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LAMELLARIID GASTROPODS COLLECTED BY JAPANESE ANTARCTIC RESEARCH EXPEDITIONS FROM NEAR SYOWA STATION AND BREID BAY, ANTARCTICA

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Abstract: Among the benthos materials collected from near Syowa Station, Breid Bay and Günnerus Bank, Antarctica, four species of the lamellariid gastropods were found. The descriptions on a new species *Marseniopsis syowaensis* n. sp., and two known species, *M. conica* and *M. mollis* are given. A single specimen considered to be a new species from Breid Bay is described. Some ecological bearings of the lamellariid gastropods in the Antarctic are discussed.

1. Introduction

Since the early twentieth century, a large number of the Antarctic molluscan species have been reported by many authorities, such as SMITH (1902, 1915), THIELE (1912), POWELL (1951, 1958), ARNAUD (1972) and EGOROVA (1982) among others. On the contrary, very few papers have been made public on mollusks collected by the Japanese Antarctic Research Expeditions (HORIKOSHI and HOSHIAI, 1977, 1978; HORIKOSHI *et al.*, 1979; OKUTANI, 1986; NUMANAMI and OKUTANI, 1990). Therefore, the composition, structure, and ecology of molluscan fauna around Syowa Station have been insufficiently worked out up to this date.

Antarctic lamellariid gastropoda was first described by BERGH (1886) from Kerguelen. Nine species have been described from the Antarctic and Subantarctic regions up to this date (POWELL, 1960). Among them only two species were reported from near Syowa Station (HORIKOSHI *et al.*, 1979).

During the course of investigations on benthic molluscs collected by the Japanese Antarctic Research Expeditions, 17 specimens of the gastropod family Lamellariidae, including a new, two known and a single unidentified species, were found in the samples from Breid Bay, near Syowa Station and Langhovde, Antarctica. The present paper describes morphological details of these specimens, and discusses some ecological notes of the lamellariid gastropods in Antarctica.

2. Materials and Methods

A 2 m beam-trawl was towed by the icebreaker "SHIRASE" at five stations in Breid Bay and Günnerus Bank during the period from December 1984 to February 1985 and December 1985 to February 1986. SCUBA diving sampling was made near Syowa Station, East Ongul Island, in January 1981. Sampling with a small dredge was also

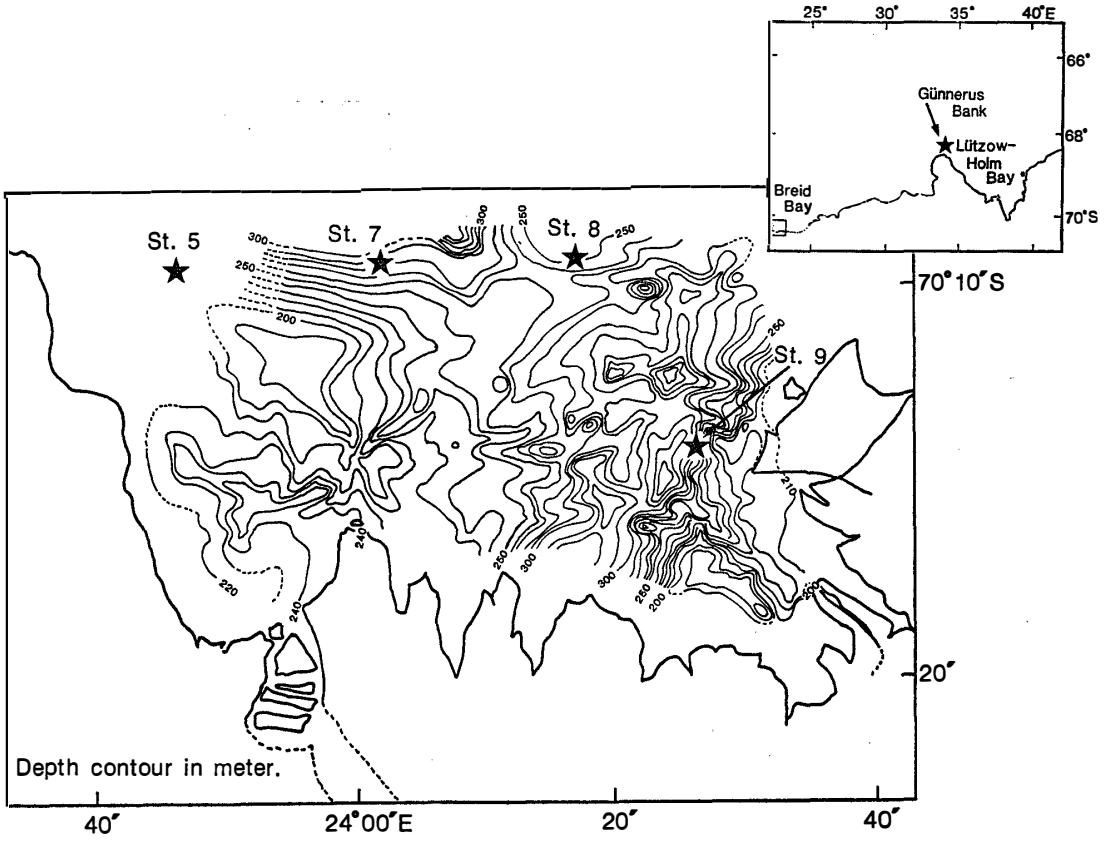

Fig. 1. Trawling sites (stars) in Breid Bay and Günnerus Bank by the icebreaker "SHIRASE".

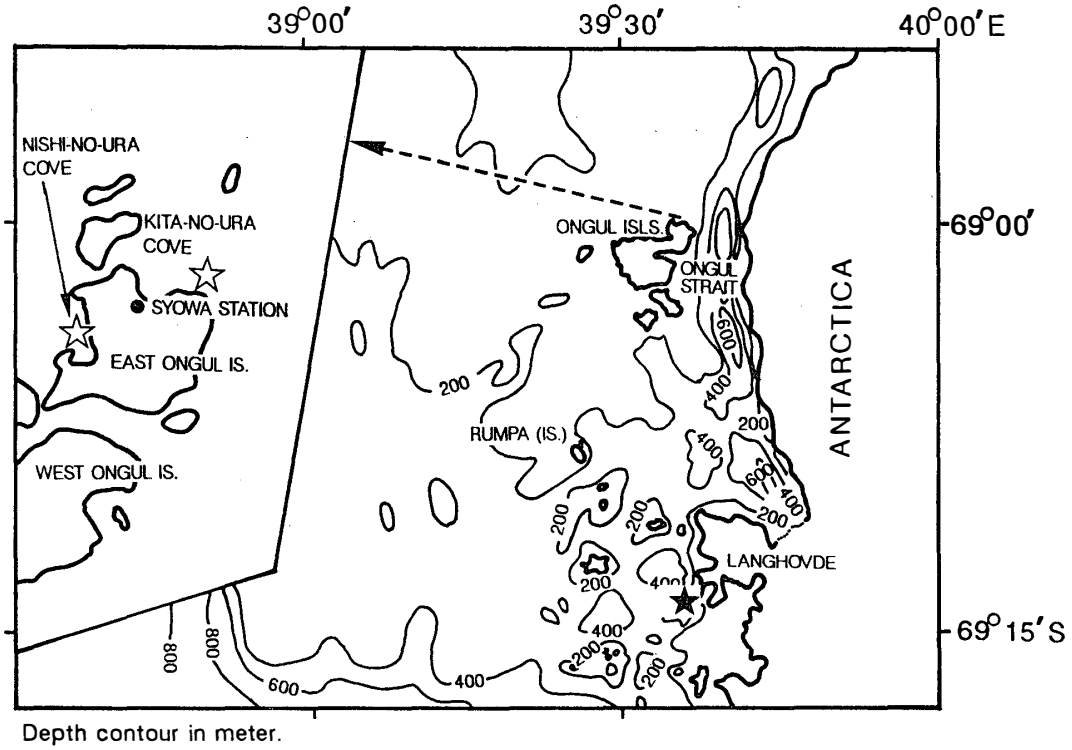

Fig. 2. SCUBA diving (white stars) and small-dredge sampling (black star) sites near Syowa Station and Langhovde.

