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Preliminary Study of Malacofauna of Maxwell Bay, South Shetland Islands, Antarctica

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남극 남쉐틀랜드군도 맥스웰만의 연체동물상에 관한 기초연구

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Abstract: A preliminary study of Antarctic mollusks was conducted as a part of an evaluation of program of environmental conditions and conservation at Maxwell Bay, South Shetland Islands, Antactica. Twenty-three species of 1 chiton, 12 gastropods, and 9 bivalves were identified and redescribed.

Key words: South Shetland Islands, Maxwell Bay, mollusks, taxonomy

요약: 남극 환경 특성 및 보존에 관한 연구의 일환으로 남쉐틀랜드군도 맥스웰만에 서식하는 연체동물상에 대한 기초조사를 실시하였다. 조사결과 다판류 1종, 복족류 12종, 이매패류 9종 등, 총 23종이 동정되어 이를 재기재하였다.

주요어: 남쉐틀랜드군도, 맥스웰만, 연체동물, 분류

INTRODUCTION

Antarctic mollusks have been studied by many authorites at about the same time as the British Antarctic ("Terra Nova") Expedition, 1910 [Smith (1915: cited from Dell, 1990), Massy (1920), Eales (1923)], such as Smith (1885), Watson (1886), Haddon (1886). Recent studies have been conducted by Dell (1964, 1990) and many others. On the contrary, however, nothing about the fauna has been published on mollusks collected by the Korean Antarctic Research Expeditions. In this paper, Antarctic mollusks are shown to be composed of 23 species including 1 species of chiton, 12 gastropods, and 9 bivalves. Another 13 species of our collection, assigned to 6 species of Patellids, 3 mesogastropods, and 4 opisthobranchs, remain to be analyzed in future studies.

MATERIALS AND METHODS

The present study was based on the materials collected by members of the sixth Korea Antarctic Expedition from January 1992 to Feburary 1993. All the molluscan specimens were mainly gathered by scuba diving from intertidal zones to a depth of about 30m at 11 stations (Fig. 1) around the Maxwell Bay. All the specimens were fixed in seawater buffered 10% formalin solution and pre-

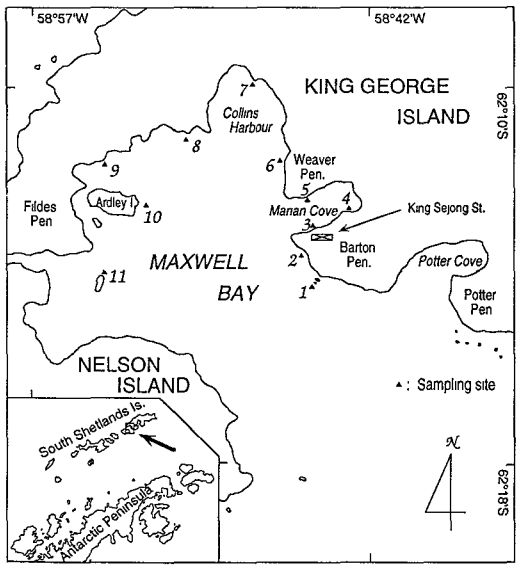

Fig. 1. A location map of sampling stations at Maxwell Bay, South Shetland Islands.

served in 90% ethyl alcohol, later, according to Lincoln & Sheals (1979). We identified specimens on the basis of morphological characteristics under a zoom stereomicroscope (WILD M10). The classification of Mollusca was principally based upon those of Dell (1990), Bernard et al. (1993), and Higo & Goto (1993).

RESULTS

List of Mollusks from Maxwell Bay, South Shetland Islands, Antarctica.

Phylum Mollusca Linnaeus, 1758
Class Polyplacophora Gray, 1821
Order Neoloricata Bergenhayn, 1955
Suborder Ischnochitonina Bergenhayn, 1930
Family Ischnochitonidae Dall, 1899
Subfamily Lepidochitoninae Iredale, 1914
Genus *Tonicina* Thiele, 1906

1. *Tonicina zschaui* (Pfeffer, 1886)

Class Gastropoda Cuvier, 1797
Suborder Prosobranchia Milne-Edwards, 1848
Order Archaeogastropoda Thiele, 1925
Suborder Trochina Cox & Knight, 1960
Superfamily Trochoidea Rafinesque, 1815
Family Trochidae Rafinesque, 1815
Subfamily Margaritinae Stoliczka, 1868
Genus *Margarites* Gray, 1847

2. *Margarites antarctica* (Lamy, 1905)

Order Mesogastropoda Thiele, 1925
Superfamily Cerithioidea
Family Cerithiopsidae H. & A. Adams, 1853
Genus Clathropsis Laseron, 1955

3. *Clathropsis mellita* Laseron, 1955

Family Trichotropidae Gray, 1850
Genus *Torellia* Jeffreys, 1867

4. *Torellia* sp.

Order Heterogastropoda
Family Naticidae Forbes, 1838
Genus *Amauropsis* M rch, 1857

5. *Amauropsis* sp.

Family Eulimidae Troschel, 1853
Genus *Melanella* Bowdich, 1882

6. *Melanella* sp.

Order Neogastropoda Wenz, 1938
Superfamily Muricoidea Rafinesque, 1815
Family Muricidae Rafinesque, 1815
Subfamily Trophoninae Cossmann, 1903
Genus *Trophon* Montfort, 1810

7. *Trophon minutus* Strebel, 1907

8. *Trophon brevispira* Martens, 1885

Family Buccinidae Rafinesque, 1815
Genus *Neobuccinum* Smith, 1877

9. *Neobuccinum eatoni* (Smith, 1875)

Genus *Prosipho* Thiele, 1912

10. *Prosipho hedleyi* Powell, 1958

11. *Prosipho crassicostatus* (Melvill & Standen, 1907)

Genus *Proneptunea* Thiele, 1912

12. *Proneptunea rufa* Oliver & Picken, 1984

Family Volutidae Rafinesque, 1815
Subfamily Zidoninae H. & A. Adams, 1853
Genus *Harpovoluta* Thiele, 1912

13. *Harpovoluta charcoti* (Lamy, 1910)

Class Bivalvia Linnaeus, 1758
Subclass Palaeotaxodonta Korobkov, 1954
Order Nuculoida Dall, 1889
Superfamily Nuclanoidea H. & A. Adams, 1858
Family Sareptidae Stoliczka, 1871
Subfamily Yoldiinae Habe, 1977
Genus *Yoldia* Möller, 1842
Subgenus *Aequiyoldia* Soot-Ryen, 1951

14. *Yoldia* (*Aequiyoldia*) *eightsi* (Couthouy in Jay, 1839)

Subclass Pteriomorphia Beurlen, 1944
Order Arcoida Stoliczka, 1871
Superfamily Limosoidea Dall, 1895

