

On some species of *Sharpeiceras* (Ammonoidea) from the Cretaceous of Hokkaido, North Japan

(Studies of the Cretaceous ammonites from Hokkaido and Sakhalin-LXXXIV)

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Tatsuro MATSUMOTO and Seiichi TOSHIMITSU (1998) On some species of *Sharpeiceras* (Ammonoidea) from the Cretaceous of Hokkaido, North Japan (Studies of the Cretaceous ammonites from Hokkaido and Sakhalin-LXXXIV). *Bull. Geol. Surv. Japan*, vol. 49 (12), p. 621-631, 2 figs., 2 tables., 3 plates.

Abstract: Two ammonite species, *Sharpeiceras florencae* Spath and *Sharpeiceras mocambiquense* (Choffat) are described as the first records of their occurrences in the Cretaceous of Hokkaido. The former, which has been known as fairly widespread, is now extended its distribution further to Hokkaido of the North Pacific region and can be called a cosmopolitan in the early Cenomanian time. *Sharpeiceras mocambiquense*, which was solely recorded from Mozambique, is now recognized to occur in the Lower Cenomanian of much distant Hokkaido. Further investigations would improve our knowledge on the taxonomy and distribution of various species of *Sharpeiceras* so that they would become good indices of the Lower Cenomanian for the global correlation.

1. Introduction

The Cretaceous ammonite genus *Sharpeiceras* includes several species which occur in much separated areas of the world, whereas a few others of the same genus have been recorded from a limited place. *Sharpeiceras kikuuae* Matsumoto and Kawashita, 1995 is, so far, an example of the latter case, whereas *S. mexicanum* (Böse, 1928) is that of the former case, since it has been recently found from Japan in addition to its occurrences in Mexico, Texas and Angola (Matsumoto and Kawashita, 1998). Whether the record from an isolated place implies really an endemic distribution or is merely due to insufficient investigation is a problem to be clarified.

In this paper we describe additional two *Sharpeiceras* species from Hokkaido which may be concerned with the above problem of distribution.

The repositories of the specimens described below are as follows, with the abbreviation of the institution at the heading:

GK: Department of Geology (so-called previously, but now changed to the Department of Earth and Planetary Sciences), Faculty of Science, Kyushu University, Fukuoka, 812-8581

GSJ: Geological Museum, Geological Survey of Japan, Tsukuba, 305-8567

YCM: Yokosuka City Museum, 95 Fukada-dai, Yokosuka, 238-0016

Details of the geographic and stratigraphic setting of the described ammonites are described in the previously published papers, which are to be indicated in the items of *Material* and *Occurrence* in the palaeontological descriptions. To supplement them Figures 1 and 2 are shown in this paper.

2. Palaeontological descriptions

Class Cephalopoda

Order Ammonoidea

Suborder Ammonitina

Family Acanthoceratidae Grossouvre, 1894

Subfamily Mantelliceratinae Hyatt, 1903

Genus *Sharpeiceras* Hyatt, 1903

Type species. — *Ammonites laticlavus* Sharpe, 1855 (p. 31, pl. 14, fig. 1) by original designation of Hyatt (1903, p. 111).

Remarks. — For the generic diagnosis and the general accounts of *Sharpeiceras* readers may refer to Wright and Kennedy (1984, p. 126) and Wright (1996, p. 154).

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Keywords: Cenomanian, Cretaceous, correlation, distribution, Hokkaido, North Japan, *Sharpeiceras*, Ammonoidea