Table 1. Collecting stations of Japanese Antarctic Research Expeditions.

Area	St.	Date	Lat. S	Long. E	Depth (m)
Breid Bay*	7	27-XII-'84	70°09.1′	24°01.9′	295–310
	8	39-XII-'84	70°08.5′	24°16.8′	270
	5	8-II -'85	70°09.0′	23°46.3′	275–283
	9	10-II -'85	70°13.7′	24°25.7′	276–289
	(1)	23-XII-'85	70°10.8′	24°11.4′	270
Günnerus Bank*	—	25-II -'85	68°23.5′	34°07.5′	281–282
	(7)	19-II -'86	67°30.3′	32°59.2′	955
Kita-no-ura Cove**	—	28- I -'81	—	—	10
Nishi-no-ura Cove**	—	18- I -'81	—	—	5
Langhovde***	—	27- I -'89	—	—	*ca.* 5

* Beam-trawl; ** SCUBA diving; *** Small-dredge.

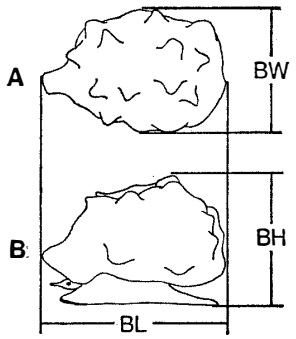

Fig. 3. Measured portions of the body. A: Dorsal view; B: Left side view; BH; Body height; BL: Body length; BW: Body width.

made in the nearshore water off Langhovde in January 1989. The date, position, and depth of these samplings are shown in Table 1 and Figs. 1 and 2.

Specimens collected with a beam-trawl were frozen at about −20°C on board the icebreaker "SHIRASE", and after being brought back to the laboratory of the National Institute of Polar Research, they were thawed and transferred into a 70% ethanol. Specimens collected by SCUBA diving were fixed in a 70% ethanol at Syowa Station immediately after capture. Langhovde specimens were fixed in a 10% formalin then and there, and were transferred into a 70% ethanol after they were brought to the laboratory of Tokyo University of Fisheries.

Measured portions of the body are shown in Fig. 3.

3. Systematics

Family Lamellariidae ORBIGNY, 1841

Subfamily Lamellariinae ORBIGNY, 1841

Genus *Marseniopsis* BERGH, 1886

Type species: *Marseniopsis pacifica* BERGH, 1886 (S. D. by THIELE, 1929).

The shell is depressed spherical or semispherical, thin and fragile, and has small

spires. The shell is completely covered by the dorsal mantle. The radula is taenioglossate with the formula 2: 1: 1: 1: 2. The rhachidian tooth is oblong or elongate trapezoid with a large, sharply pointed central cusp and some small lateral denticles. The lateral teeth are wide and strong, and two marginal teeth are simple, sickle-shaped. The sex is separated.

Marseniopsis conica (SMITH, 1902)
(Figs. 4A–E and 9A)

Lamellaria conica: SMITH, 1902, p. 206, pl. 24, fig. 4; STREBEL, 1908, p. 60. (distribution record); POWELL, 1955, p. 96. (name only).

Lamellariopis turqueti: VAYSSIÈRE, 1906, p. 40, pl. 4, figs. 42–53; VAYSSIÈRE, 1917, p. 27, pl. 1, figs. 10–15: ARNAUD, 1972, p. 127, Fig. 17. (remarks only).

Marseniopsis conica: SMITH, 1915, p. 66–67. (remarks only); EALES, 1923, p. 23–25, figs. 25, 26a; TOMLIN, 1948, p. 228. (distribution record); POWELL, 1960, p. 146. (name only); EGOROVA, 1982, p. 27–28, figs. 132–135.

Lamellaria cf. *conica*: POWELL, 1979, p. 150. (name only).

Marseniopsis cf. *conica*: HORIKOSHI *et al.*, 1979, p. 21, fig. 3. (distribution record).

Material examined: Single specimen taken alive from St. 8.

Description: The shell is small, porcelaneous white, very thin, fragile, depressed, translucent with inflated whorls, and has a very thin periostracum. The protoconch is not preserved. The teleoconch is about 2 in number of turns and rapidly increasing in diameter towards the aperture, and has numerous very fine growth lines. The suture of spire is somewhat grooved, and that of body whorl is strongly impressed. The upper whorl is small, rather high and roundly inflated. The body whorl is very large, breadth is about 119% of shell length, and well roundly inflated. The base is gently rounded. The umbilicus is narrowly open. The aperture is large and round with smooth peristome. The upper part of outer lip exceeds the lower part. The outer lip is smooth and gently rounded, and continues to more rounded basal lip. The inner lip is round and smooth, expanded outwardly. The columellar lip is gently curved. The basal lip is smooth and gently rounded.

No operculum is present.

The entire dorsum is completely covered by the mantle, with a polygonal outline in dorsal view. The coloration of the specimen preserved in alcohol is reddish brown. The mantle is thin and rugose, rather firm to touch, and has numerous small and some large mammillate processes on the surface. These small processes are irregularly arranged on the whole surface of dorsum, but almost all of the large processes are present on low ridges. The dorsal side of the mantle is divided into five areas by low ridges that originate from a raised pentagonal area in the center of the dorsum. In the frontal view, the anterior part of the mantle is contracted like a siphon, which extends anteriorly (about 2.0 mm in length). The mantle just posterior side of pedal base is so thin that the shell is visible through the mantle. The head has a pair of attenuate, acuminate, short and stout cephalic tentacles, 2.5 mm in length and 1.0 mm in width, with small black eyes on the basal outside. The coloration of cephalic tentacles is same as the mantle. The penis which is located just posterior to the right cephalic tentacle, is curved backwards, flat, long and wide (5.0 mm in length and 1.5 mm in width), with no

projection on the apex. The foot is tongue-like in shape, 59% of body length. The anterior margin of the foot is round, wider and thicker than elsewhere, and is separated into the dorsal and ventral areas by a horizontal furrow which runs along the anterior rim of the foot. The pedal sole has an uneven surface. The proboscis which is completely withdrawn into the muscular sheath, is short and wide, conical, 3.0 mm in length, 3.0 mm in width and 3.3 mm in height, and greenish in color, with a rugose surface by numerous, fine axial wrinkles.

The radula is taenioglossate, 2: 1: 1: 1: 2 with 62 transverse rows of teeth, translu-

