

Article XI—MOLLUSCA OF THE CROCKER LAND EXPEDITION TO NORTHWEST GREENLAND AND GRINNELL LAND¹

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PLATES XXV TO XXVII

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¹Scientific Results of the Crocker Land Expedition.
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INTRODUCTION

The collection brought back by the Crocker Land Expedition consists of several hundred specimens, both dry and preserved in alcohol. It includes all of the mollusks collected excepting the Cephalopoda. The absence of minute species, such as *Bela*, *Cylichna*, *Rissoa*, *Nucula*, etc., is noteworthy, as those forms were collected by the Nares Expedition. It is to be regretted that more dredging could not have been done in the neighborhood of Etah, especially in the deeper water west of the coast, in order that some of the material so abundant in beach débris might have been obtained living. However, the difficulties of making zoological investigations in these high latitudes are very great, owing to climatic and other physical causes, and Messrs. Ekblaw and Tanquary are to be congratulated for securing the amount of interesting material brought back. With all the handicaps incident to an Arctic expedition they obtained many species not before recorded from this northern land, and the results of a study of the collection have added considerably to our knowledge concerning the distribution of Arctic mollusks.

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THE PLACES OF COLLECTION OF MOLLUSCA BROUGHT BACK BY THE CROCKER LAND EXPEDITION

BY W. ELMER EKBLAW

The collections of mollusks were made at rather scattered localities and at different times by Dr. M. C. Tanquary and me. The collections at Peeawahto Point and in Foulke Fjord, Umanak or North Star Bay, and Etah were made by Dr. Tanquary and me; those at Camp Etookashoo on Fosheim Peninsula, Cañon Fjord, and Sondre Upernivik were made by me. A few specimens were secured by Dr. E. O. Hovey.

Foulke Fjord, Peeawahto Point, and Etah are really but one habitat. Foulke Fjord is the deep inlet on the north bank of which are situated Etah and Peeawahto Point. Foulke Fjord lies in latitude $78^{\circ} 20' N.$ and is the first considerable indentation on the Greenland side south of Smith Sound. It is about seven miles in total depth and the depth of the water is generally over 100 fathoms. At its head a rather large brook empties into it from the lake at the foot of the glacier which debouches about two miles from the shore. Several small mountain brooks pour their cold waters into it from the sides; but all these streams are open only for two or three months.

Most of the bottom of Foulke Fjord is of rock-ledges or of chaotic pavements of rock over which it is difficult to dredge, except near the head of the Fjord where the rock is fairly well covered by the sediments brought down by the stream. Only a small part of the specimens were obtained by dredging.

The Etah locality, which lies approximately three miles within Foulke Fjord, is a flat crescentic terrace along the shore of a small cove. Except at the ebb of the very lowest tides it is submerged and forms the habitat of numerous mollusks. At its widest point it is about 100 meters wide. It is covered by rocks and boulders, with a few scattered small patches of coarse gravel.

Peeawahto Point lies two miles farther within the Fjord. It is a talus slope of gentle gradient that extends from about 200 feet above the shore out under the waters of the Fjord. It is a rocky locality but, because of its rather gentle slope, the belt of fairly shallow water is relatively broad. The mollusks obtained at this locality were collected from the ice as it melted in the early summer.

Umanak or North Star Bay lies fifteen miles within Wolstenholme Sound in latitude $76^{\circ} 30' N.$, about 125 miles south from Etah. The mollusks from the locality were collected in large measure from the

sandy, gravelly shores of North Star Bay. This bay is rather shallow with large areas of sand covering most of the bottom. In places rock- ledges project through the sand, and these are generally overgrown by *Laminaria* sp. Three large fresh-water streams discharge into this bay.

Camp Ettookashoo, on the northern point of Fosheim Peninsula, faces out upon Greely Fjord and Fridtjof Nansen Sound, in latitude $81^{\circ} 30'$ N. It is a low flat point of gentle gradient upon which the ridges of gravel piled up by the ice of former shore-lines enclose lagoons of shallow water. The shells were collected from several of these ridges, wherever this wind had blown them somewhat free of snow. The waters washing this point open directly upon the Arctic Ocean.

Cañon Fjord is a deep fjord emptying out upon Greely Fjord. The specimens in the collection from this locality were gathered on the shores of a flat, sandy delta of a rather large stream near the head of the fjord in latitude $80^{\circ} 45'$ N. Because of the large amount of sand blown upon the ice by the heavy winds of winter the ice melts early about this delta, with a consequent large pool of open water about the mouth of the stream.

A few specimens from Sondre Upervivik were gathered on the shingly shores of a small cove along the sound between Ingnerits Peninsula and Kekertorsuak in latitude $72^{\circ} 10'$ N. The rocks and shingle of the shallow water along the shore are densely covered with these mollusks.

COMPARISON WITH COLLECTIONS MADE BY PREVIOUS EXPEDITIONS

The Mollusca of Greenland have long attracted the attention of conchologists and zoologists, collections having been made before the publication of the *Systema* of Linnæus. The territory covered by the Crocker Land Expedition, however, has been visited but few times by the naturalist. Two exploring parties to this region which brought back more or less extensive collections of marine Mollusca may be especially mentioned for comparison with the collection made by the Crocker Land party.

In 1859-1860, Dr. I. I. Hayes made a voyage in the schooner 'United States' and explored parts of Grinnell Land and the region about Foulke Fjord. Dr. Hayes brought back a large collection of marine invertebrates (69 species) which were collected at Port Foulke, Littleton Island, Cape Faraday, and Godhavn. The highest point from which shells were collected was Port Foulke, in about $78^{\circ} 30'$, north latitude. Of this material Stimpson (1863, p. 138) says:

The collections of Dr. Hayes, as might be expected from the thorough search to which the Arctic regions have lately been subjected, and the characteristic paucity of forms existing there, embrace few novelties. They possess, however, great interest, from having been found in great part at localities much nearer the Pole than any previous expeditions have succeeded in reaching on the American side of the Arctic circle. They include some species hitherto found only on the European side. And, we may add, the number of species collected by Dr. Hayes is greater than that brought back by any single expedition which has yet visited those seas, as far as can be judged by published accounts.

Twenty-one species are listed by Stimpson (1863). Of these, five species were from Port Foulke and were also collected by the Crocker party. Of the twenty-one species listed, fourteen are represented in the material collected by Ekblaw and Tanquary.

In 1875-1876, Sir G. S. Nares visited the Polar sea in the ships 'Alert' and 'Discovery.' The party reached a latitude of 83° 20' and obtained a large collection of mollusks, thirty-four species, from Grinnell Land and vicinity (Smith, 1877). Fossils were collected by Captain Feilden, naturalist to the expedition, at twenty-seven different localities, twenty-four species being certainly identified from this material (Jeffreys, 1877; Feilden, 1877). The results of the Hayes and Nares expeditions, as compared with those of the Crocker Land Expedition, are shown in Table I.

TABLE I—COMPARISON OF SPECIES COLLECTED BY THREE ARCTIC EXPEDITIONS¹

SPECIES	BAKER	SMITH	FEILDEN	STIMPSON
<i>Tonicella marmorea</i> (Fabricius).....	×	×	—	—
<i>Leda pernula</i> (Müller).....	×	×	—	—
<i>Leda pernula falcata</i> Jeffreys.....	—	—	×	—
<i>Leda minuta</i> (Müller) variety.....	—	×	—	×
<i>Yoldia glacialis</i> (Gray).....	—	×	×	—
<i>Yoldia frigida</i> (Torrell).....	—	—	×	—
<i>Yoldia arctica</i> (Gray).....	—	—	×	—
<i>Nucula inflata</i> Hancock.....	—	×	—	—
<i>Pecten grænlandicus</i> Sowerby.....	×	×	×	—
<i>Pecten islandicus</i> Müller.....	—	—	—	×
<i>Mytilus edulis</i> Linné.....	×	—	—	×
<i>Musculus lævigatus</i> (Gray).....	×	×	—	×
<i>Musculus substriatus</i> (Gray).....	×	—	—	—
<i>Crenella faba</i> (Müller).....	×	—	—	×
<i>Thracia obliqua</i> Jeffreys.....	—	—	×	—
<i>Lyonsia arenosa</i> (Möller).....	—	×	—	—
<i>Næra subtorta</i> G. O. Sars.....	—	—	×	—
<i>Astarte borealis</i> (Schumacher).....	×	×	×	×
<i>Astarte borealis sericea</i> Posselt.....	×	—	—	—
<i>Astarte crenata</i> (Gray).....	×	—	—	—
<i>Astarte crenata inflata</i> Hägg.....	×	—	—	—
<i>Astarte arctica</i> (Gray).....	×	—	—	—
<i>Astarte fabula</i> Reeve.....	×	×	×	—
<i>Astarte elliptica</i> (Brown).....	—	—	—	×
<i>Astarte striata</i> (Leach).....	—	×	—	×
<i>Astarte warehami</i> (Hancock).....	—	×	—	—
<i>Axinus gouldii</i> Philippi.....	—	×	×	—
<i>Cardium islandicum</i> Linné.....	—	×	×	—
<i>Cardium haysii</i> Stimpson.....	—	—	—	×
<i>Serripes grænlandicus</i> (Gmelin).....	×	—	—	×
<i>Macoma clacarea</i> (Gmelin).....	×	×	×	×
<i>Mya truncata</i> Linné.....	×	×	×	—
<i>Mya truncata uddevallensis</i> Forbes.....	×	—	—	×
<i>Saxicava arctica</i> (Linné).....	×	×	×	×
<i>Siphonodentalium vitreum</i> G. O. Sars.....	—	—	×	—
<i>Cylichna alba</i> (Brown).....	—	×	×	—
<i>Cylichna striata</i> (Brown).....	—	×	—	—
<i>Limacina helicina</i> (Phipps).....	×	—	—	×
<i>Clione limacina</i> (Phipps).....	×	—	—	—

¹The first column represents the Crocker Land Expedition, the second column the recent shells of the Nares Expedition, the third column the fossil shells of the same expedition, and the fourth the Hayes Expedition. The recent nomenclature is used in this table.

