

The turrilitid ammonoid *Mariella* from Hokkaido—Part 3

(Studies of the Cretaceous ammonites from Hokkaido and Sakhalin—LXXXVII)

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Abstract. *Mariella (Mariella) lewesiensis* (Spath, 1926) from the Cretaceous of the Hobetsu district, south-central Hokkaido, is described. It is represented by a large specimen, from which a question may arise about the previous view of dimorphism. This species is not directly related to *M. (M.) dorsetensis* (Spath, 1926). It has some affinities with *M. (M.) cenomanensis* (Schlüter, 1876).

Key words: Cretaceous, dimorphism, Hokkaido, *Mariella (Mariella) lewesiensis*, Turrilitidae

Introduction

Altogether eight species of the genus *Mariella* from Hokkaido have been described successively in Part 1 (Matsumoto *et al.*, 1999) and Part 2 (Matsumoto and Kawashita, 1999) under the same title as this paper. They are based primarily on a number of specimens from the mid-Cretaceous members of the Middle Yezo Subgroup in the Soeushinai area [=Shumarinai–Soeushinai area by some authors] of northwestern Hokkaido and on supplementary material from the correlative part in the Yubari Mountains of central Hokkaido.

An additional species of *Mariella* described here is represented by a large specimen which was found by T. K. from the Hobetsu district of south-central Hokkaido. At the request of the Mikasa City Museum [MCM] the specimen was temporarily put on public display there without, however, its being assigned specific name. With the consent of MCM we have recently investigated it to settle its systematic allocation. The described specimen is now officially registered at the National Science Museum [NSM] in Tokyo as a donation by T. K.

Paleontological description (continued)

Mariella (Mariella) lewesiensis (Spath, 1926)

Figures 2–4

Turrilites bergeri Sharpe, 1857, p. 65 (*pars*), pl. 26, fig. 10 only.

Turrilites lewesiensis Spath, 1926, p. 429.

Mariella lewesiensis (Spath). Spath, 1937, p. 512.

Mariella (Mariella) dorsetensis (Spath, 1926). Renz *in*, Renz *et al.*, 1963, p. 1095, pl. 1, fig. 3; Klinger and Kennedy, 1978, p. 31, pl. 9, fig. F, text-figs. 3A, 8A; Kennedy *et al.*, 1979, p. 18, pl. 1, fig.

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Mariella (Mariella) lewesiensis (Spath, 1926). Kennedy, 1971, p. 27, pl. 8, figs. 1, 4, 5, 8; Juignet and Kennedy, 1976, p. 62, pl. 3, fig. 17; Atabekian, 1985, p. 37, pl. 7, fig. 1; pl. 8, fig. 1; Wright and Kennedy, 1996, p. 339, pl. 100, figs. 4, 13, 23, 27; pl. 101, figs. 2, 3; pl. 103, figs. 6–8.

Type.—Holotype, by monotypy, is BMNH 3355B, the original of Sharpe, 1857, pl. 26, fig. 10 (reillustrated by Wright and Kennedy, 1996, pl. 101, fig. 3). It was studied by T. M. at the British Natural History Museum (BMNH) in 1979.

Material.—NSM PM16123. This specimen was collected by T. K. on 19 September 1973 at his locality no. 21 from the mudstone outcrop on the right side of a stream called the Matsukashimapu, about 600m NW of Sanushi Bridge, Inasato area in the Hobetsu district, south-central Hokkaido (Figure 1). The geologic structure is complicated in the Inasato area, where strata seem to be much disordered by folding and thrusting.

Description.—The specimen (Figures 2, 3) is in the state of half-ammonoid preservation (see Maeda, 1987 for this technical term). It is, however, magnificent in its large size, nearly 270mm in total height consisting of 7 preserved whorls and roughly 120mm in diameter at the last whorl (i.e., part of the body chamber). It would be nearly 400mm in tower height, if the missing younger whorls were added. The estimated apical angle is 21°. The late part (at the fifth whorl from the preserved top in Figure 2) is secondarily displaced from the main part, whereas the middle whorl (the third whorl from the preserved top) is almost undeformed.

The septal suture is partly exposed on this whorl (Figure 4).

The upper part of the exposed whorl face is broadly convex and smooth. It slopes down to the gently convex or nearly vertical main flank, which in turn slopes down