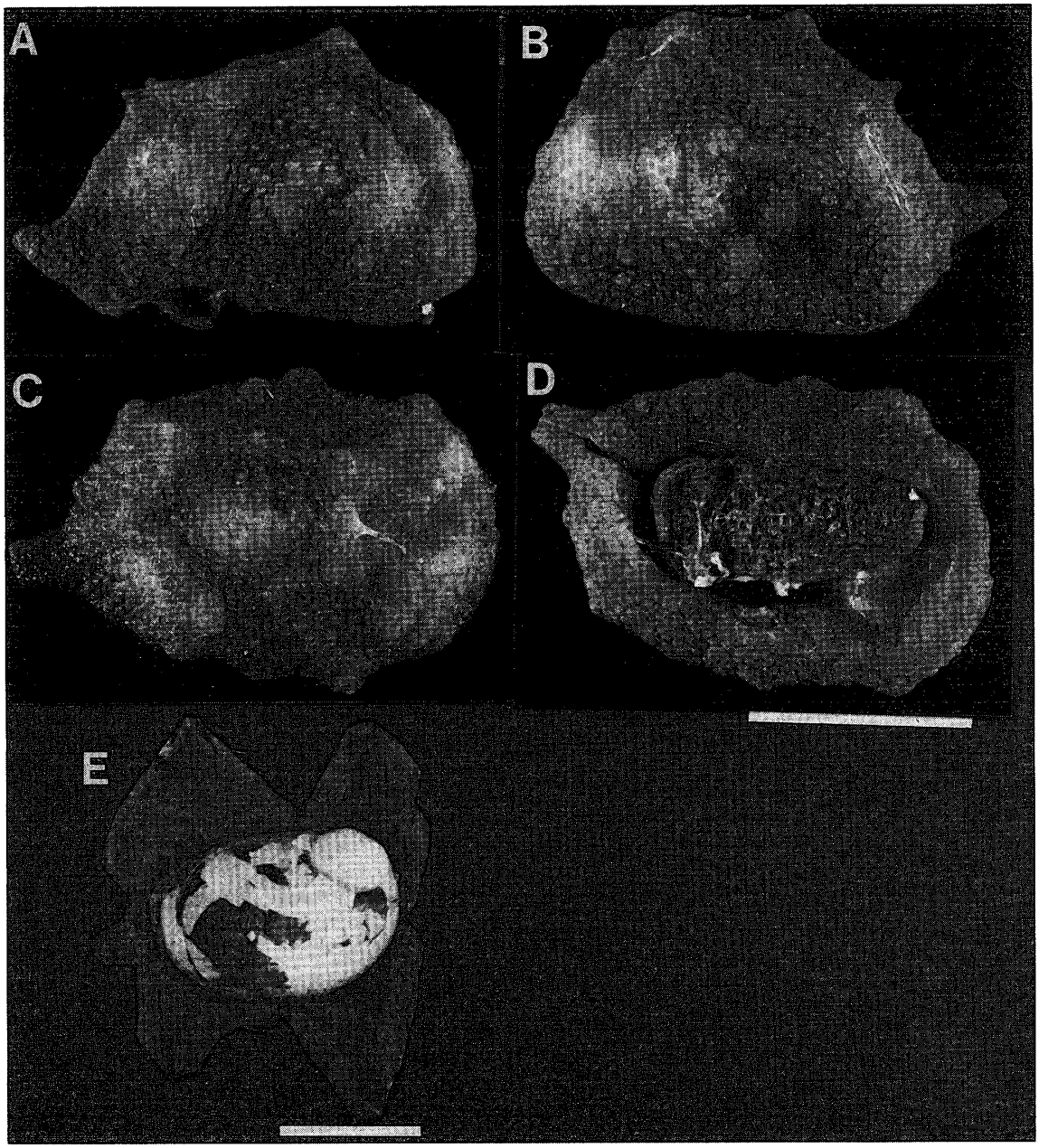

Fig. 4. Marseniopsis conica (*SMITH*) *from St. 8. A: Left side view of animal. B: Right side view of animal. C: Dorsal view of animal. D: Ventral view of animal. E: Abapertual view of shell. Scale =5 mm.*

cently pale brown in color, long and narrow (8.0 mm in length, 0.5 mm in width) (Fig. 9A). The rhachidian tooth is oblong in outline, much higher than wide, and has a long sharply pointed central cusp that carries 4 small sharp denticles on both sides. The base line is almost straight, except small projections on both lateral ends. The lateral tooth is widely triangular, large and stout, and has a large, long and stout central cusp, 3 strong denticles on lateral inside and a single small and weak denticle on outside. The base is V-shaped, as the middle area rises anteriorly. Both marginal teeth are simple sickle-shaped. The inner marginal tooth is larger and stronger than the outer one, which is weak and slender. The jaw plate is bluish in color.

Measurements: Shell length 8.8 mm, shell width 10.5 mm (body length 14.2 mm, body width 8.7 mm, body height 8.1 mm).

Previous distribution records (*Fig.* 5): Type locality: Cape Adare, 28 fathoms. Range: Antwerp Island, 64°E, 64°45′S, 110 m (VAYSSIÈRE, 1906); off Granite Harbour, entrance to McMurdo Island, 50 fathoms (SMITH, 1915); southeast of Seymour Island, 64°20′S, 56°38′W, 150 m (STREBEL, 1908); Macquarie Island, 69 m (TOMLIN, 1948); Adélie Land, 75 and 90 m (ARNAUD, 1972); south of Iwajima Island, near Syowa Station, 30 m (HORIKOSHI *et al.*, 1979); Davis Sea, 41 m (EGOROVA, 1982).

Remarks: *Marseniopsis conica* was described by SMITH (1902) based on a single

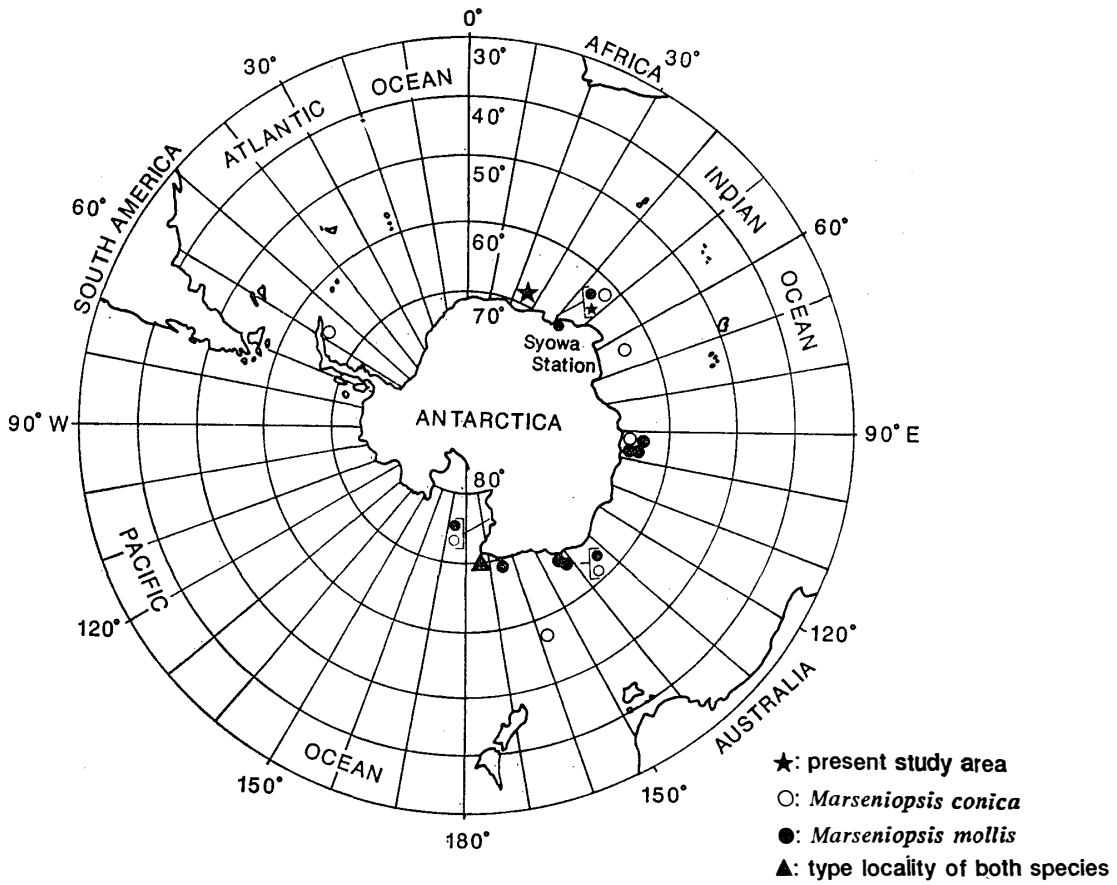

Fig. 5. Distributions of Marseniopsis conica (*SMITH*) *and* Marseniopsis mollis (*SMITH*).

specimen from Cape Adare, Adélie Land. The original description related only a few morphological characters, although an illustration of the shell was given. EALES (1923) gave the details of *M.* "*conica*", which was collected from McMurdo Sound, at 50 fathoms by the 'TERRA NOVA' Expedition, describing that the mantle is smooth and thick, in spite of the fact that the original description by SMITH (1902) stated that the mantle is thin with a granulous or finely warty appearance. The illustration of radula by EALES (1923, fig. 26a) is closely related to that of *M. mollis* (Fig. 9B). Therefore, EALES's (1923) record requires a confirmation.