SPECIES	BAKER	SMITH	FEILDEN	STIMPSON
<i>Coryphella salmonacea</i> (Couthouy).....	—	×	—	—
<i>Onchidiopsis granlandicus</i> Bergh.....	—	×	—	—
<i>Tectura rubella</i> (Fabricius).....	×	—	—	—
<i>Lepeta cæca</i> (Müller).....	×	×	—	—
<i>Margarites helicina</i> (Phipps).....	×	—	—	×
<i>Margarites vahlii</i> (Müller).....	×	—	—	—
<i>Margarites cinerea</i> (Couthouy).....	×	—	—	×
<i>Margarites glauca</i> (Möller).....	—	×	—	—
<i>Margarites umbilicalis</i> Brod. and Sowb.....	×	×	×	—
<i>Margarites umbilicalis spiralis</i> Baker.....	×	—	—	—
<i>Margarites</i> species.....	—	×	—	—
<i>Solariella lævis</i> Friele.....	×	—	—	—
<i>Natica affinis</i> (Gmelin).....	—	×	—	—
<i>Natica clausa</i> Brod. and Sowb.....	—	—	—	×
<i>Velutina zonata grandis</i> Smith.....	—	×	—	—
<i>Trichotropis borealis</i> Brod. and Sowb.....	×	×	×	—
<i>Trichotropis tenuis</i> Smith.....	—	×	—	—
<i>Boreotrophon craticulatus</i> (Fabricius).....	×	—	—	×
<i>Boreotrophon clathratus</i> (Linné).....	—	—	×	×
<i>Buccinum belcheri</i> Reeve.....	×	×	—	—
<i>Buccinum cyaneum</i> Bruguière.....	×	×	—	×
<i>Buccinum cyaneum perdix</i> (Beck).....	×	—	—	—
<i>Buccinum ekblawi</i> Baker.....	×	—	—	—
<i>Buccinum hydrophanum</i> Hancock.....	×	×	×	—
<i>Buccinum tenue</i> Gray.....	—	—	×	×
<i>Buccinum tanqueryi</i> Baker.....	×	—	—	—
<i>Buccinum tumidulum</i> G. O. Sars.....	×	—	—	—
<i>Buccinum undulatum</i> Möller.....	×	—	—	—
<i>Colus tortuosus</i> (?) Reeve.....	—	×	—	—
<i>Bela bicarinata violacea</i> Migh. and Adams..	—	×	—	—
<i>Bela tenuicostata</i> M. Sars.....	—	—	×	—
<i>Bela exarata</i> (Möller).....	—	—	×	—
<i>Bela trevelyana</i> (Turton).....	—	—	×	—
TOTAL SPECIES.....	38	34	24	21

An analysis of this table shows that Stimpson's list gives 21 species; Feilden's list (fossils), 24 species; Smith's list, 34 species; and the Crocker Land Expedition, 38 species. Nineteen species are in the Smith list that are not included in the Crocker Land Expedition material, while twenty-two species are in the Crocker Land Expedition list that are not in Smith's list. Fifteen species are found in both lists. Eight species occur in Stimpson's list that are not in Baker's list, and thirteen of the species of Stimpson's list are not in the Smith list. The combined

lists total seventy-two species and varieties for northwest Greenland. The absence of the smaller species from the Crocker Land Expedition material is noteworthy.

Several catalogues of the fauna of Greenland, including the Mollusca, have been published, among which may be mentioned: Fabricius, 1780; Möller, 1842; Mörch, 1857 and 1877; and Posselt, 1898. The increase in knowledge of the Greenland molluscan fauna is well shown by comparing the faunal lists of these authors, each separated by about fifty years.

Fabricius, 1780.....	49 species
Möller, 1842.....	133 species
Posselt, 1898.....	249 species

An analysis of Posselt's catalogue shows the following interesting distribution, indicating that the west coast fauna greatly exceeds the east coast fauna in number of species:

Inhabiting both east and west coast.....	61 species
Inhabiting east coast only.....	5 species
Inhabiting west coast only.....	169 species

Many students of Arctic Mollusca have written on the fauna of Greenland and their papers are scattered through the proceedings and transactions of learned societies. Few of these, however, have studied collections from as far north as the region under discussion.

The chief interest in the collection made by the Crocker Land Expedition is the number of species found in high latitudes and the extension of the northward range of several of the species. Thirty-two species and varieties were collected at Etah, in Foulke Fjord, which is about double the number obtained at any one point by the Nares Expedition, this party securing sixteen species from Discovery Bay, and eleven species from Franklin Pierce Bay. In Table II, the species and varieties collected by the Crocker Land party are listed from the different localities. It will be observed that eight species are recorded from 175 to 450 miles north of their previously reported northern limit (*vide* Posselt), while two species are recorded from the west coast of Greenland for the first time.

TABLE II.—DISTRIBUTION OF MOLLUSCA OF THE CROCKER LAND EXPEDITION¹

	ETAH	UMANAK	FOSHEIM PEN.	CAÑON FJORD	UPERNIVIK	M. NORTH OF PREVIOUS RECORD
<i>Tonicella marmorea</i> (Fabricius).....	×	—	—	—	—	—
<i>Leda pernula</i> (Müller).....	×	—	—	—	—	—
<i>Pecten islandicus</i> Müller.....	○	—	○	—	—	175
<i>Mytilus edulis</i> Linné.....	—	—	—	—	×	—
<i>Musculus substriatus</i> (Gray).....	×	×	—	—	—	175
<i>Musculus lævigatus</i> (Gray).....	—	○	—	—	—	—
<i>Crenella faba</i> (Müller).....	—	×	—	—	—	350
<i>Astarte crenata</i> (Gray).....	×	×	—	—	—	175
<i>Astarte crenata inflata</i> Hägg.....	×	—	—	—	—	1R
<i>Astarte arctica</i> (Gray).....	○	—	—	—	—	—
<i>Astarte borealis</i> (Schumacher).....	○	○	○	—	—	—
<i>Astarte borealis sericea</i> Posselt.....	—	○	—	—	—	—
<i>Astarte fabula</i> Reeve.....	×	—	—	○	—	—
<i>Serripes grænlandicus</i> (Gmelin).....	○	○	—	—	—	200
<i>Macoma calcarea</i> (Gmelin).....	×	—	—	—	—	—
<i>Mya truncata</i> Linné.....	×	×	—	—	—	—
<i>Mya truncata uddevallensis</i> Forbes.....	×	—	—	—	—	—
<i>Saxicava arctica</i> (Linné).....	×	×	○	—	×	—
<i>Tectura rubella</i> (Fabricius).....	×	—	—	—	—	450
<i>Lepeta cæca</i> (Müller).....	×	—	—	—	—	—
<i>Margarites helicina</i> (Phipps).....	×	×	—	—	—	—
<i>Margarites vahlæi</i> (Müller).....	×	—	—	—	—	450
<i>Margarites umbilicalis</i> Brod. and Sowb.....	×	—	—	—	—	—
<i>Margarites umbilicalis spiralis</i> Baker.....	○	—	—	—	—	n.v.
<i>Margarites cinerea</i> (Couthouy).....	×	—	—	—	—	450
<i>Solariella lævis</i> Friele.....	×	—	—	—	—	1R
<i>Trichotropis borealis</i> Brod. and Sowb.....	○	—	—	—	—	—
<i>Boreotrophon craticulatus</i> (Fabricius).....	○	—	—	—	—	—
<i>Buccinum undulatum</i> Möller.....	—	×	—	—	—	—
<i>Buccinum belcheri</i> Reeve.....	○	—	—	—	—	—
<i>Buccinum cyaneum</i> Bruguière.....	○	—	—	—	—	—
<i>Buccinum cyaneum perdix</i> (Beck).....	—	○	—	—	—	—
<i>Buccinum tanquaryi</i> Baker.....	○	○	—	—	—	n.s.
<i>Buccinum ekblawi</i> Baker.....	○	—	—	—	—	n.s.
<i>Buccinum hydrophanum</i> Hancock.....	×	—	—	—	—	—
<i>Buccinum tumidulum</i> G. O. Sars.....	×	—	—	—	—	—
<i>Limacina helicina</i> (Phipps).....	×	—	—	—	—	—
<i>Clione limacina</i> (Phipps).....	×	—	—	—	—	—
TOTAL SPECIES.....	32	13	3	1	2	—

¹x, living specimens found; o, only dead shells found; 1R, first record from west coast of Greenland; n.s., new species; n.v., new variety.

FOSSIL MOLLUSCA FROM GREENLAND AND GRINNELL LAND

Fossil mollusks have long been known from southern Greenland but it was not until 1875-1876 that they were found to occur in abundance in the northernmost parts of Greenland and Grinnell Land. The Nares Expedition discovered many deposits of fossil shells, indicating the position of ancient beaches when the land was much lower than at the present time. Captain H. W. Feilden, naturalist to the Nares Arctic Expedition, made special effort to collect these fossils and secured twenty-four species from twenty-seven different localities, ranging from 10 to 800 feet above present sea-level (Jeffreys, 1877; Feilden, 1877).

For comparison with the recent shells collected by the British expedition (Smith, 1877) and also with those obtained by the Crocker Land party, the species found fossil in northern Greenland and Grinnell Land are listed in Table III, the modern names being used.

TABLE III.—FOSSIL AND RECENT MOLLUSCA FROM GREENLAND

FOUND FOSSIL BY NARES EXPEDITION	RECENT SPECIMENS FOUND BY	
	NARES EXPED.	CROCKER LAND EXPED.
<i>Leda pernula falcata</i> Jeffreys.	—	—
<i>Leda frigida</i> (Torrell).	—	—
<i>Leda glacialis</i> (Gray).	×	—
<i>Leda arctica</i> (Gray).	—	—
<i>Pecten grænlandicus</i> Sowerby.	×	×
<i>Neæra subtorta</i> G. O. Sars.	—	—
<i>Thracia obliqua</i> Jeffreys.	—	—
<i>Astarte borealis</i> (Schumacher).	×	×
<i>Astarte fabula</i> Reeve.	×	×
<i>Axinus gouldii</i> Philippi.	×	—
<i>Cardium islandicum</i> Linné.	×	—
<i>Macoma calcarea</i> (Gmelin).	×	×
<i>Mya truncata uddevallensis</i> Forbes.	×	×
<i>Saxicava arctica</i> (Linné).	×	×
<i>Siphonodentalium vitreum</i> G. O. Sars.	—	—
<i>Margarites umbilicalis</i> Brod. and Sowb.	×	×
<i>Trichotropis borealis</i> Brod. and Sowb.	×	×
<i>Boreotrophon clathratus</i> (Linné).	—	—
<i>Buccinum tenue</i> Gray.	—	—
<i>Buccinum hydrophanum</i> Hancock.	×	×
<i>Bela tenuicostata</i> M. Sars.	—	—
<i>Bela exarata</i> (Möller).	—	—
<i>Bela trevelyana</i> (Turton).	—	—
<i>Cylichna alba</i> (Brown).	×	—
TOTALS.	13	9

It will be seen from Table III that thirteen of the twenty-four fossil species were obtained in recent state by the British expedition and nine species by the American expedition. Eleven species found fossil have not been collected in recent material from this region. These are noted in the table. In addition to the fossil mollusks obtained by the British expedition, several species of mammals and other vertebrates were collected in Kane Valley. These included reindeer, musk-ox, seal, and *Myodus torquatus*.

The Crocker Land Expedition, while exploring part of Ellesmere Land, discovered deposits of fossil marine shells on Fosheim Peninsula west and somewhat south of the deposits observed by Feilden, and at about 80° North latitude, the Feilden collections made being at latitude 82° 32' N. (north of Dumb-bell Harbor, near Cape Joseph Henry). The locality at which Mr. Ekblaw collected the marine shells is about 200–250 miles west of the localities visited by the British expedition and is believed to be the most westerly locality from which fossils have been listed.

Four species are in the collection of the Crocker Land Expedition. They were found in beach-ridges on Fosheim Peninsula and in an old beach-terrace 100 feet above sea-level, two miles inland, on the west side of Cañon Fjord, about three miles from the head of the fjord. These species are, *Pecten islandicus*, *Astarte borealis*, *Astarte fabula*, and *Saxicava arctica*. It will be noted that *Pecten islandicus* is not recorded by Feilden. The other three species are in Feilden's list.

In connection with these fossil shells and raised beaches the observations of Feilden (1877, pp. 484, 485), made over forty years ago, are of interest.

Numerous deposits of sand, mud, and gravel occupying the interior valleys, and the bottoms and margins of the fresh-water lakes dispersed over the land. These valleys must recently have been fiords, bays, or arms of the sea; the deposits now resting on their flanks and in the hollows, sometimes attaining a thickness of 200 to 300 feet, were formed by the summer torrents charged with sediment.

Oscillations of level in these regions since the close of the Tertiary epoch must have occurred on a considerable scale; for I detected Post-tertiary beds resting on undoubted Miocene strata, and extending to an elevation of not less than 1000 feet above their level. The obvious conclusion is, that since the period when a flora analogous in some respects to that now existing in Mexico flourished within 500 miles of the northern axis of our planet, there has been a subsidence of over 1000 feet, and a subsequent upheaval to a similar altitude.