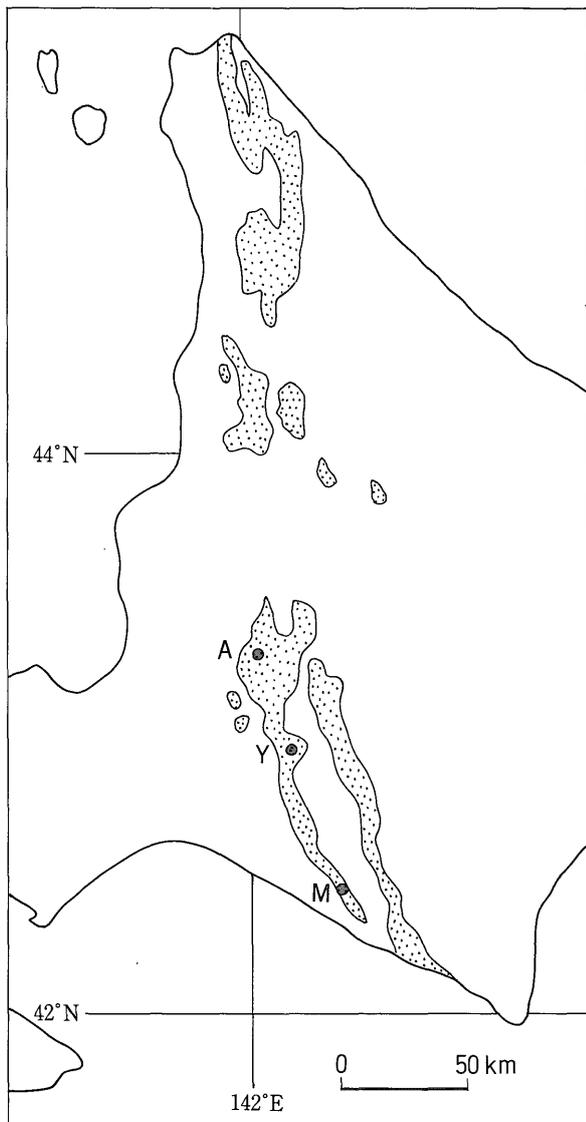


Fig. 1 Map of the main part of Hokkaido, indicating the outcropping areas of the post-Aptian Cretaceous by dots. Three areas where described *Sharpeiceras* specimens were collected: A: Ashibetsu (Hachigatsu-zawa), M: Monbetsu (Chennai-zawa), Y: Yubari Mts. (River Shirakin).

Sharpeiceras florencae Spath, 1925
(Plate 1)

Synonymy. —

Acanthoceras laticlavium (Sharpe); Douvillé, 1904, p. 239, pl. 31, fig. 3.

Sharpeiceras florencae Spath, 1925, p. 198, pl. 37; Collignon, 1933, p. 67, pl. 6, fig. 5; Matsumoto, 1959, p. 69, fig. 28; Howarth, 1985, p. 86, figs. 15–19.

Sharpeiceras goliath Haas, 1942, p. 7, fig. 7.

? *Tlahualiloceras tlahualiloense* Kellum and Mintz, 1962, p. 276, pl. 6, fig. 1; pl. 7, figs. 1, 2; pl. 8, fig. 1.

Sharpeiceras schlueteri Hyatt; Collignon, 1964, p. 102, pl. 353, fig. 1564.

Sharpeiceras vohipalense Collignon, 1964, p. 104, pl.

354, fig. 1565.

Sharpeiceras occidentalis Benavides-Cáceres; Renz, 1982, p. 68, pl. 21, fig. 1; text-fig. 48.

Holotype. — The specimen from Maputoland, southeastern coastal area of Mozambique, described and illustrated by Spath (1925, p. 198, pl. 37 (by original designation in the explanation of pl. 37)).

Material. — GK. H8499 (Plate 1), collected by Toshio Shimanuki and Yoshitaro Kawashita on April 15, 1997 from a boulder of the rivulet called Chennai-zawa, a tributary of the River Monbetsu, southern central Hokkaido (Fig. 1). One of the plaster casts prepared by Toshimitsu is kept at GSJ (F 15199) and others were sent to the persons who donated the specimen to GK.

Description. — The specimen is wholly septate and about 170 mm in diameter. Its preserved end is presumably at or near the last septum. The outer whorl is fairly well preserved on the right side, but its left side is distorted and shows only a part of the whorl flank and the depressed ornament.

The outer whorl expands with a low ratio, encircling the umbilicus of moderate width ($U/D=0.34$). The umbilical wall is low but nearly vertical to the plane of coiling. The whorl is subrectangular in a restored cross section. It is parallel sided and slightly higher than broad (in the intercostal part) or nearly as high as broad across the costal part.

The outer whorl is ornamented by rectiradiate simple ribs, which become distant with growth. Each rib has nearly equidistant three tubercles on the flank, the bullate one at the umbilical end, rather rounded or elliptical one at the mid-flank and larger inner ventrolateral one. In addition to them there is a clavate outer ventral tubercle. Although the two ventrolateral tubercles are close to each other, they are not united into a large protuberance. The inner ventrolateral tubercle has a thick dome like elevation at its base and is stretched laterally rather than upward, forming a short horn.

Sutures are exposed here and there, following the general pattern of the genus.

Dimension. — See Table 1.

Comparison. — This specimen shows the characters that conform well those of the holotype and other typical examples of *Sharpeiceras florencae* Spath. It is, hence, identified with this species, although its mode of preservation is somewhat incomplete. In the early part of the outer whorl and the preceding portion of the inner whorl of the holotype, ribs are mostly simple as those of the adult stage, but they are more crowded in earlier stages. The same feature is observable in the specimen from Hokkaido, although the ribs on the younger part are shown rather indistinctly on account of poor preservation.

Discussion. — The holotype of this species is probably

Table 1 Measurements of *Sharpeiceras florencae* Spath.

Specimen	D	U	U/D	H	H/D	B	B/D	B/H	H/h	R
GK.H8499 (E, ic)	~170	58	.34	58	.34	~52	.31	.90	—	9
Holotype (E, c)	220	69	.31	86	.39	—	—	—	1.32	9
“ (LS, ic)	~165	56	.34	63	.38	54	.33	.86	1.37	13
Howarth, fig.17	195	56	.29	78	.40	58	.30	.74	1.32	11

D=diameter, U=width of umbilicus, H=whorl-height, B=whorl-breadth, h=whorl-height at half a whorl adapically from H, R=number of ribs per half a whorl, ~≈approximate; E = near the preserved end, c = costal, ic = intercostal, LS = at or near the last septum; Howarth, fig.17 = Howarth, 1985, fig.17. Linear dimension in mm.

adult, but only an adapical part of the body chamber is preserved, as shown by the illustration of Spath (1925, pl. 37). Originally it may have exceeded 280 mm in diameter, provided that the body chamber occupied at least half a whorl.

