuruma-Shizukawa collection before hand, but the writer hesitates to describe them, because their generic positions are indeterminable at present.

Family *Parallelodontidae*

Genus *Parallelodon*

MEEK and WORTHEN, 1866

Parallelodon sp. indet.

Plate 28, Figure 1.

Only a right internal mould is at hand. Shell medium in size, elongated, bicarinated, much longer than high (MM 2800, 38.5 mm. long; 16.0 mm. high; 6.5 mm. thick); umbo prominent, located at about a third of shell-length from front; postero-dorsal wing undeveloped; ventral margin slightly concave in its median part; hinge of *Parallelodon*-type, very asymmetrical, composed of three elongated horizontal posterior, three curved anterior and several median teeth; no plate for adherence of posterior adductor.

In the dentition and outline, this seems more related to *Cosmetodon* BRANSON (1942) (= *Beushausenia* in ARKELL, 1930)

* Received Oct. 2, 1957; read April 28, 1958.

than to *Parallelodon* (s. s.). But the subgeneric reference is not further endorsed, because of the ignorance of the inclination of median teeth and surface ornaments. *Parallelodon nivanohamensis* HAYAMI (1958b) from the Hettangian Niranohama formation is obviously different from this in the wider hinge-plate, developed postero-dorsal wing and absence of anterior carination. This is probably an ally to *Cucullaea hettangiensis* TERQUEM (1855) from the lower Lias of Paris basin, which was included in *Beushausenia* by ARKELL (1930). But its specific identification is deferred until the external characters are known.

Occurrence:—Black sandstone of Dome-rio-Toarcian Shinatani formation at Shinatani in Omi-machi, Niigata Pref.

Genus *Grammatodon* MEEK, 1860

Grammatodon (?) sp. indet.

Plate 28. Figures 2-3.

A left valve and two left internal moulds are at hand. Shell very small, trapezoidal, sharply carinated posteriorly, not alate, much longer than high (left valve, MM 2801, 10.5 mm. long; 7.5 mm. high; 3.0 mm. thick); umbo protruded above hinge-line, situated at about two-fifths of shell-length from front; surface netted with roughly spaced radial ribs and concentric growth lamellae; hinge of *Grammatodon*-type, fairly asymmetrical, composed of more or less elongated horizontal lateral and several granular median teeth.

The hinge structure shows that this

form is more closely related to *Grammatodon* than to *Parallelodon* or *Cucullaea*. The radial ribs are more wide-spaced in the central part than on lateral sides. But the shell-size is so small for the genus that the writer finds no comparable species in foreign literatures.

Occurrence:—Black sandstone at Shinatani.

Family Cardiidae

Genus *Protocardia* BEYRICII, 1845

Protocardia kurumensis HAYAMI,
new species

Plate 28, Figures 5-8.

1957, *Protocardia* cf. *contusa* HEALEY, listed in KOBAYASHI and others, *Jour. Geol. Soc. Japan*. Vol. 63, No. 738, p. 186.

Description:—Shell small to medium; subtriangular, fairly inequilateral, strongly inflated, much longer than high; umbo protruded above hinge-margin, recurved, slightly prosogyrous, submesial; anterior margin rounded, passing gradually into venter; postero-dorsal one obliquely truncated, curving more or less abruptly towards venter; surface divided into three parts by anterior and posterior blunt carinae; posterior part occupying about a third of whole surface, marked with about 25 fine radial riblets; remaining parts with fine regular concentric striae; hinge known only in posterior part of right valve; cardinal 3b small, conical, bordered by a triangular socket (2' and 4b') on each

<i>Measurement in mm.</i>	Length	Height	Thickness
Holotype (MM 2803) Left valve	21.5	17.5	6.0
Paratype (MM 2804) Right internal mould	20.0	17.0	5.0

side; right posterior lateral tooth short, subparallel to valve margin; adductors weakly impressed, subequal; inner ventral margin finely crenulated in posterior part where radials are distributed.

Observation and Comparison.—There are eight specimens, but all more or less deformed secondarily. The holotype (Fig. 5) exhibits surface-ornaments of *Protocardia*-type. The weak ventral sinuation is probably due to secondary deformation, because it is absent in the paratype (Fig. 6) and other specimens. Several smaller specimens (Figs. 7 and 8) from a black shale are strongly deformed, and at a glance they are very different forms from the two type specimens from a sandstone.

As listed before, this may be an ally to *Protocardia contusa* HEALEY (1908) from the Rhaetic (or Noric) Napeng bed in Upper Burma. But the posterior radial ribs are about nineteen in the Napeng species, whereas they are more than 25 in number in the present species. The umbo seems to be slightly protruded than in *contusa*. There are many Jurassic species hitherto referred to this genus. But this is distinguishable from most of them in the more trigonal outline and characteristic concentric ornamentation.

Occurrence.—Black sandstone and shale at Shinatani. Several specimens procured also from a sandstone at the upper stream of Kanayamadani, and one from a black shale at the middle stream of Tsuchizawa.

Family Pleuromyidae

Genus *Pleuromya* AGASSIZ, 1843

Pleuromya hashidatensis

HAYAMI, new species

Plate 28, Figure 9.

1957. *Pleuromya* aff. *forsbergi nipponica* KOBAYASHI and ICHIKAWA listed in KOBAYASHI and others, *loc. cit.*

Description.—Shell small, elongated, thin, moderately inflated, about twice as long as high (MM 2808, 30.5+ mm. long; 16.5 mm. high; 3.5 mm. thick); antero-dorsal margin short and obliquely truncated; postero-dorsal one long, fairly sinuated; umbo broad, blunt, located at about a third of shell-length from front; posterior area wide and fairly flattened; surface marked with somewhat irregular concentric growth-lamellae; internal structure unknown.

Observation and Comparison.—Two left valves are at hand. The holotype exhibits the outline and surface-marking of this species, although its posterior part is broken off. Unless the hinge is observable, it is not easy to distinguish *Homomya* from *Pleuromya*. Generally speaking, however, *Homomya* has a more rounded antero-dorsal margin, more inflated shell and larger dimensions than *Pleuromya*. In these features this agrees better with the latter than the former.

Pleuromya forsbergi (BOHM) *nipponica* KOBAYASHI and ICHIKAWA (1951) from the Carnic Kochigatani group in Sakawa basin is very similar to this in the external aspects. Although NAKAZAWA (1956) doubted its reference to *Pleuromya*, this is probably congeneric with the Carnic species. But specifically this is different from that with regard to the more salient umbo and less elongated outline. This is more or less similar to the holotype of *Homomya matsuoensis* NAKAZAWA (1956, pl. 2, figs. 1a-c). Compared with its paratype (figs. 2a-d), however, the posterior area is much more expanded than in *matsuoensis*. The shell-size of *matsuoensis* is more than 50 mm. in length. Namely,

it is much larger than this species.

Occurrence:—Black arenaceous shale of Domerian Teradani formation (*Analtheus*-bed) at Kanayamadani in Omimachi, Niigata Pref. Collected by TOKUYAMA*.

Family Pholadomyidae

Genus *Homomya* AGASSIZ, 1843

Homomya satoi HAYAMI,
new species.

Plate 28, Figures 10 a-c.

Description:—Shell medium, oblong, subequivalve or equivalve, inequilateral, inflated, thin, about 1.5 times as long as high (holotype, MM 2810, 54.0 mm. long; 35.5 mm. high; 26.5 mm. thick, bivalved); antero-dorsal margin short and rounded; postero-dorsal long and nearly straight; valve margin closed in anterior but gaping widely in posterior half; umbo located at about a fourth from front; surface marked with irregular concentric plications and growth lamellae; hinge unknown but probably edentulous.

Observation and Comparison:—A solitary bivalved internal mould is at hand. Judging from the rounded anterior margin and strong convexity of the shell, this is referable to *Homomya*, instead of *Pleuromya*. This resembles *Homomya signicollina* MARWICK (1953) from the Middle Jurassic of New Zea-

* The writer is grateful to Mr. A. TOKUYAMA for the donation of the specimens.

land, but differs in the more posteriorly located umbo.

Occurrence:—Sandstone at Shinatani.

Homomya sp. indet.

Plate 28, Figure 11.

A solitary bivalved internal mould belongs to an old collection of this institute. It is procured from the Kuruma group, but its exact locality and horizon are unknown. This differs from the preceding in the more elongated outline, sinuated postero-dorsal margin and narrow posterior gaping. Its specific identification is deferred until better material is procured. Specimen, MM 2811, 50.5 mm. long; 25.5 mm. high; 24.0 mm. thick.

Family Thraciidae

Genus *Thracia* BLAINVILLE, 1821

Thracia subrhombica HAYAMI,
new species.

Plate 28, Figures 12-14.

Description:—Shell medium, compressed, thin, subrhomboidal in outline, much longer than high; antero-dorsal margin very slightly convex, while postero-dorsal one is nearly straight or slightly concave; posterior margin subvertically truncated; ventral margin more or less abruptly turned near its mid-point; posterior area flattened, defined by a blunt carination; surface marked with irregular concentric plications and numerous growth-lamellae.

Measurement in mm.	Length	Height	Thickness
Holotype (MM 2812) Right valve	33.5	24.0	3.0
Paratype (MM 2813) Right valve	33.0	22.5	3.0
Paratype (MM 2814) Left valve	38.5	26.5	3.5

Observation and Comparison:—Seven single-valved specimens are at hand. Judging from the opisthogyrous umbo, thin test and general outline, this is referable to *Thracia*, although posterior gaping, hinge-structure and muscle system are unknown. It has been discussed by some palaeontologists whether *Thracia* BLAINVILLE (1824) appeared already in the Jurassic. The writer considers here *Corimya* AGASSIZ (1843) and *Homoeodesma* FISCHER (1887) as two synonyms of *Thracia* in agreement with ARKELL (1929-37).

This is distinguishable from the hitherto described species of *Thracia* in the more rhomboidal outline. This is fairly similar to *Thracia depressa* SOWERBY (1823, Vol. 5; ARKELL, 1929-37) from the Oxfordian and especially to its lectotype in ARKELL (pl. 50, fig. 7) in the rhomboidal outline. But the postero-dorsal margin of *depressa* is more sigmoidal. This is also somewhat similar to *Thracia frearsiana* D'ORBIGNY (1845) from the Oxfordian of European Russia, but differs from that species in the less inflated shell with a more flattened posterior area. *Corimya glabra* AGASSIZ (1843) from the Upper Lias differs from this in the more inequilateral outline and more posterior beak.

Occurrence:—Common in a black shale of the lower Hettangian Nirano-hama formation at Nirano-hama in Utatsumura, Miyagi Pref.

Thracia (?) sp. indet.

Plate 28, Figure 15.

