

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

11. A New Species of *Ataxioceras* in Nippon.

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(Contribution from the Geological Institute, Imperial University of Tokyo.)

[With Pl. XI.]

Some years ago when the senior author¹⁾ was carrying on, jointly with IWAYA, a geological survey in the Sakuradani area in the Province of Awa, Mr. Kagetoshi HASHIMOTO, an ardent fossil collector there, generously gave him some ammonites from Kurisaka.²⁾ One of these ammonites was a lytacoceratid. Prior to this he found another lytacoceratid in the fossil collection of the Imperial University of Tokyo. This specimen was collected at Kubokawa³⁾ in the Monobegawa area in the Province of Tosa by Emeritum Professor Tsunenaka IKI⁴⁾ in 1896 when he was a student at the University.

The Nishikawa stream which is a branch of the Monobegawa flows along that village and a lens of Torinosu limestone contained in marl is exposed on the west side of the stream. In this marl bed IKI collected an ammonite and *Trigonia* 2 spp., the latter in a horizon a little above the former. For the geology of the middle part of the Monobegawa area where the locality lies the reader is referred to the paper by KURATA, AOTI and HUKASAWA.⁵⁾

HASHIMOTO's specimen was collected at Kurisaka in the Kurisaka formation in the Decke of the same name, where it overlies the Chichibu group disconformably and is overlain by the Shobu formation with a bed of conglomerate at its base.

The authors have made a palaeontological study on all of these specimens recently with the result that the two specimens were found to belong to an undescribed species of *Ataxioceras*. Therefore the fossiliferous beds must be Kimmeridgian or thereabout.

* This is a product of studies on the Jurassic System which the senior author is now undertaking with the grant given to him from the Hattori-Hoko-Kai.

1) T. KOBAYASHI and Y. IWAYA (1941), On the Imbricated Structure of the Sakuradani Area in the Province of Awa. *Proc. Imp. Acad. Tokyo*, vol. 17.

2) 高知縣香美郡西川村久保川.

3) 德島縣那賀郡宮濱村栗坂.

4) T. IKI (1897), Geology of Eastern Tosa. *Graduation-Thesis from Geol. Inst. Imp. Univ. Tokyo*, MS; (1897), Jurassic and Cretaceous Formations in Tosa. *Jour. Geol. Soc. Japan*, vol. 4.

5) N. KURATA, K. AOTI and T. HUKASAWA (1941), Geology of the Middle Part of the Monobegawa Basin. *Jour. Geol. Soc. Japan* vol. 48.

Ataxioceras kurisakense, new species.

Plate XI, figures 2-3.

Description.—Spire coils very rapidly; umbilicus occupying about one-fourth the diameter of the shell and deep; no less than a half of the penultimate whorl embraced by the ultimate whorl.

Last whorl in cross section subelliptical in the early stage, but later becomes more thickened on the umbilical side; its thickness there corresponds to half its height; lateral side of the whorl almost flat but abruptly curves near the umbilical and ventral margins.

In the latter part of the penultimate whorl primary ribs are densely distributed and mostly bifurcate at its mid-height, but the point of bifurcation shifts to a point one-third the height away from the umbilical margin in the early part of the ultimate whorl; in the latter part of this whorl the primary ribs are more widely spaced and thickened on the umbilical side; they bifurcate or even trifurcate at a point about one-fourth the height away from the umbilical periphery and some of them bifurcate once more at about the mid-height; the riblets thus yielded more or less curve forward on the ventral side of the whorl and the branching point becomes obsolete; a constriction appears in the full-grown stage.

Observations.—The specimen from Kurisaka which is the holotype is an external mould, its approximate dimensions and their percentage-ratio being as follows:

Diameter of the shell	77 mm.	100%
Umbilical width	18 mm.	23.4%
Height of the last whorl	33 mm.	43.0%

The cross section is known only of the last two whorls. Though it may have been modified by secondary compression to some extent, it shows that the change of the section have been brought about through growth. In the latter part of this whorl the thickness corresponds to about one half of its height and the whorl is thickest at a point about one-fourth the height away from the umbilical margin.

Last whorl is almost flat on the lateral side but, sloping abruptly near the dorsal margin of the lateral area, it becomes subvertical on the umbilical wall. The umbilicus is deep. The peripheral margin of the whorl on the other hand is subangulated in form of a roof, caused by secondary compression.

Primary ribs are distributed fairly densely, ten of them being countable in the last quarter of the last whorl. The ribs there are more widely spaced than those behind. They become more close-set in the earlier stage by diminishing the breadth of the interspace, the point of their bifurcation lying at the mid-height. In the latter part of the whorl the primary rib is fairly strong on the umbilical side, but becomes as slender as the secondary and tertiary ones on the other side. One or two secondary

ribs branch off from a primary one at a distance of about one-third the height away from the umbilical margin, and sometimes a tertiary rib branches off from one of them at the median point of the whorl-height.