This species is similar to *Lamellariopsis turqueti* VAYSSIÈRE, 1906 from Antwerp Island, Antarctic Peninsula, Kerguelen Islands and Adélie Land, by having the same type of mantle. According to VAYSSIÈRE (1917), *L. turqueti* differs from *M. conica* in having more rounded shell, rosy reddish mantle and different radular characters. It is true that VAYSSIÈRE's illustration (1917, pl. 1, fig. 12) gives an impression that *L. turqueti* has more rounded shell with more spacious and oval aperture. But, the radula is clearly identical with that of *M. conica*, and the distribution of *L. turqueti* overlaps with that of *M. conica*. From these facts, it is here considered that *L. turqueti* is conspecific with *M. conica*.

POWELL (1979) placed *Marseniopsis conica* in the original generic allocation *Lamellaria*. But, the genus *Lamellaria* differs from *Marseniopsis* in having inverted V- or Y-shaped rhachidian tooth and no marginal teeth (Fig. 9E). Thus, we disagree with POWELL's generic allocation.

Marseniopsis mollis (SMITH, 1902)
(Figs. 6A–D, and 9B; Plate 1.3–1.5)

Lamellaria mollis: SMITH, 1902, p. 205, pl. 24, figs. 19–21.

Marseniopsis mollis: SMITH, 1915, p. 66. (distribution record); HEDLEY, 1916, p. 53 (distribution record); THIELE, 1912, p. 200, pl. 15, fig. 22. (radula); EALES, 1923, p. 25, fig. 26b; POWELL, 1960, p. 146. (name only); ARNAUD, 1972, p. 126, fig. 17. (remarks only); EGOROVA, 1982, p. 28, figs. 128–130.

Marseniopsis cf. *mollis*: HORIKOSHI *et al.*, 1979, p. 21, fig. 4. (distribution record).

Material examined: 5 specimens taken alive from St. 9; single living specimen from Kita-no-ura Cove; single living specimen from off Langhovde, 27 January 1989.

Description: The shell is very thin, fragile, translucent, depressed, with inflated whorls, and has a very thin periostracum. In the large specimen, the shell is porcelaneous white, but that of small specimen is transparent. The protoconch is about 1.75 in number of turns, about 1.3 mm in diameter, glossy and transparent, and has 8 spiral lirae. The teleoconch is about 3 in number of turns in the largest specimen, and rapidly increasing in dimeter towards the aperture, and has numerous very fine growth lines. The suture is somewhat grooved. The upper whorl is little rounded, conspicuously small and depressed. The body whorl is very large and well inflated, with breadth being 151% of shell length. The base is roundly inflated. The umbilicus is not open. The aperture is large and round with smooth peristome. The upper part of the aperture exceeds the lower part. The outer lip is round and smooth. The inner lip is also round, smooth and expanded outwardly. The columellar lip is smooth and roundly curved. The basal lip is round.

No operculum exists.

The entire dorsum is completely covered by the mantle, and elliptical shape in dorsal view. When alive, the mantle and foot are yellow, and the cephalic tentacle and penis are creamy colored (Plate 1.3–1.5). But in preserved condition in alcohol, these are white or grayish white. The mantle is uniformly thick and somewhat firm, except dorsal area. The anterior mantle has a narrow and deep slit. The surface of dorsum is almost smooth, except some wrinkles. The head has a pair of attenuate, long and slender cephalic tentacles with very small eyes (about 0.6 mm in diameter) which are located on the outside of about 2/3 from the apex of these tentacles. The foot is about 60% of body length. The anterior margin of the foot is almost straight, wider and thicker than elsewhere, and is separated into the dorsal and ventral areas by a horizontal furrow which runs along the anterior rim of the foot. The pedal sole is smooth or uneven. The proboscis is long, stout and slightly conical, 10.2 mm in length, 7.0 mm in width and 7.0 mm in height, and buff in color, and the surface is rugose with numerous axial wrinkles.

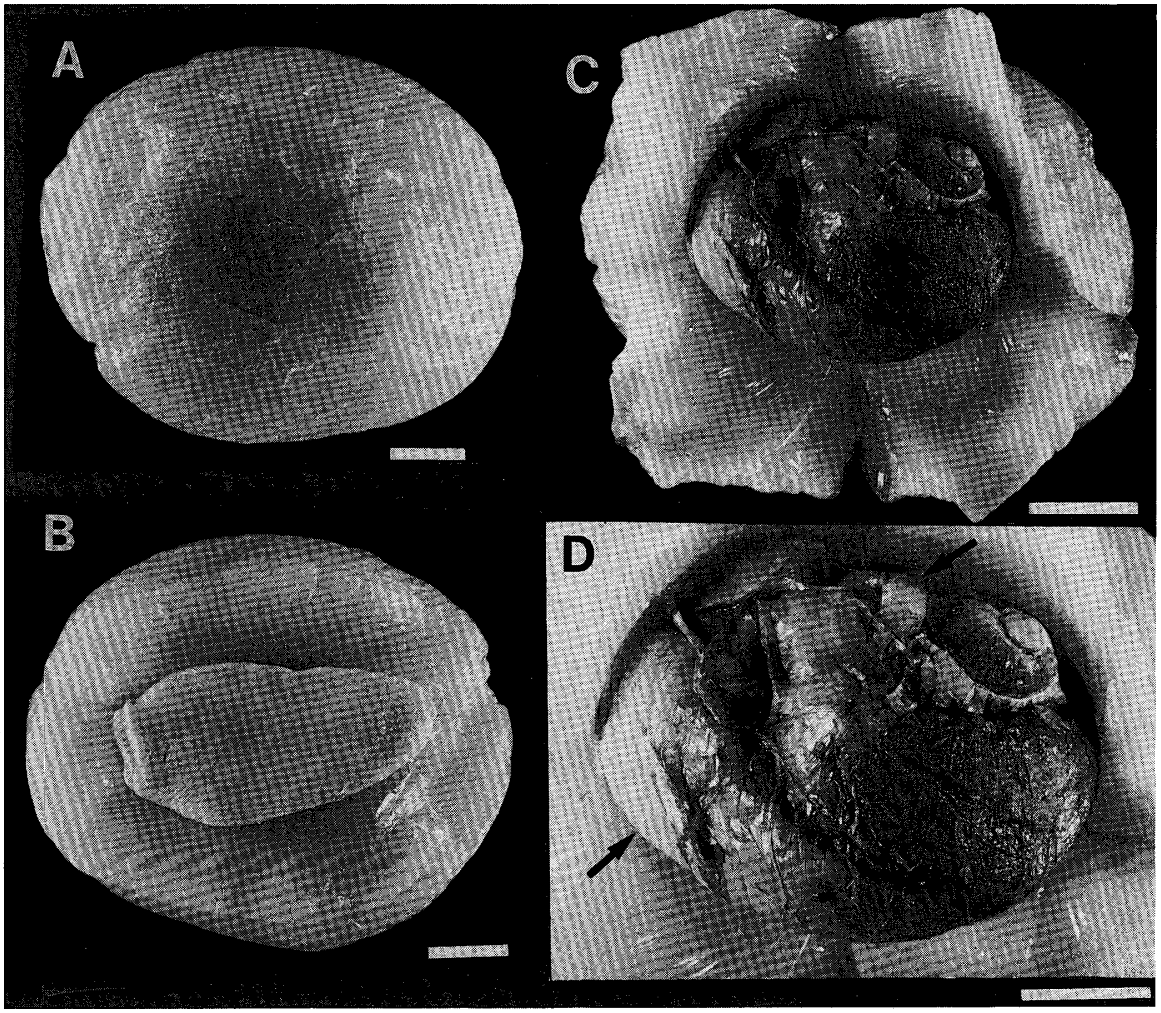

Fig. 6. Marseniopsis mollis (*SMITH*) *from Langhovde. A: Dorsal view of animal. B: Ventral view of animal. C: Cutting of dorsal area of mantle. D: Abapertual view of shell, showing the remained calcareous layer (arrows). Scale=10 mm.*

The radula is taenioglossate, 2: 1: 1: 1: 2 with 53 transverse rows of teeth, translucent brown in color, long and wide (13.0 mm in length and 4.2 mm in width; Body length is 71.3 mm) (Fig. 9B). The rhachidian tooth is oblong in outline, much higher than wide, and has a long, large and strong central cusp that carries 2 to 4 small sharp-pointed denticles on both sides. The base line is wavy. The lateral tooth is elongate triangular, wide, large and stout, and has a long, stout and acute central cusp that carries 2 sharply pointed, strong denticles on lateral inside and 1 or 2 small and weak denticles on outside. The base line is V-shape as the middle area rises anteriorly. The marginal teeth are simple sickle-shaped, and the inner marginal tooth is larger and stronger than the outer one.

