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A New Upper Triassic Nautiloid from Okinawa-jima (Paleontological Study of the Ryukyu Islands—VI)

Takeshi ISHIBASHI

Abstract

A new species, *Indonautilus konishii*, is described here from the Upper Triassic Nakijin Formation of Okinawa. This is first record of *Indonautilus* from the Carnian of Triassic. The Triassic nautiloids in Japan are also noted in this article.

Introduction

Nautiloids are evidently far less numerous than ammonoids in the Mesozoic Era. Triassic coiled nautiloids have been systematically described by KUMMEL (1953, 1965). Although it is not sufficient to construct the phylogeny of this group of fossils only on the basis of present materials, the present new species, found in the Upper Carnian *Juvavites* cf. *kellyi* zone, may be useful for making clear the phylogeny of *Indonautilus*.

The present specimen was collected from the Triassic Nakijin Formation in Okinawa. This formation consists mainly of limestone, with a subordinate amount of mudstone and chert in the upper member which yields an abundance of ammonites (ISHIBASHI, 1970, 1973, 1975). The ammonites are recognized in three faunal zones, *Sirenites* cf. *nanseni*, *Sandlingites* aff. *oribasus* and *Juvavites* cf. *kellyi* zones in ascending order. The present nautiloid specimen occurs at the uppermost horizon 1 (ISHIBASHI, 1969) together with many ammonites in the *Juvavites* cf. *kellyi* zone. Some coleoid cephalopods also were collected from the same horizon and will be described in a separate paper.

I would like to express my deepest appreciation to Professor Tatsuro MATSUMOTO of Kyushu University for his guidance and valuable suggestions throughout the course of cephalopod paleontology. The present paper is dedicated to Professor MATSUMOTO on the occasion of his retirement from Kyushu University in 1977. My sincere thanks are due to Professor Ryuzo TORIYAMA of Fukuoka University for his encouragement and reading of the manuscript. Acknowledgements are also due to Miss Seiko HAYAKAWA for typewriting the manuscript.

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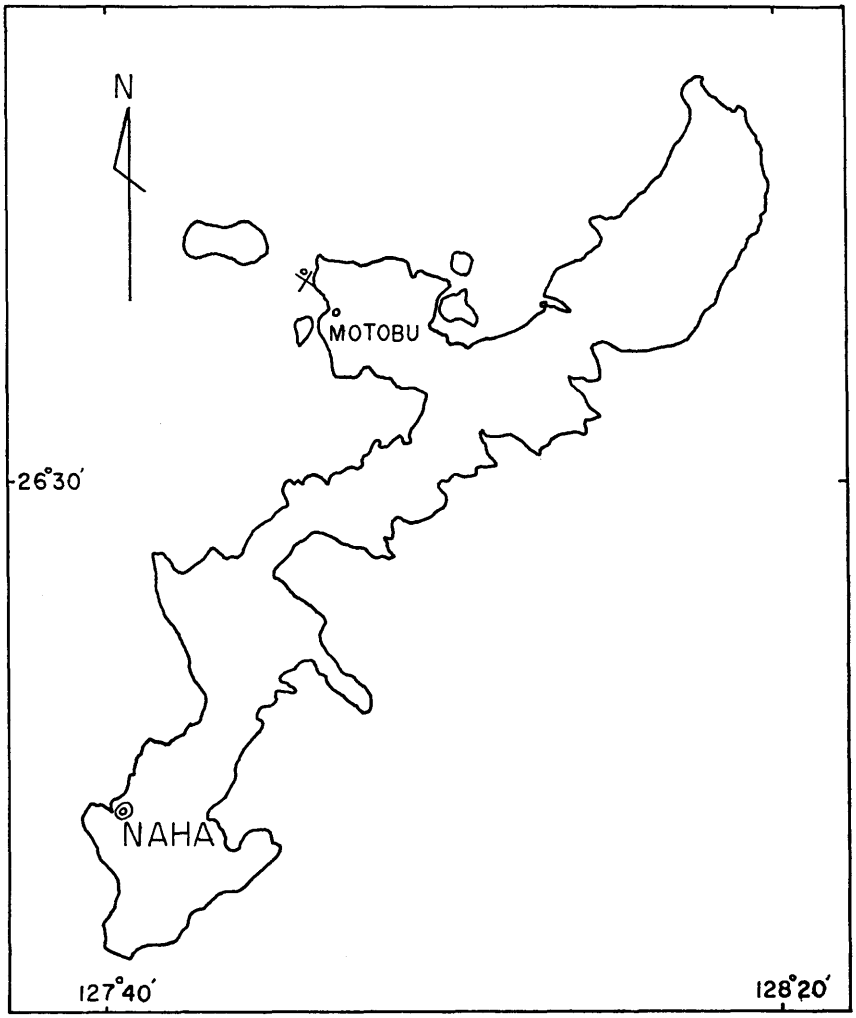
Notes on the Triassic nautiloids in Japan

