PROVISIONAL AID TO THE STUDY OF THE
TASMANIAN MOLLUSCA.

BY R. M. JOHNSTON, F.L.S.

The student of Conchology in Tasmania labours under many disadvantages, owing to the circumstance that the descriptions of the various species inhabiting our waters are scattered widely in various publications of Europe and America, while nearly half of the number of the principal type species are deposited in foreign museums, and are therefore inaccessible for purposes of reference to local students.

Before we can rest satisfied with the existing classification of many species there is much careful work to be done; for it is well known that the specific descriptions of the earlier distinguished collectors who accompanied expeditions to our seas, are often too meagre to satisfactorily distinguish or separate them from many allied distinct species subsequently discovered. Such accidental collections, too, very naturally contain many forms belonging to widely variable species, and the individuals, of necessity taken by them as types, do not always present the most suitable characters which would serve to distinguish the central type of a widely variable species, and hence the local observer, unable to refer to original types described, is often puzzled or uncertain in his determinations.

It would be well, therefore, to follow the example of New Zealand, in making up a duplicate collection of our shells as complete as possible, and thereafter submit one of them to a well-known European authority like Ed. Von Martens, who would critically examine and compare them with original types in European collections, and submit a critical report for the guidance of local workers. Such a course has already been adopted by New Zealand under the guidance of Professor Hutton, one of the ablest authorities, and certainly one of the most energetic naturalists in Australasia; an example which Tasmania would do well to follow. If Messrs. Legrand, Petterd and Beddome, who have so ably worked in this branch of science in Tasmania, and who possess the best local collections, were to engage in a work of this kind under the auspices of the Royal Society of Tasmania, I am satisfied that the very best results would be attained, and we would then prepare the way for the publication of a work on Tasmanian Mollusca that we could place thorough dependence upon.

It will be observed that although the whole of the 716
known species contained in the list prepared by me were
described by over 75 distinct authors at different times and in
various publications, yet the greater half (384) were described
by five persons, and among these the Rev. J. E. Tenison-Woods
alone described 213 species, or nearly a third of the whole.
Following next in order to the work of this gifted naturalist
last named (whose death, recently, is a loss which all Austral-
asi ans most deeply deplore), come the names of Lamarck, Reeve,
Sowerby, Petterd, Cox, Deshayes, Brazier, Quoy, A. Adams,
Gray, Beddome and Angas, all of whom score double figures
as regards the number of species described by them
respectively.

My own contributions to local Conchology hitherto have
been mainly confined to the Fossil Mollusca, although I have
been enabled to give the results of long extended observations,
and have added 9 new species to the list, in various papers
contributed at different times to this Society. Taking the
names of Tenison-Woods, Petterd, Cox, Brazier, and Beddome,
as local workers, we have some reason to be proud of their
accomplishments, for although later in the field, and only
numbering 5 out of the 75 authors of species, they have
between them described nearly half the number of all the
known Tasmanian species.

The labours of the Rev. J. E. Tenison-Woods, F.L.S., etc.,
deserve special reference, for his writings in all branches of
Australasian Natural History are so numerous and valuable
that they form in themselves a considerable library. Apart
from his many works published in the proceedings of kindred
societies in Australia and New Zealand, his interesting
volume published many years ago on the Geology of South
Australia, and his fine work on the Fishes and Fisheries of
New South Wales, he has contributed no less than 31
important communications to the Royal Society of Tasmania,
four of which form the chief source of our information
concerning the marine and fresh water shells of this Island.

Nor must we forget the labours of another local worker,
who although not appearing among the authors of species,
has perhaps done more for the science of Conchology in this
island than any other single person. I refer to Mr. W.
Legrand. This indefatigable naturalist may truly be regarded
as the Pioneer of Conchology in Tasmania. He, assisted by
Dr. Cox and Mr. Brazier, published the first really important
work on Tasmanian Conchology in the year 1870 (Monograph
of Tasmanian Land Shells), which afterwards formed the
principal part of Mr. Petterd's later monograph on the same
subject, published in the year 1878. Nor were Mr. Legrand's
labours confined to the land shells. For many years he was
the only person who possessed an extensive knowledge of our
local mollusca; and such was his enthusiasm and industry in the investigation of the Conchology of Australia generally, that Mr. Woods regarded his collection in the year 1875 to be the "finest in the southern hemisphere," and writing in acknowledgment of the great services which he rendered to himself in the preparation for his census of Tasmanian shells, published in 1877, by generously placing at his disposal the whole of his fine collection, and by affording him the greater benefit of his vast store of local information, he refers to Mr. Legrand’s monograph in the following terms:—“Within the last few years Mr. W. Legrand has published a monograph of all the (then) known land shells, accompanied with extensive notes on the habits, and very excellent figures of the newer species. What gave the work a greater value, was that it was for the most part privately printed by the author. The whole of the work being done by his own hand.”

Next in order of time to Mr. Legrand comes Mr. Petterd. Mr. W. F. Petterd, C.M.Z.S., is a native of Hobart, Tasmania, whose name will ever stand a credit to the land of his birth. Almost self-taught in natural history, he has by natural talent accomplished more and better work than many of the European Naturalists, who have had the advantages of immediate reference to the stored and classified collections of the world’s great observers. Mr. Petterd is undoubtedly the “Tam Edwards” of Tasmania. His love for natural history as a youth fortunately attracted the notice of our veteran Conchologist, Mr. Legrand, to whom Mr. Petterd, with many others—myself among the number—owe a lasting debt of gratitude for the kindly help and encouragement always readily bestowed.