Measurements: Sea Table 2.

Table 2. Measurements and condition of Marseniopsis mollis (*SMITH*).

No.	1	2	3	4	5	6	7
St.	9	9	9	9	9	Ki	La
BL (mm)	17.8	14.1	17.8	21.3	14.6	55.2	71.3
BW (mm)	12.2	11.1	11.1	13.3	9.8	36.8	58.4
BH (mm)	11.3	9.0	6.0	8.7	14.2	35.9	38.1
Condition	L	L	D	D	D	L	L

BL: Body length; BW: Body width; BH: Body height; L: Specimen taken alive; D: Damaged specimen; Ki: Kita-no-ura Cove; La: Langhovde.

Previous distribution records (*Fig.* 5): Type locality: Cape Adare, 6–29 fathoms. Range: off Oates Land, 69°43′S, 163°24′E, 180–200 fathoms and McMurdo Sound, 77°12′S, 164°18′E, 207 fathoms (SMITH, 1915); Commonwealth Bay, 25–400 fathoms, off Mertz Glacier, 66°55′S, 145°21′E, 288 fathoms, off Drygalski Island, 60 fathoms, Davis Sea, 66°08′S, 94°17′E, 120 fathoms and off Shackleton Iceshelf, 64°32′S, 97°20′E, 110 fathoms (HEDLEY, 1916); McMurdo Sound, 50 fathoms (EALES, 1923); Terre Adélie, 38–210 m (ARNAUD, 1972); in shore, Ongulkalven Island (HORIKOSHI *et al.*, 1979); Davis Sea, 41 m (EGOROVA, 1982).

Remarks: *Marseniopsis mollis* is the commonest species in the genus *Marseniopsis* in the costal waters of the Antarctic Continent. In this study, all the specimens collected from Breid Bay were very small, but those collected from the nearshore waters of Kita-no-ura Cove and Langhovde were large. The shell of this species is easily decalcified, but the calcareous layer remains in the areas of the suture and the base in one of the specimens under study (Fig. 6D).

ARNAUD (1972) stated that *Marseniopsis antarctica* (VAYSSIÈRE, 1906) is a synonym of *M. mollis*. But, *Marseniopsis antarctica* is separable from the *M. mollis* in the following characters: 1) The protoconch lacks spiral lirae; 2) the central cusp of rhachidian tooth carries 9 or 10 small denticles on both sides; and 3) the lateral tooth has no denticle on the lateral outside. Therefore, we do not agree with ARNAUD's view.

Marseniopsis syowaensis n. sp.

(Figs. 7A–F and 9C; Plate 1.1, 1.2)

Material examined: A single specimen taken alive off Langhovde, 27 January

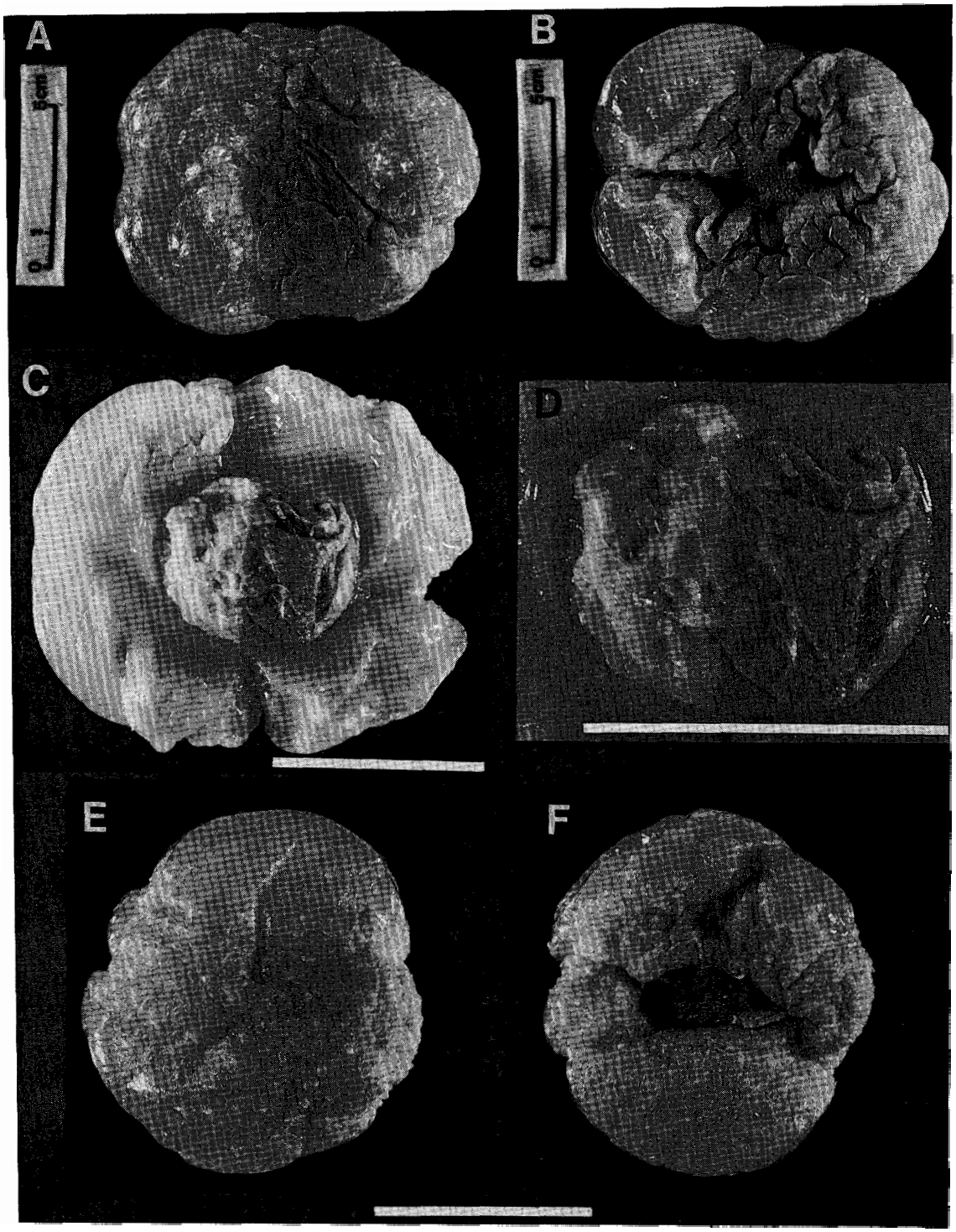

Fig. 7. Marseniopsis syowaensis *n. sp.* (*A–D from Langhovde, E, F from Kita-no-ura Cove*). *A: Dorsal view of animal. B: Ventral view of animal. C: Cutting of dorsal area of mantle. D: Abapertual view of shell. E: Dorsal view of animal. F: Ventral view of animal. Scale=50 mm.*

1989; 2 living specimens from East Ongul Island, January 1981.

Description: The shell, which completely lacks calcareous matter but consists of a thin horny material, is large in size, depressed, semispherical with well inflated whorls. As the shell is transparent, the internal organs are visible through. The protoconch is transparent and finely granulated, also consisting of a thin horny material, and is about 1.3 in number of turns, about 1.5 mm in diameter. The teleoconch is 2.3 in number of turns, roundly inflated, and rapidly increasing the diameter towards the aperture, and has numerous, very fine growth lines. The suture is impressed. The upper whorl is small and depressed. The body whorl is large, with breadth being about 118% shell length. The base is roundly inflated. The umbilicus is narrowly open. The aperture is large and round with smooth peristome. The upper part of aperture exceeds the lower part. The outer lip is round and smooth. The inner lip is round and smooth, expanded outwardly. The columellar and basal lips are round.

