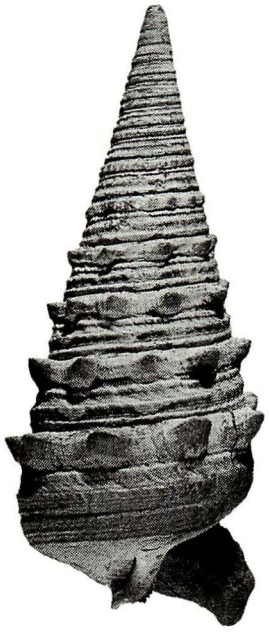
ISSN 0031-0204

日本古生物学會報告・紀事

Transactions and Proceedings of the Palaeontological Society of Japan

New Series No. 145



日 本 古 生 物 学 会

Palaeontological Society of Japan

April 30, 1987

The fossil on the cover is *Vicarya yokoyamai* Takeyama, an Early Middle Miocene gastropod from the Kurosedani Formation at Kakehata, Yatsuo-cho, Nei-gun, Toyama Prefecture, central Japan (Collected by T. Kotaka and K. Ogasawara, IGPS No. 99075, photo by S. Ohtomo and Y. Kikuchi, x0.9).

All communication relating to this journal should be addressed to the

PALAEONTOLOGICAL SOCIETY OF JAPAN

% Business Center for Academic Societies,

Yayoi 2-4-16, Bunkyo-ku, Tokyo 113, Japan

Trans. Proc. Palaeont. Soc. Japan, N. S., No. 145, pp. 1–9, 5 Figs., April 30, 1987

825. LITTLE KNOWN AMMONITE *GRANDIDIERICERAS* FROM HOKKAIDO
(STUDIES OF CRETACEOUS AMMONITES FROM HOKKAIDO–LVIII)*

TATSURO MATSUMOTO

c/o Department of Geology, Kyushu University 33, Fukuoka 812

and

RINJI SAITO

S. G. Giken, 2-11 Ono-ue, Kumamoto 862

Abstract. The ammonite genus *Grandidiericeras* of the Puzosiinae (Desmoceratidae) was represented by only a single species which occurred rarely from the Campanian (Upper Cretaceous) of Madagascar. We describe in this paper another new species on the basis of several large specimens obtained or observed years ago from the Coniacian of the Ikushumbets district, Hokkaido. This denies the previous thoughts that the genus was a special offshoot of the Puzosiinae in a local province, although we should search for more material and reliable evidence to make clear its phylogenetic origin.

Introduction

More than 50 years ago one of us (R. S.) was devoting himself to a study of Cretaceous strata and ammonites of the Ikushumbets (now called Mikasa) district when he was a student of Hokkaido University (Sapporo). The results were written in two volumes of manuscripts which have not been published but kept in the university. Taxonomic results in them are now out of date and some of the collected specimens are missing. There is, however, a large ammonite which has been kept carefully. This has been noticed by the other of us (T. M.), who has recently studied it in comparison with a similar ammonite stored in Tohoku University (Sendai). In due course, we have cooperated with each other to replenish the old collections with new knowledge that the large ammonites are referred to *Grandidiericeras*, little known genus of the Puzosiinae. This paper is to describe the result of our study.

* Received March 19, 1986; read June 15, 1986 at Kitakyushu Museum of Natural History.

Palaeontological description

Family Desmoceratidae Zittel, 1895

Subfamily Puzosiinae Spath, 1922

Genus *Grandidiericeras* Collignon, 1961

Type species:–*Grandidiericeras grandidierorum* Collignon, 1961 by original designation.

Diagnosis:–Fairly involute and rather narrowly umbilicate shell, with high whorl and narrowly arched venter. Numerous crowded ribs of unequal length but of similar strength; long ones arising at or near the umbilical rim and gently flexuous on the flank; shorter ones branched or intercalated at various points of the flank; all the ribs curved forward on the outer part to a certain degree depending on species. Constriction absent or very faint on outer whorls.

Body-chamber of large macroconch may be broadened, with divergent flanks and broadly rounded venter, and smooth on the surface.

Suture similar to that of *Puzosia*, being finely and deeply incised in mature shell.

Comparison and remarks: As Collignon (1961) pointed out, this genus is similar to *Austiniceras* in shell-form, but it does not show such a distinct differentiation of major and minor ribs as that of *Austiniceras*. It seems to have a peculiar shell-form of macroconch. It is distinguished from *Mesopuzosia* in its more involution and absence or faintness of constrictions in the main part. Its phylogenetic origin is uncertain, although it was regarded by Collignon as an offshoot from *Austiniceras*.

The genus is represented at present by a few species.

Grandidiericeras nagaoi sp. nov.

Figures 1, 2, 3-1a–1c, 4-1a–1b

Holotype:–GMH. No. 12008, obtained by R. Saito in 1932 from the green sandstone (GS2 of Matsumoto, 1965; 1984) at loc. Ik 966d on the River Ikushumbets, about 500 m downstream from the mouth of the tributary called Kami-ichi-no-sawa, Mikasa district.

Paratype:–IGPS. 98917, without locality record, but its rock matrix is very similar to that of the holotype.

Diagnosis:–Shell very large, consisting of fairly involute whorls which expand with high ratio. Umbilicus narrow for the subfamily, encircled by steep or nearly vertical wall. Whorl higher than broad, elongated ovoid in section, with subrounded umbilical shoulder and gently convex flanks which converge gradually to rather narrowly arched venter.

Ribs gently flexious on flanks, moderately projected on venter, numerous and crowded, consisting of longer and shorter, branched or intercalated ones. No constriction on the observable last whorl of the phragmocone.

Suture of *Puzosia* pattern, having asymmetrically tripartite, large L, which is much deeper than E, smaller and oblique U2 and remarkably descending auxiliaries (suspensive lobe, U3=S).

Body-chamber of probable macroconch much different from phragmocone in having nearly smooth and broad shell with divergent flanks and broadly rounded venter.

Observation:–The holotype is wholly septate and the umbilical seam of the succeeding full one whorl is traced. Should the umbilical ratio (U/D) be assumed as 0.21, the entire shell would be about 900 mm in diameter. The paratype is somewhat larger than the holotype, but still septate.

The ratio of the increase in height is 1.73 and that of radius 1.71 per half a whorl in the holotype. This is very high for the subfamily. Moreover, the outer whorl overlaps two thirds (in height) of the inner whorl. Accordingly, the umbilicus is narrow for the subfamily Puzosiinae, being 21 to 20 percent of the shell diameter in the holotype. The expansion ratio of the whorl height is smaller (1.55) and the umbilical ratio (U/D) is somewhat larger (0.24) in the paratype. This can be regarded as variation.

For some reasons the inner nuclear part of the shell is not well preserved in these two specimens. As far as the well observable outer whorl of the phragmocone is concerned, there are no periodic constrictions nor flares. This is unusual for the Puzosiinae, but a low flare which probably corresponds to a constriction is seen on the inner whorl of the paratype at a point 390° preceding to the preserved end.

The ribs are numerous. In the holotype

Table 1. Measurements (in mm).

Specimen	Diameter	Umbilicus	Height	Breadth	B/H
GMH 12008 (1)	348.5 (1)	70.0 (.20)	176.5 (.51)	~120 (.34)	0.68
GMH 12008 (2)	290.0 (1)	61.0 (.21)	142.0 (.49)	~97 (.33)	0.68
IGPS 98917	545.0 (1)	133.0 (.24)	250.0 (.46)	~168 (.33)	0.67
〃 (−180°)	380.0 (1)	~100. (.26)	~170.0 (.45)	>95	>0.56

(1) at M in Figure 1; (2) at m in the same figure; ~: approximate

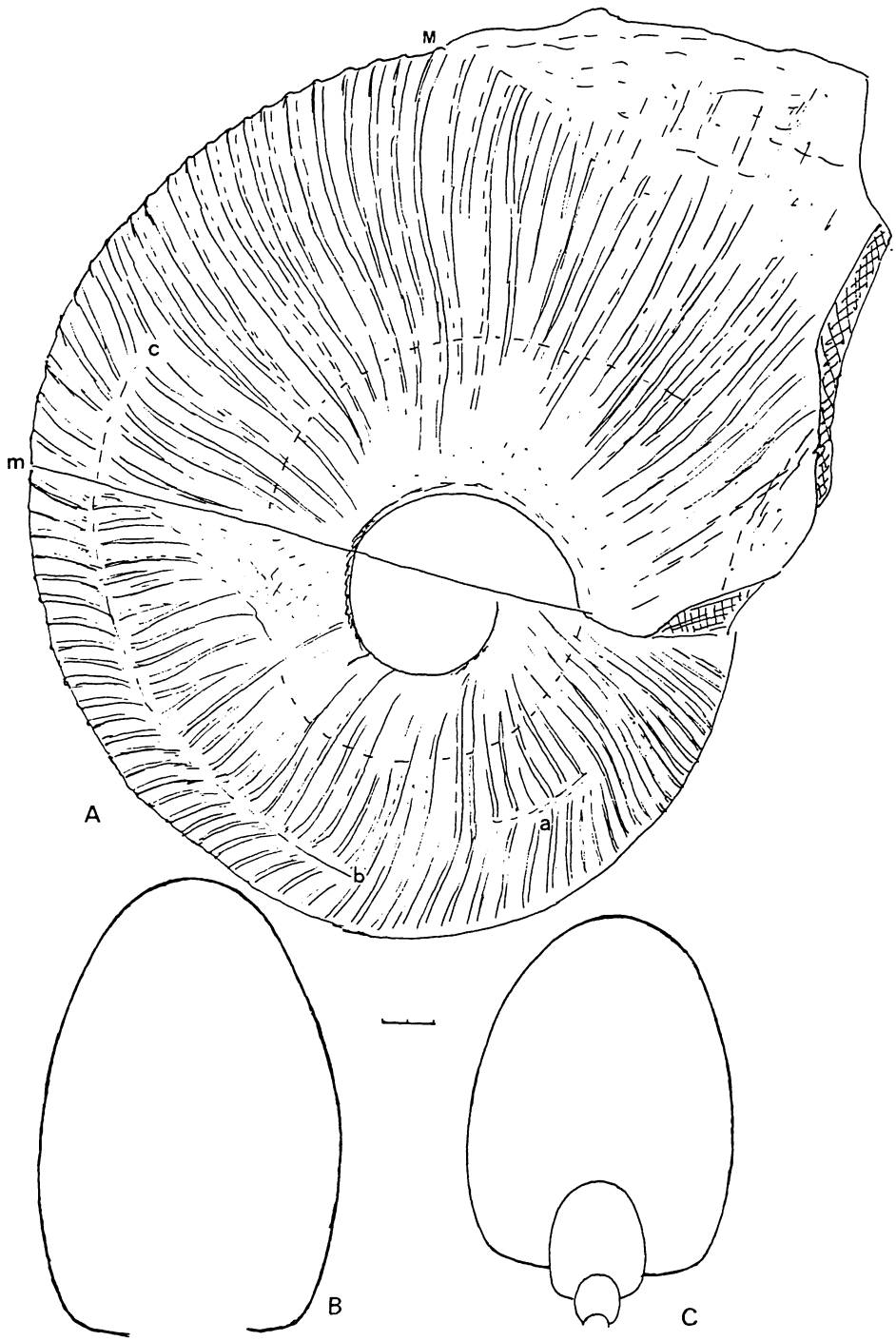


Figure 1. *Grandidiericeras nagaoi* sp. nov.
Diagrams of the holotype: lateral view (A) and whorl-sections (B, C) at M and m. M, m: Two positions of measurements. a and b–c: two places where injury is traced. Scale bar: 20 mm. (T. M. & R. S. *delin.*)

they number 60 on its venter within a half whorl up to point M and 55 up to point m. They are of unequal length, crowded and nearly as narrow as or slightly narrower than the interspaces. Long ribs arise from near the umbilical margin but are not stronger than shorter ones. The shorter ribs are intercalated between or branched from the longer ones on the outer and also on somewhat inner parts of the flank. The mode of ribbing of the paratype looks similar to that of the holotype, although it is somewhat obscured on the weathered internal mould.

The ribs are gently flexuous on the flank and moderately projected on the venter. On the left side of the holotype the normal curvature of the ribs are modified by injuries, at a in Figure 1 and for about 90° from b to c in the same figure. This is a rather rare case, since examples of injured large ammonites of the Puzossinae are very few in our experience, although we know more examples of injured small shells. The paratype has no sign of injury.

Regrettably the smooth body-chamber was not brought back to the institution. There was, however, another huge specimen embedded in the same sandstone. Its phragmocone was quite similar to the holotype, but its body-chamber was extraordinarily broadened, with divergent flanks and a broadly rounded venter, as shown in Figure 2, and was nearly smooth on the surface. This specimen is now missing from the University of Hokkaido Collection.

Comparison and discussion:—On the ground of compressed and fairly involute shell, mode of ribbing and the absence of constrictions or flares on the ribbed outer whorl, this species is assigned to the genus *Grandidiericeras* Collignon, 1961. It is, however, much larger and less compressed than the type species, *G. grandidierorum* Collignon.