The old beaches from which both Feilden and Ekblaw collected molluscan fossils are related to the Pleistocene or Glacial Period, and the fossils are possibly contemporaneous with the deposits at Montreal and

other parts of Canada, which were laid down during the latter part of the Pleistocene. It is also possible that they may be much older. The differences in the altitude of many of the deposits studied by Feilden suggest changes of climate such as recorded by Jensen at Orpigsint and other places on the Greenland coast (1909, p. 299).

DESCRIPTION OF SPECIES

. AMPHINEURA

POLYPLACOPHORA

Ischnochitonidæ

Tonicella marmorea (Fabricius)

Chiton marmoreus FABRICIUS, 1780, Fauna Grœnlandica, p. 420.

Chiton ruber MÖLLER, 1842, Index Moll. Grœn., p. 89.

Boreochiton marmoreus G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 116, Tab. VIII, fig. 3.

Tonicella marmorea PILSBRY, 1892, Manual Conch., (1) XIV, p. 41, Pl. x, figs. 8-15.

Chiton (Boreochiton) marmoreus POSSELT, Conspectus Faunæ Grœn., p. 111, 1898.

Distribution.—West Greenland, Nanortalik to Franklin Pierce Bay, Grinnell Land, 5-100 fathoms; east Greenland, north to latitude 65° 40' N., 25-40 fathoms.

Crocker Land Expedition.—Etah, six specimens.

Of the six species of *Chiton* recorded from Greenland, *marmoreus* was the only one obtained by the expedition. It may be known by its red color ornamented with buff streaks, and by its leathery nude girdle. It is apparently the only species of Polyplacophora that extends its range to latitude 80° N., and is a circumboreal species, being found in both the Atlantic and Pacific oceans. It is reported by Smith from Franklin Pierce Bay, Grinnell Land. This *Chiton* is frequently found on the gills and other parts of the mouth of a shark which is abundant in Arctic waters and is much sought after by the Greenland Esquimo.

PELECYPODA

PRIONODESMACEA

Ledidæ

Leda pernula (Müller)

Arca pernula MÜLLER, 1779, Beschäft. Berliner Gesell. naturf. Freunde, IV, p. 57.

Leda pernula G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 35, Tab. v, fig. 1a-d.

Leda pernula POSSELT, 1898, Conspectus Faunæ Grœn., p. 43.

Leda pernula VERRILL AND BUSH, 1898, Proc. U. S. Nat. Mus., XX, p. 855, Pl. LXXXII, fig. 2.

Distribution.—West Greenland, Julianehaab to Discovery Bay, Grinnell Land, 5–300 fathoms; east Greenland, north to latitude 65° 40' N., 3–110 fathoms

Crocker Land Expedition.—Etah, head of Foulke Fjord, 2–10 fathoms, September 7, 1914.

But one specimen of this species was obtained by the expedition. It has the following measurements: length, 17; height, 10; breadth, 5.5 mm. The surface is ornamented by rather coarse and heavy concentric striations and the umbones are much eroded. In east Greenland it occurs abundantly in 3–50 fathoms on a clay bottom with stones. Smith reports *pernula* from Discovery Bay, Grinnell Land, in latitude 81° 41' N., and Jeffreys lists it (as variety *falcata* Jeff.) from Floeberg Beach, latitude 82° 27' N., in fossil deposits 200 feet above sea-level.

Pectinidæ

Pecten (Chlamys) islandicus Müller

Pecten islandicus MÜLLER, 1776, Zool. Danicæ Prodr., p. 248.

Pecten islandicus FABRICIUS, 1780, Fauna Grœn., p. 415.

Pecten islandicus MÖLLER, 1842, Index Moll. Grœn., p. 89.

Pecten islandicus GOULD, 1870, Invert. Mass., p. 198, fig. 495.

Pecten islandicus G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 16, Tab. II, fig. 2.

Pecten islandicus POSSELT, 1898, Conspectus Faunæ Grœn., p. 14.

Distribution.—West Greenland, Julianehaab to Etah, 5–200 fathoms. Does not occur on the east coast of Greenland except as a fossil.

Crocker Land Expedition.—Etah, Peeawahto Point, June 29, 1915, one perfect specimen, one beach-worn ventral valve; head of Foulke Fjord, 2–10 fathoms, one broken dorsal valve, September 7, 1914. Camp Ettookashoo, Fosheim Peninsula, April 22, 1915, fragments, collected by W. E. Ekblaw.

This large *Pecten* is a common mollusk on the west coast of Greenland. Smith lists *Pecten (Ammusium) grœnlandicus* Sowerby from Discovery Bay, Grinnell Land, latitude 81° 41' N. but does not mention *islandicus*. Jeffreys also records *grœnlandicus* as a fossil but does not list *islandicus*. It is possible that this species does not extend its range north of Etah. Mr. Ekblaw collected fragments of this *Pecten* on clay beach-ridges on Fosheim Peninsula in latitude 81° 30' N. Posselt gives the northern range as northwest of Cape York, or 175 miles south of the Etah locality.

Mytilidæ

Mytilus edulis Linné

Mytilus edulis LINNÉ, 1758, Syst. Nat., Ed. X, I, p. 705.

Mytilus edulis FABRICIUS, 1780, Fauna Grœn., p. 417.

Mytilus edulis MÖLLER, 1842, Index Moll. Grœn., p. 92.

Mytilus edulis GOULD, 1870, Invert. Mass., p. 183, fig. 483.

Mytilus edulis POSSELT, 1898, Conspectus Faunæ Grœn., p. 18.

Distribution.—West Greenland, Julianehaab to Upernivik, shore to 20 fathoms; east Greenland, north to latitude 75° 37'.

Crocker Land Expedition.—Søndre Upernivik, Danish Greenland, on shingly beach, June 1917.

Of this species Mr. Ekblaw says: "they live in shallow water along the shore among rocks, where they virtually cover the sea-bottom for long stretches." This species evidently does not extend as far north as the other species of pelecypods, Umanak being its northern limit. This is about 125 miles south of the Etah locality from which most of the material came.

***Musculus substriatus* (Gray)**

* *Modiola lævigata* var. *B. substriata* GRAY, 1824, Suppl. to Appendix to Parry's Voyage, 1819–1820, p. 129, fig. 83.

Modiolaria discors GOULD, 1870, Invert. Mass., p. 192, fig. 489 (*non* Linné).

Modiolaria substriata POSSELT, 1898, Conspectus Faunæ Grœn., p. 26.

Distribution.—West Greenland, Nanortalik to Etah, 5–100 fathoms; east Greenland, Hekla Havn, Gaaseland.

Crocker Land Expedition.—Etah, Foulke Fjord, 40 fathoms, August 21, 1914, four specimens; dredged in July or early August, 1914, twenty specimens; head of Foulke Fjord, 2–10 fathoms, September 7, 1914, three empty valves; Etah, on beach, eight specimens; Peeawahto Point, near Etah, two specimens; North Star Bay, Umanak, on beach, one living specimen, on *Laminaria*, two specimens, July 13, 1914.

This mollusk is a common species in west Greenland. Jensen (1909, p. 327) states that *substriatus* is rarely found in east Greenland, the common *Musculus* being *lævigatus* Gray. This condition is apparently reversed in west Greenland, *substriatus* being the commoner species. Smith lists *lævigata* from Franklin Pierce Bay, Grinnell Land (latitude 79° 25' N.) but does not mention *substriata*. *Musculus* has not been detected among the fossils from the deposits of Grinnell Land. Posselt gives the northern range as northwest of Cape York, which is 175 miles south of the Etah locality.

The Greenland specimens of this species are somewhat variable. The periostracum of the shell varies from bright lemon-yellow or greenish yellow in the young and immature individuals to black or dark chestnut in the adult specimens. In some specimens there is a central vertical zone of dark brown extending from the umbones to the ventral margin. The dredged specimens are mostly small, ranging from 3.50 to 23 mm. in length.

The two species called *substriatus* and *lævigatus* are closely related. Young specimens of *substriatus* 8 mm. long, dredged in Foulke Fjord, have the posterior slope strongly striated and quite fully meet the requirements of sculpture for *lævigatus*. On specimens 13 mm. long the sulcations have become weaker and are lacking on the ventral portion of the shell, and on specimens 17 mm. long the striations have entirely disappeared from the ventral third of the shell which is marked only by very fine radial impressed lines. In shells 24 mm. long the striations are reduced to a few radial riblets near the umbones and these persist in the largest specimens examined, 40 mm. long. The riblets on the anterior part of the shell are always sharply defined in both adult and young individuals. A shell $1\frac{1}{2}$ mm. long, from Umanak, has both umbonal slopes strongly striated. The presence of these young shells with strongly striated posterior margin leads one to question the distinctness of the two species, the *lævigatus* condition changing to the *substriatus* condition as the mussel increases in age. Adult shells, however, are quite easily separated, the absence of posterior striation in *substriatus* and its presence in *lævigatus* being clearly indicated.

Musculus lævigatus (Gray)

Mytilus descors FABRICIUS, 1790, Fauna Græn., p. 418 (*non* Linné).

Modiola lævigata GRAY, 1824, Parry's First Voyage, Suppl. to Appendix, p. 24.

Modiolaria lævigata G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 29, Tab. III, fig. 3a-b.

Modiolaria lævigata POSSELT, 1898, Conspectus Faunæ Græn., p. 25.

Distribution.—West Greenland, Nanortalik to Franklin Pierce Bay, Grinnell Land, 5–300 fathoms; east Greenland, Angmagsalik to Shannon Fjord, 3–30 fathoms.

Crocker Land Expedition.—North Star Bay, three valves in beach débris.

Of the 30 or more specimens of *Musculus* collected by the expedition, only three valves represent the present species, which appears to be rare in the localities visited. It may be known from *substriatus* by the striate posterior margin of the shell which is almost smooth in *substriatus*. In east Greenland, *lævigatus* occurs on a stony bottom in water 1–60 fathoms deep. It is recorded by Smith from Franklin Pierce Bay, Grinnell Land, in 15 fathoms.

Crenella faba (Müller)

Mytilus faba MÜLLER, 1776, Prod. Zool. Dan., p. 250.

Mytilus faba FABRICIUS, 1780, Fauna Græn., p. 419.

Modiola faba MÖLLER, 1842, Index Moll. Græn., p. 92.

Modiolaria faba POSSELT, 1898, Conspectus Faunæ Græn., p. 22.

Crenella faba DALL, 1902, Proc. U. S. Nat. Mus., XXIV, p. 508, Pl. xxxi, fig. 12.

Distribution.—West Greenland, Ivigtut to Umanak, 5–250 fathoms.

Crocker Land Expedition.—Umanak, three specimens.

The specimens obtained by the expedition are smaller than that figured by Dall (*op. cit.*, 18 mm. long), measuring but 8.5 mm. They are apparently typical *faba*, however, being of a livid purple-brown color externally, with lavender interior. This species is closely related to *Crenella pectinula* Gould, a common species of the North Atlantic coast of North America. As it is not listed by Smith from the Grinnell Land region it probably does not extend its range much farther north of the Umanak region. Posselt gives the northern range as Upernivik, which is about 350 miles south of the Umanak locality.

Astartidæ

Upwards of twelve species of this family have been recorded from Greenland waters (Dall, 1903) four of which are represented in the material brought back by the Crocker Land Expedition.

Astarte crenata (Gray)

Plate XXV, Figures 1, 2

Nicania crenata GRAY, 1824, Parry's First Voyage, Suppl. to Appendix, p. 242.

