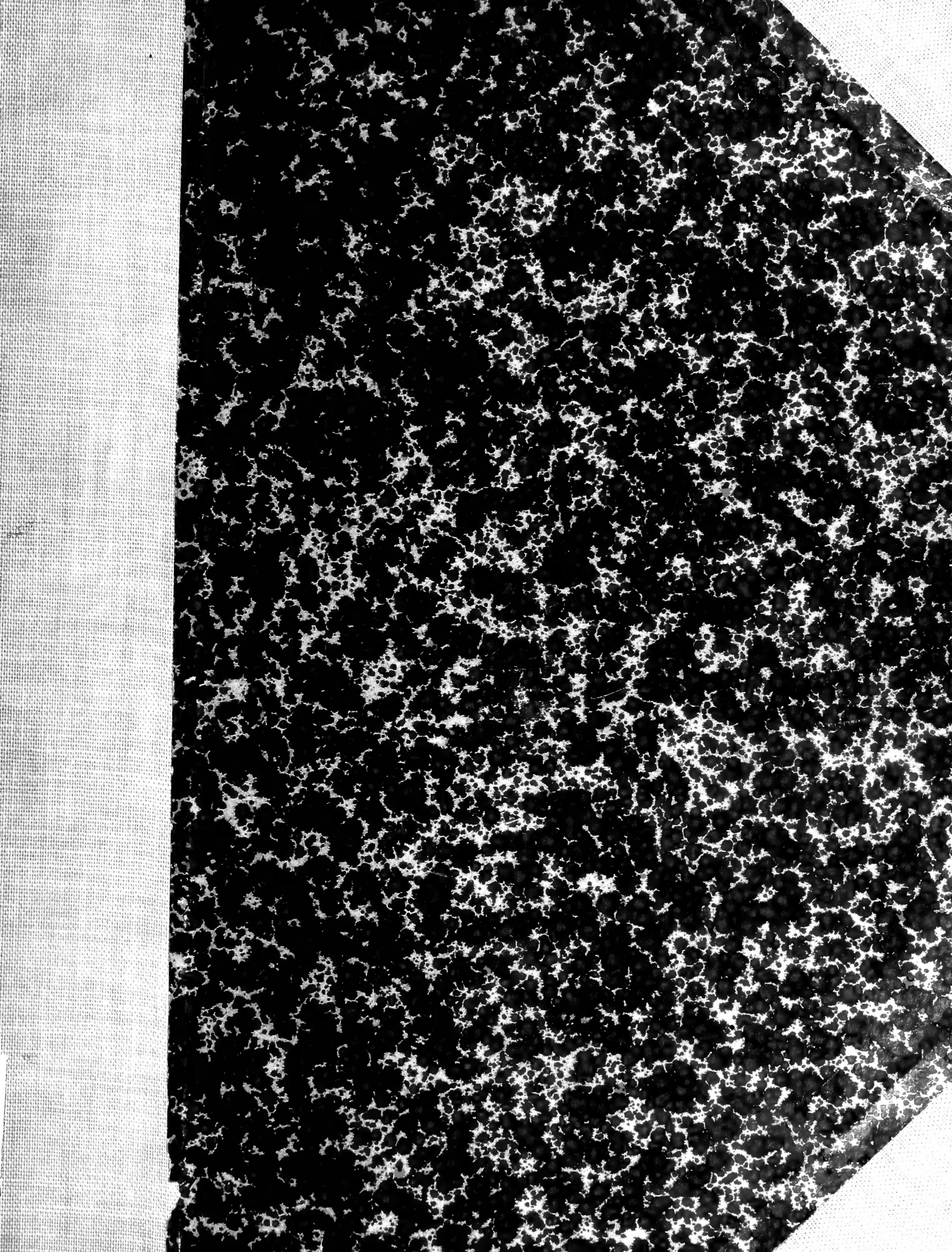

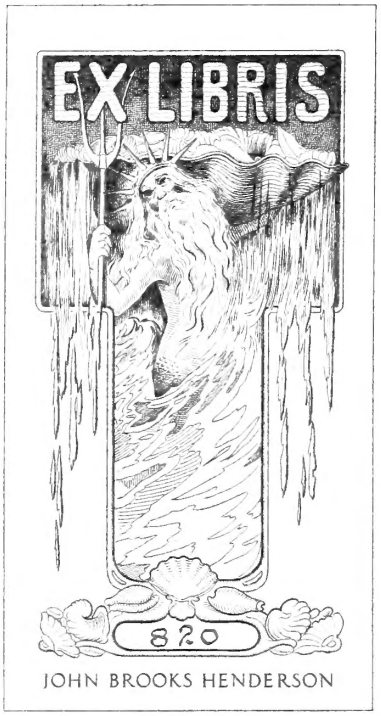

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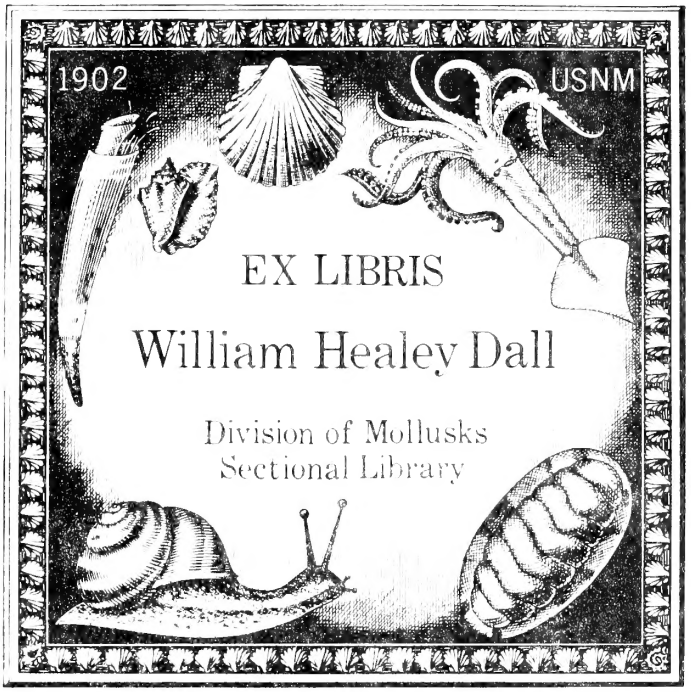

KUNGL. SVENSKA VETENSKAPSAKADEMIENS HANDLINGAR. Band 48. N:o 1.

NORTHERN

AND

ARCTIC INVERTEBRATES

IN THE

COLLECTION

OF THE

SWEDISH STATE MUSEUM

(RIKSMUSEUM)

V.

PROSOBRANCHIA. 1 DIOTOCARDIA

BY

NILS ODHNER

WITH SEVEN PLATES

COMMUNICATED DECEMBER 6TH 1911 BY HJ. THÉEL AND G. HOLM

UPPSALA & STOCKHOLM. ALMQVIST & WIKSELLS BOKTRYCKERI-A.-B.

BERLIN
R. FRIEDLÄNDER & SOHN
11 CARLSTRASSE

LONDON
WILLIAM WESLEY & SON
28 ESSEX STREET. STRAND

PARIS
LIBRAIRIE C. KLINCKSIECK
11 RUE DE LILLE

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1912

Introduction.

Since the publication of Part III of the present series of monographs, entitled Opisthobranchia and Pteropoda, I have been engaged in studies with the view to the publication of faunistical accounts of the remaining groups of Northern and Arctic Mollusca in the collections of the Swedish State Museum. The present work forms the beginning of a faunistic revision of the Prosobranchia. Based on a very rich material, it aims to give in the first place a survey of the variation of these molluscs within the Boreo-Arctic region. In general the same principles have been followed as in the earlier part; thus in the first section a scheme is given for the examination of the species, arranged according to the commonly adopted classification, and in the second section the distribution of the forms has been stated, both according to the collections (under the heading »Habitat») and to the Literature (under »General distribution»). The descriptions of the new forms are placed together in a separate section at the end. The list of Literature has reference to all the authors cited, and the Index includes all the names mentioned in the work. On the Plates are figured (photographs) all the species included in the collections, representing different localities and different forms, to show their geographical, formal and sculptural variation. The same principles have been followed to show the variation of the radula in the polymorphous genera Margarita and Solariella.

In order to get an objective survey of the variation I have tried to express it mathematically, but this has been limited to the formal variation, as that lends itself best for expression by numbers, obtained by taking measurements of the shells. I have studied the variation of the specimens from different districts separately, by which method it is possible to compare the faunistic provinces with one another as to the character of the variation. I have preferred this way of dealing with the material, *i. e.* from a zoogeographical point of view, considering it to be of greater importance where Fauna is concerned, though recognizing that an analytical study of the species with descriptions of varieties based on morphological characteristics would be of a more purely systematic value.

The general method of expressing variation mathematically is to draw up a curve showing how the character under consideration varies around a median value

and within definite limits. As a rule in constructing such variation curves it is presupposed, that all the specimens investigated are at the same stage of development, so that all changes referable to growth are eliminated. Thus for molluscs, where growth continues constantly throughout life, such a method would obviously be impracticable. In such cases it is impossible to determine an average value of length or indeed of any such other characters, as are influenced by growth, for the absolute minimum and maximum of length etc. do not indicate the extent of variation, but rather the extreme values of the growth.

Briefly, growth is a new factor to be considered in such investigations, which stands in an unknown ratio to variation; for young forms may vary in different ways from older ones and the growth is not uniform for all the organs and dimensions during the whole of life, and thus the proportions may be subject to change, as age increases. For this reason, also, it is impossible to find any ratios (*e. g.* length to breadth) that occur so constantly both in young and full-grown specimens, that one is entitled to speak of a median value for them during the whole of life.

For molluscs and other forms with a permanent growth another method of expressing variation must be employed, and in respect to them I have proceeded in the following manner: —

In a coordinate system the horizontal or X-axis may be taken to represent the absolute length, or sometimes height, of the specimens, expressed in *mm*, while the vertical or Y-axis may be taken not as indicating the number of specimens (as usual), but the absolute amount of some other measurement such as the breadth or height of the aperture; two or more such quantities may be examined and represented on the Y-axis. A large number of specimens in all the varying stages of development must be measured and the numbers expressing the respective characters must be marked in the coordinate system. They fall within zones of a certain breadth, which thus give us a conception of the extent of variation during all the stages of development. By connecting all the extreme values, curves are obtained, which mark the limits of the variation. Between these lies an average value, attained by the majority of the specimens.

The extent and the median value of variation are available as a characterisation of the entire material. By taking more characters into account on the Y-axis the material will be further defined in those several respects. The relative positions of the variation zones form another basis for establishing the distinction existing in different classes of material.

It is evident that the greater the number of specimens, the more exact will the result be. Some of the values arrived at in this work for the variation limits might very probably be subject to some slight adjustment, were the measurement of a larger number of shells carried out; they must be regarded as only approximate in character and in some cases should only with reserve be used for comparisons.

In order to illustrate the above account some examples are given below in a graphic form.

Figs. 1—3 represent the variation of *Margarita groenlandica* in different dis-

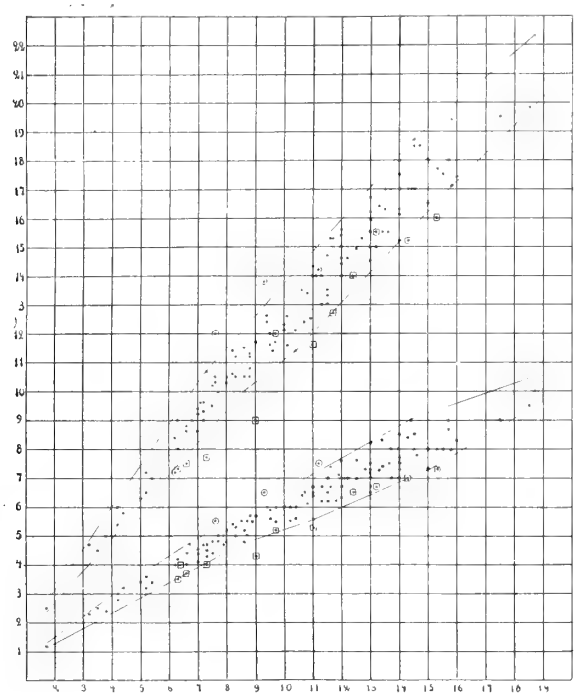

Fig. 1.

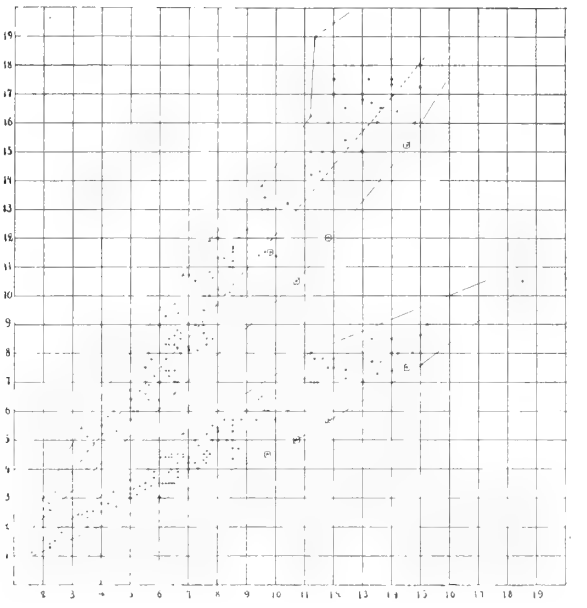

Fig. 2.

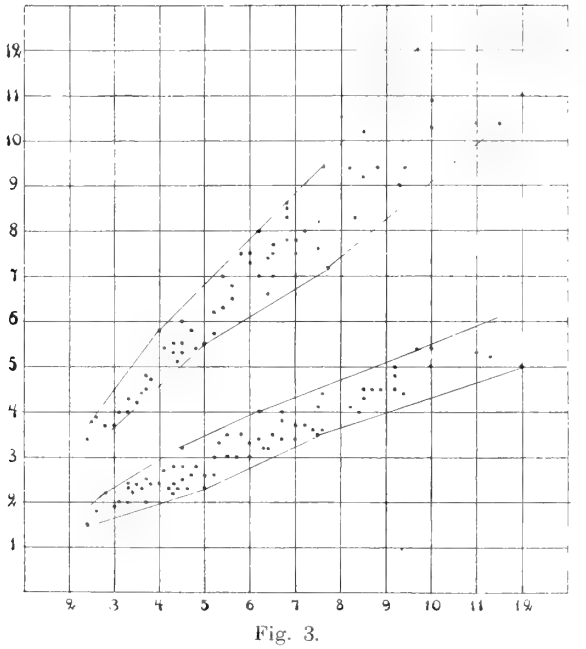

Fig. 3.

Figs. 1—3. *Margarita groenlandica*. 1. Spitzbergen. 2. Greenland. The broken line marks the limit between forma typica and var. umbilicalis. 3. Norway and Iceland. — The squares mark specimens, which are the true forma typica, the circles (Spitzbergen) the true var. umbilicalis. The upper zone indicates the diameter, the lower one the height.

tricts. On the horizontal or X-axis, the absolute height of the shell (taken vertically from the spire to the lowest part of the base) has been marked; its breadth or diameter (taken perpendicularly to the height), as well as the height of aperture, has been marked on the vertical or Y-axis. A specimen may, for example, have a height of 13, a diameter of 16.8 and an aperture height of 7.5 mm (see Fig. 1). The number 13 is then found on the horizontal or X-axis, the number 16.8 is to be marked vertically over 13 (by following the Y-axis), and the number 7.5 is to be marked in the same manner vertically over 13. The points thus obtained consequently show, that a specimen of the height 13 has a diameter of 16.8 and an aperture height of 7.5 mm. By measuring more specimens of the height 13 it will be found that some have a diameter of 16.2, others 15.5 or 15 mm etc., and that the aperture height is in the respective cases 8.2, 7 and 7.2 mm. All these numbers are to be marked vertically over 13. The points thus obtained show that a specimen of the height 13 may have a diameter of 16.8—15 mm and an aperture height of 8.2—7 mm. When a very great number of specimens with the height 13 has been measured, all the points thus obtained mark the general extent of variation of diameter and aperture height in specimens of 13 mm in height. When the same process is performed with specimens of other heights, it is obvious that the points mark the extent of variation of diameter and aperture height within all these classes. By connecting the extreme points, which represent the extreme values, a curve is obtained, which marks the limits of variation of the characters under consideration. Such limits are represented by the lines in the diagrams. They have been constructed on the bases of a relatively small number of specimens and have therefore only an approximate value. They mark the boundaries of distinct zones, which indicate the extent of variation of respective characters; thus the upper zone in Figs. 1—3 shows the extent of variation of the shell diameter, the lower one that of the aperture height.

Comparing these curves with one another, the following results may be established: — The largest specimens are from Spitzbergen, the next in order being the Greenland specimens, then those from Iceland and, lastly, the Norwegian ones. The first-named districts, moreover, show a different position both absolute and relative of the variation zones, falling higher in the coordinate system than the zones of Iceland and Norway; consequently the species has, in general, a greater breadth and a higher aperture in Spitzbergen and Greenland. But the specimens from Iceland and Norway fall within the lower part of the zones of Greenland and Spitzbergen, which proves that the latter forms occur in all the districts mentioned. This fact is most plainly evident in respect to Spitzbergen, where the zones are narrower; the values of some, which are higher, fall above the limits for the majority of specimens. These latter accord with the Norwegian form; they seem to be rarer at Spitzbergen than at Greenland.

The broader form, with a wider aperture, which is responsible for the high parts of the zones, is the variety *umbilicalis*. This form also occurs on the Norwegian coast, as is evident from curve 3, where some specimens fall above the highest limit; they are however very sparse.

From these curves we consequently deduce the following results as to the variation of *Margarita groenlandica:* The typical form and the variety *umbilicalis* are common in Greenland; var. *umbilicalis* is the most common form of the species on Spitzbergen and forma typica is occasional; the last is dominant in Iceland and Norway, where var. *umbilicalis* is very rare. It is also evident, that numerous stages of transition occur between the two forms in Greenland, so that they cannot be distinguished from one another — at least judging solely by their formal characters.

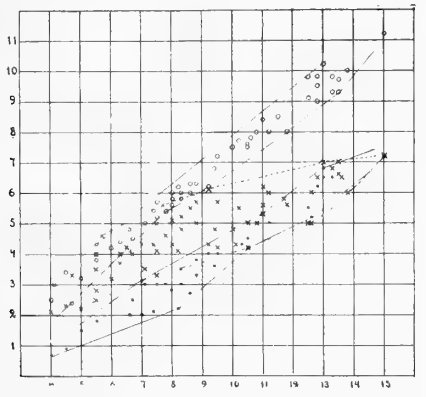

Fig. 4.

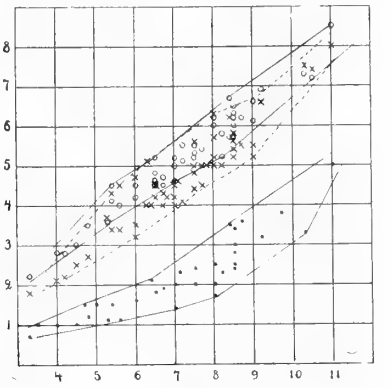

Fig. 5.

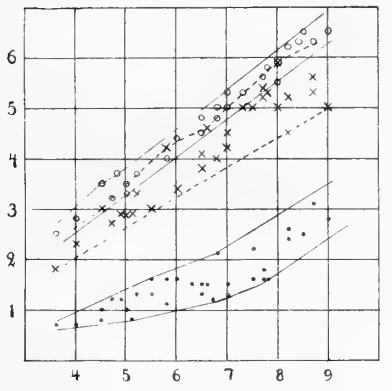

Fig. 6.

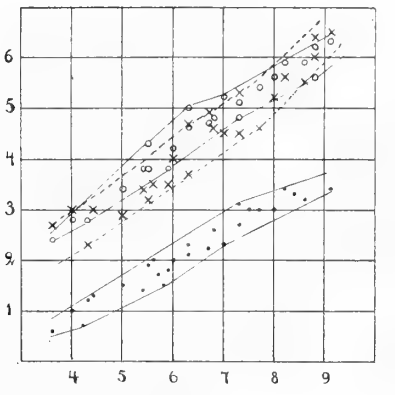

Fig. 7.

Figs. 4—7. *Puncturella noachina.* 4. Southern Scandinavia. 5. Spitzbergen. 6. Greenland. 7. Finmark. o breadth, × height, ● apex perpendicularly from posterior margin.

In curve 1, the broken line marks the limit between the two forms, which were kept apart from one another when being measured. The line divides the zone into two equal halves, which is intended to indicate that the extreme specimens of the higher part form the variety, those of the lower part the type (in their clearest development), and that they are connected together by intermediate specimens.

The above curves (4—7) illustrate the variation of *Puncturella noachina.* On the *X*-axis there has been inserted the length (or maximal diameter), on the *Y*-axis the measurements 1) of breadth (minimal diameter), 2) of height and 3) of the distance perpendicularly from the apex to the posterior margin.

Specimens from southern Scandinavia (western coasts of Sweden and Norway) differ, as may be seen, in their essential characters from the forms of the Arctic districts; in the first place they attain a considerable size, and besides this, are different in some other respects, namely as to height and as to the position of the apex. The height in large specimens is, comparatively speaking, very small, and the apex has a more central position than is otherwise the case, but specimens from northern Norway, though in other respects like those of Spitzbergen, manifest the same characteristics. On Spitzbergen and Greenland the variation is uniform, but a larger size seems to be more common in the first-named district.

Instead of such variations being expressed graphically, they may be indicated tabularly by stating the limits of variation-extent. It is necessary to determine these limits for different stages of growth; on the basis of these statements the curve can easily be drawn up in its entirety. Thus the curves of *Puncturella noachina* and *Margarita groenlandica* given above can be tabularly represented as on pag. 39 and 60—61.

The examples advanced will be sufficient to show how the formal variation of shells may be expressed in such way as to provide some fixed points for judging of the mutual faunistic conditions of different districts. It is evident, that the characters employed here might be augmented with one or two others, but I have considered those included sufficient for determining the shell form in all essential respects. On these secondary characters depend, *e. g.* the width of the umbilicus, which seems to vary in direct proportion to the breadth of the shell; the apical angle and the convexity of whorls are characters of slighter importance than those above mentioned.

In order to furnish a survey of structural variation, where this proves to be especially noteworthy, I have included, in certain cases, short accounts of the extreme forms of sculpture and the transitions between them. Instead of giving extensive accounts, I refer to the figures, which show the details in all their modifications better than any descriptions.

In those cases where I have considered it particularly desirous for the sake of clearness, a short comprehensive survey of the variation of the radula has also been given. Here I again refer to the figures for details.

The systematic arrangement of the prosobranchiate molluscs still remains unaccomplished in many respect. I have here followed the system devised by BOUVIER, 1887, which is at present accepted by the majority of writers on the subject, in the form in which it is given in LANG's »Lehrbuch der vergleichenden Anatomie, Mollusca», 1900. For the subdivision into families and genera as well as for the synonyms employed I have followed and adopted, with a few exceptions, PILSBRY's »Manual of Conchology» and the »List of British Marine Mollusca prepared by a Committee of the Conchological Society», second edition, 1902.

The statements of length in the synopsis of species is given merely in order to show the size (medium to maximum) of the species, to serve as a help in their determination. Only the most important varieties are included in the systematic survey, others are mentioned in connection with the accounts of the distribution and the general variation.

Prosobranchia.

Heart with the auricle before the ventricle; respiratory organ a ctenidium in front of the heart (seldom secondary branchiæ or none); nervous system of the streptoneurous type; animal nearly always gonochoristic.

Subordo I Diotocardia (Aspidobranchia).

Heart with one (Docoglossa) or two (Rhipidoglossa) auricles; ctenidium bipinnate; pedal ganglia not developed, replaced by longitudinal ganglious cords with transverse commissures. Shell never siphonated.

Synopsis of Families.

A. Docoglossa.

Radula with 1—3 lateral teeth; heart on the left side of the body, before the rectum, with 1 auricle; no epipodium. Shell limpet shaped without internal callus and without slits; apex straight conic or inclined forward, never backward.

1. A real ctenidium in the mantle cavity on the left side of the body; no accessory branchiæ. Radula without rhachian tooth, of the formula 1.2.(1.0.1).2.1 or 0.2.(1.0.1).2.0 *Fam. Acmæidæ.*
2. No ctenidium in the mantle cavity; accessory branchiæ in the mantle furrow all around the foot. Radula usually without rhachian tooth; normal formula 3.1.(2.0.2).1.3 *Fam. Patellidæ.*
3. No ctenidium nor accessory branchiæ. Radula with a rhachian tooth, of the formula 2.0.1.0.2 *Fam. Lepetidæ.*

B. Rhipidoglossa.

Radula usually with many laterals; heart in the median line of the body, pierced by the rectum, with 2 auricles; epipodium mostly present. Shell usually spirally twisted or, if limpet shaped, with posterior apex.

1. Zygobranchia: Branchiæ 2; both auricles equally developed.
   a. Shell spirally twisted, with a spiral slit; operculum present; radula $\infty . 1 . (4 . 1 . 4) . 1 . \infty$; eyes sessile at the outer base of the tentacles
   Fam. Pleurotomariidæ.
   b. Shell limpet or cap-shaped, usually with a short, straight anal slit; no operculum; radula $\infty . 1 . (4 . 1 . 4) . 1 . \infty$ (except in Propilidium); eyes pedunculate or subsessile at the outer base of the tentacles, or absent (in Propilidium)
   Fam. Fissurellidæ.
2. Azygobranchia: 1 ctenidium (= the left of the Zygobranchia); right auricle blindly closed. Shell spirally twisted; operculum present.
   a. Operculum usually multispiral with central nucleus; animal with epipodial cirri.
      +. Peristome of the shell incomplete (not continued by a callous margin on the body whorl); shell nacreous; jaws present or not *Fam. Trochidæ.*
      ++. Peristome continuous; shell not nacreous; jaws present
      Fam. Cyclostrematidæ.
   b. Operculum paucispiral with excentric nucleus; animal without epipodial cirri; peristome incomplete; shell not nacreous; jaws and dentition unknown (systematical position doubtful)[1] *Fam. Adeorbidæ.*

Synopsis of Genera and Species.

Fam. Acmæidæ.

Acmæa Eschscholtz 1830.
Tectura Audouin 1830.[2]

Radula with 3 lateral but no median teeth; a branchial plume in the mantle cavity, but no cordon around the foot; eyes on the base of the tentacles.

I. Radula with no uncinus: $0 . 2 . (1 . 0 . 1) . 2 . 0$; teeth of the radula blunt (subg. Acmæa sensu stricto).
   A. Outer laterals smaller than the inner ones; shell internally with a dark brown centre of regular form within the mantle scars, and with a broad, continuous, dark brown border; externally sculptured with fine radiating striæ; colour: brown stripes or spots, forming a net-like texture, sometimes uniformly white or brown. L. 20—30 mm A. testudinalis (Müller 1776).
   Pl. 1 figs. 1—7; Pl. 6 fig. 1.
   B. Lateral teeth of the radula uniform in size. Small forms.
      1. Shell light yellowish with radiating stripes of red (rarely unicoloured); sculpture consisting of obsolete radiating lines. L. 7—14 mm
      A. virginea (Müller 1776).
      Pl. 1 figs. 9—15.

[1] G. O. Sars (1878) places these forms under fam. Solariidæ.
[2] For this synonym confer Watson (1886).

Uniformly cream-coloured; radiating lines distinct. L. 10—11 mm
var. spitzbergensis n. var.
Pl. 1 figs. 14—15.

2. Shell of a uniform reddish, brownish or yellowish colour, without radiating sculpture. L. 4—8 mm A. rubella (FABRICIUS 1780).
Pl. 1 figs. 16—23.
Shell elevated conic with concave under side var. elevata ODHNER 1910.
Pl. 1 fig. 23.

II. Radula with a rudimentary uncinus on each side, at least in certain segments: 1 . 2 . (1 . 0 . 1 .) 2 . 1; all teeth pointed (subg. Collisella DALL 1871).

A. Second lateral tooth elongated conical, about 4 times the third in length, slowly tapering towards the apex. Shell smooth or with fine radiating striæ, apex directed foreward, hind slope slightly convex; colour: white and brown stripes of about equal breadth; inside bluish with a well defined brown centre and a broad white-striped brown marginal band. L. 24—34 mm
A. patina ESCHSCHOLTZ 1833.
Pl. 1 fig. 8

B. Second lateral tooth about 2 times the third, from a quadrangular base abruptly tapering towards the apex. Shell smooth or with strong radiating ridges; apex directed foreward, hind slope highly convex; colour: irregular brown and white stripes and minute white and black dots; inside with an undefined brown centre (or spots), a bluish or whitish lateral partition and a dark marginal zone often with irregular white and brown dots. L. 11—25 mm A. persona ESCHSCHOLTZ 1833.

C. Second lateral tooth nearly as long as the third, triangular, thus immediately from the base-line tapering towards the pointed apex. Shell conic with coarse radiating ridges, often obsolete, hind slope nearly straight; colour: brown stripes broader than the white ones; inside cream coloured with an irregularly brown-spotted centre and a narrow discontinuous marginal band of brown dots. L. 30—40 mm A. pelta ESCHSCHOLTZ 1833.
Pl. 1 fig. 8; Pl. 6 fig. 2.

Fam. Patellidæ.

I. Radula 3 . 1 . (2 . 0 . 2) . 1 . 3; branchiæ in a complete circle; shell solid with the apex nearly central Patella LINNÉ 1758.

II. Radula of the same formula; branchial circle interrupted in front; shell thin, with the apex anterior Helcion MONTFORT 1810.

Patella LINNÉ 1758.

Surface of the shell with radiating ribs (sometimes obsolete) and striæ. Colour varying: white, yellow, red, greenish or blackish. L. 35—58 mm
P. vulgata LINNÉ 1758.
Pl. 1 figs. 24—26.

Helcion MONTFORT 1810.

Surface of the shell smooth, with only a few radiating striæ. Colour brownish or greenish with broken rays of a bright blue. L. 15—20(24) mm

H. pellucidum (LINNÉ 1758) (=Nacella pellucida Auct.).

Pl. 1 figs. 27—32.

Fam. Lepetidæ.

I. Uncini of the radula smooth in the margin; central tooth 5-cuspidate; apex of the shell erect; surface finely granulate — Lepeta GRAY 1847.

II. Uncini of the radula finely ciliated in the margin; central tooth 3-cuspidate; apex of the shell inclined forward.

A. Surface smooth or with concentric lines only; colour whitish. Cusps of the central tooth nearly equal in size — Cryptobranchia MIDDENDORFF 1851.

B. Surface with radiating ribs and granula; colour orange, reddish or grayish. Middle cusp of the central tooth very large — Pilidium FORBES 1849 (= Scutellina G. O. SARS 1878).

Lepeta GRAY 1847.

Shell depressed conic with subcentral apex; hinder slope usually straight; surface latticed by fine radiating and concentric striæ, granulated in their crossings; colour whitish, brownish or reddish. L. 10—18.7 mm — L. coeca (MÜLLER 1776).

Pl. 2 figs. 2—17.

Cryptobranchia MIDDENDORFF 1851.

Shell solid, smooth or with very fine striæ; apex anterior or subcentral; hinder slope of the shell convex; mouth ovoid, broader posteriorly; colour white or grayish. L. 10—20 mm — C. alba DALL 1869.

Pl. 2 fig. 1.

Pilidium FORBES 1849.

Shell depressed with fine granular radiating ridges; apex anterior; hinder slope arcuated; mouth oval; colour orange or reddish. L. 7—9.8 mm

P. fulvum (MÜLLER 1776).

Pl. 2 figs. 18—23.

Colour whitish — var. albula JEFFREYS 1865.

Pl. 2 fig. 23.

Shell large, much depressed and broad in proportion to the length

var. expansa JEFFREYS 1865.

Pl. 2 figs. 18, 19.

Fam. Pleurotomariidæ.

Scissurella D'ORBIGNY 1823.

Anal slit open; operculum horny, circular, multispiral with central nucleus; animal with 2 long epipodial filaments on each side.

Shell usually somewhat depressed, aperture broader than high; sculpture consisting of fine radiating ribs and very close spiral striæ; colour white; epidermis pale brownish. H. (of the type) 1.7, D. 2.5 mm; whorls 4; height of aperture = twice the spire (FORBES & HANLEY 1853) Sc. crispata FLEMING 1832.

Shell less depressed; whorls more flattened above; body-whorl therefore more angulated; aperture = $\frac{3}{2}$ the spire; H. 4.2, D. 5 mm; whorls 4 $\frac{3}{4}$

var. angulata LOVÉN 1846.

Pl. 2 figs. 26—27.

Shell higher than in the type; whorls more convex; body-whorl well rounded; radiating ribs fewer; H. 2.3; D. 2.7; aperture 1.3 mm; whorls 4

var. aspera PHILIPPI 1844 (= var. paucicostata JEFFREYS 1865).

Pl. 2 fig. 25.

Fam. Fissurellidæ.

Apex of the shell persistent, inclined backwards, or replaced by the anal slit and in this case furnished inside with a septum or callus; rhachian tooth of the radula broader than the uncini (subfam. Emarginulinæ).

I. Anal slit above the anterior margin; apex central or nearly so.

A. Anal slit apical, situated before the middle of the shell, bounded inside all around with a callus, but without septum Glyphis CARPENTER 1856

(= Fissurella BRUGUIÈRE 1792 pro parte).

B. Shell internally with a septum below the hinder part of the anal slit.

1. Apex persistent, bent backward; anal slit preapical

Puncturella LOWE 1827.

2. Anal slit apical and central Fissurisepta SEGUENZA 1862.

II. Anal slit in the anterior margin; shell without internal septum; apex persistent

Emarginula LAMARCK 1801.

III. No anal slit; shell with an internal septum as in Puncturella; apex persistent; radula aberrant, agreeing with Lepeta, 2 . 0 . 1 . 0 . 2, with tricuspidate rhachian tooth and serrated uncini; eyes absent (systematical position uncertain)

Propilidium FORBES & HANLEY 1849.

Glyphis CARPENTER 1856.

Shell depressed oval, with coarse and dense radiating ribs of alternating strength and concentric striæ. Colour yellowish or brownish, sometimes with darker reddish rays. L. circa 26, Br. 18, H. 8—11 mm (England)

G. græca (LINNÉ 1758).

Puncturella LOWE 1827.

Shell more or less conic, with straight or arcuated anterior slope; apex posterior or subcentral; sculpture consisting of radiating riblets of alternating strength and concentric fine lines of growth; colour whitish. L. 7—15 mm

P. noachina (LINNÉ 1771).

Pl. 2 figs. 28—41.

Fissurisepta SEGUENZA 1863.

Shell oval, conic, depressed, but with an elevated apical part, the summit of which is taken up by the subcircular foramen; sculpture consisting of radiating alternately larger and smaller, closely tuberculate striæ; colour opaque whitish. L. 2.9; Br. 2.3 mm F. granulosa JEFFREYS 1882
(= F. papillosa JEFFREYS 1870, not SEGUENZA 1863.)

Emarginula LAMARCK 1801.

I. Sculpture reticulated of coarse and sparse longitudinal cords, mostly intermixed with smaller ones, and concentric ribs of about the same strength; colour white. L. 9—16 mm E. fissura (LINNÉ 1758)
(= E. reticulata SOWERBY 1813).
Pl. 2 figs. 42—45.

II. Sculpture consisting of broad longitudinal fascicles of riblets alternating with finer threads and crossed by fine and close concentric liræ; colour white. L. 25—37 mm E. crassa SOWERBY 1813.
Pl. 2 figs. 46—50, Pl. 3. figs. 1—2.

Propilidium FORBES & HANLEY 1849.

Shell oblong, depressed, with subcentral apex, sculptured by fine and close-set radiating striæ, granulated by crossing concentric ones; apex distinctly twisted; colour whitish. L. 4.3 mm P. ancyloide (FORBES 1840).
Pl. 2 fig. 24.

Fam. Trochidæ.

Animal with frontal lobes; jaws present; radula often with more than 5 lateral teeth on each side (subfam. Gibbulinæ).

I. Aperture quadrangular (not rounded); columella dentated or sinuated at base; outer lip smooth; shell solid, usually variegated and strongly sculptured.
   A. Shell umbilicated, usually spirally ribbed, but without sharp keels at the suture; radula $\infty . 1 . (5 . 1 . 5) . 1 . \infty$, the rhachian tooth with its basal plate broader than long Gibbula RISSO 1826.
   B. Shell imperforated, smooth or spirally keeled or granular; often a sharp ridge at the suture; radula $\infty . 1 . (4-5 . 1 . 4-5) . 1 . \infty$, the rhachian tooth usually with a longer than broad basal plate Calliostoma SWAINSON 1840
   (= Zizyphinus GRAY 1840).

II. Aperture rounded; columella with a strong tooth below; outer lip thickened and nodulous within; shell solid, uniformly brownish; whorls rounded, sculptured with spiral cords and longitudinal lamellæ
Craspedotus PHILIPPI 1847 (= Danilia BRUSINA 1865).

III. Aperture rounded; columella simple; shell usually thin, smooth or variously sculptured but always unicoloured.
   A. Radula with numerous (> 40) lamellæ with recurved apex, denticulated on both sides; the lateral tooth incomplete (without cusp); shell smooth or spirally sculptured Margarita LEACH 1819.

B. Radula with fewer (5—30) lamellæ with falciform apex; lateral tooth of the same form as the median ones or the first lamellæ, well developed; shell often with net-like or granular sculpture Solariella Searles Wood 1842
(= Machæroplax Friele 1877).

Gibbula Risso 1826.

I. Whorls flattened, not inflated nor nodulous below the suture.

A. Shell often pyramidal, narrowly umbilicated with close-set grayish to brownish radiating stripes, often broken into dots, intervals as narrow as the stripes; these extending mostly to the umbilicus; sculpture formed by fine spiral thread-like ridges, of which 11—14 on the base, of uniform strength. H. 12—20 mm G. cineraria (Linné 1758).
Pl. 3 figs. 4—7.

B. Shell depressed, conical but never pyramidal, narrowly umbilicated, with sparse reddish stripes (intervals broader than these), extending to the umbilicus, never broken into dots; sculpture formed by coarser ridges, of which 6—8 stronger and a few finer on the base; body-whorl with a broad flattened nearly smooth peripheric angular ridge. H. 17, D. 20 mm (England)
G. obliquata (Gmelin 1783)
(= Trochus umbilicatus Montagu 1803).

II. Whorls inflated in their upper part and truncated at the suture.

A. Shell conic, narrowly umbilicated; whorls not nodulous; colour yellowish or greenish with a brilliant lustre; longitudinal stripes of brown sparse, wavy or zigzag, usually broken up in dots on the base, disappearing toward the umbilicus. H. 10—14 mm G. tumida (Montagu 1803).
Pl. 3 figs. 8—15.

B. Shell depressed, widely umbilicated; whorls nodulous at the suture; colour yellowish without lustre, variegated by brown dots or irregular and abrupted stripes. H. 11—20 mm (England) G. magus (Linné 1758).
Pl. 3 fig. 3.

Calliostoma Swainson 1840.
Zizyphinus Gray 1840.

I. Radula as in Gibbula (rhachian tooth with broad basal plate); shell granulated by crossing spiral riblets and longitudinal lamellæ; colour variegated with light yellowish and darker red or brownish spots or stripes. H. 12—18 mm
C. miliare (Brocchi 1814)
(= Trochus millegranus Philippi 1836).
Pl. 3 figs. 16—20.

II. Radula typical (rhachian tooth with narrower basal plate); shell with spiral sculpture only.

A. Lateral teeth of the radula 5 on each side; whorls flattened with 3—5 spiral riblets and 2 stronger on the base; sides of the shell (from apex to base) slightly convex; colour pale yellowish or reddish with brown dots or stripes. H. up to 28 mm C. conuloide (Lamarck 1822)
(= Trochus zizyphinus Jeffreys 1865, not Linné 1758).
Pl. 3 figs. 21—23.

B. Lateral teeth of the radula 4 on each side; whorls slightly convex with 3—4 spiral ribs of uniform strength; colour pearl-white; animal differing from all Trochidæ by 4 lateral cirri on each side (instead of 3). H. 10—14 mm
C. occidentale (MIGHELS & ADAMS 1841).
Pl. 3 figs. 24—25.