In Japan coiled nautiloid species have not been reported in so large number

as ammonoid ones, being the smallest in number in the Mesozoic era, six species in the Triassic and eight in the Cretaceous of Japan. None of them has hitherto been known from the Jurassic system.

The Triassic nautiloid was first reported from the Rifu Formation, Kitakami Massif by YABE and SHIMIZU (1927). They described two species, *Syringonautilus japonicus and Pleuronautilus*? sp. which occurred in the *Protrachyceras reitzi* zone of Lower Ladinian, but the latter species was not illustrated. BANDO (1964) described *Pleuronautilus* (*Holconautilus*) *yabei,* collected from the same locality and horizon of the Rifu Formation as that of the previous two species, but he did not give the comparison between them. Judging from their descriptions, the two specimens seem to be different from each other.

One more species, *Grypoceras* sp., was reported by OBATA et al., (1975) from the Zohoin Formation, Shikoku, in which representatives of *Protrachyceras,*



Text-figure 1. Map showing the locality *Indonautilus konishii* sp. nov.

P. aff. *archelaus* and *P.* cf. *pseudoarcheraus* are known to occur. Since the specimen has only a part of the outer whorl and is not well preserved, better materials are necessary for assigning the taxonomic position.

Only one species, *Holconautilus* sp., was reported by ISHIBASHI (1972), in the Carnian Tanoura Formation of southern Kyushu. The specimen is a fragmentary whorl and smaller than those of the Rifu Formation. A Norian nautiloid named *Germanonautilus kyotanii* was described by NAKAZAWA (1959) from the Nariwa Formation, Okayama, western Japan. The specimen is well preserved showing the fine striae on surface and the suture-line which has a relatively deep lateral and a ventral lobes.

In addition to these six species, a new species, *Indonautilus konishii*, is described in this article. The Triassic coiled nautlods so far known in Japan are listed as follows:

Tainoceratidae	
Germanonautilus kyotanii NAKAZAWA	Norian
Holconautilus yabei (BANDO)	Ladinian
Holconautilus sp.	Carnian
Pleuronautilus ? sp.	Ladinian
Grypoceratidae	
Grypoceras sp.	Ladinian
Syringonautilidae	
Syringonautilus japonicus YABE et SHIMIZU	Ladinian
Liroceratidae	
Indonautilus konishii sp. nov.	Carnian

Description of a species

Superfamily Clydonautilaceae HYATT et ZITTEL, 1900

Family Liroceratidae MILLER et YOUNGQUIST, 1949

Genus *Indonautilus* MOJSISOVICS, 1902

Type-species:—*Nautilus kraffti* MOJSISOVICS, 1902 (=*Nautilus* sp. indet. ex. *N.* aff. *mesodici* MOJSISOVICS, 1896)

1902. *Indonautilus* MOJSISOVICS; *Abhandl. Geol. Reichsanst. Wien*, **6**, Suppl., p. 205.
1915. *Indonautilus* MOJSISOVICS; DIENER, *Fossilium Catalogues*, Cephalopoda Triadica I, p. 333.
1932. *Indonautilus* MOJSISOVICS; KUTASSY, *Ibid.*, Cephalopoda Triadica II, p. 716.
1953. *Indonautilus* MOJSISOVICS; KUMMEL, *U. S. G. S. Prof. Paper*, (250), p. 72.
1960. *Indonautilus* MOJSISOVICS; KUMMEL, *Bull. Mus. Comp. Zool., Harvard College*, **123**, (7), p. 297.
1964. *Indonautilus* MOJSISOVICS; KUMMEL et al., *Treatise Invert. Paleont.*, Mollusca 3, Pt. K, p. 447.