Astarte crebristriata G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 54, Tab. v, fig. 7a-b.

Astarte crenata POSSELT, 1898, Conspectus Faunæ Græn., p. 64.

Astarte crenata DALL, 1903, Proc. U. S. Nat. Mus., XXVI, p. 939.

Distribution.—West Greenland, Julianehaab to Etah, Foulke Fjord, 5–410 fathoms; east Greenland, north to Shannon Fjord, 30–160 fathoms.

Crocker Land Expedition.—Etah, Foulke Fjord, 40 fathoms, August 21, 1914, eight specimens; Umanak Fjord, July 13, 1914, fifteen specimens on *Laminaria*; North Star Bay, eight specimens.

Crenata is said to be a rare species and appears in but few lists of Greenland mollusks. It is not mentioned by Smith among the shells obtained in Grinnell Land nor by Jeffreys among the fossils of the same region. It would appear, therefore, that the specimens from Etah mark the most northern locality thus far recorded for this species. Posselt gives Cape York as the northern range, 175 miles south of the Etah locality. The Crocker specimens are somewhat variable in form and sculpture. In some individuals the anterior end is greatly produced and the shell is quadrate in form. Other individuals are ovate with the umbones nearer the anterior end. The concentric ribs vary in number and coarseness, and the shell is thinner than most of the species of the

genus. The color of the Crocker Land specimens is light brown in living shells and straw-colored in beach shells. Several characteristic measurements are given below.

Length, 19.5	Height, 14.5	Breadth, 9	mm.	Foulke Fjord
20.5	14.5	9.5	mm.	Foulke Fjord
18	13	8	mm.	Foulke Fjord
22	18	11	mm.	Amanak Fjord
19.5	16	9	mm.	Amanak Fjord

Specimens were submitted to Dr. W. H. Dall who stated that they were quite typical *crenata*.

***Astarte crenata inflata* Hägg**

Plate XXV, Figure 3

Astarte crenata var. *inflata* Hägg, 1904, Archiv for Zoologi, II, No. 2, p. 37, Taf. I, figs. 4-6.

A single specimen from Foulke Fjord, dredged in August 1914, is apparently referable to this variety. It is ventricose, with a short anterior end and truncate posterior end, the color being yellowish brown. The specimen has the following measurements: length, 18; height, 15; breadth, 9 mm.

***Astarte arctica* (Gray)**

Plate XXV, Figure 10

Crassina arctica GRAY, 1824, Parry's First Voyage, Suppl. to Appendix, p. 242.

Astarte arctica MÖLLER, 1842, Index Moll. Groen., p. 92.

Astarte arctica DALL, 1903, Proc. U. S. Nat. Mus., XXVI, p. 940.

Distribution.—Vadso, Norway; the Arctic Atlantic, Davis Strait, and Greenland, in 15 to 60 fathoms. Also near Bering Sea (Dall).

Crocker Land Expedition.—Etah, from shore débris, four specimens, *Arctica* is considered a form of *borealis* by most students, including the Arctic writers, Jensen, Posselt, Smith, and Jeffreys. It is quite distinct, however, being entirely without concentric ribbing on the beaks, a feature that is quite conspicuous in *borealis*. Only four specimens were collected by the expedition and these are large and apparently typical. The epidermis is black, the shell very heavy and the valves thick. The umbones are all eroded and in one specimen half the surface of both valves has been deeply eroded. The largest specimen measures as follows: length, 45; height, 38; breadth, 20 mm.

Arctica has not been reported from east Greenland.

Astarte borealis (Schumacher)

Plate XXV, Figures 5 to 7

Tridonta borealis SCHUMACHER, 1817, Essai Nouv. Syst. Hab. Test., p. 147, Pl. XVII, fig. 1.

Tridonta borealis G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 50, Tab. v, fig. 8a-b (part).

Astarte borealis POSSELT, 1898, Conspectus Faunæ Græn., p. 61.

Astarte borealis DALL, 1903, Proc. U. S. Nat. Mus., XXVI, p. 941.

Distribution.—West Greenland, Julianehaab to Discovery Bay, 5-43 fathoms; east Greenland, north to Shannon Fjord, 8-40 fathoms.

Crocker Land Expedition.—Etah (six specimens) and North Star Bay (twenty-three specimens) in shore débris; Camp Etookashoo, Fosheim Peninsula, in clay beach-ridges; Cañon Fjord, Fosheim Peninsula, about three miles from head of fjord (about fifty fossil specimens from Fosheim Peninsula).

The specimens of *borealis* vary considerably in form and in coloration. All agree, however, in having strongly ribbed beaks, the greater portion of the ventral and middle portion of the valve showing only fine growth-lines. The extent of ribbing varies considerably, in some individuals being confined to the region of the beaks while in others it extends half way to the ventral margin. In young specimens the whole valve may be sulcate. In outline the shells vary from almost circular, with the posterior end truncated, to elliptical, with an elongated posterior end. Several characteristic measurements are indicated below.

Length, 36	Height, 28	Breadth, 12 mm.
31	24	10 mm.
29.5	24	9.5 mm.
37	32	16 mm.
27	24	6.5 mm.

The color ranges, in the expedition specimens, from deep chestnut to black. The fossil specimens are yellowish white. Specimens were submitted to Dr. W. H. Dall, who identified them as typical *borealis*.

Borealis is recorded from Dumb-bell Harbor and Discovery Bay, Grinnell Land, by Smith (as *Astarte semisulcata*), dredged in 5 fathoms. It is a common Arctic species, circumboreal in distribution, extending its range on the Atlantic coast as far south as Cape Cod Bay. On the east coast of Greenland it has been dredged in 1-158 fathoms on clay and mud bottom with stones.

Fossil shells referable to this species occur plentifully near Camp Etookashoo, on Fosheim Peninsula in clay beach-ridges, and in an old beach-terrace 100 feet above the sea, two miles inland, on the west side

of Cañon Fjord, about three miles from the head of the fjord. The fossils are very large, the umbones eroded in the Cañon Fjord specimens, and with the concentric ridging absent from all parts of the shell except the umbones, in most specimens. There is also some variation in the elevation of the umbones. Two characteristic measurements are:

Length, 43	Height, 35 mm.
45	34 mm.

Astarte borealis is recorded by Jeffreys and Feilden as a fossil from many places in Grinnell Land and the northwestern part of Greenland, at heights from 100 to 400 feet above sea-level.

***Astarte borealis sericea* Posselt**

Plate XXV, Figures 8, 9

Astarte borealis (Chemnitz) var. *sericea* POSSELT, 1895, Meddel. om Grønland, XIX, p. 71, Tab. I, figs. 8-12.

Astarte borealis var. *sericea* POSSELT, 1898, Conspectus Faunæ Grœn., p. 63.

Three specimens from North Star Bay appear to belong to the variety *sericea* of Posselt, being much elongated with dark brown or black epidermis. *Sericea* was described from specimens collected on the east coast of Greenland, at Hekla Havn. Jensen (1909, p. 335) states that all of the east Greenland specimens which he had examined were "more or less compressed and as a rule extremely lengthened." The only difference observed in the west Greenland specimens is that the shells of the form called *sericea* are more elongated and hence not as high compared with the length as are the typical specimens of *borealis*. There is quite a difference from this standpoint between the three shells selected as *sericea* and typical *borealis*, but whether this difference would prove constant in a large series of specimens is perhaps to be questioned. Measurements of the three specimens of *sericea* are given below. These should be compared with measurements of typical *borealis* which appear on a previous page.

Length, 36	Height, 30	Breadth, 13 mm.
37	26	14 mm.
32	22	13 mm.

***Astarte fabula* Reeve**

Plate XXV, Figure 4

Astarte fabula DALL, 1903, Proc. U. S. Nat. Mus., XXVI, p. 942.

Distribution.—Franz Joseph Land to Greenland and adjacent Arctic waters in 12 to 90 fathoms. Also in the Polar Sea near Bering Strait (Dall).

Crocker Land Expedition.—Foulke Fjord, dredged in 40 fathoms, August 21, 1914, one specimen; Cañon Fjord, two miles inland on west side of fjord about three miles from head, on old sea-terrace, 100 feet above sea-level, April 28, 1915, one valve.

The single living specimen was submitted to Dr. Dall who reported it to be an elongated mutation of *Astarte fabula*. This specimen has about twenty-four distinct sulcations in the umbonal region, the rest of the shell being simply marked by growth-lines. A single valve was found among fossils from Cañon Fjord. The two specimens referred to this species measure as follows:

LIVING.	Length, 25.5	Height, 19.5	Breadth, 9 mm.
FOSSIL.	17	13	mm.

Astarte fabula is not mentioned by Posselt, possibly being included in *banksi* which is listed. It is listed by Smith from Dumb-bell Harbor and Discovery Bay and by Jeffreys and Feilden as a fossil from several places in Grinnell Land and Ellesmere Land, at heights of 50–200 feet above sea-level.

Cardiidae

Serripes grænlandicus (Gmelin)

Venus islandica FABRICIUS, 1780, Fauna Grœn., p. 411 (*non* Linné).

Cardium grænlandicum GMELIN, 1790, Syst. Nat., I, part 6, p. 3252.

Cardium grænlandicum MÖLLER, 1842, Index Moll. Grœn., p. 93.

Aphrodite grænlandica G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 49, Tab. v, fig. 3 a-b.

Cardium (*Serripes*) *grænlandicum* POSSELT, 1898, Conspectus Faunæ Grœn., p. 55.

Serripes grænlandicus DALL, 1900, Proc. U. S. Nat. Mus., XXIII, p. 388.

Distribution.—West Greenland, Frederiksdal to Etah, 5–170 fathoms; east Greenland, Hekla Havn.

Crocker Land Expedition.—Etah, on beach, twelve valves. Head of Foulke Fjord, Etah, 2–10 fathoms, Sept. 7, 1914, one specimen. North Star Bay, in kelp on gravel beach, about thirty-six valves. Peeawahto Point, Foulke Fjord, fragments of valves.

This is apparently a common species in west Greenland. The specimens are of large size, reaching a maximum length of 69 mm. Jensen (1909, p. 353) gives the length of large specimens from east Greenland as from 53 to 55 mm. In this territory it occurs commonly from one to ten fathoms on a clay and sandy clay bottom among laminarians. This species is not listed by Smith among the material collected in Grinnell Land and it is also absent from the list of fossils

by Jeffreys and Feilden from the same territory. *Cardium islandicus* is listed by all of these authors but this is quite another species. It seems evident that the Foulke Fjord record of *grønlandicus* is the farthest north of any yet reported. It is about 200 miles north of Posselt's northern range, Melville Bay.

Tellinidæ

Macoma calcarea (Gmelin)

Tellina calcarea Gmelin, 1790, Syst. Nat., I, part 6, p. 3236.

Tellina calcarea Möller, 1842, Index Moll. Grœn., p. 93.

Macoma proxima Gould, 1870, Invert. Mass., p. 95, fig. 401.

Macoma calcarea G. O. Sars, 1878, Moll. Reg. Arct. Norv., p. 76, Tab. vi, fig. 2 a-b.

Macoma calcarea Posselt, 1898, Conspectus Faunæ Grœn., p. 85.

Distribution.—West Greenland, Julianehaab to Etah, 5–380 fathoms; east Greenland, north to latitude 65° 40', 25–40 fathoms.

Crocker Land Expedition.—Foulke Fjord, 40 fathoms, Aug. 21, 1914, one specimen; Etah, five specimens.