Craspedotus PHILIPPI 1847.
Danilia BRUSINA 1865.

Shell elevated, imperforate; spiral cords 3—4 on the upper, 9 on the last whorl. H. 7—8, D. 6—7 mm (France, LOCARD 1892)
C. otavianus (CANTRAINE 1835)
(= Monodonta Tinei CALCARA 1839).

Margarita LEACH 1819.

I. Radula with a rudimentary lateral tooth; lamellæ denticulated in the inner and the outer margin.

A. Shell smooth, without sculpture (except extremely fine spiral lines on the base), depressed conical; umbilicus narrow, not surrounded by a carina; aperture twice the spire in height; colour grayish green or reddish brown; radula $\infty . 1 . (6 . 1 . 6) . 1 . \infty$, the central cusp of the median tooth < their lateral denticles; height of the last whorl above the columella, seen from aperture, = half its breadth. H. circa 4—9; D. circa 5—11 mm
M. helicina PHIPPS 1774.
Pl. 3 figs. 26—34; Pl. 6 figs. 3—5.

B. Shell with spiral sculpture (sometimes absent in M. groenlandica).

1. Sculpture consisting of very fine and dense spiral striæ; umbilicus narrow; colour light yellowish or greenish, sometimes dark bluish, often vividly iridescent. Spire usually elevated, longitudinal sculpture (lines of growth) feebler than the spiral one; shell shining. Radula $\infty . 1 . (5 . 1 . 5) . 1 . \infty$. H. 6—10, D. 6—11 mm M. olivacea (BROWN 1827)
(= M. argentata GOULD 1841).
Pl. 3 figs. 41—46; Pl. 4 figs. 1—3; Pl. 6 figs. 8—10.

Spire usually more depressed; longitudinal sculpture of very fine dense-set lamellæ of about the same strength as the spiral lines, which are fainter than in the type; shell of a light colour, not shining; radula $\infty . 1 . (4 . 1 . 4) . 1 . \infty$ var. gigantea LECHE 1878.
Pl. 3 fig. 44; Pl. 4 figs. 2—3; Pl. 6 figs. 11—13.

2. Sculpture consisting of coarse and sparse ridges or of sparse impressed lines (sometimes absent); umbilicus usually wide; shell often not iridescent.

a. No prominent longitudinal sculpture, though irregular striæ or folds sometimes are present at the suture; spiral ribs or striæ mostly present, seldom wanting; usually no keel around the umbilicus; height of the last whorl, above the columella, seen from aperture,

< half its breadth; colour of the shell yellowish, grayish or reddish; radula ∞ . 1 . (6 . 1 . 6) . 1 . ∞. H. 10—18, D. 10—24 mm
M. groenlandica (Chemnitz 1781).
Pl. 4 figs. 4—27; Pl. 6 figs. 14—20.

α. Longitudinal short folds at the suture
var. undulata Sowerby 1838.

β. Spiral riblets coarse and dense var. rudis Mörch 1869.

γ. A few spiral riblets and a few impressed lines
var. intermedia Leche 1878.

δ. Smooth, depressed, umbilicus moderate var. lævigata Mörch 1869.

ε. Smooth, conical; only with 1—2 spiral ribs on the uppermost whorls var. lævior Jeffreys 1865.

ξ. Shell depressed, much dilated, umbilicus wide
var. umbilicalis Broderip & Sowerby 1838.

b. Shell with spiral and longitudinal sculpture, the former consisting of strong sparse riblets on the whorls and feebler ones on the base; the later consisting of dense-set (on the upper whorls more prominent) lamellæ of growth, much finer than the spiral ridges; a spiral keel usually surrounding the umbilicus; colour grayish or brownish; radula ∞ . 1 (4 . 1 . 4) . 1 . ∞; median teeth usually with acute cusps and about 5—7 denticles on each side. H. 10—25, D. 10—26 mm
M. cinerea (Couthouy 1839).
Pl. 4 figs. 28—37; Pl. 5 figs. 1—5; Pl. 7 figs. 1—4.

Shell depressed conical, whorls rounded, sculptured by low, uniform keels at equal distances; angular keel indistinct; umbilical keel absent or well developed; base often nearly smooth; median teeth of the radula with broadly rounded cusps and fine and dense (8—14) denticles on each side var. striata Broderip & Sowerby 1829 (= var. grandis Mörch 1857).
Pl. 4 figs. 34—36; Pl. 5 figs. 1—2.

II. Radula with all teeth well developed (no rudimentary lateral); lamellæ denticulated only in the outer margin; formula ∞ . 0 . (5 . 1 . 5) . 0 . ∞; shell completely smooth, elevated conical; aperture nearly = the spire in height; colour white with a vivid iridescent lustre; central cusps of the median teeth > the lateral denticles. H. 2—4.3; D. 2.2—4.3 mm M. Vahlii Möller 1842.
Pl. 3 figs. 35—40; Pl. 6 figs. 6—7.

Solariella Searles Wood 1842.
Machæroplax Friele 1877.

I. Shell smooth or with indistinct spiral grooves, thin; whorls 5, tumid; umbilicus moderately wide and deep; spire pointed; shell light flesh-coloured with a faint tinge of nacreous lustre. H. 6; D. 6.5 mm. (Radula unknown) S. lævis Friele 1886.

II. Sculpture consisting of longitudinal folds and very fine spiral striæ, more distinct on the base; 1—3 umbilical keels present; shell conical, whitish, greenish or brownish. H. 8—11; D. 9—12 mm. Radula 11—12 . 1 . (3 . 1 . 3) . 1 . 11—12
S. varicosa (MIGHELS & ADAMS 1842)
(= Margarita elegantissima S. WOOD 1848).
Pl. 5 figs. 6—14; Pl. 7 figs. 5—6.

III. Sculpture consisting of spiral keels, which are usually more prominent than the longitudinal folds or striæ; colour whitish, greenish or brownish. Radula 5–10 . 1 . (2 . 1 . 2) . 1 . 5—10. Type with 1—2 prominent spiral ridges and fine striæ; umbilical keel present. H. circa 7, D. 8 mm
S. obscura (COUTHOUY 1839).
Pl. 5 fig. 22; Pl. 7 figs. 9—20.

(Specimens with 3 strong spiral ridges and a feeble umbilical keel pass over into var. finmarchica.)

a. Spiral ridges many, strong, though 2—3 are more prominent than the rest; umbilical keel present var. cineræformis LECHE 1878.

b. Spiral ridges many, of about uniform strength; umbilical keel present
var. albula GOULD 1862.
Pl. 5 fig. 20.

(Specimens without umbilical keel pass over into var. bella.)

c. Spiral ridges replaced by fine and dense striæ; umbilical keel present
var. intermedia LECHE 1878.
Pl. 5 fig. 23.

d. Spiral ridges 4—5, unequal in strength; fine longitudinal striæ; no umbilical keel; H. 4.5; D. 5 mm var. finmarchica n. n.
(= Machæroplax obscura COUTH. of SARS 1878).
Pl. 5 figs. 36—35.

e. Spiral ridges about 7, unequal in strength; longitudinal striæ indistinct; no umbilical keel; H. 4.8; D. 6.4 mm var. multilirata n. var.
Pl. 5 figs. 28—30.

f. Spiral liræ undeveloped, replaced by finer striæ, about 6—8 on the last whorl; no umbilical keel. H. 4.5, D. 5.8 mm var. islandica ODHNER 1910.
Pl. 5 fig. 24.

g. Longitudinal sculpture coarse and distant, often of nearly the same strength as the spiral one; this consisting of a few equally strong ridges; umbilical keel present or not. Radula with 5—8 lamellæ on each side. H. 6.5, D. 7 mm var. bella (VERKRÜZEN 1875) G. O. SARS 1878.
Pl. 5 figs. 25—27, 31, 34.

IV. Sculpture consisting of spiral riblets and rows of tubercles (surface of the shell nodulous or granular).

A. 3 prominent spiral ridges on the last whorl and 1 on the base, surrounding the umbilicus; aperture roundish; colour pearl-white. H. 8, D. 7 mm. Radula 5 . 1 . (3 . 1 . 3) . 1 . 5 (FRIELE 1877) S. cincta (PHILIPPI 1836)
(= Trochus amabilis JEFFREYS 1865).

B. No keels on the whorls nor around the umbilicus; surface closely and finely reticulated; colour whitish with a margaritaceous lustre. H. 6.5, D. 7 mm. Radula as in the type var. affinis JEFFREYS 1883.
Pl. 5 fig. 38.

C. 2—3 prominent spiral ridges on the last whorl, the subsutural one consisting of sparse tubercles; 4—5 nodulous ridges on the convex base; aperture quadrangular; colour yellowish white, somewhat nacreous. H. 6.7, D. 7 mm S. infundibulum (WATSON 1879).
Pl. 5 fig. 37.

Fam. Cyclostrematidæ.

I. Radula ∞ . 1 . (5 . 1 . 5) . 1 . ∞; shell solid with strong transverse ribs; operculum calcareous Moelleria JEFFREYS 1865.

II. Radula ∞ . 0 . (4 . 1 . 4) . 0 . ∞; shell thin, finely sculptured (or smooth); operculum corneous Cyclostrema MARRYATT 1818.

Moelleria JEFFREYS 1865.

Shell depressed, with longitudinal dense ribs, extending on the base to the umbilicus; this moderately wide, surrounded with about 4 spiral riblets; colour white, grayish or brownish. H. 2, D. 2.4 mm; Wh. 3 M. costulata (MÖLLER 1842).
Pl. 5 figs. 43—47.

Cyclostrema MARRYATT 1818.

Delphinoidea BROWN 1827.

I. Surface cancellated by elevated spiral and longitudinal lines (subg. Cyclostrema sensu stricto).
Shell highly depressed, sculptured by spiral lines and denser longitudinal ones; umbilicus very wide, without peculiar peripheric sculpture; colour transparent white. H. 0.9; D. 1.4 mm; Wh. 3
C. areolatum G. O. SARS 1878.

II. Surface spirally striated (subg. Tubiola A. ADAMS 1864).

A. Whole surface with microscopical, densely punctured striæ; shell depressed, widely umbilicated; distance form apex to the insertion of outer lip (oblique spire height) about $^3/_4$ of the aperture height; colour shining white. H. 0.8, D. 1.2 mm; Wh. 3 C. millepunctatum FRIELE 1886.

B. Surface not punctured; usually only the base striated.

1. Basal striæ concentric with or emerging from the umbilicus.

a. Spire low, depressed; the oblique spire height $^2/_3$ of the aperture; shell globose; umbilicus moderately wide; breadth of aperture $\geq$ half the breadth of the shell; surface smooth, only the base with 8—10 striæ; colour white. H. 2.3, D. 2.5 mm; Wh. 4
C. basistriatum (JEFFREYS M. S.) G. O. SARS 1878.
Pl. 5 figs. 40 and 42; Pl. 7 fig. 8.

Surface striated all over var. striolata G. O. SARS 1878.

Surface finely and regularly striated all over; aperture more expanded than in the type (its height = $^2/_3$ of the height of the shell) var. profunda FRIELE 1879.

b. Spire higher, shell more depressed; aperture < half the breadth of the shell.

+. Surface sculptured all over by spiral striæ; oblique spire height $^4/_5$ of the aperture; umbilicus wide; colour white. H. 1, D. 1.3 mm; Wh. 3
C. Willei Friele 1886.

++. Only the base striated.

α. Shell moderately depressed, its height nearly as large as the breadth, umbilicus moderately wide or narrow, not perspective.

×. Aperture slightly angulated above; oblique spire height $^3/_4$ of the aperture; whole surface microscopically rugulated; base with numerous striæ; colour yellowish white. H. 1.1, D. 1.3 mm; Wh. 3
C. rugulosum (Jeffreys M. S.) G. O. Sars 1878.

××. Aperture circular; oblique spire height $^4/_5$ of the aperture; surface smooth, but the apical whorls with 1—2 spiral liræ and the base with more or less conspicuous striæ; colour grayish. H. 1.6; D. 1.8 mm; Wh. 4 C. turgidum n. sp.
Pl. 5 fig. 39; Pl. 7 fig. 7.

β. Shell highly depressed, its height about $^2/_3$ of its breadth; umbilicus wide, perspective; base with numerous striæ; aperture slightly angular above; colour transparent white, sometimes yellowish. H. 1.2, D. 1.8 mm; Wh. 3—4 (England) C. serpuloide (Montagu 1808)
(= Skenea? divisa Forbes & Hanley 1853).

2. Basal striæ absent or arcuated, with their foremost ends bent down into the umbilicus.

a. Shell globose; oblique spire height about $^3/_4$ of the aperture; umbilicus a narrow fissure or wholly covered; base with nearly inconspicuous striæ; colour opaque white. H. 1.8, D. 2 mm; Wh. 4
C. trochoide (Jeffreys M. S.) G. O. Sars 1878.
Shell narrowly umbilicated, wholly smooth
var. Peterseni Friele 1877.
Pl. 5 fig. 41.

b. Shell depressed; oblique spire height $^2/_3$ of the aperture; umbilicus wide; basal striæ distinct; colour white. H. 1.2, D. 1.8 mm; Wh. 3
C. lævigatum (Jeffreys M. S.) G. O. Sars 1878.

Fam. Adeorbidæ.

I. Shell depressed, thin, with flattened base, obviously spirally sculptured; aperture oblique
Adeorbis S. Wood 1842.

II. Shell globular, thin, nearly smooth or microscopically reticulated; aperture roundish
Archytæa Costa 1869
(= Trachysma [Jeffreys M. S.] G. O. Sars 1878).

Adeorbis S. Wood 1842.

Whorls convex, the last large, obliquely flattened towards the aperture; umbilicus wide and deep, with an obtuse angular margin; colour reddish white. H. 1.7, D. 2 mm; Wh. 4 A. fragilis G. O. Sars 1878.

Archytæa Costa 1869.
Trachysma (Jeffreys M. S.) G. O. Sars 1878.

Whorls convex even at the aperture, not flattened below; umbilicus deep, moderately wide without angular border; colour transparent white. H. 1, D. 1.1 mm; Wh. $3\,^1/_2$ (G. O. Sars)

A. delicatum Philippi 1844.

Shell more dilated, base somewhat flattened, aperture oblique. H. 1.2, D. 1.4 mm

var. expansa G. O. Sars 1878.

Geographical and bathymetrical distribution.

[ap. = height of aperture; br. = breadth; d. = diameter; h. = heigth; l. = length; sh(s). = shell(s); sp(s). = living specimens; Mus. G. = Museum at Gothenburg; Mus. L. = Museum at Lund; Mus. U. = Museum at Uppsala].

Acmæa testudinalis (Müller 1776).

Pl. 1 figs. 1—7; Pl. 6 fig. 1.

Habitat:[1]

West coast of Sweden: Hittarp, Helsingborg, Skåne, 2 sps, max. l. 8.9 (Lönnberg $^{26}/_{6}$ 1902); Kullen (Lilljeborg 1852[b]) 1 sh., l. 15.5; br. 11.6; h. 5.2; apex 4 (Mus. U.) — Kattegatt: Lilla Middelgrund, 10 fms, sand, stones, 2 sps, max. l. 9.5 (Gunhild Exp. $^{17}/_{7}$ 1878) — Bohuslän: Marstrandsfjorden, 10 fms, 1 sp., l. 11 (Sept. 1864); Gullmarn, 1 sp., l. 18 (Lovén); D:o 4 sps, max. l. 20.5; br. 15.3; h. 6; and l. 18.5; br. 15.3; h. 7.6 (Mus. U.); D:o, Strömmarna, 10 fms, stones, 1 sp., l. 10.4 (N. Odhner $^{14}/_{6}$ 1907); D:o, Smalsund, Zostera, and Blåbergsholmen, algæ (Théel 1907); Väderöarna, the coral reef, 1 sp., l. 8.8 (Zool. St. 1890); Sydkoster, 15—20 fms, rocks, 3 sps, max. l. 21.5 (Eisen & Stuxberg $^{6}/_{7}$ 1871); Strömstadsfjärden, 1 sp., l. 15.5 (Hanson $^{3}/_{8}$ 1881); Svinesund, 30—70 fms, stony mud, 1 sp., l. 7.2 (Lindahl 1871.) — Bohuslän without definite locality, many sps, max. l. 22 (Lovén & B. Fries; Pl. 1 fig. 1); 1 sp. of aberrant breadth: l. 18; br. 16, h. 6.

South and West coast of Norway: Dröbak, 5—8 fms, stones, Fucus, 8 sps, max. l. 9.8 (Lovén); Christianiafjorden, 2 sps, max. l. 9 (Asbjörnsen); Sörfjorden, Hardanger, 45 fms, stones, 1 sp., l. 9.6 (Bovallius 1880); Hitterö, 20—30 fms, 1 sh., l. 12 (Öberg 1869); Bergen, 7 sps, max. l. 15.9 (Sars); Trondhjemsfjorden, 1 sp., l. 13.7 (Koren); D:o, Rissen, 1—10 m, mud, 1 sp., l. 9.5 (Östergren $^{12}/_{7}$ 1902); Norway, without definite locality (»mare norvegicum»), many sps, max. l. 19.2 (Marklin); D:o, many sps, max. l. 10.2 (Düben).

Northern Norway: Tromsö, ebb, 1 sp., l. 13.3 (Malmgren 1864); Karlsö, 30 fms, shells, 1 sp., l. 12.7 ($^{11}/_{6}$ 1864); Kjosenfjord, ebb, algæ, stones, many sps, max. l. 22.6

[1] Acmæa testudinalis, mentioned by Aurivillius, 1887 (from Behring Island) includes A. pelta and patina, which confer.

($^{22}/_{10}$ 1861). — Ulfsfjord, 25—50 fms, 2 sps, max. l. 6.6. — Grötsund, 4 fms, shells, and ebb, many sps, highly varying: max. l. 22.1; br. 16.1; h. 6.5; another sp. l. 14,3; br. 11.3; h. 6.2; or l. 16; br. 11.2; h. 5.5 (Fig. 6). — Finmark, without definite locality, many sps, max. l. 21.4 (Lovén); D:o, 6 sps, max. l. 25.8 (Sparre Schneider).

Murman coast and Kola Peninsula: Gawrilowo, 1 sp., l. 23.3 (Herzenstein 1880). — Waideguba, a few sps, max. l. 13.6 (Sandeberg $^{10}/_{8}$ 1877). — Lumbowski, 20 fms, 10 sps, max. l. 23.8 (S. $^{3}/_{8}$ 1877). — Ladigino, 13 sps, max. l. 30.6 (S. $^{11}/_{8}$ 1877). — Orafjord, 100 fms, 4 sps, max. l. 17.3 (S. $^{3}/_{9}$ 1877). — Russian Lapland, Schuretskoja (Lilljeborg) 6 sps, max. l. 12.4 (Mus. U.).

Nova Zembla and Kara Sea (Leche 1878): max. l. 23.7 (Cape Grebeni, living).

? Spitzbergen: Bel Sound, 8—12 fms, 1 sh., l. 14.5; br. 10.6; h. 5.8 (Fig. 4); probably mistaken for Iceland.

Iceland (Odhner 1910): Berufjord, max. l. 28; Raufarhofn, max. l. 12.2; Siglafjord, max. l. 24.2 (Figs. 2—3).

Greenland (Posselt & Jensen 1899): some measurements: Norsovak, max. l. 18.8; Nivakfjord, max. l. 28.8 (Fig. 7); Egedesminde, max. l. 23.2; Ritenbenk max. l. 23.2; Godhavn, max. l. 25; Claushavn max. l. 19.3; Sukkertoppen, max. l. 24.8 (Fig. 5); Godthaab, l. 8; Omenak, max. l. 23.5. — Further: Pröven, 20—40 fms, rocks, 1 sp., 2 shs, max. l. (sh.) 20.2. — Cape Dudley Digges, 30—40 m, mud, 1 sh., l. 26.1 (E. Nilson $^{5}/_{7}$ 1894). — 64°56′ N. 66°18′ W., 15—30 m, sand, 1 sp., l. 12 (E. Nilson $^{12-13}/_{10}$ 1894).

Behring Sea: St. Lawrence Island, 1—4 fms, sand, 10 sps, max. l. 21; br. 16; h. 5.8; apex 6.6 (Vega Exp. $^{1}/_{8}$ 1879; Aurivillius 1887).

Limits of formal variation:

Scandinavia,	l.	10—12	14—16	18—20	22—24	26—28	max. 25.8 (Finmark)	30.6; 30.4 (Kola)
Murman coast,	br.	6.8—9.8	9.6—12.8	12.7—16	15.8—19	19.5—21.5	19	22.7; 22.9
Kola; 65 sps	h.	2.6—5.4	3—6.6	5—8	6.4—10.5	8.2—11.5	8	13; 14.4
measured	apex[1]	2.2—4	3.4—4.4	4—6.4	4.4—9.2	8—10	8	8.5; 10.2
	l.	10—12	14—16	18—20	22—24	26—28	max. 28 (Berufjord)	
Iceland;	br.	7.3—9.2	10.2—12.2	13—15.8	16—18.4	18.2—20	20	
15 sps	h.	3.4—4.4	5—6	6—7.8	8—9.5	8.8—11	11	
measured	apex	2.3—3.2	3.8—5.3	5—7.5	7—8	8.2—8.8	8.8	
	l.	10—12	14—16	18—20	22—24	26—28	28.8 (Nivakfjord)	
Greenland;	br.	7—9.2	10—12.4	12.2—16.2	16.3—19.5	18.8—23.2	22.5	
35 sps	h.	3—4.4	4.4—6.2	5.2—7.8	6.2—10	8.2—11	10	
measured	apex	3—3.8	3.7—5.5	5.2—7.6	7—9.6	9.2—11.8	12	

Colour variations: forma *tesselata* Müller 1776: colour marbled with brown and white (typical); *atropurpurea* Lovén 1846: colour dark purplish, Bohuslän; *alba* Lovén 1846, *lactea* Jeffreys 1865: colour white, Bohuslän, Denmark, England; *pallida* Verkrüzen 1872: colour white to reddish brown »without the longitudinal rays of the typical species», Iceland.

[1] Perpendicular distance from apex to anterior margin.

General Distribution:

Norway: Finmark southwards, l. 30 (G. O. Sars 1878; l. 47, M. Sars 1858; Friele 1874; Schneider 1881, 1885, 1891, 1894; Aurivillius 1886; Bidenkap 1897; De Guerne 1886, 0—124 m; Norman 1902; Nordgaard 1907). — Christianiafjord (Asbjörnsen 1854; Jeffreys 1870, to 40 fms). — Bohuslän (Lovén 1846; Malm 1855). — Göteborg Skärgård (Malm 1858). — Kullen (Lovén 1846; Lilljeborg 1852[b]). — Kattegatt, rare, Öresund, more common, Zostera; max. l. 29 (Mörch 1871; Petersen 1888), + var *alba*. — Öresund: Hven—Landskrona; Sofiero, 10—17 m (Lönnberg 1898). — Kiel, l. 20 (Meyer & Möbius 1872). — Iceland (Mörch 1869[a]; Verkrüzen 1872[a], + var. *pallida*; Posselt & Jensen 1899; Johansen 1902). — Faroes (Mörch 1868). — Great Britain (Jeffreys 1865). — Dogger Bank (Hargreaves 1910). — Azores, 15 m to 450 fms (Dautzenberg 1889; Watson 1886). — Russian Lapland (Middendorff 1849). — Murman coast, White Sea; Nova Zembla (Herzenstein 1893, Dautzenberg 1911). — Kolguev, 10 fms (Melvill & Standen 1900). — Kara Sea, 12 fms, l. 16 (Collin 1887). — Behring Sea, Arctic Ocean, Alaska to Sitcha (Dall 1878). — Japan, 7 fms (Jeffreys 1876). — Amur, l. 37 (Schrenk 1867). — Greenland, to 100 fms (Posselt & Jensen 1899; Grieg 1909, l. 25). — Cumberland Sound (Pfeffer 1886). — Parry Islands, 12—15 fms (Sutherland 1852; Reeve 1855). — E. Canada, to 15 fms (Whiteaves 1901). — New England, l. 18 (Gould & Binney 1870). — Mexico (Jeffreys 1869). — Antilles (*fide* Meyer & Möbius 1872). Depths 0—450 fms. Stones, rocks, mud, algæ, Zostera.

Acmæa virginea (Müller 1776).

Pl. 1 figs. 9—15.

Habitat:

West coast of Sweden: Skåne, NW off Sofiero, 1 sp., l. 5 (Lönnberg $^{16}/_{6}$ 1902); Kullen (Lilljeborg 1855) 2 shs, max. l. 7; br. 4.7; h. 2.3 (Mus. U.). — Halland: lighthouse of Väderö in SSW, point of Höghalla in ESE, 15 fms, shells and gravels, 2 sps, max. l. 9.5; br. 7; h. 5.7 (Lönnberg $^{10}/_{7}$ 1902); Fig. 10; off Varberg, 1 sh., l. 4.8 (Torell). — Kattegatt: Lilla Middelgrund, 1 sh., l. 4.6 (Gunhild Exp. 1878); about $^{1}/_{4}$ mile NE of lightship Fladen, 40 m, clay, mud, 2 sps, max. l. 4.8; br. 3.6; h. 2 ($^{23}/_{9}$ 1911). — Bohuslän (Fig. 10): N. Åstol—Dyrön, Marstrand, 18—36 m, 2 sps, max. l. 7 (Lagerberg $^{23}/_{7}$ 1906); Gullmarn: Strömmarna, 10 fms, stones, 4 sps, max. l. 6 (N. Odhner $^{14}/_{6}$ 1907); Strömmarna—Lunnevik, 18 m, mud, 1 sp., l. 4.2 (N. Odhner $^{17}/_{7}$ 1907); Skatholmen, E of the fine sand, 5—6 m, stones, gravel, algæ, 3 sps, max. l. 8.5 ($^{26}/_{6}$ 1903); D:o, fine sand with shells, 6 sps, max. l. 6.4 ($^{26}/_{6}$ and $^{4}/_{8}$ 1903); Skårberget, 2 sps, max. l. 6.3 (Lovén); Flatholmen, NE point, 1 sp., l. 5.5 ($^{3}/_{7}$ 1906); other localities see Théel (1907). — Väderöarna, sand, clay, 4 sps, max. l. 9 (A. Goës); D:o, 100 fms, 1 sh. — Dyngö, 10 sps, max. l. 5.4 (A. Goës). — Koster, 2—5 fms, inside the islands, 1 sp., l. 9 (Ljungman 1865); D:o, 15—20 fms, rocks, 1 sp.,

l. 5.3 (Eisen & Stuxberg $^{6}/_{7}$ 1871). — Strömstad, 1 sp., l. 5.5 (Hanson $^{15}/_{3}$ 1890). — Bohuslän, without definite locality, many sps., max. l. 9.2 (B. Fries 1838); (Fig. 10).

South and west coast of Norway: Herföl, 16 fms, 6 sps, max. l. 7.9 (Torell). — Christianiafjorden, 5 sps, max. l. 10.4 (Asbjörnsen). — Dröbak, 5—8 fms, corals, many sps, max. l. 10.6 (Lovén 1850); Fig. 9; many of these shells have a concave under side, due to their adherence to corals; D:o, 50 fms, 2 shs, max. l. 6 (Lovén 1850). — Sörfjorden, Hardanger, 45 fms, stones, 4 sps, max. l. 6.5 (Bovallius $^{16}/_{7}$ 1880). — Stolsfjord, Farsund, 47 fms, clay, 1 sp., l. 8 (Bovallius 1880). — Färnefjord, 20—100 fms, sand, clay, 1 sp., l. 5.5 (v. Yhlen). — Hitterö, 20—30 fms, shells 3 shs, max. l. 9.4 (Öberg 1869). — Bergen, 10 shs, max. l. 8.8 (Sars). — Grip and Kristiansund (Lilljeborg 1851) many shs, high or depressed, max. l. 8; br. 6.3; h. 2 and l. 7.5; br. 6.1; h. 2.8 (Mus. U.) — Trondhjemsfjord, 6 sps, max. l. 14.4 (Koren). — Norway, without definite locality, many sps, much varying: max. l. 9.6; br. 8; h. 4; apex 2.5; another sp.: l. 8; br. 6.6; h. 3; apex 1.2 (Düben).

Northern Norway: Nordlanden, 4 sps, max. l. 8 (Nylander & Gadd). — Tromsö (Lilljeborg) many shs, max. l. 6; br. 5; h. 1.8 (depressed and with curved inferior margin) (Mus. U.). — Kjosenfjord, 25—40 fms, clay (Goës & Malmgren $^{20}/_{10}$ 1861) 1 sh., l. 9.1; br. 6.8; h. 6; apex 2.5. — Grötsund, 70—100 fms, clay, 7 sps, max. l. 9.2 (Goës & Malmgren); D:o, 4 fms, shells, 4 sps, with concave under side, max. l. 4.5. — Peisen, 5 sps, with a slightly curved under side, max. l. 6.6 (Nylander & Gadd). Finmark without definite locality, 4 shs, max. l. 9.7 (Lovén); Figs. 11—12. — Kvænangen, 0—25 fms (Cleve) 3 sps, max. l. 8.5 (Mus. U.).

Iceland (Odhner 1910). Maximal dimensions: Thistilfjord, l. 6; br. 4.5; h. 2; Raufarhofn l. 12; br. 9.8; h. 6.3; shell solid (Fig. 13); Iceland, without definite locality, 1 sh., l. 13; br. 11; h. 6.5; apex 3.

Limits of formal variation:

	l.	4—5	6—7	8—9	10—11	max. 14.4 (Trondhjemsfjord)
Scandinavia;	br.	2.6—4	4.2—6.5	5.8—7.5	7.4—9	11,1
75 sps	h.	1.3—2.4	1.6—3.4	2.2—4.9	3—5.8	4.5
measured	apex	0.8—1.6	0 8—2.7	1.4—3.3	2—3.5	4

Specimens with a curved inferior margin occur commonly together with the type on coral bottoms. They are not included in the above table.

Variation of colour and sculpture: The red radiating stripes of the shell are seldom wanting (var. *lactea* Jeffreys (1865) of an uniform white colour), but they become paler in older specimens. In the following var. *spitzbergensis* they are wholly absent. The shell is usually smooth, but faint radiating lines sometimes occur; they are particularly prominent in var. *spitzbergensis*.

General Distribution:

Norway, Varangerfjord—southwards (G. O. Sars 1878; Friele 1874; Schneider 1885, max. l. 13; 1891, 1894; Bidenkap 1897; Aurivillius 1886; De Guerne 1886; Norman 1902; Nordgaard 1907; Lilljeborg 1851). — Christianiafjord (Asbjörnsen 1854; Jeffreys 1870, 0—100 fms). — Bohuslän, 1—60 fms (Malm 1855); Göteborg Skärgård, Vinga, 16—23 fms (Malm 1858); Hallands Väderö (Lönnberg 1903); Kullen (Lovén 1846; Lilljeborg 1855). — Kattegatt to Hven, 7—16 fms (Mörch 1871; Petersen 1888). — Öresund, 10—22 m (l. 8; Lönnberg 1898). — Iceland (+ var. *lactea*, Verkrüzen 1872; Johansen 1902; Odhner 1910). — Faroes (var. *orbicularis*, Mörch 1868). — N. of Hebrides, 530 fms (Jeffreys 1882). — British Isles (Jeffreys 1865, 1882). — Dogger Bank (+ var. *lactea*, Hargreaves 1910). — Heligoland, 2—10 fms (Metzger 1875). — North Sea off Holland—Belgium, rare (Maitland 1897). — France, rather common (Locard 1892). — Spain and S. Portugal (Jeffreys 1882); Portugal, rather common (Nobre 1905). — Mediterranean (Carus 1889). — Off Morocco; Madeira; Canaries; Cap Verde Isles; Azores; St. Helena; to 650 fms (Jeffreys 1882). Depths 0—650 fms. Stones, sand, clay, corals, algæ.

Var. **spitzbergensis** n. var.

Pl. 1 figs. 14—15.

Habitat:

Spitzbergen: Treurenburg Bay, 1 sh., l. 10.9; br. 8.2; h. 3.9. — Mossel Bay, 14 fms, Lithothamnion, sand ($^{17}/_{1}$ 1873), 1 sh., l. 10.3; br. 7.4; h. 3.8. Both these shells are of a relatively fresh appearance and probably not subfossil.

Acmæa rubella (Fabricius 1780)

(incl. var. **elevata** Odhner 1910).

Pl. 1 figs. 16—23.

Habitat:

Northern Norway: Ramsfjord, 9—13 fms, 1 sh., l. 2.8; br. 2.9; h. 2.7; curved inferior margin (Torell); Kjosenfjord, ebb, algæ, stones, 1 sh., l. 5.3; curved inferior margin (Goës & Malmgren $^{20}/_{10}$ 1861); Grötsund, 4 fms, shells, 1 sh., l. 4.6; curved inf. marg. (G. & M. 1861), Fig. 20; Karlsö, N. of Tromsö, 5—15 fms, rocks, 1 sp., l. 5.7 (Leche 1878); Finmark, without definite locality (Lovén) 1 sh. (Fig. 21).

Kola Peninsula: Waideguba, off the harbour, with surface net, 1 sp., l. 2.8 (Sandeberg $^{26}/_{7}$ 1877).

Kara Sea (LECHE 1878): Kostin sharr, 1 sh., l. 4.6 (Fig. 16) and other localities.

Spitzbergen: Horn Sound, 40—60 fms, clay, stones, 1 sh. (fragm.), l. about 7. — Bel Sound, 30—60 fms, stones with zoophytes, 5 shs, max. l. 5.7 (Torell). — Ice Fiord, Cape Thordsen, 2 sps, max. l. 4.9 (Willander 1870). — Kings Bay, 120 fms, clay, 1 sh. (fragm.) (1861). — Kobbe Bay, 3 fms, sand, 1 sh., l. 3.9 ($^{27}/_{5}$ 1861). — Smeerenburg Bay, low water, 1 sh., l. 6 ($^{22}/_{8}$ 1868). — Norwegian Islands, 15—20 fms, stones, sand, 5 shs, max. l. 6.3 ($^{12}/_{8}$ 1872). — Liefde Bay, 20—30 fms, clay with stones, 1 sh., l. 5 ($^{3}/_{9}$ 1868). — Mossel Bay, 9 $^{1}/_{2}$—16 fms, sand, Lithothamnion, 2 shs, max. l. 6.5 ($^{16}/_{1}$ and $^{15}/_{3}$ 1873); D:o, 20 fms, mud with shells, 1 sp., l. 4.7 ($^{29}/_{5}$ 1873). — Lomme Bay, at a glacier bank, 1 sh., l. circa 7 (Torell 1861). — Treurenburg Bay, 6—15 fms, sand, clay, stones (1861), 7 shs, max. l. 8 (Fig. 17). — Parry's Island, 30—40 fms, stones, gravel, 2 sps, max. l. 4.2 ($^{8}/_{9}$ 1868). — Castrén's Islands, 30—40 fms, clay, stones, 1 sp., 1 sh., max. l. 6.4 ($^{7}/_{9}$ 1868). — Charles XII Island, 80°45′ N. 25°20′ E., 60—70 fms, rocks with Corallina, 3 sps, max. l. 3.5 ($^{20}/_{8}$ 1898).

Iceland (ODHNER 1910) incl. var. *elevata:* Berufjord, max. l. 6 (Figs. 19 and 22—23). — Thistilfjord, max, l. 4.8. — Raufarhofn, max. l. 4.3.

Greenland (POSSELT & JENSEN 1899); some measurements: Julianehaab, max. l. 6.5. — Godthaab, max. l. 5. — Sukkertoppen, max. l. 5.6. — Egedesminde, max. l. 5.6. — Godhavn, l. 6. — Umanak, max. l. 4.5. — Pröven, max. l. 7 (Fig. 18). — Upernivik, max. l. 4.3. — 63°47′ N. 52°26′ W., max. l. 5.4.

Variation:

Colour varies form darker to lighter brownish. — As in A. virginea, specimens of A. rubella, living on coral bottoms at Iceland and Finmark have a concave underside and sometimes an elevated shape (var. *elevata* ODHNER 1910); but stages of transition from such extreme forms lead over into the type.

Limits of formal variation:

Iceland	l.	2—3	3—4		4—5	5—6	max. 6 (Berufjord)	
(incl.var.*elevata**);br.		1.7—3*	2.7—4*; 2.5—3.3		3—4.1	3.8—(4.7)	4.9	
20 sps,	h.	1.2—2.5*	2—3*; 1.4—2		1.7—2.9	2—3.7	3.3	
measured	apex	0.7—1.3	1—1.7		1.2—2	1.7—2.5	2.5	
	l.	2—3	3—4	4—5	5—6	6—7	max. 7 2 (Pröven)	
Greenland;	br.	(1.7)—2.5	2.3—3.3	3—4.1	3 8—5.3	4.8—6	5.9	
25 sps	h.	(1.1)—1.6	1.4—2.1	1.7—2.9	2 2—3.7	2.5—3.8	3.7	
measured	apex	(0.7)—1.2	1—1.7	1.3—2	1.7—2.7	2—3	2.6	
	l.	2—3	3—4	4—5	5—6	6—7	7—8	max. 8.2 (Treurenburg Bay)
Spitzbergen;	br.	(1.5)—2.3	2.3—3.2	3—4.4	3.8—5	4 8—5.9	5 6—6.8	6.9
25 sps	h.	(0.8)—1.4	1.2—2.2	1.7—3	2.3—3.2	2.8—4	3.6—4.7	4.9
measured	apex	(0.9)—1.2	1.1—1.6	1.4—2.2	1.6—2.4	2—3	2—3.3	3.2

Numerals in a parenthesis mark calculated values.

General Distribution:

Norway: Tromsö to Vadsö, 10—14 fms (l. 6, G. O. Sars 1878; Lovén 1846; Schneider 1885; Norman 1902); Varangerfjord, 20—30 m (De Guerne 1886). — Murman Coast; Nova Zembla (Herzenstein 1893; Leche 1878). — Spitzbergen (Torell 1859); Stor Fiord (l. 6.3, Knipowitsch 1901[b]). — Jan Mayen (Becher 1886). — Off Norway, 300 fms, dead shell (Friele & Grieg 1901). — Iceland (Odhner 1910). — Greenland from Upernivik southwards, 100 fms, l. 7 (Posselt & Jensen 1899). — Jones Sound, 10—20 m, l. 7.5 (Grieg 1909). — Parry Islands, 12—15 fms (Sutherland 1852). — E. Canada, 20—35 fms (Whiteaves 1901). — Newfoundland (Verkrüzen 1877). — Alaska (*fide* Posselt & Jensen 1899). Depths 3—300 fms. Rocks, stones, sand, clay, algæ.

Acmæa patina Eschscholtz 1833.

(= Patella testudinalis forma normalis Aurivillius 1887).

Pl. 1 fig. 8.

Habitat:

Behring Island, 0—1 fms, stones, algæ, many sps, max. l. 33.5; br. 26.7; h. 10.2; apex 11.9 (Vega Exp. $^{16}/_{8}$ 1879).

Limits of formal variation (100 sps):

l.	16—18	20—22	24—26	28—30	32—34
br.	11—14	13.8—17	17—21	20.4—24.6	24—27
h.	3.8—5.6	4.8—7	5.6—8.8	6.4—10.2	7.8—11.6
apex	3—5.6	4—7	5.4—9.6	6.8—11.8	9.4—13.8

General Distribution:

Behring Island (Dall 1887); Alaska, Aleutian Islands to San Diego, California (Dall 1878).

Acmæa persona Eschscholtz 1833.

Habitat:

Behring Island, 0—1 fms, among A. patina and A. pelta, 15 sps, max. l. 11.1; br. 8.2; h. 3.5; apex 1.2 and l. 10; br, 8; h. 3.2; apex 1.3. The specimens belong to the smooth forma typica.

General Distribution:

Aleutian Islands to S. Barbara Island, California (DALL 1878).

Acmæa pelta ESCHSCHOLTZ 1833.

(= Patella testudinalis forma elatior Aurivillius 1887).

Pl. 1 fig. 8.

Habitat:

Behring Island, together with the preceding species, numerous sps, max. l. 42; br. 31.2; h. 16.8; apex. 14.