Family Philobryidae Bernard, 1897
Genus *Philobrya* Carpenter, 1872
15. *Philobrya sublaevis* Pelseneer, 1903
16. *Philobrya wandelensis* Lamy, 1906
Genus *Adacnarca* Pelsneer, 1903
17. Adacnarca nitens Pelseneer, 1903
Genus *Lissarca* Smith, 1877
18. *Lissarca notorcadensis* Melvill & Standen, 1907
19. *Lissarca miliaris* (Philippi, 1845)
Order Limoida Waller, 1978
Superfamily Limoidea Rafinesque, 1815
Family Limidae Rafinesque, 1815
Genus *Limatula* Wood, 1839
Subgenus *Antarctolima* Habe, 1977
20. *Limatula* (*Antarctolima*) *ovalis* (Thiele, 1912)
21. *Limatula* (*Antarctolima*) *pygmaea* (Philippi, 1845)
Subclass Heterodonta Neumayr, 1884
Order Veneroida H. & A. Adams, 1856
Family Limidae Rafinesque, 1815
Superfamily Cyamioidea
Family Cyamiidae Philippi, 1845
Genus *Cyamiomactra* Bernard, 1897
22. *Cyamiomactra laminifera* (Lamy, 1906)
Subclass Anomalodesmata Dall, 1889
Order Pholadomyoida Newell, 1965
Superfamily Pandoroidea Rafinesque, 1815
Family Laternulidae Hedley, 1918
Genus *Laternula* Röding, 1798
23. *Laternula elliptica* (King & Broderip, 1831)

SYSTEMATIC ACCOUNT

Phylum Mollusca Linnaeus, 1758
Class Polyplacophora Gray, 1821
Order Neoloricata Bergenhayn, 1955
Suborder Ischnochitonina Bergenhayn, 1930
Family Ischnochitonidae Dall, 1899
Subfamily Lepidochitoninae Iredale, 1914
Genus *Tonicina* Thiele, 1906

1. *Tonicina zschaui* (Pfeffer, 1886) [Pl. 1, Figs. 1, 2]

Chiton zschaui Pfeffer, 1886, Polyplacophora, p.105, pl.3, fig.2 (cited from Kaas & Van Belle, 1985).

Tonicia zschaui: Pilsbry, 1893, p.204, pl.40, fig.12; Dell, 1964, p.116: Kaas & Van Belle, 1985, pp.149-151, fig.68

Material examined: 3 inds. (abbreviation of individuals), Stn. (abbreviation of Station) 6 (1 Feb. 1993); 2 inds., Stn. 10 (29 Jan. 1993).

Description: Body small in size, elongated, length more than twice the width. Valves solid, beaked, with smooth and narrow girdle: girdle grooved into characteristic median portion, arranged with corpuscules on dorsal side. Tegmentum of all valves with microgranulose, concentrical growth lines close set, neatly discernible on end valves and lateral areas of intermediate valves, weaker on central areas.

Type locality: South Georgia.

Distribution: South Georgia, South Shetland Ia., Palmer I., Booth I., Petermann I.

Class Gastropoda Cuvier, 1797
Subclass Prosobranchia Milne-Edwards, 1848
Order Archaeogastropoda Thiele, 1925
Suborder Trochina Cox & Knight, 1960
Superfamily Trochoidea Rafinesque, 1815
Family Trochidae Rafinesque, 1815
Subfamily Margaritinae Stoliczka, 1868
Genus Margarites Gray, 1847

2. *Margarites antarctica* (Lamy, 1905) [Pl. 1, Fig. 3]

Margarita antarctica Lamy, 1905, Bull. Mus. Hist. nat. 11, p.481, fig.5 (cited from Arnaud, 1972).

Margarella antarctica: Powell, 1951, Discovery Rep. 26, p.98, fig. G9 (radula) (cited from Arnaud, 1972).

Margarites antarctica: Arnaud, 1972, p.430, fig.1: Dell, 1990, fig.178.

Material examined: 1 ind., Stn. 1 (9 Jan. 1933); 4 inds., Stn. 1 (30 Jan. 1993); 2 inds., Stn. 1 (17 Feb. 1933); many inds., Stn. 2 (1 Feb. 1933); 10 inds., Stn. 3 (3 Jan. 1993); 2 inds., Stn. 4 (26 Jan. 1993); many inds., Stn. 5 (30 Dec. 1992); many inds., Stn. 6 (6 Jan. 1992); 9 inds., Stn. 6 (17 Jan. 1993); many inds., Stn. 7 (7 Jan. 1993); 2 inds., Stn. 8 (17 Feb. 1993); 7 inds., Stn. 9 (29 Jan. 1993); 8 inds., Stn. 10 (29 Jan. 1993); many inds., Stn. 11 (1 Feb. 1933).

Description: Shell whitish gray, minute in size, rather thin, extremely low and wide cone-shaped. Whorls 4, including smooth protoconch of 1 and

1/2 whorls not clearly distinguished from each other. Exterior surface somewhat smooth with fine regular growth lines and coarse irregular axial sculptured lines. Large circular aperture with fragile lips, more than 1/3 of shell's length.

Type locality: South Sandwich Is.?

Distribution: Bellinghausen Sea, South Sandwich Is, Orcades Is., South Shetland Is.

Order Mesogastropoda Thiele, 1925
Superfamily Cerithioidea
Family Cerithiopsidae H. & A. Adams, 1853
Genus *Clathropsis* Laseron, 1955

3. *Clathropsis mellita* Laseron, 1955 [Pl. 1, Fig. 4]

Clathropsis mellita Laseron, 1955, p.160, Fig. 11.

Material examined: 1 ind., Stn. 1 (17 Feb. 1993).

Description: Shell towering: whorls 9, destroyed except for body whorl during identification. Body whorl intercrossing 3 spiral and 28 axial ribs; axial ribs continuing to base.

Type locality: Bundaberg, Queensland in Australia.

Distribution: Maxwell Bay, Queensland in Australia.

Family Trichotropidae Gray, 1850
Genus Torellia Jeffreys, 1867

4. *Torellia* sp. [Pl. 1, Fig. 5]

Material examined: 1 ind., Stn. 1 (9 Jan. 1993); 4 inds., Stn. 1 (30 Jan. 1993); 1 ind., Stn. 1 (17 Feb. 1993); 2 inds., Stn. 2 (1 Feb. 1993); 2 inds., Stn. 3 (3 Jan. 1993); 2 inds., Stn. 7 (7 Jan. 1993); 1 ind., Stn. 11 (1 Feb. 1993).

Order Heterogastropoda
Family Naticidae Forbes, 1838
Genus Amauropsis Mörch, 1857

5. *Amauropsis* sp. [Pl. 1, Fig. 6]

Material examined: 1 ind., Stn. 6 (5 Jan. 1992); 2 inds., Stn. 7 (7 Jan. 1993).