This *Macoma* is apparently not uncommon in the region about Etah. The specimens are quite typical and do not differ from individuals living on the New England coast. It is recorded by Smith, as *Tellina tenera* Leach, from Discovery Bay, in 5 fathoms, and by Feilden from fossil deposits in Greenland and Ellesmere Land, 200 and 300 feet above sea-level. Posselt gives the northern range as Melville Bay, about 200 miles south of Etah.

Myacidæ

Mya truncata Linné

Mya truncata Linné, 1758, Syst. Nat., Ed. 10, I, p. 670.

Mya truncata Fabricius, 1780, Fauna Grœn., p. 404.

Mya truncata Möller, 1842, Index Moll. Grœn., p. 94.

Mya truncata Sars, 1878, Moll. Reg. Arct. Norv., p. 92.

Mya truncata Posselt, 1898, Conspectus Faunæ Grœn., p. 99.

Distribution.—West Greenland, Julianehaab to Dobbin Bay and Discovery Bay, Grinnell Land, 5–380 fathoms; east Greenland, north to Sabine Fjord, 25–40 fathoms.

Crocker Land Expedition.—Etah, on beach at low tide, Aug. 21, 1914, twelve specimens, young to adult; head of Foulke Fjord, 2–10 fathoms, three specimens; Etah, on beach, six valves.

Mya truncata is a common mollusk in west Greenland. It is more abundant in shallow water, specimens from deeper water usually being young and immature. The specimens obtained by the expedition are

not as a rule as large as individuals from the New England coast, the largest valve from Etah measuring 65 millimeters in length. *Mya truncata* is listed by Smith from Dobbin Bay and Discovery Bay, Grinnell Land, and the species probably extends as far north as mollusks can live on this Arctic coast. Jeffreys lists it among the fossils from deposits in Grinnell Land and adjacent territory. This clam is largely used as food by the walrus and other Arctic animals. The same is true of *Saxicava arctica*.

***Mya truncata uddevallensis* Forbes**

Mya uddevallensis Forbes, HANCOCK, 1846, Ann. Mag. Nat. Hist., XVIII, p. 337.

Mya truncata var. *uddevallensis* JENSEN, 1909, Meddel. om Græn., XXIX p. 309.

Distribution.—Probably the same as *truncata* in northern latitudes.

Crocker Land Expedition.—Etah, head of Foulke Fjord, 2–10 fathoms, three specimens; Peeawahto Point, Foulke Fjord, ten specimens, June 29, 1915; Umanak, on *Laminaria*, two specimens, July 13, 1914.

The *Myas* of the expedition may be divided into two forms, one the typical *truncata*, or near it, and the other the variety *uddevallensis* Forbes, in which the shell is short and high and the truncation extends obliquely backward, differing in this respect from typical *truncata* in which the truncation is obliquely forward or is perfectly vertical. The young shells have the posterior end rounded and the beaks near the middle of the valve, resembling the young of *Mya arenaria*.

The variety *uddevallensis* includes about half the material collected by the expedition. Jensen (1909, p. 355) states that the variety preponderates in east Greenland. Jensen's largest specimen measured 53.5 mm. in length; the largest specimen in the Crocker Land material measures 54 mm. in length, showing that the variety reaches about the same size on both the east and west coasts. A large specimen from Etah measures 52 mm. long and 38 mm. high. A small individual from *Laminaria* measures 11 mm. in length. The variety is listed by Feilden from various places in fossil deposits from 40 to 800 feet above sea-level.

Saxicavidæ

***Saxicava arctica* (Linné)**

Mya arctica LINNÉ, 1767, Syst. Nat., Ed. 12, p. 1113.

Mya arctica FABRICIUS, 1780, Fauna Græn., p. 407.

Saxicava arctica G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 95, Tab. xx, fig. 8 a-c.

Saxicava arctica POSSELT, 1898, Conspectus Faunæ Græn., p. 94.

Distribution.—West Greenland, Nanortalik to Dobbin Bay, Grinnell Land, 2–280 fathoms; east Greenland, north to Shannon Fjord, 30 fathoms.

Crocker Land Expedition.—Etah, from beach débris, thirty-four specimens; Foulke Fjord, head, 2–10 fathoms, Sept. 7, 1914, two specimens; Foulke Fjord, 40 fathoms, August 21, 1914, eight specimens; Peeawahto Point, Etah, beach débris, one specimen; North Star Bay, one specimen; Amanak, on *Laminaria*, July 13, 1914, one specimen; Sondre Upernivik, in coral-like marine plant, brought up on shark line, May 1917, two specimens.

All of the Crocker Land material appears to be of the pholadis-form described by Jensen (1909, p. 358). The shells vary in thickness and in the rib-like character of the lines of growth which are very heavy on the young and immature shells but disappear on the very old shells, leaving only the heavy lines of growth. The species attains a large size, a single individual from Peeawahto Point measuring 53 mm. in length. In old specimens the posterior ridge becomes less conspicuous and in some specimens entirely disappears. A single specimen in the collection is quite arcuate on the ventral margin and is higher in proportion to the length than the majority of the specimens, due possibly to a cramped position among the stones along the shore.

Saxicava arctica is listed by Smith from Discovery Bay, Dobbin Bay, and Franklin Pierce Bay, in 5–30 fathoms. As a fossil it is listed by both Jeffreys and Feilden as abundant in various places in Grinnell Land and northwest Greenland, in beds from 40 to 400 feet above sea-level. Mr. Ekblaw discovered the species as a fossil in clay beach-ridges at Camp Etokashoo, Fosheim Peninsula, April 22, 1915. The fossil shells are not as large as the recent specimens collected by the expedition.

GASTROPODA

ASPIDOBANCHIA

Acmæidæ

Tectura rubella (Fabricius)

Patella rubella FABRICIUS, 1780, Fauna Grœn., p. 386.

Patella rubella MÖLLER, 1842, Index Moll. Grœn., p. 89.

Tectura rubella G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 121, Tab. VIII, fig 5 a-b.

Acmæa rubella PILSBRY, 1891, Man. Conch., (1) XIII, p. 9, Pl. XLII, figs. 79, 80.

Tectura rubella POSSELT, 1898, Conspectus Faunæ Grœn., p. 115.

Distribution.—West Greenland, Julianehaab to Etah, 5–100 fathoms; east Greenland, Hekla Havn.

Crocker Land Expedition.—Foulke Fjord in 40 fathoms, August 21, 1914.

A single specimen of this little limpet was detected in a vial of specimens from Foulke Fjord. It is large for the species, measuring 5.5 mm. in length and 4.5 mm. in width. The species is not listed by Smith from Grinnell Land nor does it appear in Jeffrey's fossil list. Its previously reported northern limit appears to be Upernivik (Posselt) and the Etah record, about 450 miles farther north, seems to be its most northern recorded range.

Lepetidæ

Lepeta cæca (Müller)

Patella cæca MÜLLER, 1776, Zool. Danicæ Prod., p. 237.

Lepeta cæca G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 123, Tab. xx, fig. 17 a-b.

Lepeta cæca PILSBRY, 1891, Man. Conch., (1) XIII, p. 68, Pl. xl, figs. 29-32.

Lepeta cæca POSSELT, 1898, Conspectus Faunæ Græn., p. 117.

Distribution.—West Greenland, Julianehaab to Richardson Bay, Grinnell Land, 2-300 fathoms; east Greenland, Hekla Havn to Walrus Fjord, 25-40 fathoms.

Crocker Land Expedition.—Etah, Foulke Fjord, 40 fathoms, August 21, 1914, seven specimens.

This handsome little shell was found associated with *Tectura rubella*, *Margarites umbilicalis*, and other mollusks, dredged at this depth. The specimens are not of maximum size (10 mm. long) but seem typical. Six living specimens were obtained and these are covered with beautifully beaded radiating ribs. The apex is eroded in all specimens. This species is listed by Smith from Franklin Pierce Bay, Richardson Bay, and Cape Fraser, in 15 to 70 fathoms. It is not recorded as a fossil by Jeffreys or Feilden.

Trochidæ

Upwards of ten species of this family are recorded from Greenland waters, five of which are represented in the Crocker Land Expedition material. Nearly all of these are of the genus *Margarites*.

Margarites helicina (Phipps)

Turbo helycinus PHIPPS, 1774, Voyage toward the North Pole, p. 198.

Turbo helycinus FABRICIUS, 1780, Fauna Græn., p. 393.

Margarita helicina MÖLLER, 1842, Index Moll. Græn., p. 81.

Margarita helicina PILSBRY, 1889, Man. Conch., (1) XI, p. 285, Pl. LXIV, figs. 45-47; Pl. XXXIX, fig. 63.

Margarita helicina POSSELT, 1898, Conspectus Faunæ Græn., p. 122.

Distribution.—West Greenland, Julianehaab to Franklin Pierce Bay, Grinnell Land, 2-100 fathoms; east Greenland, Shannon Fjord, 4-22 fathoms.

Crocker Land Expedition.—Foulke Fjord, dredged in July or early August, 1914, one specimen; Umanak, on *Laminaria*, in lead in ice near shore, June 9, 1914, one hundred and eleven specimens.

This beautiful little pearly snail is apparently common in shallow water (2–20 fathoms) near shore, in Greenland. It is the most abundant species collected by the expedition. Its habitat at Umanak, on *Laminaria*, suggests this vegetation as its food-plant. The Umanak specimens are also peculiar in being heavily encrusted with a species of Bryozoa. *Helicina* is widely distributed in England, Scandinavia, Greenland, New England, Bering Sea, and south on the Pacific coast to Washington. Though given by Posselt as occurring as far north as Franklin Pierce Bay it is not mentioned by either Smith or Jeffreys among the shells of Grinnell Land. The finding of but a single shell near Etah by the Crocker Land Expedition would seem to indicate that it is rare as far north.

Margarites vahlii (Möller)

Margarita vahlii MÖLLER, 1842, Index Moll. Grœn., p. 8.

Margarita vahlii PILSBRY, 1889, Man. Conch., (1) XI, p. 289, Pl. xxxix, figs. 58, 59.

Margarita vahlii POSSELT, 1898, Conspectus Faunæ Grœn., p. 124.

Distribution.—West Greenland, Godthaab to Etah, 2–300 fathoms.

Crocker Land Expedition.—Etah, Foulke Fjord, dredged in July or early August, 1914.

A single shell of this tiny *Margarites* was found with several other shells dredged in Foulke Fjord. It agrees in all respects with the description in the Manual of Conchology and with the figures on plate xxxix of that work, except that the spire is a trifle more depressed in the Crocker Land specimen. This specimen measures as follows: length, 2.75; diameter, 2.75 mm. *Vahlii* has apparently not been previously reported north of Upernivik, 450 miles south of the Etah locality. It is not listed by either Smith or Jeffreys among the mollusks of Grinnell Land and vicinity.

Margarites umbilicalis (Broderip and Sowerby)

Margarita umbilicalis BRODERIP AND SOWERBY, 1829, Zool. Journ., IV, p. 371.

Maragrta umbilicalis PILSBRY, 1889, Man. Conch., (1) XI, p. 288, Pl. xxxix, figs. 61, 62, 64; Pl. LXIV, figs. 39–41.

Margarita umbilicalis POSSELT, 1898, Conspectus Faunæ Grœn., p. 127.

Distribution.—West Greenland, Nanortalik to Floeberg Beach, Grinnell Land, 5–160 fathoms; east Greenland, north to Shannon Fjord and Germania Havn, 2–40 fathoms.