One of us (T. M.) once studied the holotype of that species (Collignon, 1961, pl. 17, figs. 1, 1a; this paper Figure 5), MHN. 3915, from the Middle Campanian of Madagascar. Its dimensions at about 30° behind the preserved end and D=149.4 (1), U=41.0 (.27), H=65.2 (.44),

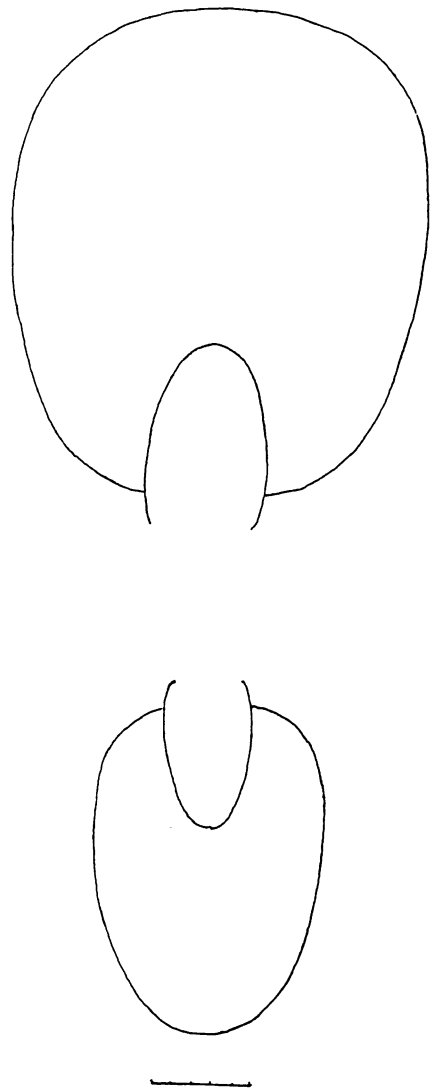


Figure 2. *Grandidiericeras nagaoi* sp. nov. Cross-section of another large specimen from the type locality. Inner whorls may be somewhat distorted. Scale bar: 50 mm. (R. S. *delin.*)

B=31.5 (.21), B/H=0.48. The preserved last part of the body-chamber is somewhat deformed. At about 90° behind the preserved end in the undeformed part B/H is 0.54, being still smaller than that (0.68) of our specimens. The flanks are rather flattened and the venter is narrowly arched in the Madagascar specimen as in typical examples of *Austiniceras*. Owing to unfavourable preservation, the absence or

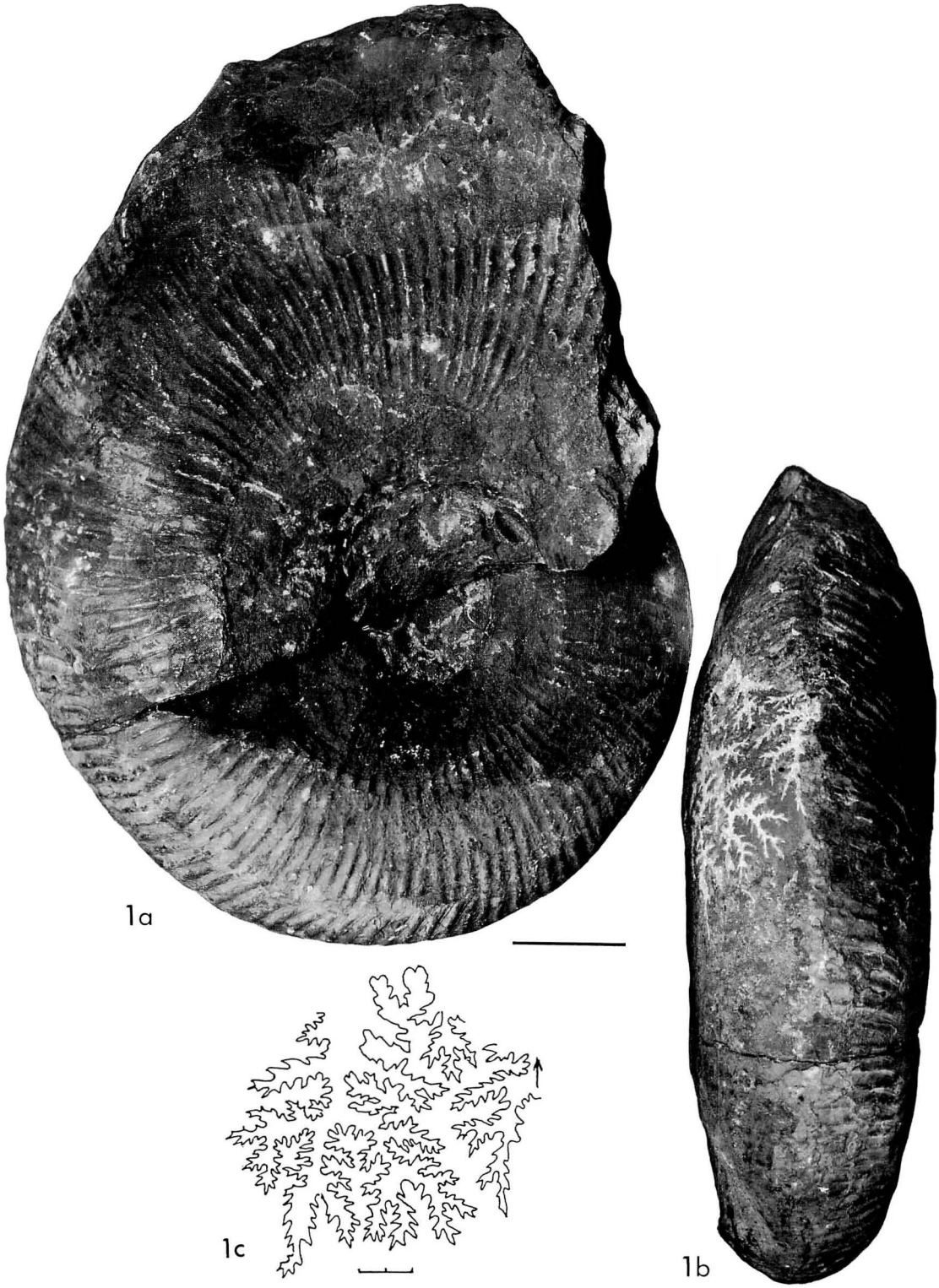


Figure 3. *Grandidiericeras nagaoi* sp. nov.
Lateral (1a) and ventral (1b) views of the holotype, GMH. 12008 from loc. Ik 966d (of T. M.), collected by R. Saito; scale bar: 50 mm; part of suture (1c) drawn by R. S. scale bar: 20 mm.

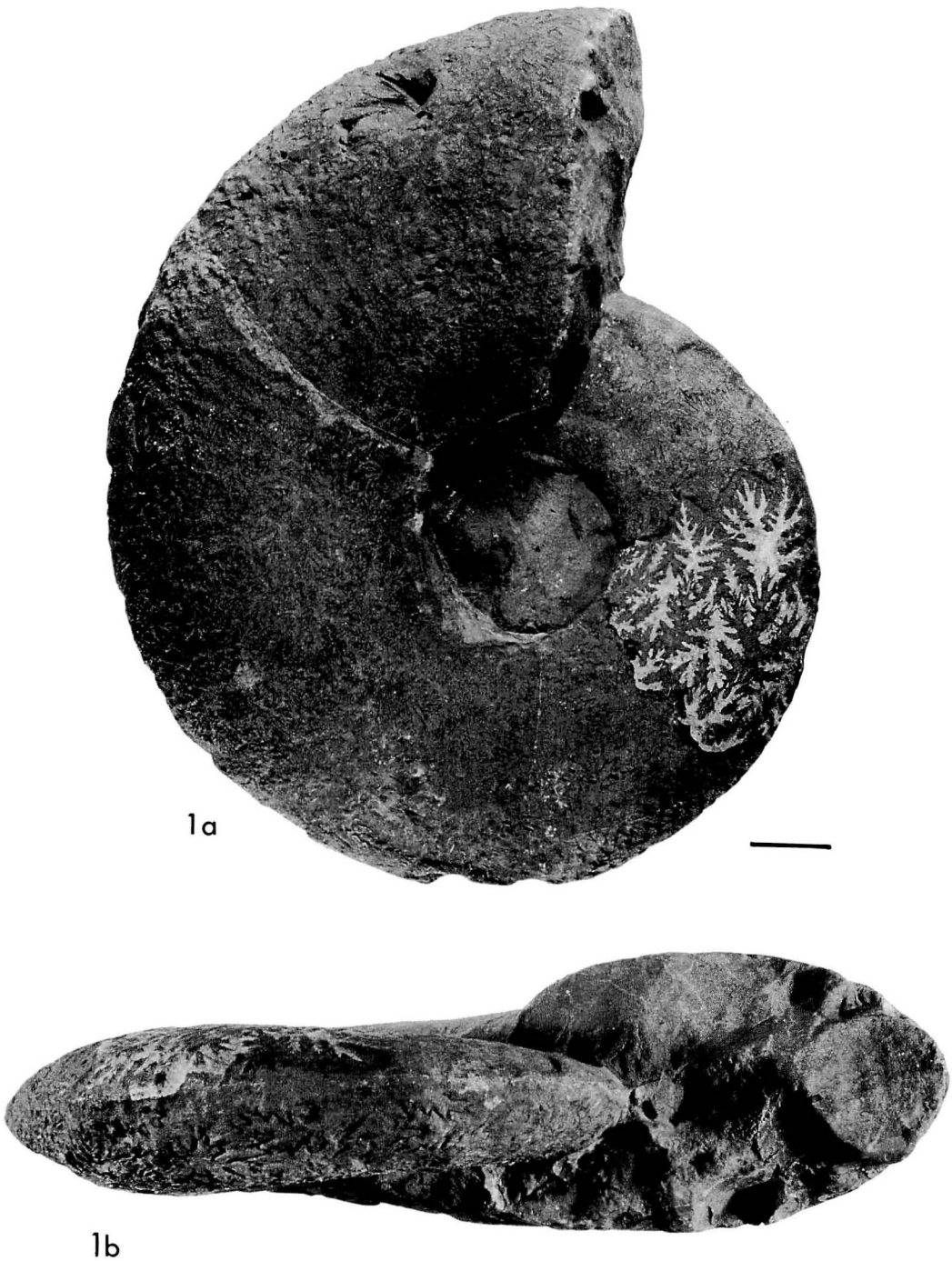


Figure 4. *Grandidiericeras nagaoi* sp. nov.
Lateral (1a) and frontal (1b) views of the paratype, IGPS. 98917; scale bar: 50 mm.

presence of constrictions on the inner whorls of the holotype is not clearly observable. Anyhow, our species is distinct from the species from Madagascar.

Desmoceras montisalbi Laube et Bruder, 1887 (p. 222, pl. 24, figs. 1a, b), from the Turonian of Bohemia, was regarded by Collignon as possibly *Grandidiericeras*, but listed under *Austiniceras* in another page. Its holotype is about 40 cm in diameter and smaller than ours. It seems to have major ribs and accordingly it is probably a species of *Austiniceras*. In fact, Wright and Kennedy (1984, p. 60) listed *D. montisalbi* as a synonym of *A. austeni*, although the Bohemian specimen seems to be too much secondarily compressed for precise identification.

As in the case of *Puzosia* and *Mesopuzosia*, a dimorphic pair must exist in *Grandidiericeras*. The holotype of *G. grandidierorum* is not very large, about 150 mm in diameter, but has a body-chamber. Presumably it may represent an adult microconch, although its apertural margin is not preserved. We presume that the macroconch of that species is larger and may have a broader and smoothed body-chamber, as suggested by our example. This should however, be examined by the actual specimen to be searched for in the future.

In the case of *G. nagaoi*, the large specimens described by us must have been macroconchs. Especially, the much broadened body-chamber illustrated in Figure 2 suggests to us that it is a mature female shell which may have contained a large egg or a number of eggs. Then, what was the microconch which made a pair with this macroconch?

In the Coniacian of Hokkaido, *Mesopuzosia yubarensis* (Jimbo) occurs fairly commonly. It is seemingly similar to the phragmocone of *G. nagaoi* in the compressed and fairly involute shell-form and numerous ribs. On the average, it has a more compressed whorl and wider umbilicus and its ribs are more remarkably projected on the venter. Moreover, the periodic constrictions and flares persist to the adult stage in *M. yubarensis* as in other species of *Mesopuzosia*.

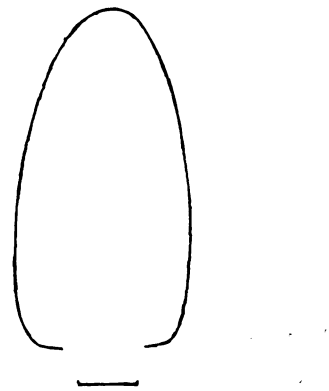


Figure 5. *Grandidiericeras grandidierorum* Collignon.
Whorl-section of the holotype. Scale bar: 10 mm. (T. M. *delin.*)

The large body-chamber of its probable macroconch has not divergent flanks but is suboval in cross section as in other *Mesopuzosia*. Thus *M. yubarensis* has no relation to *G. nagaoi*. We should search for the microconch of *G. nagaoi*.

Occurrence:—The locality of the holotype collected by R. Saito is the same as loc. Ik 966d of Matsumoto (1965, fig. 2). The exposed bed is the green sandstone (marked as GS2) above the zone prolific of *Reesidites minimus* (Hayasaka et Fukada) and assigned to the base of the Conician by Matsumoto (1984, fig. 2). The bed cropped out above the running water of the River Ikushumbets, but it is now submerged under the artificial lake of the Katsurazawa dam. Another specimen illustrated in Figure 2 was also in the same bed and Matsumoto also found still another large specimen of probably the same species at the same locality. It is worthy to note that several huge individuals were embedded in the green sandstone of a restricted exposure. This bed is intercalated between finer silty sediments. It may be allowed to imagine that an environment of somewhat shallow sea with sandy bottom may have been favourable for mature females of this species to come in to set their eggs attached to algae or something grown on this substratum and that they may have died for some reason at this place.

More specimens should be searched for in other places.

Concluding remarks

Although most genera of the Puzosiinae occur commonly and show a widespread distribution in various regions of the world, *Grandidiericeras* has been reported very rarely. It was represented by only two specimens of one species from the Campanian of Madagascar. This situation and its peculiar characters have given us thoughts that it may be a local and special offshoot in the evolutional history of the Puzosiinae.

Now the genus includes at least two species, its distribution is extended to Japan and its stratigraphic range downward to the Lower Coniacian. The mode of occurrence of the described species in Hokkaido denies its true rareness and the scarcity of available specimens are probably due to our inadequate collection. In other words, we should search for more material and reliable evidence to make clear the phylogenetic origin of this kind of little known ammonite.