There is an internal mould of left valve (MM 2815, 20.0 mm. long; 14.5 mm. high; 2.0 mm. thick) on which concentric surface-markings are impressed. This is fairly similar to *Thracia prisca* HEALEY (1908) from Napeng bed with regard to the similar outline and surface-markings. But the material is compressed secondarily, and its specific identification impossible at present.

Occurrence:—Black shale at Shinatani.

Family Cuspidariidae

Genus *Cuspidaria* NARDO, 1840

Cuspidaria (?) a sp. indet.

Plate 28, Figures 16-19.

Shell small, slightly inequivalve, spoon-like in outline, protruded posteriorly, moderately inflated, thin, becoming narrower towards posterior end; posterior margin truncated; umbo located slightly anterior to mid-length, slightly opisthogyrous; ventral margin sinuated near the junction with posterior area, which is flattened and sharply defined from main part by a narrow ridge; surface smooth except for somewhat irregular growth-lamellae.

Measurement in mm.	Length	Height	Thickness
(MM 2817) Left valve	19.5	13.5	3.5
(MM 2818) Right internal mould	17.0	11.5	2.5
(MM 2819) Left internal mould	20.0	11.5	3.0

Observation and Comparison:—Five right and three left specimens are at hand. Although most of them are

strongly deformed secondarily, it is observable that the posterior area of a left valve is more contorted than a right

and that the postero-dorsal margin is more convex than in right.

This is a very strange form, and its taxonomic position cannot be decided at present. The outline and inequivalve shell remind one of corbulid. *Corbula eastonii* VOGEL (1900) from the Jurassic of Borneo and some other Jurassic corbulids, in fact, show more or less similar outline and posterior carination. But this cannot be referred to the genus by the thin test. This is probably more related to the Cuspidariidae, although such a sharp posterior carination and short posterior area are unknown in them. "*Cuspidaria*" *ayabensis* NAKAZAWA (1956) from the Carnic Nabae group has such a posterior area and may be congeneric with this. But the shell is less elongated and the size much smaller than in that species.

Cuspidaria (?) b sp. indet.

Plate 28, Figures 20-21.

There are nine specimens which resemble the preceding form in the external aspects and probably congeneric with it. But the shell is much smaller (left valve, MM 2820, 9.0 mm. long; 5.0 mm. high); posterior area more protruded backwards and defined more sharply. The left valve is marked with fine concentric lines, and the right valve with more wide-spaced growth-lamellae. But the discordance may be partly attributed to secondary deformation. This form is probably an ally to *Neaera sambasana* VOGEL (1900) from the Jurassic of Borneo.

Occurrence:—Black shale at Nirano-hama.

Postscript

1. After the writer's paper on *Gervillia*

and *Isognomon* in Japan (1957, *Japan. Jour. Geol. Geogr.*, Vol. 28, Nos. 1-3.) was completed, many well preserved specimens of *Isognomon rikuzenicus* (YOKOYAMA) were obtained from the uppermost part of the "Cyrenoid bed" at Nirano-hama. Judging from the material, the outline is fairly variable and the byssal gape is fairly wide and the anterior margin sometimes strongly concave below the terminal beak as seen in *Isognomon* (s. s.). Its juvenalia have very terminal and protruded umbones and fairly different in outline from *Isognomon* cf. *rikuzenicus* from the Kuruma group at Neiridani. Two internal moulds of the latter form illustrated in that paper are probably adults and specifically distinguishable from *rikuzenicus*.

2. *Volsella bakevelloides* HAYAMI (1958a, *Trans. Proc. Pal. Soc. Japan*, N. S., No. 29) has been represented by three comparatively small specimens. But recently a large left valve (MM 2822, 70.0 mm. long; 67.5 mm. high; 14.0 mm. thick) was supplied from the same locality. It is obviously conspecific with the holotype of *bakevelloides*, judging from its growthlines, though its anterior wing is comparatively small. It is illustrated in Pl. 28, Fig. 4 in this paper. The generic name *Volsella*, the oldest name for the genus, was rejected by an opinion of the International Commission of Zoological Nomenclature and has been replaced by a younger name *Modiolus*. Therefore, the generic name *Volsella* SCOPOLI, 1777 in that paper should be read *Modiolus* LAMARCK, 1799.

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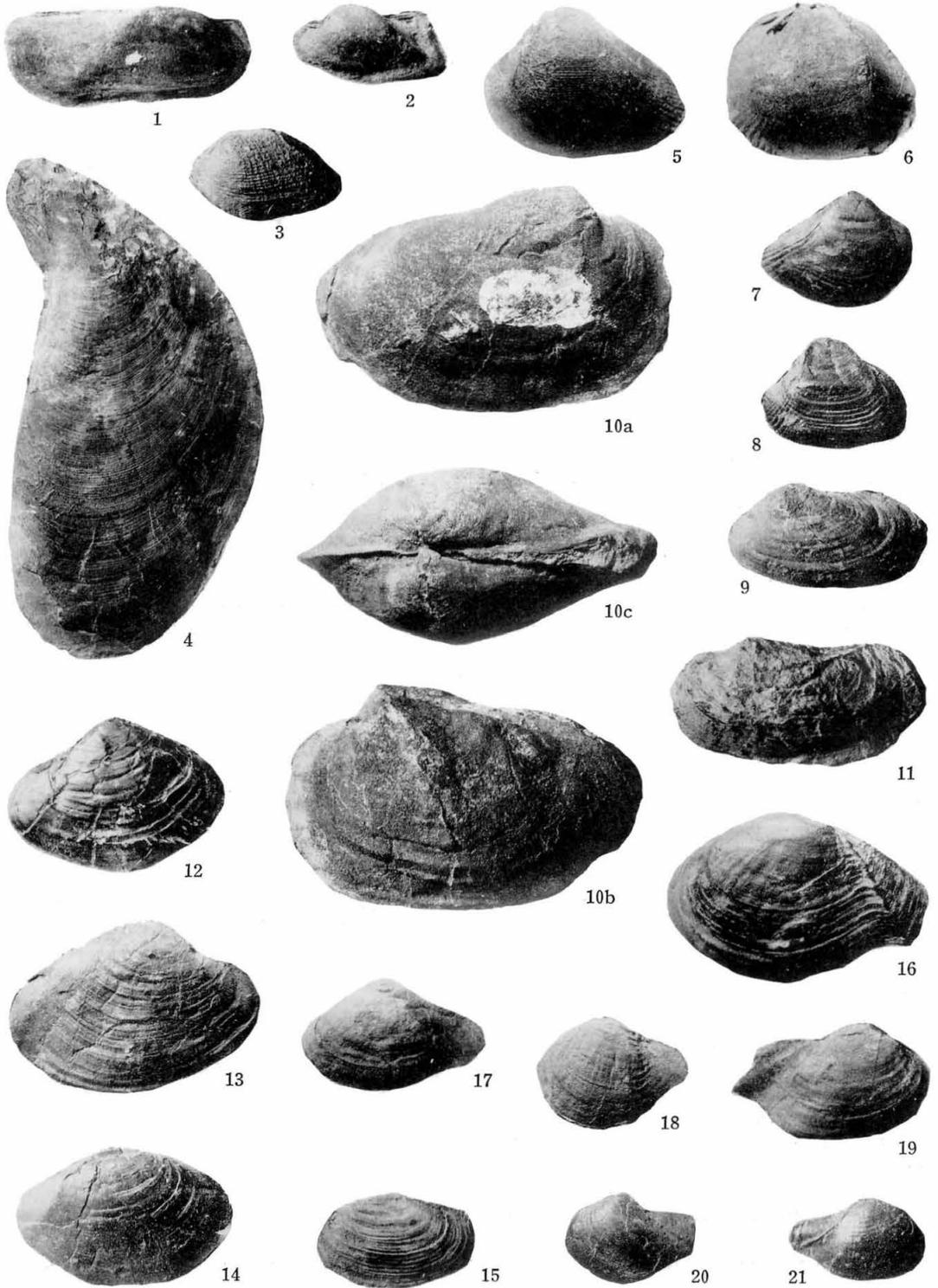
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 Explanation of Plate 28

- Parallelodon* sp. indet.p. 193
 Fig. 1. Right internal mould (MM 2800) \times 1. Loc. Shinatani in Omi-machi, Niigata Pref.
- Grammatodon* (?) sp. indet.p. 194
 Fig. 2. Left internal mould (MM 2802) \times 3. Loc. ditto.
 Fig. 3. Left valve (MM 2801) \times 3. Loc. ditto.
- Modiolus bakevelloides* (HAYAMI)p. 199
 Fig. 4. Left valve (MM 2822) \times 1. Loc. Nirano-hama in Utatsu-mura, Miyagi Pref.
- Protocardia kurumensis* HAYAMI, new species.p. 194
 Fig. 5. Left valve, holotype (MM 2803) \times 2. Loc. Shinatani.
 Fig. 6. Right internal mould, paratype (MM 2804) \times 2. Loc. ditto.
 Fig. 7. Right valve (deformed) (MM 2805) \times 2. Loc. ditto.
 Fig. 8. Right valve (deformed) (MM 2806) \times 2. Loc. ditto.
- Pleuromya hashidatensis* HAYAMI, new species.p. 195
 Fig. 9. Left valve, holotype (MM 2808) \times 1. Loc. Kanayamadani in Omi-machi.
- Homomya satoi* HAYAMI, new species.p. 196
 Fig. 10a-c. Bivalved internal mould, holotype (MM 2810) \times 1. Loc. Shinatani.
- Homomya* sp. indet.p. 196
 Fig. 11. Bivalved specimen (MM 2811) \times 1. Loc. unknown.
- Thracia subrombica* HAYAMI, new species.p. 196
 Fig. 12. Right valve, holotype (MM 2812) \times 1. Loc. Nirano-hama.
 Fig. 13. Left internal mould, paratype (MM 2814) \times 1. Loc. ditto.
 Fig. 14. Right valve, paratype (MM 2813) \times 1. Loc. ditto.
- Thracia* (?) sp. indet.p. 197
 Fig. 15. Left internal mould (MM 2815) \times 1. Loc. Shinatani.
- Cuspidaria* (?) a sp. indet.p. 197
 Fig. 16. Left valve (MM 2817) \times 3. Loc. ditto.
 Fig. 17. Left internal mould (MM 2819) \times 2. Loc. ditto.
 Fig. 18. Left internal mould (MM 2823) \times 2. Loc. ditto.
 Fig. 19. Right internal mould (MM 2818) \times 2. Loc. ditto.
- Cuspidaria* (?) b sp. indet.p. 198
 Fig. 20. Left valve (MM 2820) \times 3. Loc. Nirano-hama.
 Fig. 21. Right valve (MM 2821) \times 3. Loc. ditto.

All specimens here illustrated are kept in the Geological Institute, University of Tokyo.