No operculum is present.

The entire dorsum is completely covered by the mantle. The outline of the dorsum is obcordate in dorsal view. The mantle of small specimen is dome-like shaped (Fig. 7E, F). In fresh condition, the coloration of dorsal side of the mantle of the paratype ♯2 specimen is pale pink with pale brown spots, the ventral side is only pale pink, and the foot and cephalic tentacle are white (Plate 1.1, 1.2). But, the coloration of the specimen preserved in alcohol is uniformly buff or pale pink. The mantle is soft, jelly, but very thick. The anterior side of the mantle is wide and thick, and has an incision. The posterior side of the mantle is round and thinner than the anterior. The dorsal surface of the mantle has numerous wrinkles and irregular warts of shrinkage. The head has a pair of attenuate, acuminate, short, stout and creamy colored cephalic tentacles (13.6 mm in length, 4.5 mm in width; body length 115 mm), with very small eyes on the middle outside. The foot is very small in contrast with the huge mantle, being only 40% of mantle length. The anterior margin of the foot is round, wider and thicker than other part, and is separated into the dorsal and ventral areas by a horizontal furrow which runs along the anterior rim of the foot. The pedal sole is uneven. The proboscis is short and conical, 11.0 mm in length, 4.4 mm in width and 5.0 mm in height, and buff in color, superficially rugose with numerous axial wrinkles.

The radula is taenioglossate, 2 : 1 : 1 : 1 : 2 with 47 transverse rows of teeth, translucently brown in color, long and wide (13.6 mm in length and 4.5 mm in width; body length is 115 mm) (Fig. 9C). The rhachidian tooth is oblong, much higher than wide, with a large and strong central cusp that carries 4 or 5 sharply pointed small denticles on both sides. The middle area of base rises anteriorly, and the base line is V-shape. The lateral tooth is elongate quadrate, wide, large and stout, and has a large, stout, but rather blunt triangular central cusp that carries 3 to 5 sharply pointed small denticles on lateral inside and 1 or 2 very weak vestigial denticles on outside. The middle area of base rises anteriorly. The base line of lateral tooth is wavy. The marginal teeth are simple, sickle-shaped, and the inner one is larger and stronger than the outer.

Type depository: Holotype and paratype ♯1 specimens are deposited in National Science Museum of Tokyo (NSMT). Paratype ♯2 specimen is deposited in National Institute of Polar Research (NIPR).

Measurements:

Holotype (NSMT Mo-69600): Shell length 41.2 mm, shell width 48.6 mm (body length 115.0 mm, body width 100.0 mm, body height 43.1 mm; collected from Langhovde).

Paratype ♯1 (NSMT Mo-69601): Shell length 23.8 mm, shell width 32.1 mm (body length 75.5 mm, body width 80.5 mm, body height 38.4 mm; collected from East Ongul Island).

Paratype ♯2 (A20-037): Shell length 29.5 mm, shell width 39.8 mm (body length 59.8 mm, body width 46.5 mm, body height 41.0 mm; collected from East Ongul Island).

Remarks: This species is included in the genus *Marseniopsis* because of typical radular characters. The dorsal mantle completely covers the shell, with no dorsal pore.

Marseniopsis syowaensis n. sp. is remarkably large compared with other species of Antarctic lamellariids. *M. mollis* (SMITH, 1902) is similar to this species in radular character, but the former has a longer and sharply pointed central cusp on the rhachidian tooth, 2 denticles on the inner edge of the lateral tooth and stouter, and more gently curved inner marginal tooth (Fig. 9B). *M. mollis* has a very thin calcareous shell and a stronger and firmer mantle, which is thinner than that of the present new species. The cephalic tentacles of *M. mollis* are longer and slenderer than this new species. *M. syowaensis* n. sp. is also similar to *Lamellariopsis aurora* HEDLEY, 1916, from the Davis Sea, in having large and obcordate mantle. However, if compared with the same size individuals of these two species (about 70 mm in body length; Fig. 7E, F), the mantle of *M. syowaensis* n. sp. is dome-like in shape and orbicular in outline, but the mantle of *L. aurora* is obcordate in outline. The cephalic tentacles of *L. aurora* are longer and slenderer than those of this new species. HEDLEY (1916) described *L. aurora* by only a single specimen which was torn and distorted, and the shell character was not observed. Nevertheless, *L. aurora* is distinguishable from this new species by having the different characters of soft parts.

All of known species of Antarctic *Marseniopsis* have a very thin and fragile calcareous shell. And when these specimens are preserved in formalin, their shell is easily decalcified. In spite of the fact that we first suspected that the shell of this new species was also decalcified, the shells of all three specimens in different preservative conditions lack calcareous matter, but consist of only a thin horny material. Thus, we are convinced that this species does not develop the calcareous deposit on the shell.

This species was collected from the nearshore water off Langhovde with a small dredge. Around East Ongul Island, this species was collected by SCUBA diving from a depth of 8 m in Nishi-no-ura Cove and 10 m in Kita-no-ura Cove. The bottom substratum of Nishi-no-ura Cove was sandy with sporadic outcrop of rocks, whereas that of Kita-no-ura Cove was composed of stable rocks and large stones (NAKAJIMA *et al.*, 1982).

This species was observed from a depth of about 30 m in the Ongul Strait, near Syowa Station, by an underwater TV. The bottom substratum of the observed area was sand, with growth of many sponges and ascidians (Y. NAITO, pers. commun.).

Etymology: The name of this species is commemorating Japanese Antarctic Research Expedition's scientific station "Syowa" (69°00′S, 39°35′E), Antarctica.

Marseniopsis sp.
(Figs. 8A–D and 9D)

Material examined: A single specimen taken alive from St. 9.

Description: The shell is small, porcelaneous white in color, very thin, fragile, and has numerous very fine growth lines and a very thin periostracum. The morphological details of the shell are not clear, because the shell is heavily damaged.

No operculum is present.

The entire dorsum is completely covered by the mantle, which is oval in outline in dorsal view. When preserved in alcohol, animals buff in color. The mantle is thick, and has little wrinkled surface. The posterior side of the mantle is rather thicker than elsewhere, and has some large knobs. The anterior part of the mantle it contracted like a siphon, extending anteriorly. The head has a pair of obtuse buff colored cephalic tentacles, 1.0 mm in length and 0.25 mm in width, with large black eyes (0.25 mm in diameter) on basal outside. The foot is small in comparison to the mantle and occupies about 58% of the body length. The anterior margin of the foot is round, wider and thicker than the other part, and is separated into the dorsal and ventral areas by a horizontal furrow running along the anterior rim of the foot. The pedal sole is uneven. The proboscis is short and conical, 1.5 mm in length, 1.0 mm in width and 1.0 mm in height, with numerous fine axial wrinkles on the surface.