We agree with Howarth (1985, p. 88) in regarding *Sharpeiceras goliath* Haas (1942, p.7, fig. 7), from Angola, as a synonym of *S. florencae*. It exceeds 300 mm in size and may exemplify a completely preserved adult example, as Howarth has interpreted.

Sharpeiceras occidentalis Benavides-Cáceres of Renz (1982, p. 68, pl. 21, fig. 1; text-fig. 48), from Venezuela, is probably a synonym of *S. florencae*, as Howarth (1985) has pointed out, although Renz's (1982) illustration was only for the inner whorl detached from a large but incomplete outer whorl. Likewise, a large holotype (368 mm diameter) of *Tlahualiloceras tlahualiloense* Kellum and Mintz (1962, p. 276, pl. 6, fig. 1; pl. 7, figs. 1, 2), from the Indidura Formation of Coahuila, Mexico, is very close to *S. florencae*, as Matsumoto *et al.* (1969, p. 260) mentioned. Its compressed whorl is certainly due to secondary deformation.

The holotype of *S. occidentale* Benavides-Cáceres, 1956 (p. 465, pl. 54, figs. 5, 6), from Peru, is probably referable to *S. schlueteri* Hyatt, 1903, on the ground of the disposition of moderately coarse ribs which are separated by interspaces slightly wider than the ribs. In this respect we would agree with Wright and Kennedy (1987, p. 129) to regard it as a synonym of *S. schlueteri* Hyatt, 1903. However, the umbilical ratio of *S. occidentale* (U/D=0.33) is considerably lower than that of the lectotype of *S. schlueteri* (U/D=0.40) estimated from the figure of Schlüter (1871, pl. 7, figs. 4, 5). This may be due to a change with growth, for that lectotype is very large (about 350 mm diameter). In fact, from the illustration of the French specimen (Wright and Kennedy, 1987, text-fig. 33 J) U/D is estimated as 0.33 at D(ic)=135 mm (the same size as Benavides-Cáceres specimen) and 0.38 at D(ic)=175 mm at the preserved end of the still septate specimen.

On the other hand *S. schlueteri* of Collignon (1964,

p. 102, pl. 353, fig. 1564) is certainly *S. florencae* because of the configuration of its ornament and the umbilical ratio (0.33). The holotype of *S. vohipalense* Collignon (1964, p. 104, pl. 354, fig. 1565), another specimen from Madagascar, is undoubtedly identified with *S. florencae*. Its umbilical ratio estimated from the figure is 0.32 at the intercostal diameter 145 mm. This specimen is similar to the holotype of *S. florencae* in size and also in showing the adult type distant ribs with strong inner ventrolateral tubercles on its preserved last quarter whorl. The size of its full grown original shell is, however, hardly estimated because the position of its last septum is not clearly indicated on the figure. At any rate, whether *S. florencae* was dimorphic or not is hardly decided from the available material in spite of the situation that the specimens referable to this species are comparatively numerous and that some of them are very large (368 mm). In other words, no example of undoubted microconch has been confirmed.

Although several specimens from England were referred to *S. florencae* by Kennedy (1971, p. 67, pl. 25, fig. 2), we hesitate to approve the occurrence of this species there. At least one of them (*op. cit.*, pl. 25, fig. 2) has been altered to *Sharpeiceras* sp. by Wright and Kennedy (1987, p. 129, pl. 41, fig. 2; text-fig. 34 B), because *S. florencae* at the young stage as small as that specimen has more crowded and less stout ribs and probably more compressed whorl. That specimen rather resembles the young shell of *S. schlueteri*, as represented by the inner whorl of the well-preserved example figured by Kaplan *et al.* (1984, pl. 2, fig. 1). We are at present unable to give remarks on the affinities of this and certain other specimens, including *S. kongo* Matsumoto, Muramoto and Takahashi (1969, p. 261, pl. 29, fig. 1; pl. 30, fig. 1; text-figs. 3, 4) from Hokkaido, with *Sharpeiceras falloti* (Collignon, 1931, p. 81, pl. 8, figs. 9-12). The problem is, however, important for getting more reliable knowledge on taxonomy and distribution of the species concerned. We are, hence, anxious to look at relevant specimens

of successive growth stages from overseas regions.