Mr. Petterd’s keen perception, bright intelligence, and taxidermical skill, combined with a rare facility for depicting the objects which interested his attention by artistic drawings, soon gave him a wide and thorough command of the principal forms of local natural history in Tasmania. Nor were his observations and collections of natural objects confined to his native country. He travelled as an observer widely over Australia, from Cape Howe to the Gulf of Carpentaria, and was one of the early pioneer explorers of New Guinea and the Islands of the Pacific. His splendid collections made in all these regions have largely increased our store of knowledge and have enriched the principal Museums of Europe, Australia and America. As a Conchologist he is best known by his fine “Monograph of the Land Shells of Tasmania,” read before this society and published in the year 1879. This work has deservedly obtained for him the widest reputation. His contributions on Conchology to the Royal Society of Tasmania since that time have greatly extended our knowledge,
and he is now, I believe, engaged upon an elaborate treatise on the shells of Tasmania, which will in the future be the standard work of reference to Tasmanian students.

The labours of Lieut. C. E. Beddome have also added largely to our knowledge, and his contributions respecting new forms (17 species), brought to light by his extensive dredging investigations, come very close to those of Mr. Petterd. Mr. Beddome has also contributed several interesting papers to this Society on Conchology, and he is now the possessor of one of the finest collections in Australasia. He prepared a splendid classified collection of our shells for the Fisheries Exhibition held in London in the year 1887, for which he was awarded First Prize and a Gold Medal.

Nor must we forget in this place the valuable work of the Rev. H. D. Atkinson, of Circular Head. This gentleman has for many years been a most enthusiastic collector. Some of the most interesting forms contained in the Rev. J. E. Tenison-Woods' "Census," were brought to light by Mr. Atkinson, who was the first person in Tasmania who extended his researches into the deeper waters by means of the dredge. At the time Mr. Woods was preparing his "Census," Mr. Atkinson was the only person in Tasmania who sought for novelties in this way.

The labours of Mr. B. Dyer, of Hobart, Mr. R. Gunn, and Mr. A. Simson, of Launceston, as collectors, are also worthy of special notice in this place.

Since the appearance of the Rev. J. E. Tenison-Woods' Catalogue of Tasmanian Shells, valuable critical emendations have been made by Prof. Tate and Mr. John Brazier, and these have been availed of by me in the preparation of the Classified List attached to this paper. These gentlemen have also largely contributed in the extension of our knowledge of the Mollusca. Mr. Brazier's contributions to our knowledge of the land and fresh water shells are especially extensive.

In the following pages I have given a fairly comprehensive account of the bibliography of the subject, and for the convenience of local students who are not in possession of works of reference, I have added a part devoted to the description of the various families, mainly based upon the late G. W. Tryon's splendid work on "Structural and Systematic Conchology," (April, 1884.) To afford additional facilities to such students, I have also prepared an artificial key to the classes, families, and genera, which I hope will prove to be of service. In the preparation of this key, I have been greatly aided by a similar key prepared by Prof. Hutton for his excellent work on the Conchology of New Zealand, (Manual of the New Zealand Mollusca,) published in the year 1880.

In conclusion, I may add that this contribution can only be
considered merely as a provisional aid to students of Tasmanian Conchology; but it is hoped it may serve a useful purpose until such time as a more complete work makes its appearance. No doubt it is possible I have failed to notice recent minor contributions which may have appeared in foreign publications, and in the compilation from so many sources, I may have allowed some errors to creep in, but I think these are few and unimportant, and will not materially interfere with its general usefulness.

ARTIFICIAL KEY TO THE FAMILIES.

I. MARINE UNIVALVES.

GASTEROPODA.

(1.) Shell regularly spiral.

(a.) Shell fusiform, tapering to each end, moderately large.

Large anterior canal, short, recurved, varices not more than 5
Canal straight, short, varices three or more
Canal usually straightish and long, no varix
Shell notched in front, ovately fusiform
Shell with columella plaited, polished aperture, nearly as long as the shell, narrow
Columella plaited, aperture small, narrow, not exceeding half the length of shell
Columella plaited, aperture oblong, whorls cancelled, last one inflated
Shell small, inner and outer lip crenulated interiorly
Shell small, somewhat ventricose and rugose, inner lip with a posterior shining callosity, or blunt denticiform plait, anterior canal short, reflected truncate

(b.) Shell convolute, the aperture nearly as long as the shell.

*Spire moderate.
Spire and columella lip covered with enamel, shining
Small, columella plaited, outer lip thickened in middle
Small, columella plaited, aperture, rounded in front

Tritonidae, viii.
Muricidae, vii.
Fusidae, ix.
Buccinidae, x.
Volutidae, xii.
Mitridae, xiii.
Cancellariidae, xvii.
Columbellidae, xvi.
Nassidae, xi.
Olividae, xv.
Marginellidae, xiv.
Tornatellidae, liii.
Small, columnella plaited or toothed, spire short

**Spire very short.
Aperture with a recurved canal
Shell inversely conical
*** Spire none.
Oval, aperture narrow
Shell cylindrical, small
Small, white, pellucid, last whorl expanded
Moderate or large, inflated
Like Bullula, shell thin, flexible

*(c.*) Shell turreted, elongate or subulate.