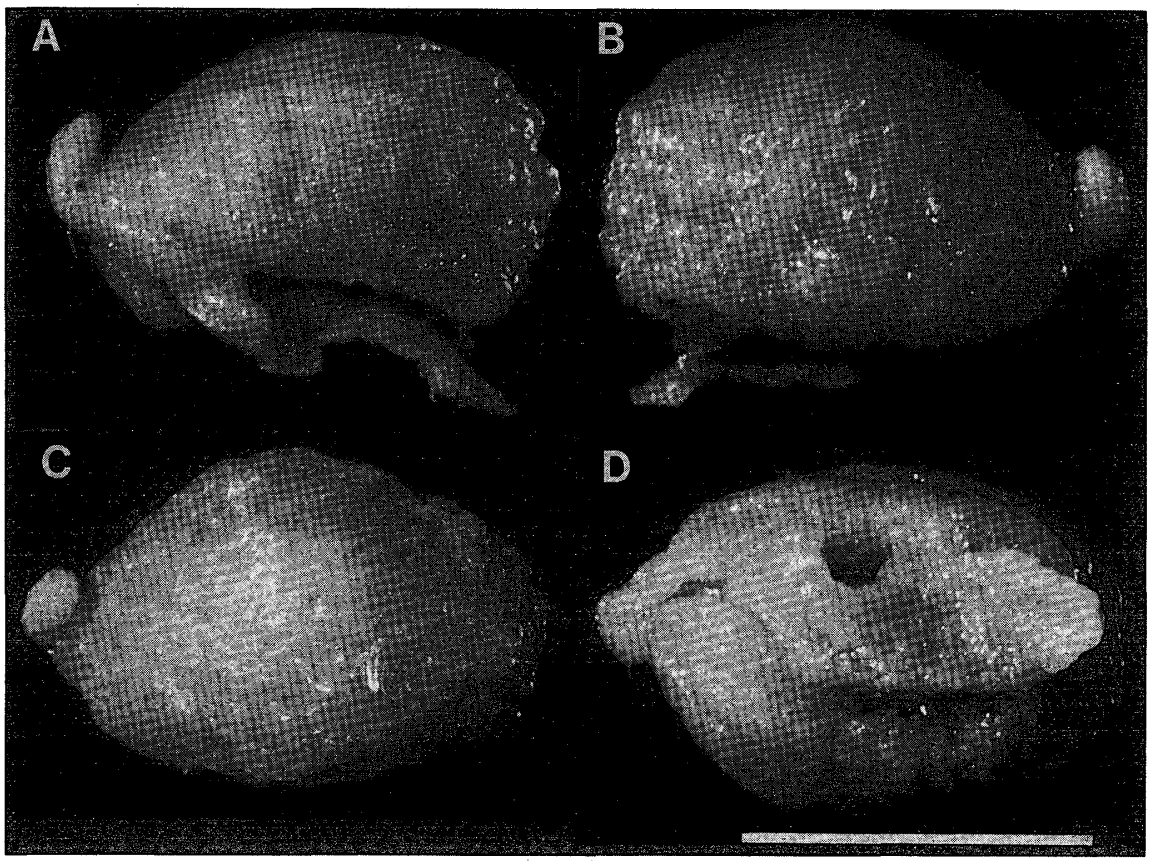

Fig. 8. Marseniopsis *sp. from St. 9. A: Left side veiw of animal. B: Right side view of animal. C: Dorsal view of animal. D: Ventral view of animal. Scale=5 mm.*

The radula is taenioglossate, 2 : 1 : 1 : 1 : 2, translucent brown in color (Fig. 9D). The rhachidian tooth is rectangular, much higher than wide, and has a long sharply pointed central cusp that carries 2 or 3 small sharp denticles on both sides. The base line is straight. The lateral tooth is triangular, large and stout, and has a long central cusp that carries 2 large and strong denticles on both sides. Denticles of the inner side

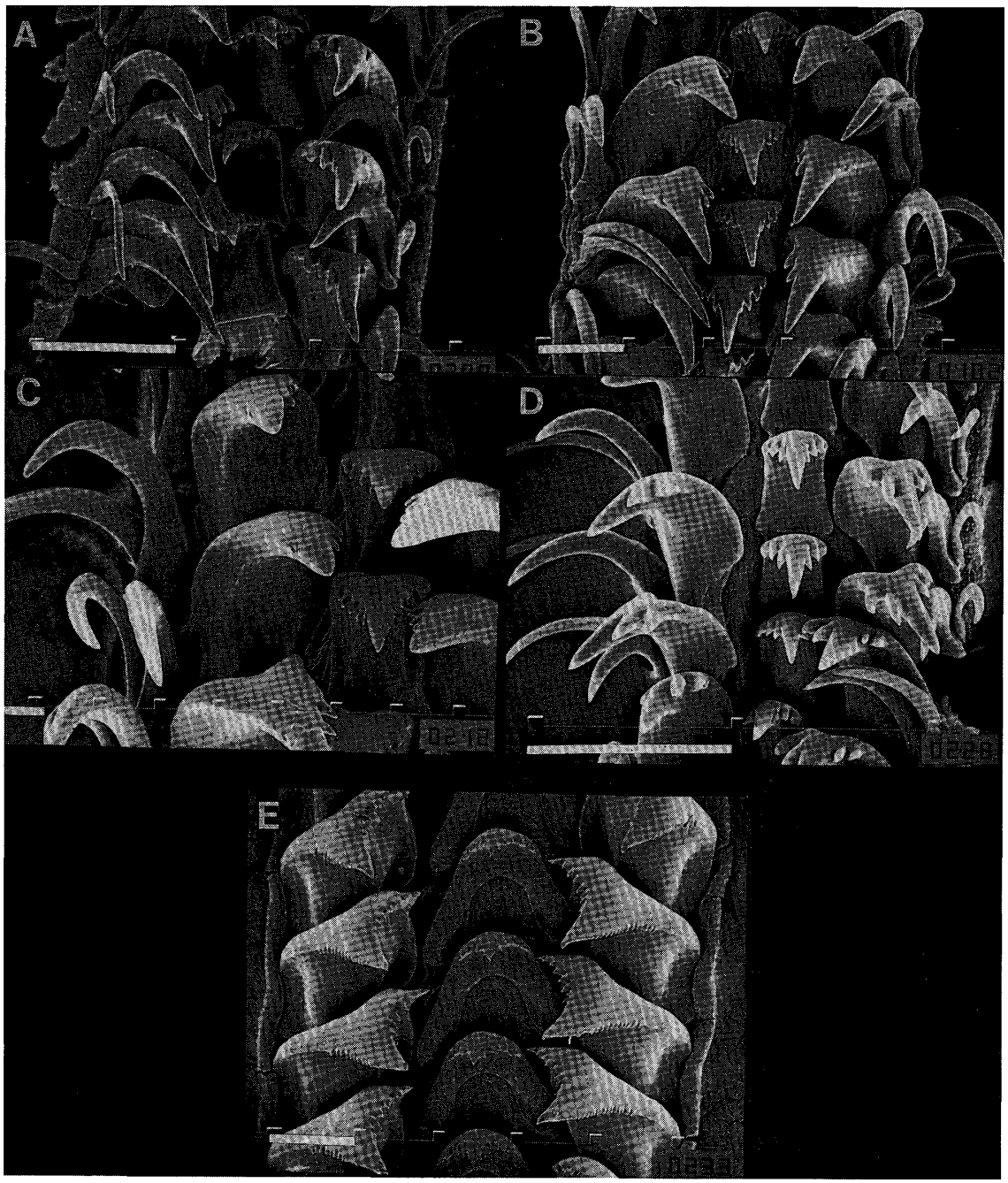

Fig. 9. SEM photographs of radula of five species. A: Marseniopsis conica (*SMITH*) *of Fig. 4. B:* Marseniopsis mollis (*SMITH*) *of Fig. 6. C:* Marseniopsis syowaensis *n. sp. Fig. 7A–D. D:* Marseniopsis *sp. of Fig. 8. E:* Lamellaria kiiensis *HABE from nearshore water off Shimoda, Izu Peninsula, Japan. Scale=100 μm.*

of the lateral tooth are larger and stronger than the outer ones. The middle area of the base of the lateral tooth rises anteriorly, so that, the base line is V-shaped. The marginal teeth are simple sickle-shaped, and the inner marginal tooth is larger and stronger than the outer one.

Measurements: Body length 7.8 mm, body width 4.5 mm, body height 5.0 mm (shell length and shell width are not measured).

Remarks: This species is included in the genus *Marseniopsis* because of typical radular characters.

This species is separable from the other species in the following characters: 1) Denticles of rhachidian tooth are fewer in number, larger and stronger than those in other species, and 2) denticles on lateral outside of lateral tooth are remarkably larger and stronger than those in other species.

It is presumed that this is an undescribed species. Unfortunately, as only a single specimen with a heavily damaged shell has been known, this species is not named at present before better material becomes available in future.