C. Ueki photo.

338. SPECIES OF THE GENUS *NEPTUNEA* FROM THE
PALAEOGENE FORMATIONS IN THE KUSHIRO
COAL FIELD, HOKKAIDO, JAPAN*

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北海道釧路炭田古第三紀層産の *Neptunea* 属化石：釧路炭田の古第三紀層、浦幌層群および音別層群に産する *Neptunea* 属を検討し、9 種を認め (5 新種をふくむ) 記載をおこない、あわせて、これらの諸種の産出層準に吟味を加えた。松井 愈

Nine species belonging to the genus *Neptunea*, the typical cold water elements of the so-called Poronai fauna, will be described in this short note. All these specimens at hand have been collected by the members of the Department of Geology and Mineralogy, including the present writer. They were found in various horizons of the Palaeogene deposits developed widely in Kushiro coal field, southeastern Hokkaido, which are usually regarded to be divisible into main two divisions, the Urahoro and the Onbetsu formations respectively (See Table I). Of them, the Onbetsu group is exclusively represented by the marine facies, having numerous molluscan fossils. It probably covers the former conformably, and may be subdivided into four formations (On₁-On₄ in Table I) from its lithological facies. The Urahoro group consists mostly of the coal measures and thick bedded conglomerates of terrestrial origin; it is relatively poor in marine facies, except for the so-called Sitakara formation (U₃), of which fossil content

shows certainly to have been deposited under the brackish- or sea-water. The Tenneru formation (U₃) is also locally represented by marine facies and contains molluscs, although they are less numerous than those of the Sitakara formation.

Now, for all these marine formations as well as marine intercalations above noted, the specific distribution of the genus *Neptunea* can be tabulated as in the following table (Table II).

Before going into the description, the writer wishes to record his hearty thanks to Prof. Masao MINATO, the Department of Geology and Mineralogy, Hokkaido University, for his kind reading of the manuscript. For the helpful criticisms thanks are also offered to Messrs. Satoru UOZUMI, Tsutomu FUJIE, also of the same Department of the Univ., and to Mr. Tosio YAMAMOTO, a geologist of the Meiji Coal Mining Company.

This study has been financed by grants from the Science Research Fund of the Ministry of Education, to which the writer acknowledges his indebtedness.

* Received July 15, 1957; read June 15, 1957.

Table 1. Classification of Palaeogene Sediments of the Kushiro Coal Field.

Group	Formation	Lithology	Thickness	Facies	Main fossils
Onbetsu Group	Chokubetsu (On ₄)	Greyish compact hard shale, intercalating black sandstone patches.	200m.	marine	
	Nuibetsu (On ₃)	Dark grey tuffaceous sandstone, containing pyroclastic grains, and sometimes intercalated thin agglomerate in the middle and upper parts.	300	marine	<i>Yoldia laudabilis</i> YOK. <i>Portlandia watasui</i> KAN. <i>Thyasira bisecta</i> CONR. <i>Periploma besshoensis</i> (YOK.) <i>Venericardia akagii</i> KAN. "Tapes" <i>ezoensis</i> YOK. <i>Malletia poronaiica</i> (YOK.) <i>Trochocerithium wadanum</i> (YOK.)
	Charo (On ₂)	Dark grey mudstone, intercalated marly layers and nodules, calcareous bands, thin white tuff.	250	marine	<i>Neptunea onbetsuensis</i> MATSUI <i>Ancistrolepis japonicus</i> TAK. <i>Callianassa muratai</i> NAG.
	Omagari (On ₁)	Greenish sandstone, intercalating thin conglomerate at basal part; upper part gradually becomes fine grained and transits to On ₂ .	60	marine	
Urahoro Group	Shakubetsu (U ₆)	Grey siltstone, sandstone, thin conglomerate, intercalated coal seams. Conglomerate contains white volcanic pebbles.	250	brackish	<i>Corbicula tokudai</i> (YOK.) <i>Batissa sitakaraensis</i> (SUZ.) <i>Ostrea praegravitesa</i> TAK.
	Shitakara (U ₅)	Dark grey siltstone, platy greenish grey sandstone intercalating thin fine grained conglomerate.	200	terrestrial	<i>Nemocardium yokoyamai</i> TAK. <i>Mya grewingki</i> MAK.
	Yubetsu (U ₄)	Greyish sandstone, dark grey siltstone, reddish conglomerate, intercalating coal seams.	300	marine	<i>Neptunea sitakarensis</i> MATSUI <i>Linthia yessoensis</i> MINATO
	Tenneru (U ₃)	Reddish conglomerate, intercalating greyish sandstone patches and thin coal seams.	200	brackish	<i>Batissa sitakaraensis</i> (SUZ.) <i>Corbicula tokudai</i> (YOK.) <i>Ostrea praegravitesa</i> TAK.
	Harutori (U ₂)	Greyish sandstone and dark grey mudstone, intercalating coal seams.	100	(marine—in eastern part)	<i>Nemocardium yokoyamai</i> TAK. <i>Papyridea</i> cfr. <i>harrimanii</i> DALL <i>Mya grewingki</i> MAK. <i>Neptunea sitakarensis</i> MAT.
	Beppo (U ₁)	Blackish conglomerate intercalating grey sandstone patches.	50	terrestrial	

Table II.

Species	Geological Occurrence	U ₃	U ₂	On ₁	On ₂	On ₃
<i>Neptunea</i> sp.						
<i>N. sitakarensis</i> MATSUI n. sp.		—	—			
<i>N. shoroensis</i> MATSUI n. sp.			—			
<i>N. huruhatai</i> MATSUI n. sp.						
<i>N. modestoidea</i> TAKEDA						
<i>N. ezoana</i> TAKEDA						
<i>N. subcarinata</i> MATSUI n. sp.				—	—	
<i>N. onbetsuensis</i> MATSUI n. sp.					—	
<i>N. dispar</i> TAKEDA						—

Family Neptuneidae

Genus *Neptunea* (BOLTEN)

ROEDING, 1798

Genotype: *Fusus anticuus* LINNAEUS.

Neptunea sp.

Plate 29, Figures 1a, 1b.

Shell large, fusiform, spire elevated; each whorl has wide tabulation which is separated from the canaliculated suture; tabulated area slopes gently down to the shoulder. Apex and anterior part of the body whorl unfortunately missing.

Dimensions:—Apical angle about 55°, height of the shell about 62 mm., at least so far as the preserved part is concerned, however it might be found to have originally reached as much as 75 mm. if the shell were in complete state of preservation.

Occurrence:—U₃: Senposhi, Oboro mura, Kushiro Prov., (Coll. I. HAYASHI)

Repository:—U. H. Reg. No. 12669 (U. H.—Dept. Geol. Min., Fac. sci., Hokkaido Univ., Sapporo).

Remarks:—The only single specimen for this species is at the writer's disposal for study. It is illustrated in

fig. 1, on Pl. 29. The present specimen is doubtlessly quite unique in its outline of shell, and in this regard easily separable from all the hitherto known fossil species of the genus *Neptunea*. However, it seems to the present writer to be rather closely allied to the shell described by B. C. CLARK under the name of *N. aff. tabulatus* from the Palaeogene of Alaska, although the test is almost completely exfoliated both in the Japanese and Alaskan specimens, and it may not be at all reasonable to give a name for such an imperfect material.

Neptunea sitakarensis MATSUI n. sp.

Plate 29, Figures 2a, 2b, 3, 4.

Shell rather small, thin tested, with a high spire, the height of which is sub-equal to that of the aperture. Apical angle about 52°; whorls five to six in number, separated from one another by distinct, more or less canaliculated sutures. The protoconch is composed of one or one and half turns of the whorl, which is smooth on the outer surface. The other whorls moderately convex with each other, usually indistinctly but sometimes distinctly shouldered at about the midpoint of the depth;

upper surface more or less flattened, lower surface below the shoulder slightly convex and nearly vertical. The ornamentation of each whorl consists of a few spiral ribs, alternating with secondary fine striae; three ribs and two secondary striae usually observable on the third whorl, while there are four to five ribs alternating with the secondary striae on the fifth and body whorls. Spiral ribs are usually narrow, moderately elevated, rounded on top, and sharply defined from the broad interspaces; the uppermost rib is weakly developed in the fifth and body whorls, which is somewhat more nearly disposed to the upper suture; the second one is situated at about the middle of the upper surface; the third one forms the shoulder itself, and the fifth is slightly above the latter suture.

Body whorl is large, bluntly shouldered, convex at the sides; it becomes gradually narrow towards the anterior extremity and is spirally ribbed; basal part is ornamented with eight to ten spiral ribs, which are slightly narrower and weaker than those on the convex part of the whorl; aperture subpointed posteriorly; inner lip excavated; columella slightly bent outward; anterior canal rather short and narrow.

Dimensions :—

Height	Max. Diam.	Apic. Ang.
37 mm.	20 mm.	53°
38 ..	23 ..	51°
36 ..	21 ..	52°

Occurrences :—

U₃: Senposhi, Oboro mura, Kushiro Prov., (Coll. I. HAYASHI)

U₅: Ponshitakara gawa, Akan mura, Kushiro Prov. (MATSUI's Loc. no. 68, Coll. T. FUJIE)

On₂: Takinoue, Shoro mura, Ku-

shiro Prov., (MITANI's Loc. no. 226, Coll. K. MITANI)

" : Kamishoro, Shoro mura, Kushiro Prov.

Repository:— U. H. Reg. No. 12674, 12679, 12701.

Remarks:—These specimens now at hand closely resemble *Chrysodomus chikuzenensis* NAGAO described and illustrated by T. NAGAO from the Yamaga beds of the Chikuhō Coal Field, island of Kyushu, Japan. However, the former species may be specifically distinguishable from the latter in having a shell with the whorl ornamented by secondary spiral striae in addition to spiral ribs.

Buccinum matchgarensis MAKIYAMA described by MAKIYAMA from Matchgar and Yotukura, seems also to be nearly allied to the present form in respect to the features of upper whorls, but MAKIYAMA's species is genetically distinct from the present form, now under consideration, in its shorter columella.

Neptunaea oomurai OTUKA shows also close similarity to the present form, especially in its outer form, but former has more numerous spiral ribs on the whorls than the latter and has fine longitudinal costae on the post-embryonal whorls.

Neptunaea shoroensis MATSUI n. sp.

Plate 29, Figures 5a, 5b, 6a, 6b.

Shell fusiform, with moderately elevated spiral whorls, apical angle about 45°; whorls five in number, separated from one another by a distinct suture. Each whorl distinctly angulated at a little above the middle; upper surface slightly concave and inclined outwards; lower surface almost flattened. Ornamentation consisting of four spiral ribs and numerous fine

crowded lines of growth; spiral ribs rather flat and broad: two upper ribs on the upper surface are weak and sometimes indistinct; the lower two are strong and more highly elevated than the upper two; the third located on the shoulder itself, while the fourth is situated on the middle of the lower surface; body whorl is large, much higher than the spire, distinctly but more or less round shouldered, convex below the shoulder and becomes gradually narrow downwards; the base is ornamented by ten to twelve spiral ribs which are more crowded than those of convex parts. Aperture elongate, with rather oblique anterior canal; outer lip thin; inner lip excavated by a thick twisted columella.