Outer lip indented near the suture, canal long and straight
Shell elongated, polished, richly coloured, shelly operculum
Whorls ribbed, sutures deep
Aperture channeled in front, subulate
Aperture with an oblique notch in front
Shell awl-shaped, spirally striate, aperture rounded
Very small, milk white, polished
Very small, slender, many whorled, whorls plaited
Very small, aperture ovate, columnella truncate
Very minute, elongate, whorls flattish, covered with brownish epidermis
Very small, aperture entire, often umbilicated, columnella smooth

*(d.*) Shell globular or turbinated.

Polished, aperture semi-circular
Aperture semi-circular, columnella flat
Shell thin, blue
Aperture rounded, not pearly inside
Aperture rounded, pearly inside, operculum horny
Like Trochidae, but with shelly operculum

*(e.*) Shell conical, with a flat base.

Shell not pearly inside, umbilicated
Shell not pearly inside, not umbillicated
Shell pearly inside, lip without slit
Shell pearly inside, lip perforated, or with a slit
Base with a half cup shaped shelf or plate, apex sub-central
Shell depressed, lenticular
   Rotellidae, xlii.
   (f.) Shell oval shaped.

Interior with a shelly process
   Calytræidae, xxiv.
   (g.) Shell depressed or ear shaped.

Shell depressely turbinate, umbilicated
   Liotiidae, xli.
Shell ear shaped, thin, fragile, pellucid
   Naticidae, xxiii.
Shell ear shaped, nacreous not perforated
   Stomatellidae
   Shell ear shaped, nacreous perforated with holes
   Haliotidae, xlviii.

(2.) Shell irregularly spiral.

Aperture rounded, entire, or with a longitudinal slit
   Vermetidae, xxix.

(3.) Shell flat or simply conical.

Conical, curved anterior, margin notched or the apex perforated
   Fissurellidae, xlix.
Conical or depressed, neither notched nor perforated
   Patellidae, l.
Like Patella, but having a projection formed over a siphonal groove on right side
   Siphonariidae, lxvii.
Shell small, translucent trigonal
   Aplysiidae, lvii.

(4.) Shell multivalve.

Shell composed of eight separate imbricating plates
   Chitoniidae, li.

Class SCAPHOPODA.

(5.) Shell tube-like, tapering posteriorly
   Dentaliidae, lxviii.

(II.) MARINE BIVALVES.

Class PELECYPODA.

(A.) Bivalves cemented to or contained within a shelly tube.
Shell either small, equilateral, cemented to the lower end of a shelly tube, umbos alone visible, as in Aspergillus, or wholly contained within a tube as in Gasterochæna
   Gastrochænidae, lxix.

(B.) Bivalves not cemented or contained within a shelly tube.

(1.) Dorsal margin protected by one or more accessory valves.
Shell gaping at both ends, thin, brittle white, very hard
   Borers
   Pholadidae, lxxi.

(2.) Bivalves lacking accessory valves.
   (a.) Two adductor impressions, nearly equal.
   *Pallial line sinuated.
   †Ligament external.
Very long, sub-cylindrical, straight ends
gaping
Solenidae, lxxii.
Equivale thick, gaping
Saxicavidæ, lxxiii.
Shell rounded, beaks turned forward;
S WebGL TEETH 2—2
Semelidæ, lxxxviii.
hinge teeth
Tellinidæ, lxxix.
Compressed, thin ligament, anterior
Petricolidæ, lxxxii.
Shell rugosely striated and ribbed,
Saxicavidæ, lxxiii.
sinus profound
Tellinidæ, lxxix.
Three diverging teeth in each valve
Pallial line simple.
† Ligament external.
†† Ligament internal.
Trigonal, radiately ribbed, inside pearly
Trigoniidæ, xci.
Radiately ribbed, cordate not pearly
Cardiidae, lxxxii.
Thin, orbicular, white, divaricating striæ
Lucinidæ, lxxxv.
Inequivalve thick, attached by left umbo
Chamidæ, lxxxiv.
Sub-orbicular, smooth, ligament double
Ungulidæ, lxvi.
submarginal. No lateral teeth
Corbulidæ, lxxiv.
Minute, thin, sub-oval, usually trans-
Anatiniæ, lxxxv.
parent
Mactridæ, lxxvi.
† Ligament external.
Radiately ribbed, inside pearly
Anatiniæ, lxxxv.
Thin, orbicular, white, divaricating striæ
Mactridæ, lxxvi.
Inequivalve thick, attached by left umbo
Paphiidæ, lxxvii.
Sub-orbicular, smooth, ligament double
Nuculidæ, xcii.
submarginal. No lateral teeth
Trigoniidæ, xci.
Minute, thin, sub-oval, usually trans-
Cardiidae, lxxii.
parent
Lucinidæ, lxxxv.
†† Ligament internal.
Large, solid, oblong, ventricose, at-
Crassatellidæ, lxxxviii.
tenuate behind, smooth or con-
Astartidæ, lxxxix.
centrally furrowed
Arcidæ, xciii.
Roundly ovate, strongly radiately ribbed
Nuculidæ, xcii.
Hinge, many teeth in a line, not pearly
Crassatellidæ, lxxxviii.
Hinge, many teeth in a line, pearly
Astartidæ, lxxxix.
inside
Arcidæ, xciii.
(b.) Two adductor impressions, very unequal, umbo for anterior.
Nuculidæ, xcii.
Shell equivalve, oval or elongated, inside
Mytilidæ, xcv.
pearly
Pinnidæ, xcvii.
Shell large, equivalve wedge shaped,
Aviculidæ, xcv.
thin, brittle
Spondylidæ, xcvii.
Shell small, eared, thin, transparent, or
having pearly interior, often
gaping
Spondylidæ, xcvii.
(c.) One adductor impression.
Shell irregular, radiately ribbed, spiny,
usually 2 hinge teeth in each
valve
BY R. M. JOHNSTON, F.L.S.