Occurrence. — The sole example of this species from Hokkaido is from the lower Cenomanian mudstone along the Chennai-zawa, a small branch rivulet of the River Monbetsu at Hirotoni. The area is in the geological sheet map of “Biu” (Yoshida *et al.*, 1959), but the locality was not indicated in that map. The Upper Cretaceous of the area was subsequently subdivided into the Members A 1, A 2 to D by Akitoshi Inoma (personal communication to T. M.), as shown by Matsumoto *et al.* (1997, fig. 1). The unit of mudstone along the Chennai-zawa is the Member A1, which has yielded, in addition to this species, *Sharpeiceras mexicanum* (Böse), *Desmoceras* (*Pseudouhligella*) *japonicum* Yabe, *Gabbioceras yezoense* Shigeta and *Parajaubertella kawakitana* Matsumoto. The assemblage indicates the early Cenomanian age.

Outside Japan, *S. florencae* has been reported to occur in Mozambique, Madagascar, Angola, Venezuela, Mexico, Texas and Iran. Thus, it is distributed worldwide, although the studied specimens in respective regions are not numerous (see references in the synonymy list).

Sharpeiceras mocambiquense (Choffat, 1903)
(Plates 2, 3)

Synonymy. —

Acanthoceras laticlavium (Sharpe) var. *mocambiquensis* Choffat, 1903, p. 25, pl. 4, fig. 3a, b and pl. 7, fig. 1a, b.
Sharpeiceras aff. *S. laticlavium* var. *indica* Kossmat; Shimizu *et al.*, 1953, p. 14 (listed only).

Sharpeiceras aff. *S. vohipalense* Collignon; Matsumoto and Suekane, 1987, p. 3, pl. 1, figs. 1-3.

Holotype. — A single specimen from Conducia, northeastern coastal area of Mozambique, described and illustrated as *Acanthoceras laticlavium* (Sharpe) var. *mocambiquensis* Choffat (1903, *vide supra*) (by monotypy).

Material. — The following two specimens from Hokkaido: (1) GSJ F 5151, collected by K. Tanaka in 1951 at Locality 52, on a branch rivulet in the upper reaches of the Hachigatsu-zawa, a tributary of the River Ashibetsu, from the lower part of the Mikasa Formation (see Shimizu *et al.*, 1953, route map 2 and also geological sheet map of Kamiashibetsu for the location). According to the subsequent work by Matsumoto and Okada (1973, p. 289, figs. 9, 10), its precise horizon is referred to the basal part of the middle member (marked as Mkm) of the Mikasa Formation (see Fig. 2 of this paper). (2) YCM.713, collected by T. Suekane at loc. S 901 on the left side of the River Shirakin [= Hakkin-zawa by some authors] in the Yubari Mountains (Fig. 1; see Matsumoto and Suekane, 1987, text-fig. 1, for the locality and pl. 1, figs. 1-3 for the much reduced illustration of this specimen). The plaster cast of this specimen is GK.H 9647.

Description. — The two specimens are similarly large. At about the last septum the intercostal diameter of YCM.713 is 265 mm. The body chamber of YCM.713 is incompletely preserved; namely its ventral half and its last portion are destroyed away. On the assumption that its body chamber was half a whorl, as

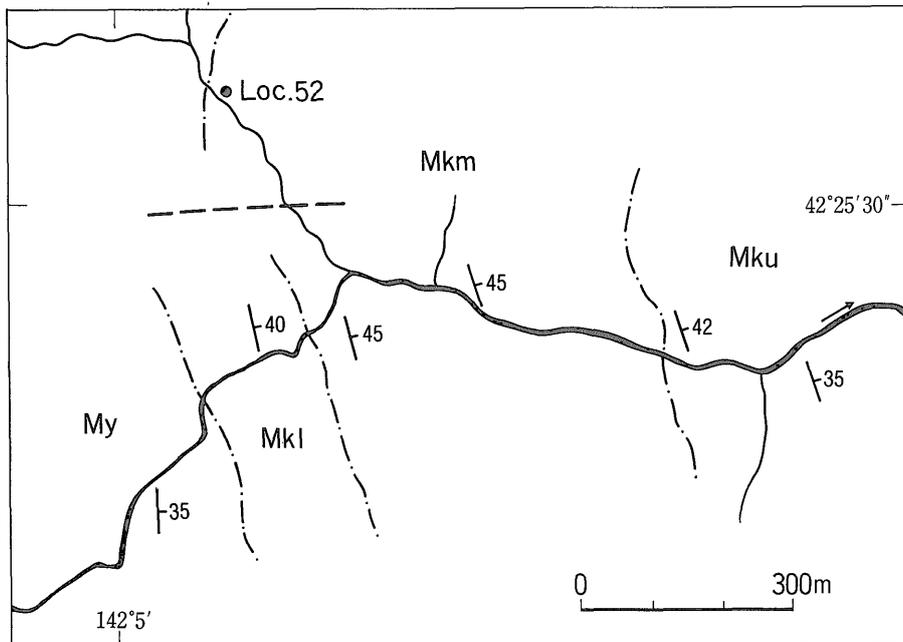


Fig. 2 Geological route map of the Hachigatsu-zawa (part), indicating Loc. 52. Chain: Boundary of lithostratigraphic units. My: Main part of the Middle Yezo Subgroup. Mkl, Mkm, Mku: Lower, Middle and Upper Members of the Mikasa Formation. Broken line: fault. (Adapted from Matsumoto and Okada, 1973, fig. 9).