Remarks:—The genus *Indonautilus* was established by MOJSISOVICS, 1902 as a taxon of the family Clydonautilidae. The type-species, *Indonautilus kraffti*,

was designated by him on the basis of *Nautilus* sp. indet. ex aff. *N. mesodici* reported from Himalaya region. He mentioned that *Indonautilus* is similar to *Paranautilus* but differs from *Grypoceras*.

KUMMEL (1950) established the family Paranautilidae in which *Paranautilus*, *Indonautilus* and *Sibyllonautilus* are included. He summarized the phylogeny of Triassic coiled nautiloids in 1953. Later he recognized strong affinities between Paranautilidae and Liroceratidae and included the former into the latter family (KUMMEL, 1960; KUMMEL et al., 1964). The Russian *Osnovy* (RUZHENTSEV et al., 1962) treated *Indonautilus* as a member of Paranautilidae. In this paper I follow the scheme proposed by KUMMEL et al., (1964) in the American Treatise for the taxonomy of nautiloid families.

The genus *Indonautilus* includes three Triassic species as follows:

(1) *Indonautilus kraffti* (MOJSISOVICS)

This species is the type-species of the genus, and was originaly reported from the *Halorites*-limestone of the Himalaya region. The holotype is relatively small, 48 mm in diameter, with 2 mm of (MOJSISOVICS, 1896, p. 673) umbilical perforation. DIENER (1908) described a well preserved and fine specimen assignable to *I. kraffti* from Spiti in the Himalaya. This specimen is 147 mm in shell diameter, with an umbilicus of 10 mm, representing the largest shell of the genus. JAWORSKI (1915) described *Nautilus* sp. indet. (ex. aff. cf. *kraffti* MOJSISOVICS) from Misol Island, Indonesia, which was referred to *Indonautilus* by KUMMEL (1953, p. 73). This specimen is 52 mm in shell diameter. These three specimens are known from Norian beds.