Acknowledgements

This species is dedicated to the late Professor Takumi Nagao who gave us instructive suggestions when we started to do a research work. We owe much to Professor Makoto Kato of Hokkaido University and Professor Tamio Kotaka of Tohoku University who have afforded facilities for this study, and to Mr. Sumio Kumano, Dr. Kenshiro Ogasawara and Mr. Shohei Otomo for their kind help in the respective institutions. Miss Yoshimi Tanigawa assisted us in preparing the typescript.

Repositories:—Abbreviated as follows in this paper: GMH. Geological & Mineralogical Collections, Hokkaido University, Sapporo; IGPS. Institute of Geology and Palaeontology, Tohoku University, Sendai; MHN. Muséum National d'Histoire Naturelle, Paris.

References cited

Collignon, M. (1961): Ammonites néocrétacées du Menabe (Madagascar). VII-Les Desmoceratidae. *Ann. Géol. Madag.*, vol. 31, p. 1–115, pls. 1–32.

Laube, G. C. and Bruder, G. (1887): Ammoniten der böhmischen Kreide. *Palaeontographica*, vol. 33, p. 215–239, pls. 23–39.

Matsumoto, T. (1965): A monograph of the Collignoniceratidae from Hokkaido. Part 1. *Mem. Fac. Sci. Kyushu Univ., Ser. D*, vol. 16, no. 1, p. 1–80, pls. 1–18.

——(1984): The so-called Turonian-Coniacian boundary in Japan. *Bull. Geol. Soc. Denmark*, vol. 33, p. 171–181.

Wright, C. W. and Kennedy, W. J. (1984): The Ammonoidea of the Lower Chalk. Part 1. *Monogr. Palaeontogr. Soc., London*, p. 1–126, pls. 1–40 (Publ. no. 567, part of vol. 137 for 1983).

Hokkaido 北海道, Ikushumbets〔Ikushunbetsu〕幾春別, Kami-ichi-no-sawa 上一の沢, Katsurazawa 桂沢, Mikasa 三笠.

北海道産未熟知アンモナイト *Grandidiericeras*. この属はマダガスカルの上部白亜系カンパニアン産の1種に基づき Collignon(1961) が Puzosiinae の1属として提唱したが，他に実例が知られていなかった。斎藤が北大在学当時採集し研究した標本及びその他を松本が再検討し，本属の日本における実例とみなしてここに記載した。密巻きで螺環断面は長卵形，長短の肋が多数密集し，挿入又は分岐の短肋よりも長肋はやや多いがその強さに大差がなく，少くも後期にはくびれが発達しない等，本属の特性を示す。模式種 *G. grandidierorum* Collignon よりもはるかに大きく，螺環の幅がやゝ広い。住房では肋は弱化消失し，幅が外方に向けて増大して広い外面をもつ特異な形状を呈する。模式種とは別種で，*G. nagaoi* sp.nov. とした。*Puzosia* や *Mesopuzosia* の場合と同様に，本属にも大小2型のdimorphismがあるなら，ここに報告の実例はマクロコンクであろう。しかし対応するミクロコンクは未詳である。

桂川ダム建設前に幾春別川本流を横断する緑色砂岩層（loc. Ik966d の GS 2）中に複数個体産した。この砂岩層は Matsumoto(1984) がコニアシアンの基底部としたものである。

マ島でも日本でも *Grandidiericeras* の比較的初期の性状が未詳であり，このため本属の起源や系統上の位置づけは明らかでない。また模式種のマクロコンクの住房の性状が未詳なことも弱点で，今後の探究が必要である。

松本達郎・斎藤林次

Trans. Proc. Palaeont. Soc. Japan, N. S., No. 145, pp. 10–15, 3 Figs., April 30, 1987

826. *POIKILOSAKOS* (OLDHAMINIDINA, BRACHIOPODA) FROM THE PERMIAN OF NORTHEAST JAPAN*

JUN-ICHI TAZAWA

Department of Earth Sciences, Faculty of General Education,
Niigata University, Niigata 950-21

and

YUKIHIRO TAKAIZUMI

Koyodai 4-33-22, Izumi, Miyagi Prefecture 981-31

Abstract. The oldhaminoid brachiopod genus *Poikilosakos* is recorded for the first time from the Japanese Permian. The new species *Poikilosakos kamiyassensis* is described from the Middle Permian Kanokura Formation (Member KN1) of Kamiyasse, southern Kitakami Mountains, northeast Japan. This species is a large, transversely wider *Poikilosakos* that may be an advanced form, closely related to *Poikilosakos tschernyschewi* Fredericks, 1926 from the Lower Permian of the central Ural Mountains, U.S.S.R.

Introduction

The purpose of this paper is to indicate the presence of a primitive and rare oldhaminoid *Poikilosakos* in the Middle Permian of Japan. The specimens described here as *Poikilosakos kamiyassensis*, sp. nov. were collected from a dark grey shale in the lower part of the lower Kanokura Formation (Member KN1; *Monodiexodina kofuganensis* Zone of Minato *et al.*, 1978) at locality KF212 in the middle Matashirosawa Valley, a small tributary of the Shigejisawa Valley, Kamiyasse, Kesennuma City, Miyagi Prefecture, northeastern Honshu (Figure 1).

In the Kamiyasse district the Kanokura Formation is about 1,100 m in thickness (Tazawa, 1973, 1976), and can be subdivided as follows in descending order (Figure 2):

KN4: Shales with layers of sandstone and limestone (320 m);

KN3: Massive limestones with layers of conglomerate, sandstone and shale (130 m), containing *Lepidolina multiseptata, Verbeekina verbeeki, Codonofusiella explicata* and *Parawentzelella* (*Parawentzelella*) *canalifera*;

KN2: Sandstones and arenaceous or argillaceous, impure limestones (150 m), with numerous fossils of fusulinids and brachiopods such as *Monodiexodina matsubaishi, Chusenella chosiensis, Streptorhynchus pelargonatus, Stenoscisma humbletonensis* and *Spiriferellina cristata*;

KN1: Shales with layers of sandstone and conglomerate (500 m).

Most of the Member KN1 is poorly fossiliferous, but fossils are rich at certain levels. The shale containing *Poikilosakos* and other brachiopods, bryozoans and trilobites is about 4 m in thickness, situated at 130 m below the base of the Member KN2 composed of a greenish-grey, fine-grained sandstone with *Monodiexodina matsubaishi*.

The genus *Poikilosakos* was proposed by Watson in 1917 with *Poikilosakos petaloides* Watson from the Wayland Shale (Graham Formation) at Graham, Young County, north-central Texas as type species. And the following seven

* Received September 1, 1986

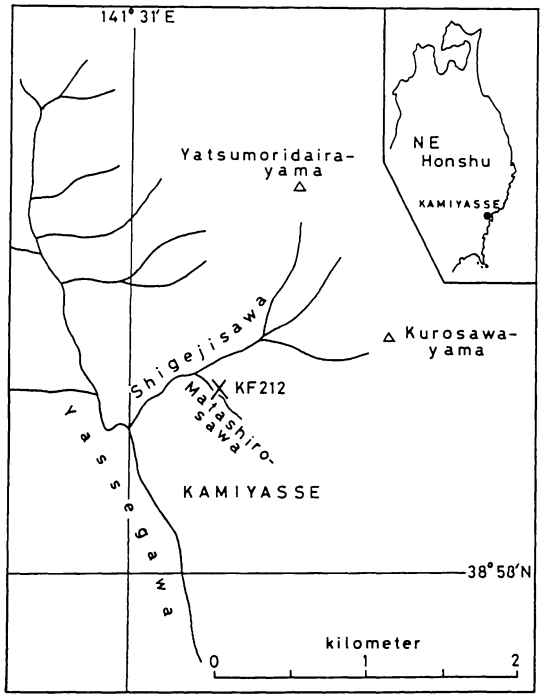


Figure 1. Map showing the fossil locality (KF212).

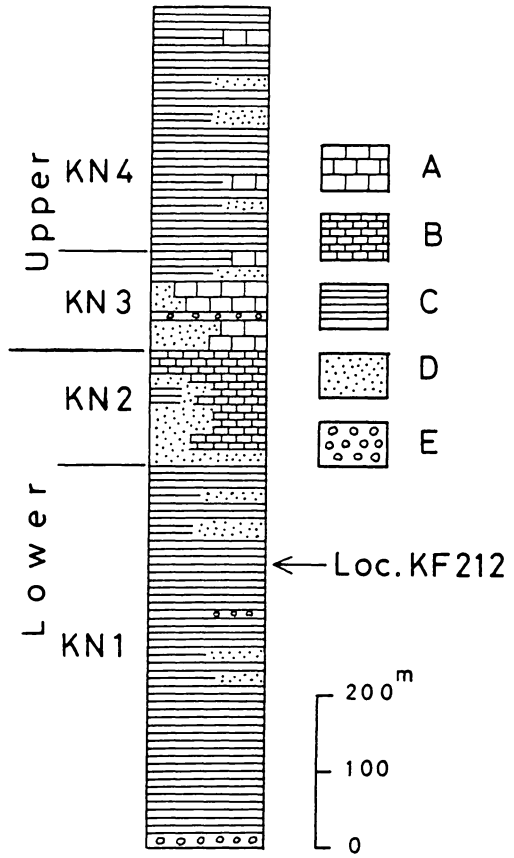


Figure 2. Columnar section of the Kanokura Formation of the Kamiyasse district, showing the stratigraphic position of the fossil locality (KF212). A: massive limestone; B: bedded impure limestone; C: shale; D: sandstone; E: conglomerate. (Redrawn, and adapted from Tazawa, 1973).

species of this genus are at present known from the Upper Carboniferous (Upper Pennsylvanian) to the Middle Permian of the United States (Texas, Kansas), Soviet Union (Ural Mountains), Indonesia (Timor) and Japan (Kitakami Mountains): *P. petaloides* Watson, 1917, *P. tschernyschewi* Fredericks, 1926, *P. variabile* Wanner and Sieverts, 1935, *P. informis* Cooper and Grant, 1974, *P.* sp. 1 Cooper and Grant, 1974, *P.* sp. 2 Cooper and Grant, 1974, and *P. kamiyassensis,* Tazawa and Takaizumi, sp. nov. The morphology and classification of *Poikilosakos* have been discussed fully by Watson (1917), Dunbar and Condra (1932), Williams (1953, 1965) and Cooper and Grant (1974); and the life habit has been reconstructed by Rudwick (1971).

In the present study, the brachiopod specimens were collected by the junior author (Y.T.), and the systematics was prepared by the senior author (J.T.). All the specimens are stored in the Institute of Geology and Palaeontology, Faculty of Science, Tohoku University, Sendai.

Systematic descriptions

Order Strophomenida Öpik, 1934

Suborder Oldhaminidina Williams, 1953

Superfamily Lyttoniacea Waagen, 1883

Family Poikilosakidae Williams, 1953

Genus *Poikilosakos* Watson, 1917

Poikilosakos Watson, 1917, p. 212; Dunbar and Condra, 1932, p. 270; Williams, 1953, p. 287; 1965, p. H519; Cooper and Grant, 1974, p. 389.

Type species:—*Poikilosakos petaloides* Watson, 1917, from the Graham Formation of Graham,

north-central Texas; Plattsmouth Limestone at south of Williamsburg, Kansas; Neal Ranch Formation of the Glass Mountains, west Texas (Watson, 1917; Dunbar and Condra, 1932; Rudwick, 1971; Cooper and Grant, 1974).

Species other than type species assigned to the genus:—*Poikilosakos tschernyschewi* Fredericks, 1926, from the Sakmarian Stage of Krasnoufimsk, central Ural Mountains, U.S.S.R. (Fredericks, 1916, 1926).

Poikilosakos variabile Wanner and Sieverts, 1935, from the Middle Permian (= lower Punjabian, after Waterhouse, 1976) of Basleo, western Timor (Wanner and Sieverts, 1935).

Poikilosakos informis Cooper and Grant, 1974, from the Skinner Ranch Formation of the Glass Mountains, west Texas; Bone Spring Formation of the Sierra Diablo Mountains, west Texas (Stehli, 1954; Cooper and Grant, 1974).

Poikilosakos sp. 1 Cooper and Grant, 1974, from the Neal Ranch Formation of the Glass Mountains, west Texas (Cooper and Grant, 1974).

Poikilosakos sp. 2 Cooper and Grant, 1974, from the Word Formation of the Glass Mountains, west Texas (Cooper and Grant, 1974).

Poikilosakos kamiyassensis Tazawa and Takaizumi, sp. nov., from the lower Lower Kanokura Formation (Member KN1) of Kamiyasse, southern Kitakami Mountains, northeast Japan.

Diagnosis:—Small, simplest Poikilosakidae. Pedicle valve nearly flat and completely attached. Pedicle valve interior having about 2 pairs of lateral lobes and 1 pair of anterior lobes; both of which irregularly developed and showing a very rough symmetry about median plane.

Remarks:—*Poikilosakos* is the simplest and most primitive oldhaminoid, bearing a few irregular, short and broad lobes in the latilobate stage of Cooper and Grant (1974), and asymmetric diductor muscles in the pedicle valve. In the United States this genus has been recorded from the Upper Pennsylvanian to the Middle Permian, but in Asia and Russia it occurs from the Lower or Middle Permian. *Poikilosakos dzulfensis* Sarytcheva, 1964, described from the Upper Permian (Dzulfian) of the Transcaucasus, U.S.S.R. may be the young of *Leptodus* Kayser, 1883 (Cooper and Grant, 1974, p. 390).

Pseudoleptodus Stehli, 1956 is distinguished from *Poikilosakos* by its elongate, larger, conical or subconical shaped shell, and in having more advanced lobes, which regularly and symmetrically developed and strongly inclined towards anterior.

Poikilosakos kamiyassensis, sp. nov.

Figure 3-1a–7c

Material:—Eight, imperfect specimens, pedicle valve internal moulds, collected by Takaizumi from the lower part of the Lower Kanokura Formation (Member KN1) at locality KF212 in the middle Matashirosawa Valley, Kamiyasse, southern Kitakami Mountains, northeast Japan, IGPS coll. cat. nos. 99009–99016. Holotype: IGPS coll. cat. no. 99010, illustrated in Figures 3-7a–c.