Table 2 Measurements of *Sharpeiceras mocambiquense* (Choffat) and *Sharpeiceras schlueteri* Hyatt (lectotype) (at the bottom).

Specimen	D	U	U/D	H	H/D	B	B/D	B/H	H/h	R
GSJ F5151(E, ic)	255	85	.33	104	.41	~70	.27	.67	1.58	11
" (E, c)	260	83	.32	110	.42	~78	.30	.71	1.62	12
YCM.713 (E-150°)	265	85	.32	108	.41	—	—	—	1.50	11
Holotype (E-150°)	350	100	.29	132	.38	96	.28	.73	—	12
<i>S. schlueteri</i>	348	135	.39	123	.35	102	.29	.83	1.37	13

E-150°= at the point 150° adaptically from E (preserved end). Other symbols as for Table 1.

Measurements of the holotype of *S. mocambiquense* depend on Choffat (1903, p. 26, pl. 4, fig.

3a, b and pl. 7, fig. 1a, b); those of *S. schlueteri* are cited from Wright and Kennedy, 1987, p.130.

in other better preserved examples of *Sharpeiceras*, the entire shell diameter of this specimen would have been nearly as large as 420 mm.

GSJ F 5151 is wholly septate, but its preserved end is presumably at or near the last septum. Its earlier part of the preserved outer whorl is again incomplete, but owing to the regular disposition of tubercle, the outline of the missing part can be reconstructed. Thus, the intercostal diameter near the preserved end (marked M in Plate 2) is estimated as 255 mm and the costal diameter immediately behind M is about 260 mm. This size is, thus, quite similar to that of YCM.713 at the last septum.

In both specimens the rate of whorl expansion is fairly high (H/h: about 1.5) and the width of umbilicus is about one third of the shell diameter. The specimens may be secondarily compressed, but from the less deformed part (the left side in YCM.713 and the right side in GSJ F 5151) the ratio B/H is estimated as slightly less than 0.7 at the intercostal part and somewhat more than 0.7 in the costal section. The whorl section is subrectangular. The flank is very weakly convex in GSJ F 5151 and nearly flat in YCM.713. As the latter specimen was embedded in mudstone, its original shape may have been secondarily flattened. The umbilical edge is abruptly bent to the steep wall, which in turn is overhanging and gently convex rather than strictly flat:

The ornament of the outer whorl is characteristic. It consists of long ribs, which have tubercles in five rows. The ribs are weakly prorsiradiate with a very gently concave curvature on the flank of the early part of the outer whorl and become nearly rectiradiate in the later part. They are separated by much wider interspaces and gradually strengthen with growth. The five tubercles are (1) the bullate umbilical one, (2) the subrounded or elliptical one of moderate intensity at about the middle of flank (somewhat inside of the strict mid-flank), (3) the weaker one on the outer part of flank (midway between the second and the fourth ones), (4) the larger and stronger one at

the inner ventrolateral shoulder which stretches sideways, and (5) the clavate outer ventrolateral one. The tubercles also strengthen with growth along with the ribs, although some of the tubercles appear to be blunt on account of weathering.

The sutures are well exposed on the surface of YCM.713. They are similar to those of the illustrated large specimen of *S. laticlavium* (Wright and Kennedy, 1987, text-fig. 30).

Dimension. — See Table 2.

Comparison. — The described two specimens are best referable to *Sharpeiceras mocambiquense* (Choffat, 1903), because of their very large size, rather low umbilical ratio (U/D about 0.3), comparatively compressed whorl (B/H about 0.7), simple long ribs disposed at fairly wide intervals on the outer whorl and tubercles in five rows, of which those on the outer flank are weaker than others but independent and disposed at midway between the mid-lateral and inner ventrolateral ones and those at the ventrolateral shoulder are strong and stretch sideways.

GSJ F5151 was listed as *Sharpeiceras* aff. *laticlavium* var. *indica* Kossmat by Shimizu *et al.* (1953, p. 14), but it does not fit the form described by Kossmat (1895, p. 199, pl. 24, figs. 5, 6), for the latter is small and has intercalated or branched ribs frequently. Förster (1975, p. 247, pl. 16, fig. 5) regarded Kossmat's (1895) species as *Mantelliceras indicum* (Kossmat).

In the previous work of Matsumoto and Suekane (1987, p. 3, pl. 1, figs. 1-3), the specimen YCM.713 was described under *Sharpeiceras* aff. *S. vohipalense* Collignon. This was misleading. They did not notice the outer lateral tubercles, which are weak but shown on the photograph. As has been mentioned already, *S. vohipalense* is a synonym of *S. florencae* Spath (see also discussion below).