Shell inequivalve, upper one flat, no teeth
Shell thin, perlaceous, with a deep notch or hole in the inferior valve, attached
Shell eared, sub-orbicular, radiately ribbed
Shell eared, white, gaping at the sides, equivalve often minute

(C.) Shell globular, three lobed, concentrically striated, open in front and behind, lodged at the extremity of a shelly lined tube or burrow

TEREDIDAE, LXX.

CLASS BRACHIOPODA.

(D.) Shell round or oval, perforated near or at the apex, minutely punctate

TEROBRATULIDAE, CII.

(III.) LAND AND FRESH WATER MOLLUSCS.

(A.) Land Slugs, or Snails; shell none, or rudimentary.
Shell rudimentary, a calcareous plate concealed under the mantle, jaw of animal without ribs
Shell rudimentary, often composed of a few calcareous grains, jaw of animal strongly ribbed

LIMACIDAE, LXI.

ARIONIDAE, LXII.

(2.) Land Snails, with shell more or less spiral and fully developed.
Shell small, oval, with short spire, fragile, whorls few, rapidly enlarging, resembling some fresh water

LYMNAEA

SNECINEIDAE, LXIII.

VITRINIDAE, LVIII.

SHELL minute, multispiral, cylindrical, with obtuse summit, pupiform, aperture small, usually contracted by internal teeth or lamellae.
Whorls reversed in local example

HOLICIDAE, LIX.

PUPIDAE, LX.

OSTREIDAE, CI.

ANOMIIDAE, C.

PECTINIDAE, XCVIII.

LIMIDAE, XCIX.
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

(B.) Fresh water or sub-aquatic, nearly all more or less covered with a dark brownish epidermis.

(a.) Spiral univalves.

* Sub-aquatic.

Shell minute, cylindrical apex, truncated whorls, striated transversely—margins of sea shore

Shell, smooth, elongated, perforated, whorls very convex, aperture round, peristome slightly expanded or reflected, apex frequently decollate. (Pomatiopsis) Part Rissoidæ, xxxvi.

** Aquatic.

(1.) † Shell very minute, depressed, conical or umbilicated

(2.) †† Shell very minute, 4 to 6 whorls, sub-umbilicated, elongate, ovate or pupiform (Bithynella), turbinately ovate, inner lip more or less reflected. (Beddomeia) Part Rissoidæ, xxxvi.

(3.) ††† Shell small, globose, rounded, ovate imperforate, inner lip thickened. (Brazieria.) Part Rissoidæ, xxxvi.

(4.) Shells found in or near brackish water. Small, minute, globose, conical, sharp lip Shell, moderate, sub-globose, banded Elongate, minute, pyramidal pointed spire, flattish whorls. (Tatea.) Assiminiidæ, xxxvii. Amphibolidæ, lxvi. Rissolliidæ, xxxv.

(5.) Shell moderate size or minute with sharp spire more or less acuminate; columella lip with oblique plait above, oval, oblong, corneous translucent, dextral. (Limnaea.) Part Limnæidæ, lxv.

Sinistral. (Physa.)

Shell very minute, discoidal bi-concave. (Planorbis.)

(b.) Non-spiral, patelliform or conical, base, partly closed by a flat shelf, leaving a semi-lunar aperture, apex inclined to the right. (Gundlachia.) Part Limnæidæ, lxv.

Shell aperture simple, entire, conical, limpet-shaped, sometimes radiatelyribbed. (Ancyclus.)
(c.) Bivalve shells minute, ovate, thin, olive or white. (Pisidium)
Minute, sub-quadrate, thin, yellowish. (Sphærium or Cyclas.)

Shell, large, oblong-oval, blackish epidermis; umbo eroded, pearly inside

Cyreniæ, lxxxi.

Unioniæ, xc.

List of the Various Authors who have described more than one local species, arranged according to the order of their importance locally.

Species described.