Diagnosis:—Large, transverse *Poikilosakos*; pedicle valve interior with long, narrow, often irregularly branched lobes.

Description:—Shell large in size for the genus. Pedicle valve subcircular in young shells, becoming transversely wider in adult shells. Length of pedicle valve about 21 mm, width of pedicle valve about 34 mm in the holotype; length of

→ **Figure 3.** *Poikilosakos kamiyassensis* Tazawa and Takaizumi, sp. nov., from the Middle Permian Kanokura Formation (Member KN1) of Kamiyasse, southern Kitakami Mountains, northeast Japan. 1a–c. Internal mould of pedicle valve and the rubber cast, IGPS coll. cat. no. 99009; 1a, b: mould (1a x1, 1b x2); 1c: rubber cast (x2), 2. Internal mould of pedicle valve, IGPS coll. cat. no. 99012 (x1), 3. Internal mould of pedicle valve, IGPS coll. cat. no. 99015 (x1), 4a, b. Internal mould of pedicle valve, IGPS coll. cat. no. 99016 (4a x1, 4b x2), 5a, b. Internal mould of pedicle valve, IGPS coll. cat. no. 99011 (5a x1, 5b x2), 6. Internal mould of pedicle valve, IGPS coll. cat. no. 99013 (x1), 7a–c. Internal mould of pedicle valve and the rubber cast, IGPS coll. cat. no. 99010 (Holotype); 7a, b: mould (7a x1, 7b x2); 7c: rubber cast (x1).

1a

1b

1c

2

3

5a

4a

4b

5b

6

7a

7b

7c

pedicle valve about 20 mm, width of pedicle valve about 22 mm, width of hinge line 3.1 mm, length of right diductor scar 2.2 mm in an immature but well-preserved specimen (IGPS coll. cat. no. 99009).

Pedicle valve interior slightly concave to nearly flat, and the surface marked faintly with fine pustules. Hinge line short and straight, having a thick hinge ridge at posterior side. Triangular areas (dental areas of Watson, 1917) at just anterior to each side of hinge line which is slightly concave and sculptured with fine longitudinal striae. Diductor scars asymmetrical about median plane; larger right one smooth, long, narrow, and sheathed on its sides entirely; smaller one on left side, near posterolateral margin of visceral region, more widely diverging towards anterior than the right one. Visceral region wholly enclosed by a thin wall, forming in maximum two lateral lobes and one anterior lobe on each side of valve. Lateral lobes slightly inclined towards anterior. Both lateral and anterior lobes long, narrow, and often irregularly branched. Interspaces between lobes very shallow and broad. Median indentation strongly developed, reaching to about four-fifths valve length.

External features of pedicle valve and both internal and external features of brachial valve unknown.

Remarks:—The present materials are lacking mould or cast of the pedicle valve exterior and also those of the internal and external parts of the brachial valve. However, the internal structures of the pedicle valve are well preserved, especially in the specimen numbered IGPS coll. cat. no. 99009, and they show the characters of the genus *Poikilosakos*.

Poikilosakos kamiyassensis, sp. nov. seems to be an advanced form, and most resembles *P. tschernyschewi* Fredericks, 1926 from the Lower Permian (Sakmarian) of the central Ural Mountains in its size and shape and in having long, narrow lobes. But in the Russain species, the lobes are less frequently branched and more symmetrically developed.

P. informis Cooper and Grant, 1974 from the Lower Permian (Wolfcampian and Leonardian) of west Texas has long, narrow and irregularly branched lobes, and is regarded to be an evolved *Poikilosakos* species. The American species is, however, more elongate in shell outline, and the lobes are more irregular than the Kitakami species.

P. variabile Wanner and Sieverts, 1935 from the Middle Permian exotic limestone block in Basleo, western Timor is much smaller in size, and is clearly distinguished from the present species.

The type species, *P. petaloides* Watson, 1917 is the earliest and most primitive *Poikilosakos*, and is easily distinguished from *kamiyassensis* by its smaller dimensions and the massive lobes.

Acknowledgements

We are indebted to Prof. Koji Nakamura of Hokkaido University and Prof. Yoshiyuki Hasegawa of Niigata University for critical reading of the manuscript, and Mr. Shohei Otomo of Tohoku University for his help in photography. To these people we offer our thanks.

References

Cooper, G. A. and Grant, R. E. (1974): Permian brachiopods of west Texas, 2. *Smithson. Cont. Paleobiol.*, no. 15, p. 233–793, pls. 24–191.

Dunbar, C. O. and Condra, G. E. (1932): Brachiopoda of the Pennsylvanian System in Nebraska. *Nebraska Goel. Surv., Ser. 2, Bull.* 5, p. 1–377, pls. 1–44.

Fredericks, G. (1916): The palaeontological notes, 2. On some Upper Palaeozoic Brachipoda of Eurasia. *Mém. Com. Géol., N. S.*, liv. 156, p. 1–87, pls. 1–5 (in Russian).

——(1926): New Lyttoniinae from the Upper Carboniferous of Krasnoufimsk. *Ann. Soc. Paléont. Russie*, tom. 6, p. 83–89.

Kayser, E. (1883): Obercarbonische Fauna von Lo-Ping. *In* Richthofen, F. von, *China*, Bd. 4, p. 160–208, pls. 19–29, D. Reimer, Berlin.

Minato, M., Kato, M., Nakamura, K., Hasegawa, Y., Choi, D. R. and Tazawa, J. (1978): Biostratigraphy and correlation of the Permian of Japan. *Jour. Fac. Sci., Hokkaido Univ., Ser. 4*, vol. 18, nos. 1–2, p. 11–47.

Öpik, A. A. (1934): Über Klitamboniten. *Tartu Univ. (Dorpat), Acta Comm., Ser. A*, vol. 26, no. 3, p. 1–239, pls. 1–48.

Rudwick, M. J. S. (1971): The functional morphology of the Pennsylvanian oldhaminoid brachiopod *Poikilosakos*. *Smithson. Cont. Paleobiol.*, no. 3, p. 267–282, pls. 1, 2.

Sarytcheva, T. G. (1964): Oldhaminid brachiopods from the Permian of Transcaucasia. *Paleont. Zh. (1964)*, no. 3, p. 58–72, pls. 7, 8 (in Russian).

Stehli, F. G. (1954): Lower Leonardian Brachiopoda of the Sierra Diablo. *Bull. Amer. Mus. Nat. Hist.*, vol. 105, art. 3, p. 262–358, pls. 17–27.

——(1956): Notes on oldhaminid brachiopods. *Jour. Paleont.*, vol. 30, no. 2, p. 305–313, pls. 41, 42.

Tazawa, J. (1973): Geology of the Kaimiyasse area, southern Kitakami Mountains. *Jour. Geol. Soc. Japan*, vol. 79, no. 10. p. 677–686 (in Japanese).

——(1976): The Permian of Kesennuma, Kitakami Mountains: A preliminary report. *Earth Science (Chikyu Kagaku)*, vol. 30, no. 3, p. 175–185, pls. 1–3.

Waagen, W. (1883): Salt Range fossils, 1. *Productus* Limestone fossils: Brachiopoda. *Palaeont. Indica*, Ser. 13, vol. 1, pt. 4, fasc. 2, p. 391–546, pls. 29–49.

Wanner, J. and Sieverts, H. (1935): Zur Kenntnis der permischen Brachiopoden von Timor, 1. Lyttoniidae und ihre biologische und stammesgeschichtliche Bedeutung. *N. Jb. Miner. Gol. Paläont.*, Bd. 74, Abt. B, p. 201–281, pls. 6–9.

Watson, D. M. S. (1917): *Poikilosakos*, a remarkable new genus of brachiopods from the upper Coal-Measures of Texas. *Geol. Mag.*, vol. 54, p. 212–219, pl. 14.

Williams, A. (1953): The morphology and classification of the oldhaminid brachiopods. *Jour. Washi. Acad. Sci.*, vol. 43, no. 9, p. 279–287.

——(1965): Oldhaminidina. *In* Moore, R. C. *ed., Treatise on Invertebrate Paleontology, Part H (Brachiopoda 1)*, p. H510–H521, Geol. Soc. Amer., New York and Univ. Kansas Press, Lawrence.

Kamiyasse 上八瀬, Kesennuma 気仙沼, Matashirosawa 又四郎沢, Shigejisawa 茂路沢.

東北日本のペルム系産腕足類 *Poikilosakos*（オルドハミナ亜目）：南部北上山地，宮城県気仙沼市上八瀬茂路沢支流又四郎沢において，中部ペルム系叶倉層下部（ＫＮ１部層）の頁岩から，我国ではこれまでに産出記録がない腕足類 *Poikilosakos* が発見採集された。これを *Poikilosakos kamiyassensis* と命名し記載する。

本種は大型で殻幅が広く，茎殻内部に不規則に分枝する細長い裂片（lobe）を持つことで特徴づけられる。形態的には，ウラル山地の下部ペルム系から記載された *Poikilosakos tschernyschewi* Fredericks, 1926 に最もよく似ており，*Poikilosakos* のなかでは比較的進化した種であると考えられる。

田沢純一・高泉幸浩

Trans Proc. Palaeont. Soc. Japan, N. S., No. 145, pp. 16–31, 7 Figs., April 30, 1987.

827. NOTES ON *FORBESICERAS* (AMMONOIDEA) FROM HOKKAIDO (STUDIES OF CRETACEOUS AMMONITES FROM HOKKAIDO-LX)*

Tatsuro Matsumoto

c/o Department of Geology, Kyushu University 33, Fukuoka 812

Abstract. In this paper three species of the ammonite genus *Forbesiceras* which occurred in the Lower Cenomanian of Hokkaido are described and figured. They are *F. largilliertianum* (d'Orbigny), *F. beaumontianum* (d'Orbigny) and a new species. The last one is well defined on the basis of at least eleven specimens from one and the same locality in Mikasa. It is allied to *F. obtectum* (Sharpe) and *F. subobtectum* (Stoliczka) but distinct in its own peculiar characters as described below.

Through this study a clioscaphitoid shape of the adult shell of *Forbesiceras* has become distinct. The dimorphism which has been noticed by previous authors can be approved also by examples in Japan, but my observation is yet insufficient to draw up the true feature.

Introduction

Ammonites of the genus *Forbesiceras* sometimes occur in the Cenomanian sediments of certain facies in Hokkaido, but they have been left undescribed. One of the reasons for the delayed situation was a difficulty in getting a proper concept of the previously established species. This has been much relieved by the recent work of Wright and Kennedy (1984) and I report in this paper the result of my study with palaeontological descriptions.

The material for this study is mainly the specimens which were obtained from the lower part of the Mikasa Sandstone Formation exposed in the Ikushumbets Velley of central Hokkaido. They belong to the collections of Takemi Takahashi (TTC.), the Muramotos' (MC.) [Tatsuo and Kikuwo Muramoto], Hajime Inoue and Yoshitaro Kawashita (YKC.), all in Mikasa; also those of Kenji Sanada and Yasujiro Kera in Sapporo; some other specimens in the Geological Collections, Kyushu University (GK.) from the same formation in the Ikushumbets and adjacent Ashibetsu areas. My study is extended to another specimen obtained from the Shumarinai area, northwestern Hokkaido, by Shunji Hayashi who transferred it to the collection of Katsujo Yokoi in Kenbuchi. In 1952 I studied preliminarily a specimen which was obtained by Dr. Rinji Saito from the lower part of the Mikasa Formation and stored in Hokkaido University. This was listed as *Forbesiceras* aff. *obtectum* (Sharpe) (Matsumoto, *ed.*, 1954, p. 16) but is now missing regrettably and excluded from the description in this paper.

Before going further, I wish to thank sincerely the above gentlemen for their generosity to let me study freely the valuable specimens in their collections. Thanks are extended to Dr. Masayuki Noda and Mr. Seiichi Toshimitsu for their kind help in taking photographs; also to Miss Yoshimi Tanigawa for her assistance in preparing the typescript.

In the descriptions below, the following letters are used for the dimensions. The measurements are in mm.

D=diameter, U=umbilicus, H=whorl-height, h=whorl-height at a point 180° earlier, B=whorl-breadth, R=radius, r=radius at a point 180° earlier.

* Received July 18, 1986; read January 31, 1987 at Shizuoka University.

Palaeontological descriptions

Superfamily Acanthocerataceae de Grossouvre, 1894

Family Forbesiceratidae Wright, 1952

Genus *Forbesiceras* Kossmat, 1898

Type species:—*Ammonites largilliertiaus* d'Orbigny, 1841 (designated subsequently by Diener, 1925, p. 180).

Remarks:—The systematic position of *Forbesiceras* has been properly allocated by Casey (1965, p. 461) to the Acanthocerataceae as a derivative from the Lyelliceratidae Spath, 1921, through *Neophlycticeras* Spath, 1922 (a member of the Lyelliceratidae) and then *Paradolphia* Casey, 1965 (an ancestral member of the Forbesiceratidae).

The diagnosis of this peculiar genus has been given concisely and adequately by Wright and Kennedy (1984, p. 89). They have noted that a species of *Forbesiceras* is markedly dimorphic in size, but they have not mentioned about the length of the body-chamber and the outline of the apertural margin.

Through this study, I have noticed in some examples of at least two species that the body-chamber is approximately about 180° in length, that its expansion ratio of whorl-height decreases in the last stage where the umbilical seam egresses markedly and that the adult shell shows accordingly a clioscaphitoid outline.

In connexion with the above features, I have endeavoured to find evidence for the dimorphism. The difference in size between the presumed microconch and macroconch may be great in some species (*e.g., F. largilliertianum*) but does not seem to be so great in some others (*e.g.*, a new species described below). In comparison with the microconch, the macroconch seems to have a broader whorl with somewhat more convex flanks in the adult stage.

In view of some tendency to the differentiation of the ornaments between the inner and outer parts of flank, I expected at first such a markedly dimorphic difference in the apertural margin as that observed in some ammonites of the Oppeliidae, but this does not seem to occur in *Forbesiceras*. So far as I have examined, the apertural margin is simple, showing only an ocular sinus, even in the case of the presumed microconch. Anyhow, I confess that the observation about the dimorphism in *Forbesiceras* is yet insufficient.