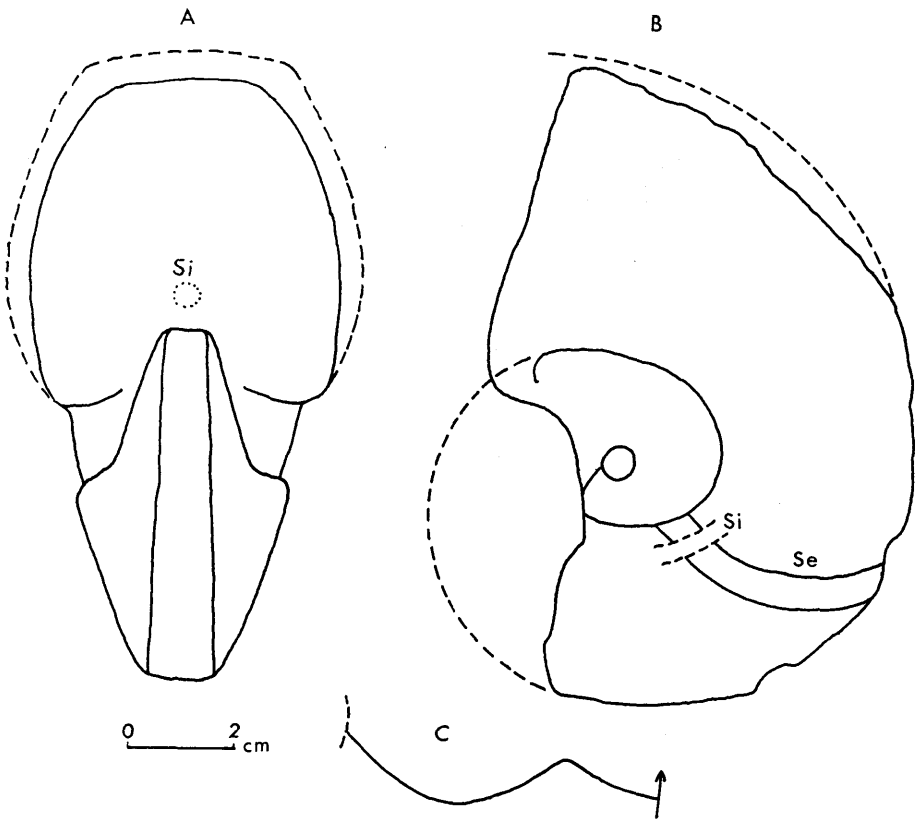
(2) *Indonautilus awadi* KUMMEL

The materials composed of four specimens from Araif-el-Naga, Sinai, Egypt and other from Makhtesh Ramon, Israel were paleontologically studied by KUMMEL (1960). The holotype from Egypt has a shell of 72 mm in diameter, and the paratype from Israel is 80 mm in diameter. There are some morphological differences between the specimens from Egypt and Israel, but he considered these differences as variation within a species. This species occurred in the Anisian, Middle Triassic.

(3) *Indonautilus konishii* sp. nov.

The present new species was collected from the Upper Triassic bed of Okinawa together with many ammonites. The bed belongs to *Juvavites* cf. *kellyi* zone, middle Upper Carnian in age. *Indonautilus konishii* is an important species linking *I. awadi* of Anisian and *I. kraffti* of Norian.

KRUMBECK (1913) reported *Nautilus* (*Indonautilus*) *subbambanagensis* from the Norian bed of Buru Island, Moluccas, Indonesia. The specimen is ca. 45 mm in diameter and has a relatively round venter, being similar to *Paranautilus* in general shape of the shell. KUMMEL (1953, p. 73) referred this species to the genus *Paranautilus*, whom I follow.



Text-figure 2. Diagrammatic sketches of frontal (A), longitudinal (B) sections and suture-line (C). Se; septum: Si; siphuncle

Indonautilus konishii sp. nov.
Pl. 65, Figs. 1–3; Text-figs. 2, 3

Material:—The specimen at hand (GK.F 566) is the holotype composed of a moderately large conch having 110 mm in diameter and 52 mm in width. The umbilicus is 17 mm in diameter. The last whorl of the living chamber is secondarily deformed inside.

Description:—Shell involute, large discoidal, laterally compressed with flattened sides, generally wider toward the last chamber in whorl section fine radial striae observed on flank; umbilicus moderately small, with abruptly rounded umbilical shoulder; venter flattened or slightly rounded, gradually widen toward the last chamber with angle of ca. 10 degree, ventral shoulder abruptly rounded like the umbilical one; suture relatively simple, with a broadly concave lateral lobe and a broad shallow ventral lobe; siphuncle subdosal.

Remarks:—The aperture of the present specimen is deformed on both sides, but the conch and other characters are well preserved for identification. The present species is similar to *Indonautilus awadi* KUMMEL, 1960, from Israel and Egypt, in lateral view and whorl sections, but differs in its larger size,

A B

Text-figure 3. Photographs of ventrolateral view showing sutures (A) and ventral view (B) of *Indonautilus konishii* sp. nov.

characteristic ventral view and a broader lateral lobe; especially the former has more abruptly rounded ventrolateral and umbilical shoulders than the latter.

Indonautical kraffti, from the Himalaya and Moluccas, somewhat resembles the present species but is distinguished by the greater expansion of the whorl width and suture of shallow lateral and ventral lobes.

The specific name is dedicated to Professor Kenji KONISHI of Kanazawa University who investigated the geology of Ryukyu Islands after the World War II, and gave me chances to study the geology of this district.

Occurrence:—Horizon 1 (Ya). Locality 1, Yamakawa, argillaceous limestone, Motobucho, Okinawa-jima. Upper Member, Nakijin Formation: Upper Carnian [*Juvavites* cf. *kellyi* zone].

Concluding Remarks

A new species, *Indonautilus konishii*, described in this article. The present species records the first occurrence of *Indonautilus* in the Carnian, Triassic and is an important one linking *I. awadi* of Anisian and *I. kraffti* of Norian.

The genus *Indonautilus* generally has a flattened or slightly rounded venter and the tendency to increase shell diameter and apertural breadth. The suture-line has a broadly concave lateral and a broad shallow lobes. Judging from its characters *Indonautilus* might derived together with *Paranautilus* and *Sybillo-nautilus* from *Liroceras* in late Permian.