Family Eulimidae Troschel, 1853
Genus Melanella Bowdich, 1882

6. *Melanella* sp. [Pl. 1, Fig. 7]

Material examined: 2 inds., Stn. 5 (17 Feb. 1993); 2 inds., Stn. 7 (7 Jan. 1993); 2 inds., Stn. 8 (17 Feb. 1993).

Order Neogastropoda Wenz, 1938
Superfamily Muricoidea Rafinesque, 1815
Family Muricidae Rafinesque, 1815
Subfamily Trophoninae Cossmann, 1903
Genus Trophon Montfort, 1810

7. *Trophon minutus* Strebel, 1907 [Pl. 1, Fig. 8]

Trophon minutus (Strebel MSS) Melvill & Standen, 1907, Trans. roy. Soc. Edinb. p. 167, pl. 1, figs. 7-7a (cited from Dell, 1990); Oliver & Picken, 1984, p. 113, figs. 33a-b; Dell, 1990, pp. 203, 205, fig. 353.

Trophon condensatus Hedley, 1916, Reports on the Scientific Investigations British Antarctic Expedition, p. 60, pl. 9, fig. 98 (cited from Dell, 1990).

Material examined: 1 ind., Stn. 1 (8 Jan. 1993); 2 inds., Stn. 1 (9 Jan. 1993); 5 inds., Stn. 1 (17 Feb. 1993); 1 ind., Stn. 11 (1 Feb. 1993)

Description: Shell whitish gray, rather solid, with numerous strong axial lamellae. Whorls 5 including a smooth protoconch of 1-1/4 whorls with distinctive suture to form spiral staircase.

Type locality: ?

Distribution: South Shetland Is., South Orkney Is., South Sandwith Is., South Georgia Is., from off

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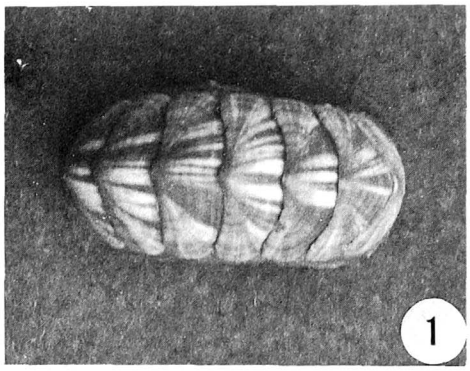
PLATE 1

Fig. 1, 2. *Tonicina zschaui* (Pfeffer, 1886) Height: 12.2mm, Width: 5.45mm
Fig. 3. *Margarites antarctica* (Lamy, 1905) Heitht: 6.6mm, Width: 13.3mm
Fig. 4. *Clathropsis mellita* Laseron, 1955 Measureless for destruction of specimen
Fig. 5. *Torellia* sp. Height: 12.05mm, Width: 11.7mm
Fig. 6. *Amauropsis* sp. Height: 29.3mm, Width: 25.1mm
Fig. 7. *Melanella* sp. Height: 3.3mm, Width: 3.75mm
Fig. 8. *Trophon minutus* Strebl, 1907. Height: 7.4mm, Width: 3.75mm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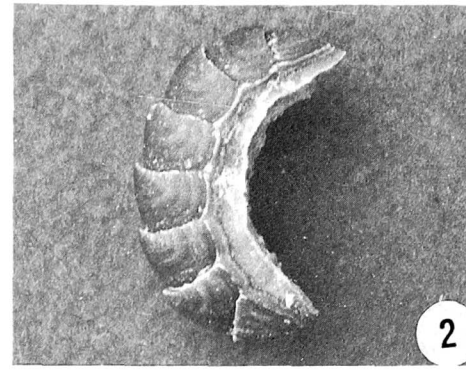
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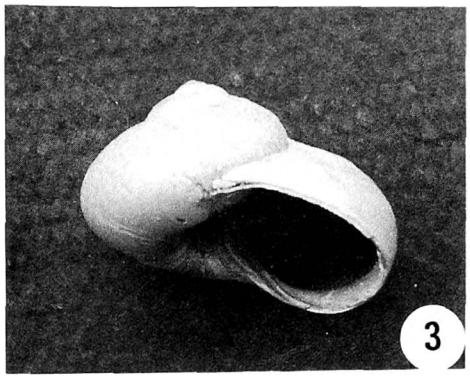
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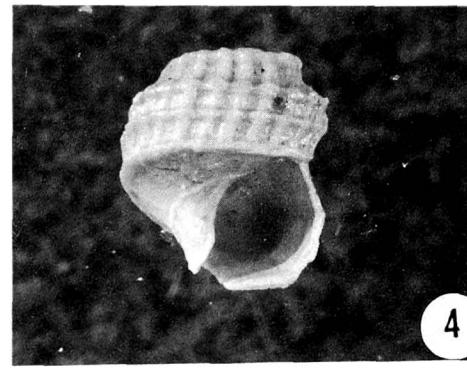
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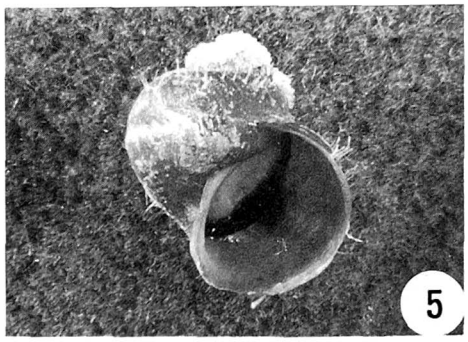
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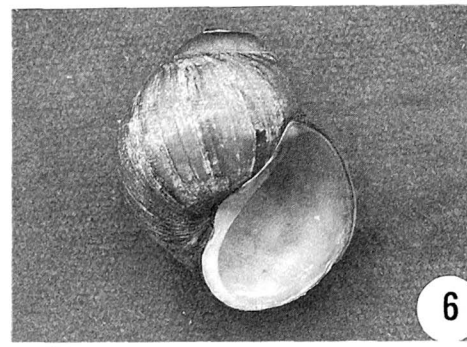
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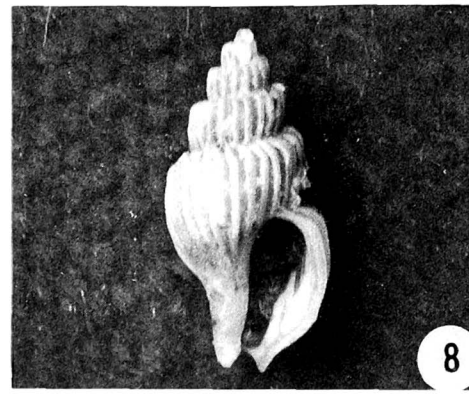
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the antarctic continent from between 140°E and 170°E in 30-45m, Ross Sea, off Kerguelen Is.