<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tenison-Woods</td>
</tr>
<tr>
<td>2</td>
<td>Lamarck</td>
</tr>
<tr>
<td>3</td>
<td>Reeve</td>
</tr>
<tr>
<td>4</td>
<td>Sowerby</td>
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<tr>
<td>5</td>
<td>Petterd</td>
</tr>
<tr>
<td>6</td>
<td>Cox</td>
</tr>
<tr>
<td>7</td>
<td>Deshayes</td>
</tr>
<tr>
<td>8</td>
<td>Brazier</td>
</tr>
<tr>
<td>9</td>
<td>Quoy</td>
</tr>
<tr>
<td>10</td>
<td>A. Adams</td>
</tr>
<tr>
<td>11</td>
<td>Gray</td>
</tr>
<tr>
<td>12</td>
<td>Beddome</td>
</tr>
<tr>
<td>13</td>
<td>Angas</td>
</tr>
<tr>
<td>14</td>
<td>Crosse</td>
</tr>
<tr>
<td>15</td>
<td>Linne</td>
</tr>
<tr>
<td>16</td>
<td>Johnston</td>
</tr>
<tr>
<td>17</td>
<td>Adams and Angas</td>
</tr>
<tr>
<td>18</td>
<td>Swainson</td>
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<tr>
<td>19</td>
<td>Pfeiffer</td>
</tr>
<tr>
<td>20</td>
<td>Quoy and Gaim</td>
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<td>21</td>
<td>Tate</td>
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<td>22</td>
<td>Chemnitz</td>
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<tr>
<td>23</td>
<td>Dunker</td>
</tr>
<tr>
<td>24</td>
<td>Martyn</td>
</tr>
<tr>
<td>25</td>
<td>Boru</td>
</tr>
<tr>
<td>26</td>
<td>H. and A. Adams</td>
</tr>
<tr>
<td>27</td>
<td>Guelmil</td>
</tr>
<tr>
<td>28</td>
<td>Philippi</td>
</tr>
<tr>
<td>29</td>
<td>Huds</td>
</tr>
<tr>
<td>30</td>
<td>Kiener</td>
</tr>
<tr>
<td>31</td>
<td>Stutchbury</td>
</tr>
</tbody>
</table>
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

32. Hanley ... ... ... ... 3
33. Frauenfeld ... ... ... ... 2
34. Menke ... ... ... ... 2
35. Mueller ... ... ... ... 2
36. All others ... ... ... ... 63

Total ... ... ... ... 716

CLASSES, FAMILIES AND GENERA.

DESCRIPTIVE ACCOUNT OF THE VARIOUS CLASSES, FAMILIES, AND GENERA OF MOLLUSCS INHABITING TASMANIA, SYSTEMATICALLY ARRANGED ACCORDING TO TRYON, ("STRUCTURAL AND SYSTEMATIC CONCHOLOGY, 1884."

NOTE.—The Roman numbers refer to the number of the family, and the Arabic numbers in brackets to the number of the species; both arranged in consecutive order in the systematic list.

CLASS CEPHALOPODA.

Cuttle Fish, Squids, Nautili, etc.

Head large, separate from the body; eyes large, lateral; cars developed; mouth with two horny or shelly beak-like jaws with fleshy lips, and surrounded by eight or ten fleshy arms or numerous tentacles, furnished with an entire or slit tube, used in locomotion, which is usually directed backwards in swimming.

SYNOPSIS OF FAMILIES.

A. Order Dibranchiata.

Animal breathing by a single pair of symmetrical branchiae or gills; eyes sessile; shell internal or none; mandibles horny; arms with suckers.

Sub-Order Octorona.

Arms, eight; no shell, (the so-called shell of the argonaut is the egg nest of the female.)

Sessile Suckers slightly pedicelled; female having two of the upper arms expanded into broad webs, one of which secretes an egg nest (nautiliform shell.)

Family Octopodidae

Argonautidae
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(i.) Family Octopodidae.

Mantle supported by fleshy bands; no cephalic aquiferous pores; arms subulate, elongated, more or less united by webs, their suckers sessile.

SYNOPSIS OF GENERA.

(1.) Arms with two rows of suckers

   (a.) Body not finned.

   Body rounded; arms long; suckers sessile; third right arm of male hectocotylised

   Differs from Octopus in having a small aquiferous system, consisting of a bag with a small pore at its lower edge upon the web between each arm

   Body oval, wider than head; arms short; cups with narrowed bases; third left arm hectocotylised

   Arms united by a web nearly to the ends

   (b.) Body Finned.

   Body like Octopus, but finned; arms with two rows of suckers

   (2.) Arms with a single row of suckers

   (a.) Not Finned.

   Body rounded, without fins; third right arm hectocotylised

   More gelatinous than Eledone; suckers smaller, less developed

   (b.) Finned.

   Body with two transverse medial fins; mantle united to the head nearly all round by a conical band; arms united by a web nearly to the tips

   (3.) Arms with three rows of suckers.

   Body not finned.

   (ii.) Family Argonautidae.

   Mantle supported by two buttons fitting into grooves at the base of the siphuncle; the two upper or dorsal arms (in the females only) expanding into broad webs at their extremity, from which an egg-nest (shell) is
secreted; cups slightly pedicelled; a pair of aquiferous pores at the upper hinder angle of the eye. 

**Genus.**

Characters those of the family; the third right arm of the male is hectocotylised; shell thin, translucent; nautiliform, white, usually two nodose keels at periphery. 

**Argonauta** (3)

**Sub-Order DECAPODA.**

*Ten arms*, of which *eight are sessile*, and *two (longer) tentacular*, shell internal.

(1.) *Internal shell horny.*

(a.) Eyes covered by skin; mostly littoral species. 

**Family**

Body long; tentacular arms, partially retractile  

Body short; tentacular arms, completely retractile 

(b.) Eyes *naked*; Pelagic species. 