References

BANDO, Yuji (1964): On some Middle Triassic fossil cephalopods from Japan, with a note on the Middle Triassic formations in Japan. *Japan. Jour. Geol. Geogr.*, 35, (2–4), 112–137, pl. 5.

DIENER, Carl (1908): Ladinic, Carnic and Noric Fauna of Spiti. *Geol. Surv. India, Palaeont. Indica*, [15], **3**, (3), 1–157, pls. 1–24.

——— (1915): *Cephalopod triadica* I. Fossilium Catalogus, Animalia, Pars 8, 1–369, Junk Berlin.

ISHIBASHI, Takeshi (1969): Stratigraphy of the Triassic Formation in Okinawa-jima, Ryukyus. *Mem. Fac. Sci., Kyushu Univ.*, [D, Geol.], **19**, (3), 373–385, pl. 53.

——— (1970): Upper Triassic Ammonites from Okinawa-jima, Part I. *Ibid.*, [D, Geol.], **20**, (2), 195–223, pls. 29–29.

——— (1972): Upper Triassic cephalopods from the Tanoura district, Kumamoto Prefecture, Japan. *Trans. Proc. Palaeont. Soc. Japan*, [N.S.], (88), 447–457, pl. 54.

——— (1973): Upper Triassic Ammonites from Okinawa-jima, Part II. *Mem. Fac. Sci., Kyushu Univ.*, [D, Geol.], **22**, (1), 1–12, pls. 1–3.

——— (1975): Upper Triassic Ammonites from Okinawa-jima, Part III. *Ibid.*, [D, Geol.], **22**, (2), 192–213, pls. 27–28.

JAWORSKI, E. (1915): Die Fauna der Obertriadischen *Nucula*-Mergel von Misol. *Palaontologie von Timor*, **2**, (5), 71–174, pls. 43–45.

KRUMBECK, L. (1913): Obere Trias von Buru und Misol. In BOEHM, 1913, Beiträge zur Geologie von Niederlandisch Indien, Abt. 2. *Palaeontographica*, Suppl. 4, 1–161, pls. 1–11.

KUMMEL, B. (1950): Triassic stratigraphy of the area around the Green River Basin, Wyoming. *Wyoming Geol. Assoc., Fifth Ann.* Field Conf. Guidebook, 28–37.

——— (1953): American Triassic coiled nautiloids. *U. S. Geol. Surv., Prof. Paper*, (250), 1–104, pls. 1–19.

——— (1960): Middle Triassic nautiloids from Sinai, Egypt and Israel. *Bull. Mus. Comp. Zool., Harvard College*, **123**, (7), 285–302, pls. 1–4.

——— et al. (1964): *Treatise on Invertebrate Paleontology*, Pt. K, Mollusca 3, Ed. MOORE, R. C., 1–519, Geol. Soc. Amer. & Univ. Kansas Press.

KUTASSY, A. (1933): *Cephalopoda triadica II.* Fossilium Catalogus, Animalia, Pars. **56**, Junk, Berlin.

MOJSISOVICS, E. (1896): Beiträge zur Kenntniss der obertriadischen Cephalopoden-Faunen des Himalaya. *Denkschr. Akad. Wiss. Wien*, **63**, 575–701, pls. 1–22.

——— (1902): Die Cephalopoden der Hallstätter Kalke, Supplement. *Abhandl. Geol. Reichsanst. Wien*, **6**, Pt. 3, Suppl., 175–356, pls. 1–32.

NAKAZAWA, K. (1959): Two cephalopod species from the Norian Nariwa Group in Okayama Prefecture, West Japan. *Japan. Jour. Geol. Geogr.*, **30**, 127–133, pl. 11.

OBATA, I et al. (1975): A Triassic nautiloid from Shikoku. *Mem. Nat. Sci. Mus.*, (8), 21–26. (in Japanese with English summary).

RUZHENTSEV, V. E. et al. (1962): *Mollusks, Cephalopoda I.* Osnovy Paleontologii (Ed. ORLOV, Yu. A.), 1–438, 89 pls., Moskow (in Russian).

YABE, H. and SHIMIZU, S. (1927): The Triassic Fauna of Rigu near Sendai. *Tohoku Imp. Univ., Sci. Rep.*, [2nd, Geol.], **11**, (2), 101–136, pls. 10–14.