Crocker Land Expedition.—Etah, Foulke Fjord, dredged in July or early August, 1914, two specimens; head of Foulke Fjord 2–10 fathoms, Sept. 7, 1914, eight specimens; Foulke Fjord, 40 fathoms, August 21, 1914, two specimens; Etah, from beach débris, nine specimens; Peeawahto Point, Foulke Fjord, one specimen.

This is the largest species of the genus found in Greenland waters and is apparently a common mollusk in west Greenland and adjacent territory. It varies considerably in form and sculpture. In full-grown typical examples there are usually six whorls, the nuclear whorls are very finely striate, the striæ increasing in strength to the third whorl where they may form raised ribs; on the fourth whorl they grow fainter and disappear on the fifth and sixth whorls which are usually smooth. The height of the spire varies considerably in the Etah specimens. Some extreme measurements are given below:

Height, 19	Diameter, 22 mm.
17	21.5 mm.
17.5	20 mm.
16	19 mm.

Margarites umbilicalis is listed by Smith from Franklin Pierce Bay, in 15 fathoms, and by Jeffreys as a fossil from Shell Flats, 200 feet above sea-level, and Kane Valley, 40 feet above sea-level.

***Margarites umbilicalis spiralis*, new variety**

Crocker Land Expedition.—Etah, beach débris, two specimens; head of Foulke Fjord, 2–10 fathoms., Sept. 7, 1914, two specimens.

Among the specimens collected at Etah are several individuals in which the spiral sculpture is continued from the upper whorls to the aperture, producing wide, raised bands separated by narrow incised channels. A rather wide space within the umbilicus is without impressed lines.

Height, 15	Diameter, 18 mm.	Holotype A. M. N. H., No: 2511.
15	18.5 mm.	Paratype, N. H. Mus., Univ. Ill., No. Z10862.

The sculpturing of this variety is so striking and the absence of intermediate forms so marked that a name seems necessary for this shell. The Arctic shells from Greenland, of which about thirty specimens have been examined, are either lirate on the upper third and fourth whorls or lirate on all the whorls, intermediate forms being absent. The variety seems to be rare.

Margarites cinerea (Couthouy)

Trochus cinerarius FABRICIUS, 1780, Fauna Grœn., p. 391 (*non* Linné).

Turbo cinereus COUTHOUY, 1839, Bost. Journ. Nat. Hist., II, p. 99, Pl. III, fig. 9.

Margarita striata MÖLLER, 1842, Index Moll. Grœn., p. 81.

Margarita cinerea G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 134, Tab. IX, fig. 1 a-c.

Margarita cinerea PILSBRY, 1889, Man. Conch., (1) XI, p. 291, Pl. LXIV, figs 53, 54.

Margarita cinerea POSSELT, 1898, Conspectus Faunæ Grœn., p. 129.

Distribution.—West Greenland, Julianehaab to Etah, 5–200 fathoms; east Greenland, Hekla Havn.

Crocker Land Expedition.—Etah, Foulke Fjord, dredged Aug. 7, 1914, two specimens.

This *Margarites* is a variable species of wide distribution. Of the two specimens obtained by the Crocker Land party, one has five and the other six whorls. Both are strongly lirate, the basal portion of the last whorl near the umbilicus being less distinctly marked, however, than the rest of the shell. The nuclear whorls are smooth and hyaline. Judging by the small number of specimens collected this species must be a rare shell in this part of Greenland. The specimens measure as follows:

Height, 12	Diameter, 13.5 mm.
8	9 mm.

This species is not mentioned by either Smith or Jeffreys from Grinnell Land and no records have been seen north of Upernivik, 450 miles south, the northern limit given by Posselt. Etah, therefore, appears to be its northernmost recorded range.

Solariella lævis Friele

Solariella lævis FRIELE, 1886, Norwegian North-Atlantic Expedition, Moll., part 2, p. 30, Pl. XII, figs. 4-6.

Solariella obscura var. *lævis* PILSBRY, 1889, Man. Conch., (1) XI, p. 310, Pl. LXVI, figs. 94–96.

Distribution.—Arctic Ocean east of Greenland, 300–350 fathoms.

Crocker Land Expedition.—Etah, Foulke Fjord, dredged in 40 fathoms, August 1914, four specimens.

No record of this tiny species has been seen from west Greenland. There seems little question, however, that the specimens from Etah are the *lævis* described by Friele. The shells are of the same size, shape, and texture as those of Friele. The surface is brilliantly polished, pearly, and without a trace of spiral sculpture, even the base of the shell being without the faint angular margin below the periphery described by Friele. Two specimens measure as follows:

Height, 4.5	Diameter, 4.5 mm.
4	3.5 mm.

This appears to be the first record of this beautiful little shell from west Greenland as well as from shallow water.

Trichotropidæ

Trichotropis borealis Broderip and Sowerby

Trichotropis borealis BRODERIP AND SOWERBY, 1828, Zool. Journ., IV, p. 375.

Trichotropis atlantica Beck, MÖLLER, 1842, Index Moll. Græn., p. 12.

Trichotropis borealis GOULD, 1870, Invert. Mass., p. 390, fig. 651.

Trichotropis borealis G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 163.

Trichotropis borealis POSSELT, 1898, Conspectus Faunæ Græn., p. 168.

Distribution.—Julianehaab to Dumb-bell Harbor, Grinnell Land, 5–250 fathoms.

Crocker Land Expedition.—Etah, head of Foulke Fjord, 2–10 fathoms, Sept. 7, 1914, four specimens.

This variable species is apparently not common in the vicinity of Etah. The specimens collected, three of which were living, show some variation in ribbing, three specimens having small riblets between the primary riblets, especially between the suture and the upper carina on the body whorl. It is listed by Smith from Dumb-bell Harbor and Discovery Bay in five fathoms. Jeffreys lists it from Kane Valley mud beds, 40 feet above sea-level, the deposit being in latitude 82° 33' N.

Muricidæ

Boreotrophon craticulatus (Fabricius)

Tritonium craticulatum FABRICIUS, 1780, Fauna Græn., p. 401.

Trophon fabricii (Beck) MÖLLER, 1842, Index Moll. Græn., p. 87.

Trophon fabricii, POSSELT, 1898, Conspectus Faunæ Græn., p. 174.

Boreotrophon craticulatus DALL, 1902, Proc. U. S. Nat. Mus., XXIV, p. 538.

Distribution.—West Greenland, Julianehaab to Etah.

Crocker Land Expedition.—Etah, Foulke Fjord, dredged in early August 1914, one specimen.

Of the five species of *Boreotrophon* credited to Greenland, *craticulatus* was the only one obtained by the expedition. The single specimen is without the animal. It is slender, with nine thin, irregular varices, the interstices ornamented with strong spiral riblets. This specimen measures as follows: length, 34; width, 18; aperture length, 20; width, 9 mm.

Trophon is not listed by Smith from Grinnell Land. Jeffreys lists *Trophon clathratus* Linné as a fossil from Cape Joseph Henry. The present species, *craticulatus*, is not recorded, apparently, from this part of Greenland and the Etah record appears to be the most northern yet reported from Greenland.

Buccinidæ

The family Buccinidæ, or whelks, has been much abused by some writers, the tendency being to lump all the similar forms under a few species. Some of the earlier writers, especially Dr. William Stimpson, separated the species largely on the basis of sculpture of the surface, which character has been shown by later students of the group, notably Dall, to be one of the most important points for the identification of the species. One of the best papers in which the sculpture is well figured is Dall's account of the Mollusca in the Point Barrow, Alaska, Report. Differences also occur between the sexes which complicate the difficulties of properly classifying the species of this variable genus. As nearly all of the material in the Crocker Land collection consists of shells without the animal the distinguishing sexual characters can not be considered. The sculpture, however, has been carefully examined with a compound microscope and the distinguishing features noted.

At the present time upwards of seventy-five species of *Buccinum* are known, thirty-six of which are from the northern Pacific region (Dall, 1907, p. 139). Posselt (1898, pp. 193-214) credits Greenland with twelve species, as noted below:

<i>undatum</i> Linné	<i>perdix</i> (Beck) Mörch
<i>belcheri</i> Reeve	<i>hydrophanum</i> Hancock
<i>undulatum</i> Möller	<i>ciliatum</i> Fabricius
<i>terræ-novæ</i> (Beck) Mörch	<i>tenuë</i> Gray
<i>grænladicum</i> Chemnitz	<i>glaciale</i> Linné
<i>amaliæ</i> Verkrûzen	<i>hancocki</i> Mörch

Of these, *grænladicum* of Chemnitz (not a binomial writer) is better known under the name of *cyaneum* Bruguière and *hancocki* Mörch should be called *grænladicum* Hancock. To these *humphreyianum* Bennett and *tumidulum* Sars should be added. Posselt (1898, pp. 203-209) lists five varieties of *perdix* and the same number of *hydrophanum*, but none of these were found by the Crocker Land Expedition. In a recent work on the fossil Buccinums of Great Britain (Harmer, 1914) three species in addition are credited to Greenland. These are *fragile* (Verkrûzen) MS. G. O. Sars, *elongatum* Verkrûzen, and *tottenii* Stimpson. This work is beautifully illustrated, many of the recent as well as the fossil species being figured. Two new species are described in the present paper. It is apparent that a comprehensive monograph of the species of the genus from American waters is badly needed. Dall has worked out a large buccinoid fauna in the Pacific waters, especially

from the northern part of these waters, and similar work on the northern Atlantic region would produce comparable results.

If the species listed by Harmer from Greenland be admitted to this faunal region, there are nineteen species found in the waters of this large land area. Only six species were obtained by the Crocker Land Expedition, in addition to the two species which are believed to be new to science.

***Buccinum undulatum* Möller**

Plate XXVI, Figure, 6; Plate XXVII, Figure 4

Buccinum undulatum MÖLLER, 1842, Index Moll. Græn., p. 84.

Buccinum undulatum STIMPSON, 1865, Northern Buccinums, p. 17.

Buccinum undulatum POSSELT, 1898, Conspectus Faunæ Græn., p. 194.

Distribution.—West Greenland.

Crocker Land Expedition.—Umanak, five specimens, living.

The specimens collected by the expedition appear to be referable to *undulatum* rather than *undatum*. This species has of recent years been considered a synonym of *undatum*; but the Greenland specimens from Umanak are quite different from the common *Buccinum* found in both America and Europe. Compared with specimens from Long Island Sound, the Greenland shells have a rounder aperture, the sinus of the outer lip is narrow and placed near the suture, while in *undatum* it is near the center of the aperture, or at the periphery. The transverse ribs in the Greenland species are broader, flatter, and fewer in number. The sculpture in the New England specimens is more deeply incised, the primary ridges being raised, well rounded, with one to three secondary ridges between. About three secondary ridges occupy the space of one millimeter. In the Greenland specimens the spiral sculpture consists of large, nearly equidistant ridges, the interspaces being as wide as the ridges. Three or four of these ridges occur in one millimeter. The primary ridges are low and not conspicuous; there are two small ridges on the primary ridges and three or four small secondary ridges between the primary ridges (Pl. XXVII, fig. 4). The plan of the sculpture is the same in both *undatum* and *undulatum*. A large specimen measures: length, 68 width, 48; aperture length, 33; width, 20 mm.

Many years ago Stimpson (1865, p. 17) maintained that these two names represented different species although he remarks that "specific tangible differences are hard to find" and adds that "there is a facies, difficult to describe, which makes the forms easily recognizable." Verrill, however (1882, p. 489), remarks that "Our littoral variety is certainly very different, as a variety, from the common shallow-water form of Great Britain, but the latter can be almost exactly matched by our

specimens dredged abundantly on the sandy bottoms, off Cape Cod and south of Marthas Vineyard, while our littoral variety seems to have its counterpart on the northern coasts of Norway and Finmark." From the evidence it would seem that there are two forms found on both American and European shores, typified by *undatum* and *undulatum*. At all events, the specimens brought back by the Crocker Land Expedition are different from the shells usually classed as *undatum* and they fit the shell described by Möller as *undulatum*.