Limits of formal variation (100 sps):

l.	16—18	20—22	24—26	28—30	32—34	36—38
br.	11.2—13.4	14—16.8	16.8—21.4	19.4—24	22—27.6	24.4—29
h.	5.4—7	6.6—8.8	7.8—11.4	9—13.8	11—15.8	12.8—16.8
apex	4.2—6.4	5.2—8	6.4—10	5.6—11.8	8.6—13.6	8.6—15.4

General Distribution:

Behring Island (Dall 1887). — »Aleutian Island and the southern coast of Alaska south and east to the Santa Barbara Islands, Cal., between or near tide-mark» (Dall 1878).

Patella vulgata LINNÉ 1758.

Pl. 1 figs. 24—26.

Habitat:

Bohuslän: Hållö, 2 sps, max. l. 53. — Gullmarn: Flatholmen, Blåbergsholmen, Bonden, Smögen, common in the outer islands, rocks, algæ, in tide-mark (THÉEL 1907); Off Bondhålet (Aurivillius 1895). — Väderöarna, many sps, max. l. 47, highly varying in form and sculpture (Figs. 25—26). — Bohuslän, without definite locality, max. l. 64 (v. Fries).

Norway: Farsund, 15 fms, 2 shs, l. 50 (Eugenie Exp. $^{11}/_{10}$ 1851); max. l. 54 (Mus. U.). — Jæderen, 100—150 fms, 1 sh., l. 27.5 (B. Olsson). — Rondö, 20—30

fms, shingles, 1 sh., l. 20.3 (v. Yhlen). — NW. off Siggen, Bergen, 100 fms, 3 shs, max. l. 47 (1875). — NNW. off Bergen, 90—150 fms, fish bank, many shs, max. l. 53 (Olsson). D:o, 90—170 fms, 3 shs, max. l. 42.5 (Uddström). — Bergen, 4 shs, max. l. 28.5 (M. Sars). — Trondhjem, 5 shs, max. l. 47 (Sundevall). — Norvay, without definite locality, many shs, max. l. 52 (Rasch), Fig. 24.

Shetland: Baltasound, on stones, tide mark, 2 sps, max. l. 23 (Hammarsten 1909).

Varieties:

Shell with coarse ribs, type, Fig. 26; with fine but sharp ribs, var. *depressa* PENNANT 1777, Fig. 24; depressed; fine ribs; inside dark bluish, var. *coerulea* LINNÉ 1767 (in JEFFREYS 1865), Fig. 25.

Limits of formal variation:

	l.	14—18	22—26	30—34	38—42	46—50	54—58
Scandinavia;	br.	10—15	16.8—23	24—30	30—38.4	37—45	46—50
75 sps	h.	3.5—8	5.5—10.3	(7)[1]9—16	13—19	15—25	20—28
measured	apex	4.5—7	7.2—10.2	10.8—14.4	13.8—18	10.4—21.6	17—26.8

General Distribution:

Norway to Lofoten, l. 39 (G. O. Sars 1878); to Vanö, 70° N. (Schneider 1895). Nordlanden (Krause 1887; Lovén 1846). — West coast (Friele 1874; Lilljeborg 1851). — Christianiafjord (Asbjörnsen 1854). — Bohuslän (Lovén 1846; Malm 1855). — Denmark, Bulbjerg, dead sh. (Mörch 1871); west coast of Jutland (Christensen 1907). — Faroes l, 60 (Mörch 1868). — British Isles (Jeffreys 1865). — Dogger Bank (Hargreaves 1910). — Holland and Belgium, rare (Maitland 1897). — France, very common (Locard 1892). — Portugal, abundant (Nobre 1905). — Mediterranean (Carus 1889). — Cape Verde Isles (Jeffreys 1865). — Azores (Dautzenberg 1889). — Tide mark, in deeper water dead shells.

Helcion pellucidum (LINNÉ 1758).

Pl. 1 figs. 27—32.

Habitat:

West coast of Sweden: Kullen (LILLJEBORG 1852[b]), many shs, max. l. 16; br. 12; h. 4.8 (Mus. U.); Skåne, off Hallands Väderö, NW. to N. of Torekov, 8 fms,

[1] Exceptional, 1 sp. from Väderöarna.

algæ, 2 sps, max. l. 13.8 (E. Lönnberg $^{16}/_{7}$ 1902). — Halland: Varberg, 1 sh., l. 13.7 (Torell). — Bohuslän, Gullmarn: Blåbergsholmen, Flatholmen, Strömmarna, Stångholmen and other localities (Théel 1907), 20—40 fms, Laminariæ, rather common, max. l. 17.8 (Strömmarna 1894); Kräftfjord, 15—30 fms, sand 1 sh., l. 8,5; Gullmarn, without definite locality, many shs, max. l. 20 (Fries & Lovén), Figs. 31, 32. — Väderöarna, 30 fms, sand, 4 sps, max. l. 11.2 (Gunhild Exp. $^{12}/_{7}$ 1877); D:o, sand, clay, 5 shs, max. l. 10.8 (A. Goës). — Sydkoster, 15—20 fms, rocks, 3 shs, max. l. 17.3 (Eisen & Stuxberg $^{6}/_{7}$ 1871); Kosterfjorden, 5—15 fms, rocks, 1 sp., l. 9 (Ljungman $^{28}/_{5}$ 1865); Koster, many sps, max. l. 17.4 (Fries & Lovén), Figs. 31—32.

Norway: Christianiafjorden (Asbjörnsen) 3 shs, max. l. 18.3 (Fig. 29). — Stolsfjord, Farsund, 47 fms, clay, 2 shs, l. 10.2 (Bovallius 1880), Fig. 28; max, l. 13 (Mus. U.). — Hitterö, 20—30 fms, shells, many shs, max. l. 13.9 (Öberg 1869). — Bodybet, 20 fms, 3 shs, max. l. 14.7 (v. Yhlen). — Grip (Lilljeborg) many sps, max. l. 15 (Mus. U.). — Bergen, 4 shs, max. l. 12 (M. Sars). — Hammarfest, 2 shs, max. l. 13.3 ($^{26}/_{6}$ 1840). — Finmark, many shs, max. l. 24.7 (Lovén), Fig. 27. — Norway, without definite locality, 8 shs, max. l. 14.9 (Düben, Marklin), Fig. 30.

Iceland (Odhner 1910): Reykiavik, l. 9.8.

Limits of formal variation:

	l.	6—7	8—9	11—12	14—15	17—18	19—20	max. 20 (Bohuslän)	24.7 (Finmark)
Scandinavia	br.	4—5.3	5.4—7,3	7 3—9.8	9.8—12.5	12—15	13.5—16.6	16.6	18.9
50 sps	h.	1—1.7	1.5—2.7	2.8—4	3.7—5.7	5—7	7—8.5	8.5	11
measured	apex	0	0—0.8	0.1—1.7	0.3—2.3	2.3—3.5	2—4	2.7	4

General Distribution:

Norway to Öxfjord (l. 18, G. O. Sars 1878), to Vardö (Schneider 1894, 1895), West coast (Friele 1874, Lilljeborg 1851); Christianiafjord (Asbjörnsen 1854). — Bohuslän, 6—20 fms, Laminariæ (Malm 1855); Väderösund (Lönnberg 1903); Kullen (Lovén 1846; Lilljeborg 1852[b]). — Denmark: W. of Jutland (Christensen 1907); Kattegatt to Hornbæk, Odense Fiord and Hellebæk (Mörch 1871; Petersen 1888). — Murman coast (Herzenstein 1893). — Iceland (Mörch 1869[a]; Verkrüzen 1872; Johansen 1902; Odhner 1910). — Faroes (Mörch 1868). — British Isles (Jeffreys 1865). — Dogger Bank (+var. *lævis*, Hargreaves 1910). — Heligoland, 2—10 fms (Metzger 1875). — Belgium, very rare (Maitland 1897. — France rather common (Locard 1892). — Spain to 20 fms (Jeffreys 1882). — Portugal, abundant (Nobre 1905). — Mediterranean (Carus 1889). — W. off Ireland, 90—370 fms; E. off Shetland 75 fms; N. off Scotland, 364—808 fms (Jeffreys 1882). — Mogador (Mc Andrew 1852). Depths to 808 fms. Algæ, rocks, sand etc.

Lepeta coeca (Müller 1776).

Pl. 2 figs. 2—17.

Habitat:

West coast of Sweden: Skåne: Helsingborg, 18—22 fms, clay with sand, 1 sh., l. 10, br. 7.7; h. 4.2 (Gunhild Exp. $^{17}/_{7}$ 1878); Öresund between Helsingborg and Landskrona, 2 shs, max. l. 8.6; SW. of Sofiero 1 sp., l. 7.2; br. 5.3; h. 2.3 (Lönnberg $^{26}/_{6}$ 1896); Knähak perch, 1 sh., l. 12.5 and N. of Pilhak perch, pebbles, shells, 1 sp., l. 4 + 1 sh., l. 9.4 (Mus. L.) — Bohuslän: Gullmarn, 5 sps + shs, max. l. 15.4 (Lovén); D:o, Skårberget, 1 sp., l. 10; br. 7.9; 3.7 (Lovén); D:o, Stångholmen, 2 sps, max. l. 10 (Aurivillius $^{11}/_{6}$ 1890); D:o, Flatholmsrännan, 60—80 m, 3 sps, max. l. 13.2; br. 10.4; h. 3.8 ($^{18}/_{8}$ 1911). — Väderöarna, many sps, max. l. 12.8 (Lovén), Fig. 3; D:o, 40—50 fms, corals, 1 sp., l. 9.8; br. 7.2; h. 3.2 ($^{25}/_{7}$ 1877); D:o, 60 fms, clay, many sps, max. l. 11.6. — Ramsö, 130 fms, clay, 1 sp., l. 8.1 ($^{2-3}/_{8}$ 1889). — Koster 1 sh., l. 11; br. 8.6; h. 3.5 (Lovén); Kostersten, 60—110 fms, many sps, max. l. 10.8 (Aurivillius $^{16}/_{7}$ 1895); Kosterrännan, 12 fms, clay, 2 sps, max. l. 9.5 ($^{19}/_{7}$ 1877). — Svinesund, 30—70 fms, mud with stones, 2 shs, max. l. 11.5 (J. Lindahl). — Skagerrack 150 fms, clay, 3 shs, max. l. 3.6 (J. Lindahl).

South and west coast of Norway: Christianiafjorden, 4 shs, max. l. 11.4 (Asbjörnsen), Fig. 2. — Utne, Hardangerfjord, 30—40 fms (Aurivillius) 1 sh., l. 13.5; br. 10.2; h. 4; apex 5 (Mus. U.); Sörfjorden, Hardanger, 45 fms, stones, many sps, max. l. 9 (Bovallius $^{16}/_{7}$ 1880). — Godö, 90 fms, clay, 3 shs. max. l. 8.3 (v. Yhlen). — Bergen, 5 shs, max. l. 12.8 (M. Sars), Fig. 4. — Molde and Kristiansund (Lilljeborg) many sps, max. l. 12.3 (Mus. U.). — Trondhjemsfjorden, 1 sp., l. 7.5 (Koren). — Norway, without definite locality, 2 sps, max. l. 7.8 (Düben).

Northern Norway: Grötsund, 70 fms, clay, stones, many shs, max. l. 7.9 (Goës & Malmgren 1861). — Ramfjord, 80 fms, clay, 3 shs, max. l. 5.5 (G. & M. 1861). Kjosen, 25—40 fms, clay, many shs, max. l. 14 (G. & M.). — Karlsö, N. of Tromsö, 2 shs, max. l. 7.3 (G. & M.). — Maskenæs and Gjesvær, 2 shs, max. l. 9.2 (Maskenæs). — Ulfsfjord, many sps. max. l. 9.7 (G. & M.), Fig. 5.

Murman coast: Teriberka, 31—33 fms, stones, shells, 2 shs, max. l. 9.1 (Herzenstein).

Kola Peninsula: Ora Guba, 90—100 fms, many sps, max. l. 13.5 (Sandeberg $^{3}/_{9}$ 1877).

Kara Sea (Leche 1878); max. l. 13.9 (Kostin sharr, Fig. 7).

Spitzbergen: Horn Sound, 40—60 fms, clay, 6 sps, max. l. 15.3 (Torell 1858), Fig. 12. — Horn Sound Islands, 30—40 fms, stones, clay, 2 shs, l. 13.5 ($^{30}/_{2}$ 1864). Bel Sound, 5—12 fms, stones, algæ, 3 shs, max. l. 10.8 (Torell 1858); D:o, Recherche Bay, close by Fox Glacier, 90 m, stones, 1 sp., l. 11 ($^{4}/_{7}$ 1898). — Ice Fiord, 15—70 fms, stones, 1 sp. + 1 sh., max. l. 16 (sh.), Fig. 10; (1861); D:o, Sassen Bay, 20 fms, clay, 1 sh., l. 17.4 (1861). — $^{1}/_{2}$ min. S. of Prince Charles Foreland, 78° 4′ N. 11°

37′ E., 240 m, bott. temp. + 3.15°, small stones with fine, soft, blackish gray clay, 3 sps + 2 shs, max. l. (sh.) 13.7 ($^{24}/_{8}$ 1898). — Kings Bay, 25—160 fms, clay with sand, many shs, max. l. 15.6; D:o, 200 fms, fine clay, 2 shs, smaller. — Cross Bay, 30—200 fms, clay, many shs, max. l. 14.4 (1861). — English Bay, 40—60 fms, clay, stones, many shs, max. l. 14.8 (1861). — Seven Ice Mountains, 30 fms, stones, 2 shs, max. l. 6.7 (Lovén). — 79° 47′ N. 11° 15′ E., 100 fms, many sps, max. l. sh. 16; l. sp. 12 ($^{18}/_{7}$ 1872). — Danes Gat, 7—10 fms, stones with algæ, 3 shs, max. l. 16.5 (1868). — 79° 58′ N., 9° 30′ E., 19—20 min. NW. off Danes Island, 435 m, bott. temp. + 1.5°, gray clay, stones, many sps, max. l. 11.1 ($^{27}/_{8}$ 1898). — Smeerenburg Bay, 70—26 fms, stones, clay, 1 sh., l. 13.5 ($^{21}/_{8}$ 1868); D:o, 90—110 fms, 13 shs, max. l. 16.2 (1868). — Red Bay, 30—40 fms, fine clay, many shs, max. l. 14 (1861). — Liefde Bay, 20—30 fms, stones, clay, 6 shs, max. l. 14.7 ($^{3}/_{9}$ 1868). — Off Grey Hook, 81 fms, clay, 5 shs, max. l. 10.8 ($^{2}/_{7}$ 1873). — Wijde Bay, 30—40 fms, fine clay, 3 shs, max. l. 13 (1861). — 79° 50′ N., 15° 45′ E., 100 fms, stones, clay, 2 shs, max. l. 12.2 ($^{16}/_{7}$ 1873). — Mossel Bay, 9—28 fms, stones, clay, Lithothamnium, 6 shs, max. l. 15.8 (1873), Fig. 11. — E. off Vertegen Hook, 40—50 fms, 3 shs, max. l. 6.3 ($^{6}/_{7}$ 1861); D:o, 100 fms, 2 shs, max. l. 10.3 ($^{3}/_{7}$ 1873), Fig. 9. — Treurenburg Bay, 5—20 fms, many shs, max. l. 14.5; D:o, 20—30 fms, 3 shs, smaller; D:o, 45 fms, clay, many shs, max. l. 16.5; D:o, 30—60 fms, fine clay, 1 sh., l. 15.3; D:o, 60 fms, clay with stones 3 shs, max. l. 15; D:o, 70 fms clay, stones, 3 shs, max. l. 12.6 (1861). — Lomme Bay, 25—40 fms, clay with stones, 10 shs, max. l. 16,2 ($^{9}/_{9}$ 1868), Fig. 8. — 80° 8′ N., 15° 24′ E., 16 fms, stones, 1 sh., l. 15.8 ($^{2}/_{7}$ 1873). — Hinlopen Strait, 10—30 fms, stones, clay, 1 sp. + shs, max. l. 15.9. — Shoal Point, 30 fms, clay, 1 sh., l. 12 (1861). — Off Hekla Cove, 10—14 fms, 1 sh., l. 14 ($^{5}/_{7}$ 1873). — Waygat Islands, 60—70 fms, clay, many shs, max. l. 15.3 (1861). — Between Waygat Islands and Lovéns Mount, 100 fms, fine clay, 1 sh., l. 13.8 (1861). — King Charles Land, Bremer Sound, 100—110 m, bott. temp. — 1.45°, fine clay with big stones, Biloculina sparse, many sps, max. l. 18.2 ($^{8}/_{8}$ 1898). — Mouth of Stor Fiord, 100—120 fms, clay with stones, 4 shs, max. l. 18.7 ($^{29}/_{7}$ 1868).

Iceland (Odhner 1910); Hofsos, l. 6.6. — Öfjord, l. 5.9. — Reykiavik, l. 5.6. — Berufjord, l. 9.4 (Fig. 6). — Arnanes, l. 16. — Iceland without definite locality, max. l. 9.7.

Greenland (Posselt & Jensen 1899); some measurements of maximal length: Julianehaab 7.6; Godthaab 11.5; Sukkertoppen 11; Egedesminde 12.7; Christianshaab 11.5; Claushavn 11.2; Godhavn 16.8 (Fig. 13); Ritenbenk 13.4; Umanak 11.3; Pröven 18.5 (Fig. 17); Upernivik 13; Arsukfjord 16.3 (Fig. 16); Kekertak 16.6 (Figs. 14—15); Off the SE. coast 18. — East Greenland (Hägg 1905), max. l. 14.4.

Newfoundland Bank, 45° 53′ N., 51° 56′ W., 50 fms, stones, shells, many sps, max. l. 8.1 (Ing. & Glad. Exp. $^{16}/_{8}$ 1871).

Limits of formal variation:

West coast of	l.	5—6	7—8	9—10	12—13	13—14	15—16	Max. 15.6 (Christianiafjord)
Scandinavia;	br.	3.7—4.5	4,9—6.1	6.4—8	8 8—10.3	9.5—11.1	11.4—12.3	12.1
40 sps	h.	1.9—2.3	2.2—3.2	3—4.2	3.5—5	3.8—5.9	4.4—6.6	4.7
measured	apex	1.9—2.3	2.1—3.2	2,8—4	4—5	4.3—5.3	5—6	5.8
	l.	5—6	7—8	9—10	12—13	13—14	Max. 14 (Kjosen)	
Finmark and	br.	3.7—4.5	4 9—6.1	6.5—8	8.7—10.5	9.4—11.2	10.8	
Kara Sea;	h.	2—3	2.5—3.6	3.4—4.7	4.2—5.8	4.3—5.8	4.4	
35 sps								
measured	apex	1.7—2.4	2.5—3.5	3.3—4,2	4.5	4.7—5.4	5.4	
	l.	6—7	7—8	9—10	12—13	13—14	16—17	18—19	Max. 18.7 (Stor Fiord)
Spitzbergen;	br.	4.4—5	5—6	6.3—7.8	8.5—10	9.3—11	11.7—13.2	13,2—14.2	14.1
60 sps	h.	2.3—3	2.5—3.5	3.3—4.3	4.3—5.9	4.5—7	6.2—8.1	8.3	8.3
measured	apex	1.6—2.6	2—3	2.9—3.9	3.4—5.3	3.6—5.8	5.5—7.1	8	8
	l.	5—6	7—8	9—10	Max. 9.7 (»Iceland»),				16 (Arnanes),
Iceland;	br.	3.7—4.8	5—6.2	6.9—7.8	7.8 shallow water				12.5 fish stomachs
25 sps	h.	1.8—2.8	2.9—3.7	3.6—4.6	4.7				6.5
measured	apex	1.7—2.4	2.1—3	2.8—3.6(4)	3.8				6
	l.	5—6	7—8	9—10	12—13	13—14	16—17	18—19	Max. 18.5 (Pröven)
Greenland;	br.	3.6—4.7	5—6.3	6.6—8	8—9.7	9.5—11	11.8—13.3	13.4—13.6	13.4
50 sps	h.	1.7—2.5	2.6—3.5	2.9—4.2	3,7—5.7	3.7—6	5.6—7.3	8—8.2	8
measured	apex	1.8—2 3	2.3—3.1	2.5—3.9	3.7—5	4—5.5	5—7	7	7

Variation of radula: I have found no essential difference in the radula of specimens from Spitzbergen with an elevated shell and more depressed ones from Bohuslän; but in the former the radula is of a stronger construction.

General Distribution:

Norway: Vadsö southwards, 10—100 fms (l. 14, G. O. Sars 1878; Friele 1874; Schneider 1881, 1885, 1891, 1894, Aurivillius 1886, Bidenkap 1897, Norman 1902, Nordgaard 1907). — Christianiafjord, 40—100 fms (Asbjörnsen 1854, Jeffreys 1870). — Väderöarna, 30—70 fms (Malm 1855); Göteborg Skärgård (Malm 1858); Kullen (Lilljeborg 1855), — Kattegatt—Hven, 15—30 fms (l. 12, Mörch 1871; Petersen 1888). — Öresund, 18—36 m (l. 11; Lönnberg 1898). — Iceland (Mörch 1869[a], Verkrüzen 1872). — Faroes (Mörch 1868). — NE. off Shetland, 204 m (Simpson 1910). — Shetland, 80—90 fms (Jeffreys 1865). — North Atlantic 56° 1′ N., 34° 42′ W., 690 fms (Jeffreys 1877). — Jan Mayen, 263 fms (Friele 1878). — Murman coast, White Sea, Nova Zembla, Kara Sea (Herzenstein 1893). — Barent Sea, 128—145 fms (D'Urban 1880), 80—240 m (Knipowitsch 1901[a]). — Spitzbergen (to 133 m, Knipowitsch 1901[b]; 1902; 12—95 fms, l. 16, Krause 1892; 20—125 fms, Friele 1879; Mörch 1869[c]). — Franz-Josef Land, 75 fms (Melvill & Standen 1900). — E. Greenland, 80—250 m, l. 14.3 (Hägg 1905). — W. Greenland, 15—410 fms (Posselt & Jensen 1899). — Jones Sound and North Devon, 6—60 m, l. 16 (Grieg 1909). — Parry Islands, 12—15 fms

(Sutherland 1852, Reeve 1855). — Grinnel Land (Smith 1877). — E. Canada, 20—50 fms (Whiteaves 1901). — New England, rare (Gould & Binney 1870). — Culebra Island, West Indies, 390 fms (Watson 1886). — Azores 1,287 m (Dautzenberg 1889). — Japan, 48 fms (Jeffreys 1876). — Amur (l. 8.5, Schrenk 1867). Depths 5 fms — 1,287 m. Clay, sand, stones.

Cryptobranchia alba Dall 1869.

Pl. 2 fig. 1.

Habitat:

Behring Sea, to 6 fms. l. 20 (Aurivillius 1887): Konyam Bay (Fig. 1) and St. Lawrence Island.

General Distribution:

Aleutian Islands; East Siberia; Behring Sea (Dall 1869, 1875; Krause 1885; Crosse 1877; Aurivillius 1887).

Pilidium fulvum (Müller 1776).

Pl. 2 figs. 18—23.

Habitat:

West coast of Sweden: Kattegatt, NW. of Nidingen, 50 m, rocks and clay, 1 sp., l. 6; br. 4; h. 2 ($^{25}/_{9}$ 1911); SW. of Nidingen, 40 m, clay, 1 sh, l. 7.5; br. 5.4; h. 2.2 ($^{23}/_{9}$ 1911). — Bohuslän, Gullmarn (Lovén), many sps, max. l. 7.7 (Figs. 18, 19, 22); Skår and other localities (Théel 1907). — Väderöarna, to 100 fms, many sps, max. l. 9.5 (Figs. 18, 19, 22); D:o, Lophohelia Reef, 1 sp., l. 6 ($^{13}/_{8}$ 1889); D:o, Stora Väderö, 1 sh., l. 8 (Olsson 1869). — Kostersten, Kosterfjorden, 2 sps, max. l. 6.6 ($^{3}/_{8}$ 1889); Kosterrännan, 12 fms, clay, 2 shs, max. l. 6.4 (Gunhild Exp. $^{18}/_{7}$ 1877). — Svinesund, 30—70 fms, mud with stones, 1 sh., l. 5.6 (Lindahl). — Bohuslän, without definite locality, many shs, max. l. 8.8 (B. Fries 1838).

Norway: Christianiafjorden, 2 shs, max. l. 9.8 (Asbjörnsen). — Hitterö, 20—30 fms, shells, 1 sh., l. 5.3 (Öberg 1869). — Utnefjord, Hardanger, 100 fms, sand, stones, many shs, max. l. 7.8 (Bovallius 1880), Fig. 21; D:o, 30—40 fms (Aurivillius) 1 sh., l. 7 (Mus. U.). — Bodybet, varying depths, sand, clay, 1 sh., l. 5.3 (v. Yhlen). — Storeggen, shingles, 1 sh., l. 9.4 (v. Yhlen). — Kristiansund (Lilljeborg) many sps, max. l. 8 (Mus. U.); Molde (Lilljeborg) 1 sh., l. 6.7 (Mus. U.). — Finmark, Tranö, 1 sh., l. 4.7 (Goës & Malmgren 1861); D:o, Grötsund, 70 fms, clay (G. & M.) 1 sh., l. 5.5; br, 4.1; h. 1.7; apex 0.8, orange-coloured, coarsely sculptured (Fig. 20), and

80—100 fms, 3 shs, max. l. 5.5; br. 4; h. 2.3; apex 0.7, grayish white, coarsely sculptured; var. *albula* (Fig. 23). — Norway, without definite locality, many shs, max. l. 9.3 (Düben).

Limits of formal variation:

Scandinavia; l.	3—4	4—5	5—6	6—7	7—8	8—9	9—10	max. 9.5 (Väderöarna)	9.8 Christia-
50 sps br.	(1.9)—2.9	2.4—3.9	3.1—4.7	4—5.4	5—6.4	5.7—7.4	6.6—(8.2)	7	7.5 niafjord
measured h.	(0.9)—1.8	1.3—2.4	1.5—2.4	1.7—2.7	1.9—3	2.4—3.3	2.4—(3.3)	2.7	2.3
apex	(0.7)—1	0.6—1.2	0.7—1.4	0.8—1.7	1.8—2	1.5—2.4	1.9—(2.7)	2.1	2

Numerals in a parenthesis are calculated.

Structural variation: radiating riblets are always present, though more or less conspicuous, especially prominent in specimens from Grötsund, Norway. — Colour variation: from light yellowish to reddish or brownish; specimens from Grötsund differ from the typ by their uniform white colour (var. *albula* Jeffreys, Fig. 23). — Specimens of unusual breadth are named by Jeffreys as var. *expansa* (Figs. 18, 19).

General Distribution:

Norway: Vadsö, southwards, 10—180 fms (Aurivillius 1888; l. 9, G. O. Sars 1878; Norman 1902; Krause 1887); Varangerfjord, 20—124 m (De Guerne 1886); western coast (Friele 1874; Metzger 1875, 0—35 fms; Nordgaard 1907). — Christianiafjord, 10—140 fms (Asbjörnsen 1854; Jeffreys 1870). — Bohuslän, 20—70 fms (Malm 1855); Göteborg Skärgård, 23 fms (Malm 1858); Kullen (Lilljeborg 1855). — Hellebæk, Denmark, 16 fms (Mörch 1871); Kattegatt (Petersen 1888). — North Sea and Fair Isle Bank, to 286 m (Simpson 1910 + var. *albula* and *expansa*). — N. of Hebrides, 170—189 fms (Jeffreys 1869); Western coasts of British Isles, 10—100 fms (Jeffreys 1865). — France, very rare (Locard 1892, 1899). — Azores, 1,000 fms (Watson 1886). Depths to 1,000 fms. Rocks, sand, clay.

Scissurella crispata Fleming 1832

(incl. var. **angulata** Lovén and var. **aspera** Philippi).

Pl. 2 figs. 26—27.

Habitat:

Bohuslän: Väderöarna, 60 fms, corals (Lovén) 2 shs, max. h. 1.8; aperture 1.3; br. 2.5; wh. 3 3/4; Svinesund, 30—70 fms, mud with stones (Lindahl) 1 sh., h. 3.5; aperture 2.4; br. 4.2, wh. 4 1/2; var. angulata. — Norway; Dröbak, 60 fms, clay, several shs (Lovén 1850), max. h. 4.2; aperture 2.7; br. 5; wh. 4 3/4 (Fig. 27); Grip (Lilljeborg) 1 fragm.; var. angulata; Bergen, 70 fms, sand (Lilljeborg) type and var. aspera; D:o, (M. Sars) 2 shs, h. 2.3; aperture 1.3; br. 2.7; wh. 4; Fig. 25, var. aspera; Finmark (Lovén) 2 shs, max. h. 1.8; aperture 1.3; br. 2.4 var. angulata (original). —

Norway—Beeren Island, 73° 3′ N., 18° 30′ E., 410 m, gray clay; bottom temp. + 2° ($^{4}/_{9}$ 1898) 2 shs, max. br. 2.8, Fig. 26, var. angulata. — Spitzbergen (var. angulata): King Charles Land, Bremer Sound, 100—110 m, fine clay mixed with big stones, bottom temp. — 1.45°, Biloculina sparse ($^{8}/_{8}$ 1898) 4 sps, max. br. 1.8; Charles XII Island, 80° 45′ N., 25° 20′ E., 60—70 m, rocks with Corallinæ ($^{20}/_{8}$ 1898) 2 sps, br. 1.2. — East Greenland: Franz-Josef Fiord, E. off Cape Weber, 72° 32′ N., 24° 35′ W., 100—110 m, mud with stones and gravel ($^{28}/_{8}$ 1899).

General Distribution:

Norway: Lofoten—Vadsö—Bergen, 40—300 fms (l. 4.3; br. 4.5, G. O. Sars 1878; Friele 1874; Schneider 1885); S. Varanger (Norman 1902); Bergen, type, and Finmark, var. *angulata* (Lovén 1846); Korsfjord, 135—217 fms (Metzger 1875), Christianiafjord 4—120 fms (Jeffreys 1870). — Kosterfjord, 100 fms (Malm 1874). — Murman coast (Herzenstein 1893). — Spitzbergen (Mörch 1869[c]). — Between Hebrides and Faroe Isles, 170—189 fms; W. and S. off Ireland, 164—725 fms (+ var. *aspera);* Shetland, 66 fms (var. *aspera* and *angulata;* Jeffreys 1883). — British Islands, N. and W. coasts (Jeffreys 1865). — France, 60—2,020 m (Locard 1899). — Gulf of Gascogne, 322—1,094 m; Mediterranean, 160—597 m; Off Cape Finisterre, 2,018 m (Locard 1898). — Off Portugal, 220—994 fms (Jeffreys 1883; Nobre 1905). — Mediterranean (Carus 1889). — Off Morocco (Jeffreys 1883). — Azores 1,022—1,919 m (Locard 1898). — E. Canada 4—790 fms (Whiteaves 1901). — New England, 238—365 fms (Verrill 1883, 1885). — Culebra Island, West Indies, 390 fms; between Marion and Prince Edward Island, 140 fms (Watson 1886). Depths 4 fms—2,020 m. Clay, stones.

Glyphis græca (Linné 1758).

Distribution: Faroe Islands (Jeffreys 1869, Mörch 1869[b]) 1,006 m (Lighting & Porcupine); S. and. W. coast of England and Scotland to Shetland; Ireland (Jeffreys 1865). — France (Locard 1892). — Mediterranean to Aegean (Carus 1889). — Cape St. Vincent, 106 m; Madeira (Locard 1898). — Canaries (Jeffreys 1865).

Puncturella noachina (Linné 1771).

Pl. 2 figs. 28—41.

Habitat:

West coast of Sweden: Kattegatt, SW. of Nidingen, 40 m, clay, 1 sh., l. 9; br. 6.2; h. 5.3 ($^{23}/_{9}$ 1911). — Gullmarn, Skår, several shs, max. l. 15; br. 11.2; h. 7.5, Fig. 28; and sps, max. l. 13.5; br. 9.8, h. 6.5, Fig. 29; Saltkällefjorden (Aurivillius 1894), 20—35 fms, 3 sps + 1 sh., max. l. 11; br. 8.3; h. 6.4. — Väderöarna, 60 fms, corals, several sps, max. l. 12.8; br. 9.9; h. 6.5, Fig. 30. — Koster, 95 fms, clay, many shs; D:o, Kosterrännan, 12—25 fms, clay (Aurivillius $^{16}/_{7}$ 1895), many sps,

max. l. 7.6; br. 5.8; h. 4.1; 1 mile W. of Koster, 20 fms, rocks (Ljungman $^{18}/_{7}$ 1865), 1 sp., l. 7.6; Sneholmen, Kosterfjorden, 60—120 fms (Aurivillius 1895), 2 sps, max. l. 6.5. — Ramsö, 130 fms, clay ($^{3}/_{8}$ 1889) 1 sp., l. 7.5. — Svinesund, 30—70 fms, mud with stones (Lindahl) a few sps, max. l. 8.5; br. 6.2; h. 4.5.

Norway: Dröbak, 60 fms, clay, several sps, max. l. 17. — Christianiafjorden (Asbjörnsen) 4 sps, max. l. 13.8; br. 10; h. 6. — Hitterö, 20—30 fms, shells (Öberg 1869) many sps, max. l. 10.2. — Christiansand, 50 fms (Lindahl) 1 sh., l. 9. — Farsund, 2 shs, l. 10.2; br. 7.4; h. 6.1; l. 10.1; br. 7.5; h. 4.5 (Mus. U.). — Sörfjorden, Hardanger, 45 fms, stones (Bovallius $^{16}/_{7}$ 1880) 1 sp. — Utnefjord (Bovallius) 1 sp. l. 6. — Färnefjord, 100 fms, stones (v. Yhlen) 1 sp., l. 8.6. — Storeggen, 120 fms, stones (v. Yhlen) 3 sps, max. l. 6.2; br. 4.3; h. 3.8. — Giskö, 40 fms, sand (v. Yhlen), 1 sp., l. 6. — Bergen, many shs, max. l. 10.5, Fig. 31. — N. W. of Bergen, 90—150 fms, 1 sp., l. 9.7, Fig. 38. — Grip and Christiansund (Lilljeborg) several sps, max. l. 9.2 (Mus. U.). — Finmark: Karlsö and Karlsösund, 15 fms, stones, corals (Malmgren 1861) 3 shs, max. l. 6.6; D:o, N. of Tromsö, 50 fms (1861) 3 shs, max. l. 5.7; br. 4; h. 4; D:o, Ulfsfjord, 25—50 fms ($^{12}/_{10}$ 1861) 2 shs, max. l. 8.2; D:o Grötsund, 80—100 fms, clay, many shs, max. l. 9.2; br. 6.3; h. 6.5, Fig. 39; D:o, Kjosen, 25—40 fms, clay, many shs, max. l. 7.5; br. 5.3; h. 4.8; D:o, Ramsfjord, 9—13 fms, 1 sh., l. 5—6; D:o, Peisen (Nylander & Gadd) 1 sh. — Varangerfjord (N. & G.) 1 sh., l. 4.7. — Finmark (Sparre Schneider) 6 sps, max. l. 7.6, Fig. 33.

Murman Coast and Kola Peninsula: Schalin Island, 3—$5^{1}/_{2}$ fms, mud (Herzenstein 1887), 1 sh., l. 5.4; br. 3.7; h. 3.7. — Waideguba (Sandeberg $^{8}/_{8}$ 1877) 1 sh., l. 5.2.

Kara Sea (Leche 1878) Measurements: Kostin sharr, max. l. 5.3; br. 3.5; h. 4. — Matotschkin sharr, max. l. 9.4; br. 6.5; h. 6.2. — Gostinoj, max. l. 10; br. 7.5; h. 6.7.

Spitzbergen: without definite locality (Torell), 2 sps, max. l. 11; br. 8.7; d. 8, Fig. 37. — Horn Sound, 40—60 fms, clay, stones (1861) many sps, max. l. 8; br. 6; h. 5.1. — Bel Sound, 12—70 fms, stones, many sps, max. l. 9.4; br. 6.9; h. 6.8, Fig. 34. — Ice Fiord, 15—70 fms (1861), 2 shs, max. l. 9,5; D:o, Green Bay, 40—45 fms, clay ($^{11}/_{8}$ 1868) 2 sps, max. l. 10.3. — Seven Ice Mountains, 30 fms, stones (Torell) 2 shs, l. 8; br. 6.1; h. 5.1. — Cross Bay, 30—60 fms, stones, clay (1861) 1 sp., l. 8.5. — Kings Bay, 1 sh., l. 7.2. — Amsterdam Island, 25 fms, sand (1861) 1 sp., l. 7.4. — Hackluyts Headland, 18—20 fms (1861), 1 sp., l. 6.5. — Red Bay, 30—40 fms, clay, 6 sps, max. l. 8.3. — Treurenburg Bay, 12—20 fms, clay, mixed with sand ($^{17}/_{6}$ 1861) 3 sps, max. l. 7.6; br. 5.2; h. 4.6. — Mossel Bay, 9—15 fms, sand, Lithothamnion, 6 sps + 2 shs, max. l. 7.2. — Liefde Bay, 20—30 fms, clay with stones ($^{3}/_{8}$ 1868), 2 shs, l. 5.2. — Norwegian Islands, 15—25 fms, stones ($^{14}/_{7}$ 1872), 3 shs, max. l. 8. — Cloven Cliff, 20—30 fms, stones (1861) 2 sps, max. l. 8; br. 6; h. 6.3, Fig. 35. — Off Vertegen Hook, 100 fms ($^{3}/_{7}$ 1873), 1 sp., l. 7.7; E. of the same locality, 40—50 fms, stones (1861), 2 sps, max. l. 8.6. — Lomme Bay, 25—40 fms, clay, stones ($^{10}/_{9}$ 1868), 2 shs, max. l. 6.6. — Brandywine Bay, 10—15 fms, clay, stones ($^{5}/_{9}$ 1868) many sps, max. l. 6.5; br. 4.6; h. 4.4. — Parry's Island, 25—30 fms, stones, gravel ($^{8}/_{9}$ 1868), 2 sps, max. l. 8.2; br. 5.3; h. 4.8. — 80° 11′ N., 16° 10′ E., 115 fms, clay, stones ($^{7}/_{7}$ 1873), 3 sps, max. l. 10.3; br. 7.4; h. 7.5. —

80° N., 13° 30′ E., 20 fms ($^{1}/_{6}$ 1861), 2 sps, max. l. 4.9. — Lovéns Mount, 36 fms, clay, stones ($^{11}/_{9}$ 1868), 3 shs, max. l. 7.5. — Waygat Islands, 60—70 fms, clay ($^{8}/_{8}$ 1861) 4 sps, max. l. 9.4. — Hinlopen Strait, 10—25 fms, stones, clay (1861), 1 sp., l. 7.5. — Thuym Point, 36 fms, rocks ($^{6}/_{7}$ 1873), 1 sp., l. 4.1. — 72° 10′ N., 20° 37′ E., 200—230 fms, clay ($^{21}/_{7}$ 1868), 2 shs, max. l. 7.6. — 71° 5′ N. 20°, E., 125 fms, gravel mixed with clay ($^{20}/_{7}$ 1868), 2 shs, max. l. 6.4.

Iceland (Odhner 1910); maximal measurements: Berufjord, l. 6.7; br. 4.8; h. 4, Fig. 32. — Thistilfjord, l. 7.3; br. 5.5; h. 4.5.

East Greenland (Hägg 1905), 300 m, l. 11 (Mus. U.).

West Greenland (Posselt & Jensén 1898); maximal measurements: Pröven, l. 8.4; br. 6.3; h. 5.2, Fig. 41. — Sukkertoppen, l. 8.4; br. 6.3; h. 5.2. — Godthaab, l. 8; br. 5.5; h. 5. — Omenak, l. 9; br. 6.5; h. 5, Fig. 40. — Ikamiut, l. 9; br. 6.4; h. 5.2, Fig. 36.

Bank of Newfoundland, 45° 53′ N., 51° 56′ W., 50 fms, shingles, shells (Ing. & Glad. Exp. 1871), 2 sps, max. l. 7; br. 5; h. 4.8.