8. *Trophon brevispira* Martens, 1885 [Pl. 2, Fig. 9]

Trophon brevispira Martens, 1885, Sitz. Ges. Naturf. Freunde Berlin, p. 91 (cited from Arnaud, 1972); Arnaud, 1972, p. 432; Oliver &Picken, 1984, figs. 39-40.

Cominella modesta (non Martens, 1885): Lamy 1906, Bull. Mus. Hist. nat. 11, p.121 (cited from Arnaud, 1972).

Material examined: 1 ind., Stn. 2 (1 Feb. 1993).

Description: Shell white, minute in size, solid, intercrossing strong axial and spiral rib becoming weaker close to protoconch. Whorls 4 including protoconch but destroyed in this specimen: body whorl get more than 3/4 of shell ength.

Type locality: South Georgia Is.?

Distribution: Maxwell Bay, South Georgia I., Petermann I.

Family Buccinidae Rafinesque, 1815

Genus Neobuccinum Smith, 1877

9. *Neobuccinum eatoni* (Smith, 1875) [Pl. 2, Fig. 10]

Buccinopsis eatoni: Smith, 1875, Ann. Mag. Nat. Hist. (4) 16, p.68 (cited from Dell, 1990).

Neobuccinum eatoni: Arnaud, 1972, p. 431: Arnaud, 1985b, p. 109 with text fig.: Dell, 1990, pp.165-168, figs. 280-282.

Material examined: 1 ind., Stn. 6 (25 Jan. 1993); 3 inds., Stn. 7 (25 Jan. 1993); 9 inds., Stn. 3 (5 Jan. 1992).

Description: Shell medium size with dark brown pattern over gray background. Exterior surface smooth with fine growth line on body whorl becoming pale on whorl 2 and absent thereafter. Aperture with fragile outer lip, ovoid-shaped. Operculum black brown, semi-ovoidal, chitinous, with its nucleus near siphonal canal.

Type locality: Coulman Island, Ross Sea.

Distribution: Ross Sea, Bellingshausen Sea, Antarctic Penin., South Shetland Is., South Orkney Is., South Sandwich Is., Kerguelen Is., Heard Is.

Genus *Prosipho* Thiele, 1912

10. *Prosipho hedleyi* Powell, 1958 [Pl. 2, Fig. 11]

Prosipho hedleyi Powell, 1958, B.A.N.Z. Antarctic Research Expedition 1929-1931 Reports B, 6, p.195, pl. 2, fig. 7 (cited from Dell, 1990); Dell, 1990, p. 194, fig. 327.

Material examined: 1 ind., Stn. 1 (1 Jan. 1993); 1 ind., Stn. 1 (30 Jan. 1993); 1 ind., Stn. 1 (17 Feb. 1993); 2 inds., Stn. 7 (7 Jan. 1993); 2 inds., Stn. 11 (1 Feb. 1993).

Description: Shell small, slim, fusiform, with whorls including protoconch of 2 whorls: each whorl corded with 2 strong spiral ribs, 3 in body whorl with 1 more weak rib under suture, and 6 in base.

Type locality: ?

Distribution: Ross Sea, off Antarctic Penin.

11. *Prosipho crassicostatus* (Melvill & Standen, 1907) [Pl. 2, Fig. 13]

Chrysodomus (Sipho) crassicostatus Melvill & Standen, 1907, Trans. roy. Soc. Edinb., 48, p. 138, figs. 10-10a (cited from Oliver & Picken, 1984)

Prosipho crassicostatus: Oliver & Picken, 1984,

PLATE 2

Fig. 9. *Trophon brevispira Martens*, 1885
Height: 11.45mm, Width: 7.7mm

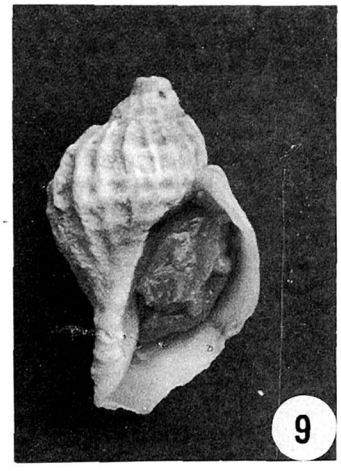
Fig. 10. *Neobuccinum eatoni* (Smith, 1875)
Height: 51.3mm, Width: 32.45mm.

Fig. 11. *Prosipho hedleyi* Powell, 1958
Height: 5.9mm, Width: 2.7mm.

Fig. 12. *Harpovoluta charcoti* (Lamy, 1910)
Height: 55.85mm, Width: 32.75mm.

Fig. 13. *Prosipho crassicostatus* (Melvill & Standen, 1907)
Height:6.5mm, Width: 3.05mm.

Fig. 14. *Proneptunea rufa* Oliver & Picken, 1984
Height: 11.8mm, Width: 7.2mm.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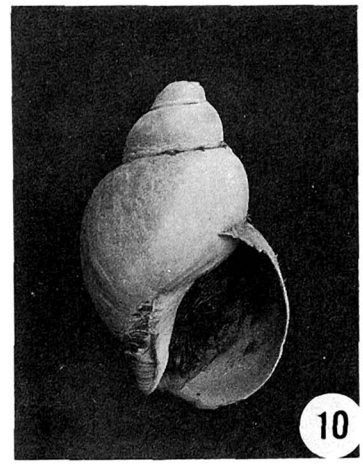
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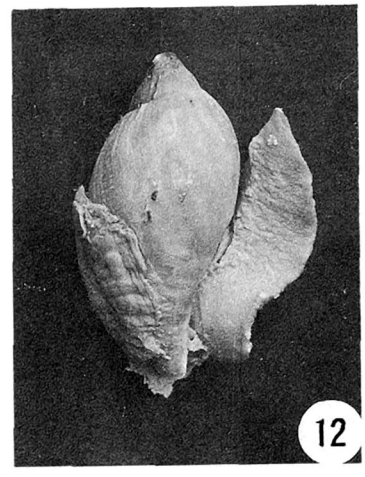
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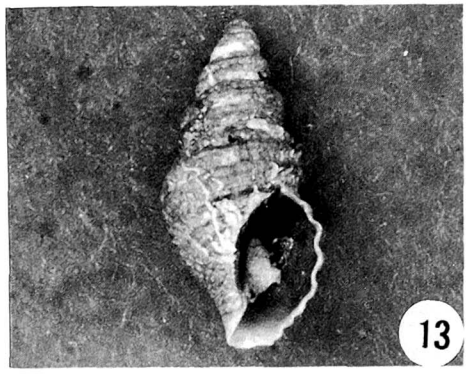
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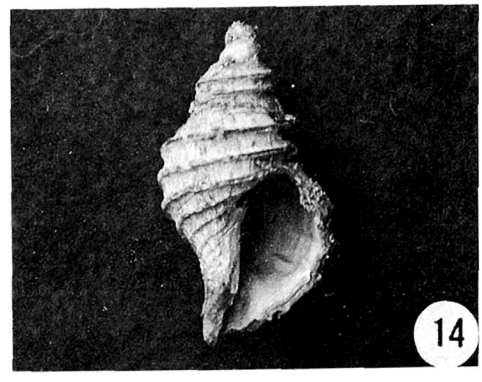
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p. 102, figs. 4a-b, 8a-b, 12, 16; Dell, 1990, figs. 317, 339-340.