Neither *undatum* or *undulatum* are listed by Smith and Jeffreys from the Grinnell Land region and it seems probable that the Crocker Land specimens represent the most northern locality yet reported.

***Buccinum belcheri* Reeve**

Plate XXVI, Figure 3; Plate XXVII, Figure 6

Buccinum belcheri REEVE, 1855, Belcher's Last Arctic Voyage, p. 394, Pl. xxxii, fig. 7 a; 1877, Ann. Mag. Nat. Hist., (4) XX, p. 133, figs.

Buccinum belcheri TRYON, 1881, Man. Conch., (1) III, p. 193, Pl. lxxvii, fig. 353.

Buccinum belcheri POSSELT, 1898, Conspectus Faunæ Græn., p. 194.

Distribution.—West Greenland, Port Refuge; Dobbin Bay, Grinnell Land, 30 fathoms.

Crocker Land Expedition.—Etah, two beach specimens.

Among the beach specimens collected at Etah are two specimens of a *Buccinum* which seem referable to Reeve's *belcheri*. They may be described as follows: shell thin, elongated-oval in outline; spire elongated, turreted; suture distinctly impressed; body whorl narrow, elongated, occupying about two-thirds the length of the shell; whorls rounded, somewhat convex, not carinated, plicated or folded; spiral sculpture consisting of thirty-two to thirty-four, flatly rounded, primary ridges; each primary ridge alternates with a secondary ridge which is less than half the width of the primary ridge; a primary and two secondary ridges occupy the space of one millimeter; occasionally, near the base of the shell, the secondary ridges may be double and on the base they may be absent, leaving a wide, shallow groove between the primary ridges; each primary ridge usually has upon it two or three smaller secondary ridges of about equal diameter (Pl. XXVII, fig. 6); the axial sculpture consists of many close-set, incised growth-lines which give the surface a wavy aspect; aperture elliptical, narrow; less than half the length of the shell; columella apparently without plaits.

Length, 50	Width, 29	Aperture length, 27	Width, 14 mm.
47	26	25	14 mm.

This *Buccinum* appears to be one of the most distinct of the genus but seems to have been noticed by few students of Arctic mollusks. The absence of folds or carinæ and the distinct spiral sculpture will easily distinguish it from all other Greenland species. It is related to *ciliatum* Fabricius, but the spiral sculpture is different as is also the surface ornamentation. Verrill's *gouldi* (1882, p. 497) founded on Gould's figure of *ciliatum* (non Fabricius), in the *Invertebrata* of Massachusetts, may be a related species.

Belcheri is reported by Smith from Dobbin Bay, Grinnell Land, in 30 fathoms, and by Dall (1879, p. 145) from Cumberland Sound. Posselt lists the species from west Greenland. Its distribution in Greenland and other waters has not been worked out. Judging by the paucity of references to this species it must be a rare form in the Arctic regions.

The *Buccinum inexhaustum* Verkrüzen, from Newfoundland, described and figured by Harmer (1913, p. 110, Pl. x, fig. 3) seems related and may be the same as Verrill's *gouldi*. If this should be so the species would have to take the name *inexhaustum* as it was given a year earlier (1881) than Verrill's (1882). Verkrüzen's paper seems to have escaped the notice of many writers on American *Buccinum*.

***Buccinum cyaneum* Bruguière**

Plate XXVI, Figure 4; Plate XXVII, Figure 5

Buccinum cyaneum BRUGUIÈRE, 1792, *Encyc. Méth., Hist. Nat. des Vers.*, I, p. 266.

Buccinum cyaneum MÖLLER, 1842, *Index Moll. Græn.*, p. 84.

Buccinum sericatum HANCOCK, 1846, *Ann. Mag. Nat. Hist.*, (1) XVIII, p. 328, Pl. v, fig. 6.

Buccinum cyaneum STIMPSON, 1865, *Northern Buccinums*, p. 19.

Buccinum grænlandicum G. O. SÆRS, 1878, *Moll. Reg. Arct. Norv.*, p. 259, Pl. XIII, figs. 9 a-b; Pl. XXV, figs. 1, 2.

Buccinum cyaneum VERRILL, 1882, *Trans. Conn. Acad. Arts Sci.*, V, p. 492.

Buccinum grænlandicum POSSELT, 1898, *Conspectus Faunæ Græn.*, p. 199.

Distribution.—West Greenland, Nanortalik to Port Foulke, 3–90 fathoms; east Greenland, Angmagsalik.

Crocker Land Expedition.—Etah, in beach débris.

A single specimen, apparently referable to *cyaneum*, occurred in the Crocker material. It is short and ventricose with tumid whorls, chestnut colored epidermis and brown dashes on the revolving ridges. The sculpture consists of about thirteen raised primary ridges, separated by wide intervals; the primary ridges have two to three secondary ridges upon them and the interspaces have also the same number of secondary ridges. There are usually about five secondary ridges in the space of one

millimeter (Pl. XXVII, fig. 5). Toward the base of the shell the primary ridges disappear. Axial sculpture consisting of raised, rib-like growth-lines which decussate the surface in connection with the spiral ridges. The aperture and spire are about equal in length and the columella has a strong plait. The shell measures as follows: length, 40; width, 24; aperture length, 24; width, 12 mm.

This shell is called *grænlandicum* by many students, but Chemnitz was not a binomial writer and hence his names cannot be used. It is recorded by Smith, as *sericatum*, from Dobbin Bay, Grinnell Land, in 30 fathoms. It is not listed by Jeffreys among the fossils of Grinnell Land and northwestern Greenland. Listed from Port Foulke by Stimpson in 1863.

***Buccinum cyaneum perdix* (Beck) Mörch**

Tritonium grænlandicum (Beck) MÖRCH, 1868, Faun. Moll. Islandiæ, p. 211.

Buccinum finmarchianum Verkrüzen, G. O. SÆRS, 1878, Moll. Reg. Arct. Norv., p. 262, Tab. XIII, fig. 10.

Buccinum cyaneum var. *perdix* VERRILL, 1882, Trans. Conn. Acad. Arts Sci., V, p. 492, Pl. XLIII, fig. 5.

Buccinum perdix POSSELT, 1898, Conspectus Faunæ Græn., p. 203.

Distribution.—Probably the same as *Cyaneum*.

Crocker Land Expedition.—Umanak, on *Laminaria*, July 13, 1914.

A single broken, dead specimen of a *Buccinum* from Umanak appears referable to this variety of *cyaneum*. It is small, without undulations or ribs, and with a thin peristracum similar to that described by Verrill (1882, p. 493) "closely lamellose along the lines of growth." There are rows of short, fine hairs at the intersection of the spiral and axial sculpture, as described by Verrill in New England specimens. The spiral sculpture appears to be the same as in *cyaneum*. In the specimen collected from Umanak the spire whorls are decollated and the lower part of the outer lip is broken. There are three whorls remaining. The specimen measures: length, 28; width, 18 mm.

***Buccinum tanquaryi*, new species**

Plate XXVI, Figures 1, 2; Plate XXVII, Figure 3

Shell large, rather thin, turreted; whorls seven, convex, rapidly increasing in diameter, without axial plications; sutures well impressed; nucleus eroded in all specimens; the body whorl has from six to nine raised spiral ridges usually placed equidistant and marked by long dashes of dark chestnut or red; sculpture consisting of many (five in two millimeters) rather coarse flat ridges or threads, separated by narrow, incised grooves; the width of these ridges is very uniform over the whole shell; many of these ridges are broken up into three smaller ridges separated by incised

grooves (Pl. XXVII, fig. 3); axial sculpture of rather heavy growth-lines which are more or less raised and with the spiral sculpture decussate the surface of the shell; periostracum light olivaceous; aperture yellowish with a tinge of pink or purple, less than half the length of the shell, roundly ovate, somewhat patulous, the outer lip a trifle thickened, sinuous in the adult; pillar lip with a coating of callus, the columella without marked plications, though thick and massive; canal slightly recurved, wide, siphonal fasciole wide, strong.

Length, 67, Width, 39 Aperture length, 33 Width, 22 mm. Holotype, A.M.N.H. No. 2508.

63 37 28 18 mm. Paratype, Univ. Ill. No. Z 10869.

Crocker Land Expedition.—Etah, eight beach specimens; Peeawahto Point, five beach specimens.

This species is related to both *cyaneum* and *perdix*, from which it is separated by its large size, sinuous outer lip, and finer sculpture. Half-grown shells somewhat resemble Sars' figure of *finmarchianum* variety *scalaris* (1878, Pl. xxv, fig. 4).

This species, which is believed to be undescribed, is very uniform in size, sculpture and coloration. The shell is usually rather thin, but one specimen in the lot from Etah is quite heavy and has a thicker shell. The number of beach shells collected would seem to indicate that this species is not uncommon in northwest Greenland and it probably will be found in other places.

***Buccinum ekblawi*, new species**

Plate XXVI, Figures 7, 8; Plate XXVII, Figure 2

Shell large, rather thin, turreted; whorls seven, convex, carinated; the body whorl has four or five carinæ, the two upper ones of which are raised to form heavy keels, causing the shell to be strongly unicarinate or bicarinate, as one or both of the carinæ are prominent; one carina may form a strong peripheral keel which extends well up the shell toward the spire; when two carinæ are present, one is at the periphery and the other just below the periphery which borders the suture in the upper whorls; there are ten or eleven longitudinal folds on the body whorl; more or less oblique, which extend from the suture to the second carina, but not below (usually), forming tubercles or nodes on the upper carina; spiral sculpture consisting of very many (nine or ten in the space of one mm.) narrow, flattened ridges, separated by deep incised lines (Pl. XXVII, fig. 2); these ridges are not of equal width; axial sculpture of fine lines of growth, which cut the spiral lines, forming a minutely decussated or latticed effect; there is no division into primary or secondary ridges; aperture broad, ovate or roundly ovate, less than one-half the length of the shell, broadest in the center; outer lip patulous, somewhat sinuous, thickened within in the adult shell; pillar lip much excavated above, oblique, with three more or less distinct folds; canal slightly curved, rather wide, siphonal fasciole wide; periostracum smooth, light brown, with dark brown blotches, especially on the spiral carinæ.

species from Dobbin Bay and Franklin Pierce Bay, in 30 fathoms of water. Jeffreys lists it as a fossil from north of Dumb-bell Harbor in latitude 82° 33' N.

Buccinum tumidulum G. O. Sars

Plate XXVI, Figure 5

Buccinum tumidulum G. O. Sars, 1878, Moll. Reg. Arct. Norv., p. 263, Tab. xxv, figs. 5, 6.

Buccinum tumidulum VERRILL, 1882, Trans. Conn. Acad. Arts Sci., V, p. 496.

Buccinum hydrophanum tumidosa var. b. POSSELT, 1898 (?), Conspectus Faunæ Græn., p. 208.

Distribution.—Probably the same as *hydrophanum*.

Crocker Land Expedition.—Etah, Foulke Fjord, 2-10 fathoms, Sept. 7, 1914.