Dimensions :—

Height	Max. Diam.	Apic. Ang.
49 mm.	38 mm.	47°
65 ..	40 ..	44°
59 ..	38 ..	45°
48 ..	(28) ..	45°

Occurrences :—

U₃: Senposhi, Oboro mura, Kushiro Prov. (Coll. I. HAYASHI)

U₅: Ponshitakara gawa, Akan mura, Kushiro Prov. (MATSUI'S Loc. no. 68, Coll. T. FUJIE)

" : Shoro Coal Mine, Shoro mura, Kushiro Prov.

" : Kamishoro, Shoro mura, Kushiro Prov.

Repository :—U. I. Reg. No. 12673, 12675, 12676, 12678.

Remarks :—These specimens are characteristic in respect to the high spire, moderately rounded whorls, three to five spiral ribs and secondary striae between them on each upper whorl.

This form is quite unique in its outer form especially in its high spire, elongate

aperture and distinctly angulated shoulder in each whorl, and easily separable from all the hitherto known species in Japan, either fossil or living. But the present form is akin to *Chrysodomus allispiratus* NAGAO which was reported by NAGAO from the Doshi beds of the Asakura Coal Field, Kyushu, in its shouldered outer form. Yet the present form is also specifically distinguishable from the latter in having a larger shell, and a longer anterior canal.

Neptunea huruhatai MATSUI n. sp.

Plate 29, Figures 7a, 7b, 8a, 8b.

Shell moderate sized, spire high with more than five rounded whorls besides the embryonal part which is unfortunately lacking. Entire shell spirally sculptured. Whorls separated by abutting fine sutures, which are equal in size and gently elevated. The uppermost rib lies close to the upper suture, and the fifth one slightly above the lower suture. There are also two or three fine secondary spiral striae in each interval of the spiral ribs, the former become gradually narrower downwards. Aperture rhomboidal in form, canal short and slightly recurved.

Dimensions :—

Height	Max. Diam.	Apic. Ang.
(62 mm.) upper whorls lost	30 mm.	35°

Occurrences :—

U₅: Ponshitakara gawa, Akan mura, Kushiro Prov. (MATSUI'S Loc. no. 68, Coll. T. FUJIE)

" : Shitakara gawa, Akan mura, Kushiro Prov. (MATSUI'S Loc. no. 33)

" : Shoro Coal Mine, Shoro mura, Kushiro Prov.

Repository:—U. H. Reg. No. 12670, 12671, 12691, 12692.

Remarks:—This species shows a much smaller apical angle and possesses a much higher spire than those of any hitherto known Japanese species belonging to this genus *Neptunea*. Further the features of aperture and canal of the present species are chrysodomid.

Neptunea landesi (TEGLAND), described by C. W. WEAVER from the Tertiary formation of the western coast, North America, is somewhat allied to the present species in respect to the high spire and small apical angle, but the former has a heavy revolving keel on the posterior whorls, and such features are wholly absent in the latter.

Neptunea modestoidea TAKEDA

Plate 30, Figures 1a, 1b.

1953. *Neptunea modestoidea*, TAKEDA, *Studies on Coal Geol.*, No. 3, pp. 53-54, Pl. III, figs. 1-7.

Shell moderate in size, fusiform, with high spire, about six well-rounded whorls, surface ornamented by five to six spiral ribs and many fine striae on and between the main threads. Aperture elongated and canal slightly recurved.

Dimensions:—

Height	Max. Diam.	Apic. Ang.
(39 mm.) upper whorl lost	35 mm.	55°
(53 ..) ..	?	about 50°

Occurrences:—

U₅: Ponshitakara gawa, Akan mura, Kushiro Prov. (MATSUI'S Loc. no. 68, Coll. T. FUJIE)

On₃: Nuibetsu, Shiranuka mura, Kushiro Prov.

Repository:—U. H. Reg. No. 12672, 12694.

Remarks:—This form seems to be quite rare species in Hokkaido; H. TAKEDA described it mainly on the basis of specimens from South Sakhalin, and single specimen collected from On₁ in Kushiro coal field.

The writer was also able to examine only five specimens for this species collected from U₅ and On₃ in the Kushiro coal field. Although the surface ornamentation of the holotype of this species was unobservable from its poor preservation and the anterior parts of the body whorl are lacking, the illustrated specimens in this paper show characteristic numerous fine spiral striae to cover the whole outer surface of the shell, and the aperture to be elongated, while the canal is slightly recurved.

Neptunea hobetsuensis HAYASAKA and MATSUI is doubtlessly allied to the present form, but whorls of the former are more highly convex than that of the latter, the spiral ribs of the former increase in according with its growth stage, but in the present species the number of ribs is almost constant.

Neptunea ezoana TAKEDA

Plate 30, Figure 4.

1953. *Neptunea ezoana*, TAKEDA, *Studies on Coal Geol.*, No. 3, pp. 52-53, Pl. II, figs. 1, 3 & 6.

Original Description (TAKEDA 1953): "Shell moderate, fusiform, rather thin, high turreted, spire same or higher than aperture; apex subacute, apical angle about 52°; whorls 7, convex but roundly shouldered, which is distinct on middle whorls, each whorl separated by distinct suture. Ornamentation consists of 4 spiral ribs (on fourth and sixth whorl) with numerous crowded growth lines; body whorl large, inflated

but abruptly tapering towards end; canal rather short, slightly curved. Spiral ribs narrow, elevated, sharp; third rib strongest and situated on shoulders. Sometimes a fifth rib appears nearer to next suture. At the last whorl 10 ribs and one or two short perceptible ones on siphonal margin of outer lip. Secondary feeble ribs sometimes appear between each of the main ribs and the new ones are near to the upper suture. In this case the total number of ribs is 8, but the four main ribs strongly on internal mould.

Space between upper suture and shouldered portion sometimes flat, gently sloping or slightly concave, which is clearly shown on internal mould by the feeble condition of first and second spiral ribs".

Dimensions :—

Height	Max. Diam.	Apic. Ang.
(65 mm.) apex and extremity lost	43 mm.	52°
(? ") "	46	55°
(92 ") "	56	51°
(95 ") "	55	53°

Occurrences :—

U₅: Kamiatsunai, Otsu mura, Tokachi Prov. (Coll. Shoichi NISHIDA)

On₂: Takinoue, Shoro mura, Kushiro Prov. (MITANI'S LOC. no. 226)

" : Teshibetsu gawa, Teshibetsu mura, Kushiro Prov. (MATSUI'S LOC. no. 138, Coll. T. FUJIE)

Repository :—U. H. Reg. No. 12680, 12687, 12688, 12700.

Remarks :—Only four specimens of this species are available to the writer. They were collected from U₅ and On₂ in the Kushiro coal field. All of them

are ornamented with thirteen or fourteen ribs and numerous weak spiral striae between the main ribs on the body whorl. The aperture of them is moderately wide, outer lip is thin, inner lip is excavated by thick tested columella, canal is narrow and notched anteriorly.

This species somewhat resembles *N. onbetsuensis* MATSUI but the former is specifically distinguishable from the latter by its less convex, smaller body-whorl, and by its four strong and one feeble spiral ribs.

N. oomurai OTUKA reported from Teshio Prov., Northern Hokkaido is also another species allied to this form, but it has more simple spiral ribs and shows strong angularity in the whorls.

Neptunea subcarinata MATSUI n. sp.

Plate 30, Figures 2, 3a, 3b.

Shell strong, solid, ovato-fusiform, whorls about six. Each whorl convex and prominently shouldered. The upper surface of the whorls flat or gently concave, ornamented by three weak spiral ribs. The fourth rib, at shoulder itself, strong and prominent. Lower surface of the whorl nearly vertical. The fifth spiral rib almost mid-point of the lower surface. On the fourth and fifth whorls, there are four or five fine feeble spiral striae between each main ribs. Suture distinct. Aperture medium in size, ovate, angulated above; outer lip distinctly angulated by the carination of the body whorl. Canal short, wide, turning to the left, ending in a well-marked notch.

Occurrences :—

On₁: Kamiatsunai, Otsu mura, Tokachi Prov. (Coll. J. ISHII)

On₂: Kamishoro, Shoro mura, Kushiro Prov.

Height	Max. Diam.	Apic. Ang.
55 mm.	?	60°
(42 ..) upper whorl lost	30 mm.	61°
(47 ..) ..	30	61°
(36 ..) ..	28	56°
(53 ..) ..	37	60°

On₂: Teshibetsu gawa, Teshibetsu mura, Kushiro Prov. (MATSUI'S Loc. no. 148, Coll. T. FUJIE)

Repository:—U. H. Reg. No. 12681, 12683, 12684, 12685, 12686.

Remarks:—These sharply-keeled specimens may be perhaps specifically identical with the form described by H. TAKEDA under the name of *Neptunea subantiquata* MARTON and RACKETT from Rosukezawa south Sakhalin; nevertheless they are doubtlessly distinct from the species *Neptunea subantiquata* MARTON and RACKETT, now living in the sea around the circum-polar region, by their more distinct shoulders and three spiral ribs on the upper surface on each whorl. However *N. intersculpta* described by HARMER seems to be somewhat allied to the present form but for the fact that the former has more convex whorls and conspicuous secondary spiral striae.

Neptunea onbetsuensis MATSUI n. sp.

Plate 30, Figures 5, 6a, 6b.

Shell strong, solid, ovato-fusiform, spire comparatively high; whorls six to seven, round shouldered; the last ventricose about two-thirds the total height of the shell; spiral angle 55°.

The outer surface sculptured by three, rather broad, moderately elevated, flat-topped ribs; of them, uppermost rib lies on the shoulder itself. The body whorl is ornamented by about ten to twelve strong spiral ribs, increasingly densely arranged towards the base of the shell. Each whorl has numerous finely crowded growth lines on the rather broad interspaces of the spiral ribs. Suture distinct; aperture large, ovate in form, angulate above; total length of the aperture plus canal reaches more than half the length of the shell; outer lip expanded outwards and regularly curved, not distinctly angulated by the carination of the body whorl; inner lip excavated by thick twisted columella, which is rather short and slightly bent outwards; canal short, wide, more or less strongly turning to the left of the aperture.