Limits of formal variation:

Scandinavia,	l.	4—5	6—7	7—8	8—9	10—11	13—14	max. 15 (Skår)
S. and W. coast;	br.	2.5—3.9	4.2—5.3	4.7—6	5.3—6.8	7—8.5	9.1—10.7	11.2
60 shs	h.	2.2—3.7	2.8—5.1	3—6	3.4—6	4.4—6.2	5.1—7.1	7.5
measured	apex[1]	0.8—1,7	1.5—3.3	2—3.5	2.3—3.9	4—5.2	5.6—7	7
	l.	4—5	6—7	8—9	max. 9.2 (Grötsund)			
Finmark;	br.	2.5—3.8	4—5.7	5.7—6.3	6.3			
50 shs	h.	2.3—3.4	3.2—5	5.2—6.6	6.5			
measured	apex	0.5—1.4	1.1—2.4	2—3.2	3.2			
	l.	4—5	6—7	8—9	10—11	max. 11 (Spitzbergen without loc.)		
Spitzbergen;	br.	2.6—4	4.3—5.3	5.2—7	6.8—8.7	8.7		
45 shs	h.	2.2—3.5	3.3—4.6	4.7—6.9	6.6—8	8		
measured	apex	0.8—1.6	1.3—2.5	1.7—3.7	3—5	5		
	l.	3—4	4—5	6—7	max. 7.3 (Thistilfjord)			
Iceland;	br.	2—3	2.8—3.9	4.3—5,3	5.5			
25 shs	h.	1.8—2.5	2—3.3	3.8—4.5	4.5			
measured	apex	0.5—1.1	0.6—1.3	1.5—2.5	3			
	l.	4—5	6—7	8—9	max. 9 (Omenak)			
West Greenland;	br.	2.8—3.8	4—5.3	5.5—6.5	6.5			
30 shs	h.	2—3.5	3.4—4.8	4.5—6	5			
measured	apex	0.7—1.2	1—2.2	1.7—3	2.8			

The variation of this species on the coast of southern Scandinavia is considerably different from that of Arctic districts. The height is comparatively speaking lower than elsewhere; this fact is obvious from the curves on pag. 7. In younger specimens this character is less strikingly developed than in older ones. A comparison between the larger specimens of Spitzbergen and those of Scandinavia proves that

[1] Perpendicularly from posterior margin.

the growth proceeds in different ways: in Spitzbergen the proportions of the shell are not subject to any great change, but in southern waters the height increases in irregular proportion to the length and breadth; thus the large specimens here are always more depressed, while in Arctic districts they are more elevated. Besides this, the southern specimens attain a greater length than the Arctic ones, so that the maximum size of the species is to be found in the boreal region. Specimens from Finmark show a perfect agreement with the elevated arctic forms. The last-named gives evidence of a striking uniformity of variation in the different districts.

General Distribution:

Norway: Finmark southwards, 10—250 fms (l. 9, G. O. Sars 1878; Friele 1874; Schneider 1881; 1885, l. 9.5; 1895; Aurivillius 1886; Norman 1902; Nordgaard 1907; Lilljeborg 1851; Metzger 1875). — Christianiafjord, 10—60 fms (Asbjörnsen 1854; Jeffreys 1870). — Väderöarna, 60—120 fms (Malm 1855); Bohuslän to Finmark (Lovén 1846). — E. Kattegatt, 15—40 fms (Petersen 1888). Iceland (Mörch 1869[a]; Verkrüzen 1872). — Faroes (Mörch 1868). — N. of Hebrides, 570 fms (Jeffreys 1883[b]). — British Islands (Jeffreys 1865). — Dogger Bank, 30 fms (Hargreaves 1910). — North Sea, coast of Holland—Belgium (Maitland 1897). — France, 585 to 2020 m (Locard 1899; Reynell 1909). — Cape Finisterre, 2018 m (Locard 1898). — Off Portugal, 292—1095 fms (Jeffreys 1882; Nobre 1905). — Jan Mayen, 263 fms (Friele 1878). — Murman Coast, White Sea, Nova Zembla (Herzenstein 1893). — Murman Coast, l. 10.4; h. 7.3 (Pfeffer 1890). — Kara Sea, 4—20 fms (l. 9.5, Leche 1878). — Spitzbergen, 146—410 fms (Friele 1879; Mörch 1869; Knipowitsch 1901). — Franz-Josef Land, 53—93 fms (Melvill & Standen 1900). — E. Greenland (Hägg 1905). — W. Greenland, 4—100 fms (Posselt & Jensen 1899). — Jones Sound, 69 m, l. 7 (Grieg 1909). — Wellington Channel (Reeve 1855; Cemoria cognata). — E. Canada, 10—50 fms (Whiteaves 1901). — New England to Cape Cod, l. 5 (Gould & Binney 1870); 16—640 fms (Verrill 1885). — Behring Sea (Krause 1885). — Ochotchian Sea and Japan (Jeffreys 1876). — Vancouver, Puget Sound; Oregon, var. *galeata* (Carpenter 1857, 1864). — Marion and Prince Edward Island, 60—310 fms (var. *princeps*); Magellan Sound (var. *galeata*: Watson 1886). — Patagonia (Strebel 1907). — Falkland Island, 4—30 fms (Strebel 1907, 1908). Depths to 1095 fms. Clay.

Fissurisepta granulosa Jeffreys 1882.

Distribution: Norway: Dröbak, 50 fms (Jeffreys 1870) 3 shs. — Off Portugal, 292 fms (Jeffreys 1882; Nobre 1905).

Emarginula fissura (Linné 1758).

(= E. reticulata Sowerby 1813.)

Pl. 2 figs. 42—45.

Habitat:

West coast of Sweden: Kullen (Lilljeborg 1852) 1 sh., l. 10.2; br. 8; h. 5.2 (Mus. U.). — Bohuslän (Lovén) several shs, max. l. 13; br. 10.4; h. 8.5; Skår, Gull-

marn (Lovén) several sps, max. l. 13.8; br. 10.5; h. 9.6, Fig. 45. — Väderöarna, 60 fms, clay (Gunh. Exp. 13/7 1877) 4 shs, max. l. 8; D:o (A. Goës 1861) many sps, max. l. 16; br. 12; h. 9; D:o, 40—50 fms, corals (Gunh. Exp. 25/7 1877) 2 sps, max. l. 9.5. — Kosterfjorden, shells, algæ (Malmgren) 2 sps, max. l. 9; Koster, many shs, max. l. 11.6; br. 10.2; h. 8; Sneholmen, Kosterfjorden, 60—120 fms (Aurivillius 1895) 1 sp., l. 6. — Ramsö, 10—55 fms, sand mixed with clay (Eisen & Stuxberg 12/7 1871) 7 shs, max. l. 11.2. — Svinesund, 30—70 fms, mud with stones (Lindahl) 3 shs, max. l. 7.6.

Norway: Christianiafjorden (Asbjörnsen) 5 shs, max. l. 13.7; br. 10; h. 8.5; another specimen, var. incurva (with concave inferior margin) l. 6.8; br. 5.2; h. 5.6. — Dröbak 60 fms, clay (Lovén) many sps, max. l. 13.1 and 7.3; D:o, 5—6 fms (Lovén) 1 sp. juv. — Christiansand, 50 fms, shells (Lindahl) 1 sp., l. 8. — Hitterö, 20—30 fms, shells (Öberg 1869), many sps, max. l. 10.6. — Rondö, 60 fms, clay (v. Yhlen) 1 sp., l. 10.4; br. 7.1; h. 6. — Farsund, many shs, max. l. 15.2; br. 12; h. 8.5 (Mus. U.). — Utnefjord, Hardanger, 110 fms, sand (Bovallius 1880) 2 sps, max. l. 11.6. — Storeggen, 150 fms, Oculina (7/9 1862) 1 sp., l. 6 (Mus. G.) — Bergen, 3 shs, (Lilljeborg) max. l. 7.5 (Mus. U.); D:o (M. Sars) many shs, max. l. 13.7, Fig. 44; D:o, 100—160 fms (Johansson 1877) 1 sp., l. 8.9. — Grip (Lilljeborg) 2 shs, max. l. 8.2 (Mus. U.). — Finmark (Lovén) 2 shs, max. l. 8.2; br. 6; h. 4.5, Fig. 43; the other sp., l. 6.8; br. 4.9; h. 4.4, Fig. 32. — Grötsund (1861) 1 sh., l. 8; br. 6.3; h. 3.8.

? Spitzbergen: Bel Sound, 35—40 fms, stones with Zoophytes (Torell) 1 sh., l. 9.6; br. 7.3; h. 5.8. Locality probably mistaken.

Limits of formal variation (Scandinavian coasts):

		l.	4—5	6—7	8—9	10—11	12—13	max. 16 (Väderöarna)
55 sps		br.	2.8—4	4—5.5	5.7—7	7—8.7	8.2—10.5	12
measured		h.	2.3—3.8	3.2—5.7	3.7—6.2	4.6—6.9	5.4—8.4	9
		apex [1]	0.5—1.3	0—2.1	0.6—3.7	2.3—4.5	3—5.2	5.2

This species varies greatly in form, from a depressed (var. *subdepressa* Jeffreys 1865) to a much elevated (var. *elata* Jeffreys 1865) shape. The position of the apex is usually dependent upon height, so that in higher specimens it is very near to and sometimes almost vertically bent over the posterior margin (var. *incurva* Jeffreys 1865).

General Distribution:

Norway: Hammerfest, southwards, to 100 fms (l. 14, G. O. Sars 1878; Krause 1887; Friele 1874; Metzger 1875; Lilljeborg 1851; Nordgaard 1907). — Christianiafjord, 20—60 fms (Asbjörnsen 1854; Jeffreys 1870, incl. var. *incurva*). — Bohuslän, to 80 fms (Malm 1855; Lovén 1846); Göteborg Skärgård (Malm 1858); Kullen (Lilljeborg 1852). — Kattegatt, Aalbæk, 40 fms, dead shs (Mörch 1871); Hellebæk, 14 fms, 1 sp.

[1] Perpendicularly from posterior margin.

(Petersen 1888). — Faroes (Mörch 1868). — N. of Scotland, W. of Faroe Isles, 251—539 fms (Jeffreys 1882). — British Islands (Jeffreys 1865). — Dogger Bank (Hargreaves 1910). — W. of Ireland, 90—808 fms (Jeffreys 1882). — North Sea coast of Holland—Belgium (Maitland 1897). — France, to 2020 m (Locard 1899; Reynell 1909). — Spain, Vigo Bay; S. of Portugal. var. *elata* (Jeffreys 1882). — Portugal (Nobre 1905). — Mediterranean (Carus 1889). — Canaries? (Mc Andrew 1852). Depths 20 fms to 2020 m. Sand, clay, shells, algæ.

Emarginula crassa Sowerby 1813.

Pl. 2 figs. 46—50; Pl. 3 figs. 1—2.

Habitat:

West coast of Sweden: Kattegatt, S. W. of Nidingen, 40 m, clay, 1 sh., l. 24.5; br. 18; h. 10 ($^{23}/_{9}$ 1911). — Bohuslän: Gullmarn, 50—70 fms, clay (Lindahl) 1 sh., l. 12; D:o, many localities, Figs. 46—48, 1—2; Flatholmen and Humlesäcken (1909) a few sps; N. point of Flatholmen ($^{27}/_{7}$ 1908) 1 sp., l. 35; br. 27; h. 17; Skårberget, 60—70 fms, clay (Théel 1887) 1 sp., l. 20; D:o, 60 fms (Lovén 1852) several sps, max. l. 36.5; br. 27; h. 17. — Väderöarna, 60 fms, corals, many shs, max. l. 29.5; br. 22.5; h. 12 and l. 29.5; br. 22; h. 14; 2 sps, l. 14; br. 10.6; h. 7. — Koster, Styrsö ($^{10}/_{8}$ 1886) many sps, max. l. 29; br. 22.5; h. 15.5; Sydkoster, 5—20 fms (Eisen & Stuxberg 1871) 2 shs, l. 18; 1 mile W. of Koster, 20 fms, rocks (Ljungman $^{18}/_{7}$ 1865) 1 sp., l. 25; E. of Stora Sneholmen, Kosterfjorden, 50—150 m, rocks, mud (I. Arwidsson $^{22}/_{8}$ 1901); D:o, 60—120 fms (Aurivillius 1895) many sps, max. l. 37; br. 29; h. 17.

Norway: Christianiafjorden (Asbjörnsen) 2 shs, max. l. 19; br. 13.5; h. 5.5. — Dröbakegrund, 5—8 fms, corals, many shs, max. l. 17. — Hardanger (Juel 1878) 1 sp., l. 11. — Bergen (Düben & Koren) 1 sh., l. 23.5, Fig. 50. — Grötsund, Finmark, 100 fms (1861) 2 shs, max. l. 18.1; br. 13.6; h. 8.2, Fig. 48; and l. 16.7; br. 12; h. 7.5, Fig. 49.

? Spitzbergen: Norwegian Islands, 18—25 fms, hard bottom (Sp. Exp. $^{19}/_{8}$ 1872) 1 sh. (of a fresh appearance) l. 14.8; br. 11; h. 6. Locality probable confused.

Limits of formal variation:

50 sps							
l.	18—20	22—24	26—28	30—32	34—36	max. 37 (Kosterfjorden)
measured br.	12.5—15,7	16—19	19—23	21.5—25.5	24.5—28	29
h.	5.5—10	7—12.5	9.5—14.5	11—18.4	11.5—20	17
apex[1]	3—6.8	4.5—8	5—10.2	6.5—14	11—16	13

Two extreme formal varieties of Emarginula crassa are common, one depressed and one elevated form, connected by intermediate stages (cfr Pl. 2 and 3).

[1] Perpendicularly from posterior margin.

General Distribution:

Norway: Lofoten southwards, 10—300 fms (l. 30, G. O. Sars 1878; Friele 1874). — Christianiafjord, rare, 10—100 fms (Asbjörnsen 1854; Jeffreys 1870). — Bohuslän to Bergen (Lovén 1846); Bohuslän, 15—30 fms (Malm 1855). — British Islands (Jeffreys 1865). — W. off Ireland, and St. 89 (Norway ?, Porcupine Exp. 1869, Jeffreys 1882). — France, 400—500 m (l. 32; Locard 1899). Depths 5—300 fms. Rocks, clay, corals.

Propilidium ancyloide (Forbes 1840).

Pl. 2 fig. 24.

Habitat:

Bohuslän: Gullmarn, 2 shs, max. l. 4.3; br. 3; h. 2 (Malm); D:o, 2 shs, max. l. 3.1; br. 2.2; h. 1.3 (Lovén). — Väderöarna, 1 sh., l. 4.5, br. 3.2; apex[1] 2 (Lovén), Fig. 24.

Norway: Bergen (Lilljeborg) 1 sh., l. 3.7; br. 2.6; h. 1.6 (Mus. U.).

General Distribution:

Norway, Lofoten 300 fms, 1 sh., l. 3; west coast, shs (G. O. Sars 1878). — Christianiafjord, 40—60 fms, dead shell (Jeffreys 1870). — Bohuslän: N. Flatholmsrännan, 12 fms, not rare (Malm 1863). — Wyville Thomson ridge, 189 fms; S. and W. off Ireland. 90—1360 m (Jeffreys 1882). — N. Atlantic 56° 11′ N., 37° 41′ W., 1450 fms (Jeffreys 1877). — S. of Cape Mondego, Portugal, 740—1095 fms (Jeffreys 1882; Nobre 1905). — Mediterranean (Carus 1889); off Marseille, 600 m (Locard 1899). — Canaries, 1 dead sh., 1975 m (Locard 1898). Depths 12—1450 fms. Clay, shells.

Gibbula cineraria (Linné 1758).

Pl. 3 figs. 4—7.

Habitat:

West coast of Sweden: Kullen (Lilljeborg 1852[b]), 9 shs and sps, the largest dead; max. h. 15; d. 13.7 (Mus. U.). — Skåne, Hittarp, E. N. E. of Hittarp Reef (Lönnberg $^{26}/_{6}$ 1896) 1 sh., h. 11.5; ap. 5; d. 12; Hallands Väderö to Höghalla udde, 8 fms algæ (Lönnberg $^{16}/_{7}$ 1902) 2 sps, max. h. 9.3; Off Sandhamn, N. E. side of Hallands Väderö (Lönnberg $^{2}/_{7}$ 1902) 2 sps, h. 9.7; d. 11.3; wh. 6 $^{1}/_{2}$. — Kattegatt, between Anholt and Læso (v. Yhlen 1872) 2 sps; max. h. 11 (Mus. G.); Kungsbackafjorden 15—20 m ($^{19}/_{9}$ 1911) 1 sp., h. 11, d. 12.4; N. W of Nidingen, 50 m, rocks and clay ($^{25}/_{9}$ 1911) 1 sp., h. 10; d. 10.2; Lilla Middelgrund, 10 fms, sand, stones

[1] Perpendicularly from posterior margin.

Gunhild Exp. $^{12}/_{7}$ 1878) 4 sps, max. h. 8.1; ap. 4; d. 9.3; whorls 6. — Göteborg Skärgård: Svartskär—Vinga, 26 m (Lagerberg $^{31}/_{7}$ 1906) 1 sp.; D:o, Tistlarne, 26 m, and Buskär, 26—53 m (Mus. G.). — Bohuslän, numerous shs (1838) max. h. 13; ap. 7; d. 15.2; whorls 6 + (Figs. 5 and 7); Marstrand, N. Nordholmen—Långdalsudden, 20—38 m (Lagerberg $^{19}/_{7}$ 1906) 1 sp.; D:o, N. Åstol—Dyrön, 18—36 m (Lagerberg $^{23}/_{7}$ 1906) 2 sps; Gullmarn, off Långegap, 30 m, clay and dead Zostera ($^{26}/_{7}$ 1907), 1 sp., overgrown by algæ; h. 12; ap. 4.6; d. 11.2; Kristineberg, many localities (Théel 1907); Skatholmen, 5—6 m, stones, gravel, algæ ($^{26}/_{6}$ 1903), many sps, max. h. 9.7; ap. 4.2; d. 10; Delsboudd, 18—35 fms and Alsbäck, 70 fms (Mus. G.). — Väderöarna, numerous sps, max. h. 12.8; ap. 5.6; d. 12.5; D:o, 60 fms, corals, many shs, max. h. 13.7; ap. 6.4; d. 13.5; wh. 7; St. Väderö, 10—90 fms (Olsson $^{26}/_{6}$ 1869), many sps. — Lindö (Olsson 1869) 1 sh. — Dyngö, 15 fms, clay, 1 sp., h. 10. — Ramsö, 10—25 fms, clay mixed with sand (Eisen & Stuxberg 1871) 1 sh. — Sydkoster, 5—20 fms, rocks (E. & S.) many sps, max. h. 12.8; W. of Sydkoster, 2—6 fms (Ljungman $^{18}/_{7}$ 1865) many sps, max. h. 12; Nordkoster, inside the islands, 2—6 fms, clay, sand (L. $^{27}/_{7}$ 1865) many shs; Kosterfjorden, 18 fms, clay (L. $^{13}/_{7}$ 1865) many sps, max. h. 15.4; ap. 6.5; d. 14; wh. 7; D:o, 5—15 fms, rocks (L. $^{28}/_{5}$ 1865) many shs. — Kilsund, Skagerrack, 40 fms, shells (Gunhild Exp. $^{4}/_{7}$ 1877) 1 sh., d. 9. — Strömstadsfjärden, 8—15 fms (Hanson $^{3}/_{8}$ 1881) 1 sp.

Norway: Christianiafjorden (Asbjörnsen) many sps, max. h. 13; ap. 5.6; d. 12.8; transition form to G. tumida: h. 11; ap. 5; d. 13. — Dröbak. 5—8 fms, corals, 7 sps, max. h. 10.8; ap. 5.1; d. 11.1; wh. 6. — Hitterö, 20—30 fms (Öberg 1869) a few sps, max. h. 6.3; ap. 3.6; d. 9; wh. 5 $^{1}/_{2}$. — Stavanger (v. Friesen) many shs, max. h. 12; ap. 6; d. 13.2; wh. 6. — Flekkefjord, 15—20 fms (Öberg 1869) 3 sps. — Haugesund, 32 fms (Bovallius) many sps, max. h. 12.5; d. 14.5; wh. 6. — Farsund, many sps, max. h. 8.7 (Mus. U.). — Gravenfjord, 150 fms, shells (Bovallius 1880) 1 sp., h. 5.5. — Bergen, many sps, max. h. 13.6; ap. 6.2; d. 15.1; wh. 6 $^{1}/_{2}$, Fig. 4. — Bodybet, 2 shs, max. d. 5.6. — Finmark: Ulfsfjord, 2 shs, max. h. 9; d. 11; wh. 6 $^{1}/_{4}$. — Karlsösund, 15 fms, stones, corals (1861) 5 shs, max. h. 11.7; d. 13.7; wh. 7, Fig. 4. — Tromsö (Lilljeborg 1848) 7 sps, max. h. 15.2; d. 14.7 (Mus. U.). — Finmark (Lovén) many shs, max. h. 19.4; ap. 8.8; d. 19, Fig. 6.

Shetland: Baltasound on stones at the shore (Hammarsten 1909) many sps, max. h. 15; ap. 7.5; d. 17.4; wh. 6 $^{1}/_{2}$; shells unusually solid.

Limits of formal variation:

Scandinavia; Height of shell	4—5	6—7	8—9	10—11	12—13	14—15	18—19	max. 19.4 (Finmark)
100 sps Height of aperture	2.3—3.2	3—4.2	3.8—5.4	4.6—5.9	5—7	5.7—7.6	7.5—8.8	8.8
measured Diameter of shell	5.3—7.5	4—10.2	9.3—12	10.6—13.6	11.3—15.2	13.2—17.6	17.2—19	19
Whorls	5	5—5 $^{1}/_{2}$	6	6—6 $^{1}/_{2}$	6—7	> 6 $^{1}/_{2}$		

The variation is considerable as well on the Swedish as on the Norwegian coast; the breadth of variation is similar in both districts. Specimens from Finmark, collected by Lovén, show the maximal dimensions; such are, however, usually smaller than southern forms of the same number of whorls.

General Distribution:

Norway: Nordkap, southwards, to 60 fms (d. 12, G. O. Sars 1878; Friele 1874; Schneider 1885, 1891; Aurivillius 1886; Lilljeborg 1851); Vardö (Schneider 1894; Norman 1902). — Christianiafjord, 10—60 fms (Asbjörnsen 1854; Jeffreys 1870). — Bohuslän, 3—20 fms (Malm 1855); Göteborg Skärgård (Malm 1858); Hallands Väderö 11—15 m (Lönnberg 1903); Kullen (Lilljeborg 1852[b]; Lovén 1846). — Denmark: W. coast of Jutland (Christensen 1907); Kattegatt to Hven and St. Belt, 40 fms (Mörch 1871; Petersen 1888). — Öresund, to S. of Hven, 16—20 m (h. 15; Lönnberg 1898). — Iceland and Faroes (Jeffreys 1883). — N. of Hebrides, 189 fms (Jeffreys 1869). — British Islands (Jeffreys 1865). — Dogger Bank (+ var. *electissima;* Hargreaves 1910). — North Sea coast of Holland—Belgium (Maitland 1897). —France to 180 m (Locard 1899). — Spain, Vigo Bay (Jeffreys 1883). — Portugal, very common (Nobre 1905). — Mogador, Morocco (Jeffreys 1883). Depths to 189 fms. Rocks, stones, clay, algæ.

Gibbula obliquata (Gmelin 1783).

(= Trochus umbilicatus Montagu 1803.)

Distribution: Denmark, Hirtshals, a dead sh. (Mörch 1871; Petersen 1888). — Faroe Islands (Mörch 1868). — Southern and western coasts of Great Britain and Scotland (Jeffreys 1865). — France, atlantic coast (Locard 1892). — Spain, Mediterranean and Black Sea; Morocco (incl. var. *lata:* Jeffreys 1865).

Gibbula tumida (Montagu 1803).

Pl. 3 figs. 8—15.

Habitat:

West coast of Sweden: Skåne, Hittarp, 1 sh. (Lönnberg $^{26}/_{6}$ 1896); Knähak perch, 28—34 m, 2 sps, h. 11 (Mus. L.); Landskrona—Helsingborg (Rahmn) 2 sps, max. h. 7.7; ap. 4.6; d. 9.2; wh. 5 $^{3}/_{4}$; Kullen (Lilljeborg) 9 shs and sps, the largest dead (fossil?) max. h. 13; and h. 11; d. 12 (Mus. U.); Point af Kullen—Vinga Skär, 15 fms, clay (Lönnberg $^{3}/_{7}$ 1902), 1 sp., h. 8.2; ap. 4.7; d. 9.6; wh. 5 $^{1}/_{2}$; Väderö lighthouse—point of Höghalla, 15 fms, shells, gravel (Lönnberg $^{10}/_{7}$ 1902) 5 sps, max. h. 13.5; ap. 6.5; d. 13.2; wh. 5—6, Fig. 15. — Kattegatt: Lilla Middelgrund, 10 fms, sand, stones (Gunhild Exp. $^{12}/_{7}$ 1878) 3 sps, max. h, 8.4; S. W. of Nidingen, 40 m, clay, 1 sh., d. 4.5 ($^{23}/_{9}$ 1911); Fjordskär, Kungsbackafjorden, 15—20 m, clay, stones ($^{25}/_{9}$ 1911) 1 sp., h. 8.6; d. 9.1. — Göteborg Skärgård: Innertistlarna —Resö, 26 m (Lagerberg $^{4}/_{8}$ 1906) 1 sp.; Svartskär—Vinga, 26 m (L. $^{31}/_{7}$ 1906) 2 sps.; Skagerrack: Torrboskär—Skagen, 27 fms, clay mixed with sand (Gunhild Exp. $^{8}/_{7}$ 1878), 1 sp., d. 6.2; Skagerrack, 22 fms, gravel (Lindahl) 2 shs, max. h. 8; Skagen—Nidingarna, 35 fms, clay mixed with sand (Gunhild Exp. $^{9}/_{7}$ 1878) 3 sps, max. h. 8.7; d. 9.2; wh. 6. — Bohuslän, numerous sps (Lovén) max. h. 8.9; ap. 4.3; d.

9.4; wh. 6 (Fig. 8); Gullmarn (Lovén) many sps, different localities, max. h. 10.6; ap. 5.6; d. 10.9; wh. 6; Stigfjorden (Aurivillius) many sps, max. h. 9.4; d. 9; wh. 5 3/4, Fig. 9. — Sydkoster, 5—20 fms (Eisen & Stuxberg 1871) 5 sps, max. h. 8.1; d. 9; wh. 6; W. of Nordkoster, 10—15 fms, clay (Ljungman 4/8 1865), 4 sps, max. h. 7.9; Dyngö (Goës) 2 sps.

Norway: Dröbak, 5—6 fms, stones, algæ, 8 sps, max. h. 9.2; d. 9.5; wh. 6. — Hitterö, 20—30 fms, shells (Öberg 1869), many sps, max. h. 11; ap. 5.3; d. 10.5; wh. 6 3/4. — Jederen, 100 fms, 1 sh., h. 14; d. 13.5. — Stavanger (v. Friesen), 3 shs + 1 sp., max. 9.6 (sh.); 8.6 (sp.). — Hardanger, 75 fms, sand (Bovallius) 1 sh. — Utnefjord, 95 fms (Bovallius) 1 sp., h. 3.6. — Flekkefjord, 15—20 fms (Öberg 1869) 5 sps, max. h. 8.4, Fig. 13. — Samlenfjord, 220 fms, rocks, 1 sp. + 1 sh., max. (sp.) h. 8.6; ap. 4.1; d. 9; wh. 6. — Storeggen (v. Yhlen), 50—140 fms, shingles, 1 sp., h. 8.6; d. 9; wh. 5 3/4, Fig. 10. — N. W. of Egersund, 50—60 fms (22/10 1872) 1 sh., h. 8.3. — Molde, Christiansund and Bergen (Lilljeborg) small sps (Mus. U.). — Finmark (Lovén) a few sps, max. h. 11.5; d. 11.3; D:o, Grötsund, 4—30 fms, clay (Goës & Malmgren 1861), many sps, max. h. 12.5; ap. 5; d. 11.4; wh. 6 3/4, Fig. 14; Karlsösund, 15 fms, stones, corals (1861), many sps, max. h. 10; d. 9.4; wh. 6 1/2; Tromsö, 20 fms (1861), 1 sp.; h. 7.6; Kjosen, 30 fms, clay (1861), many sps, max. h. 13.7; ap. 6.3; d. 11.8; wh. 6 3/4, Fig. 12; Ulfsfjord (1861) many sps, max. h. 13.2; d. 13, Fig. 11.

Kola Peninsula: Waidaguba (Sandeberg 16/9 1877) 1 sp., h. 8.8; ap. 4; d. 8.3; wh. 5.

Iceland (Odhner 1910); Reykiavik, 1 sp., h. 8.

Limits of formal variation:

Scandinavia;	Height of shell	4—5	6—7	8—9	10—11	12—13	13—14	max. 14 (Jederen)
100 sps	Height of aperture	2.2—3.2	3.2—3.9	3.8—4.8	4.4—5.8	5—6.5	5.5—6.7	6.5
measured	Diameter of shell	4.8—6.8	6.8—8.8	8—10	9.2—11	10.3—13	11.2—13.5	13.5
	Whorls	4 1/2—5	5—5 3/4	5 1/4—6	6—6 3/4	6—7	6—7	

In comparison with the preceding species the variation breadth is smaller and the difference in size between maximal specimens of Sweden and Norway is not so striking. Specimens from Finmark are usually more elevated than elsewhere.

General Distribution:

Norway: Vadsö and Vardö, southwards, 100 fms (d. 10, G. O. Sars 1878; Friele 1874; Schneider, h. 11, 1885; 1881; 1891; 1894; Bidenkap 1897; Aurivillius 1886; Norman 1902). — Christianiafjord, 10—100 fms (Asbjörnsen 1854; Jeffreys 1870). — Bohuslän, 14—35 fms (Malm 1855); Göteborg Skärgård (Malm 1858); Hallands Väderö; Skelderviken (Lönnberg 1903); Kullen (Lilljeborg 1852[b]). — Kattegatt to 24 fms (Mörch 1871, Petersen 1888). — Öresund, to S. of Hven, 22—29 m. (h. 11; Lönnberg 1898). — Iceland (Mörch 1869[a]; Verkrüzen 1872). — Faroes (d. 10, Mörch 1868). — S. W. of Faroe Isles, 650 fms (Jeffreys 1883). — British Islands (Jeffreys 1865). —

Dogger Bank (Hargreaves 1910). — North Sea, 5—50 fms (Metzger 1875); coast of Holland—Belgium, rare (Maitland 1897). — France, rare (Locard 1892). — Off Spain, 20—232 fms; Gibraltar Bay (Jeffreys 1883). Depths to 650 fms. Stones, sand, clay, algæ.

Gibbula magus (Linné 1758).

Pl. 3 fig. 3.

Habitat:

Bohuslän, Nordkoster, 1 shell, h. 11; aperture h. 6; diam. 14.1; whorls 5 1/2. This single shell was found by Lieutenant Bunsen on the north-western shore of Nordkoster, without any foreign shells in accompany and apparently not in ballast. (Note of Lovén.)

General Distribution:

British Islands (Jeffreys 1865). — Scarborough, shs, »possibly introduced» (Hargreaves 1910). — Belgium, rare (Maitland 1897). — France, common (Locard 1892). — Portugal, common (Nobre 1905). — Morocco (Jeffreys 1882). — Mediterranean (Carus 1889). — Madeira and Canaries, to 40 fms (Mc Andrew 1852, Jeffreys 1883). Azores, 15—20 m (Dautzenberg 1889).

Calliostoma miliare (Brocchi 1814).

(= Trochus millegranus Philippi 1836.)

Pl. 3 figs. 16—20.

Habitat:

West coast of Sweden: Skåne, Råå, deep hole (1880), 1 sh., h. 10.2. — Kattegatt: S. W. of Nidingen, 1/2 mile from lightship Fladen, 40 m, clay, mud (23/9 1911) 1 sp., h. 10; D:o, 20—30 m, stones (23/9 1911), 2 sps, max. h. 12; (with Verruca). — Bohuslän: Gullmarn, many localities (Lovén), numerous shs, max. h. 18; ap. 6.5; d. 15.2; wh. 10, Fig. 16; D:o, Alsbäck, 30—50 fms (Mus. G.); D:o, Saltkällefjorden, 20—35 fms (Aurivillius 1894) 1 sp; D:o, Ullholmsrännan (Aurivillius 31/5 1890) 1 sp.; D:o, Kristineberg and other localities (Théel 1907); measurements: h. 14; ap. 4.7; d. 13.8; wh. 8 1/2; h. 14.1; ap. 5; d. 12; wh. 8 1/2. — Väderöarna, many sps, measurements: h. 13.2; ap. 4.8; d. 12.7; wh. 8 1/2; h. 11.4; ap. 4.6; d. 11.6; wh. 8, Fig. 19. — Koster, E. of Hamnskär, 100—80 m (22/9 1910), 1 sp., h. 11; Kosterfjorden, 20 fms, 3 shs; D:o, 12 fms, clay (Gunhild Exp. 13/7 1877) 1 sh., h. 9. — Svinesund, 30—70 fms, stones, mud (Lindahl) 2 shs, max. h. 7.2; ap. 3; d. 7.4; wh. 7.

Norway: Christianiafjorden (Asbjörnsen) 2 sps, max. h. 12.4. — Dröbak (Lovén) 60 fms, clay, 1 sh., h. 6.7. — Christiansand, 50 fms, shells (Lindahl) 1 sh., h. 10. —

Hitterö, 20—30 fms, shells (Öberg 1869), 2 sps, max. h. 7.2 — Flekkefjord, 15—20 fms (Öberg 1869) 2 sps, max. h. 12.9; ap. 4.4; d. 12.2. — Samlenfjord, 220 fms, rocks (Bovallius 1880) 3 sps + 1 sh., max. h. 12.6; Utnefjord, 95 fms, sand (B. 1880), 6 sps + 8 shs, max. (sp.) h. 14.8; d. 14; wh. 7; Gravenfjord, 150 fms, shells (B. $^{13}/_{7}$ 1880), 3 shs, max. h. 13.5; d. 12.4, Fig. 17; Bergen (M. Sars) many sps, max. h. 13.5, Fig. 18. — Storeggen, E. Bredsund, 20—100 fms, 1 sh., h. 9.5. — Christiansund (Lilljeborg) many sps, max. h. 12.6 (Mus. U.). — Trondhjem (Boeck) 1 sp. h. 11.5. — Finmark, Grötsund, 100 fms (1861) 2 sps + 1 sh., max. (sp.) h. 11.5; ap. 3.5, d. 10.8; wh. 8, Fig. 20.

Limits of formal variation:

	Height of shell	6—7	9—10	11—12	13—14	16—17	max. 18 (Gullmarn)
45 sps measured	Height of aperture	2.2—3	3—3.8	3.4—4.5	4—5.1	5—6.2	6.5
	Diameter of shell	5.8—7.7	8.5—10.5	9.8—12	11.2—13.7	13.7—15	15.2
	Whorls	$6^1/_2$	$7^1/_2$—8	8—$8^1/_2$	$8^1/_2$	$9^1/_2$	10

Sculptural variation: The basal or peripheric ridge is sometimes feeble or wholly absent.

General Distribution:

Norway: Lofoten, southwards, 20—30 fms (h. 16; G. O. Sars 1878; Friele 1874; Krause 1887; M'Andrew 1856; Metzger 1875). — Christianiafjord, sand and stones, 10—100 fms (Asbjörnsen 1854; Jeffreys 1870). — Bohuslän, 20—50 fms (Malm 1855); Göteborg Skärgård (Malm 1858); Bohuslän to Bergen (Lovén 1846). — Kattegatt to S. of Anholt (Petersen 1888). — N. Öresund, 29 m (h. 15; Lönnberg 1898). — S. and. S. W. of Faroe Isles, 159—364 fms (Jeffreys 1883). — N. of Hebrides, 189 fms (Jeffreys 1869). — British Islands (Jeffreys 1865). — W. off Ireland, 90—370 fms (Jeffreys 1883). — N. Bay of Biscay, 75 fms, dead shells (Reynell 1909). — France to 400 m (Locard 1899). — Belgium, rare (Maitland 1897). — Off Portugal and Morocco, 292—386 fms (Jeffreys 1883, Nobre 1905). — Cape Verde Islands (Jeffreys 1883). Depts 15—386 fms. Rocks, sand, shells, clay.

Calliostoma conuloide (Lamarck 1822).

(= Trochus zizyphinus Auct., non Linné 1758.)

Pl. 3 figs. 21—23.

Habitat:

West coast of Sweden: Gullmarn, several sps, different localities (Théel 1907); max. h. 25.5; ap. 11; d. 26.8; wh. $9^1/_2$; h. 20.5; ap. 7; d. 21; wh. 9, Fig. 21. — Väderöarna, many sps, max. h. 28; another sp. h. 27; ap. 11; d. 26.3; wh. 9. — Kummelbanken, Skagerrack (1900) 2 sps, max. h. 16.

Norway: Hitterö, 20—30 fms, sand, shells (Öberg 1869) 1 sp., h. 10.8; D:o, Kirkehavn (Öberg) 1 sp., h. 16. — Jederen, 100—150 fms (B. Olsson 1872) 1 sp., h. 24.3; ap. 10.5; d. 24.2 (with Balanus). — Haugesund (Wittrock 1865) 1 sh., h. 14; D:o (Lilljeborg 1854), many sps, max. h. 28; d. 26 (Mus. U.). — SE. of Bergen (T. Andersson 1872) 1 sp., h. 24.4; ap. 9.5; d. 25; wh. 9 1/2. — Bergen (M. Sars) many sps, max. h. 27.4; ap. 11; d. 24.5; wh. 10, Fig. 22. — Rondö, 60—70 fms, shells, sand (v. Yhlen) 2 sps, max. h. 13 5. — Bank NW. of Bergen, 100—150 fms (T. Andersson) 1 sp., h. 20. — Grip (Lilljeborg) many sps, max. h. 29; d. 30 (Mus. U.). — Finmark (Lovén) 1 sh., fragmentary, h. circa 27; ap. 9; d. 25.2, Fig. 23. Two similar fragmentary shells are labelled »Bahusia 1837 & 38 (B. Fries)».

Variation: The proportions of the shell are somewhat varying, as is evident from the measurements given above.

General Distribution:

Norway: Finmark (Lovén 1846); not found by G. O. Sars (1878); N. of Trondhjemsfjord (M'Andrew 1856); Christiansund (Lilljeborg 1851); Bergen (Friele 1874); west coast, 0—20 fms (Metzger 1875); Christianiafjord, 10—20 fms (Asbjörnsen 1854). — Väderöarna, 20 fms (Malm 1855). — W. coast of Jutland, Denmark (Christensen 1907). — Faroes (Mörch 1868). — N. of Hebrides, 189—530 fms (Jeffreys 1869). — British Islands (Jeffreys 1865). — Belgium, rare (Maitland 1897). — Dogger Bank (+ var. *lyonsi*, Hargreaves 1910). — France (Locard 1892). — Portugal, rather rare (Nobre 1905); Spain; S. off Portugal, to 530 fms (Jeffreys 1883). — E. off Morocco, 112 m, dead sh. (Locard 1898); Mogador (Jeffreys 1883). — Madeira and Canaries (Mc Andrew 1852). — Azores, 450 fms (Watson 1886); 15—20 m (Dautzenberg 1889). The true C. zizyphinum (Linné 1766) is a Mediterranean form, occurring rarely even on the Atlantic coast of France (Locard 1892, 1904). Depths 10—530 fms. Sand, shells.

Calliostoma occidentale (Mighels & Adams 1841).

Pl. 3 figs. 24—25.

Habitat:

North Sea, 58° 55′ N., 3° 28′ E., 170—200 fms, gravel (v. Yhlen) 1 sp., h. 10.3; ap. 4.2; d. 9.6; wh. 7, Fig. 25. — Norwegian west-coast: the fish bank NW. off Bergen, 100—150 fms (T. Andersson 1872), 2 sps, max. h. 11.2. — Storeggen, 80 fms, gravel (v. Yhlen), 1 sp., h. 8; ap. 2.9; d. 7.1; wh. 6 3/4. — Jutland Reef, 60—130 fms (Uddström 1873), 3 sps, max. h. 12.3; ap. 5.2; d. 11.4; wh. 7. — Christiansund, (Lilljeborg) 2 shs, max. h. 9 (Mus. U.).