Discussion. — *S. mocambiquense* is allied to *S. florencae* in that the two species commonly show a fairly narrow umbilical ratio (U/D around 0.3), that the ribs become increasingly distant and strong with growth whereby the inner ventrolateral tubercles stretch sideways in

a style of horns. The two species, however, can be distinguished; namely in *S. florencae* the ribs are more crowded in earlier part and become separated more rapidly later. Although there may be some extent of variation, *S. florencae* has generally broader whorls with a larger ratio of B/H and also coarser and more robust ribs in comparison with *S. mocambiquense*. The existence of the outer lateral tubercles at midway between the mid-lateral and the inner ventrolateral tubercles throughout the outer full whorl is characteristic of *S. mocambiquense*, although they are not strong.

Wright and Kennedy (1987, p. 129) listed *Acanthoceras laticlavium* var. *mocambiquensis* Choffat, 1903 [published in January] as a synonym of *Sharpeiceras schlueteri* Hyatt, 1903 [published in May or later], though with a query. In our opinion the two species can be distinguished. Namely, *S. mocambiquense* keeps to have a comparatively narrow umbilicus even in the late growth stage, showing U/D about 0.3 in contrast to about 0.4 of *S. schlueteri*. The ribs become more distant with growth in the former than in the latter. As a result the ribs on the large outer whorl are less numerous in *S. mocambiquense* than in *S. schlueteri*, for instance 22 or 23 in the former compared with 28 or 29 in the latter. This difference would be more pronounced on the adult body chamber of about half a whorl, although completely preserved examples are not available at present.

According to Wright and Kennedy (1987, p. 130), there are some British examples of *S. schlueteri* in which an outer lateral tubercle appears at diameters of 290 mm. Without seeing the specimens or good illustrations, we hesitate to give adequate remarks on this information. We expect, as a possibility, that those British specimens could be referable to *Sharpeiceras kikuae* Matsumoto and Kawashita, 1995 (see revised description of Matsumoto and Kawashita, 1998, p.92, figs. 3, 4). *S. kikuae* indeed resembles *S. schlueteri* in the large size (D=410 mm near the apertural end of the adult holotype), fairly wide umbilicus (U/D=0.42), and the coarse ribs on the outer whorl, except for the finer flange on the apertural margin. However, the former has a distinct row of outer lateral tubercles in contrast to no record of such a character for the latter in the descriptions of Schlüter (1871) and Hyatt (1903). At any rate, we should make the true state more clearly by further examination of sufficient material.

Occurrence. — See material for the geographical locations of the two specimens from Hokkaido. GSJ F5151 came from the lower part of the Mikasa Formation. It was in the sandy siltstone (or silty fine-grained sandstone) at the horizon about 130 m above the base of the Mikasa Formation. *Desmoceras (Pseudouhligella) japonicum* occurs from this and other levels (above and below) showing a long range through the Cenomanian.

Ando (1990) suggested that the basal part of the Mikasa Formation along this route is referable to the Upper Albian on the evidence of ammonite which is tentatively called *Cantabrigites* aff. *subsimplex* Spath (Matsumoto *et al.*, 1991). YCM.713 is within the unit of the mudstone exposed along the upper course of the River Shirakin. It is associated with a species allied to *Inoceramus* (s.l.) *crippsi* Mantell and its horizon is reasonably below the horizon of *Cunningtoniceras takahashii* (Matsumoto), a middle Cenomanian ammonite. Because of a folded structure what comes below the horizon of YCM.713 is not known. At any rate, the described two specimens came from somewhere in the lower part of the Cenomanian.

The age of the holotype of *S. mocambiquense* is not precisely recorded. Undoubted examples of the same species have not been reported from other regions. As Hokkaido, northern Japan, is much separated from Mozambique, the species can be expected to occur widely in other regions of the world.

3. Summary of results

In this paper two ammonoid species, *Sharpeiceras florencae* Spath, 1925 and *Sharpeiceras mocambiquense* (Choffat, 1903) are described on the specimens from the Lower Cenomanian of Hokkaido. The former is based on a recent acquisition from the Monbetsu area, south-central Hokkaido, whereas the latter depends on the two specimens previously reported under different names, one from the Ashibetsu area and the other from the Yubari Mountains of central Hokkaido.

S. florencae is known to distribute worldwide, although some specimens have been reported under several dissimilar names which should be regarded as synonymous with *S. florencae*.

S. mocambiquense was previously reported solely from a locality in northern Mozambique. This paper gives the first record of its occurrence outside that area. There is, however, an opinion (Wright and Kennedy, 1987, p. 127) that it might be included in the better known species, *S. schlueteri* Hyatt, 1903. At present we do not agree with this view and suggest that *S. kikuae* Matsumoto and Kawashita, 1995, recently established on a specimen from Hokkaido, is more closely allied to, if not identical with, *S. schlueteri*.

At any rate, further investigations on sufficient material are required to make clear the true state. Species of *Sharpeiceras* would, thus, become good indices of the Lower Cenomanian for the global correlation.