Dimensions:—

Height	Max. Diam.	Apic. Ang.
85 mm.	52 mm.	54°
86 ..	59 ..	56°
(86 ..) upper whorl lost	62 ..	55°
102 ..	58 ..	56°
(86 ..) upper whorl & extremity lost	58 ..	56°
83 ..	56 ..	58°

Occurrences:—

On₁: Kamiatsunai, Otsu mura, Tokachi Prov. (Coll. J. ISHII)

On₂: Takinoue, Shoro mura, Kushiro Prov. (MITANI'S Loc. no. 266, Coll. T. FUJIE)

" : Teshibetsu gawa, Teshibetsu

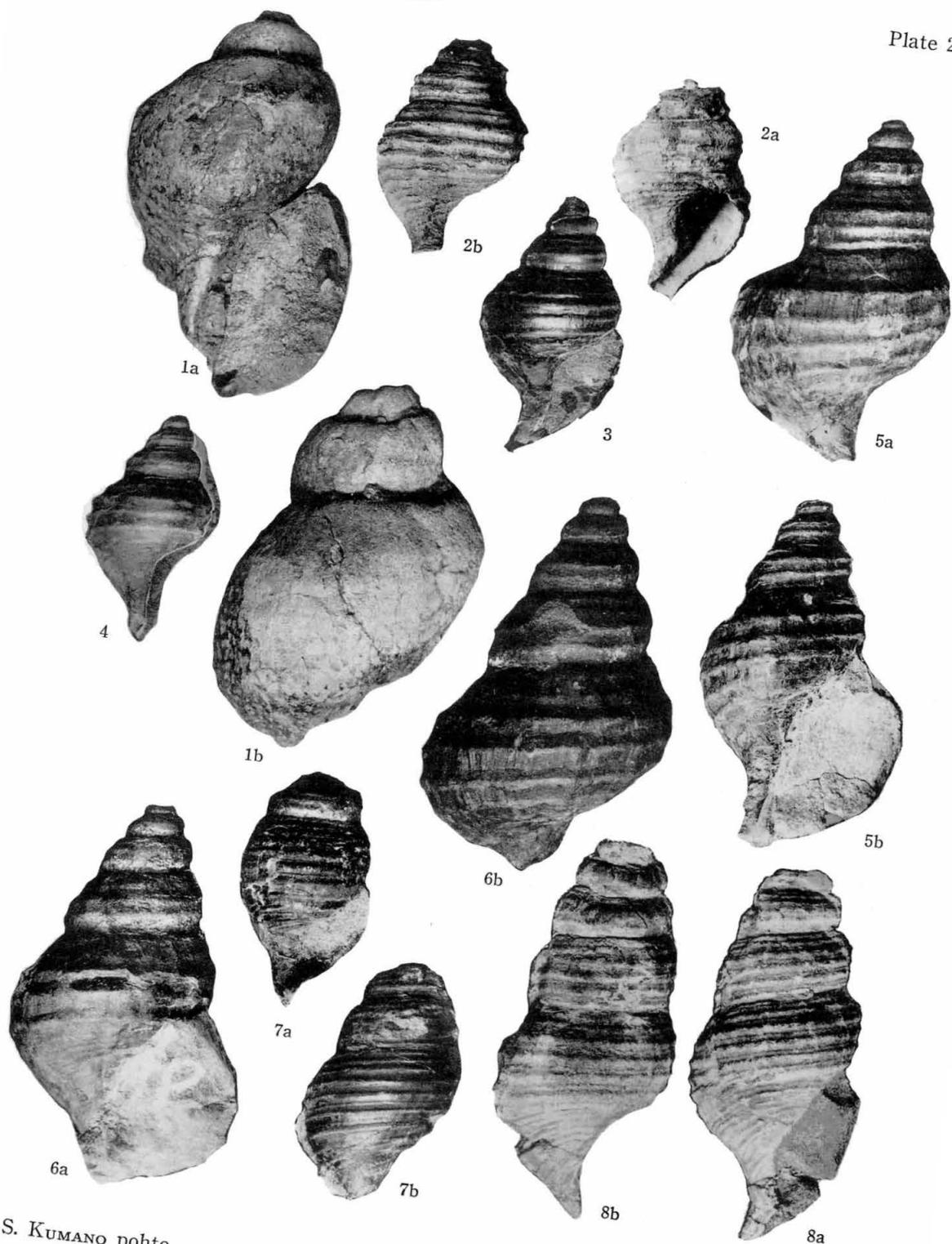
Explanation of Plate 29 (All figures are in natural size)

Figs. 1a, 1b. *Neptunea* sp.

Figs. 2a, 2b, 3, 4. *Neptunea sitakarensis* n. sp.

Figs. 5a, 5b, 6a, 6b. *Neptunea shoroensis* n. sp.

Figs. 7a, 7b, 8a, 8b. *Neptunea huruhatai* n. sp.



mura, Kushiro Prov. (MATSUI'S Loc. no. 148)

On₂: Kamishoro, Shoro mura, Kushiro Prov.

Repository:—U. H. Reg. No. 12695, 12696, 12697, 12698, 12699.

Remarks:—So far as the writer is aware, this form is specifically distinguishable from all hitherto known species of this genus by its large convex body whorl, three strong spiral ribs on the upper whorls and rather short bent canal.

The specimens now at hand are rather closely akin to *Neptunea ezoana* TAKEDA, collected in association with the former; however the present specimens have shells more convex in larger body whorl, with three strong spiral ribs, besides, the former have generally larger shells than the latter.

N. oomurai OTUKA is also another species allied to the present form in respect to the outer shape, but the preceding species has weak spiral striae on the whorls besides the ordinarily strong ribs and a more faint suture.

Chrysodomus modestus KURODA, described by KURODA from Nagano Prefecture seems to be akin to this new form, but it has a lower spire, and is ornamented with numerous spiral ribs.

Neptunea dispar TAKEDA

Plate 30, Figures 7a, 7b, 8a, 8b.

1953. *Neptunea dispar*, TAKEDA, *Studies on Coal Geol.*, no. 3, p. 55, Pl. I, figs 2, 4, 8-12.

Original Description (TAKEDA 1953):—“Shell medium, broadly fusiform, with high spire which is shorter than aperture and abruptly decreases in diameter upwards; whorls 5 or 6, separated by distinct suture. Early whorls convex,

rounded, but on later whorls usually distinctly shouldered at about mid-point of the depth, with upper surface flattened, slightly convex and gently sloping and lower surface nearly vertical, rather concave on inner side. Ornamentation consists of numerous spiral striae, strong and weak irregularly mixed, usually about 11 on upper surface of the whorl. In addition to these spiral striae, each whorl is ornamented by many tubercles, about 12 on last whorl.

Tubercles sharp, pointed, situated on shoulder itself but becoming indistinct nearer to mouth and, on the contrary, one strong spiral rib running on that portion which coincides with the middle part of the wall. Extremity of canal chrysodomid. Lower half of body whorl ornamented by a few rather strong spiral ribs.”

Dimensions:—

Height	Max. Diam.	Apic. Ang.
(16 mm.) apex & extremity lost	14 mm.	62°
(24) ..	20	56°

Occurrences:—

On₃: Nuibetsu, Shiranuka mura, Kushiro Prov.

? : Exact locality unknown. (upper tributary of Charo gawa, Shiranuka mura, Kushiro Prov. (Coll. Koya HIRANO))

Repository:—U. H. Reg. No. 12677, 12689.

Remarks:—The specimens minutely examined by the writer were collected from On₃ developing at Nuibetsu and upper tributary of Charo gawa (exact locality unknown). Small shells are somewhat broadly fusiform, with only four whorls besides the embryonal whorl which is unfortunately lacking. Spiral striae about thirteen on upper

surface of each whorl. Tubercles about fourteen on last whorl. Lower surface of the body whorl is ornamented by a distinct secondary keel with twelve or thirteen weak tubercles. Except the different number of tubercles and the existence of a rather distinct secondary keel in the present specimens, they are doubtlessly similar to the holotype of this species.

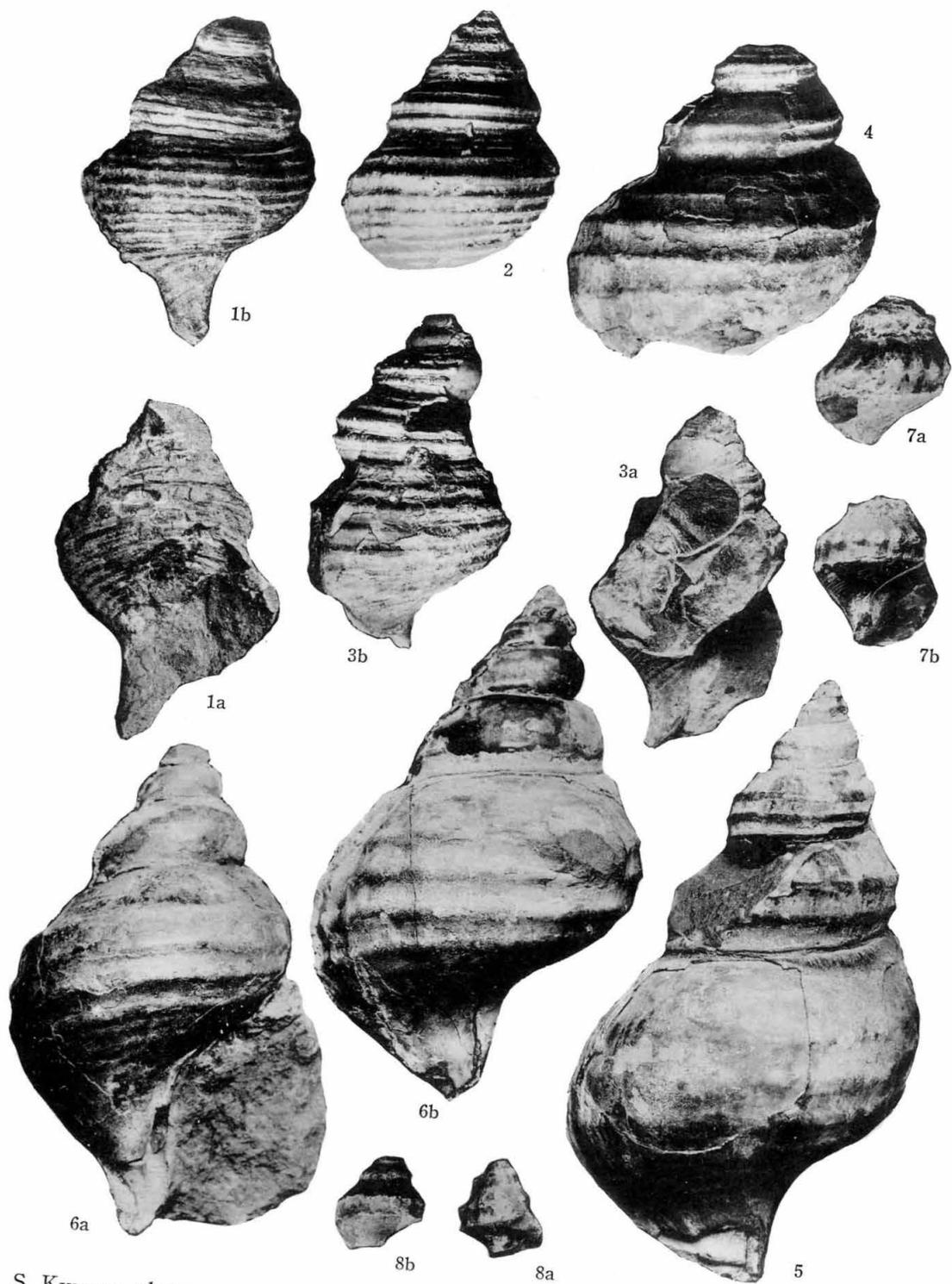
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Explanation of Plate 30 (All figures are in natural size)