Finmark: Karlsö, 30 fms, shells (Malmgren 1861, 1864) 8 sps, max. h. 13.7; ap. 5.2; d. 12.1; wh. 7 3/4; D:o, Karlsösund, 15 fms, stones, corals (M. 1861) 4 sps, max. h. 12.8; ap. 5.2; d. 11.3; wh. 7 3/4. — Ulfsfjord (Goës & Malmgren 1861) 3 sps,

max. h. 12.1; d. 11.4. — Kjosen (G. & M. 1861) 2 sps, max. h. 10.7. — Loppen (Lovén, type of Lovén's Margarita alabastrum Beck)[1] 3 sps, max. h. 14.3; ap. 5.5; d. 12.2; wh. 8, Fig. 24, — Hammerfest, 100 fms, sand (Lovén) 5 sps, max. h. 12.7.

Kola Peninsula: Waideguba, 1 mile on sea (Sandeberg $^{28}/_{8}$ 1877) 2 sps, max. h. 10.3; ap. 4.5; d. 9.2; wh. 7. — Subowski, 14 fms, sand (Sandeberg $^{6}/_{9}$ 1877) 1 sp., h. 6.2; ap. 3; d. 5.5; wh. $5\,^{3}/_{4}$.

Average value of formal variation:

	Height of shell	5—6	8—9	11—12	max. 14.3 (Loppen)
30 sps	Height of aperture	2.2—2.5	3.2—3.8	4.5—5	5.5
measured	Diameter of shell	4.5—5.5	7.2—8	9.7—10.6	12.2
	Whorls	$5^{1}/_{2}$	$6^{1}/_{2}$	7	8

General Distribution:

Norway: Vadsö and Vardö, southwards, 30—150 fms (h. 16, G. O. Sars 1878; Schneider 1881, 1885, 1894; Aurivillius 1886; De Guerne 1886); Bog Fiord, E. Finmark, 20—30 fms (Norman 1902); Nordland (Krause 1887); Drontheim (M'Andrew 1856); Bergen (Lovén 1846; Friele 1874). — Murman coast (Herzenstein 1893). — Faroes, 10—30 fms (Jeffreys 1869; Mörch 1869[b]). — Between Hebrides and Faroes, 170—189 fms; The Minch 45—60 fms; Faroes 114 fms; Shetland, 75 fms; W. off Ireland, 90—164 fms (Jeffreys 1869, 1883). — N. of Hebrides and Shetland—Faire Isles, 97—1000 m (Simpson 1910). — Scarborough and Dogger Bank, 20—40 fms (Hargreaves 1910). — E. Canada, 25—40 fms (Whiteaves 1901). — New England, rare, h. 13 (Gould & Binney 1870). — E. Coast of N. America 207—630 fms (Verrill 1885). Depths 15 fms to 1000 m. Sand, gravel.

Craspedotus otavianus (Cantraine 1835).

Distribution: Norway, west coast, Bergen, 20—30 fms, 1 sp. (Friele 1874); 80—100 fms (G. O. Sars 1878). — Between Hebrides and Faroe Isles, 229 fms; W. off Ireland, 173 fms; Lighting Exp. 1868, st. 89 (Jeffreys 1883). — North Sea (Locard 1904). — N. of Spain, 411 m (Locard 1898). — Off Portugal and Morocco, 72—386 fms (Jeffreys 1883). — Portugal (Nobre 1905). — Mediterranean, Marseille 445—555 m, and other localities to 2000 m; Aegean (Locard 1898; Carus 1889). — Madeira; Azores (Locard 1898).

Margarita helicina (Phipps 1774).

Pl. 3 figs. 26—34; Pl. 6 figs. 3—5.

Habitat:

West coast of Sweden: Bohuslän (Lovén) 7 sps, max. h. 3.1; ap. 2; d. 3.7; wh. $4\,^{1}/_{2}$, Fig. 34; Humlesäcken, algæ (Théel 1907). — Sydkoster, 5—15 fms (Eisen

[1] Becks's type is a Margarita cinerea Couth. according to Posselt & Jensen 1899.

& Stuxberg 1871), 1 sh., h. 2.9; ap. 2.2; d. 3.7; wh. 4; D:o, 10 fms, 1 sp., h. 3.3; ap. 2.2; d. 4; wh. 4 1/2. — Väderöarna, 1 1/2 fms, sand with Amphioxus, 7 sps, max. d. 1.2 (Mus. G.; determined and described by MALM, 1855, as »Skenea? divisa Forb. & Hanl.»).

West coast of Norway: Bodybet, 20 fms, sand (v. Yhlen) 1 sh., h. 5.6; ap. 3.3; d. 6.5; wh. 5; D:o, 60—70 fms, sand, 1 sp., h. 3.2; ap. 2.2; d. 4; wh. 4 1/4. — Bergen (Koren) 2 sps; D:o (M. Sars) 3 sps, max. h. 4.9; ap. 3.1; d. 6.5; wh. 5; h. 3.7; ap. 2.4; d. 4.8; wh. 4 1/2. — SE. of Bergen, 100—150 fms (1874) 1 sp., h. 6.1; ap. 4; d. 7.8; wh. 5, Fig. 32. — Norway, without definite locality (Düben), many sps, max. h. 4.4; ap. 2.7; d. 5.1; wh. 5, Fig. 33. — Hardangerfjord (Aurivillius M. S.).

North coast of Norway: Finmark (Lovén) many sps (with Bryozoa), max. h. 6.4; ap. 3.5; d. 7.5; wh. 5, Fig. 30. — Stensö (Villander 1870) 1 sp., d. 4.5. — Karlsö, N. of Tromsö, 15—20 fms, corals, sand, stones (Malmgren 1861) 1 sp., d. 4.3. — Kalfjord, 50 fms, clay (Goës & Malmgren) 1 sh., d. 3.5. — Kjosen, ebb (G. & M.) 11 sps, max. h. 3.3; ap. 2.4; d. 4.6; wh. 4 1/4. — Vardö, in the surface (Sandeberg 24/6 1877) 5 shs, max. d. 4.

Murman Coast and Kola Peninsula: Ara (Herzenstein 1884), sublittoral region, 5 sps, max, h. 3.4; d. 4.4; wh. 4. — Subowski, 14 fms, sand (Sandeberg 6/9 1877) 2 sps, max. d. 4. — Waideguba (Sandeberg 16/9 1877) 4 sps, max. d. 5.

Kara Sea (LECHE 1878) Max. dimensions: Möller Bay, h. 4.3; ap. 3.2; d. 5.9; wh. 4 1/2, Fig. 28. — Matotschkin sharr, h. 5; ap. 3.8; d. 6.1; wh. 4 3/4.[1]

Spitzbergen, west coast: Horn Sound, 3—10 fms (Malmgren 2/8 1864) many sps, max. d. 9.5; D:o, 5—40 fms (1861) 10 shs, max. d. 8.7. — Bel Sound, 5—8 fms, stones, algæ (Torell 1858) many sps; D:o, 35—40 fms, stones, zoophytes, many sps, max. d. 10.8 (with Bryozoa); D:o, 5—12 fms, morainic clay, 2 sps, d. 9; D:o, 3—6 fms, algæ (22/7 1864) 8 sps, max. d. 9.5. — Skans Bay, 15 fms, clay (22/7 1873) 1 sp., d. 5.6. — Ice Fiord: Advent Bay, 5—10 fms, clay (3/8 1868) 4 sps, max. h. 5.8; ap. 4.2; d. 8; D:o, 20—40 fms (8/8 1868) 4 sps, h. 4.8; d. 6; D:o, 2—5 fms (5/8 1868) numerous sps, max. d. 7; Green Bay, 5—20 fms, algæ with clay (31/7 1868) several sps, max. d. 8.7; Safe Bay, 30—50 fms, bluish clay (27/6 1864) 1 sp., d. 6; Cape Thordsen, 2 fms (Willander 11/8 1870) many sps, max. d. 7.3 (with Bryozoa); Sassen Bay, 2 fms, algæ, clay (1861) 1 sp., d. 4.2. — Kings Bay, 25 fms (1861) 2 sps, max. d. 7.5; D:o, 60 fms, 5 shs, max. d. 6.5. — Seven Ice Mountains, 30 fms, stones (Torell) 2 shs, max. d. 7. — Danes Island, Kobbe Bay, 3 fms, gravel (27/5 1861) 6 sps, max. d. 3; D:o, ebb (26/5 1861) many sps, max. d. 8.3 (with Bryozoa); D:o, 8—4 fms, gravel, numerous sps, max. d. 11.3, Fig. 26. — Danes Gat, 20 fms, clay (10/9 1861) 2 shs, max. d. 7. — Virgo's harbour, Danes Island, 25—30 m, grayish clay, Laminariæ (27/8 1898) 1 juv.; D:o, 2—3 fms, algæ (26/8 1898) 6 sps, max. d. 5.5. — Amsterdam Island, 25 fms, mud (1861) 2 sps, max. d. 6; D:o, 12 fms, stones (23/5 1861) 3 sps, max. d. 7.4 (with Bryozoa).

Spitzbergen, North coast: Hackluyts Headland, 16—20 fms, stones, red algæ

[1] According to Leche the maximal height amounts to 5.5 mm.

(22/5 1861) 10 sps, max. h. 6.8; d. 9. — Smeerenburg Bay, low water, algæ, stones, sand (22/8 1868) 13 sps, max. h. 7; d. 9.3; wh. 4 1/2 (with Bryozoa); D:o, 20 fms, sand, stones, clay (3/9 1861) 9 sps, max. h. 7.6; d. 9.3; wh. 5 1/4 (with Bryozoa); D:o, 85 fms, clay (1861) 1 sh., d. 4. — Foul Bay, 15 fms, sand (23/8 1872) 7 sps, max. d. 9. — Fair Haven, 10 fms, clay, close by the glacier (24/8 1872) 1 sh., d. 6.5; D:o, 2—22 fms, algæ, sand, clay (29/8 1872), many sps, max. d. 10. — Cloven Cliff, 20 fms (Torell 1858), many sps, max. d. 10 (with Bryozoa); D:o 4 fms, sand, 2 sps, d. 9 (with Bryozoa); D:o, 12—20 fms, stones with algæ, many sps, max. d. 8.2. — Norwegian Island, 7—20 fms, stones, sand, clay (21/8 1872) numerous sps, max. d. 9.3 (with Bryozoa). — Liefde Bay, 20—30 fms, clay mixed with stones (3/9 1868) 1 sp., d. 3.8; D:o, 15—30 fms, algæ, clay, stones (2/8 1868) 5 sps, max. d. 6.8. — Off Mossel Bay, 12 fms, sand (15/1 1873) many sps, max. d. 7.5; Mossel Bay, 1—15 fms, algæ, Lithothamnion (1872—73) numerous sps, max. h. 7.4; ap. 4.8; d. 9.3; wh. 5; D:o, 5—7 fms, algæ (25/11 1872) 15 sps, max. d. 8.2 (with Bryozoa); D:o, 9 fms (1872) 10 sps, max. d. 8; D:o, 11 fms, sand, algæ (7/10 1872), 1 sp., d. 6. — Vertegen Hook, 40—50 fms, stones (6/7 1861), 4 sps, max. h. 4.5; ap. 2.5; d. 5.1. — Hekla Cove, 6 fms, Laminariæ (1861) 10 sps, max. d. 8.5. — Treurenburg Bay, 6 fms, sand, clay mixed with stones (26/6 1861) 2 sps, max. d. 7.5; D:o, 5—20 fms, stones, clay, many sps, max. d. 9.6; D:o 14—21 fms, clay, 2 sps, d. 4.3 and 2; D:o, 20—30 fms, clay with stones, 1 sp., d. 7; D:o, 25 fms, clay (1861) 1 sh., d. 8.3 (with Bryozoa). — Lomme Bay, 5—15 fms, clay, stones, algæ (11/9 1868) many sps, max. h. 7; d. 9.5. — Hinlopen Strait, 10—25 fms, clay (1861) 6 sps, max. d. 7.5 (with Bryozoa). — Shoal Point, 20—30 fms, clay (15/7 1861) 15 sps, max. d. 8.3, (with Bryozoa). — Brandywine Bay, 5—15 fms, stones (5/9 1868) many sps, max. d. 10 (with Bryozoa). — Castrén's Islands, 3—10 fms, algæ, stones (7/9 1868) numerous sps, max. d. 10. — Parry Island, 30—40 fms, stones, gravel (8/9 1868) 5 sps, max. d. 6.9 (with Bryozoa).

Spitzbergen, East coast: Walter Thymen Strait, the outlet in Stor Fiord, 30—40 fms (1864) 1 sp., h. 8.6; d. 11.7; wh. 5 1/4. — Stor Fiord, 5—10 fms, clay (23/8 1864) 1 sp., h. 7.5; d. 9.6; D:o, 4—7 fms, fine clay (23/8 1864) 7 sps, max. h. 6; d. 8.6; D:o, without definite depth, many sps, max. h. 9.4; ap. 6.2; d. 11.5; wh. 5 1/2. — Whaler's Pynt, Stor Fiord, 20—40 fms, clay (10/8 1864) 1 sp., d. 4.1.

Beeren Island: 74° 21′ N., 19° 15′ E., 20 m, bottom temp + 1.5°, stones, Laminariæ and red algæ (15/8 1898) many sps, max. d. 5. — D:o, 1—2 fms, rocks and gravel (24/7 1868) 7 sps, max. h. 4; d. 5.3; wh. 4 1/4.

Iceland (Odhner 1910). Maximal dimensions: Berufjord, h. 4.6; ap. 3.2; d. 5.8; wh. 4 1/2, Fig. 31. — Raufarhofn, h. 4.5; ap. 2.8; d. 5.

East Greenland (Hägg 1905) 12—35 m, max. d. 8.5 (Mus. U.).

West Greenland (Posselt & Jensen 1899). Dimensions: Egedesminde h. 6; ap. 4; d. 7.7; wh. 5, Fig. 29. — Norsouak, h. 6.5; ap. 4.3; d. 7.9; wh. 5. — Further: Cape Dudley Digges, 76° 21′ N., 68° 28′ W., 30—40 m, mud (E. Nilson 5/7 1894) 3 sps, max. d. 4.6. — Duck Island, 73° 55′ N., 57° 28′ W., 3—27 m, rocks, stones (E. Nilson 30/6 1894), many sps, max. h. 7; ap. 4.2; d. 7.6; wh. 5. — Kingitok, 73° 17′ N., 56° 10′

W., 27 m, hard mud (E. Nilson 16/6 1894) 6 sps, with Bryozoa, max. d. 7. — Davis Strait, 64° 56′ N., 66° 18′ W., 15—30 m, sand (E. Nilson 12/10 1894) 2 sps, max. d. 7; D:o, low water, many sps, max. h. 8; ap. 5; d. 9; wh. 5 1/4.

Bank of Newfoundland, 46° 5′ N., 51° 44′ W., 56 fms, sand, shells (Ing. & Glad. Exp. 16/8 1871) 1 sp., h. 5.3; ap. 3.3; d. 6; wh. 5.

Behring Island, low water (Vega Exp. 17/8 1879) 2 sps, max. h, 5.7; ap. 4; d. 8; wh. 4 1/2; shell very solid, Fig. 27.

Limits of formal variation:

Spitzbergen;	h.	2—3	3—4	4—5	5—6	6—7	7—8	9—10	max. 9.8 (Stor Fiord)
80 sps	ap.	1.5—2.6	2—3.4	2.3—4.1	3—4.5	3.7—4.9	3.8—5.5	5.2—6.2	5.7
measured	d.	2.9—4.5	4—6	5—7	6—8.6	7.3—10	8.5—10.8	10.5—12	11.1
	wh.	3 1/2—4	4—4 1/2	4 1/4—4 1/2	4 1/2—5	4 1/2—5	4 1/2—5	5 1/4—5 1/2	5 1/4
Greenland;	h.	2—3	3—4	4—5	5—6	6—7	max. 6.5 (Norsouak)		max. 8 (Davis Strait)
50 sps	ap.	1.4—2.4	2—2.9	2.3—3.3	2.7—4	3.4—4.5	4.3		5
measured	d.	2.8—4.7	3.7—5.7	4.8—6.7	5.5—7.7	7.8—8.2	7.9		9
	wh.	3—4	4—4 1/2	4 1/2—5	5	about 5	5		5 1/4
West coast of	h.	2—3	3—4	4—5	5—6	6—7	max. 6.4 (Finmark)		
Scandinavia;	ap.	1.3—2.2	1.9—2.8	2.4—3,4	2.7—3.8	3.2—4.3	3.5		
50 sps	d.	2.6—3.2	3.5—5.1	4.5—6.8	5.7—7.7	6.8—8.5	7		
measured	wh.	3 1/4—4 1/2	4—4 1/2	5	5	about 5	5		
	h.	2—3	3—4	4—5	max. 4.6 (Berufjord)				
Iceland;	ap.	1.5—2.3	2—3	2.5—3.2	3.2				
40 sps	d.	2.5—4.6	4—5.6	4.9—5.8	5.8				
measured	wh.	3 3/4—4	4—4 1/2	4 1/2—5	4 1/2				

The Scandinavian specimens, especially those from the southern districts, such as Bohuslän, have a comparatively small diameter (thus are more elevated) than specimens from Arctic districts.

Colour variation: var. *fasciata*, JEFFREYS 1865, has a spiral band of reddish-brown below the suture.

Variation of the radula: This varies but slightly in the different districts. Form and denticulation of the teeth is the same, and the number of uncini only is subject to change. Specimens from Bohuslän (full-grown, with a diameter of 3.7) have circa 50 uncini (Pl. 6. fig. 3); specimens from Norway (Düben; d. 5.1) have 80; those from Spitzbergen (d. 9.5) about 80 (fig. 4—5); the specimen from Behring Island (d. 8) likewise circa 80; specimens from Egedesminde have usually about 80 uncini (2 sps, h. 5.4; d. 7.2 and h. 5.4; d. 6.6), but one especially high and narrow specimen showed only 50. Young animals always have a lesser number of uncini than older ones; a specimen from Sukkertoppen (d. 2.2) had only 40, and another from Mossel Bay (d. 30) 50. According to Sars, 1878, young specimens have also a smaller number of median teeth. One specimen from Norway (Düben) had an aberrant radula of the formula $\infty . 1 . (6 . 1 . 7) . 1 . \infty$; the 7th tooth exhibiting some exceptionally strong denticles in the outer margin.

General Distribution:

Norway, Finmark southwards (d. 7; G. O. Sars 1878; Friele 1874; Schneider 1881; 1885; 1891; 1894; Bidenkap 1897; Aurivillius 1886; Norman 1902); Korsfjord 135—217 fms (Metzger 1875). — Bohuslän, Väderöarna, Laminariæ (Malm 1855); Göteborg Skärgård, Vinga ränna, 1 sp. (Malm 1858). — Kattegatt, NE. of Anholt, dead shs (Petersen 1888). — Iceland (Mörch 1869[a], Verkrüzen 1872; Johansen 1902). — Faroes (Mörch 1868). — British Islands (Jeffreys 1865, Hargreaves 1910, + var. *fasciata*). — Jan Mayen, 10—15 fms (Friele 1878, Hägg 1905). — Norwegian Sea (Friele 1902). — Murman Coast, White Sea, Nova Zembla and Kara Sea (Herzenstein 1893, Dautzenberg 1911). — Russian Lapland (Middendorff 1849). — Kara Sea, 2—20 fms (Leche 1878; Collin 1887). — Franz-Josef Land, 1—127 fms (Melvill & Standen 1900). — Spitzbergen, to 87 m (d. 8.5, Knipowitsch 1901[b]; 1902; Krause 1892; Friele 1879; Mörch 1869). — Greenland, to 100 fms (Posselt & Jensen 1899). — Jones Sound, 4—26 m, max. d. 9.2 (Grieg 1909). — Parry Islands (Sutherland 1852). — Eastern Canada (Whiteaves 1901). — New England (d. 6, Gould & Binney 1870). — Behring Sea (Crosse 1877; Krause 1887); Behring Island (Dall 1885); Aleutian and Sitcha (Dall 1875). — Ochotchian Sea (var. *major*, Middendorff 1849, 1851). — Amur, l. 5.5 (Schrenk 1867). — Northern Japanese Sea (Dunker 1882). — Vancouver Island (Carpenter 1864). Depths to 226 m; Young sps to 386 m; dead shells to 1,203 m (Hägg 1905). Algæ, stones, sand, clay.

Margarita olivacea (Brown 1827)

(incl. var. **gigantea** Leche).

Pl. 3 figs. 41—46; Pl. 4 figs. 1—3; Pl. 6 figs. 8—13.

Habitat:

Finmark (Lovén) 1 sp., h. 2.6; d. 3.5; sculpture moderately fine; colour light yellowish green. — D:o (Sparre Schneider) 3 sps, max. h. 3.5; ap. 2.2; d. 4; wh. 4 1/2; aperture somewhat lower than in specimens from Spitzbergen.

Kara Sea (Leche 1878), max. h. 5.6; ap. 3.6; d. 6.2; wh. 4 1/2; sculpture varying, coarser or finer. Var. gigantea; h. 9.7; ap. 6.5; d. 10.9; wh. 5, Fig. 3 to the right; h. 10.3; ap. 7; d. 11.2; wh. 5 1/2, Fig. 3 to the left. — Further: Jugor sharr, off Chabarova, 5—8 fms, clay, sand (N. Zembla Exp. 31/7 1875).

North of Siberia and Behring Sea (Aurivillius 1887): Irkaipij, Fig. 2, and other localities. Max. dimensions of var. gigantea (= the type of Aurivillius), N:o 1068: h. 6.2; ap. 4.2; d. 7; wh. 4 and h. 6; ap. 4.5; d. 7.6; wh. 4. Shell thin, light coloured; apex obtuse.

Spitzbergen: Off Horn Sound, 76° 46′ N., 5° 22′ E., 210 m, fine blackish gray clay, bottom temp. + 2.83° (26/6 1898), 12 sps, max. h. 8; ap. 5.4; d. 9 (agreeing with var. gigantea by the thin shell and the pointed apex, but aberrant by the more elevated

spire), Fig. 44. — Bel Sound, 35—40 fms, stones, zoophytes (Torell), 3 sps, max. d. 3.6 (greenish); D:o, 5—12 fms, stones, algæ (Torell) 2 sps, max. d. 5. — Cloven Cliff, 5 fms, sand (Torell), 3 sps, max. d. 7.4, Fig. 46. — E. of Vertegen Hook, 80° 10′ N., 17° E., 40—50 fms, stones (1861), 1 sp., d. 4.1 (dark bluish gray). — Treurenburg Bay, 30 fms, clay (1861) 1 sh., d. 5.2; D:o, 70 fms, clay, stones ($^{7}/_{6}$ 1861) 1 sh., d. 5.7. — Brandywine Bay, 5—15 fms, stones ($^{5}/_{9}$ 1868) 1 sh., d. 4.7. — Parry Island, 30—40 fms, stones, gravel ($^{8}/_{9}$ 1868), 1 sh., d. 5.3 (dark bluish tinted). — Hinlopen Strait 79° 45′ N., 20° E., 50 fms. fine reddish clay ($^{5}/_{8}$ 1861), 1 sp., d. 3.5 (greenish). — Lovén's Mount, 36 fms, clay with stones ($^{1}/_{9}$ 1868), 1 sh., d. 5.2. — Waygat Islands, 60 fms, clay (1861) 1 sp., d. 5. — King Charles Land, Bremer Sound, 100—110 m, bottom temp. — 1.45°, fine clay with big stones; Biloculina sparse ($^{8}/_{8}$ 1898), 3 sps, max. d. 5.6, Fig. 43. — Stor Fiord, 5—10 fms, clay ($^{23}/_{8}$ 1864) 7 sps, max. d. 7.2 (dark blue), Fig. 42. — Mouth of Stor Fiord, 100—120 fms, clay with stones ($^{29}/_{7}$ 1868) 1 sp., d. 5.4 (whitish).

Iceland (Odhner 1910). Dimensions: Öfjord, h. 4; ap. 2.7; d. 4.3, Fig. 41. — Bjarnanes, h. 4.6; ap. 2.8; d. 5.1; wh. $4^{1}/_{2}$, Fig. 46.

West Greenland (Posselt & Jensen 1898). Maximal dimensions: Sukkertoppen, h. 5; ap. 2.9; d. 5.3; wh. $4^{3}/_{4}$; h. 4.7; ap. 2.7; d. 5.5; wh. $4^{3}/_{4}$, Fig. 45. — Egedesminde, h. 6; ap. 3.9 or 3.5; d. 6.3 resp. 6.5; wh. 5 (2 sps). — Godthaab, h. 5.9; ap. 3; d. 5.8; wh. 5, Fig. 46. — Further: NW. of Cape York, 5—15 fms, clay mixed with sand, algæ ($^{27}/_{7}$ 1883), 1 sp., d. 8.4 — 72° 8′ N., 74° 20′ W., 30—80 m, hard mud (E. Nilson $^{11}/_{9}$ 1894) 4 sps, max. h. 9.5; ap. 5; d. 9.7. — Harungen, Disco, 161 fms, loose grayish clay ($^{11}/_{7}$ 1871) 1 sp. (= groenlandica in Posselt) h. 3.7; ap. 2; d. 4.4.

East Greenland (Hägg 1905). Dimensions: h. 6.2; ap. 3.8; d. 6.7 (Mackenzie Bay; colour light yellowish; type).

Limits of formal variation:

Spitzbergen;	h.	4—5	6—7	7—8	max. 8 (Horn Sound)	
30 sps	ap.	2.3—3.6	3.7—4.9	4—5 3	5.4	
measured	d.	4.5—6	6.2—8	7.3—9	8.9	
	wh.	4	$4^{3}/_{4}$	5	5	
Greenland;	h.	4—5	6—7	7—8	9—10	max. 9.8 (72° 8′ N.)
50 sps	ap.	2.2—3.6	3.5—4.5	4—4.8	4.7—5.4	5.4
measured	d.	4.5—5.9	6.2—7.9	7.4—8.6	9—10	9.8
	wh.	4—$4^{1}/_{4}$	5	5	$5^{3}/_{4}$	$5^{3}/_{4}$

The sculpture varies somewhat in prominence. Usually the spiral striæ are more or less deeply impressed and crossed by fine longitudinal lines of growth (forma typica). Sometimes the longitudinal lines have the shape of fine lamellæ and are as conspicuous as the spiral sculpture itself, which consists of broader and very shallow furrows, sometimes limited by fine lamelliform riblets (var. *gigantea*).

The colour is pale yellowish, iridescent, to grayish green and dark bluish. Var. gigantea is always light-coloured.

Variation of the radula: Two forms of radulæ are distinguishable (cfr Pl. 6, figs. 8—13); the one with 11 median teeth (5 . 1 . 5), the other with 9 (4 . 1 . 4). The form of the teeth is somewhat different in these cases, having in the first a broad semicircular base, attached with a broad (not lengthened) area; the apices are furnished with long central cusps and feeble denticles on the sides. In the other case the teeth are somewhat quadrangularly rounded and more contracted beneath the apices, with narrower and more lengthened feet. The denticulation is more marked and extends usually far towards the central cusps; these are usually small, but sometimes rather prominent (*e. g.* specimens from Cloven Cliff, fig. 9). The first-named form of radula is characteristic of var. gigantea and is only met with in specimens of its sculpture (from Horn Sound, Matotschkin sharr and Behring Sea). Aurivillius (1887) describes the specimens from Behring Sea as the typical form, but they have the shell and radula characters of var. gigantea LECHE, and the var. gigantea of Aurivillius is the typical form; of the first, one specimen has 11 median teeth (according to Aurivillius), thus presenting mixed typical and varietal characters. — The number of lamellæ varies from about 20 to 25 (both in type and variety), but sometimes amounts to about 60 (var. gigantea, Cloven Cliff).

General Distribution:

Norway: Vardö to Lofoten (d. 3.5, G. O. Sars 1878; h. 5, Schneider 1885, 1891); Tromsö (Schneider 1881); Bogfjord (Norman 1902). — Murman coast, White Sea and Arctic Ocean N. of Siberia (Herzenstein 1893). — Kara Sea, 2—90 fms (Collin 1887; Leche 1878 + var. *gigantea*). — Barent Sea, 80—211 m (Knipowitsch 1901[a]). — Nova Zembla (Dautzenberg 1911). — Siberia; Behring Sea, 3—55 fms (Aurivillius 1887, + var. *gigantea*, cfr above; Dall 1875; Crosse 1877; Krause 1885). — Iceland (Odhner 1910). — Scotland (Jeffreys 1869). — East Greenland, 3—220 m (Hägg 1905). — West Greenland, to 200 fms (Posselt & Jensen 1899). — Grinnel Land (Smith 1877). — Jones Sound and North Devon, 4—40 m, max. d. 7.5 (Grieg 1909). — Parry Islands (Sutherland 1852). — East Canada, 20—60 fms (Whiteaves 1901). — New England (d. 4, Gould & Binney 1870). Depths to 200 fms. Clay, sand, stones, algæ.

Margarita groenlandica (CHEMNITZ 1781).

Pl. 4 figs. 4—27; Pl. 6 figs. 14—20.

Habitat:[1]

West coast of Sweden: Gullmarn (Lovén) 1 sp., together with Moelleria costulata and Rissoa Jeffreysi; d. 2. — Kosterfjorden, 10—15 fms, rocks (Aug. 1863) 3 sps, white, feebly sculptured or smooth, max. h. 4.5; ap. 3; d. 6; wh. 4 1/2 (var. 2 a—2 c).

[1] The notes in brackets after the measurements refer to the account of the variation given below.

West coast of Norway: Norway, without definite locality (Düben) many sps, max. h. 8.2; ap. 4.1; d. 9.5; wh. 6. — Farsund, 3 shs, max. d. 5.5 (Mus. U.). — Stavanger (Aurivillius) 2 sps (var. 1 b). — Utnefjord, Hardanger, 90 fms, stones (Bovallius 1880) 1 sh. (var. 1 b). — Bodybet, 29 fms (v. Yhlen) 1 sh. (var. 1 b); D:o, 60—70 fms, sand (v. Yhlen) 2 sps (var. 1 b—1 c), Fig. 27. — Hitterö, 20—30 fms, shells (Öberg 1869) 2 shs, max. h. 4.6; d. 6; wh. 4 1/2 (var. 1 c—2 c); many red coloured (var. 1 b). — Haugesund, 25 fms, sand (Bovallius) many sps, max. h. 5.6; ap. 3.5; d. 6.8; wh. 5 (var. 1 b). — North Sea, 55° 55′ N., 3° 28′ E., 170—220 fms, gravel (v. Yhlen), 1 sp., h. 7.6; ap. 4.5; d. 9.4; wh. 5 1/2 (var. 1 a). — Bergen (M. Sars; Koren) 7 sps, max. h. 9; ap. 4.5; d. 10.3; wh. 6 (var. 1 a—1 b—1 c); one high specimen: h. 9; ap. 4.3; d. 9.5; wh. 6 1/2, var. lævior, Fig. 26. — Grip (Lilljeborg) many sps, max. h. 4.3; d. 5.2; wh. 5 (Mus. U.). — Bejan, Trondhjem (Boeck) 1 sp., h. 6.2; ap. 4; d. 8; wh. 5 1/2 (var. 2 c). — Kvænangen, 5—20 fms, many sps (Cleve), max. h. 16; ap. 5.8; d. 15; wh. 7 (Mus. U.). — Grötsund, 4 fms (Goës & Malmgren 1861), many sps, max. h. 9.5; ap. 4.5; d. 9.3; wh. 6 1/2 (var. 1 b). — Ulfsfjord, 25—50 fms (G. & M. 12/10 1861) 1 sh. — Kalfjord, 50 fms, 1 sh., h. 5.5; d. 7; wh. 5 1/4 (var. 1 c). — Kjosen, 25—40 fms, many sps, max. h. 9.2; d. 10.2; wh. 6 (var. 1 b), Fig. 25. — Karlsösund, 15 fms, stones, corals (G. & M. 1861), many sps, max. h. 6.8; d. 7.8; wh. 5 3/4 (var. 1 b). — Karlsö N. of Tromsö (G. & M. 9/5 1861), 30 fms, shells, 7 sps, max. h. 6.5; ap. 3.4; d. 7.6; wh. 6 (var. 1 b); D:o, 70 fms, 1 sp., d. 3.5. — Tromsö, 20 fms (G. & M. 1861) 1 sp. (var. 1 b).

Finmark: without definite locality (Sparre Schneider) many sps, max. h. 10; ap. 5; d. 10.5; wh. 6 1/2 (var. 1 b), Fig. 24. — Hammerfest, 60—100 fms, shells, many sps (var. 1 b). — Stensö (Villander 1870) 8 sps (var. 1 b). — Vadsö, 20—30 fms, stones (Klinckowström 3/9 1896) 1 sp. (var. 1 b).

Murman Coast and Kola Peninsula: Ara, stones, Lithothamnion (Herzenstein 1884) 2 sps, max. h. 7.5; ap. 3.5; d. 7.7; wh. 5 (var. 1 b). — Waidaguba (Sandeberg 18/8 1877) 1 sh., d. 7.5 (var. 1 b); D:o, 1 mile off the coast, 52 fms, sand, shells (Sandeberg 28/7 1877) many sps, max. h. 9; ap. 5; d. 10; wh. 6 1/4 (var. 1 b). — Subowski, 15 fms, sand (Sandeberg 16/9 1877) many sps, max. h. 8.5; d. 9; wh. 6 1/2 (var. 1 b). — Teriberki Fiord, 20 fms (Sandeberg 24/8 1877) 1 sp., d. 4.5 (var. 1 b).

Kara Sea (Leche 1878). Dimensions: Kostin sharr, h. 8.8; ap. 4.4; d. 10.2; wh. 6, Fig. 21, 22. — Further: W. of N. Gåskap, 3 fms, rocks (23/6 1875) 3 sps, max. h. 11.5; d. 12; wh. 6 (var. 1 a). The var. rudis Mörch of Leche resembles the Norwegian specimens, but is somewhat lower. The varieties 2 a—2 c are common (=lævigata Mörch of Leche).

North of Siberia: Actinia Bay, Taimyr Sound, 4—6 fms, clay mixed with sand (Vega Exp. 1878) 1 sp., h. 8; ap. 4.8; d. 10.2; wh. 5 (var. 2 c, determined by Aurivillius as M. obscura var. intermedia).

Spitzbergen, West coast: Horn Sound, 40—60 fms, stones, clay, 10 sps, max. d. 15.6 (var. 1 a, 1 b, 1 c); one sp., elevated, smooth (var. lævior), radula normal. — Bel Sound, 12—26 fms, stones, algæ (Torell 1858), 25 sps, max. d. 14 (var. 2 a—2 c; other specimens var. 1 a, max. d. 16.1); D:o, 5—8 fms, stones, algæ, 16 sps,

max. d. 12.7 (var. 2 c—a); D:o, 3—6 fms (1864), algæ, 1 sh., D:o, 30—40 fms, stones, zoophytes (Torell) numerous sps, max. d. 18 (var. 2 c), Fig. 20. — D:o, Recherche Bay, between Reindeer Point and Fox Glacier, 90 m, stones with fine, grayish blue clay ($^{8}/_{7}$ 1898), 2 sps, max. d. 10.5 (var. 2 a). — Skans Bay, 15 fms, clay ($^{22}/_{7}$ 1873), 18 sps, max. d. 16 (var. 2 a); shell in sculpture like M. obscura, but radula typical. — Ice Fiord, without definite locality, 15—70 fms, stones (1861) many sps, max. d. 15.5 (var. 2 a); D:o, 50 fms, fine clay (Torell) 1 sp.; Green Bay, 5—20 fms, clay with stones and algæ ($^{1}/_{8}$ 1868) 12 sps, max. d. 15.4 (var. 2 a—2 c); Advent Bay, 30 fms, clay (Torell) 1 sp.; D:o, 5—10 fms, clay ($^{3}/_{8}$ 1868) 8 sps, max. d. 19.8; wh. 6 $^{3}/_{4}$ (var. 2 a); Safe Bay, 30—50 fms, bluish clay ($^{27}/_{6}$ 1864), 6 sps, max. d. 15 (var. 1 a—2 a); Cape Thordsen (Villander 1870) 3 sps, max. d. 15.1 (var. 1 a—2 a). — English Bay, 40—60 fms, stones, 8 sps, max. d. 16.3 (var. 2 a). — Kings Bay, 30—40 fms, clay with stones ($^{17}/_{8}$ 1868) 3 shs (var. 2 a); D:o, 40—60 fms, 13 sps, max. d. 13.4. — Cross Bay, 2 fms, clay (1861) many sps; D:o, 60 fms, clay with stones, 1 sp. (var. 2 a); D:o, 30—200 fms, 3 sps, max. d. 16.5 (var. 1 a—2 a); D:o, 2 fms, many sps, max. d. 12 (var. 1 a—1 c). — Seven Ice Mountains, 30 fms, stones, 4 sps, max. d. 17 (var. 2 a). — Magdalena Bay, 20 fms, sand (Torell) 2 sps, max. d. 17; D:o, 4—10 fms, stones, algæ (Torell) 3 sps, d. 15.4 (var. 1 a); D:o, 20 fms, sand ($^{26}/_{7}$ 1864) 3 sps, max. d. 17 (var. 2 a). — Kobbe Bay, 2—6 fms, sand, algæ (1861) many sps, max. d. 18.6 (var. 2 a—2 c—1 a), Fig. 18. — Danes Island, Virgo's harbour, 79° 43′ N., 10° 52′ E., 25—30 m, gray clay, Laminariæ ($^{27}/_{8}$ 1898) many sps (var. 2 a—1 c). — Danes Gat, 7—10 fms, stones with algæ ($^{21}/_{8}$ 1868) 3 sps, max. d. 15.4 (var. 2 a—2 c—1 c). — Amsterdam Island, 12 fms, stones ($^{23}/_{5}$ 1861) 1 sp., d. 12.4 (var. 2 a). — Smeerenburg Bay, 4—10 fms, algæ, rocks ($^{22}/_{8}$ 1868) many sps, max. d. 19.5 (var. 2 c); D:o, 70—26 fms, 4 sps, max. d. 12.7 (var. 1 a); D:o, 25 fms, stones, clay (1872) 1 sp., d. 9.8 (var. 2 a); D:o, 90—110 fms, stones, clay (1861) 3 sps, max. d. 13.5. — Hackluyts Headland, 20 fms, red algæ (1858) 1 sh.; D:o, 16—20 fms, clay (1861) numerous sps, max. d. 15.6 (var. 1 a—1 b—2 a), Fig. 23.