The genus *Forbesiceras* is geographically widespread. Its occurrence has been recorded from Europe, central Asia, the Middle East, north, south and west Africa, Madagascar, southern India, Texas, California and Japan (Hokkaido and Shikoku). The genus ranges almost throughout the Cenomanian stage, but the stratigraphic range of a species is shorter. According to Wright and Kennedy (1984), for instance, *F. beaumontianum* is widespread in the Lower Cenomanian, although it does not occur abundantly; *F. largilliertianum* is also widespread in the Lower Cenomanian but in England it occurs also in the Zone of *Acanthoceras jukesbrownei* of Middle Cenomanian; *F. obtectum* is well recorded from the Middle Cenomanian of various regions but may appear earlier: *F. bicarinatum* Szász, 1976 is so from the Upper Cenomanian Zone of *Calycoceras guerangeri* and ranges into the Zone of *Metoicoceras geslinianum*.

Forbesiceras largilliertianum (d'Orbigny)

Figures 2-1a–d

1841. *Ammonites Largilliertianus* d'Orbigny, p. 320, pl. 95.
1864. *Ammonites Largilliertianus* d'Orbigny; Stoliczka, p. 94, pl. 49, fig. 1.
1898. *Forbesiceras Largilliertianum* (d'Orbigny); Kossmat, p. 125.
1964. *Forbesiceras largillierti* (d'Orbigny); Collingnon, p. 19, pl. 321, fig. 1409.
1984. *Forbesiceras largilliertianum* (d'Orbigny); Wright and Kennedy, p. 89 (with full list of synonymy), pl. 11, figs. 2–6; pl. 12, figs. 1–3, 9; pl. 16. fig. 2; text-figs. 12A–L; 13A–Z; 14A–H.

Material:—A single specimen, TTC. 510704 (T. Takahashi Coll.) from loc. Ik 8800p. Its replicas are in the Museum of Mikasa and also

in the Geological Collections, Kyushu University.

Description:—The phragmocone ends at about the diameter of 63 mm and the body-chamber is preserved for about a half whorl. The preserved end is probably the original apertural margin. The spiral outline is changed at about 90° after the last septum, so as to lower the ratio of whorl-height expansion and to let the umbilical seam egress nearly straight forward and then slightly incurved, resulting in a clioscaphitoid shape. Keeping pace with this, the highly compressed shape of the whorl, with B/H=0.44, is somewhat relieved and the adoral half of the body-chamber has gently convex flanks, with B/H= 0.57, and a broadly rounded venter on which the median raised line and ventrolateral keels weaken and then disappear.

The body-chamber looks almost smooth on the internal mould of its posterior part but has numerous, dense, fine subcostae and lirae on the outer flanks and venter of the rest main part. On the inner flank there are several radial elevations disposed at wide intervals. They are somewhat bullate around the umbilicus and extend but weaken outward to the middle of flank. The numerous fine subcostae on the outer flank are gently concave or somewhat prorsiradiate. Some of them are extended from the inner ribs showing a gentle flexuosity. They cross the venter transversely. The apertural margin is parallel to the simple line of the subcostae as mentioned above and has an ocular sinus.

The visible part of the phragmocone is quite involute, much higher than broad, subtrapezoid in section and broadest below the mid-flank, with a narrow and nearly flat venter demarcated by ventrolateral keels. The ribs on the outer flank are narrow and somewhat prorsiradiate. They are more distinct, less crowded and less numerous (15 or 16) in the preceding quarter than those in the last quarter of the septate whorl. The ribs form small, clavate tubercles at the ventrolateral keel and then pass across the venter with weakening. A faintly serrated, low keel-like elevation is partly discernible along the siphonal line. There are widely spaced subradial ribs on the inner flank, showing a gentle sinuosity together with some outer ribs on their extension. Partly exposed sutures are those of *Forbesiceras* pattern.

Measurements:—

	D	U	H	B	B/H	h	H/h
(1)	90.0	–	40.4 (.45)	23.0 (.26)	0.57	39.1	1.03
(2)	77.2	1.6 (.02)	47.2 (.61)	21.0 (.27)	0.44	29.5	1.60
(3)	63.3	–	39.1 (.62)	17.0 (.27)	0.43	23.7	1.65

(1): preserved end, (2): 90° earlier than (1), (3): at the last septum, *i.e.* about 180° earlier than (1).

Comparison and discussion:—Based on the above described characters, this specimen is identified with *F. largilliertianum* (d'Orbigny), which has been described amply by Wright and Kennedy (1984). It is certainly an example of microconch, because of its small size (D=63 mm at the end of phragmocone) and reduced ornament of the body-chamber. It is, however, somewhat different from the illustrated British example of an adult microconch (Wright and Kennedy, 1984, pl. 12, fig. 9) in that it has dense and fine outer lirae or subcostae and widely spaced and blunt inner ribs on the main part of the body-chamber instead of more distinct reduction of the ornament. This may be due to the state of preservation and also a variation within a species. The clioscaphitoid shape of the body-chamber, with an egressed umbilical seam at the last stage, has not been recognized in the incomplete specimens from Europe.

A fragmentary specimen from the Lower Cenomanian sandstone of the Monobe area (Shikoku), which I called *Forbesiceras* (?) sp. aff. *F. beaumontianum* (d'Orbigny) (Matsumoto, 1982, p. 35, pl. 4, fig. 3), is not a named species because of almost closed, very narrow umbilicus. It may be better compared with an immature shell of *F. largilliertianum* in which ribs are not so fine as those of the mature one. It was obtained by T. Kozai together with *Turrilites* (*Mesoturrilites*) aff. *T.* (*M.*) *aumalensis* Coquand and *Ostringoceras* cf. *O. bechii* (Sharpe).

Occurrence:—The described single specimen was obtained by T. Takahashi from a nodule at loc. Ik 8800p, derived from the lower part of the Mikasa Sandstone Formation exposed in a stream called the Hachi-no-sawa, Migi-futamata (recently called the Ganseki-zawa by some people), in the upper reaches of the Kami-ichi-no-sawa, a tributary of the River Ikushumbets, Mikasa district of central Hokkaido.

Forbesiceras beaumontianum (d'Orbigny)

Figures 2-2a–d

1841. *Ammonites Beaumontianus* d'Orbigny, p. 328, pl. 98, figs. 1, 2.
1964. *Forbesiceras largillierti* (d'Orbigny); Collignon, p. 60, pl. 334, fig. 1499 only.
1965. *Forbesiceras beaumontianum* (d'Orbigny); Casey, p. 460, fig. 173.
1984. *Forbesiceras beaumontianum* (d'Orbigny); Wright and Kennedy, p. 91, pl. 12, figs. 7, 8; pl. 13, fig. 1; text-figs. 15A–C; 16A–F (with full list of synonymy).

Material:—A single specimen, H 28 in K. Yokoi Collection (Kenbuchi). As it is partly damaged, it is carefully embedded in a plate of gypsum. Its younger part is removable.

Description:—The last septum is at D=80 mm and only the posterior portion of the body-chamber is preserved. The trace of the umbilical seam suggests that the body-chamber may have exceeded 200° and accordingly the entire shell diameter may have been 150 mm or more.

The umbilicus is open narrowly (about 7% of D) in the phragmocone and enlarged in the body-chamber upto 23 mm (probably over 10% of D) at the last stage. The expansion ratio of whorl is high (1.7 or 1.8 in a half whorl). As the right side of the outer whorl is not well preserved, the ratio B/H cannot be precisely measured, but it must be small. In younger stages the flank becomes flat and the venter is narrow and flat, being demarcated by ventrolateral shoulders. Later the flank is gently convex and the venter seems to widen.

Numerous fine ribs on the outer flank are slightly prorsiradiate and gently curved forward. They form small tubercles at the ventrolateral shoulder, crossing the venter vertically. The rib-density increases gradually as the shell grows. For example, there are 15 outer ribs in a quarter whorl at D=35 mm, 20 at D=43 mm and 34 at D=90 mm. The ventrolateral tubercles are shortly clavate in earlier stages but minutely nodate

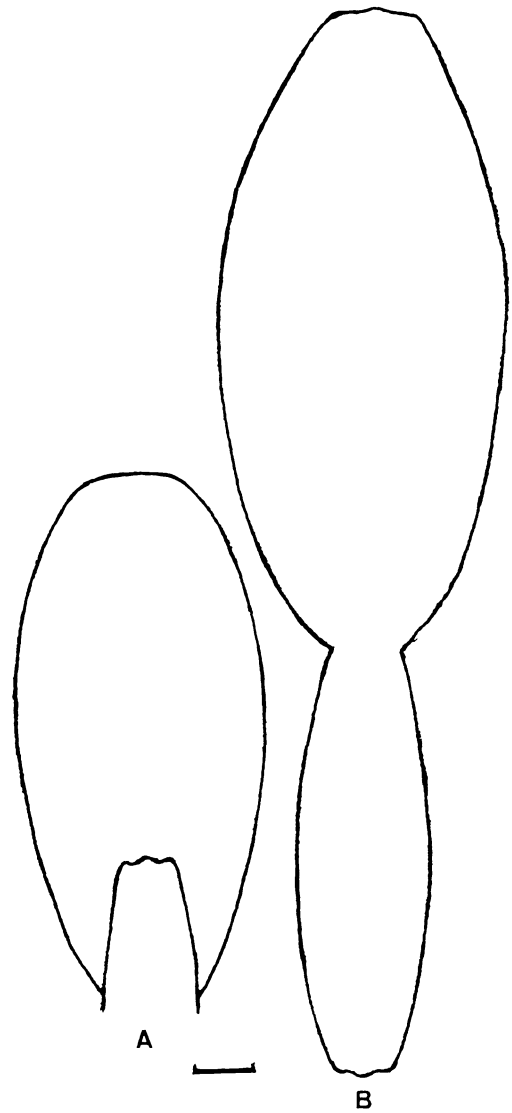
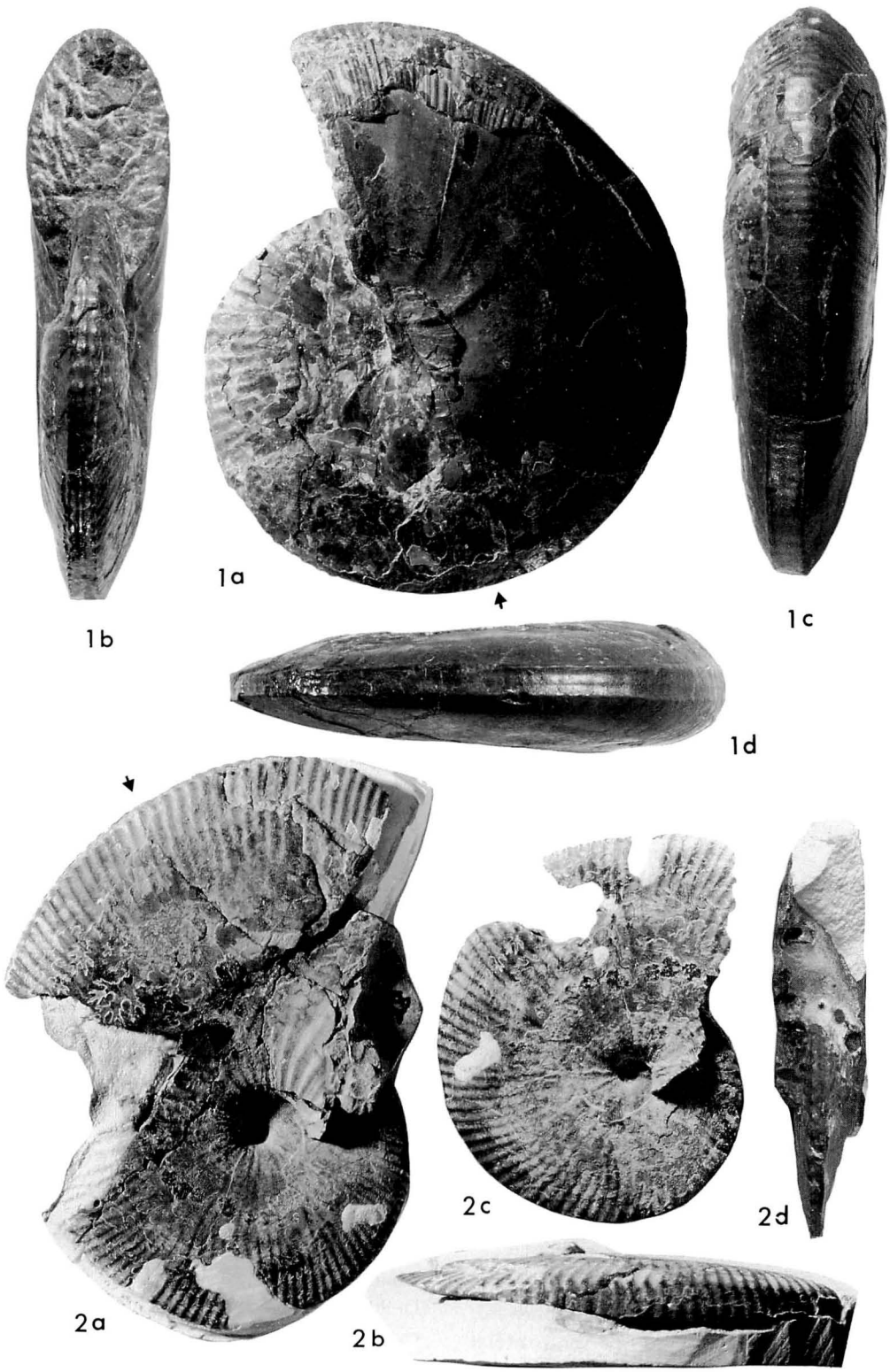


Figure 1. *Forbesiceras mikasaense* sp. nov. Outline of the holotype in cross-section. A: the last quarter of the body-chamber; B: along the maximum diameter through the middle of the body-chamber. Scale-bar: 10 mm. (T. M. *delin.*)


1a
1b
1c
1d
2a
2b
2c
2d

later.