Material examined: 1 ind., Stn. 7 (7 Jan. 1993); 22 inds., Stn. 11 (1 Feb. 1993).

Description: Shell small, fusiform; 5 whorls including protoconch of 1-1/2 whorls; each whorl corded with 3 strong ribs, 4 in body whorl with 1 more weak rib in suture, and 5 in base.

Type locality: ?

Distribution: Maxwell Bay, Bransfield Strait, Signy I. in South Orkney Is.

Genus Proneptunea Thiele, 1912.

12. *Proneptunea rufa* Oliver & Picken, 1984 [Pl. 2, Fig. 14]

Proneptunea rufa Oliver & Picken, 1984, pp.104, 106, figs. 18a-b, 20a-b, 22). Material examined: 1 ind., Stn. 1 (9 Jan. 1933); 1 ind., Stn. 8 (17 Feb. 1993).

Description: Shell small, pale brown, fusiform; 4 whorls including protoconch of 1-1/4 whorls; each whorl with fine axial striations, corded with 2 strong ribs, 3 in body whorl, and 6 in base decreasing in size toward shiphonal canal. Aperture semi-ovoidal, with smooth paietal callus and outer crenation.

Type locality: Borge Bay in Signy I.

Distribution: Maxwell Bay, Signy I.

Family Volutidae Rafinesque, 1815.
Subfamily Zidoninae H. & A. Adams, 1853
Genus *Harpovoluta* Thiele, 1912

13. *Harpovoluta charcoti* (Lamy, 1910) [Pl. 2, Fig. 12]

Buccinum charcoti Lamy, 1910, Bulletin du Muséum d´ Muséum d'histoire naturelle 16, p.318 (cited from Dell, 1990).

Harpovoluta charcoti: Thiele, 1912, Deutsche Südopolar-Expedition 1901-1903, 13, p217 (cited from Dell, 1990); Arnaud, 1972, p.432; Arnaud, 1985b, p.115 with text fig.; Dell, 1990, pp.218-219, figs. 365-366, 374-375, 383.

Volutharpa charcoti: Smith, 1915, Br. Antarct. ("Terra Nova") Exped. 1910. Nat. Hist. Rep., Zoo. 2, p.72 (cited from Dell, 1990).

Harpovoluta vanhoeffeni Thiele, 1912, Deutsche Südopolar-Expedition 1901-1903, 13, p.213, pl.14, fig. 1, text fig. 1 (cited from Dell, 1990).

Harpovoluta vanhoeffeni var. *striatula* Thiele, 1912, Deutsche Südopolar-Expedition 1901-1903, 13, p.214 (cited from Dell, 1990).

Harpovoluta striatula: Vayssière, 1917, Deuxième Expédition Antarctique française (1908-1910) Sciences Naturelles: Documents Scientifiques, p.36, pl. 4, figs. 50-53 (cited from Dell, 1990).

Material examined: 1 ind., Stn. 6 (6 Jan. 1992).

Description: Shell whitish yellow, medium, ovoid-shaped, thin and fragile; 4 whorls with smooth and indistinct suture. Exterior surface, on which unidentified zooantharians attached, has irregular axial growth bands. Aperture ovate, with fragile outer lip.

Type locality: Off South Shetland Is.

Distribution: South Shetland Is., South Sandwith Is., Ross Sea.

PLATE 3

Fig. 15, 16. *Yoldia (Aequiyoldia) eightsi* (Couthouy, in Jay, 1839)
Height: 11.1mm, Width: 21.05mm, Breadth: 7.45mm

Fig. 17. *Philobrya sublaevis* Pelseneer, 1903
Height: 9.65mm, Width: 9.45mm, Breadth: 4.65mm

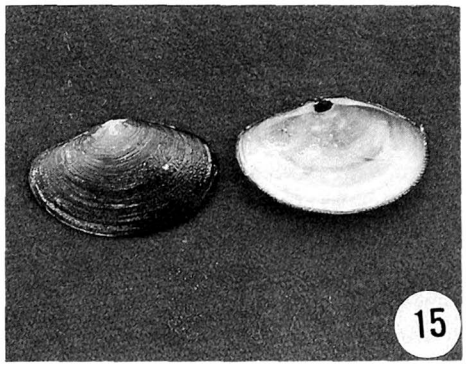
Fig. 18. *Philobrya wandelensis* Lamy, 1906
Height: 9.6mm, Width: 4.2mm, Breadth: 2.75mm

Fig. 19. *Adacnarca nitens* Pelseneer, 1903
Height: 3.55mm, Width: 3.6mm, Breadth: 2.8mm

Fig. 20. *Lissarca notorcadensis* Melvill & Standen, 1907
Height: 5.6mm, Width: 7.0mm, Breadth; 4.1mm

Fig. 21. *Lissarca miliaris* (Philippi, 1845)
Height: 3.25mm, Width: 4.2mm, Breadth: 2.8mm