Spitzbergen, North coast: Fairhaven, between Inner Norwegian Island and Polhem harbour, 15 fms, sand ($^{29}/_{8}$ 1872) 3 sps (var. 2 c); D:o, on the shore opposite Inner Norwegian Island, 2—3 fms, rocks with algæ ($^{27}/_{8}$ 1872) 6 sps, max. d. 20 (var. 2 c); D:o, 10—30 fms, sand, clay; also in running water in the glacier bay (1872) many sps, max. d. 14.6 (var. 2 c—1 a). — Foul Bay, 15 fms, sand ($^{23}/_{8}$ 1872) 12 sps, max. d. 14. — Norwegian Islands, 15—20 fms, stones, sand ($^{14}/_{8}$ 1872) numerous sps, max. d. 17.5 (var. 2 a). — Cloven Cliff, 12—20 fms, stones, algæ (Torell 1858) numerous sps, max. d. 18 (var. 2 a). — 80° N., 13° 30′ E., 20 fms ($^{1}/_{6}$ 1861) 2 sps. — Red Bay (1861) many sps, max. d. 18.5 (var. 2 c). — Liefde Bay, 3—5 fms, algæ, stones, clay ($^{29}/_{8}$ 1868) many sps, max. d. 14.7 (var. 2 c—1 a); D:o, 10—30 fms, clay, 1 sh., d. 11.7; D:o, 10—15 fms ($^{2}/_{9}$ 1868) 8 sps, max. d. 14 (var. 2 a—2 c); D:o, 20—30 fms, clay with stones ($^{3}/_{9}$ 1868) many sps, max. d. 14 (var. 1 a—2 a); Liefde Bay, inlet, 140 m, stones, red algæ, 1 sp., d. 9 (var. 1 a). — Wijde Bay, 30 fms, fine clay (1861) 2 sps, max. d. 18. — Mossel Bay, 2—12 fms, algæ, Lithothamnium, sand, stones (1872—73) many sps, max. h. 17.5; d. 19.5 (var. 2 a—2 c). Off Mossel Bay, 12 fms,

sand (1872—73) 1 sp., d. 14 (var. 2 b). — E. of Vertegen Hook, 40—50 fms, stones (1861) 1 sp., d. 5.6. — Treurenburg Bay (1861) 21 fms, clay, 6—70 fms, sand, clay, numerous sps, max. d. 18.5 (var. 2 a—2 c). — Off Hekla Cove, 10—14 fms, clay, 4 sps, max. h. 19; ap. 10; d. 22.4; wh. 6 3/4 (var. 2 c). — 80° N., 18° 30′ E., 10 fms, stones (19/7 1861) 3 sps, max. d. 15 (var. 2 c). — Lomme Bay, 5—15 fms, algæ, stones, clay (11/9 1868) max. d. 13.7 (var. 2 c); D:o, 25—40 fms, clay with stones (9/9 1868) many sps, max. d. 17.5 (var. 2 a). — Hinlopen Strait, 50 fms, fine reddish clay (5/8 1861) 2 sps, max. d. 10.5 (var. 2 a); D:o, 10—20 fms, clay with stones, numerous sps, max. d. 17.6, Fig. 19; D:o, 8 fms, stones (10/7 1861) 4 sps. — Lovén's Mount, 36 fms, clay with stones (11/9 1868) 3 shs, max. d. 10.5 (var. 2 a). — Shoal Point, 20—30 fms (1861) many sps, max. d. 18. — Low Island, stones (25/7 1861) 1 sp., d. 9.6 (var. 2 c). — Brandywine Bay, 5—15 fms, clay with stones, 10 sps, max. d. 14.5. — Parry Island, 20 fms (8/9 1868) 2 sps, max. d. 12 (var. 2 c).

Spitzbergen, East coast: Waygat Islands, 50—70 fms (1861) many sps, max. d. 14.4. — King Charles Land, Swedish Foreland, 10—16 m, fine blackish gray sand, stones, clay, algæ (6/8 1898) many sps, max, d. 15.4 (var. 2 c); D:o, Bremer Sound, 100—110 m, bottom temp. — 1.45°, fine clay with big stones, Biloculina sparse (8/8 1898) 7 sps, max. d. 17.5 (var. 2 c). — Stor Fiord, 5—10 fms, fine clay (23/8 1864) 13 sps, max. d. 17 (var. 2 a—2 c); D:o, 4—7 fms, fine clay (23/8 1864) 3 sps, max. d. 7.7 (var. 1 b). — Between Hope Island and Beeren Island, 75° 49′ N., 24° 25′ E. 80 m, rocks, bottom temp. — 1.42° (21/6 1898) 4 sps, max. d. 17.2 (var. 2 a).

Iceland (Odhner 1910). Dimensions: Berufjord, h. 11; ap. 5.2; d. 11.8; wh. 6 1/4, Fig. 17. — Bjarnanes, h. 12; ap. 5; d. 12; wh. 6 1/2.

West Greenland (Posselt & Jensen 1898). Maximal dimensions: Egedesminde, h. 8.5; ap. 4.5; d. 10; wh. 5 1/2, Fig. 4. — Godthaab, h. 9; ap. 4; d. 8.8; wh. 6 1/4, Fig. 5. — Julianehaab, h. 14.5; ap. 7.5; d. 15.2; wh. 6, Fig. 6—7. — Umanak (var. lævigata), h. 14; ap. 8.5; d. 17.5; wh. 6, Figs. 8, 9, 12; D:o (forma typica), h. 14; ap. 7.5; d. 17.5; wh. 6 1/4, Figs. 9 and 12. — Kekertak, h. 15; ap. 8; d. 18; wh. 6 1/2, Figs. 10, 11. — Upernavik, h. 13.5; ap. 7.3; d. 16; wh. 6, Fig. 13. — Pröven (var. umbilicalis). h. 13.5; ap. 7.5; d. 16.5; wh. 6 1/2, Fig. 14. — Cape York (var. umbilicalis), h. 13; ap. 8; d. 17; wh. 6, Figs. 15, 16. — Further: Cape Dudley Digges, 30—45 m, mud (E. Nilson 5/7 1894) many sps, max. h. 15.5; ap. 9.5; d. 23; wh. 6 3/4 (var. umbilicalis). — 73° 48′ N., 80° 30′ W., 14—27 m, hard stony bottom (E. Nilson 25/8 1894) many sps, d. 13.5 (var. umbilicalis). — 72° 8′ N., 74° 20′ W., 30—80 m, hard mud (E. Nilson 11/9 1894) 2 sps. max. d. 13.7 (var. umbilicalis). — 64° 56′ N. 66° 18′ W., on the shore, low water (E. Nilson 12/10 1894) many sps, max. h. 18.5; ap. 10.5; d. 24; wh. 7 (var. umbilicalis; umbilicus very wide, perspective, sculpture none, but on the uppermost whorls feeble spiral striæ).

East Greenland (Hägg 1905) 3—300 m, var. 2 b, d. 21.9. Further: Franz-Josef Fiord, E. of Cape Weber, 73° 32′ N., 24° 35′ W., 100—110 m, mud with stones and gravel (28/8 1899) 2 sps, juv.

Bank of Newfoundland, 46° 5′ N., 51° 44′ W., 56 fms, sand, shells (Ing. & Glad.

Exp. $^{16}/_{8}$ 1871) 1 sp., d. 6 (var. 1 b). — D:o, 45° 53′ N., 51° 56′ W., 50 fms, stones, shells ($^{16}/_{8}$ 1871) many sps, max. h. 8; ap. 4; d. 9.3; wh. 5 $^{1}/_{2}$.

Variation of the shell and the radula.

General remarks. As to form, the shell varies in two ways: 1) towards an elevated shape and, 2) towards a more or less depressed one. As to sculpture the following stages may be distinguished: a) the normal sculpture, composed of rather coarse, flattened keels, abruptly truncated in their upper margin by a spiral impression; b) a coarser sculpture, derived from the latter by means of an additional shallow furrow on the keels, through which these are given a definite lower margin; c) a finer sculpture, derived from the first by an extreme depression of the keels, so that at last only fine striæ remain, which may in extreme cases wholly disappear.

Norway, limits	h.	4—5	6—7	9—10	max. 10 (Finmark)
of variation,	ap.	2.2—3.2	3—4.2	4.1—5.6	5
60 sps	d.	4.5—6.7	6.1—8.9	8.8—12	10.5
measured	wh.	$4^{1}/_{2}$—$5^{1}/_{4}$	$5^{1}/_{4}$—$5^{3}/_{4}$	6—$6^{1}/_{2}$	$6^{1}/_{2}$

The sculpture characteristic of Norwegian shells is the coarser spiral liration b); and often short longitudinal folds appear at the suture of the shells (M. undulata Sowerby). Sometimes, however, the shell is entirely smooth and either of a conical shape (var. lævior Jeffreys), e. g. from Bergen, or depressed like var. umbilicalis, e. g. specimen from Bejan and Bodybet.

Iceland. All these specimens belong to the variety 1 b, agree wholly with the Norwegian forma undulata, and fall within the same limits of formal variation. The maximal size is greater here than in Norway. Smooth specimens also occur, belonging to the conical var. lævior, but var. umbilicalis is not represented in the collections.

Murman Coast and Kola Peninsula. These specimens agree with the Norwegian form 1 b; no examples of var. umbilicalis have been found.

Kara Sea. Leche's M. groenlandica var. rudis Mörch is like the Norwegian shell, but somewhat lower than the specimens from Finmark, similar to the typical form of Spitzbergen and Greenland; besides this occur varieties 2 a—2 c (var. lævigata).

Spitzbergen,	h.	4—5	6—7	9—10	13—14	18—19	max. 18.6 (Advent Bay)	and 18.5 (off Hekla Cove)
limits of variation;	ap.	2.3—3.5	3.7—4.8	5—6.3	6.5—8.8	9—10.5	10	9.5
130 sps measured	d.	5—7	7.5—10	10.3—13.3	14.5—18	19—22.4	19.8	22.4
	wh.	$4^{3}/_{4}$—5	5—$5^{1}/_{2}$	$5^{1}/_{4}$—$5^{3}/_{4}$	$5^{1}/_{2}$—$6^{3}/_{4}$	$6^{1}/_{4}$—$6^{3}/_{4}$	$6^{3}/_{4}$	$6^{1}/_{4}$

For a few specimens the measurements fall out of these limits. Such forms are either extraordinarily low or exceptionally high. In the latter case they agree entirely with the shells from Finmark or fall out of the limits of their variation (e. g. specimens from Virgo's harbour: h. 15.3; ap. 7.4; d. 16; wh. $6^{3}/_{4}$ (var. 2 c). Greatly

elevated shells of coarse sculpture occur at Hackluyts Headland and in Stor Fiord, at the first named locality mixed with transitions to var. 2 a.

Greenland,	h.	4—5	6—7	9—10	13—14	max. 18.5 (64° 56′ N.)
limits of variation;	ap.	2.5—3.6	3—5.3	4.2—6.8	6.3—8.7	10.5
130 sps measured	d.	5—6	6.4—10.8	9.3—14	13—18.5	24
	wh.	$4^3/_4$—5	5—$5^1/_2$	$5^1/_2$—6	6—$6^1/_2$	7

Two extreme forms may be distinguished, forma typica and var. umbilicalis, which are connected by series of intermediate forms. Forma typica is more elevated, usually sculptured in accordance with a) or b) (see above), though coarsely sculptured forms, similar to the Norwegian shells, are more rare. Var. umbilicalis is usually smooth or feebly sculptured; in young specimens, as also in the upper whorls of the older ones, a coarser sculpture always appears. Specimens of var. umbilicalis from East Greenland, described by Hägg, 1905, are strongly sculptured. Form and sculpture are not in reciprocal relation to each other, though in high shells the sculpture is usually more distinct, in lower ones more feeble, yet all combinations of form and sculpture occur.

Newfoundland. These shells are similar to the Norwegian form, but are comparatively more depressed; they also resemble specimens from Greenland.

Variation of the radula: The number of median teeth is constantly 6 on each side and an incomplete lateral tooth always occurs outside of them. This number is present even in very young specimens (cfr Pl. 6 fig. 20). The number of lamellæ varies between 70 (fig. 16, Julianehaab) and about 100 (fig. 17, Berufjord), the average being about 90. In young specimens a lesser number occur *e. g.* 50 (fig. 20). The rhachian tooth may be of a more quadrangular shape, more or less dilated, but these characters pass over into one another, and no rules for correspondence with the shell characters are possible of establishment. Var. umbilicalis varies in this respect similarly to forma typica.

General Distribution:

Norway: arctic region (h. 15; d. 14; G. O. Sars 1878; Schneider 1881, 1885, 1891, 1894; Aurivillius 1886; Bidenkap 1897; Norman 1902); west coast (Friele 1874; Lilljeborg 1851; Metzger 1875, 0—20 fms; Nordgaard 1907); Norwegian Sea (Friele 1901). — British Islands (Jeffreys 1865); North Channel (Jeffreys 1883). — Between Shetland and Faroe Isles, 93—150 m (Simpson 1910). — Faroes, 650 fms (Mörch 1868; Jeffreys 1883). — Iceland (Mörch 1869[a]; Verkrüzen 1872; Johansen 1902). — Jan Mayen, 30 fms (Friele 1878). — Murman Coast, White Sea, Nova Zembla; Kara Sea (Herzenstein 1893, Dautzenberg 1911). — Russian Lapland (Middendorff 1849). — Barent Sea, 25 fms (D'Urban 1880); D:o, 150—170 m (+ var. *umbilicalis*, 66—194 m; Knipowitsch 1901[a]). — Kara Sea, 5—60 fms (Leche 1878; Collin 1887). — Franz-Josef Land, 26—110 m (Knipowitsch 1901[a]; Melvill & Standen 1900). — Spitzbergen, to 98 m (Kni-

powitsch 1901[b], 1902, d. 19.5); Krause 1902, d. 18.5, var. *umbilicalis;* type only on the west coast, Prince Charles Foreland, d. 12.5; Friele 1878 and 1886). — Jan Mayen (Friele 1878). — E. Greenland (Dall 1886; Hägg 1905). — W. Greenland to 160 fms (Posselt & Jensen 1899). — Grinnel Land, 82° 29′ N. (Smith 1877). — Jones Sound and North Devon, 4—60 m (var. *umbilicalis*, d. 20.5, Grieg 1909). — Parry Islands, type and var. *umbilicalis* (Sutherland 1852). — Cumberland Sound (var. *umbilicalis*, d. 22.3, Pfeffer 1886). — Northumberland Sound (var. *umbilicalis*, Reeve 1855). — East Canada (Whiteaves 1901). — New England (Gould & Binney 1870). Depths to 160 fms. Stones, sand, algæ, clay.

Margarita cinerea (Couthouy 1839)

(incl. var. **striata** Broderip & Sowerby).

Pl. 4 figs. 28—37; Pl. 5 figs. 1—5; Pl. 7 figs. 1—4.

Habitat:

West coast of Norway: Dröbak, Stormeja, 60 fms (Lovén & Torell) 1 sp., h. 5.3; ap. 2.4; d. 6.2; wh. 5; spiral keels 2 primary + 3 secondary; angular and umbilical keel as well as longitudinal plications strong. — Tromsö, 20 fms (Goës & Malmgren) 1 sh.; Kalfjord, 50 fms (G. & M.) 2 shs, max. h. 7.2; Kvalsund, 20 fms, rocks (G. & M. 1861) 1 sp., h. 12.1; ap. 6; d. 11.9 (angular keel feeble; many spiral keels, base with coarse spirals), Fig. 31; Grötsund, 5—80 fms, clay (G. & M. 1861) 6 sps, max. h. 9.6; ap. 4.5; d. 9.8; wh. 6; 2 primary spiral keel on the 4th, 1 on the first wh., Fig. 5; Ulfsfjord, 25—50 fms (G. & M. $^{16}/_{10}$ 1861) 12 sps, max. h. 13.2; ap. 6.1; d. 12.3; wh. 7; 2 primary spiral riblets on the 4th wh.; on the upper wh. 3 primary and 4 secondary riblets; angular and umbilical keels strong; base flattened or somewhat convex, with or without striæ; longitudinal lines well defined; Kjosen, 25—40 fms, clay (G. & M. 1861) 19 sps, max. h. 12; ap. 5.2; d. 11.7; wh. 6; Karlsö, low water ($^{9}/_{5}$ 1861) 1 sp.

Finmark, without definite locality (Sparre Schneider) a few sps, max. h. 12.1; ap. 5.3; d. 11.4; wh. 6 $^{1}/_{2}$, Fig. 3; D:o (Lovén) 7 sps, max. h. 8.3; ap. 4.6; d. 8.3; wh. 5 $^{3}/_{4}$, Fig. 4. — Hammerfest, 60—100 fms, sand, shells, 5 shs. — Kvænangen, 15—60 fms (Cleve) 9 sps, max. l. 8.6; d. 7.6 (Mus. U.).

Murman Coast and Kola Peninsula: Jeretik, 11 fms (Herzenstein 1887) 1 sh., h. 7.5. — Subowski, 14 fms, sand (Sandeberg $^{6}/_{9}$ 1877) 2 sps, max. h. 7.7; ap. 3.6; d. 7.9; wh. 5 $^{3}/_{4}$. — Waidaguba, 1 mile off the coast (Sandeberg $^{28}/_{8}$ 1877) 4 shs, max. h. 8.5; ap. 4.8; d. 8.7; wh. 6.

W. of Nova Zembla: 73° 21′ 34″ N., 53° 20′ E., 30 fms (Knipowitsch 1893) 2 sps, max. h. 21.7; ap. 10; d. 21; wh. 6 $^{3}/_{4}$, var. striata. — Kostin sharr (Leche 1878), sculpture: on the upper part of the whorls 5 equally strong keels, on the base finer ones; no angular and an obsolete umbilical keel; max. h. 17; ap. 8; d. 16.5 (=Leche's var. multilirata Mörch), Fig. 36.

Kara Sea (LECHE 1878). Matotschkin sharr, 2 sps, form a transition between var. striata and the type by having keels alternating in strength and a distinct umbilical (but an obsolete angular) keel; max. h. 15; ap. 7; d. 14.6; wh 6 1/2.

North of Siberia and Behring Sea (AURIVILLIUS 1887). These specimens belong to var. striata; forma typica is not obtained. Max. h. 25; ap. 12.5; d. 26; wh. 7. (St. 1068), Fig. 2.

Spitzbergen, West coast: Horn Sound, 40—60 fms, stones, clay (Torell 1861 and 1864) 10 sps (type, Fig. 37) and 7 shs (striata), max. h. (type) 12.8; ap. 5.8; d. 12; wh. 6 1/2; angular and a feeble umbilical keel present; 1 stronger spiral keel on the whorls; base mostly striated; var. striata, max. h. 21.5; Horn Sound Islands, 30—48 fms, stones, clay (1864) 1 sp. (striata). — Bel Sound, 7—8 fms, stones algæ (Torell 1858) 1 sp., h. 8.2 (striata); D:o, 5—12 fms, morainic clay (Torell 1858) 1 sp,, h. 7; 1 sh., h. 10.5 (striata); D:o 30 fms, fine clay (Torell) 1 sp., h. 14.1; ap. 7 (transition form; sculpture of alternating coarse and fine ribs). — Recherche Bay, close by Fox Glacier, 90 m, stones (4/7 1898) 1 sh., h. 6; (striata); D:o, 40 m, blackish gray clay, sand, pebbles (5/7 1898) 1 sh., h. 19 (striata). — Skans Bay, 15 fms, clay (22/7 1873), 4 sps, max. h. 21; ap. 10.6; d. 21.5; wh. 6 3/4 (forma typica). — Ice Fiord; without definite locality, 10—20 fms, clay with stones (1861) 1 sp., h. 7.8 + 1 sh., h. 17.5 (striata); D:o, Safe Bay, 30—50 fms, fine bluish clay (27/6 1864) 1 sp. h., 11; (striata) with 11 spiral ribs and an angular keel); D:o, Advent Bay, 25—30 fms (11/8 1868) 1 sp.; h. 5 (striata). — English Bay, 60 fms, clay, stones (1861); 3 sps, max. h. 10 (striata). — Kings Bay, 40—60 fms, clay, stones (1861); 1 sp. + 2 shs (typica). — Kings and Cross Bay (1861) 4 shs, max. h. 11 (typica). — Cross Bay, 30—200 fms, clay (1861) ca 10 sps, max. h. 15; ap. 7; d. 14.2; wh. 6 3/4 (typica). — Seven Ice Mountains, 30 fms, stones (Torell), 9 sps, max. h. 10.1; ap. 5.8; d. 11.2; wh. 5 1/2 (striata); some young sps, (h. 3.3; d. 4) have 2 or 3 stronger ridges. — Magdalena Bay, 20 fms, sand (Torell) 1 sp. (striata). — Danes Gat, 7—10 fms, stones, algæ (21/8 1868) 1 sp., h. 10 (striata).

Spitzbergen, North coast: Smeerenburg Bay, 20—30 fms, sand, stones (1861) 2 sps, max. h. 15; ap. 7; d. 15; wh. 6 1/2 (striata); D:o, 90—110 fms, stones, clay (1861) 4 shs, max. h. 18.2; ap. 8.6; d. 18.1; wh. 6 1/2 (striata). — Foul Bay, 50 fms, clay, sand (12/8 1864) 1 sp., h. 11.5 (striata). — Fairhaven, 30—50 fms, clay (1864), 1 sh., h. 12 (typica); D:o, 10—30 fms, sand, clay (1872) 15 sps, max. h. 14 (transition form with angular and umbilical keel; spiral keel 8—10 of alternating strength); D:o, 10—15 fms, clay (29/8 1872) 5 sps, max. h. 9.1; ap. 5; d. 10.5; wh. 5 1/2 (typica). — Norwegian Islands, 10 fms, clay (20/8 1872) 1 sh., h. 4 (typica); D:o, 15—20 fms, sand, clay (1872) 15 sps, max. h. 12.2; ap. 6.3; d. 13.2; wh. 6 (typica). — Red Bay, 30—40 fms, clay (1861) 1 sp. (typica). — Liefde Bay, 5 fms, clay, algæ (3/9 1868) 2 sps, max. h. 9.5 (striata), Fig. 32; D:o, 10—30 fms, clay (1868) 1 sh., h. 10.2; ap. 5.5; d. 11.4; wh. 5 3/4 (striata; umbilicus wide, surrounded by a few spiral cords; base rounded, with a feeble angular keel; whorls with 9 ribs). — Off Vertegen Hook, 100 fms (3/7 1873) 1 sp., juv. — Treurenburg Bay, 6—45 fms, stones, sand, clay (1861) many sps, max. h. 21.4 (striata), Fig. 1. — Off Hekla Cove, 14 fms, clay (4/7

1873) 1 sh., h. 20.5 (striata). — Lomme Bay, 5—15 fms, algæ, stones, clay (10/9 1868) 2 sps, max. h. 15.6 (striata), D:o, 25—35 fms, clay, stones (9/9 1868) 3 sps, max. h. 18.3 (striata). — Lovén's Mount, 36 fms, clay with stones (11/9 1868) 3 sps max. h. 6.3; d. 7.5; wh. 5 (typica), — Hinlopen Strait, 10—25 fms, stones, clay (1861) 7 sps, max. h. 18 (var. striata); D:o 15—20 fms, clay with stones (1861) 2 sps, max. h. 16 (striata). — Shoal Point, 20—30 fms, clay (1861) 3 sps, max. h. 20 (striata). — Castrén's Islands, 30—40 fms, clay, stones, 1 sp., h. 7.4 (striata). — Parry Island (1868) 2 sps, max. h. 5.1; ap. 3; d. 5.8; wh. 4 1/2 (type?).

Spitzbergen, East coast: King Charles Land, Swedish Foreland, 12—20 m, fine blackish gray clay (8/8 1898) 2 sps, max. h. 17; d. 19 (striata); D:o, Bremer Sound, 100—110 m, fine clay with big stones, Biloculina sparse; bottom temp. — 1.45° (8/8 1898) 9 sps, max. h. 14.4; ap. 7; d. 14.2; wh. 6 (striata: many fine umbilical cords; angular keel feeble; 10 spiral keels on the whorls; sutures deep). — Walter Thymen Strait, the mouth, 30—40 fms (1864) 1 sp., h. 20; ap. 11; d. 20; wh. 6 1/2 (striata).

Stor Fiord, 5—10 fms, clay (23/8 1864) 10 sps, max. h. 19 (striata); D:o, 4—7 fms, fine clay (23/8 1864) 3 sps, max. h. 10; ap. 4.5; d. 9.1; wh. 6 (typical; with an angular keel and 1 coarser spiral ridge). — Whalers Point, 20—30 fms, clay (10/8 1864) 5 sps, max. h. 17; ap. 9; d. 19; wh. 6 (umbilicus wide without surrounding keel; no angular keel; striata).

Iceland (Odhner 1910). Measurements: Berufjord, forma typica, max. h. 12.3; ap. 5.5; d. 11.1; wh. 7 (spiral ribs 8, of which 2 stronger; angular keel feeble; umbilical keel strong; base convex, with strong cords; Fig. 33). — Hofsås, h. 12; ap. 5.6; d. 11.2; wh. 6 1/2 (10 ribs; base convex with dense feeble cords; no angular or umbilical keel). — Bjarnanes, h. 12.2; ap. 7; d. 13.8; wh. 5 3/4 (ribs 6 of which 3 somewhat stronger; no angular keel; umbilical keel rather feeble; base flat, nearly smooth). — Berufjord, var. striata, h. 20; ap. 10; d. 21.8; wh. 6 3/4, no angular and a feeble umbilical keel; spiral keels 4, of equal strength (fig. 35).

West Greenland (Posselt & Jensen 1899). Further: Cape Dudley Digges, 30—40 m, mud (E. Nilson 5/7 1894) 1 young sp., h. 2.5 (type). — 72° 8' N., 74° 28' W., 30—80 m, hard mud (E. Nilson 11/9 1894) 3 sps, max. h. 15; ap. 7.2; d. 14.7; wh. 6 3/4 (striata; no trace of the umbilical keel; umbilicus wide and surrounded by many fine cords; spiral sculpture disappearing on the last whorl). — Measurements: Omenak, h. 8.2; ap. 3.8; d. 8.3, wh. 5 1/2 (grandis). — Pröven, h. 14; ap. 7; d. 15; wh. 6 1/4 (forma multilirata): 14 fine and dense ridges on the whorls, on the upper ones 2 primary ridges; no angular nor umbilical keels (grandis), Fig. 30—34. — Godthaab, h. 11.5; ap. 5; d. 10.5; wh. 6 3/4 (forma typica): 3—6 (7) strong spiral keels on the whorls; base smooth or strongly sculptured; angular keel strong; umbilical keel distinct or sometimes replaced by a few feebler ones, Fig. 28. — Godhavn, h. 12; ap. 6; d. 11.8; wh. 6, Fig. 29.

East Greenland (Hägg 1905), Mackenzie Bay, max. h. 21; ap. 11.2; d. 21.5; wh. 7 (striata). — Pendulum Islands, 2 sps, var. grandis, the one sp. with stronger and unequal spiral keels and feeble angular and umbilical ones, the other sp. with feebler spiral keels and no umbilical nor angular ones. — Scoresby Sound, Harry's

Inlet, N. of NW. Fame Island, 23—25 m, hard clay (1/8 1899) 1 sp., d. 1.7; D:o, Cape Steward, 1 km off the coast, 70° 27′ N., 22° 35′ W., 13—18 fms, clay, stones, algæ (30/7 1899), 4 sps, max. h. 2.6 (striata).

Newfoundland: 46° 56′ N., 52° 28′ W., 81 fms, sand (Ing. & Glad. Exp. 15/8 1871) many sps. These agree with the Greenland forma grandis by having many unequal spiral keels (9 on the last whorl). One sp. is similar to var. striata, but it has a wider umbilicus, an angular and an umbilical keel and alternating ribs; measurements: h. 19.2; ap. 9; d. 19; wh. 7. In comparing this sp. with var. striata from Skans Bay there is but a slight difference in the higher shell and the angular and umbilical keels of the present form. — 46° 5′ N., 51° 44′ W., 56 fms, sand, shells (Ing. & Glad. Exp. 16/8 1871) 1 sh., h. 11.8; ap. 5.7; d. 12; wh. 6 1/4 (spiral cords 10, of which 2 primary; base convex, coarsely ribbed; no angular keel; a rather strong umbilical keel; type with characters of var. striata. — 45° 59′ N., 51° 49′ W., 56 fms, sand (Ing. & Glad. Exp. 16/8 1871) 1 sh., h. 21; ap. 8.5; d. 18.4; wh. 7 1/2 (spiral keels 10 of unequal strength; base convex, striated; no angular keel; a rather strong umbilical keel).

Limits of formal variation:

Norway;	h.	4—5	6—7	9—10	13—14	max. 13.2 (Ulfsfjord)			
40 sps	ap.	2—2.7	2.5—3.6	4—4.9	6.1	6.1			
measured	d.	4.1—6	6—7.5	8.5—9.9	12.3	12.3			
	wh.	4 1/2—5	5	5 1/2—6	7	7			
Spitzbergen;	h.	4—5	6—7	9—10	13—14	18—19	21—22	max. 21.4 (Treurenburg Bay)	
75 sps	ap.	2.5—3	3.2—4.5	4.2—6	5.8—8.1	8.2—10.4	10.5	10.5	
measured	d.	4 9—6	6.6—8.3	9—11.8	12.5—15.9	17.5—20.5	21.4	21.4	
	wh.	4 1/2	5	5—6	5 1/2—6 1/2	6 1/2	7	7	
North of Siberia	h.	4—5	6—7	9—10	13—14	18—19	24—25	max. 25 (Vega Exp.)	
and Behring Sea;	ap.	2.3—3	3.7—4.2	5—5.7	7.2—7.8	9.4—10	11.8—12.2	12.2	
averages of	d.	4.9—6	7—8.2	10.2—11.5	14.5—15.6	19—20	26	26	
variation	wh.	4 1/2	4 3/4	5 3/4	6	6 1/2	7	7	

Iceland;	h.	4—5	6—7		9—10		12—13		max.: type 12.8 (»Iceland»)	striata 20 (Berufjord)
		type	type	striata	type	striata	type	striata		
50 sps	ap.	2.1—2.9	3.1—3.9	3.6—4.1	4—5	5.5—6	5.2—6.2	7—7.5	6.2	10
measured	d.	4.3—5.7	6—7.3	7—8	8.5—10	10.5—11.5	10.8—12.2	13.4—14.1	11.6	21.8
	wh.	4 1/2—5	5—5 1/2	4 1/2—5	6—6 1/2		6 1/4—7	5 3/4	6 1/2	6 1/2

West Greenland;	h.	4—5	6—7	9—10	13—14	max. 14.2 (Kekertak)
95 sps	ap.	2—3	2.7—4.1	3.4—6	5.5—7.8	8
measured	d.	4.2—5.8	5.9—8	8—11.3	12—15.5	16
	wh.	4 1/2—5	5—5 1/2	5 1/2—6	about 6 1/4	6

An examination of the sculpture shows that two extreme forms of this species may be distinguished from one another, the typical *M. cinerea* of Couthouy and *M. striata* of Broderip & Sowerby. The first is characterised by having from 4 to 6 prominent spiral ridges, alternating with smaller ones; only one prominent keel appears on the apical whorls; both an angular and an umbilical keel are generally present; the base is flattened, smooth or finely striated. A form of a considerable height

and with a more rounded base (indistinct angular keel) has been described by G. O. Sars (1878) as var. grandis Mörch, but it is not identical with that form. In the other extreme variety of the present species, *var. striata* Brod. & Sow., the spiral ridges are of a uniform prominence, and about 5—8 in number; on the apical whorls 2 or more equally prominent ridges appear simultaneously; there are no prominent angular or umbilical keels; the base is more or less rounded and finely or coarsely sculptured. To this form belongs var. grandis forma *multilirata* Mörch (Pl. 4 fig. 34), which seems to be very nearly allied to the type of Broderip & Sowerby, because of its great number of spiral ridges (about 8 in Sowerby's fig. 3) and its regularly rounded base. But in var. striata the base is nearly smooth (cfr Gould & Binney 1870), while in forma multilirata it is coarsely sculptured. The typical var. grandis Mörch is figured on Pl. 4 fig. 33 and Pl. 5 figs. 1—2; the specimens figured have been compared with Mörch's originals in Copenhagen and are absolutely identical. To this form belongs M. cinerea forma typica of Sars 1878 and var. margaritifera Friele 1886. Sars has confused the type and var. grandis, but he gives the latter as a synonym of var. striata; Aurivillius (1887), Collin (1887) and Knipowitsch (1901) also consider them as identical. Posselt & Jensen (1899) say that M. striata is more coarsely spirally sculptured than Mörch's grandis; this agrees with my statement above, that M. striata is most closely allied to Mörch's forma multilirata. Friele (1886) makes the following statement: »Whether M. cinerea var. grandis Mörch is identical with the present species (M. striata Brod. & Sow.) I am unable to definitely say, but the M. cinerea var. striata illustrated by Sars, in Moll. reg. Arct. Pl. XXIV fig. 4 is not M. striata Brod. & Sow.»

I have studied the sculpture in different forms and found the following conditions as to the appearance of sculpture in earlier stages: In the typical form (M. cinerea Couthouy as above defined) from Greenland and Finmark, 1 strongly marked spiral ridge appears on the 2nd or 3rd whorl accompanied further on, on the 4th or 5th whorl, by a few fainter ones. The strongly marked ridge may be somewhat feebler and the fainter ones may even appear on the 3rd whorl. In forma multilirata from Pröven 1 strongly marked ridge appears on the 2nd whorl and some feebler ones on the 3rd. In var. grandis from Spitzbergen 2 or more comparatively faint liræ appear simultaneously on the 3rd whorl, but a very feeble trace of a keel may be visible even on the 2nd whorl. One of the earlier liræ may be more strongly marked (Kara Sea). Confer further the notes of sculpture given in several cases above.

In regard to all the formal and sculptural characters, all transitional forms occur between forma typica and var. grandis Mörch, represented in one case by forma multilirata and striata, in the other by var. grandis Sars and the form from Kara Sea. On this account I consider all these forms as varieties of the same species and not, as Friele (1886) does, as distinct species, though the extreme forms might be considered to favour such an opinion.

Variation of the radula: Like the sculpture, the radula also exhibits two different types. In certain forms the rhachian teeth are much dilated towards the sides,

being as broad as they are long with bases circularly rounded and broad necks under the apices, densely and finely denticulated (8—14 denticles on each side) and with a broadly rounded central cusp. Specimens of this type agree in sculpture with var. grandis and striata. In the second type the rhachian teeth are usually more elongated, with their sides irregularly rounded, a comparatively narrow neck, stronger and fewer denticles (5—7 on each side) and an acute or subacute central cusp. These belong to the type; the teeth of forma multilirata (Pl. 7, fig. 1 g, h) agree for the most part with the first-named form.

General Distribution:

Norway: Finmark to Lofoten, 10—100 fms (d. 11, G. O. Sars 1878; Schneider 1881; 1885, d. 12.5; 1891, 1894; Aurivillius 1886; Bidenkap 1897; Norman 1902, to 125 fms); Bergen, Florö (Friele 1876). — Murman Coast, White Sea, Nova Zembla, Arctic Ocean N. of Siberia (Herzenstein 1893). — Kara Sea, 5—60 fms, type and var. *grandis* (Leche 1878; Collin 1887). — Barent Sea, type, 80 m, and var. *grandis*, 95—211 m; Franz-Josef Land, 1—110 m (D'Urban 1880, Knipowitsch 1901[a], Melvill & Standen 1900). — Spitzbergen, 10—60 fms, type? and var. *striata* (Mörch 1869; Krause 1892; Friele 1879, 1886, d. 18; Knipowitsch 1901[b], 1902). — W. of Norway, 350 fms, var. *margaritifera* (Friele 1886). — Iceland, type and var. *striata* (Mörch 1869[a], Verkrüzen 1872; Odhner 1910). — W. of Ireland, 173 fms, dead sh. (Jeffreys 1883). — East Greenland, type and var. *grandis*, 3—300 m, d. 21.1 (Hägg 1905). — West Greenland to 300 fms, type and var. *grandis* (Posselt & Jensen 1899). — Grinnel Land (Smith 1877). — North Devon, 35 m, d. 15.5, var. *striata* (Grieg 1909). — East Canada, 10—100 fms, h. 18; type and var. *grandis* (Whiteaves 1901). — New England (Gould & Binney 1870); Cape Cod, 41 fms (Verrill 1883). — Mexico (Jeffreys 1869). — Behring Sea and Alaska, type, var. *grandis* and *striata* (Dall 1875, 1885; Crosse 1877; Krause 1885). Depths to 350 fms. Clay, sand, stones, algæ.

Margarita Vahlii Möller 1842.

Pl. 3 figs. 35—40; Pl. 6 figs. 6—7.

Habitat:

Spitzbergen: Bel Sound, 30—40 fms, stones, zoophytes (Torell 1861) 40 sps, max. h. 2.5; ap. 1.5; d. 2,8, Figs. 36, 37. — Amsterdam Island, 12 fms, stones (1861) 3 sps, max. h. 2.5; ap. 1.4; d. 2.6. — Danes Gat, Virgo's harbour ($^{26}/_{8}$ 1898) 2 sps, max. h. 3.3; ap. 1.8; d. 3.3, Fig. 39. — 80° N., 13° E., 20 fms ($^{1}/_{6}$ 1861) 2 sps, max. h. 2.4; ap. 1.4; d. 2.6—2.8. — Vertegen Hook, 80° 10′ N., 17° E., 45 fms, stones (1861) 1 sp., h. 1.5. — Off Hekla Cove, 14 fms, clay ($^{4}/_{7}$ 1873) 2 sps, max. h. 2.5; ap. 1.4; d. 3. — Shoal Point, 30 fms, clay ($^{15}/_{7}$ 1861) 2 sps, max. h. 2.9; ap. 1.7; d. 3, Fig. 35. — Hinlopen Strait, 79° 45′ N., 20° E., 50 fms, fine reddish clay ($^{5}/_{8}$ 1861) 1 sp., max. h. 2.3. — Lovén's Mount, 36 fms, clay with stones ($^{11}/_{9}$

1868) 1 sp., h. 2.7. — Waygat Islands, 60 fms, clay (1861) 4 sps, max. h. 2.5. — King Charles Land, 78° 50′ N., 27° 39′ E., 20 m, fine reddish yellow clay, bottom temp. + 0.2° ($^{12}/_{8}$ 1898) 1 sp., h. 2.7; ap. 1.5; d. 3.1. — D:o, Bremer Sound, 100—110 m, fine clay with big stones, Biloculina sparse, bottom temp. —1.45° ($^{8}/_{8}$ 1898) 4 sps, max. h. 2.1. — D:o, Swedish Foreland, 10—16 m, fine blackish-gray sand, stones, clay, algæ ($^{6}/_{8}$ 1898) 3 sps, max. h. 2.8.

Iceland (Odhner 1910). Dimensions: Öfjord, h. 3; ap. 1.5; d. 3; wh. 5, Fig. 38.

Greenland (Posselt & Jensen 1899). Dimensions: Pröven, h. 4.3; ap. 2.2; d. 4.3; wh. 4 $^{3}/_{4}$, Fig. 40. — Upernivik, h. 3; ap. 1.5; d. 3.2. — Further: Kingitok, 73° 17′ N., 56° 10′ W., 27 m, hard stony bottom (E. Nilson $^{16}/_{6}$ 1894) 1 sp., d. 1.9. — Cape Dudley Digges, 30—40 m, mud (E. Nilson $^{5}/_{7}$ 1894) 10 sps, max. d. 3.

Variation of the radula (cfr. Pl. 6 fig. 6): This — like the shell — is very constant for different districts, being of the formula 40—50 . 0 . 5 . 1 . 5 . 0 . 40—50. There is no transitory lateral tooth. The central and outer median teeth are furnished with about 6 strong denticles on either side. The tooth outside the 5th median one differs from the others by having comb-like denticulation restricted to its outer margin. Its denticles are denser, finer and blunter than those of the median teeth, in this respect agreeing with the outmost teeth or lamellæ, to which it therefore must be reckoned. On the 6 first of these a denticulation is evident, but on the following it disappears. The outermost lamellæ are very long and pin-shaped.

In its form this radula shows agreement with Margarita in its great number of median teeth and lamellæ, but differs from the latter by the denticulation of the lamellæ occuring only in their outer margin and by the absence of a lateral tooth mediating between lamellæ and median teeth.

General Distribution:

Greenland to 300 fms (Posselt & Jensen 1899). — Iceland (Odhner 1910). — Spitzbergen, Norwegian Islands, 115—146 fms (Friele 1879); Stor Fiord, 20 m (Knipowitsch 1901[a]). — White Sea (Herzenstein 1893). — Parry Islands (Sutherland 1852). — Behring Sea (Krause 1885). Puget's Sound (Carpenter 1864). Depths 10—300 fms. Sand, stones, clay, algæ.

Solariella lævis Friele 1886.

Distribution: North Atlantic, W. of Norway, 300—350 fms, Norwegian North-Atlantic Expedition St. 124 and 173 b (Friele 1886).

Solariella varicosa (MIGHELS & ADAMS 1842).

Pl. 5 figs. 6—14; Pl. 7 figs. 5—6.