When the umbilical side of the secondary and tertiary ribs are obsolete, three or four ribs equal to the primary ribs appear to be inserted between two primaries. These radially disposed ribs are very slightly convex backward. The convexity is however somewhat stronger in some of the secondary and tertiary ones than in the others. They appear on the whole to turn forward near the periphery. Though the original curvature of the periphery is indeterminable, the conclusion is quite warranted that there is neither a keel nor a groove on the peripheral margin. The three kinds of ribs run across the margin without any interruption.

Paratype specimens from Kubokawa consist of an external mould and an internal cast of a fragmentary last whorl which is about one and a half times taller than that of the preceding specimen. It may have had originally a similar section of the whorl but in its present form it is more strongly compressed laterally. Though deformed, it can be recognized that the last whorl is thickest at a point about one-third the height away from the umbilicus, and abruptly curved near the umbilicus. On one side of the cast it can be seen in the part where the ultimate whorl is broken, that a half of the penultimate whorl is involuted by the ultimate one.

Its ornamentation is quite similar to that of the preceding. On the penultimate whorl radial ribs are closely set and bifurcate at about its mid-height. In a sextant of the last volution there are about seven primary ribs which are thickened near the umbilical margin. Though the point of furcation is generally obscure, the rib appears to branch off once at a point one-fourth of the way across from the margin and sometimes again at another point at about the middle of the whorl-height. Thus bifurcated or trifurcated, about 18 to 19 ribs are distributed on the ventral side in the space involving four primaries and three intervals on the umbilical side. These numerous ribs on the dorsal side are the same in strength, and usually narrower than their interspace on the cast but the breadth is about the same between the ribs and grooves on the external mould. In the anterior part there is a relatively broad and shallow depressed band, or probably a constriction.

It is quite reasonable to take this form as *A. kurisakense* in its more grown stage than in its holotype. The septal suture is very obscurely shown on the posterior side of the cast. It looks similar to that of *Ataxioceras hypselocyclus* FONTANNES in that the external lateral lobe is apparently located at a point about one-third the whorl-height away from the periphery and inside of this point the front of three saddles extends forward abruptly from the dorsal to the first lateral one.

Comparison.—The type species of this genus is *Perisphinctes*

(*Ataxioceras*) *hypselocyclus* FONTANNES on which ARKELL⁶⁾ made a restudy. This specimen is closely allied to this species, especially to his lectotype in fig. 1, but can be distinguished from that species and also from *Perisphinctes* (*Ataxioceras*) *lothari* OPPEL⁷⁾ by the denser primary ribs, or more precisely, the primaries in the last quadrant of the last whorl number seven or eight in *hypselocyclus* and six or seven in *lothari*. There are a few distinct constrictions in the latter but none in the former. This appears to have only one constriction in its full-grown stage. Furthermore the diameter of the umbilicus in proportion to the shell-diameter is a little larger in these two than in this species. Incidentally it is to be noted that *lothari* is the type species of SCHINDEWOLF's *Parataxioceras*,⁸⁾ but according to ARKELL this genus is a synonym of *Ataxioceras*.

None of perisphincti from Kachh which SPATH⁹⁾ referred to *Ataxioceras* appears similar to this species. *Lithacoceras tarodaense* KOBAYASHI¹⁰⁾ is a sole representative of lithacoceratid in the Jurassic fauna of Nippon. It is easily distinguishable from this species by its much larger umbilicus, lessened degree of involution and stronger convexity of ribs.

Occurrence:—Kurisaka formation at Kurisaka; Torinosu series at Kubokawa.

6) W. J. ARKELL (1935), On the Lower Kimeridgian Ammonite Genera *Pictonia*, *Rasenia*, *Aulacostephanus* and *Ataxioceras*. *Geol. Mag.* vol. 72.

7) P. DU LORIOU (1877), Monographie Paléontologique des Couches de la Zone à *Ammonites tenuilobatus* (Badener Schichten) de Baden (Argovie) 2e Pt. *Mém. Soc. Pal. Suisse*, vol. 4.

8) O. H. SCHINDEWOLF (1925), Entwurf einer Systematik der Perisphincten. *Neues Jahrb. für Min. usw. Beil.-Bd.* 37.

9) L. F. SPATH (1931-33), Revision of the Jurassic Cephalopod Fauna of Kachh (Cutch). *Pal. Indica*, N. S. 9, mem. 2, pts. 4, 6.