Fig. 22. *Limatula (Antarctolima) ovalis* (Thiele, 1912)
Height: 11.35mm, Width: 8.75mm, Breadth: 7.2mm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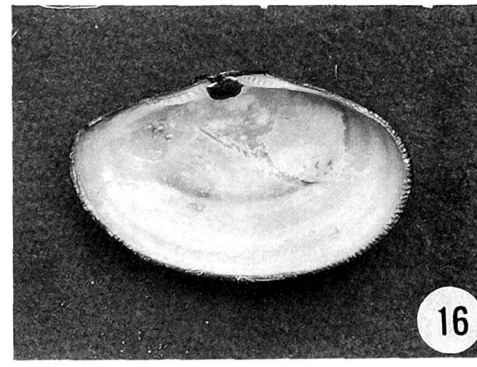
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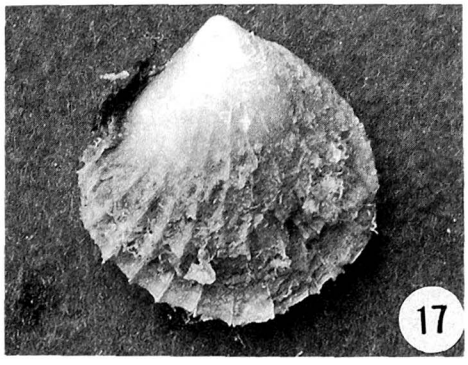
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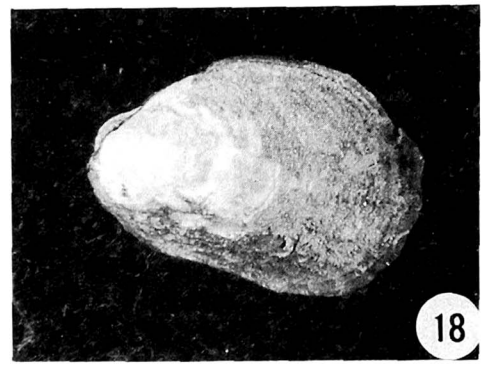
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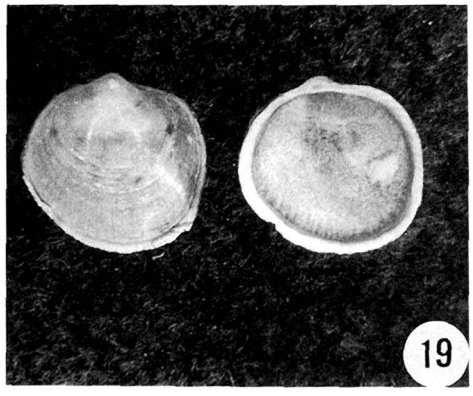
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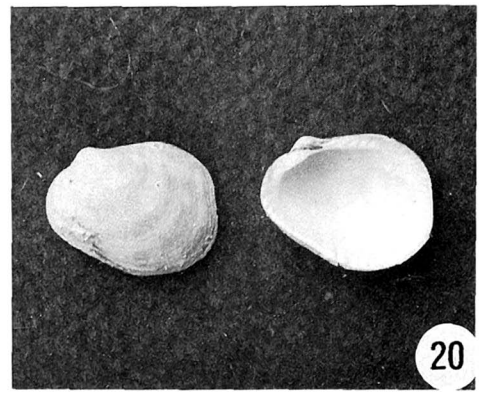
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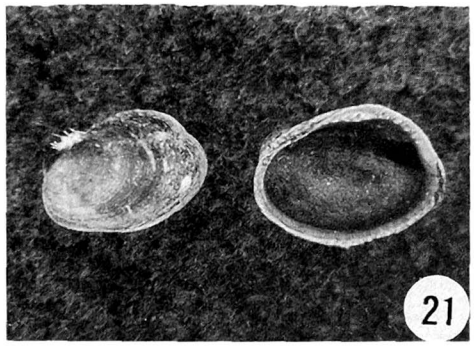
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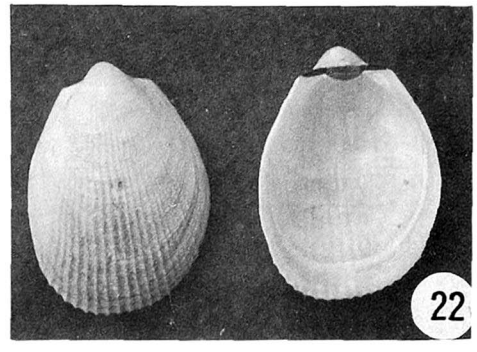
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Class Bivalvia Linnaeus, 1758
Subclass Palaeotaxodonta Korobkov, 1954
Order Nuculoida Dall, 1889
Superfamily Nuclanoidea H. & A. Adams, 1958
Family Sareptidae Stoliczka, 1871
Subfamily Yoldiinae Habe, 1977
Genus *Yoldia* Möller, 1842
Subgenus *Aequiyoldia* Soot-Ryen, 1951

14. *Yoldia (Aequiyoldia) eightsi* (Couthouy in Jay, 1839) [Pl. 3, Figs. 15, 16]

Nucula eightsii Couthouy in Jay, 1839, p.113, pl. 1, figs. 1, 13 (cited from Dell, 1990).

Leda (Yoldia) woodwardi Hanley, 1860, Proc. zool. Soc. Lond, p.140, figs. 17, 22 (cited from Dell, 1964).

Yoldia eightsii: Sowerby (in Reeve), 1871, sp. 26, pl. 5, fig. 26.

Yoldia woodwardi: Sowerby (in Reeve), 1871, sp. 2, pl. 1, fig. 2.

Yoldia subaequilateralis Smith, 1875, Ann. Mag. Nat. Hist. (4) 16, p. 73 (cited from Dell, 1990).

Yoldia kerguelensis Thiele & Jaeckel, 1931, Wiss. Ergebn. Dtsch. Tiefaee-Expedition 21, p. 207 (cited from Dell, 1990).

Yoldia (Aequiyoldia) eightsi: Soot-Ryen, 1951, Sci. Res. Nor. Ant. Exped. 1927-1928 et sqq. 32, p.6 (cited from Dell, 1964).

Yoldia (Aequiyoldia) eightsi: Dell, 1964, pp. 146-147, pl. 2, fig. 11; Dell, 1990, pp.9-10, figs. 2, 5.

Yoldia eightsi: Arnaud, 1985a, p.104 with text fig.

Material examined: 11 inds., Stn. 3 (5 Jan. 1992).

Description: Shell elliptical, flat, thin, with fine numerous growth lines. Anterior lateral teeth 11, posterior teeth 13, both becoming smaller close to either side. Ligament triangular, sited beneath umbo.

Type locality: South Shetland Is.

Distribution: South Shetland Is., South Orkney Is., South Sandwich Is., South Georgia, Falkland Is., Tierra del Fuego, southern Chile, Kerguelen Is., Ross sea.

Subclass Pteriomorphia Beurlen, 1994
Order Arcoida Stoliczka, 1871
Superfamily Limosoidea Dall, 1895
Family Philobryidae Bernard, 1897
Genus *Philobrya* Carpenter, 1872

15. *Philobrya sublaevis* Pelseneer, 1903 [Pl. 3, Fig. 17]

Philobrya sublaevis Pelseneer, 1903, Res. Voy. S. Y. Belgica Zool, p.25, pl. 7, figs. 93-94 (cited from Dell, 1990); Dell, 1964, pp.163, 165-166, pl. 4, fig, 7, text fig. 2, nos. 3, 15, 16; Arnaud, 1972, p. 433; Dell, 1990, pp.27-29, figs. 41, 50.

Philobrya limoides Smith, 1907, Nat. Ant. Exped. 1901-1904, Nat. Hist. 2, p. 4, pl. 3, figs. 3, 5, 7 (cited from Dell, 1990).

Philippiella bagei Hedley, 1916, Austral. Ant. Exped. 1911-14, Sci. Rep. C. 4(1), p. 20, pl. 1, figs. 5-7 (cited from Dell, 1990).