Body long, cylindrical; arms or tentacles armed with *hooks* 

Body long, cylindrical; arms with *suckers* only 

(2.) *Internal shell calcareous.*

(a.) Shell blade like  

(b.) Shell forming a series of chambers transversed by a siphon 

(iii.) *Family Loliginidae.*

Body rather long; buccal skin sometimes armed with suckers; tentacular arms only partially retractile; fins lateral, terminal; inner shell or *gladius* as long as the back. (Calamary.) 

**Genus.**

Body long, with posterior rhombic fins united behind; mantle supported by a cervical ridge, and by cup-like cartilages on the base of the funnel or siphon; siphon valved, attached by bands to the head; arms with two rows of suckers, provided with *horny dentated rings*; tentacular arms with *four rows of suckers* on their clubs; fourth
left arm hectocotylised at its extremity; gladius feather-like, its shaft keeled on the ventral side.

**Body**

rather long or oval, with small lateral fins extending its entire length; siphon attached to the head by muscular bands; buccal skin with seven projections covered with suckers; a strong wrinkle behind the eyes; otherwise like *Loligo*.

Family *Onychoteuthidae*.

Body long, cylindrical; mantle supported by cartilaginous projections; eyes with a lachrymal sinus; arms or tentacles **armed with hooks**; siphon with or without bands and valve; gladius or shell generally lancet form, with **end-conus**.

Arms with two rows of suckers; rings not toothed; tentacles thick; **clubs armed with two rows of strong hooks**; bases of the same also strongly hooked; gladius or shell lancet form, with a conical commencement.

Family *Ommastrephidae*.

Arms short, with two rows of suckers; tentacles short, not retractile; the clubs armed with **four rows of suckers**; siphon valved, fastened to the head by bands; shell lancet form, with a hollow end, conus.

Club arm armed with a combination of smooth-rimmed suckers and tubercles.

(A gigantic group of cephalapods.)

Family *Sepiidae*.

Eyes covered by skin; littoral. Body oval, with long lateral fins, uniting behind; mantle supported by cartilaginous tubercles, fitting into sockets on the neck and siphon; arms with suckers; tentacular arms entirely retractile; siphon valved; shell (cuttle bone, sepion, or sepiostaire.)
broad, flat, thickened internally by numerous plates, terminating behind in a hollow, imperfectly chambered, apex or mucro, without connecting siphon.

A lid-like fold under the eyes with lachrymal openings over them; six aqueous pores in the buccal membrane; arms short; tentacles long, suckers long, pedunculated; siphon with very large valve; fourth left arm hectocotylised to its base, (one or two species undetermined abundant in Tasmanian waters)

Differing from Sepia by the sessile arms having only two rows of suckers

Genus. Sepia (—)

Genus. Hemisepius (—)

(v.) Family Spirulidae.

Animal, body oblong, with minute terminal fins; mantle supported by a cervical and two ventral ridges and grooves; arms with six rows of minute cups; tentacular arms elongated; siphon valved; shell laxly spiral, pearly whorls on the same plane, not in connection, chambered; chambers connected by a ventral siphon, invested by a series of cone-shaped tubes, one for each chamber; shell is placed vertically in the end of the body, and is held in place by side flaps of the mantle.

Genus. Spirula (7)

(B.) Tetrabranchiata.

Animal breathing by two pairs of symmetrical branchiae; eyes pedunculated; mandibles shelly; arms very numerous, without suckers; shell external, chambered; capable of containing the animal.

(vi.) Family Nautilidae.

Septa simply curved, concave on the outer face; sutures simple, or undulate, or lobed; mouth simple; siphonal opening nearly central; shell often banded with colour, pearly inside. (Six living, and over 2,000 fossil species.)

Shell involute, discoidal few-whorled; septa concave, simple; siphuncle nearly central. Dist.—Tropical seas. Australia and Tasmania. Nautilus (8)
CLASS GASTEROPODA. (vii.-lxvii.)

Head distinct, usually furnished with eyes and tentacles; body mostly protected by a spiral or conical univalve shell; lower surface of animal developing a thickened, expanded, creeping disc or foot.

Sub-Class PROSOBRANCHIATA. (vii.-li.)

Sexes separate in different individuals. Mostly marine animals, provided with a shell and generally an operculum, embraces at least all operculated molluscs. Animals breathe by gills or branchiae.

Sub-Class OPISTHOBRANCHIATA. (lii.-lvii.)

Marine slugs breathing by arboreal or fasciculated branchiae, more or less exposed on back and sides posteriorly; a large division shell less, another possessing a spiral, conical or lamellar shell partly concealing branchiae and itself more or less concealed by mantle lobes. Sexes united.

Sub-Class PULMONATA. (lviii.-lxvii.)

Mostly terrestrial (land shells), a portion being fluviatile (fresh water), usually provided with a shell without operculum, breathing air by the simplest form of lung, a pouch with external opening, lined with a network of respiratory vessels. Sexes united in the same individual.

CLASS SCAPHOPODA. (lxviii.)

Shell or hollow cylinder, straight or curved without spire, open at both ends. Head rudimentary; foot vermiform, lobulate; nervous system simplified, resembling that of the pelecypods or lamellibranchs.

CLASS PELECYPODA. (lxix.-ci.)

(Lamellibranchiata, Conchifera, Bivalves.)