Acknowledgements: We appreciate the laborious field works of Dr. Keisaku Tanaka (former staff member of GSJ), Messrs. Tetsuro Suekane, Yoshitaro Kawashita and Toshio Shimanuki, who collected and supplied the valuable specimens of *Sharpeiceras* for this study. Thanks are due to Dr. Yasumitsu Kanie

for providing a photograph of YCM specimen and also Dr. Yukio Yanagisawa for careful improvements of the manuscript.

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Received August 25, 1998

Accepted October 16, 1998

北海道白亜系産アンモナイト *Sharpeiceras* の若干種について
(北海道・サハリン産白亜紀アンモナイトの研究-84)

松本達郎・利光誠一

要 旨

アンモナイトの *Sharpeiceras florencae* Spath と *Sharpeiceras mocambiquense* (Choffat) が北海道の白亜系からも産出することを、はじめて記載した。前者は従来かなり広い分布を示すことが知られていたが、北太平洋地域の北海道にも認められ、セノマニアン初期におけるコスモポリタンとすることができ、後者はモザンビクだけから記録されていたが、今回甚だ遠隔の北海道のセノマニアン下部から産出が認められた。今後の研究により、この属の諸種の分類と分布がもっと明確になり、セノマニアン下部の有効な示準種として世界各地の対比に役立つようになるであろう。

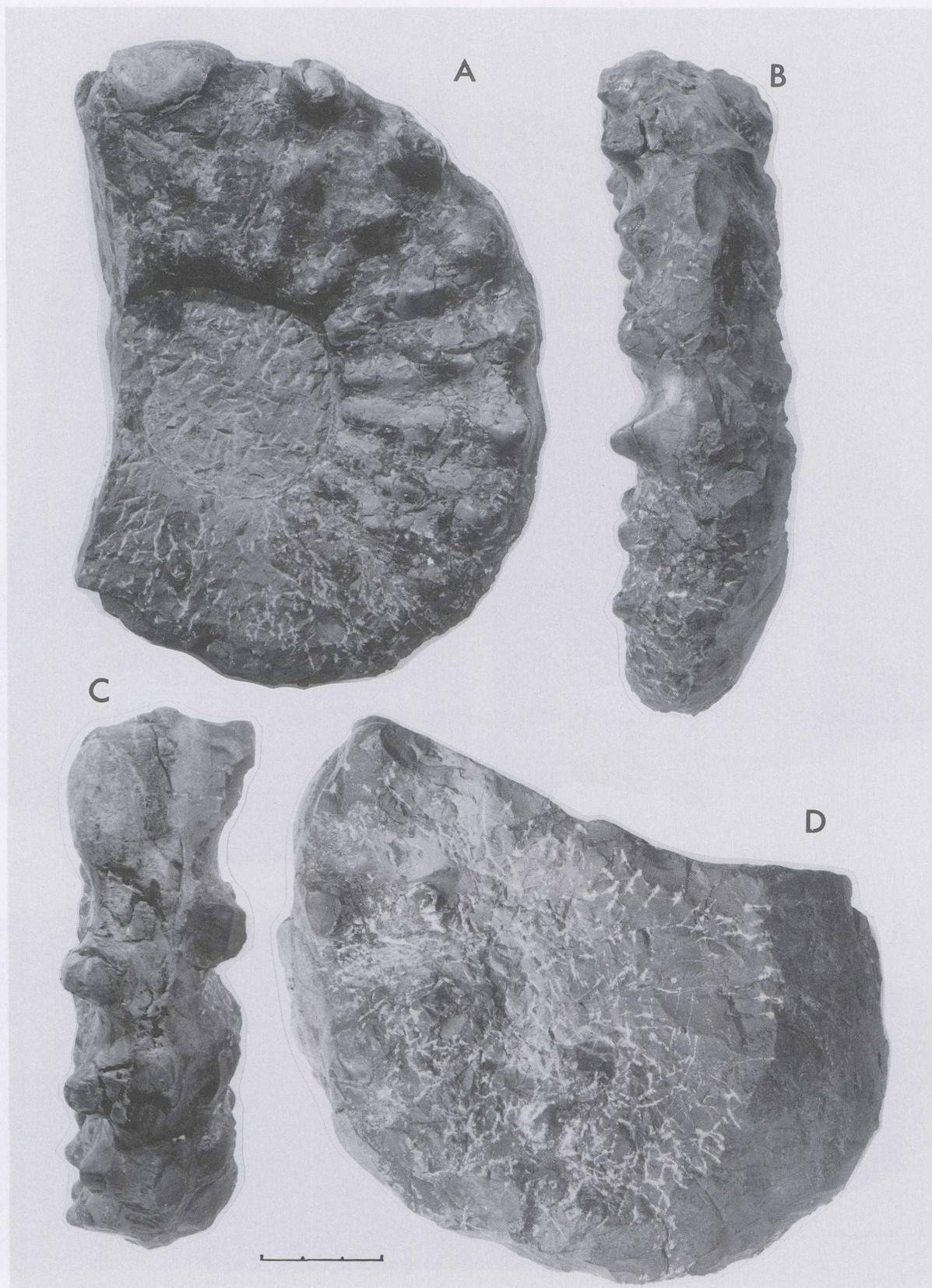


Plate 1 *Sharpeiceras florencae* Spath.