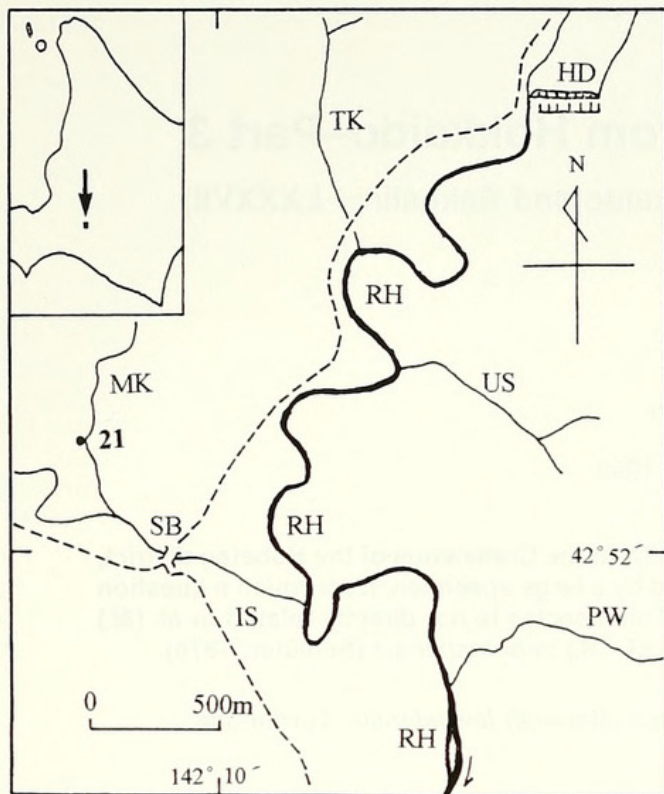


Figure 1. Map showing the location of T. Kijima's Loc. 21 where *Mariella (Mariella) lewesiensis* (Hobetsu specimen) was obtained. HD=Hobetsu Dam; IS=Inasato; MK=Matsukashimapu-zawa; PW=Penke-wakka-tannenai-zawa; RH=River Hobetsu; SB=Sanushi Bridge across the River Sanushibe; TK=Takikawa-no-sawa; US=Uesugi-zawa. The term sawa or zawa means a rivulet. Broken line: highway.

considerably inward. Thus the interwhorl junction is deeply impressed.

Each whorl is ornamented by tubercles in four rows. The tubercles of the upper two rows are coarse and fairly strong, although those of the second row are slightly smaller than those of the first row. On the whorls of the early to middle growth stages the tubercles are somewhat transversely and obliquely elongated. In later growth stages the tubercles of the upper two rows are very coarse, showing a subelliptical base, a domelike shape and a spinose peak. The tubercles of the third row are somewhat smaller than those of the second row in the early to middle growth stages. In the later growth stages they become much smaller, weaker and obliquely clavate (i.e., spirally elongated) in contrast to the enlarged tubercles of the upper two rows. The three rows on the exposed whorl face are disposed at subequal but slightly decreasing intervals downward (Figures 2, 3).

The tubercles of the fourth row are close to those of the third and run along the lower whorl seam, giving crenulation to the interwhorl junction. They are scarcely visible in earlier growth stages, but become more obvious on the lower whorl face in later stages. The tubercles of the first to fourth rows are aligned in an obliquely adoral orientation, but they do not form clear ribbing. Although the basal surface is not fully exposed, distinct ribs do not seem to run from the tuber-

cles of the fourth row. A series of shallow dimplelike depressions is discernible between the upper two rows of tubercles, but it does not form a wide and deep furrow like that of *Mariella (Wintonia)*.

Comparison.—The middle part of this specimen is comparable with the septate holotype and some other example of *M. (M.) lewesiensis* (e.g., Wright and Kennedy, 1996, pl. 101, figs. 3, 2; Atabekian, 1985, pl. 8, fig. 1). In its less deformed whorl, i.e., the third whorl from the top, the height [H] is 32mm at diameter [D] 72mm, hence, H/D is 0.47. These proportions conform with those of the holotype at a corresponding stage, where H=30.5mm, D=67.0mm and H/D=0.47. Similarity is also observable in the ornament. There are 21 tubercles in each row per whorl in the holotype. The Hobetsu specimen shows eleven tubercles in the exposed half of the whorl at the middle growth stage, although the number seems to decrease to 7 or 8 at the last stage. The smooth surface in the upper part of the exposed whorl face immediately below the upper seam is a diagnostic character of this species. This feature is clearly observed in the Hobetsu specimen. The faint ribbing on the basal surface in this species also occurs in our specimen. To sum up, the described specimen is certainly identified with *M. (M.) lewesiensis*.

Discussion.—The Hobetsu specimen attains enormous size for *Mariella (M.) lewesiensis*. This raises the problem of dimorphism. Wright and Kennedy (1996, p. 340) have pointed out a dimorphic pair in this species, namely they regarded SMC B35910 (Wright and Kennedy, 1996, pl. 103, fig. 7) as an adult macroconch and SMC B35905 (Wright and Kennedy, 1996, pl. 100, fig. 27) as an adult microconch. The former is about 200mm in estimated original tower height with an inferred apical angle of 22°, whereas the latter is about 150mm in tower height with an apical angle of 21°.

The specimen from Hobetsu is almost twice as large as the so-called macroconch example (SMC B35910) from England in regard to the total whorl height (400mm) and also to the diameter (120mm) of the last whorl. This fact throws doubt on the previous evidence of dimorphism in *M. (M.) lewesiensis*. Further investigation, including the statistical examination on a sufficient number of specimens, is required for a definite conclusion.