Explanation of Plate 65

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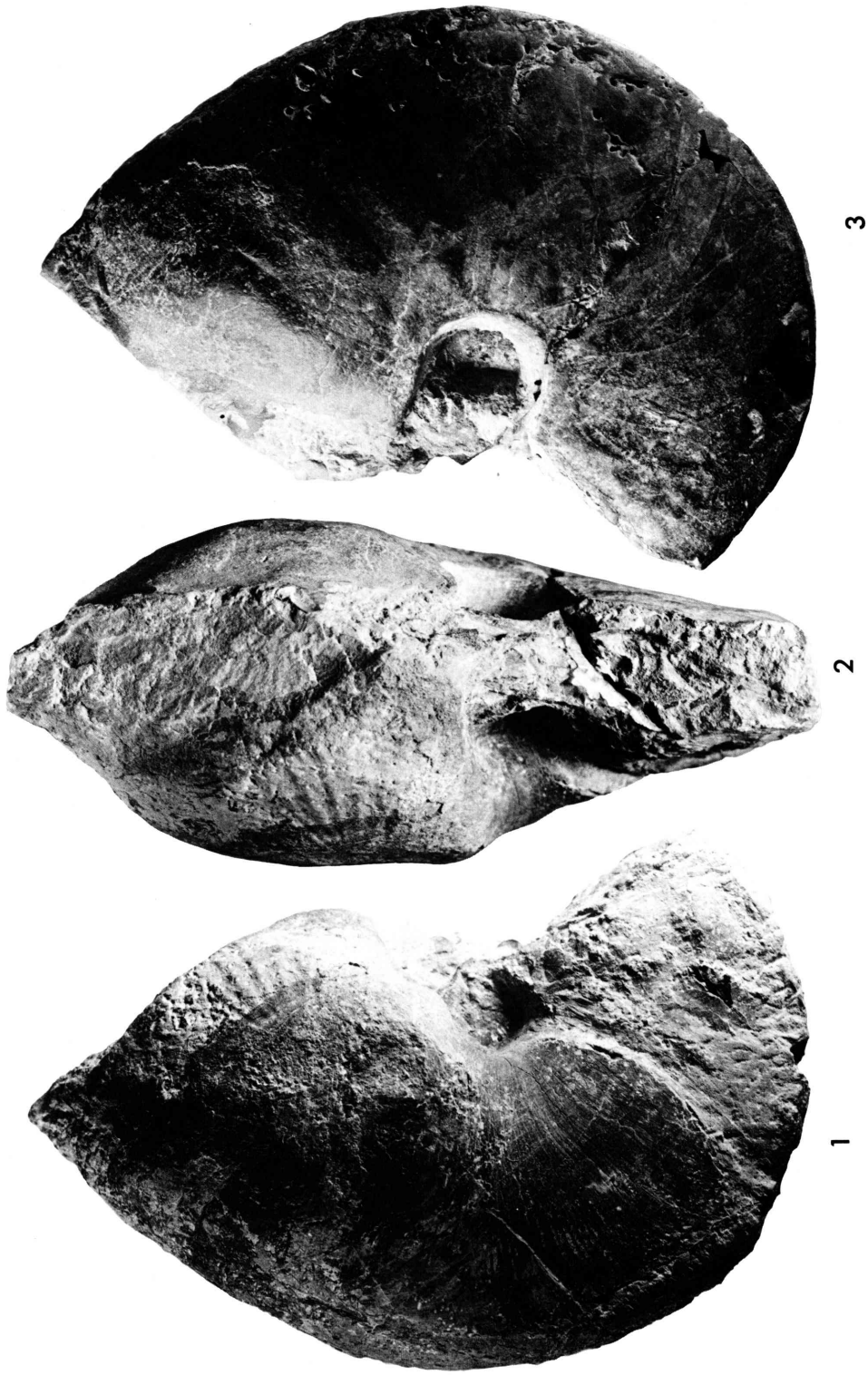
Figs. 1 and 3. Lateral views

Fig. 2. Frontal view. (GK. F566)

See page 413, Text-figure 2 of diagrammatic sketches and page 414, Text-figure 3, for other views.

(All figures natural size)



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