The inner ribs around the umbilicus are less numerous, more distant and coarser than the outer ones. Some of them are extended to or branched into outer ribs, showing a gentle sinuosity, but the extension is not so clearly traced in some others.

This specimen is covered by an inner shell layer for the most part. The sutures are observable through a semi-transparent shelly substance. Their pattern is similar to an example illustrated by Casey (1965, fig. 173c), showing an adventitious lobe in the saddle between E and L.

Measurements:–

	D	U	H	B	B/H	R/r
(1)	85.5	5.9 (.07)	51.2 (.60)	–	–	1.8
(2)	43.5	3.0 (.07)	26.5 (.61)	10.6 (.24)	0.40	1.7

(1): 30° ahead of LS (last septum), (2): 180° prior to LS.

Comparison and discussion:–On the ground of the above described characters this specimen is undoubtedly identified with *F. beaumontianum* (d'Orbigny), which has recently been redescribed by Wright and Kennedy (1984). It resembles especially the one from the Lower Cenomanian *Mantelliceras mantelli* Zone, and *Neostringoceras carcitanense* Subzone of southern England, illustrated by them (*ditto*, pl. 13, fig. 1). The two specimens are nearly of similar size and have similar ornamentation, but the former has the last suture at D=80 mm, whereas the latter with diameter of at least 90 mm is wholly septate. The authors did not indicate clearly the criteria to distinguish a microconch from a macroconch of this species. It is difficult to determine whether the described specimen from Hokkaido should be regarded as a microconch or a smaller example of macroconch.

Occurrence:–The described specimen (H25) was found in a nodule scattered as a boulder in the Sanju-sen-zawa, a branch stream of the River Shumarinai, Uryu-gun, northwestern Hokkaido, by Shunichi Hayashi who affiliated it kindly to K. Yokoi's Collection. Several species of ammonites which suggest the early Cenomanian age were obtained from the same stream (see Matsumoto and Inoma, 1975).

Forbesiceras mikasaense sp. nov.

Figures 1, 3-1a–c, 4-1a–c, 5-1a–2b, 6-1a–5

Material:–(1) Holotype, TTC. 390413 (Figures 3-1a–c; Figure 1), from loc. Ik 1100. Paratypes (2) MC. Ik 1101-c (Figures 4-1a–c) and (3) H. Inoue's specimen (on display at Mikasa Museum), both adult shells like (1); TTC. 410626 (Figures 5-1a–b), (5) TTC. 400728 (Figures 6-3a–c), (6) TTC. 410710 (Figures 6-4a–c), (7) GK. H 8108 (Figure 6-5) (collected by T. Muramoto and me), (8) TTC. 400426 (Figures 6-2a–c) and (9) TTC. 390412 (Figures 6-1a–c) which are gradually smaller and represent earlier growth-stages; also (10) Y. Kera's No. 129 (Figures 7-2a–b) and (11) K. Sanada's (Figures 7-1a–c) and (12) GK. H8125 [=TTC. 400523]; all from loc. Ik 1100–Ik 1101. Five other comparable specimens, (13) TTC. 370805 (Figures 5-2a–b) from Torii-zawa, (14) YKC. 470501, (15) GK. H 5424 from loc. Ik 1054, (16) GK. H 8109 from the Kami-ichi-no-sawa (boulder) obtained by a student of Mikasa High School, and (17) GK. H 8110 collected by Keisaku Tanaka from loc. p. 65 in the Poroko-ashibetsu.

Diagnosis:–Adult shell similar to *F. obtectum* (Sharpe) and *F. subobtectum* (Stoliczka) in having the ribs which bend strongly backward on the outer flank but such ribs appear later and are lower and broader. Immature shell

← **Figure 2.** 1-a–d. *Forbesiceras largilliertianum* (d'Orbigny)
TTC. 510704, from loc. Ik 8800p, Mikasa area; lateral (1a), frontal (1b) and ventral (1c, 1d) views, x1. Venter is shown successively by 1b, 1d and 1c, with some overlap.
2a–d. *Forbesiceras beaumontianum* (d'Orbigny)
H 28 of K. Yokoi Coll., from the Shumarinai area; lateral (2a) and ventral (2b) views of outer whorl, x1; lateral (2c) and frontal (2d) views of inner whorl, with some overlap with (2a), x1.2
Photos (Figures 1–6), without whitening, by courtesy of Dr. M. Noda. Arrow: position of the last suture.

Figure 3. *Forbesiceras mikasaense* sp. nov.
Holotype, TTC. 390413, from loc. Ik 1100, Mikasa area; lateral (1a), frontal (1b) and ventral (1c) views, x0.77. 1c shows the venter of the last two thirds of the body-chamber.

similar to that of *F. chevillei* (Pictet et Roux).

Description:—Adult shell fairly large, normally about 180 to 200 mm in diameter. Body-chamber about 180° in length, broader than phragmocone with more convex flanks and wider venter. In its last part the expansion ratio of whorl-height decreased and the umbilical seam egressing nearly straight forward, resulting in a clioscaphitoid shell-form; the growth-lines on the last part remarkably concave on the inner flank, suggesting ocular sinus, and curved gradually to be rectiradiate on the outer flank, without ventral projection or sinus.

Main part of the body-chamber and the preceding last part of the phragmocone ornamented with blunt (low and weak) ribs, which are gently concave on the inner flank, bent strongly at about the mid-flank, rursiradiate and convex on the outer flank; also train of tubercles at the ventrolateral shoulders and a median ventral keel sometimes with weak serrations. These ventral ornaments weaken as the shell growth and disappear on the last part where the venter is flatter and wider than that of the preceding main part and the ventrolateral shoulders are subrounded (Figure 1).

In the preceding, late middle growth-stage, the whorl is quite involute, showing high ratio of whorl-height expansion, and much higher than broad, with very gently convex flanks, maximum breadth at about mid-flank and narrow venter. Several ribs at wide intervals on the inner flank, narrow, somewhat prorsiradiate and gently concave, ending at or disappearing before reaching the mid-lateral tubercles, which are somewhat bullate but later more rounded but weaker. Ribs on the outer flank at this stage slightly prorsiradiate to nearly rectiradiate and fairly broad, with gentle slope to the anterior, but steeply inclined backward. Two to three outer ribs correspond to each mid-lateral tubercle, with branching or intercalation. At the end of this stage, *i.e.* for a short while passing to the late stage described above, the outer ribs consist of mixed radial and somewhat rursiradiate ones, the latter of which soon become predominant, whereas the mid-lateral tubercles become indistinct. The outer ribs form clavate tubercles at the ventrolateral shoulder and numerous riblets, 3 to 5 for each clavus, pass transversely across the venter, where a weak keel-like elevation runs along the siphonal line.

In the early middle growth-stage, from the shell diameter of about 20 mm up to 60 mm or so in some examples, the shell-form similar to that described above, the outer ribs generally more numerous, narrower and curved more distinctly forward than in the late stage, though there may be individual variation in density and coarseness; the mid-lateral tubercles also numerous, forming a spiral train in some examples (*e.g.*, TTC. 400426), more or less bullate, generally showing one by one correspondance to the outer ribs but for occasional intercalation or bifurcation of the ribs; the ribs on the inner flank narrow, occurring at wide intervals, gently concave and somewhat prorsiradiate, forming a sinuosity or even somewhat falcoid form together with some of the outer ribs on their extension; the ventrolateral tubercles pointed to shortly clavate according to the breadth of the outer ribs; ventral ribs weak and single, running transversely across the narrow venter between the ventrolateral tubercles; may be doubled in the passage substage to the late stage of multiple riblets. The median elevation on the siphonal line absent in earlier substage and discernible very weakly later.

In the early stage of still smaller size, the whorl is compressed, with smooth and flat main part of the flank; short outer ribs strongly prorsiradiate, forming minute tubercles at the edges of narrow venter. Still earlier, below 5 mm or so in diameter, the shell is smooth and the ventrolateral shoulder subrounded.

Remarks:—There is some extent of variation in this species. As the specimens were obtained from one and the same bed in a small quarry and they have essentially the same characters in common, I regard them as belonging to one and the same species, even if there is some difference in minor points.

The most remarkable aspect of variation may

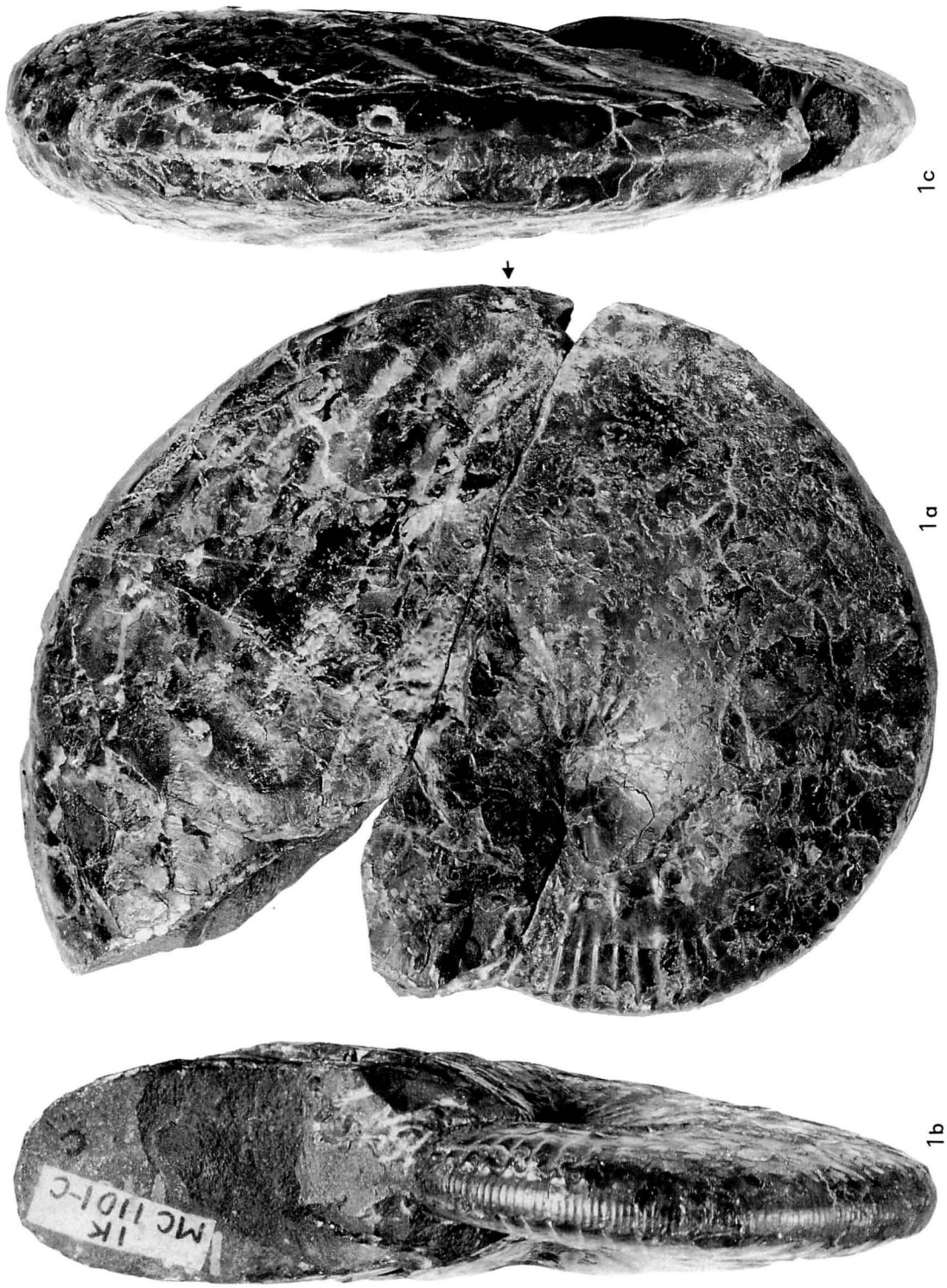


Figure 4. *Forbesiceras mikasaense* sp. nov.
Paratype, MC. 1101-C, from loc. Ik 1101, Mikasa area; lateral (1a), frontal (1b) and ventral (1c) views, × *ca* 0.7.

be concerned with the ornament. For example, a fine specimen (Figures 7-1a–c) in K. Sanada's Collection has unusually finer and weaker ornaments than those in others of the corresponding size, *i.e.* phragmocone of the middle growth-stage. Its inner ribs are very weak but occur at wide intervals and similarly subradial; its mid-lateral tubercles are extremely bullate and delicate, each of which corresponds to 3 or 4 outer ribs already at such an early stage of small diameter where one by one correspondence is normal in others; also the tubercles become obsolete in an earlier stage than in others; the outer ribs are also more numerous and weaker, although they broaden gradually as the shell grows. Its shell-form is comparatively more compressed than that of others. Although the main part of its body-chamber is unpreserved, the specimen is comparable with No. 129 of Kera's Collection, which may represent a microconch (see discussion below).

On the other hand, TTC. 400426 (Figures 6-2a–c), the 8th specimen, has coarser ribs, coarser and more rounded lateral tubercles and comparatively broader whorl than the normal ones.

Comparison and discussion:–This species can be grouped with *F. obtectum* (Sharpe, 1853) (see Wright and Kennedy, 1984, p. 94) and *F. subobtectum* (Stoliczka, 1864) (*ditto*, p. 95) in that the ribs swing back remarkably in the late growth-stage. In these two species this feature is shown already in the septate whorl and continues for a considerably long period in which the mid-lateral tubercles are distinctly developed at the bending point of the ribs, whereas in our species the bending is much delayed to appear at the last stage of the phragmocone and characterizes the main part of the adult body-chamber; also the mid-lateral tubercles weaken when the bending begins and are scarsely discernible or almost obsolete and the ribs are also blunt in the stage of bending. In general the ribs are narrower but more distinct in *F. obtectum* and coarser and much stronger in *F. subobtectum* than those of *F. mikasaense*. Moreover, the adult whorl is typically broader in this species than that in *F. obtectum* and narrower than in *F. subobtectum*, although there is some extent of variation with respect to the whorl-breadth.