No head nor eyes. Animals breathing by lamellae, two on each side, mostly dioecious head with two chambers;
nervous system, gills with three principal pairs of ganglia. No sexual union, fertilisation being accomplished by the surrounding water containing the male element. Shell composed of two valves hinged together, but occasionally (Barnea) with smaller supernumerary pieces about the hinge.

Order Siphonida. (lix. to lxxxix.)
Animal with siphons, and mantle margins more or less closed; comprises most of the marine branchia, including a large portion of the old order Dimyaria—having two well developed muscular impressions.
Siphons long, partly or wholly retractile; the pallial impression upon the inside of valve with a sinus. Sub. order. Sinnipalliata (lxix. to lxxx.)
Siphons short, not retractile; pallial impression simple without sinus. Integripalliata (lxxxi. to lxxxix.)

Order Asiphonida (xc.-ci.)
No siphons; pallial impression without sinus; mantle margin open.
Two muscular impressions equally distinct; mantle margins open or closed behind. Sub. order.
Homomyaria (xc. to xciii.)
Two unequal muscular impressions; posterior impressions large, anterior impression very small; frequently inequivale. Heteromyaria (xciv. to xcvi.)
A single posterior or sub-central adductor muscle and impression only
Monomyaria (xcvii. to ci.)

FAMILIES, GENERA AND SUB-GENERA.
(vii.) Family Muricidae.
Shell spiral; turriculated with an anterior canal; the whorls thickened by varices or nodules at each rest period in its growth.
Genus Murex. Linn. (9-11.)
Shell ovate or oblong; spire prominent; whorls convex crossed by three or more continuous varices; aperture ending below in a canal, which is generally partly closed.
Genus UROSALPINX. Stimpson. (12.)

Syn. Adamsia, Agnewia.

Shell fusiform; not variced; longitudinally ribbed or undulated and spirally striated; aperture with a short canal; outer lip dentate, lirate within. Operculum semicordate, nucleus marginal.

Genus Typhis. Montfort. (13.)

Shell ovate or oblong, with numerous projecting hollow tubular spines between the three varices; aperture nearly round, produced in front into an enclosed siphonal canal; operculum ovate with apical nucleus.

Genus TROPHON. Montfort. (14-22.)

Shell large, broadly fusiform, usually shouldered and umbilicate; with numerous lamelliform or laciniated varices, spire prominent; aperture ovate, lips thin; canal open, usually turning to the left; shell white without, but often dark within.

Genus PURPURA. Bruguierc. (23-28.)

Syn.—Microstoma. Thaïs.

Shell oblong-oval, last whorl large; spire usually short; columella flattened; aperture ovate, large, terminating in a very short oblique channel, or notched; outer lip simple. Dist.—Low water to 25 fathoms.

(viii.) Family TRITONIDÆ.

(Shell with varices which are either few and irregularly distributed, or form a continuous row crossing the whorls on opposite sides.)

Genus TRITON. Montf. (29-33.)

Syn.—Tritonium, Charonia, Aquilus, Lampusia, Ranularia

Shell oblong with prominent spire; whorls with a few remote non-continuous varices; columella rough or smooth; canal recurved; outer lip crenate or denticate; operculum ovate with sub-marginal nucleus. Dist.—Low water to 50 fathoms.

Genus Ranella. Lam. (34-36.)

Shell ovate or oblong, compressed; varices two, continuous, one on each side; columella arcuated, ridged or cremulate; aperture oval; outer lip crenated; canal short, recurved; operculum ovate, horny, with lateral nucleus. Dist.—Reefs and deep water.
Family ix. **Fusidae.**

(Shell more or less spindle-shaped, *without varices*; the lip of aperture not thickened.)

**Genus Fusus.** Lamarck. (37-42.)

Shell fusiform, not varicose; spire long, acuminate; many whorled; *columella smooth, without plaits*; aperture ovate, usually striate within; outer lip simple; *canal long and straight*; operculum ovate; acute, with apical nucleus; yellowish brown; sometimes with red brown strigæ or spots, never branded. *Dist.*—World-wide.

**Genus Fasciolaria.** Lamarck. (43-45.)

Shell fusiform; spire acuminate; aperture oval-elongate, outer lip internally crenate; *columella smooth, with a few oblique plaits*; canal moderate, nearly straight. *Dist.*—World-wide.

(x.) **Family Buccinidae.**

(Columella generally without folds or plications.)

**Genus Siphonalia.** Adams. (46-48.)

Shell ovately fusiform, sometimes variegatedly coloured, thin with very thin fugacious epidermis; last whorl ventricose, shouldered usually nodosely, plicate and spirally ribbed; aperture oval; outer lip thin; *columella smooth; canal rather short, twisted*; operculum ovate, with apical nucleus. *Dist.*—Japan, California, Australasia.

**Genus Cantharus.** Bolten. (49.)

*Syn.* Tritonidea.

Shell bucciniform, more or less ventricose in the middle, narrow anteriorly; *spire and aperture nearly equal*; columella generally with a few transverse ridges; outer lip internally crenated with a superior siphonal canal; operculum ovate, with apical nucleus.

**Genus Pisania.** Bivona. (50-51.)

Shell oblong, with prominent spire; whorls smooth or spirally striated; canal very short; outer lip thickened and crenated; operculum ovate, with apical nucleus. *Dist.*—West Indies, Mediterranean, Philippines, Australasia.