GK.H 8499, collected by T. Shimanuki and Y. Kawashita from the Chennai-zawa, Monbetsu area.

A: right side; B: venter; C: late part of venter; D: left side. Scale bar = 3 cm.

(photo by S. T. without whitening)

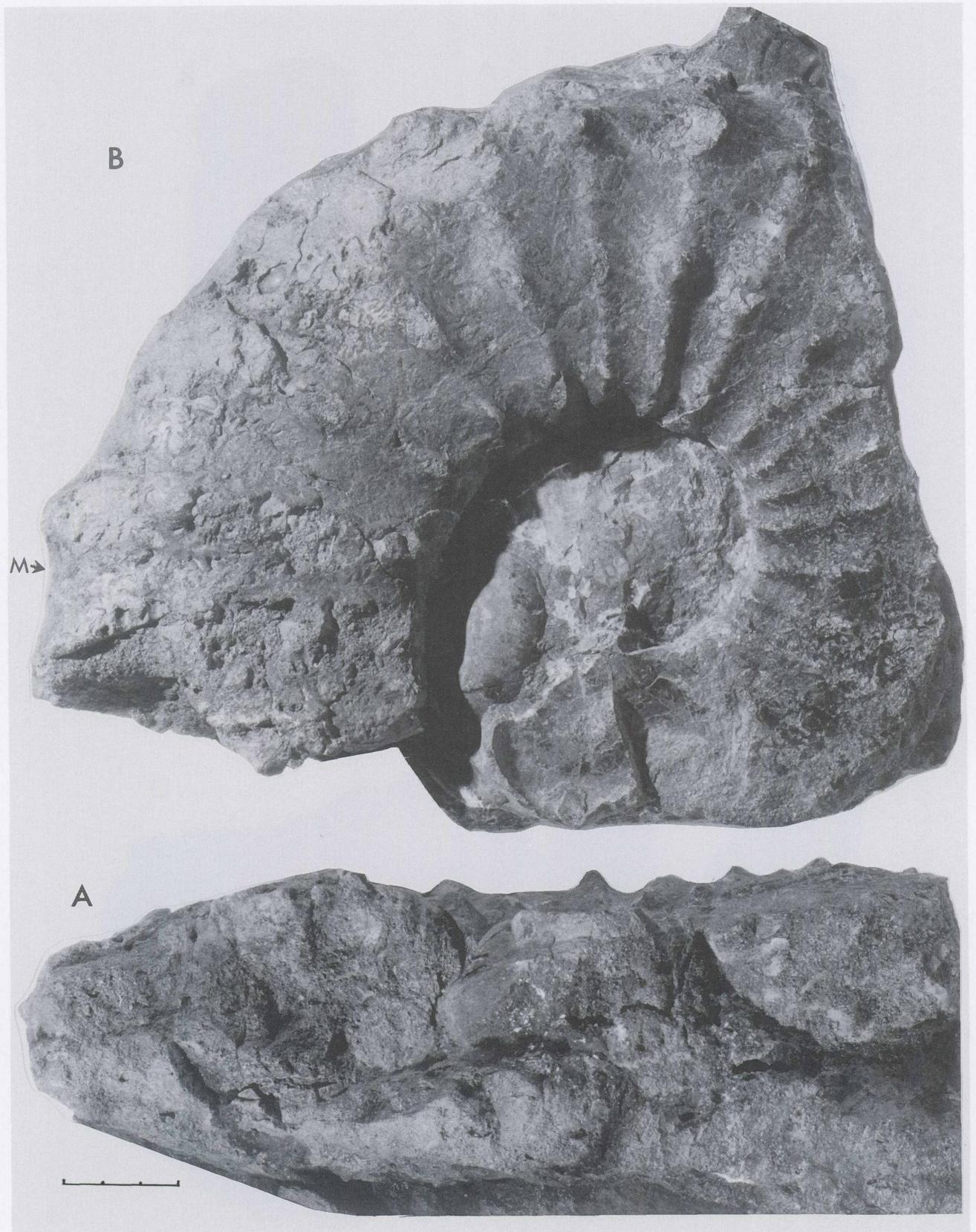


Plate 2 *Sharpeiceras mocambiquense* (Choffat).
GSJ F 5151, collected by K. Tanaka from loc.52 of Hachigatsu-zawa, Kamiashibetsu area. A :
natural frontal section; B: right side. M: position of measurement of diameter. Scale bar=3cm.
(photo by S. T. without whitening)



Plate 3 *Sharpeiceras mocambiquense* (Choffat).
YCM.713, collected by T. Suekane from loc.S 901 on the left bank of the River Shirakin, Oyubari
area. Left side. Scale bar = 3 cm.

(photo by courtesy of Y. Kanie)