Philippiella orbiculalo Hedley, 1916, Austral. Ant. Exped. 1911-14, Sci. Rep. C. 4(1), p. 21, pl. 1, figs. 12-13 (cited from Dell, 1990).

Philobrya antarctica Thiele & Jaeckel, 1931, Wiss. Ergebn. Dtsch. Tiefsee-Expedition 21, p. 190 (cited from Dell, 1990).

Material examined: 2 inds., Stn. 1 (9 Jan. 1993); 1 ind., stn. 1 (30 Jan. 1993); 1 ind., Stn. 1 (17 Feb. 1993); 1 ind., Stn. 11 (1 Feb. 1993).

Description: Shell fan-shaped; microscopic growth lines; yellowish brown epidermis marked with darker radials which absent on region of umbo and consists of a series of overlapping plates on ventral margin.

Type locality: ?

Distribution: Anatarctic Penin., South Shetland Is., South Orkeny Is., South Sandwich Is., Georgia Is., Bouvet Is.

16. *Philobrya wandelensis* Lamy, 1906 [Pl. 3, Fig. 18]

Philobrya wandelensis Lamy, 1906, Bull. Mus. Hist. nat., Paris, 12, p. 50 (cited from Dell, 1990); Dell, 1964, p.167; Dell, 1990, p.29, figs. 42, 47-49.

Hochstetteria wandelensis: Soot-Ryen, 1951, Sci. Res. Nor. Ant. Exped. 1927-1928 et sqq. 32, p.11 (cited from Dell, 1990).

Adacnarca wandelensis: Nicol, 1966, Bull. Amer. Paleont. 51, p. 33, pl. 3, figs. 4-5 (cited from Dell, 1990)

Material examined: 1 ind., Stn. 1 (17 Feb. 1993); 1 ind., Stn. 7 (7 Jan. 1993); 1 ind., Stn. 11 (1 Feb. 1993).

Description: Shell triangular, ovoid-shaped; yellowish brown epidermis marked with strong growth lines and weak redials, and consits of a series of overlapping plates on ventral margin.

Type olcality: Wandel I. in Antarctic Penin.

Distribution: Antarctic continent from 49°E to Ross Sea, off South Shetland Is., South Orkney Is., South Sandwich Is., South Gerogia and Burdwood Bank.

Genus *Adacnarca* Pelsneer, 1903.

17. *Adacnarca nitens* Pelseneer, 1903 [Pl. 3, Fig. 19]

Adacnarca nitens Pelseneer, 1903, Res. Voy. S.Y. Belgica Zool, pp.24, 41, pl. 7, figs. 83-88 (cited from Dell, 1990); Dell, 1964, p. 172; Dell, 1990, p. 31-32, figs. 38-40, 43.

Material examined: 1 ind., Stn. 11 (1 Feb. 1993).

Description: Shell small, quadrilateral, ovoid-shaped, pale brown. Exterior surface smooth with very weak radials caused by ribs sited beneath periostracum; interior surface surrounded by fine knobs along all margins. Umbo on middle part of dorsal margin. Ligament presents but no teeth.

Type locality: ?

Distribution: South Shetland Is., South Orkney Is., South Sandwitch Is., South Georgia Is., Ross Sea.

Genus *Lissarca* Smith, 1877

18. *Lissarca notorcadensis* Melvill & Standen, 1907 [Pl. 3, Fig. 20]

Lissarca notorcadensis Melvill & Standen, 1907 Trans. roy. Soc. Edinb. p. 44, figs. 14-14a (cited from Dell, 1990); Dell, 1964, p. 173; Okutani, 1986, p. 279, pl. 2, figs. 13-14; Dell, 1990, p. 32, figs. 46, 58.

Arca (Bathyarca) gourdoni Laym, 1911, Sciences Naturelles: documents scientifiques, p. 28, pl. 1, figs. 21-22 (cited from Dell, 1990).

Material examined: 5 inds., Stn. 1 (9 Jan. 1993); 1 ind., Stn. 1 (30 Jan. 1993); 3 inds., Stn. 11 (1 Feb. 1993).

Description: Shell smal, truncate, yellowish white, thin but not fragile. Anterior margin short, posterior margin longer. Exterior surface smooth with concentric growth lines; interior surface surrounded by strong knobs along margins, knobs becoming weak on middle of ventral region. Anterior lateral teeth 6, posterior teeth 3. Inner ligament between anterior and posterior teeth sited under umbo located anteriorly on dorsal margin. This species broods its young.

Type locality: South Orkney Is.

Distribution: South Shetland Is., South Orkney Is., South Sandwich Is., South Georgia Is., Antarctic Penin., Ross Sea.

19. *Lissarca miliaris* (Philippi, 1845) [Pl. 3, Fig. 21]

Pectunculus miliaris Philippi, 1845, Arch. Naturges. ch. 11, p. 56 (cited from Dell, 1990); Dell, 1964, pp. 72-73; Dell, 1990, pp.32-33, figs. 53-54.

Lissarca bennetti Preston, 1916, Ann. Mag. Nat. Hist., 8(18), p.271, figs. 7-7a (cited from Dell, 1990).

Material examined: 2 inds. Stn. 1 (30 Jan. 1993); 1 ind., Stn. 11 (1 Feb. 1993).

Description: Shell small, deep purple, truncate, with long posterior and extremely short anterior margin. Exterior surface intercrossing strong growth lines and weak radial ribs under microscope, with ridge from umbo to middle of posterior margin; interior surface surrounded by strong knobs resulting in crenation along margins becoming weak on region of ventral and posterior margin. Anterior lateral teeth 3, posterior 3, between which ligament sited.

Type locality: Magellan Strait.

Distribution: Magellan Strait, South Shetland Is., South Orkney Is., South Georgia Is., Antarctic Penin.

Order Limoida Waller, 1978
Superfamily Limoidea Rafinesque, 1815
Family Limidae Rafinesque, 1815
Genus *Limatula* Wood, 1839
Subgenus *Antarctolima* Habe, 1977

20. *Limatula (Antarctolima) ovalis* (Thiele, 1912) [Pl. 3, Fig. 22]

Lima (Limatula) ovalis Thiele, 1912, pp. 112, 226, pl. 17, figs. 5a,-b (cited from Dell, 1990); Dell, 1964, p. 184; Dell, 1990, pp. 54-55, fig. 96.