Habitat:

Finmark—Kola Peninsula: Varangerfjord (Nylander & Gadd) 1 sh., h. 9.3; ap. 4.5; d. 8.8; wh. 6. — Vadsö (Sparre Schneider) many sps, max. h. 8.4; ap. 4; d. 7.7; wh. 6 1/2, Fig. 7. — Kildin Island, Murman Coast, 5—10 fms (Herzenstein 1887) 3 sps, max. h. 7.5; ap. 4; d. 7.6, Fig. 8. — Litza, Kola (Sandeberg 5/8 1877) 4 sps, max. h. 8.5; ap. 4.4; d. 9. — Waidaguba (Sandeberg 18/8 1877) 3 sps, max. h. 7.2; ap. 3.9; d. 7.2; Fig. 10. — Teriberki Fiord, 20 fms (Sandeberg 21/8 1877) 1 sp., h. 5.2; ap. 3.3; d. 5; wh. 5. — Subowski, 14 fms, sand (Sandeberg 6/9 1877) 3 sps, max. h. 7.2; ap. 3.8; d. 7.2, Fig. 6.

Kara Sea (LECHE 1878, M. elegantissima). Dimensions: Cape Grebeni, max. h. 9; ap. 4.4; d. 8.5; wh. 6, Fig. 9. — Korepowskoi, fossil, max. h. 11; ap. 5; d. 11.2. — Matotschkin sharr, max. h. 8; ap. 4.5; d. 8.1, Fig. 12.

Behring Sea (AURIVILLIUS 1887), 1 sp. (Vega Exp. Nr. 1075), h. 7.6; ap. 3.9; d. 7.8.

Spitzbergen: Ice Fiord, 18 fms, clay with stones (1861), 1 sp., h. 9.5; ap. 5.8; d. 10.5 (aberrant form with feeble umbilical spiral keels and with sharp, impressed spiral striæ). — Amsterdam Island, 25 fms, mud (1861) 2 sps, max, d. 5.3. — Hackluyts Headland, 18—20 fms (1861) 2 sps, max. d. 8.9, Fig. 14. — Red Bay (1861) 1 sp., d. 10. — Off Mossel Bay, 12 fms, sand (15/1 1873) 7 sps, max. d. 11.8; Mossel Bay, 2—30 fms, sand, clay, shells, algæ, Lithohamnium (1872—73), numerous sps, max. h. 11.6; ap. 6.2; d. 12.4; wh. 5 1/2 (3 feeble umbilical keels). — Treurenburg Bay, 30 fms, stones with clay (17/6 1861) 2 sps, max. d. 3.2; D:o, 6—30 fms, clay, sand (20/6 1861) 70 sps, max. d. 11 (umbilical keels 2—3), Fig. 13. — Hinlopen Strait, 80° N., 17° 5′ E., 10—25 fms, stones (1861) 14 sps, max. d. 12. — Low Island, 80° 20′ N., 18° 5′ E., 16 fms, stones (25/7 1861) 1 sh., d. 6.7.

North Atlantic: 52° 5′ N., 52° 19′ W., 161 fms, clay mixed with sand (Lindahl 12/8 1871) 1 fragment of a large shell. — 49° 41′ N., 52° 9′ W., 188 fms, greenish clay (Lindahl 12/8 1871) 4 shs of a fresh appearance, max. h. 4.6; ap. 2.5; d. 5.

Newfoundland Bank: 46° 5′ N., 51° 44′ W., 56 fms, sand, shells (Lindahl 16/8 1871) 3 sps, max. h. 8; ap. 4.2; d. 7.9, Fig. 11.

Limits of formal variation:

Spitzbergen;	h.	4—5	6—7	8—9	9—10	11—12	max. 11.6 (Mossel Bay)
60 sps	ap.	2—3	3.3—4.2	4.2—5.1	4.5—5.4	5—6.4	6.2
measured	d.	3.7—5.4	5.9—7.6	7.9—9.9	8.9—11	11.2—12.4	12.4
	wh.	4	5	6	about 6	>6	>6

In sculpture the *Spitzbergian* form varies somewhat, the spiral keels of the angular and the umbilical regions of the shell being more distinct in young shells than in older ones;

the umbilical keels are 2 in number, but a feebler intermedial one may occur; sometimes the keels show a tendency to bipartition by the presence of impressed lines; in general a few feeble angular keels occur, one sometimes stronger than the rest; sometimes all angular keels are obsolete and the angular portion is only striated.

Norway—Kara Sea;	h.	4—5	6—7	8—9	max. 9.3 (Varangerfjord)
25 sps	ap.	2.2—3	3.2—3.8	3.6—5	4.5
measured	d.	4—5.2	5.7—7.2	7.4—9.4	8.8
	wh.	4—4½	5	6—6½	>6

Norway: The limits of formal variation fall lower here than in the Spitzbergian form. The specimens have therefore a more conical shape and are never depressed. 2—3 umbilical keels and feeble angular keels or striæ are present. — *Kara Sea*: The individuals here show a resemblance partly to the Spitzbergian and partly to the more elevated Norwegian form. The fossil specimens are of greater dimensions than the living ones.

Variation of the radula: The number of lamellæ is somewhat varying. Usually there are 9 on each side (Treurenburg Bay; d. 9.5; Newfoundland Bank, d. 7.9; Kildin Island, d. 7.6); larger specimens, however, have more lamellæ, *e. g.* 12 (Treurenburg Bay, d. 12), smaller ones less, 7—8 (Treurenburg Bay, d. 2.7 and d. 4.8). Sometimes the lamellæ show irregular traces of dentition, but usually they are smooth.

General Distribution:

Norway: Vadsö, 10—100 fms (h. 11, G. O. Sars 1878; Schneider 1894); Bogfjord (Norman 1902); Varangerfjord, 20—380 m (De Guerne 1886). — Murman Coast, White Sea, Nova Zembla and Kara Sea (Herzenstein 1893). — Barent Sea, 275 m (Knipowitsch 1901[a]); 62—168 fms (D'Urban 1880). — Kara Sea, 5—90 fms (h. 11, Leche 1878). — Spitzbergen, 9—100 m (Krause 1892; Knipowitsch 1901[b], 1902, h. 11; Hägg 1905). — Franz-Josef Land, 75 fms (Melvill & Standen 1900). — Behring Sea, 65 fms (Aurivillius 1887; Krause 1885). — Japan (Jeffreys 1876). — Eastern Canada, to 60 fms (Whiteaves 1901). — New England, rare (Gould & Binney 1870). — N. of Hebrides, 170 fms (Jeffreys 1869). Depths to 380 m. Sand, stones, clay, algæ.

Solariella obscura (Couthouy 1839)

(incl. **S. albula** Gould, **S. bella** Verkrüzen and other varieties).

Pl. 5 figs. 15—36; Pl. 7 figs. 9—20.

Habitat:

Norway: var. finmarchica (= Machæroplax obscura G. O. Sars 1878), Hasvig, Finmark, 3 sps, Sars' original, max. h. 4.4; ap. 1.8; d. 5.4; wh. 5, Figs. 35—36. — Var. bella: Lofoten, 200—300 fms (M. Sars, det. as Adeorbis subcarinata), 3 sps, max. h. 3.4; ap. 1.9; d. 3.9; wh. 4, Fig. 25. — Ulfsfjord (Goës & Malmgren) 1 sh.,

h. 3.5; ap. 2; d 3.8; wh. 4. — Grötsund, 69° 50′ N., 37° 25′ E., 50—80 fms, clay, stones (1861) 1 sp. + 2 shs, max. h. 5.7; ap. 2.7; d. 6.1; wh. 5 1/4, Figs. 26, 27. — Kjosen, algæ (20/10 1861) 1 sp., h. 3.8; ap. 2; d. 4.3; wh. 4. — Karlsö, N. of Tromsö, ebb (Malmgren 9/5 1861) 1 sp., h. 3.7; ap. 1.7; d. 4; wh. 5. — Finmark (Sparre Schneider) 4 sps, max. h. 5.1; ap. 2.4; d. 5.4; wh. 4 3/4.

Murman Coast and Kola Peninsula: Kildin Island, 10.5—17.5 m, sand (Herzenstein 1887) 2 sps + 1 sh., max. h. 7.3; ap. 4; d. 7.5; wh. 5 (var. albula). — Waidaguba (Sandeberg 18/8 1877) ca 10 sps, max. h. 6.9; ap. 4; d. 8; wh. 5; and h. 5.2; ap. 3; d. 5.8; wh. 4 1/2 (var. albula with transition to var. intermedia), Fig. 20. — Subowski, 14 fms, sand (Sandeberg 6/9 1877) 5 sps, max. h. 7; ap. 4; d. 8.5; wh. 5 (var. albula). — White Sea, Solowetskij Island (Knipowitsch 1891) 2 sps, h. 4.5; ap. 2.7; d. 5.6; wh. 4 3/4 and h. 4.1; ap. 2.3; d. 4.9; wh. 4 1/2 (transitions to S. bella in sculpture and radula; longitudinal folds distinct; in the smaller sp. exists an umbilical keel, wanting in the larger one, spiral sculpture for the rest like that of var. albula; radula 8 . 2 . 1 . 2 . 8), Pl. 5 fig. 15; Pl. 7 fig. 17.

Kara Sea (Leche 1878), the type, var. cineræformis and var. intermedia. Dimensions (Cape Grebeni, type): h. 6.7; ap. 3.7; d. 7.7; wh. 4 3/4, Fig. 16. — Max. dimensions: W. of Nova Zembla (var. intermedia) h. 9.4; ap. 5.1; d. 10.4; wh. 5.

North of Siberia and Behring Sea (Aurivillius 1887),[1] type and var. albula. Maximal dimensions (Vega Exp. N:o 1068): h. 9.4; ap. 5.1; d. 11.6, Fig. 19; Winter harbour, Fig. 21. — Further: 2 miles N. of Vega's winter harbour, 12 fms, sand with stones (Vega Exp. 25/6 1879) 1 sp., h. 8.3; ap. 5; d. 10, Fig. 23.

Norway—Beeren Island, 72° 10′ N., 20° 37′ E., 200—230 fms, clay (21/7 1868) 1 sp., h. 3.1; ap. 1.7; d. 3.6; wh. 4 1/2 (var. bella, but coarser sculptured than Norwegian specimens, 3 strong keels surrounding the umbilicus and 1 occurring down in it).

Spitzbergen, the type: Recherche Bay, Bel Sound, between Reindeer Point and Fox Glacier, 90 m, stones and fine grayish blue clay (8/7 1898) 1 sp., h. 7.5; ap. 4.7; d. 9.7; wh. 5 (transition to var. intermedia through 1 feeble revolving ridge and many fine striæ). — Treurenburg Bay, 75° 55′ N., 16° 30′ E., 14—21 fms, clay (8/7 1861) 2 sps, h. 2.5; ap. 1.8; d. 3; wh. 3 1/2 and h. 1.4; ap. 1; d. 1.8; wh. 2 1/2; D:o, 30 fms, stones mixed with clay (17/6 1861) 2 sps, max. h. 1.5; ap. 1.2; d. 2. — Var. intermedia: Norwegian Island, 7—20 fms, sand (7/8 1872) 2 sps, h. 6.5; ap. 4; d. 8.3; wh. 4 3/4 and h. 5.3; ap. 3.6; d. 7; wh. 4 1/2; differing from the typical var. intermedia by sparser and sharper spiral lines; Fig. 17. — Var. finmarchica: Smeerenburg Bay, 90—110 fms, clay (1861) 1 sh., h. 3.3; ap. 2.2; d. 3.7; wh. 4. — Treurenburg Bay, 79° 55′ N., 16° 30′ E., 14—21 fms, clay (18/7 1861) 1 sh., h. 3.2; ap. 2.2; d. 3.6; wh. 3 1/2. — Lovén's Mount, 36 fms, clay mixed with stones (11/9 1868) 1 sh., h. 3 ap. 2; d. 3.5; wh. 3 3/4. — Castrén's Islands, 30—40 fms, clay, stones (7/9 1868) 1 sh., h. 2.4; ap. 1.6; d. 2.8; wh. 3 1/4. — Var. bella: Off Ice Fiord, 120—140 fms, clay with stones (13/8 1868) 2 sps + 1 sh., max. h. 3.7; ap. 1.9; d. 4.3; wh. 4 1/4 (4 keels on the last whorl, 2 more prominent and many feebler umbilical cords), Fig. 31.

[1] Margarita obscura var. albula from Vega St. 29, determined by Aurivillius, is M. groenlandica, which confer.

Iceland (ODHNER 1910), var. islandica. Dimensions: h. 4.5; ap. 2.9; d. 5.8; wh. 4 1/4, Fig. 24.

N. W. Atlantic: 52° 25′ N., 52° 12′ W., 162 fms, loose clay mixed with sand (Lindahl 11/8 1871) 2 shs, max. h. 3.7; ap. 2.1; d. 5; wh. 4 1/2 (var. bella). — 52° 5′ N., 52° 19′ W., 161 fms, clay, mixed with sand (Lindahl 12/8 1871) 1 sh., h. 5.7; ap. 3.3; d. 7.7; wh. 4 3/4 (type, resembling specimens from Kara Sea, without trace of umbilical keel, but more depressed; determined by Posselt as M. groenlandica), Fig. 18.

West Greenland (not observed by Posselt): Julianehaab, 25 fms, clay, among M. groenlandica (Amondsen Okt. 1861) 1 sh., h. 4.5; ap. 2.6; d. 5.6; wh. 4 1/4 (var. islandica). — Godthaab, 72 fms, sand, among M. cinerea (Amondsen July 1862) 1 sp., h. 4.7; ap. 2.3; d. 6; wh. 4 1/2 (var. bella), Fig. 34. — Davis Strait, 65° 11′ 48″ N., 53° 33′ 48″ W., 48 fms, greenish clay (Lindahl 13/6 1871) 11 sps, max. h. 4.8; ap. 2.8; d. 6.4; wh. 4 1/2 (var. multilirata, determined by Posselt as M. groenlandica), Fig. 28, 29, 30. — Umanak, 200 fms, clay, among M. cinerea (Amondsen 1862) 1 sp., h. 5.8; ap. 3; d. 7.1; wh. 5 (var. multilirata, untypical), Fig. 33. — Jakobshavn, 120 fms, clay mixed with sand (Öberg 14/8 1870) 1 sh., h. 2.1; ap. 1.7; d. 2.9: wh. 4 (var. multilirata, determined by Posselt as M. cinerea). — Godhavn, 10—40 fms, mud (8/6 1860) 1 sp., h. 5; ap. 2.5; d. 6; wh. 4 1/2 (var. multilirata, untypical with strong, broadly rounded riblets), Fig. 32.

East Greenland: King Oscar's Fiord, S. of Ruth's Islands, ca 125 m, mud, sand, pebbles (24/8 1899) 1 sh., d. 1.9; wh. 3 (var. bella).

Newfoundland Bank, the type: 46° 5′ N., 51° 44′ W., 56 fms, sand, shells (Lindahl 16/8 1871) 3 sps, max. h. 6.4; ap. 3.5; d. 8; wh. 5; on the whorls 1 upper, stronger, and 3 lower finer revolving ridges; over the strong uppermost ridge there is a trace of a finer one.

Variation of the shell:

Kola Peninsula, Spitzbergen,	h.	4—5	5—6	6—7	7—8	8—9	max. 9.4 (Vega N:o 1068)
Behring Sea etc.;	ap.	2.6—3.5	3—4	3.5—4.6	3.8—5.6	4.4—6	5.1
45 sps of forma *typica*	d.	5—6.8	5.6—7.6	6.5—8.9	7.4—11.5	9—11.8	11.6
measured	wh.	4—4 1/2	4 1/4—5	4 3/4—5	about 5	>5	>5

Specimens from Spitzbergen have a smaller diameter of the shell than those from more eastern districts; their maximal dimensions are not so high (max. h. 7.5 etc., Recherche Bay).

Norway and Spitzbergen;	h.	2.5	3—4	4—5	5—6	max. 5.7 (Grötsund)
14 sps of var. *bella*	ap.	1.5	1.5—2.1	1.8—2.4	2.5—2.8	2.7
measured	d.	2.8	3.2—4.5	4.2—5.3	5—6.1	6.1
	wh.	3 1/2	4—5	4 3/4	about 5	5
Greenland;	h.	2—3	3—4	4—5	5—6	max. 5.8 (Umanak)
14 sps of var. *multilirata*	ap.	1.3—2	1.8—2.3	2.2—2.9	2.5—3.5	3
measured	d.	2.6—4	3.8—5.2	4.6—6.7	6—8	7.1
	wh.	3—3 1/4	3 1/2—4	4 1/4—4 1/2	about 5	5

Sculptural variation: The sculpture of S. obscura is highly varied, but no distinct characters can be found by which the forms are separated from each other. Transitional stages occur between most of the forms. The typical form has usually an umbilical keel, but one specimen from the White Sea is destitute of it and thus is a transition form to var. bella. On the other hand there are specimens of the latter variety, furnished with umbilical cords (off Ice Fiord). Var. multilirata (Greenland) has a greater number of revolving ridges, more or less prominent, thus forming a transition stage to var. islandica with spiral grooves, but without keels. The strongest sculptured specimens from Greenland show relationship, on the other hand, to var. bella. Transition forms between the type, var. albula and var. intermedia occur at Murman Coast and the Kola Peninsula. As to form, however, extreme varieties differ a good deal from each other, *e. g.* var. bella, Norway, and the typical var. multilirata, Greenland.

Variation of the radula: The number of lamellæ amounts to 10 in var. intermedia and albula (from Kola—Behring Sea), but small specimens (d. 3.2—4) of the same variety and from the same localities have only 6 lamellæ on each side. In specimens of var. multilirata from Davis Strait, 8 lamellæ occur, but young specimens (d. 3.2) have only 6; the same number is found in var. bella from Grötsund. 7 lamellæ are found in the specimens from the White Sea, which mark a transition from the type to var. bella; 6 lamellæ are found in the majority of specimens of var. bella (from Godthaab and 72° 10′ N.), in var. albula (Kildin Island) and in var. finmarchica (Finmark; young specimen of 3.8 mm diameter). One large specimen from Umanak was investigated; it had only 5 lamellæ on each side. From these statements it is obvious that the variation in the number of lamellæ is not entirely dependent upon the growth in the present species, as in forms of Margarita. Moreover one qualitative character of the lamellæ is subject to variation, namely their denticulation. Usually only the rhachian and median teeth have denticulated margins, but the denticulation is sometimes found more or less extended to the lamellæ, the first ones (Godthaab, Umanak) or nearly all (Davis Strait) being bilaterally serrated. Young specimens seem to have traces of a few denticles on both sides of every lamella (Matotschkin sharr; Vega Exp.) even when adult specimens of the same form have them entirely smooth. The rhachian tooth has a greater or less number of denticles (10—5) on each side and is somewhat varied in form (cfr Figs. 9—20).

General Distribution:

Norway: var. *finmarchica*, Vardö—Lofoten, 120—300 fms (d. 5; G. O. Sars 1878; Schneider 1891); var. *bella*, Vadsö—Lofoten, 30—40 fms (d. 7, G. O. Sars 1878; Schneider 1881, 1885, 1891; De Guerne 1886); Bogfjord (Norman 1902); var. *albula*, Vadsö—Magerö, 10—25 fms (d. 10, G. O. Sars 1878; De Guerne 1886; Schneider 1894; Norman 1902). — Murman Coast, Nova Zembla, Arctic Ocean N. of Siberia, type and var. *albula* (Herzenstein 1893). — Barent Sea, 275—308 m, type (Knipowitsch 1901[a]). — Kolguev, 20 fms, var. *albula* (Melvill & Standen 1900). — Kara Sea, 2—

120 fms, type and var. *intermedia* (Leche 1878). — Siberia, 4—10 fms (Aurivillius 1887). — Spitzbergen, 123—125 fms, type (Friele 1879), 68.5 m, type, and 9—14 m, var. *albula* (Knipowitsch 1901[a], 1902). — Jan Mayen, 70—95 fms, type (Friele 1878). — Iceland, var. *islandica* (Odhner 1910). — Between Hebrides and Faroe Isles, 170 fms, fragments, 440 fms, living sp. (Jeffreys 1882). — Greenland (Mörch fide Posselt & Jensen 1899). — East Canada, 10—40 fms, type and var. *bella* (Whiteaves 1901). — New England, Fig. 22 (Gould & Binney 1870); 208 fms, var. *bella* (Verrill 1883); 12—487 fms (Verrill 1885). — Behring Sea to 55 fms, type and var. *albula* (Dall 1875; Crosse 1877; Aurivillius 1887). — Aleutian and Sitcha (Dall 1875). Depths to 487 fms. Clay, sand, stones.

Solariella cincta (Philippi 1836).

(= Trochus amabilis Jeffreys 1865.)

Habitat:

Shetland, 3 sps (Jeffreys), max. h. 6.4; ap. 2.9; d. 6; wh. 6.

General Distribution:

Shetland (Jeffreys 1865). — Between Hebrides and Faroes, 170—440 fms (Jeffreys 1883). — Between Shetland and Faroes, 150—286 m (Simpson 1910). — France, 495—2020 m (Locard 1899). — Golfe de Gascogne, 510 m; off Spain, Portugal and Morocco, 460—2115 m (Locard 1898). — Off Portugal, 220—770 fms (Jeffreys 1882, Nobre 1905). — Azores, 155—2101 m (Jeffreys 1882, Dautzenberg 1889, Locard 1898). — West Indies and Florida, 193—888 fms (Dall 1889[a]). — E. off Tobago, 880 fms (Dall 1889[b]).

var. affinis Jeffreys 1883.

Pl. 5 fig. 38.

Habitat:

Storeggen, Norway, 140 fms, shingles (v. Yhlen) 1 sp., h. 6.5; ap. 3.2; d. 7; wh. 6.

General Distribution:

Norway: Storeggen and Florö, Bergen, 100—200 fms (Friele 1874; G. O. Sars 1878). — Shetland (Jeffreys 1865) to Azores (Jeffreys 1882) together with the type.

Solariella infundibulum (Watson 1879).

Pl. 5 fig. 35.

Habitat:

Newfoundland Bank 46° 6′ N., 52° 3′ W., 46 fms, sand, stones, shells (Lindahl $^{16}/_{8}$ 1871) 1 sh., h. 6.7; ap. 3.6; d. 7; wh. 6.

General Distribution:

N. America, off the east coast, 36° 47′ N., 1685 fms (Dall 1889[b]). — Bermudas, 1075 fms (Watson 1886). — West Indies, Guadeloupe, 769—860 fms (Dall 1889[a]).

Moelleria costulata (Möller 1842).

Pl. 5 figs. 43—47.

Habitat:

Gullmarn, Bohuslän (Lovén) 1 sh., d. 2.1, together with Margarita groenlandica and Rissoa Jeffreysi, Fig. 45.

Iceland (Odhner 1910). Dimensions: Öfjord, h. 2; d. 2.4; wh. 3 1/4, Fig. 47.

Spitzbergen: Horn Sound, 100 fms, clay, stones, 3 shs + 1 sp., h. 1.9; d. 2.2; and h. 1.7; d. 2.4, Fig. 46. — Bel Sound, 30—40 fms, stones, zoophytes (Torell 1858) 3 shs + 1 sp., d. 1.9. — Kings Bay, 20 fms, fine clay (1861) 1 sh., d. 2.2; wh. 3 1/2. Mossel Bay, 8—12 fms, sand ($^{21}/_{7}$ 1873) 1 sp., d. 2.1. — Off Mossel Bay, 15 fms, Lithothamnium, sand ($^{16}/_{1}$ 1873) 1 sh., d. 1.9. — Castrén's Islands, 30—40 fms, clay, stones ($^{7}/_{9}$ 1868) 1 sp., h. 1.5; d. 2.1. — Charles XII Island, 80° 45′ N., 25° 20′ E., 60—70 m, rocks with Corallina ($^{20}/_{8}$ 1898) 1 sp., d. 0,8; wh. 2.

West Greenland (Posselt & Jensen 1899). Dimensions: Godthaab, h. 2; ap. 1.2; d. 1.9; wh. 3 1/4, Fig. 44.

East Greenland: Clavering Island, S. W. part, 25—40 m, mud, sand, shells, stones ($^{17}/_{7}$ 1899) 2 sps, max. h. 1.4; d. 1.9; wh. 3 1/4, Fig. 43, 44.

General Distribution:

Norway, Lofoten—Vadsö, 5—60 fms, not on the west coast (d. 2.1; G. O. Sars 1878; Schneider 1885). — Murman Coast; White Sea (Herzenstein 1893). — Franz-Josef Land, 30 fms (Melvill & Standen 1900). — Iceland (Mörch 1869[a]; Verkrüzen 1872). — Between Hebrides and Faroe Isles, 170 fms (Jeffreys 1883). — N. E. off Shetland, 286 m; Fair Island 130 m (Simpson 1910). — Shetland and Scotland to Isle of Arran, dead shells (Jeffreys 1865). — Off Santander, Golfe de Gascogne, 1960

m; E. of Morocco, 1943 m (Locard 1898). — Off Portugal, 740—1095 fms (Jeffreys 1883; Nobre 1905). — Greenland, from Disco southwards, to 100 fms (d. 2 mm; Posselt & Jensen 1899). — East Canada, 4 fms (Whiteaves 1901). — Grand Manan, New England, in deep water (Gould & Binney 1870). — St. Thomas, West Indies (Verkrüzen fide Jeffreys 1883). Depths to 1943 m. Clay, sand, stones.

Cyclostrema areolatum G. O. Sars 1878.

Distribution: Norway, Lofoten, 80—100 fms (d. 1.4, G. O. Sars 1878). — Fair Isles, 61° 49′ N., 5° 36′ W., 160 m, 1 sp. (Simpson 1910). — Between Hebrides and Faroe Isles, 170 fms (Jeffreys 1883).

Cyclostrema millepunctatum Friele 1886.

Distribution: W. of Tromsö, 649 fms, Norwegian North-Atlantic Exp., St. 192 (Friele 1886).

Cyclostrema basistriatum (Jeffreys) G. O. Sars 1878
(incl. var. **striolata** G. O. Sars 1878).

Pl. 5 figs. 40 and 42; Pl. 7 fig. 8.

Habitat:

Skagerrack, 336 fms, clay (Lindahl) 2 shs, max. h. 1.3; ap. 0.9; d. 1.5; wh. 2 1/4. — Bergen and Kristiandsund, 60—70 fms (Lilljeborg) 10 sps, max. d. 2.5 (Mus. U.). — Lofoten, 200—300 fms (M. Sars) many sps, max. h. 2.4; ap. 1.5; d. 2.7; wh. 3 1/4, Fig. 40. — Spitzbergen, a bay in Hinlopen Strait, 50 fms, reddish clay (1861) 1 sh., h. 1.6; ap. 1.2; d. 2; wh. 3 1/2 (striæ very faint but equidistant, as in the type; umbilicus somewhat narrower than usual), Fig. 42.

General Distribution:

Norway, Lofoten, 120—300 fms and west coast, 50—450 fms (d. 2.5; G. O. Sars 1878; Friele 1874). — N. of Hebrides and Orkney Islands, 130—355 m (Simpson 1910). — North Atlantic 56° 1′ N., 34° 42′ W., 690 fms (Jeffreys 1877). — Porcupine Exp. 1869, St. 89, 445 fms (Jeffreys 1883). — France, Golfe de Gascogne, 1020 m (Locard 1898, 1899). — Off Cape Mondego, Portugal, 740—1095 fms (Jeffreys 1883, Nobre 1905).

var. profunda Friele 1879.

Distribution: W. of Spitzbergen, 120—1333 fms and W. of Tromsö, 649 fms, Norwegian North-Atlantic Exp. St. 353, 357 and 192 (Friele 1879, 1886; Friele & Grieg 1901).

Cyclostrema Willei Friele 1886.

Distribution: W. of Norway, 300—649 fms, Norwegian North-Atlantic Exp. St. 173 b, 192 (Friele 1886).

Cyclostrema rugulosum (Jeffreys) G. O. Sars 1878.

Distribution: Norway, Lofoten, 120—300 fms (d. 1.3; G. O. Sars 1878). — Between Hebrides and Faroe Isles, 189 fms; S. of Ireland, 539 fms (Jeffreys 1883). — France (Locard 1899). — Mediterranean (Carus 1889). — New England, 365 fms (Verrill 1883).

Cyclostrema turgidum n. sp.

Pl. 5 fig. 39; Pl. 7 fig. 7.

Habitat:

North Atlantic, »Swedish Deep», 78° 19′ N., 8° 41′ E., 2700 m, bottom temp. — 1.4°, Biloculina clay (Sp. Exp. $^{25}/_{7}$ 1898) about 15 sps, max. h. 1.6; ap. 1; d. 1.8; wh. 4, Fig. 39. — 40′ NW. of »Swedish Deep», 77° 52′ N., 8° 5′ E., 2750 m, bottom temp. — 1.4°, Biloculina clay (Sp. Exp. $^{28}/_{7}$ 1898) 1 sp., h. 1.6; ap. 1; d. 2; wh. 4.

Cyclostrema serpuloide (Montagu 1808).

(= Skenea? divisa Forbes & Hanley 1853.)

Distribution: Iceland (Jeffreys 1869). — *Not* in Norway (G. O. Sars 1878, pag. 345). — *Not* in Bohuslän (Malm 1855; cfr pag. 51 of the present work). — Between Hebrides and Faroe Isles, 530 fms (Jeffreys 1883). — Great Britain, to 25 fms (Jeffreys 1865). — France (Locard 1892). — Spain, Vigo Bay (Jeffreys 1883). — Mediterranean (Jeffreys 1865; Carus 1889, Skenea lævis Sow.). Fossil at Uddevalla, Bohuslän (Jeffreys 1865, 1869).

Cyclostrema trochoide (Jeffreys) G. O. Sars 1878.

Distribution: Vardö, southwards, 10—200 fms (d. 2; G. O. Sars 1878). — Murman Coast (Herzenstein 1893). — Golfe de Gascogne, 677—1960 m (Locard 1898, 1899). — S. of Cape Mondego, Portugal, 795 fms (Jeffreys 1883; Nobre 1905). — Cape Hatteras, Antilles to Old Providence Island (*fide* Locard 1898).

var. Peterseni Friele 1877.

Pl. 5 fig. 41.

Habitat:

Skagerrack, 336 fms, clay (Lindahl 1871) 1 sh., h. 2; ap. 1.2; d. 1.8; wh. 3, Fig. 41. — Beeren Island—Norway, 73° 3′ N., 18° 30′ E., 410 m, grayish clay, bottom

temp. + 2° C. (Sp. Exp. 4/9 1898) 1 sh., h. 2; ap. 1.25; d. 2.2; wh. 3 1/2 (differing from the type by the body whorl being somewhat flattened towards the suture and the aperture therefore subangular above).

General Distribution:

Norway: Lofoten, 80—100 fms (G. O. Sars 1878). — Nordland, shs (Krause 1887). — Klosterelv and Bog Fiord, East Finmark (Norman 1902). — W. off Norway, Norwegian North-Atlantic Exp. St. 87 and 33, 484—510 fms (Friele 1877), St. 31, 173 b, 192 and 195, 107—650 fms (Friele 1886).

Cyclostrema lævigatum (Jeffreys) G. O. Sars 1878.

Habitat:

Spitzbergen, King Charles Land, Bremer Sound between the Islands, 100—110 m, bottom temp. — 1.45°, fine clay with big stones, Biloculina sparse (Sp. Exp. 8/8 1898) 1 sh., fragmentary, probably belonging to this species.

General Distribution:

Norway, Lofoten southwards to 200 fms (d. 1.8; G. O. Sars 1878); Nordland (Krause 1887); Florö, Bergen, 20 fms (Friele 1876, and 1886 = C. trochoide, Friele 1876). — Between Hebrides and Faroe Isles, 189—229 fms (Jeffreys 1883). — N. of Hebrides, 240 m, dead shs (Simpson 1910).

Adeorbis fragilis G. O. Sars 1878.

Distribution: Lofoten, 60—80 fms, and west coast, dead shs (G. O. Sars 1878). — W. and S. off Portugal, 322—994 fms (Jeffreys 1885, Nobre 1905).

Archytæa delicatum Philippi 1844.

Distribution: Lofoten, 200—300 fms, 1 sh. (G. O. Sars 1878). — Azores, 1828 m (Dautzenberg 1889).

var. expansa G. O. Sars 1878.

Distribution: Lofoten, 200—300 fms, 1 sh. together with the type (G. O. Sars 1878).

Description of the New Forms.

Acmæa virginea (MÜLLER) var. *spitzbergensis* n. var.

Pl. 1 figs. 14—15.

Shell elliptic, solid, rather high, of a uniform cream colour without any traces of red stripes, sculptured with distinct radiating threads and concentric lines of growth. Pallial scar with a deep circular lateral sinus behind the head region. L. 10.9; Br. 8.2; h. 3.9; apex perpendicularly from anterior margin 2 mm.

This variety is distinguishable from the type by its distinct radiating sculpture and its uniform colour. The size falls within the limits of variation of the species, and it may be considered as a geographical variety confined to the north coast of Spitzbergen (cfr pag. 26). Only 2 dead shells of this form have been obtained.

Solariella obscura (COUTHOUY) var. *multilirata* n. var.

Pl. 5 figs. 28—30; Pl. 7 figs. 18, 20.

Shell depressed conical, with rounded whorls of a yellowish white colour; spiral sculpture about 7 liræ, prominent and weak ones alternately, on the last whorl, base striated, coarser around the umbilicus, but without keels; longitudinal sculpture indistinct, present in very faint traces only on the uppermost whorls; umbilicus large. Height of shell 4.8, of aperture 2.8, diameter 6.4 mm. Radula 8 . 1 . (2 . 1 . 2) . 1 . 8; median teeth finely denticulated; the innermost lamellæ bilaterally denticulated.

This shell differs from var. finmarchica (= M. obscura Couth. of Sars, 1878) in its more depressed shape, its greater number of liræ and in the absence of distinct longitudinal sculpture. The two forms are nearly allied and connected by transition stages (cfr pag. 70—73).

Cyclostrema turgidum n. sp.

Pl. 5 fig. 39; Pl. 7 fig. 7.

Shell depressed conical, with 4 tumid whorls and deep suture, white, covered with a light yellowish-green cuticula; spire elevated, aperture circular with simple

margin; surface for the most part smooth, but the umbilical region finely striated by lines emerging from the umbilicus and running arcuated towards the peristome, the upper nepionic whorl furnished in the middle with 2 faint spiral liræ, becoming subsutural on the next whorl and disappearing. Height 1.6; diameter 1.8; height of aperture 1 mm; whorls 4.

Operculum corneous with central nucleus and 7 spirals.

Radula with about 50 rows, of the formula 35 . 0 . (4 . 1 . 4) . 0 . 35. The central tooth very large, its greatest breadth in, or just below, the middle, its upper margin not markedly denticulated. Median teeth narrow, high, slightly pinched below the apex, with about 4 marginal denticles. No transition (lateral) tooth. Lamellæ with a spoon-like recurved apex, the inner ones denticulated on both sides, further out smooth, the outmost very long and narrow, pin-like.

Animal without eyes but with eye-peduncles preserved. The intestine is situated quite in the distal part of the last whorl and the stomach behind it. The content of the stomach and of the intestine was mud, containing Foraminifera, Diatomacea etc. The otocysts, situated close behind the pedal ganglia, contain many otoliths.

By its nepionic sculpture this form is distinct from other species of Cyclostrema. In C. basistriatum a sculpture of this kind sometimes occurs, but it is not constant. The tumid whorls and the elevated spire are in such cases reliable characters for the determination of C. turgidum. For the distribution see pag. 77.

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Index.

The names in parentheses show the genera, under which the species are described. Species with an asterisk (*) are figured.

Errata.

Page 16, line	20	from top of page	*for*	M. helicina PHIPPS 1774	*read*	M. helicina (PHIPPS 1774).
19, »	14 and 20	» »	»	MARRYATT	»	MARRYAT.
49, »	15	» foot	»	C. zizyphinum (LINNÉ 1766)	»	C. zizyphinum (LINNÉ 1758).

Plate 1.

Figs. 1—32.

Fig. 1. Acmæa testudinalis (Müller), Bohuslän (Lovén), some colour variations; 2 sps seen from inside.
Fig. 2. The same, Berufjord, Iceland (Torell).
Fig. 3. The same, Berufjord, young sps.
Fig. 4. The same, »Bel Sound» (Torell), 1 sp., seen from inside and outside.
Fig. 5. The same, Sukkertoppen, Greenland, seen from the left.
Fig. 6. The same, Grötsund, Finmark, from the left and from above.
Fig. 7. The same, Nivakfjord, Greenland.
Fig. 8. Acmæa pelta Eschscholtz (left and middle sp.), and A. patina Eschscholtz (right sp.), Behring Island (Vega Exp.) the outer sps seen from inside.
Fig. 9. Acmæa virginea (Müller), Dröbak (Lovén), nat. size above, × 2 below.
Fig. 10. The same, Bohuslän (B. Fries), at the sides, and Point of Höghalla (Lönnberg), in the middle, seen from the left.
Fig. 11. The same, Finmark (Lovén).
Fig. 12. The same, the left sp. in fig. 11, × 2.
Fig. 13. The same, Raufarhofn, Iceland (Torell).
Fig. 14. The same, var. spitzbergensis n. var., Mossel Bay (from above and from the left) and Treurenburg Bay (from the inside).
Fig. 15. The same as in fig. 14, × 2.
Fig. 16. Acmæa rubella (Fabricius), Kostin sharr (from the left), nat. size and × 2.
Fig. 17. The same, Treurenburg Bay, nat. size (below) and × 2 (above).
Fig. 18. The same, Pröven, Greenland, nat. size and × 2.
Fig. 19. The same, Berufjord, Iceland, nat. size and × 2.
Fig. 20. The same, Grötsund, Finmark, from the left, nat. size and × 2.5.
Fig. 21. The same, Finmark (Lovén), from inside, nat. size and × 2.2.
Fig. 22. The same, Berufjord, Iceland, nat. size and × 2.5.
Fig. 23. The same, forma elevata, Berufjord, one sp. from above, the rest from the left; nat. size and × 2.5.
Fig. 24. Patella vulgata Linné, var. depressa, Norway.
Fig. 25. The same, var. depressa and coerulea, Väderöarna, Bohuslän, from above and from the left.
Fig. 26. The same, forma typica, Väderöarna.
Fig. 27. Helcion pellucidum (Linné), Finmark (Lovén), from the left and from above.
Fig. 28. The same, Farsund, Norway, from the left.
Fig. 29. The same, Christianiafjord (Asbjörnsen), from the left.
Fig. 30. The same, Norway (Marklin).
Fig. 31. The same, Bohuslän (Lovén).
Fig. 32. The same, Bohuslän (B. Fries).

Plate 2.

Figs. 1—50.

Fig. 1. Cryptobranchia alba Dall, Konyam Bay, Behring Sea (Vega Exp.) 3 sps, from the left, from outside and from inside.
Fig. 2. Lepeta coeca (Müller), Christianiafjord (Asbjörnsen), 1 sp., seen from the left and from above.
Fig. 3. The same, Väderöarna, Bohuslän, 3 sps, seen from above, from the left side and from inside.
Fig. 4. The same, Bergen, 2 sps, from above and from the left.
Fig. 5. The same, Ulfsfjord, Finmark, 4 sps.
Fig. 6. The same, Berufjord, Iceland, the median fig. above, and the left one below are the same sp.