10) T. KOBAYASHI (1935), Contributions to the Jurassic Torinosu Series of Japan. *Japan. Jour. Geol. Geogr.* vol. 12.

Explanation of Plate XI.

Perisphinctes (Ataxioceras) hypselocyclus FONTANNES

Figure 1. Reproduction from ARKELL (1935), pl. XI, fig. 1.

Ataxioceras kurisakense KOBAYASHI and FUKADA, new species

Figure 2. Plaster cast taken from the holotype external mould from Kurisaka; natural size.

Figure 3a-c. Two views of the internal cast and a plaster cast taken from the external mould of the paratype collected from Kubokawa; natural size.

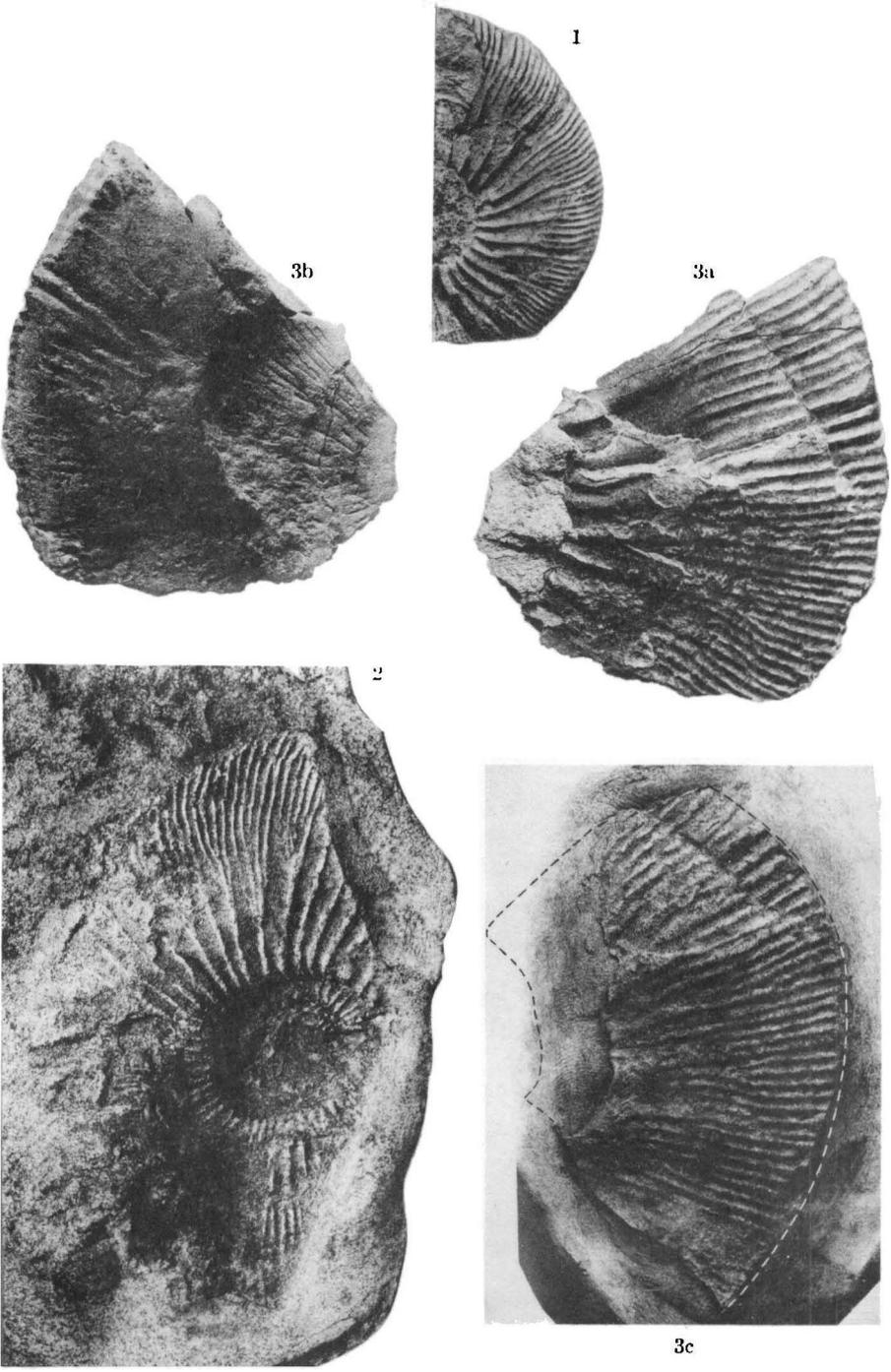


Photo. by UEKI; retouched by SUZUKI.