Figs. 1a, 1b. *Neptunea modestoidea* TAKEDA
 Figs. 2, 3a, 3b. *Neptunea subcarinata* n. sp.
 Fig. 4. *Neptunea ezoana* TAKEDA

Figs. 5, 6a, 6b. *Neptunea onbetsuensis* n. sp.
 Figs. 7a, 7b, 8a, 8b. *Neptunea dispar* TAKEDA



S. KUMANO photo.

339. SOME CAMBRO-ORDOVICIAN FOSSILS FROM THE
TAN'GYANG OR TANYO DISTRICT, SOUTH KOREA*

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韓国丹陽地方の寒武奥陶紀化石：素木卓二の採集品のうちに申下部奥陶系及び上部寒武系の種々の化石が識別された。そのうちに *Kingstonia*, *Plethometopus*, *Iddingsia* に属する新種があった。それらと共に *Hamashania* (?) sp. を記載図示する。 小林 貞一

The Cambro-Ordovician Chosen group of the Tsuibon zone in the Kogendo Limestone Plateau is very fossiliferous in Kangwondo or Kogendo, but becomes much less so in the Tan'gyang-Yongch'un (Tanyo-Eishun) District in the southwest and almost unfossiliferous in the Mun'gyong (Bunkei) District further in the southwest. Therefore the Tan'gyang collection before hand is highly valuable, although it is a small one, not well preserved. I am grateful to Mr. Takuji SHIRAKI who has given me the collection. Beside *Hamashania* (?) sp., three new species are described here as follows:

Kingstonia parallela KOBAYASHI,
new species

Plethometopus longispinus KOBAYASHI,
new species.

Iddingsia orientalis KOBAYASHI,
new species

Although their generic references are

* Received Oct. 7, 1956; read at the annual meeting of the Palaeontological Society of Japan at Sendai, Feb. 1, 1958.

still tentative, they reveal remarkable resemblances with the Croixan trilobites. *Berkeia* is suggested for *Iddingsia* (?) *shantungensis* KOBAYASHI, as its proper taxonomic position.

Chosen System of the Tan'gyang
or Tanyo District.

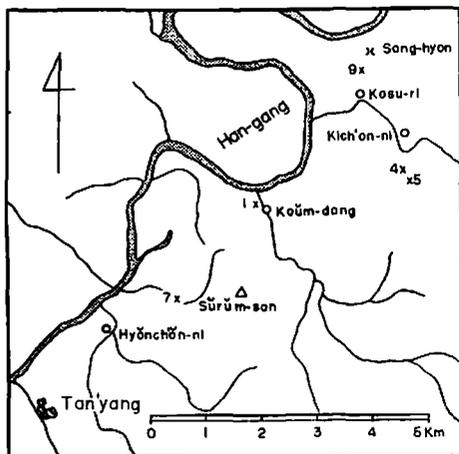
9. Tsuibon limestone, about 50 m. thick, represented by massive limestone containing ormo-ceroids (Tanyo 4) and overlain by Koten series para-unconformably.
8. Chikunsan shale, 10-20 m. thick, or dark gray shale containing ormo-ceroids (Tanyo 7F).
7. Makkol limestone, 50-70 m. thick, consists of vermicular limestone at the top and thick massive limestone below it.
6. Tomkol shale and limestone, 80-110 m. thick. Upper 50 meters composed mainly of light gray shale containing *Finkelburgia saishoensis* (Tanyo 7D and 10) and lower 30-40 meters of well bedded limestone and vermicular limestone in alternation; thin quartzite at the base.
5. Kasetsu group, 500 m. thick, com-

posed of vermicular limestone, marl and bedded limestone in alternations.

Dictyites zone in the upper part yields *Eoorthis shakuotunensis* (?) (Tanyo 5), *Dictyites longicauda*, *Iddingsia orientalis*, *Hamashania* (?) sp., (Tanyo 7C), *Plethometopus longispinus* (Tanyo 7E), and *Kingstonia parallela* (Tanyo 9).

Chuangia zone in the lower part contains *Chuangia taihakuensis* (Tanyo 7A), *Billingsella pumpellyi* (Tanyo 7B).

4. Scison (?) bed, about 50 m. thick, composed of quartzite, sandstone, thin bedded limestone and vermicular limestone in alternation.
3. Taiki limestone, 400-500 m. thick, or massive limestone with some intercalations of marl and shale.
2. Beiho slate, about 100 m. thick, represented by bluish gray to black coloured slate, phyllitic or sandy in part; thin lenses of white or pink limestone intercalated in 3 or 4 horizons.
1. Sohsan quartzite, 50 to 100 m. thick, white to light gray quartzite containing round pebbles of white quartzite and resting on gray gneiss of Taihakusan series.



List of Fossils

- Tanyo 4. Tsuibon limestone
Small ormoceroid, gen. et sp. indet.
- Tanyo 5. *Dictyites* zone
Eoorthis shakuotunensis SUN
- Tanyo 7.
- 7A. *Chuangia* zone
Chuangia taihakuensis KOBAYASHI (Pygidium)
 - 7B. *Chuangia* zone
Billingsella pumpellyi WALTER
 - 7C. *Dictyites* zone
Dictyites longicauda KOBAYASHI (Pygidium)
Iddingsia orientalis KOBAYASHI, new species.
Hamashania (?) sp.
 - 7D. Tomkol shale
Finkelburgia saishoensis (KOBAYASHI)
 - 7E. *Dictyites* zone
Plethometopus longispinus KOBAYASHI, new species
 - 7F. Chikunsan shale
Ormoceroid, gen. et sp. indet.
- Tanyo 9. *Dictyites* zone
Kingstonia parallela KOBAYASHI, new species.
Saukid, gen. et sp. indet.
- Tanyo 10. Tomkol shale
Finkelburgia saishoensis (KOBAYASHI)

List of Localities

- Tanyo 4. Kich'on-ni, Kūmgong-ni, Taegang-myōn, Tan'gyang-kun, Ch'ungch'ōng-bukto. 忠清北道丹陽郡大崗面金谷里基村里.
- Tanyo 5. Ditto.
- Tanyo 7. Valley in the north of Hyōnch'ōn-ni, Tan'gyang-myōn, Tan'gyang-kun. Ch'ungch'ōng-bukto. Ca 3 km. north-east of Tan'gyang town and

about 1200 m. west of Sürūmsan. 忠清北道丹陽郡丹陽面玄川里北方の谷。丹陽邑北東方約 3 軒瑟哈山西方 1200 米。

Tanyo 9. West side at the mid-way between Song-hyōn and Kosuri, Kagong-myōn, Tan'gyang-kun, Ch'ungch'ōng-bukto. 忠清北道丹陽郡佳谷面松峴，古藪里中間西側。

Tanyo 10. Northwest end of Koūm-dong village, Kagong-myōn, Tan'gyang-kun, Ch'ungch'ōng-bukto. 忠清丹道陽郡佳谷面古音洞部落北端。

Family Ellipsocephalidae

MATTHEW, 1887

Subfamily Kingstoniinae

KOBAYASHI, 1933

(Family Plethopeltidae

RAYMOND, 1937)

Genus *Kingstonia* WALCOTT, 1924

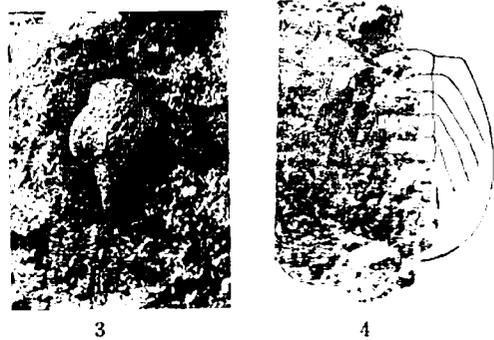
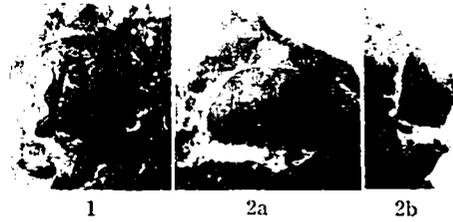
It is a question whether three Wanwanian species of *Kingstonia* are correctly located at the genus, because they occur in the too high beds. Nevertheless, the associated pygidium of *K. semicircularis* is evidently more allied to that of *Kingstonia* than the pygidium of *Leiocoryphe*. It is probable that the Wanwanian forms belong to a genus distinct from *Kingstonia*, *Bynumia* (WALCOTT, 1924), *Leiocoryphe* (CLARK, 1924), or *Stratocephala* (RAYMOND, 1937).

Kingstonia parallela KOBAYASHI,

new species.

Text-figures 2a-b.

Description.—Cephalon semi-circular, regularly and strongly convex, culminating toward a point a little posterior



Explanation of Text-figures

Fig. 1. *Iddingsia orientalis* KOBAYASHI, new species. Tanyo 7; $\times 2$

Figs. 2a-b. *Kingstonia longispinus* KOBAYASHI, new species. Dorsal and Lateral views: Tanyo 9; $\times 3$

Fig. 3. *Plethometopus spiniferus* KOBAYASHI, new species. Tanyo 7; $\times 4$

Fig. 4. *Humashania* (?) sp. Tanyo 7; $\times 1.5$

to center; no glabellar furrow; eyes and facial sutures indiscernible; occipital furrow impressed very faintly; breadth of glabella marked only by a pair of pits on occipital margin; cheeks narrower than a half of glabella; genal end pointed, but not protruded into a spine; surface smooth.

Comparison.—This has a broader glabella than any of the three Wanwanian species of *Kingstonia* (?). It looks very similar to *Leiocoryphe platycephala* KOBAYASHI (1935) from Nevada and *L. transversa* RASETTI (1944). This species is easily distinguished from them by its nearly straight anterior

and posterior margins which are subparallel to each other.

Occurrence:—Tanyo 9.

Genus *Plethometopus* ULRICH, 1931

Plethometopus longispinus

KOBAYASHI, new species

Text-figure 3.

Description:—Cranidium subtriangular, but truncated in front, gently convex and practically unfurrowed except a very shallow occipital furrow; nuchal spine stout, very long, somewhat angulated along the axis and more or less depressed on both sides of its root where it is well expanded laterally. The lateral outline is somewhat incised near the mid-length of the cranidium where a small eye may be present, but it is not clearly discernible. The facial suture appears possibly proparian, but the specimen is not so well preserved that this nature can be warranted.