Fig. 7. The same, Kostin sharr.
Fig. 8 The same, Lomme Bay, Spitzbergen.
Fig. 9. The same, Vertegen Hook, 100 fms, 2 sps, the upper fig. and the left one below are the same sp.
Fig. 10. The same, Ice Fiord.
Fig. 11. The same, Mossel Bay.
Fig. 12. The same, Horn Sound.
Fig. 13. The same, Godhavn, Greenland.
Fig. 14. The same, Kekertak.
Fig. 15. The same, Kekertak.
Fig. 16. The same, Arsukfjord.
Fig. 17. The same, Pröven.
Fig. 18. Pilidium fulvum (Müller), Väderöarna, nat. size and × 2.
Fig. 19. The same, Väderöarna, nat. size.
Fig. 20. The same, Grötsund, Finmark, nat. size and × 2.
Fig. 21. The same, Utnefjord, Norway, nat. size and × 2.
Fig. 22. The same, Väderöarna, Bohuslän, nat. size and × 2.
Fig. 23. The same, var. albula, Grötsund, Finmark, nat. size and × 3.7.
Fig. 24. Propilidium ancyloide (Forbes), Väderöarna, from above and from the left, nat. size and × 3.7.
Fig. 25. Scissurella crispata Fleming, var. aspera, Bergen, nat. size and × 3.7.
Fig. 26. The same, var. angulata, between Norway and Beeren Island, nat. size and × 2.5.
Fig. 27. The same, var. angulata, Dröbak, Norway, nat. size and × 2.5.
Fig. 28. Puncturella noachina (Linné), Gullmarn (Lovén); left and middle sp. identical.
Fig. 29. The same, Gullmarn, seen from inside, nat. size to the left, × 2.2 to the right.
Fig. 30. The same, Väderöarna, Bohuslän, 2 sps.
Fig. 31. The same, Bergen.
Fig. 32. The same, Berufjord, Iceland, 3 sps.
Fig. 33. The same, Finmark (Sparre Schneider) 3 sps.
Fig. 34. The same, Bel Sound, Spitzbergen.
Fig. 35. The same, Cloven Cliff.
Fig. 36. The same, Ikamiut, Greenland.
Fig. 37. The same, Spitzbergen (Torell).
Fig. 38. The same, NW. of Bergen.
Fig. 39. The same, Grötsund, Finmark.
Fig. 40. The same, Omenak, Greenland.
Fig. 41. The same, Pröven.
Fig. 42. Emarginula fissura (Linné), Finmark (Lovén), l. 6.8.
Fig. 43. The same, from the same locality as the preceding, l. 8.2.
Fig. 44 The same, Bergen, (M. Sars).
Fig. 45. The same, Gullmarn.
Fig. 46. Emarginula crassa Sowerby, Gullmarn (Lovén). Dimensions of the left sp. l. 31.4; br. 24.4; h. 11.4; of the right sp. l. 30; br. 23.7; h. 15.
Fig. 47. The same, Gullmarn; dimensions: l. 24.2; br. 19; h. 9.
Fig. 48. The same. Gullmarn.
Fig. 49. The same, Grötsund, Finmark.
Fig. 50. The same, Bergen.

Plate 3.

Figs. 1—46.

Fig. 1. Emarginula crassa Sowerby, Gullmarn; dimensions; l. 32.2; br. 25.7; h. 18.2.
Fig. 2. The same, Gullmarn; dimensions; l. 31.4; br. 24.4; h. 11.4.
Fig. 3. Gibbula magus (Linné), Nordkoster, Bohuslän.
Fig. 4. Gibbula cineraria (Linné), Karlsösund, Finmark (left), Bergen (right).
Fig. 5. The same, Bohuslän.
Fig. 6. The same, Finmark (Lovén).
Fig. 7. The same. Bohuslän.
Fig. 8. Gibbula tumida (Montagu), Bohuslän.
Fig. 9. The same, Stigfjorden, Gullmarn, Bohuslän.

Fig. 10. The same, Storeggen, Norway.
Fig. 11. The same, Ulfsfjord, Finmark.
Fig. 12. The same, Kjosen.
Fig. 13. The same, Flekkefjord, Norway.
Fig. 14. The same, Grötsund.
Fig. 15. The same, Laholmsbukten, between Väderö and Point of Höghalla.
Fig. 16. Calliostoma miliare (Brocchi), Gullmarn.
Fig. 17. The same, Gravenfjord, Norway.
Fig. 18. The same, Bergen.
Fig. 19. The same, Väderöarna, Bohuslän.
Fig. 20. The same, Finmark.
Fig. 21. Calliostoma conuloide (Lamarck), Bohuslän, Gullmarn.
Fig. 22. The same, Bergen.
Fig. 23. The same, Finmark.
Fig. 24. Calliostoma occidentale (Mighels & Adams), Finmark, Loppen (Lovén's type of »Margarita alabastrum Beck»).
Fig. 25. The same, North Sea.
Fig. 26. Margarita helicina (Phipps), Kobbe Bay, Spitzbergen, 4—8 fms.
Fig. 27. The same, Behring Island (Vega Exp.), 1 sp., seen from above and from aperture.
Fig. 28. The same, Möller Bay, Nova Zembla.
Fig. 29. The same, Egedesminde, Greenland.
Fig. 30. The same, Finmark (Lovén).
Fig. 31. The same, Berufjord, Iceland (Torell).
Fig. 32. The same, SE. of Bergen.
Fig. 33. The same, Norway (Düben).
Fig. 34. The same, Bohuslän (Lovén), nat. size and × 2.5.
Fig. 35. Margarita Vahlii Möller, Shoal Point, Spitzbergen, nat. size and × 2.5.
Fig. 36. The same, Bel Sound (Torell) × 2.5.
Fig. 37. The same, Bel Sound, nat. size.
Fig. 38. The same, Öfjord, Iceland (Torell).
Fig. 39. The same, Danes Gat, Spitzbergen, nat. size and × 2.5.
Fig. 40. The same, Pröven, Greenland, nat. size and × 2.5.
Fig. 41. Margarita olivacea (Brown), Öfjord, Iceland (Torell).
Fig. 42. The same, Storfjord, Spitzbergen.
Fig. 43. The same, King Charles Land, Spitzbergen.
Fig. 44. The same, var. gigantea, Off Horn Sound.
Fig 45. The same, Sukkertoppen, Greenland, 2 sps, the outer figs. from the same sp. (h. 5; d. 5.3).
Fig. 46. The same, Cloven Cliff (left), Godthaab (middle), Bjarnanes (right).

Plate 4.

Figs. 1—37.

Fig. 1. Margarita olivacea (Brown), Arsukfjord, Greenland.
Fig. 2. The same, var. gigantea, Irkaipij (Vega Exp.; type of Aurivillius).
Fig. 3. The same, var. gigantea, Kara Sea.
Fig. 4. Margarita groenlandica (Chemnitz) Egedesminde, Greenland,
Fig. 5. The same, Godthaab.
Fig. 6. The same, Julianehaab, 10—25 fms.
Fig. 7. The same, Julianehaab, 130 fms.
Fig. 8. The same, var. lævigata, Umanak.
Fig. 9. The same, type (left) and var. lævigata (right), Umanak.
Fig. 10. The same, Kekertak.
Fig. 11. The same, Kekertak, another sp.
Fig. 12. The same, type (at the sides) and var. lævigata (in the middle), Umanak.
Fig. 13. The same, Upernavik.
Fig. 14. The same, var. umbilicalis, Pröven.
Fig. 15. The same, var. umbilicalis, Cape York.
Fig. 16. The same, var. umbilicalis, Cape York, another sp.

Fig. 17. The same, Berufjord, Iceland.
Fig. 18. The same, var. umbilicalis, Kobbe Bay, Spitzbergen.
Fig. 19. The same, var. umbilicalis, Hinlopen Strait, 10—25 fms.
Fig. 20. The same, type and var. lævigata, Bel Sound, 30—40 fms.
Fig. 21. The same, var. lævigata, Kostin Sharr.
Fig. 22. The same, var. rudis, Kostin Sharr.
Fig. 23. The same, type, Hackluyts Headland, Spitzbergen.
Fig. 24. The same, var. undulata, Finmark (Sparre Schneider).
Fig. 25. The same, var. undulata, Kjosen, Finmark.
Fig. 26. The same, var. lævior, Bergen.
Fig. 27. The same, var. umbilicalis, Bodybet. 60—70 fms, from aperture and from above.
Fig. 28. Margarita cinerea, forma typica, Godthaab, Greenland.
Fig. 29. The same, forma typica, Godhavn.
Fig. 30. The same, forma multilirata, Pröven, Greenland.
Fig. 31. The same, forma typica, Kvalsund, Finmark.
Fig. 32. The same, var. striata, Liefde Bay, Spitzbergen, 5 fms.
Fig. 33. The same, forma typica, Berufjord, Iceland (Torell).
Fig. 34. The same, forma multilirata, Pröven, Greenland.
Fig. 35. The same, var. striata, Berufjord, Iceland (Torell).
Fig. 36. The same, var. striata, Kostin Sharr.
Fig. 37. The same, forma typica, Horn Sound, Spitzbergen.

Plate 5.

Figs. 1—47.

Fig. 1. Margarita cinerea var. striata, Treurenburg Bay, Spitzbergen.
Fig. 2. The same, var. striata, Behring Sea (Vega Exp.).
Fig. 3. The same, forma typica, Finmark (Sparre Schneider).
Fig. 4. The same, forma typica, Finmark (Lovén).
Fig. 5. The same, forma typica, Grötsund.
Fig. 6. Solariella varicosa (Mighels & Adams), Subowski, Kola; nat. size and × 2.3.
Fig. 7. The same, Vadsö, Norway.
Fig. 8. The same, Murman Coast (Herzenstein).
Fig. 9. The same, Cape Grebeni, Nova Zembla.
Fig. 10. The same, Waidaguba, Kola.
Fig. 11. The same, Newfoundland.
Fig. 12. The same, Matotschkin Sharr, Nova Zembla.
Fig. 13. The same, Treurenburg Bay, Spitzbergen.
Fig. 14. The same, Hackluyts Headland.
Fig. 15. Solariella obscura (Couthouy), transition to var. bella, Solowetskij Island, White Sea, 2 sps., nat. size and × 2.5.
Fig. 16. The same, Cape Grebeni, Nova Zembla.
Fig. 17. The same, var. intermedia, Norwegian Island, Spitzbergen.
Fig. 18. The same, NW. Atlantic (the same sp. on light and dark ground).
Fig. 19. The same, 62° 39′ N., 177° 5′ W. (Vega Exp. N:o 1068).
Fig. 20. The same, var. albula Gould, Kola Peninsula, Waidaguba,
Fig. 21. The same, Vega Exp., winter harbour.
Fig. 22. The same, NE. coast of N. America, nat. size and × 2.3.
Fig. 23. The same, var. intermedia, Vega Exp., 2 miles N. of the winter harbour.
Fig. 24. The same, var. islandica, Hofsos, Iceland, nat. size and × 2.3.
Fig. 25. The same, var. bella, Lofoten, nat. size and × 2.5.
Fig. 26. The same, var. bella, Grötsund, Finmark, nat. size and × 2.5.
Fig. 27. The same, var. bella, Grötsund, another sh.
Fig. 28. The same, var. multilirata n. var., Davis Strait, nat. size.
Fig. 29. The same, var. multilirata n. var., Davis Strait, × 2.3.
Fig. 30. The same as in the preceding figs., other sps., nat. size.
Fig. 31. The same, var. bella, off Ice Fiord, nat. size and × 2.5.
Fig. 32. The same, var. multilirata, transition to finmarchica, Godhavn, Greenland.

Fig. 33. The same, var. multilirata, Umanak.
Fig. 34. The same, var. bella, Godthaab, nat. size and × 2.5.
Fig. 35. The same, var. finmarchica, Hasvig, Finmark, 2 sps, from aperture and from spire, × 2.2.
Fig. 36. The same as in the preceding fig. seen from umbilicus, nat. size and × 2.2.
Fig. 37. Solariella infundibulum (Watson), Bank of Newfoundland, nat. size and × 2.3.
Fig. 38. Solariella cincta (Philippi), var. affinis, Storeggen, Norway, nat. size and × 2.3.
Fig. 39. Cyclostrema turgidum n. sp., »Swedish Deep» (Sp. Exp. 1898), nat. size and × 5.
Fig. 40. Cyclostrema basistriatum (Jeffreys) G. O. Sars, Lofoten, nat. size and × 5.
Fig. 41. Cyclostrema trochoide (Jeffreys) G. O. Sars, var. Peterseni, Skagerrack, nat. size and × 5.
Fig. 42. Cyclostrema basistriatum (Jeffreys) G. O. Sars, Spitzbergen, nat. size and × 5.
Fig. 43. Mœlleria costulata (Möller), Clavering Island, Est Greenland, nat. size and × 3.2.
Fig. 44. The same, Godthaab, Greenland, 2 sps, nat. size and × 2.7; the left sp. below is = the preceding fig.
Fig. 45. The same, Gullmarn (Lovén) nat. size and × 5.
Fig. 46. The same, Horn Sound, Spitzbergen, nat. size, × 2.5 and × 5.
Fig. 47. The same, Öfjord, Iceland, nat. size and × 3.2.

Plate 6.

Figs. 1—20. Radulæ.

Fig. 1. Acmæa testudinalis (Müller), Nivakfjord (cfr Pl. 1, fig. 7) × 50.
Fig. 2. Acmæa pelta Eschscholtz, Behring Island (cfr Pl. 1, fig. 8) × 50.
Fig. 3. Margarita helicina (Phipps), Bohuslän (cfr Pl. 3, fig. 34). Lamellæ circa 50. × 240.
Fig. 4. The same, Mossel Bay, a median tooth; height of the sh. 8.8. × 240.
Fig. 5. The same, Bel Sound; diameter of the sh. 9.5; lamellæ circa 80. × 240.
Fig. 6. Margarita Vahlii Möller, Bel Sound (cfr Pl. 3, figs. 36—37). × 240. *a* the 5th median tooth, *b* the first lamella.
Fig. 7. The same, rhachian tooth, Pröven. × 420.
Fig. 8. Margarita olivacea Brown, 72° 8′ N., 74° 20′ W., largest sp. × 240.
Fig. 9. The same, Cloven Cliff (Pl. 3, fig. 46, left); lamellæ circa 60. × 240.
Fig. 10. The same, East Greenland. × 240.
Fig. 11. The same, var. gigantea, Off Horn Sound (Pl. 3, fig. 44). × 240.
Fig. 12. The same, var. gigantea, Kara Sea (Pl. 4, fig. 3, right). × 240.
Fig. 13. The same, forma typica, Bremer Sound. × 500.
Fig. 14. Margarita groenlandica (Chemnitz) (cfr Pl. 4). *a* var. umbilicalis, Mossel Bay, depressed, sculptured like Pl. 4, fig. 7; d. 16. *b* Smeerenburg Bay, h. 13, like fig. 20. *c* var. lævigata, Mossel Bay, elevated, like fig. 19; d. 20. *d* Umanak, fig. 8, the large sp. *e* Berufjord, fig. 17, lamellæ 100. *f* Godthaab, like fig. 7, the most sps, lamellæ 90.
Fig. 15. The same, var. umbilicalis, 64° 56′ N., 66° 18′ W, maximal sp. (like Pl. 4 fig. 15); lamellæ circa 90. × 160.
Fig. 16. The same, var. umbilicalis, Julianehaab (Pl. 4, fig. 7, the depressed sp. below to the right); lamellæ circa 70. × 240.
Fig. 17. The same, forma typica, the same locality and figure, the elevated sp. below; lamellæ 90—100. × 240.
Fig. 18. The same, var. lævior, Bergen (Pl. 4, fig. 26); lamellæ circa 90. × 240.
Fig. 19. The same, var. undulata, Hitterö, Norway, d. 7. × 240.
Fig. 20. The same, var. undulata, Kosterfjorden, Bohuslän, juv. (d. 3.2), lamellæ circa 50. × 380.

Plate 7.

Figs. 1—20. Radulæ.

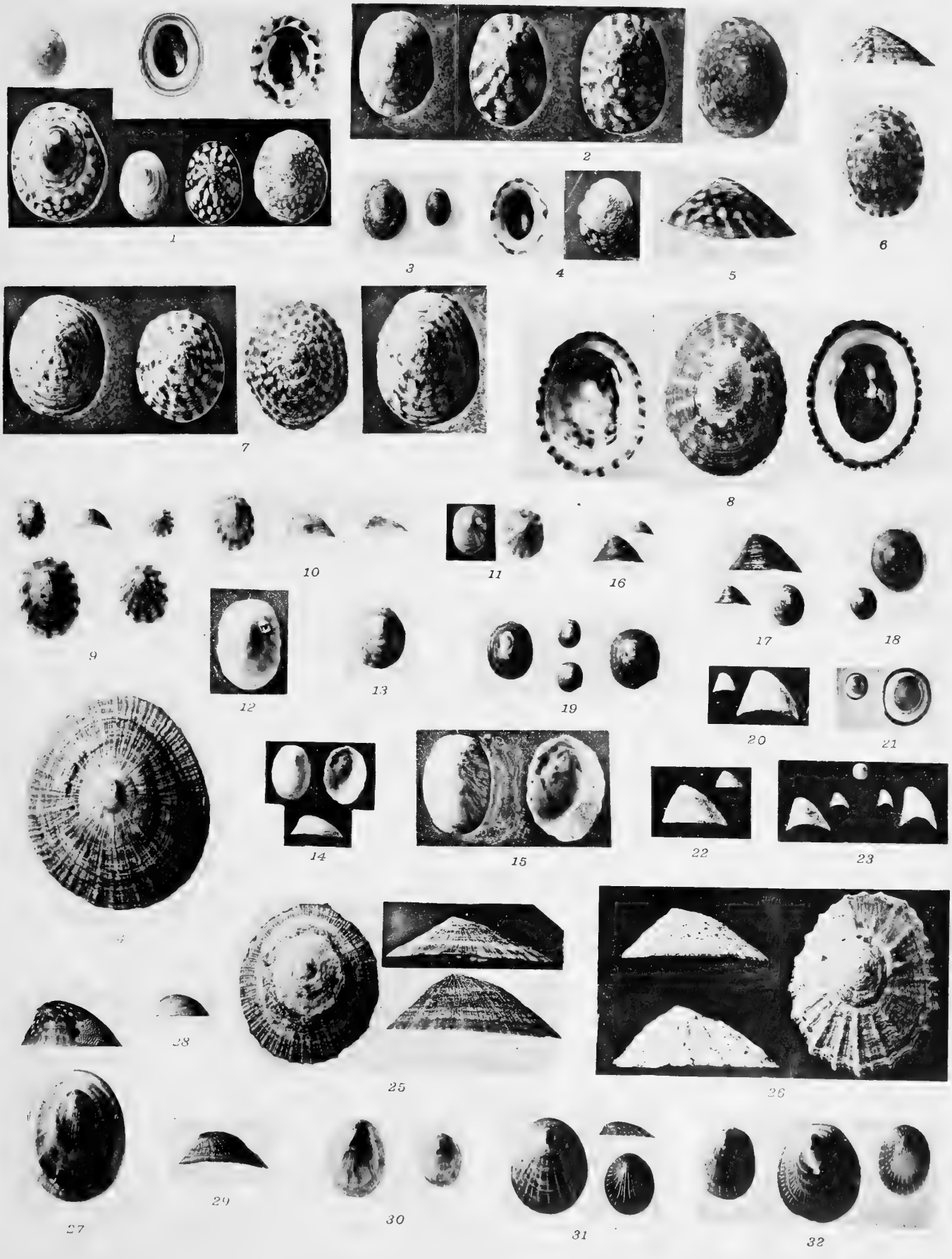
Fig. 1. Margarita cinerea Couthouy (cfr Pl. 4 and Pl. 5). × 240. *a* Iceland, Pl. 4, fig. 33; *b* Finmark, fig. 31; *c* Godthaab, fig. 28; *d* Fairhaven, like fig. 37; *e* var. striata, Skans Bay (like Pl. 5 fig. 1); *f* var. striata, Mackenzie Bay, East Greenland; *g* var. grandis forma multilirata, Bremer Sound, Spitzbergen (cfr Pl. 4 fig. 34); *h* the same, Pendulum Island, East Greenland. Lamellæ in *a—g* circa 50, in *h* 70.
Fig. 2. The same, var. striata (= grandis Mörch), Vega Exp. 67° 5′ N., 173° 24′ E. (Pl. 5, fig. 2), lamellæ circa 50. × 240.
Fig. 3. The same, forma typica, juv. (d. 1.9), Finmark. Formula: circa 25 . (3 . 1 . 3 .) circa 25. × 700.
Fig. 4. The same, var. striata, King Charles Land; lamellæ circa 50. × 240.

Fig. 5. Solariella varicosa (Mighels & Adams), Bank of Newfoundland; rhachian tooth. × 300.
Fig. 6. The same, Mossel Bay, diameter 12; lamellæ 12. × 240.
Fig. 7. Cyclostrema turgidum n. sp. (Pl. 5, fig. 39); lamellæ circa 35; *a* the 4th median tooth, *b* the first lamella from the side. × 800.
Fig. 8. Cyclostrema basistriatum (Jeffreys) G. O. Sars, Lofoten (Pl. 5, fig. 40), rhachian tooth. × 800.
Fig. 9. Solariella obscura Couthouy, Vega Exp. 62° 39′ N., 177° 5′ W., juv. (d. 4.3). × 240. *a* cusp of the 5th lamella, highly magnified. Lamellæ 6.
Fig. 10. The same, from the same locality, another sp. (Pl. 5, fig. 19, the median sp.). × 240. Lamellæ 10.
Fig. 11. The same, var. intermedia, Matotschkin sharr. × 240. Lamellæ 10.
Fig. 12. The same, var. intermedia, Waidaguba. × 240. Lamellæ 10.
Fig. 13. The same, var. albula, Kildin Island, rhachian and 1st median tooth. × 240. Lamellæ 6.
Fig. 14. The same, var. bella, 72° 10′ N. × 240. Lamellæ 7.
Fig. 15. The same, var. finmarchica, Finmark (Pl. 5, fig. 35); d. 4. × 240. Lamellæ 6.
Fig. 16. The same, var. bella, Godthaab (Pl. 5, fig. 4). × 240. Lamellæ 6.
Fig. 17. The same, transition from forma typica to var. bella, Solowetskij Island (Pl. 5, fig. 15). × 240. Lamellæ 7.
Fig. 18. The same, var. multilirata, Davis Strait (Pl. 5, fig. 29). × 240. Lamellæ 8.
Fig. 19. The same, var. bella, Grötsund (Pl. 5, fig. 27). × 240. Lamellæ 8.
Fig. 20. The same, var. multilirata, Umanak (Pl. 5, fig. 33). × 240. Lamellæ 5.

CONTENTS.

Tryckt den 4 maj 1912.

Uppsala 1912. Almqvist & Wiksells Boktryckeri-A.-B.



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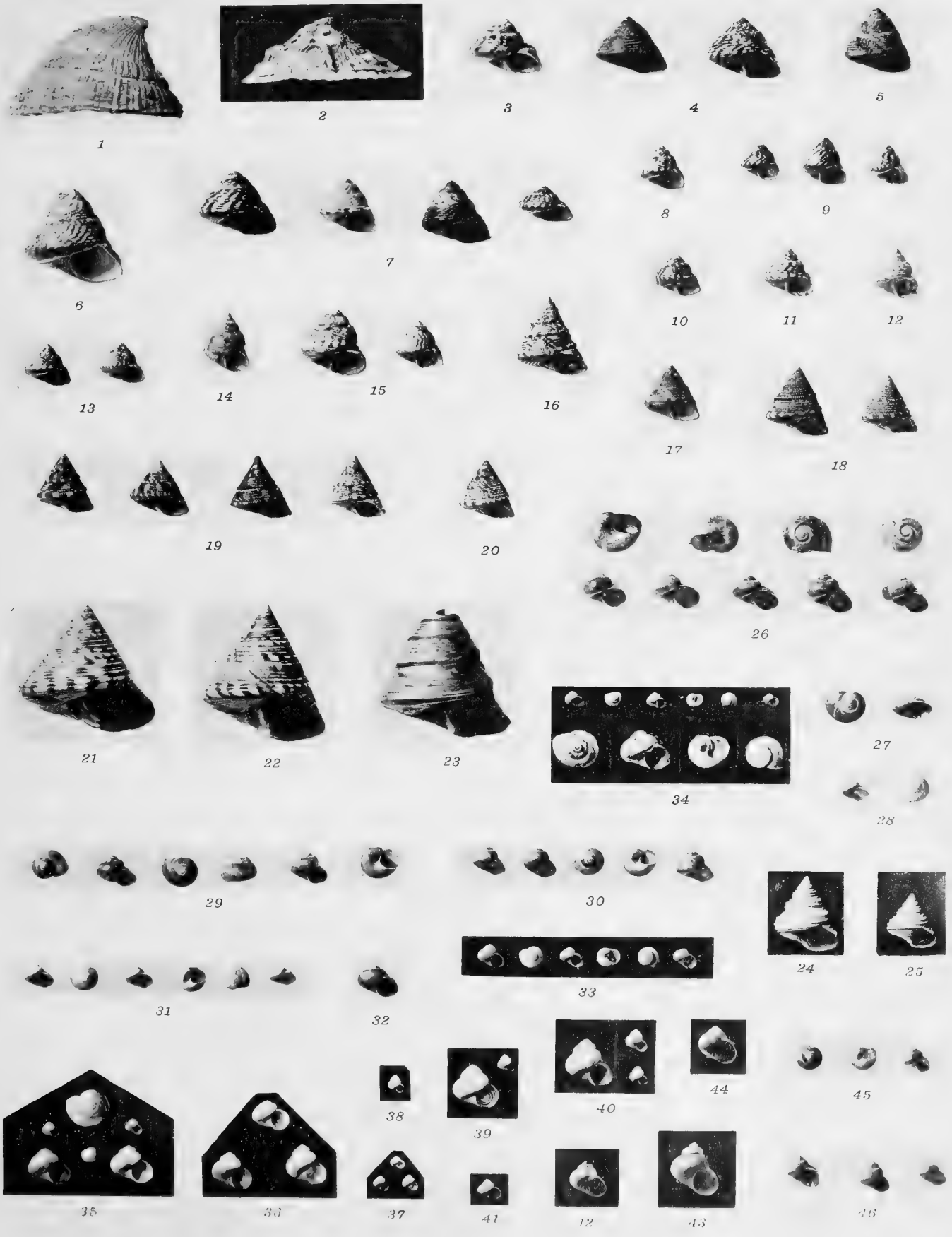
Cederquists Graf. A.-B., Stihm.



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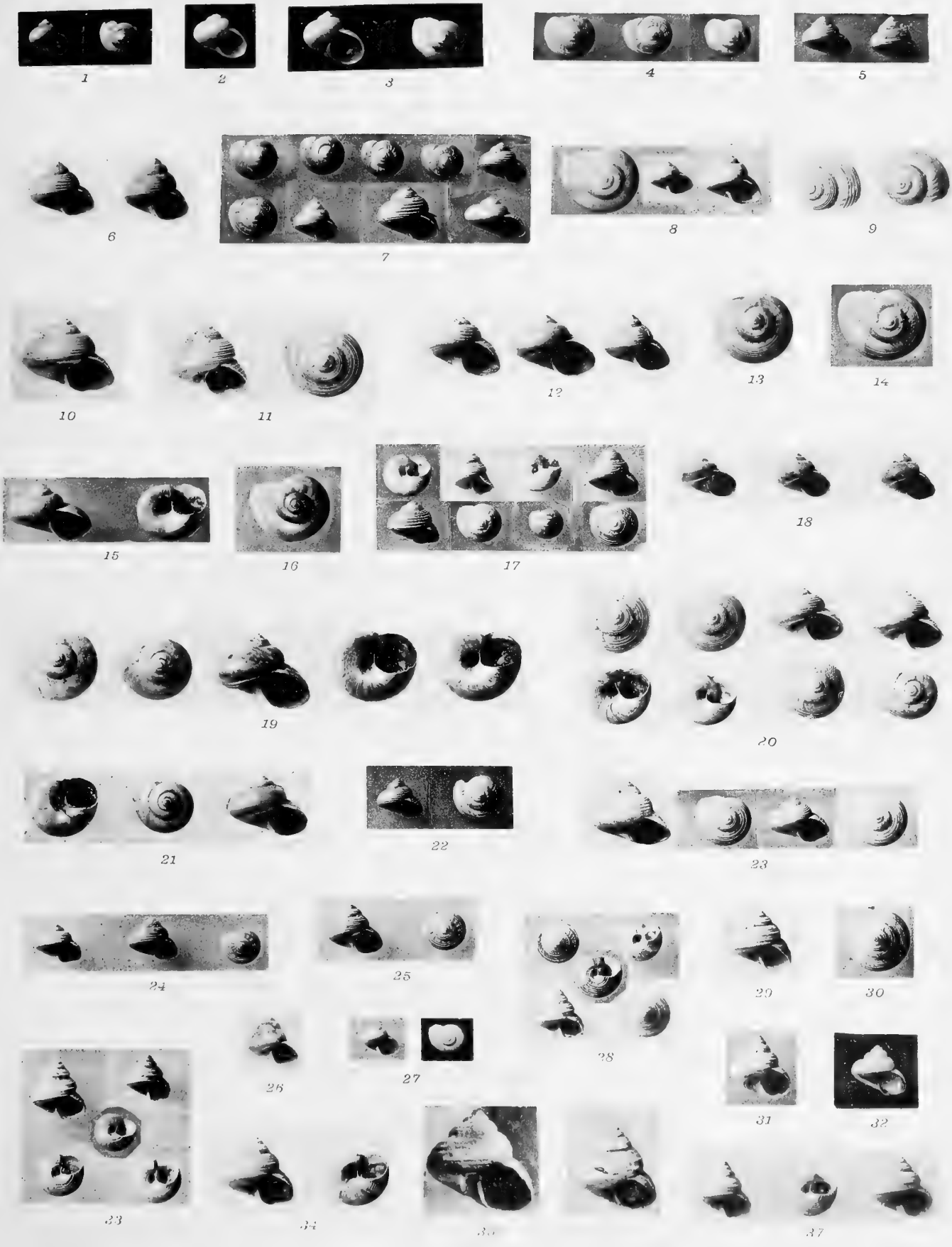

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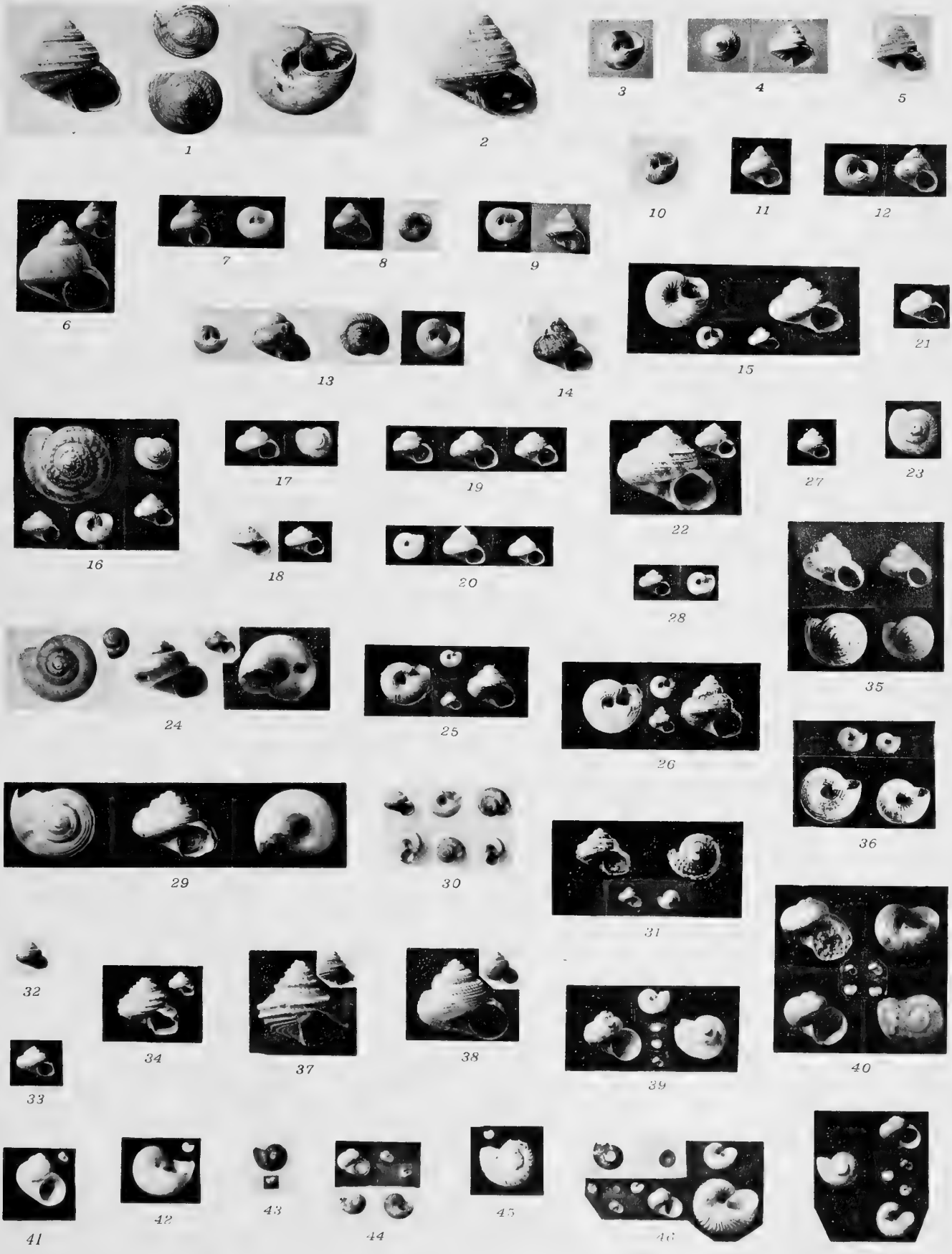

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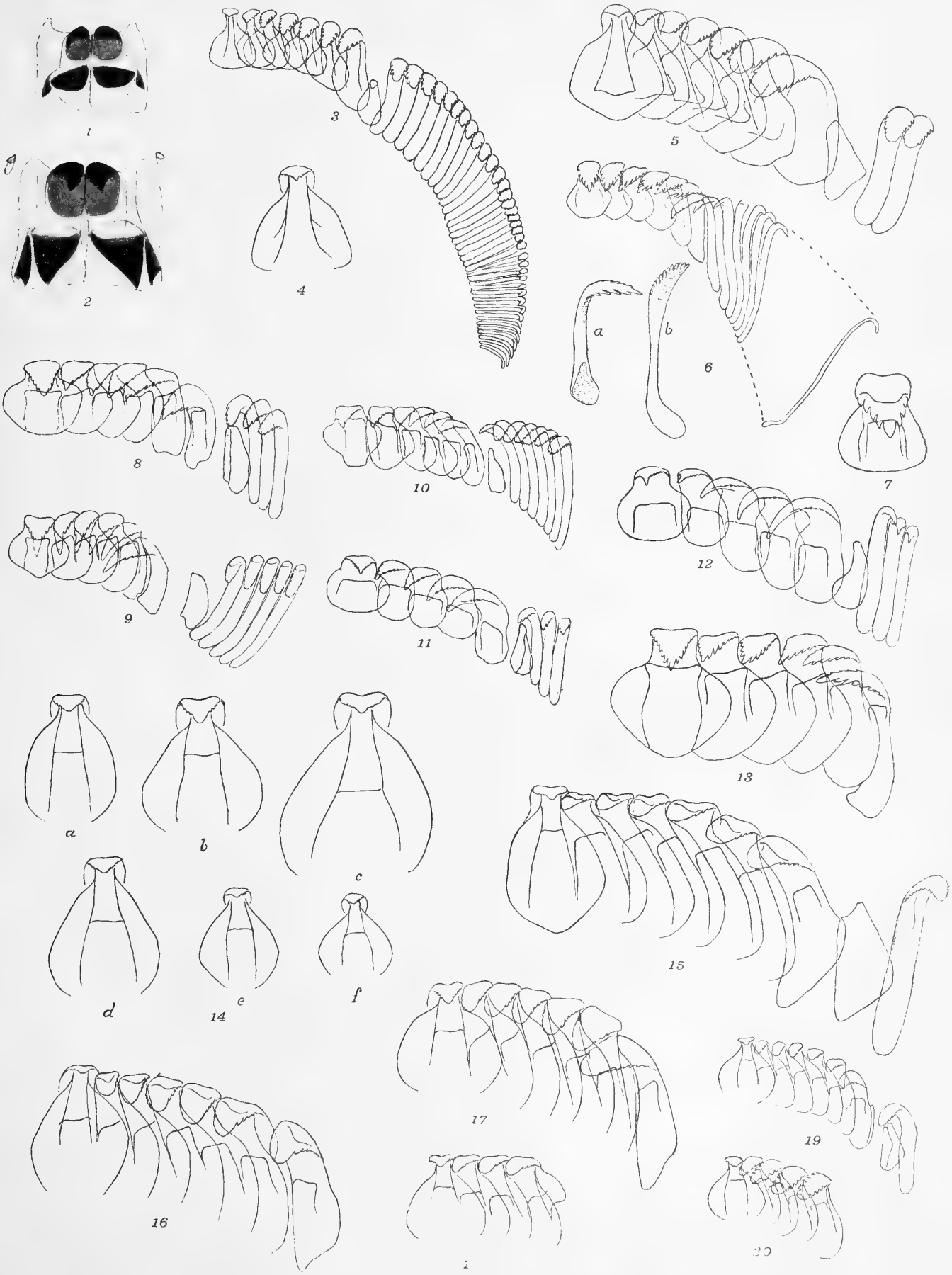
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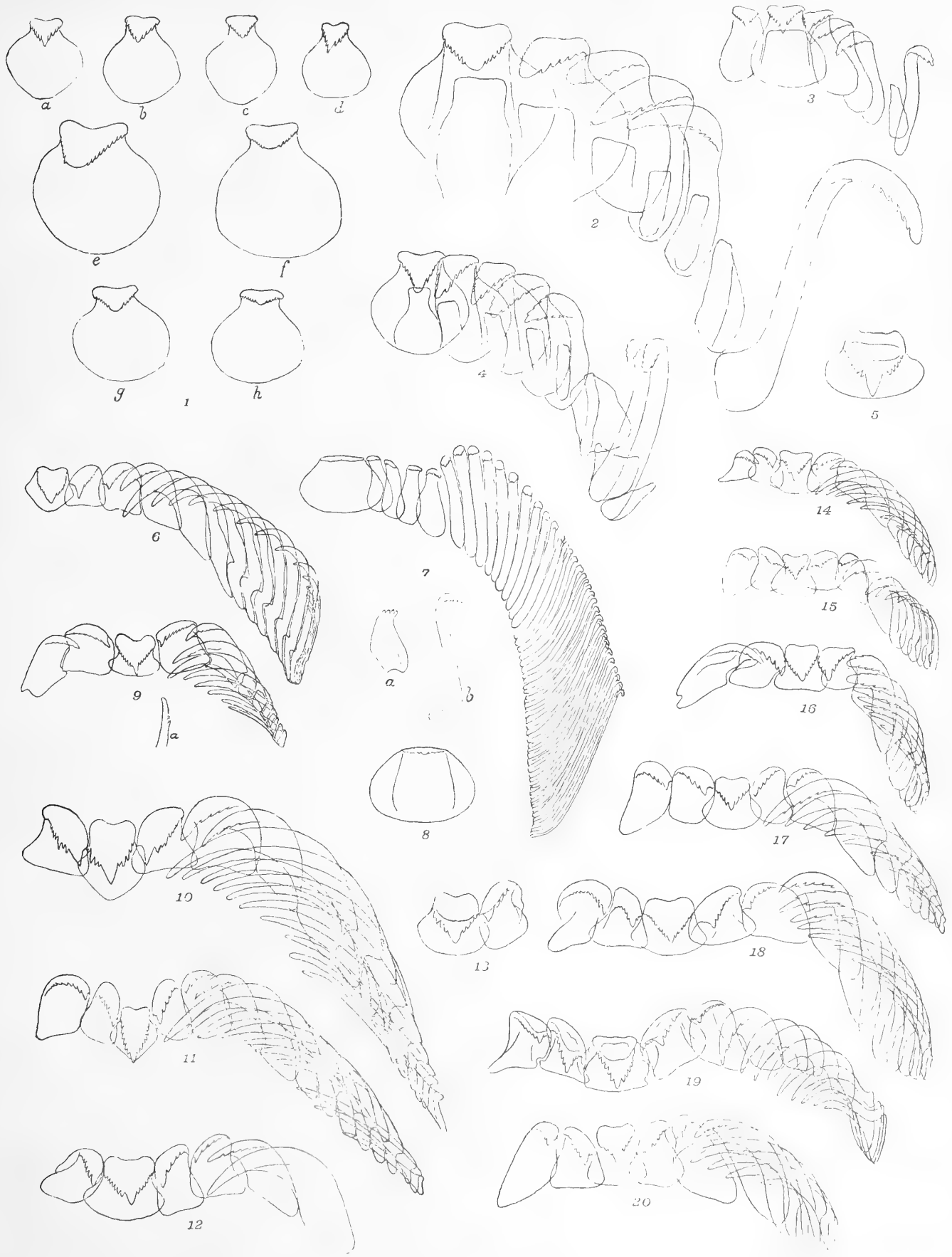

N. Odhner del.

Cederquists Graf. A.-B., Sthlm.

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