We should now consider the dimorphism in

Measurements:–

	Specimen	D	U	H	B	B/H	H/h
(1)	near end			~88	~43	~0.49	
	100° from LS	179.0	5.0 (.03)	105.0 (.59)	49.4 (.28)	0.47	1.54
	at LS	137.0	–	87.8 (.64)	37.5 (.27)	0.43	1.87
(2)	near end	197.5	7.0 (.04)	118.0 (.60)	~53 (.27)	~0.45	
	near LS	148.0	6.0 (.04)	92.5 (.63)	~44 (.30)	~0.47	1.87
(3)	90° from LS	184.0	–	109.0 (.59)	51.0 (.28)	0.47	1.47
	at LS	~149.0					
(4)	near LS	110.0	–	73.8 (.67)	29.5 (.27)	0.40	2.05
(5)	near end	90.0	1.0 (.01)	57.0 (.63)	26.0 (.29)	0.46	~1.78
(6)	near end	67.0	–	42.7 (.64)	17.8 (.27)	0.42	1.85
(7)	near end	~60.0	–	37.4 (.62)	16.5 (.28)	0.44	1.78
(8)	near end	33.8	–	21.4 (.63)	10.0 (.30)	0.47	1.74
(9)	near end	10.5	–	6.3 (.60)	2.8 (.27)	0.44	1.54
(10)	at LS	110.0	–	72.0 (.65)	28.0 (.25)	0.39	1.89
(11)	at LS	100.0	1.2 (.01)	64.0 (.64)	24.5 (.25)	0.38	1.83
(12)	–60° from end	56.0	–	35.0 (.63)	15.4 (.28)	0.44	1.67
(13)	near end	–	–	71.0	29.0	0.41	–
	–90°	–	–	58.0	22.0	0.38	–
(14)	90° from LS	158.0	–	102.0 (.65)	34.5 (.22)	0.34	1.89
	at LS	125.0	1.0 (.01)	80.0 (.64)	26.5 (.21)	0.33	1.82

Specimens (1)–(14): see Material; end: preserved end; LS=Last suture; ~: approximate because of restoration.


1a
1b
2a
2b

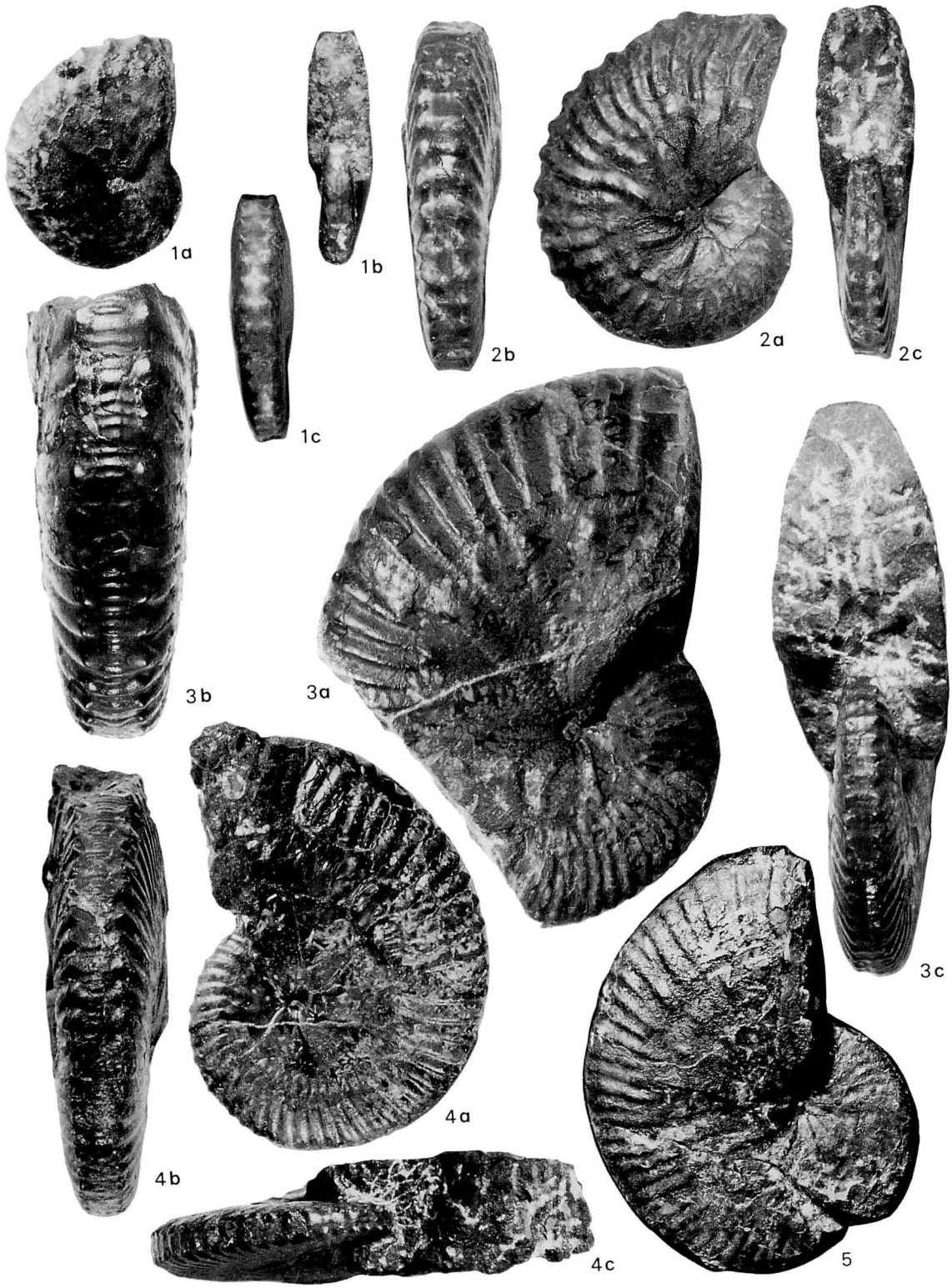
this species. If I compare *F. mikasaense* with *F. obtectum*, its holotype and the first two paratypes with D=180–200 mm could be regarded as macroconchs. They show a comparatively larger ratio of B/H and the bodychamber has fairly convex flanks. I have not yet seen a smaller example in our material which would be comparable in size with such British specimens as figured by Wright and Kennedy (1984, pl. 14, figs. 1, 2) in which ribs begin to swing back at whorlheight of about 40 mm. According to them (*ditto*, p. 95), a microconch has an estimated diameter of 130 mm. This may be nearly comparable with the 10th specimen, *i.e.* no. 129 of Y. Kera's Collection, an adult shell which shows an egressing umbilical seam at the last part, with maximum diameter of about 135 mm (deficient portion restored). It is 110 mm in diameter at the end of the phragmocone and somewhat more compressed (B/H=0.39) than others. The 4th specimen, TTC. 410626, with D=110 mm at LS and B/H=0.40, and also the 11th, with D=100 mm and B/H=0.38 at LS, may be comparable with the 10th specimen, although the main part of the body-chamber is not preserved in these two specimens. I would state that these three examples could possibly be regarded as microconches of *F. mikasaense*. Should this be the case, the difference between the microconch and macroconch would be by no means great, if not absent, in this species.

Up to the middle growth-stage there is no significant distinction between this species and *F. chevillei* (Pictet et Renevier, 1866), which has been redefined by Wright and Kennedy (1984, p. 93). When I treated smaller, incomplete septate shells alone, I thought that they could be identified with *F. nodosum* Crick, 1907 or *F. sculptum* Crick, 1907, based on my examination of the Crick's types from South Africa at the British Museum (N. H.). Wright and Kennedy (1984) have regarded the two species named by Crick as synonyms of *F. chevillei* and shown, on the basis of the British material, that *F. chevillei* has no ribs of *F. obtectum* type but becomes smooth in the late growth-stage (*ditto*, p. 94, pl. 13, fig. 2; text-fig. 17). The smaller, incomplete specimens from Mikasa are now well connected with larger adult specimens obtained from the same bed. They are all examples at various growth-stages of one and the same species. Unless the adult specimen of *F. mikasaense* be found from the type locality of *F. chevillei* in Switzerland, I shold rely on Wright and Kennedy's observation and conclude that *F. mikasaense* is a well defined new species.

Occurrence:—The holotype and the paratypes (2) to (11) occurred in a bed of sandstone at loc. Ik. 1100–Ik 1101, Katsurazawa quarry, Mikasa, on the right (northern) side of the River Ikushumbets. The bed belongs to the Zone of *Mantelliceras japonicum* and is early Cenomanian (see Matsumoto *et al.*, 1969, p. 287; Matsumoto, 1975, p. 157). Five other specimens were obtained at nearby localities in the same zone or in the presumable extension of the same zone.

The occurrence of at least 11 specimens in the same bed at the same locality (a small quarry) may imply that the species was not rare. Since the quarry was abandoned and a new road was constructed, it has become difficult to collect fossils from this locality. It should be also noted that even when the quarry was in operation, the 11 specimens including 4 adult ones, were obtained by five friends of mine at different times through their laborious hunting. On the other hand, more examples of this species may have been obtained by other persons with whom I have no acquaintance. These situations suggest that it is difficult to estimate precisely to frequency of occurrence.

← **Figure 5.** *Forbesiceras mikasaense* sp. nov.
1a–b. Paratype, TTC. 410626, from loc. Ik 1100, Mikasa area; lateral (1a) and ventral (1b) views, × *ca* 0.9.
2a–b. *Forbesiceras* cf. *F. mikasaense* sp. nov.
TTC. 370805, from the Torii-zawa, Mikasa area; lateral (2a) and ventral (2b) views, ×1.
The two specimens show a passage from the *chevillei-nodosum* type middle growth-stage to the *mikasaense* type late stage, although the earlier whorls are badly crushed and dislocated in TTC. 370805.


1a
1b
1c
2a
2b
2c
3a
3b
3c
4a
4b
4c
5

References cited

Casey, R. (1965): A monograph of the Ammonoidea of the Lower Greensand. Part VI. *Monogr. Palaeontogr. Soc.*, 1964, p. 399–546, pls. 67–90.

Collignon, M. (1964): *Atlas des fossiles caracteristiques de Madagascar (Ammonites)*, fasc. 11 (Cénomanien). 152 pp., pls. 318–375. Service Géol., Tananarive.

Crick, G. C. (1970): Cretaceous fossils of Natal. *In* Anderson, W., *Third and final report of the Geological Survey of Natal and Zululand*, p. 161–250, pls. 10–15, London.

Diener, C. (1925): Ammonoidea neocretacea. *Fossilium Catal.* (1: Animalia), vol. 29, 244 pp.

Kossmat, F. (1895–1898): Untersuchungen über die Südindische Kreideformation. *Beitr. Paläont. Geol. Öst.-Ung.*, vol. 9 (1895), p. 97–203 (1–107), pls. 15–25 (1–11); vol. 11 (1897), p. 1–46 (108–153), pls. 1–8 (12–19); vol. 11 (1898), p. 89–152 (154–217), pls. 14–19 (20–25).

Matsumoto, T. (*ed.*) (1954): *The Cretaceous System in the Japanese Islands*, 324 pp., 36 pls., Japan Assoc. Prom. Sci. Res., Tokyo.

——(1975): Additional acanthoceratids from Hokkaido. *Mem. Fac. Sci., Kyushu Univ., (D), Geol.*, vol. 22, no. 2, p. 99–163, pls. 11–23.

——(1982): Upper Cretaceous ammonites from the Monobe area, Shikoku. *In* Matsumoto, T. and Tashiro, M. (*eds.*): Multidisciplinary research in the Upper Cretaceous of the Monobe area, Shikoku. *Palaeont. Soc. Japan, Spec. Pap.*, no. 25, p. 31–52, pls. 1–7.

—— and Inoma, A. (1975): Mid-Cretaceous ammonites from the Shumarinai-Soeushinai area, Hokkaido. *Mem. Fac. Sci., Kyushu Univ., (D), Geol.*, vol. 23, no. 2, p. 263–293, pls. 38–42.

——, Muramoto, T. and Takahashi, T. (1969): Selected acanthoceratids from Hokkaido. *Ibid.*, vol. 19, no. 2, p. 251–296, pls. 25–38.

Orbigny, A. d'. (1840–1842): *Paléontologie française; Terrains Crétacés.* vol. 1, Céphalopodes, p. 1–120 (1840); 121–430 (1841); 431–662 (1842); pls. 1–151, Paris.

Pictet, F. J. and Renevier, E. (1866): Notices géologiques et paléontologiques sur le Alpes Vaudoises et les régions environnantes. IV. Céphalopodes de Cheville. *Bull. Soc. Vaudoise Sci. Nat.*, vol. 9, p. 93–114, pls. 3–5.

