

NATIONAL RESEARCH COUNCIL OF JAPAN

學術研究會議編纂

日本地質學地理學輯報

原著及抄錄

昭和二十二年 第二十卷 第二, 三, 四號

JAPANESE JOURNAL
OF
GEOLOGY AND GEOGRAPHY

Transaction and Abstracts

Vol. XX, Nos. 2-4

TOKYO

March 25th, 1947

13. On the Occurrence of *Discosphinctes* in the Kitakami Mountains in Nippon.

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(Contribution from Geol. Inst., Imp. Univ. Tokyo.)

[With Plate XIII]

Ammonites are uncommon in the Upper Jurassic formation in the Kitakami Mountainland. A few species known to occur in it remains undescribed. The junior author made a small collection of ammonites in addition to *Trigonia* of *formosa* group and several other pelecypods in purplish or greenish dark brown sandstone beds of Kogoshio in the Shishiori series exposed on the sea-shore north of Isokusa, Oshima-mura, Motoyoshi-gun, Miyagi-ken. This is the locality whence SHIDA¹⁾ once reported *Perisphinctes* (*Paraboliceras*) sp. nov.

The collection of ammonites comprises six individuals all of which apparently belong to the same species, although three of them are too badly preserved to allow anything definite to be said. The three others, each represented by an internal and an external mould, are also not well-preserved, but the general concept of this species of ammonite figured out from such specimens, shows that it is most probably a new species of *Discosphinctes* rather than a *Paraboliceras*. Therefore the fossil horizon of Isokusa may be Argovio-Kimmeridgian or thereabout.

Perisphinctes (*Discosphinctes*) *isokusense* KOBAYASHI and FUKADA, *new species*.

Plate XIII, figures 2-4.

Description.—Spire coils very rapidly. Shell is so involute that the penultimate whorl is possibly about half enclosed by the ultimate one. Compressed secondarily, it is difficult to figure out the original aspect of the cross section of the last whorl. In the present state its lateral area is only slightly convex and abruptly curved near the periphery. The angulation along the periphery is evidently due to secondary deformation. The internal mould shows that the whorl is thickest at a point about one-third from the umbilical margin. The lateral area forms a rectangle with the umbilical slope. The umbilicus is narrow and very deep.

1) T. SHIDA (1940), On the Geology of Kesenuma-machi and its Environs in Miyagi Prefecture. *Contr. Inst. Geol. Pal. Tohoku. Imp. Univ. Sendai*, No. 33.

There are about eight primary ribs in a quarter of the last whorl which are broader than the intervals. They are quite prominent near the umbilical angulation, but soon become more or less obsolete. A primary rib bifurcate at a point one-third of the way across from the umbilical margin. The two ribs thus introduced are broad but only slightly convex. One of them sometimes appears to be more slender than the other which represents the direct extension of the primary one. This rib and sometimes the secondary one also, bifurcate once more at a point about two-thirds of the way across from the umbilical margin. These ribs become prominent in the peripheral zone, all strongly rounded and separated by narrow and deep grooves. These ribs reveal weak sigmoidal curvature, forwardly convex on the dorsal side and concave on the ventral side. They do not become weak in crossing the venter.

Dimensions and Observations:—The description given above is chiefly based on the largest specimen (figs. 3a–b) which is represented by an internal and an external mould of the last whorl. The profound involution above mentioned is seen in the internal mould. The dimensions of the complete shell estimated on the large and small specimens are as follows:

| | Large specimen. | | Small specimen. | |
|--------------------------------|-----------------|--------|-----------------|-------|
| Diameter of the shell. | Ca. 67 mm. | 100 % | 40 mm. | 100 % |
| Umbilical width. | Ca. 17 mm. | 25.4 % | 10 mm. | 25 % |
| Height of last whorl. | 35 mm. | 52.2 % | Ca. 16 mm. | 49 % |
| Thickness of last whorl.? | Ca. 15 mm. | 22.4 % | ? | ? |

The small specimen (figs. 2a–b) is represented by three-quarters of the last whorl but this whorl is deformed obliquely with the result that a part of the ribs is considerably strengthened near the ventral periphery and the lateral area is flattened or even becomes concave in part. Therefore the percentage of the whorl-height given above is quite conjectural.

The third specimen (fig. 4) consists of a quarter of the last whorl. This is also deformed strongly, but shows the same kind of ornamentation. It is interesting to see in a small fragment of a whorl about 8 mm. high which is found on a side of the second specimen, that the primary ribs are much more closely set and their branching is less frequent as seen in an earlier stage of the last whorl in *Perisphinctes arussiorum*.

Comparison:—The charactersitics above mentioned agree best with *Perisphinctes arussiorum* DACQUÉ²⁾ (fig. 1) which is the type of *Discosphinctes*. The mode of ribbing is quite similar to that of the type species, especially in its latest stage, though the interspace is broader in the type species. Furthermore the umbilicus appears relatively broader and the last whorl somewhat narrower in the type. *Perisphinctes (Discosphinctes) weymouthensis* (SPATH) as well as *Perisphinctes (Discosphinctes)*

2) E. DACQUÉ (1933–34), *Wilbellose des Jurà. GÜRICH's Leitfossilien 7te Lief.*

3) W. J. ARKELL (1935–38), *A Monograph on the Ammonites of the English Corallian Beds. Palaeontogr. Soc.*

the type species and the point of bifurcation is close to the periphery.

The present species has no median groove and the ribs run across the venter. There is no protuberance as commonly seen in *Paraboliceras*.⁴⁾

Occurrence:—A sandstone member of the Kogoshio formation in the Shishiori series at the sea-shore, adjacently north of Isokusa, Oshimamura, Motoyoshi-gun, Miyagi-ken, (Province of Rikuzen).



4) V. UHLIG (1910), The Fauna of the Spiti Shales. *Palaeontol. Indica, ser. 15, vol. 4, fasc. 2.*

Explanation of Plate XIII.

Perisphinctes (Discosphinctes) arussiorum DACQUÉ.

Figure 1. Reproduction from Arkell (1935-38), pl. E, fig. 1.

Perisphinctes (Discosphinctes) isokusense KOBAYASHI and FUKADA, new species.

Figures 2 a-b. A replica (2a) taken from an external mould and an internal mould of a small specimen; natural size.

Figures 3 a-c. An internal mould (3a) and a replica (3c) taken from an external mould of a large specimen; natural size.

Figure 4. A replica taken from external mould of the third specimen.