Mariella (M.) lewesiensis has been often confused with *M. (M.) dorsetensis* (Spath). This is shown by the synonymy given in the description of the latter in Part 1 (Matsumoto *et al.*, 1999, p. 107) and that of the former in Part 3. Here we would like to comment that the two specimens illustrated by Benavides-Cáceres (1956, p. 108, pl. 40, figs. 8, 9) under "*Paraturrilites lewesiensis* (Spath)" should both be revised to *M. (M.) dorsetensis* (Spath), although one of them (Benavides-Cáceres, 1956, pl. 40, fig. 8 only) was considered so by many authors. Likewise, what was called *M. (M.) lewesiensis* (Spath) by Marcinowski (1974, pl. 32, fig. 13 without description), from the Lower Cenomanian of the Polish Jura Chain, is probably *M. (M.) dorsetensis*, because of the distinct ribs on the upper whorl face and the rows of granular tubercles on the convex flank at subequal intervals.

The morphological distinction between the two species has been already discussed in Part 1 (Matsumoto *et al.*, 1999). We offer here remarks on their affinities. *M. (M.)*



Figure 2. *Mariella (Mariella) lewesiensis* (Spath). Lateral view of NSM PM16123, $\times 2/3$. (Photo courtesy of Katsumi Shinohara, without whitening)



Figure 3. *Mariella (Mariella) lewesiensis* (Spath). NSM PM16123. Specimen turned about 60° clockwise from the position in Figure 2, $\times 2/3$. (Photo courtesy of Katsumi Shinohara, without whitening)

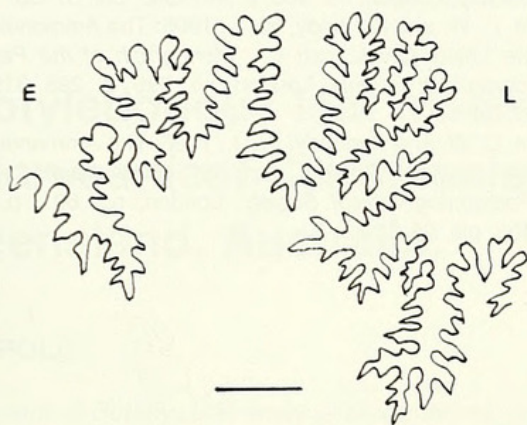


Figure 4. *Mariella (Mariella) lewesiensis* (Spath). External suture partly exposed on the preserved third whorl of NSM PM16123. E: external lobe; L: lateral lobe. Bar scale: 5 mm.

dorsetensis is closely allied to *M. (M.) bergeri* (Brongniart) of latest Albian age. The affinities of *M. (M.) lewesiensis* have not been much discussed, but recently Wright and Kennedy (1996, p. 344) have pointed out a close relationship between *M. (M.) lewesiensis* and *M. (M.) cenomanensis* (Schlüter, 1867). We would agree with them, although well preserved examples of *M. (M.) cenomanensis* have not been described from Hokkaido. Based on the description and plentiful illustrations by Wright and Kennedy (1996, p. 342, with a full synonymy, and pl. 100, figs. 3, 24, 26; pl. 101, figs. 1, 4; pl. 102, fig. 14; pl. 103, fig. 9; pl. 110, fig. 3; pl. 111, figs. 1, 3; text-figs. 136A and 141B; also Wright and Kennedy, 1995, text-fig. 129E for the suture), the following points are evident. In *M. (M.) cenomanensis* the upper part of the exposed whorl face is convex and smooth as in *M. (M.) lewesiensis*. The tubercles of the upper two rows are coarse in both species, but in the former the tubercles of the second row are clavate (i.e., spirally elongated) and disposed in the lower part of the flank, being separated from the first row by a broad, smooth zone. Some examples of *M. (M.) cenomanensis* (e.g., Wright and Kennedy, 1996, pl. 101, figs. 1, 2) are nearly as large as the Hobetsu specimen of *M. (M.) lewesiensis*.

Incidentally, "*Mariella (Mariella)* n. sp. aff. *lewesiensis* (Spath)," was mentioned by Kanie *et al.* (1977, p. 113, pl. 1, fig. 8) in their Madagascar paper. Actually it is one of the specimens (TKD 30080A from Loc. 71204 in the Shumarinai area) of *M. (M.) dorsetensis*, as has been recently described by Matsumoto *et al.* (1999, p. 108).

Distribution.—*Mariella (M.) lewesiensis* has been reported to occur in the Lower Cenomanian of southern England, France, Germany, Switzerland, Poland, Turkmenistan, Iran, Zululand (South Africa) and Madagascar (see synonymy for the references). Now its distribution is extended to Japan in the northwestern Pacific region.

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