4. Discussion

Antarctic coastal waters have high primary production of phytoplankton and ice-algae (HORNE *et al.*, 1969; WHITAKER, 1982; SATOH and WATANABE, 1986, 1988). These biological products and another organic matter, such as remains and fecal pellets of

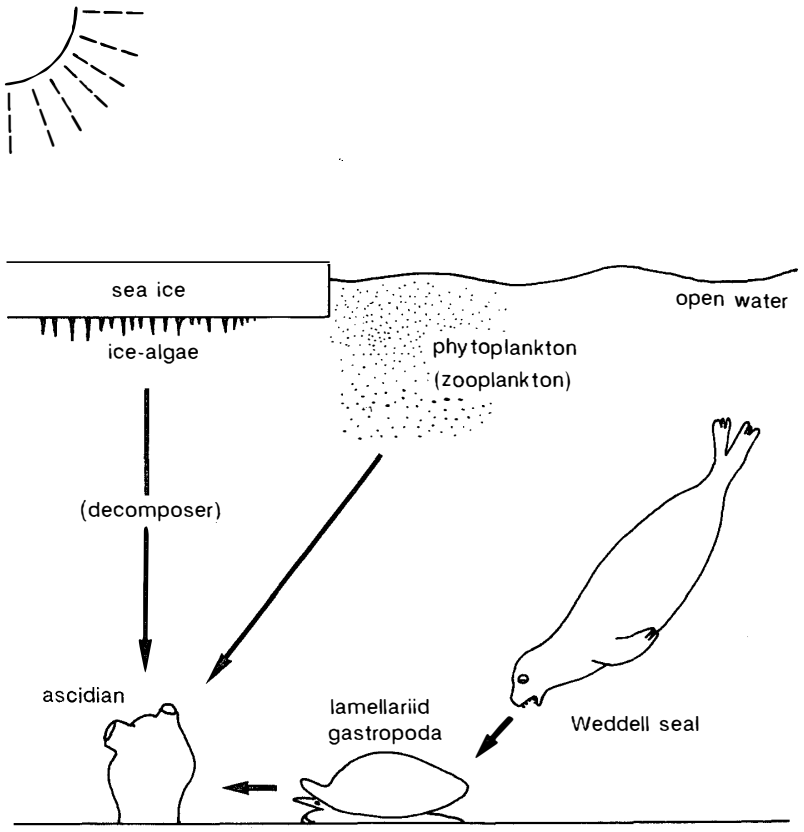

Fig. 10. An assumed food chain in relation to lamellariid gastropods in Antarctica.

zooplankton, sink to the bottom. In the antarctic coastal area, high density and biomass of benthic animals are observed (GRUZOV *et al.*, 1968; PROPP, 1970; DAYTON and OLIVER, 1977). Around Syowa Station, particularly, sponges and ascidians have extremely high biomass (1–2 wet kg/m^2 each) (NUMANAMI *et al.*, 1986). One of the major food sources for these benthic animals is derived from primary producers in the upper layers, whereas these benthic large filter feeders are positively consumed by predators of higher trophic level. Species of the family Lamellariidae feed on ascidians or sponges (MACGINITIE and MACGINITIE, 1949; FRETTER and GRAHAM, 1962; LAMBERT, 1980). The Weddell seal that was feeding on giant lamellariid gastropoda, *Marseniopsis syowaensis*, n. sp. was observed by an underwater TV (Y. NAITO, pers. commun.). However, the Weddell seal feeding on lamellariid gastropods has never been reported before. According to ØRITSLAND (1977), the Weddell seal consumes about 18 kg of food per day. We considered that lamellariid gastropod are good foods for the Weddell seal because of their large size. If this view is correct, a new energy flow in the antarctic coastal ecosystem will be proposed (shown in Fig. 10).

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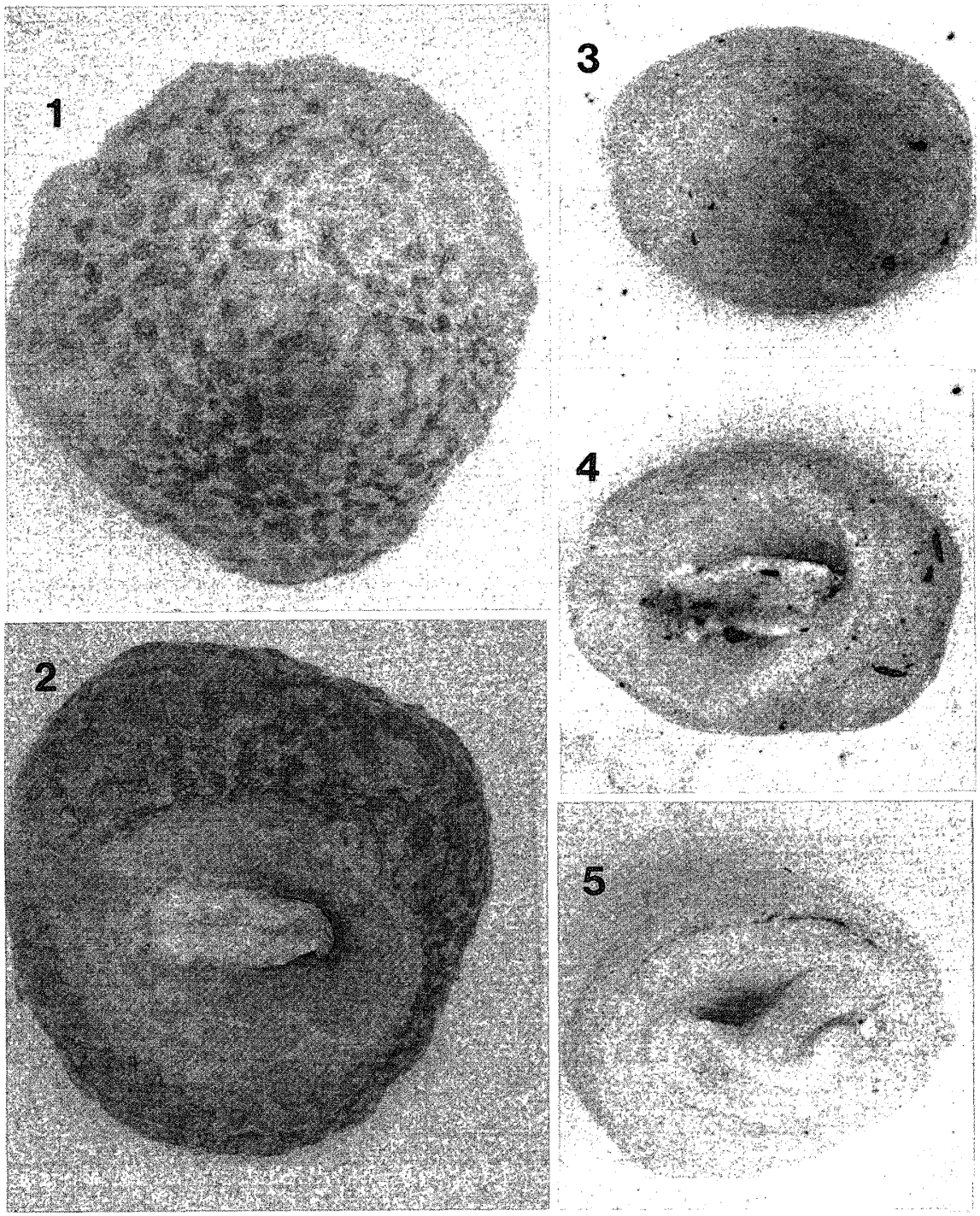

Plate 1. *Living specimens of two species of* Marseniopsis.
1: *Dorsal view of* Marseniopsis syowaensis *n. sp.* (=*Fig. 7E, F*). *2*: *Ventral view of* Marseniopsis syowaensis *n. sp.* (*Fig. 7E, F*). *3*: *Dorsal view of* Marseniopsis mollis (*SMITH, 1902*). *4*: *Ventral view of* Marseniopsis mollis (*SMITH, 1902*). 5: *Ventral view of* Marseniopsis mollis (*SMITH, 1902*) (*another specimen*). *All specimens* (*except 5*) *are directed to the left.* (*Color photographs by courtesy of Mr. Y. NAKAJIMA and Dr. K. WATANABE*).