In the narrow outline of the cranidium this species agrees better with *Stenopilus* than *Plethometopus*. In the low convexity of the cranidium and the presence of a nuchal spine it is quite distinct from the hitherto known species of *Stenopilus* and more allied to *Plethometopus*. The spine is, however, unusually long. *Arapahoia* MILLER, 1936, i. e. *Hesperaspis* STOYANOW, 1936, has such a spine, but the glabella is always distinctly outlined. The facial suture is opisthoparian in *Arapahoia*, *Stenopilus* and *Plethometopus*. It turns out a new genus, if its proparian suture be ascertained.

Occurrence:—Tanyo 7E.

Family Solenopleuridae ANGELIN, 1854

Subfamily Dokimocephalinae

KOBAYASHI, 1935

(Family Burnetiidae RESSER, 1942)

Genus *Iddingsia* WALCOTT, 1924

Iddingsia orientalis KOBAYASHI,
new species

Text-figure 1.

Description:—Glabella large, convex, conical, truncated in front, and provided with two pairs of strong oblique furrows; anterior glabellar furrows rudimentary, and visible as pits only by cross light; occipital furrow profound; occipital ring thickened mesially; fixed cheeks very narrow; eyes medium in size and set close to glabella at its mid-length; preglabellar field gently inclined and divided into a fontal limb and rim of subequal length; rim nearly flat; facial sutures diagonally issuing from eyes; test rough, but non-granulose.

Comparison:—The glabella outline is subsquare in this species, but it is well rounded in front in *I. robusta* (WALCOTT) as well as *I. similis* (WALCOTT). The frontal border is often broader than the frontal rim in *Iddingsia* (RESSER, 1942). It resembles *Maladioides* in the glabellar aspect, but the fixed cheek is much narrower.

Occurrence:—Tanyo 7C.

Genus *Berkeia* RESSER, 1937

Berkeia shantungensis (KOBAYASHI)

1935. *Iddingsia* (?) *shantungensis* KOBAYASHI, *Japan. Jour. Geol. Geogr.*, Vol. 12, p. 25, pl. 6, fig. 4.

In this species the frontal rim is less than half the length of the frontal limb and gently convex, instead of nearly flat in *Iddingsia*. In these aspects and others it fits in *Berkeia*. The relatively small glabella is its important distinction from

American species of the genus.

Occurrence:—*Tsinaia* zone; west of Tsinanfu, Shantung.

Family Dikelocephalidae MILLER, 1887

Subfamily Saukinae

ULRICH and RESSER, 1933

Genus *Hamashania* KOBAYASHI, 1942

1942. *Hamasania* KOBAYASHI. *Jour. Geol. Soc. Japan*, Vol. 49, p. 118.

Insofar as I am aware, *Mareda* is the closest relative to this genus. They have similar long multisegmented pygidia, but the pygidium of *H. pulchra* can be distinguished from that of *M. mukazegata* KOBAYASHI (1942), in its subquadrate outline, posterior expansion, a smaller number of axial rings, more flattened pleural lobes, absence of interpleural grooves and presence of a narrow marginal rim. They are contemporaries. It is further noteworthy that the fragmentary cranidium associated with the type pygidium of *Hamashania pulchra* agrees with that of *Lichengia onigawara* KOBAYASHI (1942) in the broad glabella, strong posterior furrow and especially in the large posterior plapebral lobe.

Distribution:—Daizanian or middle Upper Cambrian of Eastern Asia (Jehol and ? South Korea).

Hamashania (?) sp.

Text-figure 4.

Though fragmentary, this pygidium is of special interest because it shows close affinity to the rare species, *Hamashania pulchra* in the long outline and very oblique and flat-topped pleural bands. The axial lobe, however, tapers more slowly in this species than in that

species.

Occurrence:—Tanyo 7C.

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340. "MONOPHYLLITES" ARAKURENSIS SP. NOV.
FROM THE MAIZURU ZONE*

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舞鶴地帯の "Monophyllites" arakurensis n. sp.: 佐川期の難波江層群に非整合に被われる荒倉層から産した Monophyllitidae に属する菊石2種の記載をした。この菊石は Neo-Trias を示すものと思われ、Meso-Trias の藤ノ平期 (蔵法院層群) より新しいものである。さきに両期の間荒倉期 (earliest Carnian or Ladinian-Carnian) を設けることを提案したが、これはそれを特徴づけるものである。 中 沢 圭 二

Geological Note

The Arakura formation consisting mostly of shales and sandy shales more than 70 m thick is distributed in small patches at Arakura and Kongoin, Maizuru City, Kyoto Prefecture. It is overlain disconformably by the Sakawan (= Carnian) Nabae group, and is assumed to be in fault-contact with the Permian Maizuru group. The Arakura contains some marine animal fossils such as "Monophyllites" arakurensis sp. nov., Monophyllites ? sp. indet., Halobia ? sp., Palaeoneilo sp., Nuculopsis (Palaeonucula ?) sp., Lima sp., Psioidea spp. α , β , Spiriferina sp., gastropods and bryozoans. As will be stated below, "Monophyllites" arakurensis and M.? sp. suggest the Carnian age of this formation rather than Ladinian. Furthermore, Psioidea sp. α is closely related to the Oretian (=lower Carnian) P. conjuncta HECTOR from New Zealand. From these fossil evidences

the Arakura formation is considered to be younger than the Zohôin group in Shikoku, the type of Fujinohiran, which is characterized by an undoubted late Ladinian faunule composed of Protrachyceras aff. archelaus (LAUBE), Monophyllites sp., Daonella kotoi MOJSISOVICS, D. sakawana MOJ., etc. On the other side, the Arakura formation is evidently older than the superimposed Sakawan Nabae group. From these facts the writer recently proposed the Arakuran age between the Fujinohiran and the Sakawan**. This article treats with two species of ammonite among the fossils mentioned above.

Description of Species

Ammonoidea

Family Monophyllitidae SMITH

Genus Monophyllites, MOJSISOVICS

** NAKAZAWA, K. (1958): On the Triassic Arakura formation and a proposal of the Arakuran Age. *Earth Science (Chikyu-kagaku)*, No. 36.

* Received Oct. 5, 1957; read at the 67th Meeting of the Palaeontological Society of Japan, Sept. 28, 1957, at Kyoto.

"Monophyllites" arakurensis

NAKAZAWA, sp. nov.

Plate 31, Figures 1a-d, Text-figure 1.

Diagnosis:—Shell large in size, rather evolute. Whorls compressed, elliptical, with a little convex flank and arched venter. Surface covered by nearly straight radial striae growing stronger towards the ventral and developing into distinct ribs on the periphery, where the ribs seem to be projected backward. Suture-line monophyllic, deeply intended and more subdivided than in *Monophyllites* s. s.



Text-fig. 1. Reconstructed suture-line of "*Monophyllites*" *arakurensis* n. sp.

Remarks:—As the specimens at hand are imperfect and, further, strongly crushed by later crustal movements,

the specific characters are not fully known. The partly preserved suture-line is more developed than in *Monophyllites* s. s., and its general aspect is much similar to that of *Mojsvarites*, especially, the lower Carnian *M. eugyrus* (MOJSOVICS) (SPATH, 1934, p. 310, text-fig. 105 a). However, the species under consideration is easily distinguished from the latter by fairly strongly developed ornaments, inasmuch as *Mojsvarites* has a nearly smooth shell. In this point the species is somewhat similar to *Monophyllites* s. s., but differs in the stronger sculptures, especially, on the periphery. The backward projection of the ribs reverse to the striation of *Monophyllites* may have been caused by secondary deformation, and the radials are supposed to be nearly straight on the venter as well as on the flank. This species undoubtedly belongs to a new genus in Monophyllitidae, an offshoot from *Monophyllites*-stock, but it is tentatively placed in *Monophyllites*, because the sample is too imperfect for establishing a new genus. The advanced suture-line and developed ornament suggest its age be Neo-Triassic.

Occurrence:—From the Arakura formation at Arakura, Maizuru City.

Explanation of Plate 31

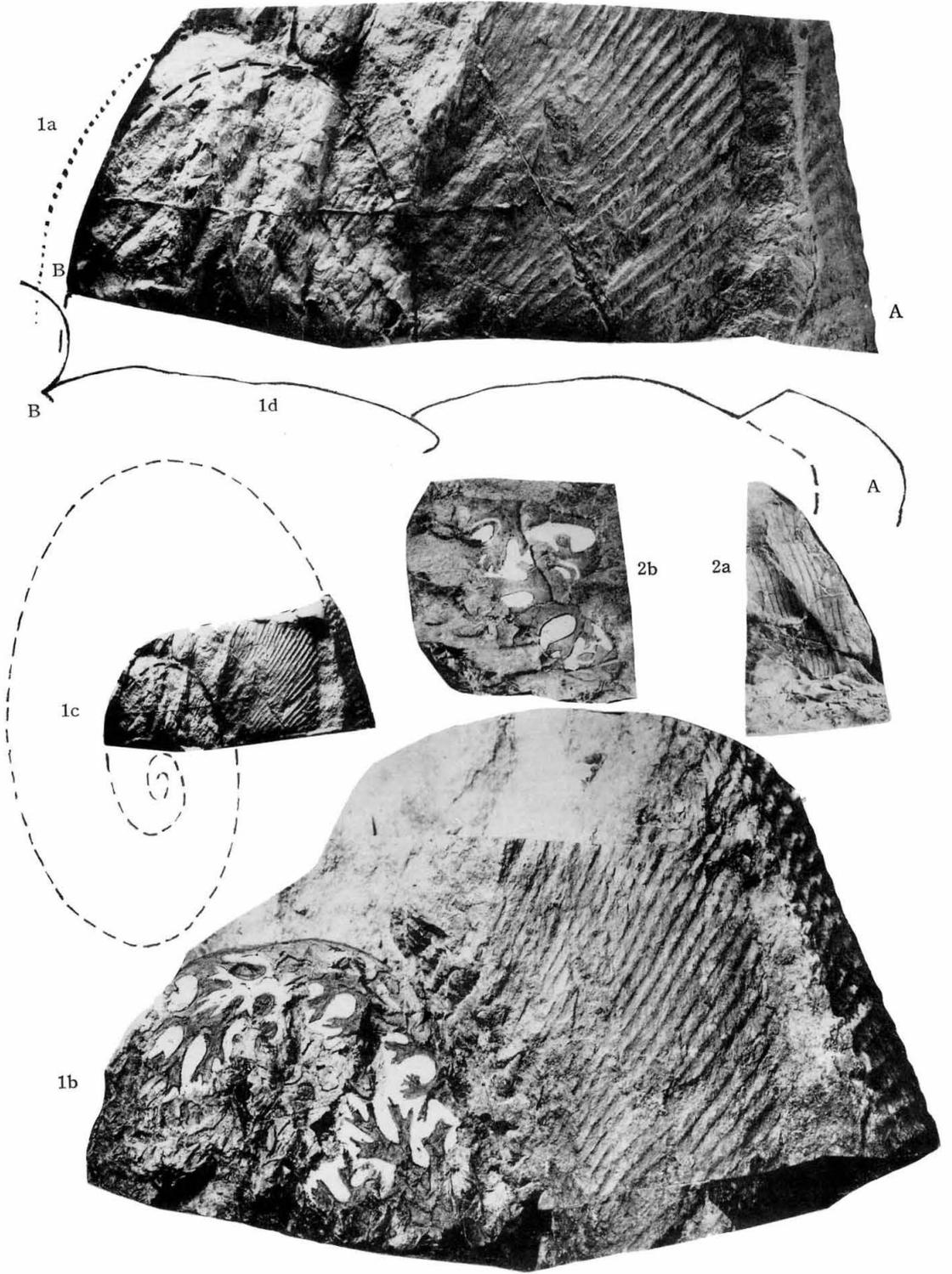
Figs. 1a-d. "*Monophyllites*" *arakurensis* NAKAZAWA n. sp.