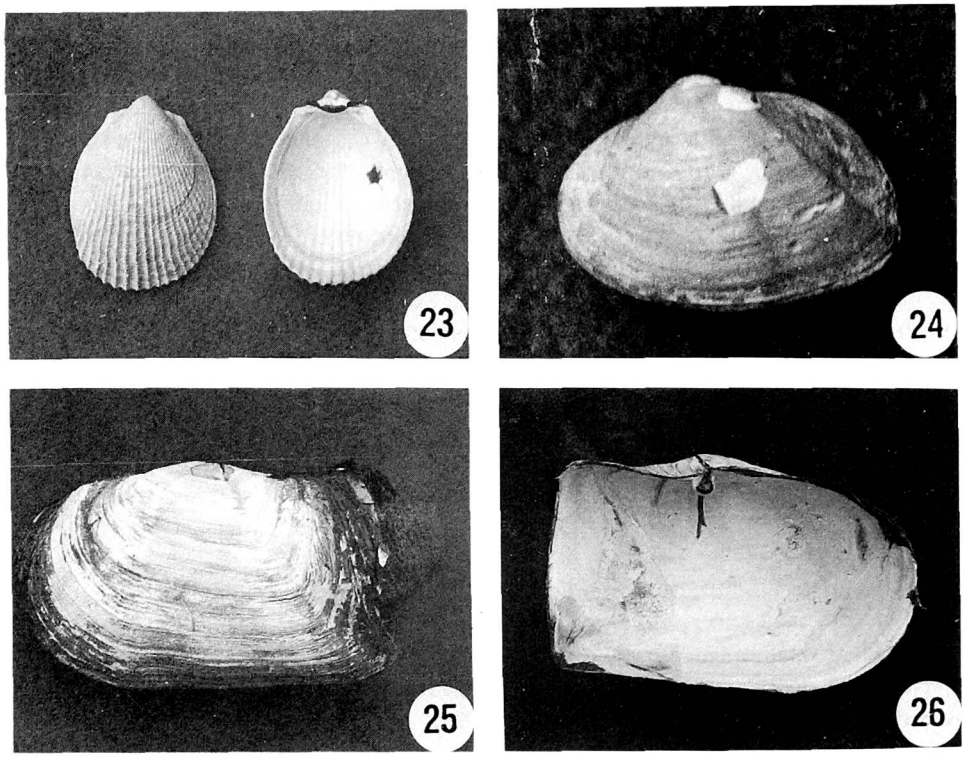

PLATE 4

Fig. 23. *Limatula (Antarctolima) pygmaea* (Philippi, 1845)
Height: 12.8mm, Width: 9.9mm, Breadth: 4.5mm

Fig. 24. *Cyamiomactra laminifera* (Lamy, 1906)
Height: 5.6mm, Width: 8.3mm, Breadth: 4.0mm

Fig. 25, 26. *Laternula elliptica* (King & Broderip, 1831)
Height: 51.6mm, Width: 65.25mm, Breadth: 30.9mm

Material examined: 6 inds., Stn. 11 (1 Feb. 1993).

Description: Shell small, white, ovoid-shaped, intercrossed with about fine radial ribs on middle part and numerous microscopic growth lines; to form weak scales. Interior surface denticulated on ventral margin due to radial ribs, with resilifer on straight dorsal margin.

Thpe locality: ?

Distribution: Region between 38°E and 143°E.

21. *Limatula (Antarctolima) pygmaea* (Philippi, 1845) [Pl. 4, Fig. 23]

Lima pygmaea Philippi, 1845 Arch. Naturges. ch. 11, p. 56 (cited from Dell, 1990).

Limatula pygmaea: Dell, 1964, pp. 182-183, pl. 2, fig. 13.

Lima falklandica A. Adams, 1863, p. 509.

Limea martiali Mabille & Rochebrune, 1889, Mission Scient. du Cap Horn, 1882-3, 6, Zool. 2, H. 124 (cited from Dell, 1990).

Limatula (Antarctolima) pygmaea: Dell, 1990, p.55.

Material examined: 3, 1/2 inds. (left valve), Stn. 1 (17 Feb. 1993).

Description: This species differs from *Limatula (Antarctolima) ovalis* (Thiele, 1912) in bearing strong radial ribs which is visible with naked eye; shell flatter, more solid, and rather grayer than former species.

Type locality: Magellan Strait.

Distribution: Southern Chile, Magellan Strait,

Falkland Is., South Shetland Is., South Orkney Is., South Sandwich Is., South Georgia Is., Antarctic Penin., Prince Edward and Marion Is., Kerguelen Is., Macquire Is.

Subclass Heterodonta Neumayr, 1884
Order Veneroida H. & A. Adams, 1856
Superfamily Cyamioidaea
Family Cyamiidae Philippi, 1845
Genus Cyamiomactra Bernard, 1897

22. *Cyamiomactra laminifera* (Lamy, 1906) [Pl. 4, Fig. 24]

Mactra (Heteromactra) laminifera Lamy, 1906, Bull. Mus. Hist. nat., Paris, 12, p. 45 (cited from Dell, 1990).

Diplodonta incerta Smith, 1907, Nat. Ant. Exped. 1901-4, Nat. Hist. 2, p.4, pl. 3, figs. 5-5a (cited from Dell, 1990).

Cyamiomactra laminifera: Dell, 1964, p.202, pl. 6, figs. 9-10; Dell, 1990, pp.50-51, fig. 100.

Cyamiomactra rousta Nicol, 1964, Natilus 78, p.60, pl. 6, figs. 1-3 (cited from Dell, 1990).

Material examined: 1 ind., Stn. 4 (26 Jan. 1993).

Description: Shell small, ovoid-shaped, pale brown due to periostracum. Esterior surface with fine growth lines and no radials; ridge from umbo to ventral margin sited near ventral margin. Umbo on dorsal margin sited at about 3/4 of length anteriorly.

Type locality: Wandel I. in Antarctic Penin.

Distribution: Bellinghausen Sea, South Shetland Is., South Orkney Is., South Sandwich Is., South Georgia Is., Antarctic Penin., off Falkland Is., Ross Sea.

Subclass Anomalodesmata Dall, 1889
Order Pholadomyoida Newell, 1965
Superfamily Pandoroidea Rafinesque, 1815
Family Laternulidae Hedley, 1918
Genus *Laternula* Röding, 1978

23. *Laternula elliptica* (King & Broderip, 1831) [Pl. 4, Figs. 25, 26]

Anatina ellipitca King & Broderip, 1831, Zool. J. 5, p.335 (cited from Dell, 1990).

Laternula elliptica: Dell, 1964, p. 229; Arnaud, 1972, pp. 434-435; Arnaud, 1985a, p.98 with text fig.; Okutani, 1986, p.277, 279-280, pl. 2, figs. 20-21; Dell, 1990, p. 62, fig. 106.

Material examined: 2 inds., Stn. 7 (7 Jan. 1993); 1 ind., Stn. 7 (16 Feb. 1993); 1 ind., Stn. 8(17 Feb. 1993).

Description: Shell large, elongated, with corase growth line, brownish tip along entire margin. Hinge presents but teeth. Spine under umbo.

Type locality: ?

Distribution: South Shetland Is., South Orkney Is., South Sandwich Is., South Georgia Is., Antarctic Penin., Kerguelen Is.

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