The single specimen obtained by the expedition is referable to Sars' species. It has the smooth surface (microscopic spiral lines similar to those of *hydrophanum* are present, fifteen to twenty in space of one mm.) ventricose whorls, and the wide expansion of enamel on the inner lip described by Sars. The color of the shell is dark brown under a whitish or greenish periostracum. The callus on the inner lip is dark brown. The spire whorls are broken as well as the lower part of the aperture, about four and one-half whorls remaining. The columella is somewhat excavated at the upper part and there is a distinct plait. The shell measures as follows: length, 32; width, 20; aperture length, 18; width, 10 mm. The single specimen was collected alive, the animal being a male, and the operculum with a central nucleus. *Tumidulum* has not been previously reported from northwest Greenland and the Crocker Land specimen appears to be the most northern record recorded.

A large mass of egg capsules was dredged in Foulke Fjord, August 7, 1914, but it is not known which species laid the eggs.

PTEROPODA

Limacinidæ

***Limacina helicina* (Phipps)**

Clio helicina PHIPPS, 1774, A Voyage towards the North Pole, p. 195.

Argonauta arctica FABRICIUS, 1780, Fauna Græn., p. 386.

Limacina arctica MÖLLER, 1842, Index Moll. Græn., p. 77.

Limacina helicina G. O. Sars, 1878, Moll. Reg. Arct. Norv., p. 328, Tab. xxix, fig. 1 a-h.

Limacina helicina POSSELT, 1898, Conspectus Faunæ Græn., p. 253.

Distribution.—Generally distributed in Arctic regions.

Crocker Land Expedition.—Greenland coast, latitude 78° N., August 18, 1913.

This pteropod is reported as very abundant off the coast of Greenland. It is not listed by Smith and may not extend its distribution as far north as Grinnell Land.

Clionidæ

***Clione limacina* (Phipps)**

Clione limacina PHIPPS, 1774, A Voyage towards the North Pole, p. 195.

Clione borealis MÖLLER, 1842, Index Moll. Græn., p. 77.

Clione limacina G. O. SARS, 1878, Moll. Reg. Arct. Norv., p. 332, Tab. xxix, fig. 4 a-e.

Clione limacina POSSELT, 1898, Conspectus Faunæ Græn., p. 256.

Distribution.—Generally distributed in Arctic waters.

Crocker Land Expedition.—Etah, in front of house, Sept. 15–19, 1916; collected by E. O. Hovey, latitude 78° N., August 18, 1913; collected by M. C. Tanquary.

This pteropod is very abundant off the Greenland coast—and, with the previous species, forms a large part of the food of whales and some fishes.

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Plate XXV

- Fig. 1. *Astarte crenata* (Gray). A. M. N. H. No. 2483.
Fig. 2. *Astarte crenata* (Gray). A. M. N. H. No. 2483.
Fig. 3. *Astarte crenata inflata* Hägg. A. M. N. H. No. 2523.
Fig. 4. *Astarte fabula* Reeve. A. M. N. H. No. 2491.
Figs. 5-7. *Astarte borealis* (Schumacher). A. M. N. H. No. 2494.
Figs. 8-9. *Astarte borealis sericea* Posselt. A. M. N. H. No. 2489.
Fig. 10. *Astarte arctica* (Gray.) A. M. N. H. No. 2490.



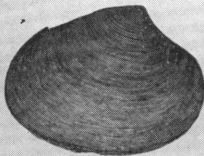
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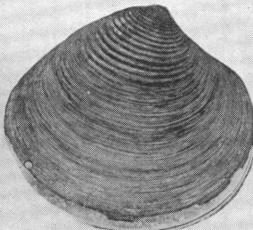
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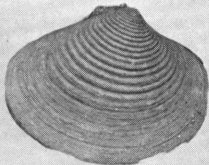
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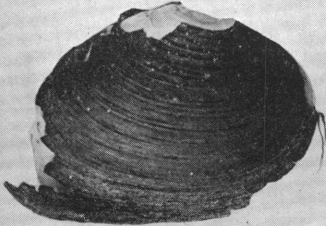
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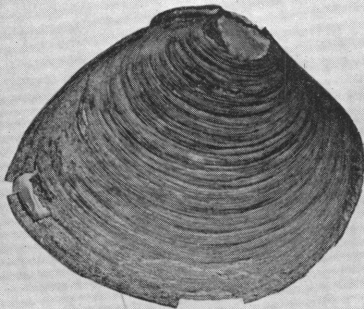
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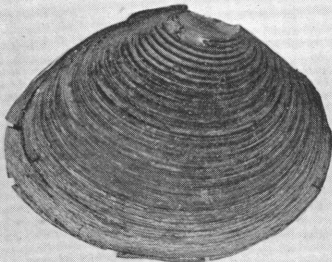
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PLATE XXVI

- Fig. 1. *Buccinum tanquaryi* F. C. Baker. Holotype, A. M. N. H. No., 2508.
Fig. 2. *Buccinum tanquaryi* F. C. Baker. Paratype, N. H. Mus., Univ. Ill.,
No. Z 10869.
Fig. 3. *Buccinum belcheri* Reeve. A. M. N. H. No. 2497.
Fig. 4. *Buccinum cyaneum* Bruguière. A. M. N. H. No. 2496.
Fig. 5. *Buccinum tumidulum* G. O. Sars. A. M. N. H. No. 2495.
Fig. 6. *Buccinum undulatum* MÖLLER. A. M. N. H. No. 2507
Fig. 7. *Buccinum ekblawi* F. C. Baker Holotype, A. M. N. H. No. 2502.
Fig. 8. *Buccinum ekblawi* F. C. Baker. Paratype, N. H. Mus., Univ. Ill.,
No. Z 10872.

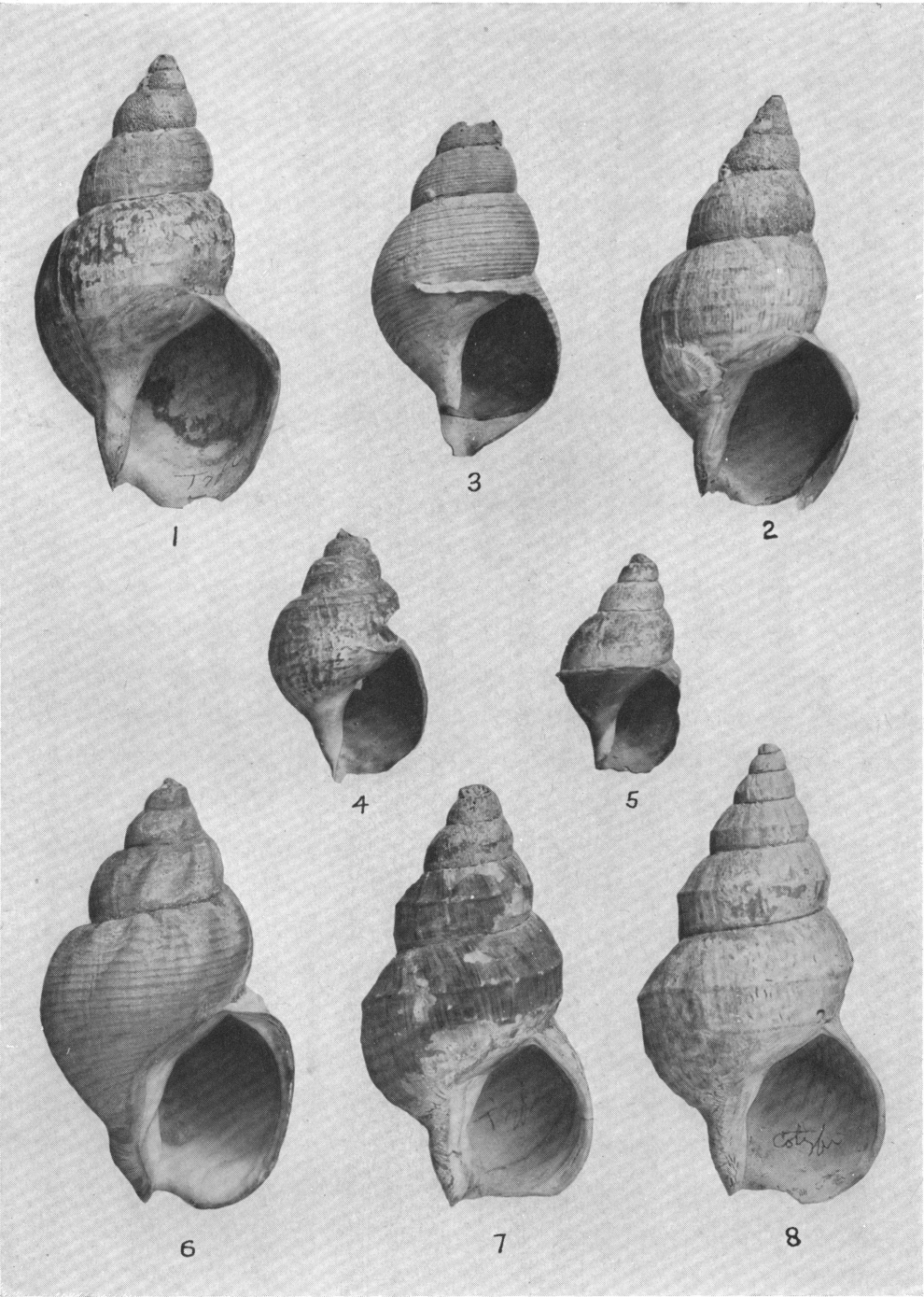
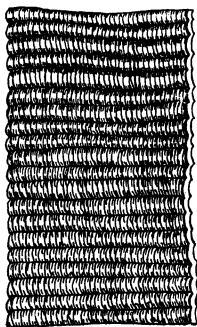


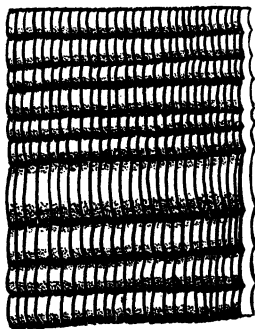
PLATE XXVII

Figures illustrating spiral sculpture of shell, showing number of riblets in one millimeter of vertical surface.

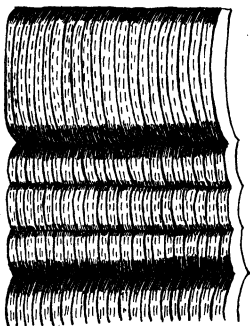
- Fig. 1. *Buccinum hydrophanum* Hancock.
- Fig. 2. *Buccinum ekblawi* F. C. Baker.
- Fig. 3. *Buccinum tanquaryi* F. C. Baker.
- Fig. 4. *Buccinum undulatum* Möller.
- Fig. 5. *Buccinum cyaneum* Bruguière.
- Fig. 6. *Buccinum belcheri* Reeve.



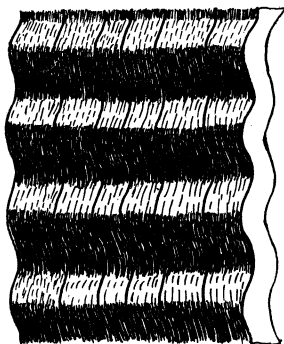
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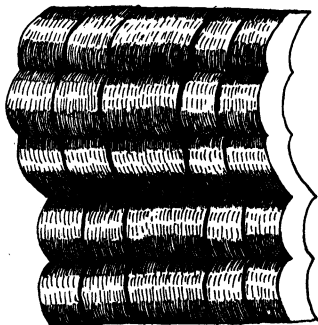
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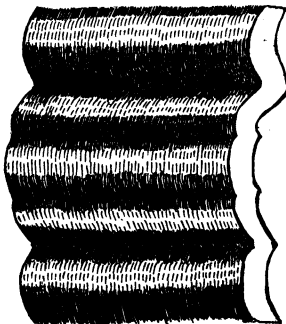
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