- 1a. Holotype (JM. 10456), clay cast of the external mould, lateral view, the Arakura formation at Arakura, Maizuru City. $\times 1$.
- 1b. External cast of the outer volution and internal mould of the preceding volution with suture-lines, the same specimen, lateral view. $\times 1$.
- 1c. Restored figure of the same specimen. $\times 1/3$.
- 1d. Excentric cross-section of the same; the shell has been crushed and partly detached near the venter. $\times 1$.

Figs. 2a-b. *Monophyllites*? sp. indet.

- 2a. Fragmental external mould (JM. 10457). Loc. ditto. $\times 1$.
- 2b. Internal mould with a part of suture-line of the same specimen. $\times 1$.

All illustrated specimens are kept in the Geological and Mineralogical Institute, University of Kyoto.



Age:—Arakuran (earliest Carnian or Ladinian-Carnian).

Reg. No. JM. 10456.

Monophyllites ? sp. indet.

Plate 31, Figures 2a-b.

A fragmental outer and an inner moulds are in hand. The surface is ornamented by slightly sigmoidal growth striae like *Monophyllites* s. s. The suture-line, though very imperfect, shows monophyllic characters, and is highly intended.

Although the surface striation is

typically of *Monophyllites* s. s., the strongly intended lateral lobes may indicate the more intimate relation to the preceding species or *Mojsvarites*. The specific comparison is, however, almost impossible because of the imperfect state of preservation.

Occurrence and Age:—ditto.

Reg. No. JM. 10457.

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PROCEEDINGS OF THE PALAEOONTOLOGICAL SOCIETY
OF JAPAN

〔日本古生物学会 1957 年々会〕 1958 年 2 月 1 日 東北大学 理学部地質学古生物学教室に於いて開催した(参会者 34 名)。1957 年 4 月 6 日の日本地質学会総会に於いて本会を独立の学会とすることが承認されたので、本会々則及び出版規定の改正案を本会総会にはかり、審議の結果これを可決した。なお、年会に於ける講演者並びに講演題目は次の通りである。

1. *Pseudoschwagerina miharanoensis*, a new Permian Fusulinids and its Growth and Form (代読).....Saburo AKAGI
 2. Fusulinids from the Funafuseyama Limestone: Part 2 (代読).....Hisayoshi IGÔ
 3. 北海道留朋郡小平村の白亜紀有孔虫 高柳洋吉
 4. 日本の古第三紀有孔虫とその堆積環境 浅野 清
 5. 房総半島並に三浦半島の第三系微化石層位学的研究〔その1〕浮遊性有孔虫化石とその層位学的意味.....浅野 清・松永孝・高柳洋吉・樋口 雄・菊池良樹・鎌田浩志・小高民夫・早坂祥三・片岡 純・中川久夫
 6. Japanese Halysitidae.....Takashi HAMADA
 7. 日本の石炭系の統区分と化石帯について..... 藤本治義
 8. On some Permian Corals from the Hida Massif (代読)Hisayoshi IGÔ
 9. 千葉県大谷層の Bryozoa について (代読) 高橋直二
 10. On the Cambrian Gastropods from Korea.....Teiichi KOBAYASHI
 11. Some Ordovician Gastropods from the Mun'gyong or Bunkei District, South Korea.....Teiichi KOBAYASHI
 12. The Lower and Middle Cretaceous Trigonians from Wakayama, Oita and Kumamoto Prefectures, West Japan Teiichi KOBAYASHI and Mitsuo NAKANO
 13. Notes on Some Species of Tertiary Mollusca from the Joban Coal-field, Japan (代読)Katsumi HIRAYAMA
 14. On the Molluscan Fauna from the Tertiary Formation of Kami-saroma, Kitamino-kuni, Hokkaido (代読)
 15. Wataru HASHIMOTO and Saburo KANNO
仙台附近中新統産 Pectinidae; その 13, *Pecten (Patinopecten) paraplebejus* NOMURA and HATAIKoichiro MASUDA
 16. 島根県中新統からの *Patinopecten inamurai* MASUDA n. sp. について Koichiro MASUDA
 17. Orientation of Pelecypodal Fossils (Part 1) (代読)Shigeru AOKI and Takaichiro OMORI
 18. Some Cambro-Ordovician Fossils from the Tan'gyang or Tanyo District, South Korea.....Teiichi KOBAYASHI
 19. A Gotlandian Nautiloid from the Hida Plateau in JapanTeiichi KOBAYASHI
 20. A New Find of Devonian Ostracoda from Fukuji District...Takashi HAMADA
 21. 中新世 *Carcinoplax* の再分類.....今泉力蔵
 22. On the Echinoid Fossil from the Nakaminato Formation (Upper Cretaceous) along the Coast of Nakaminato City, Ibaraki PrefectureToshio SAITO
 23. A New Miocene Tapirid..... Fuyuji TAKAI and Tadaichi HAYASHI
 24. A Restudy of the Genus *Physoporella* (代読)Riuji ENDO
 25. On *Schizoneura manchuriensis* KONNO and its Fructification from Tsaichia Series (Upper Permian) in Penhsihu Coal-field, N. E. China.....Enzo KONNO
 26. On the Genus *Cycadeoidea* from Hiroshima-ken, Japan.....Seido ENDO
 27. A Revision of the Miocene Fern of *Osmunda tsunenomoriensis* MATSUO from Fukui Prefecture, Inner-side of Central Japan.....Hidekuni MATSUO
- 特別講演
南極の底質と南米旅行について
(幻灯使用)新野 弘
ヨーロッパの自然史博物館
(幻灯使用)鹿間時夫
第 9 回太平洋学会議に出席して
(幻灯使用)小林貞一

日本古生物学会会則
(1958年2月1日総会にて改正)

- 第1条 本会は日本古生物学会という。
- 第2条 本会は古生物学およびこれに関係ある諸学科の進歩および普及を計るのを目的とする。
- 第3条 本会は第2条の目的を達するため次の事業を行う。
1. 会誌そのほかの出版物の発行。
2. 学術講演会の開催。
3. 普及のための採集会・講演会そのほかの開催。
- 第4条 本会の目的を達するため総会の議を経て本会に各種の研究委員会を置くことができる。
- 第5条 本会は古生物学およびこれに関係ある諸学科に興味を持つ会員で組織する。
- 第6条 会員を分けて普通会員・特別会員・賛助会員および名誉会員とする。
- 第7条 普通会員は所定の入会申込書を提出した者につき評議員の議によって定める。
- 第8条 特別会員は本会に10年以上会員であり古生物学について業績のあるもので、特別会員5名の推薦のあったものにつき評議員会の議によって定める。
- 第9条 賛助会員は第2条の目的を賛助する法人で評議員会の推薦による。
- 第10条 名誉会員は古生物学について顕著な功績のある者につき評議員会が推薦し、総会の決議によって定める。
- 第11条 会員は第12条に定められた会費を納めなければならない。会員は会誌の配布を受け第3条に規定した事業に参加することができる。
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- 第15条 本会の役員は会長1名、評議員15名とし、うち若干名を常務委員とする。任期は総て2年とし再選を妨げない。
会長の委嘱により本会に幹事および書記若干名を置くことができる。
常務委員は評議員会において互選される。評議員は特別会員の中から会員の通信選挙によって互選される。
- 第16条 会長は特別会員の中から評議員会において選出され、本会を代表し会務を管理する。
会長に事故ある場合は会長が臨時に代理を委嘱する。
- 第17条 本会は毎年一回定例総会を開く。その議長には会長が当り本会運営の基本方針を決定する。
総会の議案は評議員会が決定する。
会長は必要があると認める時は臨時総会を召集する。総会は会員の十分の一以上の出席をもって成立する。
会長は会員の三分の一以上の者が会議の目的たる事項および召集の理由を記載した書面をもって総会召集の請求を受けた場合は臨時総会を召集する。
- 第18条 総会に出席しない会員は他の出席会員にその議決権の行使を委任することができる。但し、欠席会員の議決権の代行は1人1名に限る。
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- 第20条 会長および評議員は評議員会を組織し、総会の決議による基本方針に従い運営要項を審議決定する。
- 第21条 常務委員は常務委員会を組織し評議員会の決議に基づいて会務を執行する。
- 第22条 本会の会計年度は毎年1月1日に始まり12月31日に終る。
- 第23条 本会会則を変更するには総会に付議し、その出席会員の三分の二以上の同意を得なければならない。
- 付 則 1) 評議員会の議決は総て無記名投票による。
2) 本会則は昭和33年2月1日から有効である。
3) 特別会員は今回に限り第8条に従いとりあえず現評議員会が決定する。

日本古生物学会報告紀事出版規定

(1958年2月1日改正)

I. 投稿規定

1. 原稿は日本古生物学会の年会または例会において講演（代読を認める）したものに限る。
2. 原稿は散文に限り、タイプライター用紙（22.5×27.5 cm）に1行おきに明瞭にタイプライトし、学名はイタリックに著者自身指定する。
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日本古生物学会例会通知

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第71回例会	京都大学	1958年9月27日	1958年9月6日
1958年総会・年会	東京大学	1958年12月6.7日	1958年11月15日

1958年6月12日 印刷

1958年6月20日 発行

定価 1部 250圓

東京大学理学部地質学教室内

日本古生物学会

編集者 小林 貞 一

発行者 市川 健 雄

(振替口座東京84780番)

印刷者 東京都港区芝浦1丁目1

株式会社 ヘラルド社 富田 元

購読申込は下記の賣捌店へ申込下さい

東京都千代田区神田神保町1丁目7

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