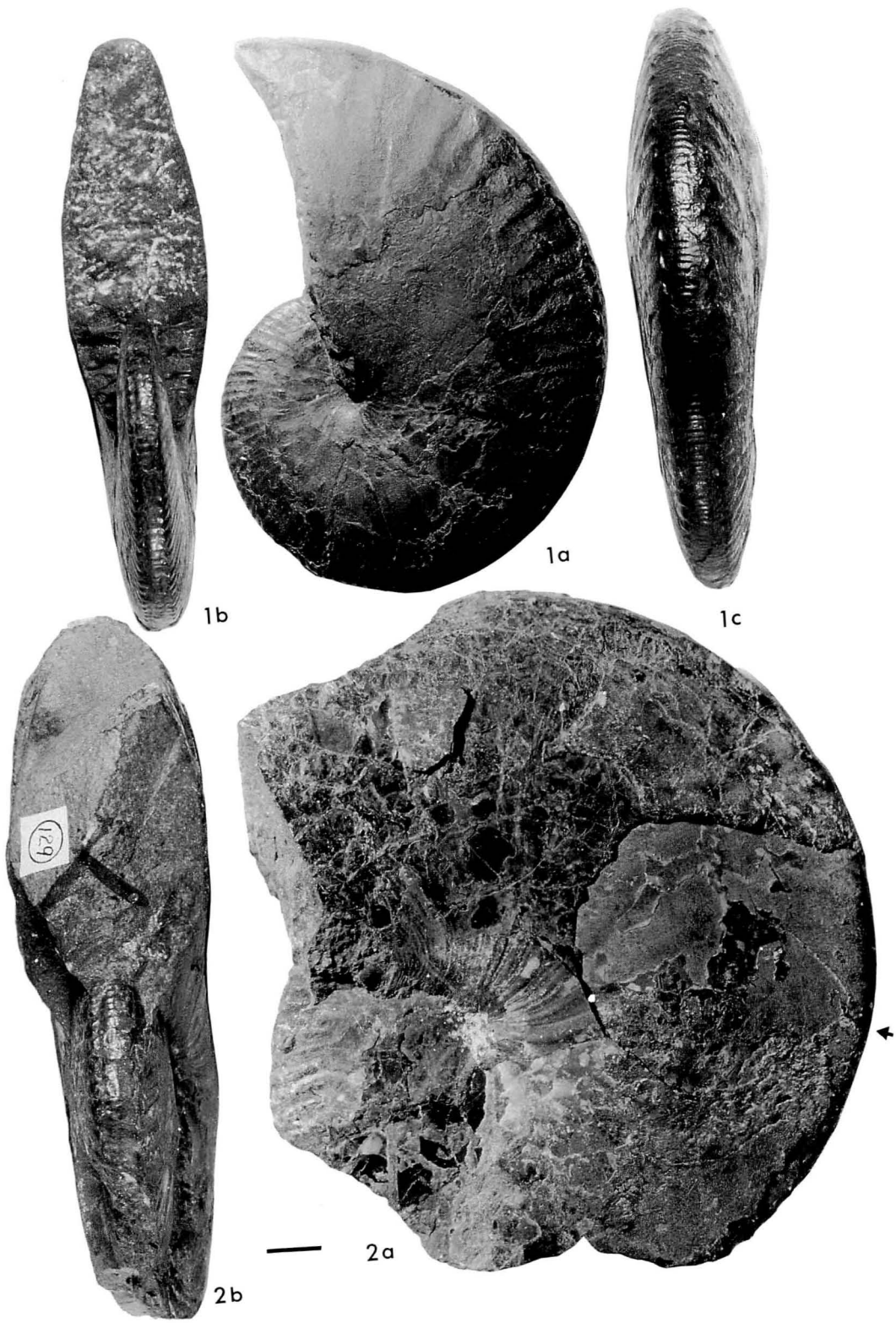
Stoliczka, F. (1863–1866): The fossil Cephalopoda of the Cretaceous rocks of southern India: Ammonoidea, with revision of the Nautilidae. *Mem. Geol. Surv. India, Palaeont. Indica*, vol. 3, p. 41–65, pls. 26–31 (1863); p. 57–106, pls. 32–54 (1864); p. 107–154, pls. 55–80 (1865); p. 155–216, pls. 81–94 (1866).

Szász, L. (1976): Nouvelles espèces d'ammonites dans le Cénomanien de la région de Hateg (Carpates méridionales). *Dàri de seamà ale sedintelor*, vol. 62, p. 169–174, pls. 1–4.

Wright, C. W. and Kennedy, W. J. (1984): The Ammonoidea of the Lower Chalk. Part I. *Monogr. Palaeontogr. Soc. London*, p. 1–126, pls. 1–40 (Publ. No. 567, part of vol. 137 for 1983).

Ashibetsu 芦別, Ganseki-zawa 岩石沢, Hachi-no-sawa 八の沢, Ikushumbets 幾春別, Kami-ichi-no-sawa 上一の沢, Katsura-zawa 桂沢, Kenbuchi 剣淵, Mikasa 三笠, Poroko-ashibetsu 幌子芦別, Sanju-sen-zawa 三十線沢, Sapporo 札幌, Shumarinai 朱鞠内.

← **Figure 6.** *Forbesiceras mikasaense* sp. nov.
Paratypes showing early to middle growth-stages, all from loc. Ik 1100–iIk 1101, Mikasa area.
1. TTC. 390412; lateral (1a), frontal (1b) and ventral (1c) views, x *ca* 3.5. 2. TTC. 400426; lateral (2a), ventral (2b) and frontal (2c) views, x *ca* 1.6. 3. TTC. 400728, lateral (3a), ventral (3b) and frontal (3c) views, x1. 4. TTC. 410710; lateral (4a) view, x0.9; ventral (4b) and frontal (4c) views, x1. 5. GK. H 8108, collected by T. Muramoto and T. Matsumoto; lateral view, x1.1.


1a
1b
1c
2a
2b

北海道産菊石類 *Forbesiceras* について：日本からも *Forbesiceras* は産するが，明確な図示を伴う記載がなかったため，海外の学者から殆んど無視されていた。今回高橋武美（下記Cのholotype 並びに種々の成長期のものとA）・村本喜久雄・井上 肇・真田健次・解良康治・川下由太郎等（以上C），並びに林俊一・横井活城（B）の諸氏が苦心して採集・整形した良い標本を提供して下さったので，これを研究し，次の3種を識別し，記述・図示した。それは A. *F. largilliertianum*（d'Orbigny）（幾春別川流域三笠砂岩層下部産），B. *F. beaumontianum*（d'Orbigny）（朱鞠内地域），C. *F. mikasaense* sp. nov.（三笠砂岩層下部，*Mantelliceras japonicum*帯：セノマニアン階下部）である。Aは1個体だが，保存がよくミクロコンクの成熟殻；Bは稀な産出だが典型的な形質を示す；Cは数も多く，中年期までは *F. chevillei*（Pictet et Roux）に類似するが，成熟期の殻はその種のように平滑でなく，側面中程で後方に屈曲するへの字型の肋が発現する特徴を示す。この種の屈曲肋は，*F. obtectum*（Sharpe）にあるもが，それより出現期が遅く，幅広いが鈍い；*F. subobtectun*（Stoliczka）の場合のように粗く強くない。AとCについては，成熟殻の住房が半巻きの長さで，*Clioscaphites* 型の殻形の変化を示すこと；殻口縁部は比較的単純であることなど，従来の海外の資料ではよくわかっていなかったことが，今回のもので判明した。この論文は単著にしたが，上記諸氏のご好意による所がきわめて大きく，深い敬意と感謝の念をもって報告する。なお折角提供して下さった標本の図示を省略した分があることをお詫びする。

松本達郎

← **Figure 7.** *Forbesiceras mikasaense* sp. nov.
Two atypical examples obtained from the type locality.
1a–c. Phragmocone, with fine ornamentation and much compressed whorl, in K. Sanada's Collection; lateral (1a), frontal (1b) and ventral (1c) views, x7/8. 2a–b. Adult shell, No.129 of Y. Kera's Collection, somewhat smaller and more compressed than the holotype; lateral (2a) and frontal (2b) views, x7/8.

PROCEEDINGS OF THE PALAEONTOLOGICAL SOCIETY OF JAPAN

日本古生物学会 1987 年年会・総会

日本古生物学会年会・総会が1987年1月30日—2月1日に静岡大学理学部および静岡商工会議所会館大ホールで開催された（参加者 231 名）。

シンポジウムⅠ「新第三紀における生物の進化・変遷とそれに関連する事件」

世話人　土　隆一・糸魚川淳二・小泉　格

古地磁気から見た新第三紀における日本列島の位置 .....広岡公夫
新第三紀珪藻群集の進化と海洋事件 ....柳沢幸夫
新第三紀有孔虫化石群の変遷に見られる事件.....米谷盛寿郎
Neogene climatic features and events of northern China .....Liu Gengwu
暖・寒流系貝類の消長と固有種の成立過程から見た事件 .....小笠原憲四郎
新第三紀海生哺乳動物群の変遷 .....岡崎美彦

国際学術集会出席報告

第2回テチス浅海域に関する国際シンポジウム (Wagga Wagga, Australia) .....小高民夫・土　隆一　他
第3回底生有孔虫国際会議 (Geneva, Switzerland) .....高柳洋吉
Symposium on the Cretaceous Stratigraphy and Palaeontology in the North China (中国，大慶市) .....木村達明・田村　実

特別講演

日本のフジツボ類の時空分布 .....山口寿之

前会長講演

Angiosperm paleobotany—地質学と植物学との接点— .....棚井敏雅

総会

個人講演

美祢層群産化石ヤブレガサウラボシ科について.....内藤源太朗
日本中生代の *Ptilophyllum* 属 .....木村達明・大花民子・大久保　敦・宮橋祐司
千葉県の下部白亜系銚子層群から産出した裸子植物の葉化石について.....木村達明・斎木健一・仲沢　隆
Aurila—Mutilus 属（介形虫）の殻表面構造 .....浜田博隆・池谷仙之
Aurila—Mutilus 属（介形虫）の系統類縁関係 .....池谷仙之・浜田博隆
介形虫 *Cythere* 属の生殖器の形態とその種間における意義 .....塚越　哲
暁新世の Stylosphaerinae 亜科について .....西村明子
デボン系福地層より産出した Receptaculitid とその分類上の位置 .....児子修司・浜田隆士
Cretaceous corbulids from Japan. Part III. *Corbula* and *Nipponicorbula* .....Kozai, T.
白亜紀三角貝 "*Trigonia deckeina*" Kubota について .....田代正之・中村彰男
Dosinia (*Kaneharaia*) の地理分布と移動について .....高木俊男
白亜紀異常巻アンモナイト *Polyptychoceras* 類の分類に関する再検討 .....早川浩司
コニアシアン・アンモナイト *Prionocycloceras* について .....二上政夫
本邦産 *Forbesiceras* (白亜紀アンモナイト) について .....松本達郎
Tiny Ammonite *Worthoceras* from Hokkaido .....Matsumoto, T. and Yokoi, K.
プゾシア類における二型性 (dimorphism) について .....松本達郎・高橋武美・川下由太郎
Dimorphism in *Hauericeras*, a Cretaceous ammonite genus .....Matsumoto. T., Toshimitsu, S. and Kawashita, Y.
西太平洋地域のシャミセンガイ *Lingula anatina* 集団の遺伝構造 .....小沢智生・久住　勉
秋吉石灰岩 *Millerella* 帯産 *Weiningia* 属腕足類について .....柳田寿一・松末和之
中新統普含寺泥岩層（鳥取層群）に産するニシン科魚類の分類 .....佐藤陽一
後期中新世 *Hipparion* (ウマ科・哺乳類) の系統関係（特に東アフリカとユーラシアのタクサについて) .....渡部真人・仲谷英夫
Thyasira bisecta の産状からわかること .....松居誠一郎
本邦白亜紀三角貝のエリアの形態と生息環境 ..

企　　画

有孔虫に関する映画とビデオ .....北里　洋

夜 間 小 集 会

「タイプ標本の保全について」　世話人..速水　格

シンポジウム II「南部フォッサマグナにおける古生物地理」

世話人　新妻信明

シンポジウムの主旨 .....新妻信明

南部フォッサマグナにおける海陸分布の変遷.... ..... 新妻信明

南部フォッサマグナにおける浮遊性有孔虫による地質年代 .....尾田太良・秋元和実

南部フォッサマグナにおけるナンノ化石の古生物地理と年代 .....岡田尚武

南部フォッサマグナにおける底生有孔虫の古生物地理 .....北里　洋

南部フォッサマグナにおける貝類化石の古生物地理 .....鎮西清高・松島義章

総合討論

New members approved by the Council Meeting held on January 29, 1987.

Ordinary Members:
Motoyama, Isao; Taguchi, Eiji; Azuma, Yoichi; Kojima, Satoru; Ueno, Katsumi; Murakami, Shiori; Sasaki, Takashi; Saito, Shigeru; Kashima, Kaoru; Morita, Kanichi; Kera, Masatoshi; Kera, Yasuji; Wakamatsu, Hisanori; Kikuchi, Masanobu; Kanazawa, Kenichi; Ueno, Hikaru.

Fellows:
Adachi, Shuko; Abe, Katsumi; Amano, Kazutaka; Okada, Hisatake; Ono, Keiichi; Kaiho, Kunio; Sashida, Katsuo; Sugiyama, Tetsuo; Taketani, Yojiro; Hatta, Akio; Matsui, Seiichiro; Yazaki, Sumio.

Deceased Members:
Sunouchi, Ikuo; Makiyama, Jiro (Honorary Member).

行 事 予 定

	開 催 地	開 催 日	講演申込締切日
1987年 136回 例会	福井県立博物館	1987年6月20日～21日	1987年4月5日

お 知 ら せ

本号から印刷の方式が変更になりました。これに伴って従来の図版（Plate）はすべて挿図（Figure）となりますので，化石の写真などを貼る場合は最大の巾と長さは15×20cmの範囲内に入れてください。ただしこれより小さい場合は任意の大きさで構いませんが，原寸を希望する場合はなるべく巾15cmあるいは7cmの範囲内に入れてください。

お こ と わ り

編集規定には〔共著者であっても，同一著者による論文は，原則として同一号には掲載されない〕とあります。本号の825と827の二論文はこれに抵触いたしますが，No. 143と同様に編集の都合上特例として掲載いたしました（編集委員長）。

○文部省科学研究費補助金（研究成果公開促進費）による。

1987年4月25日 印刷
1987年4月30日 発行

ISSN 0031-0204
日本古生物学会報告・紀事
新篇 145号
2,500円

発行者 日本古生物学会
文京区弥生2-4-16
日本学会事務センター内
（振替口座 東京 84780番）
（電話 03－817－5801）
編集者 猪郷久義・斎藤常正
編集幹事 野田浩司
印刷者 東京都練馬区豊玉北2の13
学術図書印刷株式会社 富田 潔
（電話 03－991－3754）

Transactions and Proceedings of the Palaeontological Society of Japan

New Series No. 145 April 30, 1987

CONTENTS