**Genus Cominella.** Gray. (52-59.)

Shell bucciniform, marked or spotted, *covered with an epidermis*; spire short, acute; last whorl large, ventricose,
with a posterior depressed groove at the suture, producing a contraction at the hind part of the outer lip; operculum with apical nucleus. The sub-genus Josephia, T.-Woods, differs from Cominellain possessing a plait upon the columella. Dist.—Cape, Australasia.

Genus Eburna. Lam. (60.)

Shell ovate-oblong, thick, porcellaneous, under a thin epidermis; deeply umbilicated; spire acuminated; whorls more or less convex, suture more or less channelled; columella arcuated; callous posteriorly; aperture oval, inner lip spreading, often covering the umbilicus in the adult; outer lip simple acute; operculum with apical nucleus. Dist.—Red Sea, India, Cape, Japan, China, Australasia.

(xii.) Family Nassidae.

Genus Nassa. Lam. (61-65.)

Shell small, ovate; ventricose; body whorl variously sculptured; aperture ovate, with a short, reflected, truncated, anterior canal; inner lip smooth; often widely spread over with enamel, with a posterior callosity or blunt, dentiform plait; outer lip dentated, internally crenulated; margin of operculum, serrate or entire. Dist.—World-wide.

(xiii.) Family Volutidae.

Genus Voluta. Linn. (66-72.)

Shell ovate or sub-conical, thick, solid; spire usually short; (Shoulder of whorls often angulated, sometimes nodose or spinous, but not so characterised in the Tasmanian living species.) Aperture—extending the greater length of shell—long and rather narrow; columella with a callous deposit and prominently plaited; lip generally thickened, sometimes sub-reflectcd. Dist.—World-wide, Australia being the chief centre.

(xiv.) Family Mitridae.

Genus Mitra. (73-86.)

Shell fusiform thick; spire elevated; aperture small, generally less than half the length of the shell, narrow, notched in front; columella transversely, somewhat obliquely plicate; outer lip thick, smooth within, not variced externally. Dist.—Tropical and sub-tropical; range low water to 80 fathoms.
(xiv.) Family Marginellidae.

Genus Marginella. Lam. (88-96.)

Shell smooth, bright; spire short or concealed; aperture obtuse or truncated in front; columella plicated; outer lip (of adult) with a thickened marginal varix; inner margin smooth or crenulate. Dist.—Tropical and sub-tropical.

Genus Erato. Risso. (87.)

Shell obovate, polished; spire short, conical, distinct; aperture linear; outer lip without varix, but thickened towards the middle, and denticulate within; columella with distinct plait at the fore part. Dist.—World-wide.

(xv.) Family Olividae.

(Shells sub-cylindrical, porcellanous, brilliant in colour; columella lip, sutures and spire more or less covered with a callous deposit; outer lip simple, notched below.)

Genus Olivella. Swainson. (97.)

Shell small, polished, sub-cylindrical, solid; spire produced, acute; suture canaliculate; aperture narrow behind, enlarged anteriorly; columella plicated in front, callous posteriorly; operculum present, thin, half ovate with apical nucleus. Dist.—N. America, China, Australasia, etc.

Genus Oliva. Brug. (98.)

Shell oblong, sub-cylindrical, polished; spire short, conical; suture canaliculate; aperture long, narrow, anteriorly widely notched; columella obliquely plicate; sulcate or striate in front; callous posteriorly; outer lip simple; operculum wanting. Dist.—America, Africa, India, Polynesia, Australasia.

Genus Ancillaria. (99-101.)

Shell oblong, polished, sub-cylindrical; body whorly, swollen; sutures covered by enamel; aperture broadly effuse below; columella not umbilicated, with a few oblique anterior plait; basal whorl marked with revolving grooves which terminate occasionally in a slight anterior lip projection or tooth; operculum generally present, small, ovate, acute. Dist.—Red Sea, Indian Ocean, Japan, West Indies, Australasia.
(xvi.) Family Columbellidae.
Genus Columbeilla. Lam. (102-113.)
Shellstrombiform, mitriform, or fusiform (usually fusiform, with elevated spire in Tasmanian species), smooth, or longitudinally or transversely ribbed; internal lip excavated in middle, crenulate or denticulate in front; outer lip inflected and internally thickened and crenulate in the middle. Dist.—Mostly sub-tropical. (Oat shell.)

(xvii.) Family Cancellariidae.
Genus Cancellaria. Lam. (114-117.)
Shell ovately fusiform, cancellated, reticulated or ribbed; last whorl ventricose; aperture oblong, cancellate in front; canal short, sometimes recurved; columella with several large oblique plications; operculum wanting. Dist.—World-wide; range, low water to 40 fathoms (vegetable feeders).

(xviii.) Family Terebridae. (Auger Shells.)
Genus Terebra. Lam. (118-123.)
Shell elongate, narrow, turriculate, solid; whorls flattish, numerous, with superficially impressed sutures; aperture small, ovate. Profoundly notched at the base; columella oblique; operculum annular, horny, with apical nucleus. Dist.—Mostly tropical.

(xix.) Family Pleurotomidae.
Genus Pleurotomia. Lam. (124-152.)
Shell turriculated, fusiform, terminated anteriorly by a straight canal, more or less prolonged; aperture generally linear-ovate; columella smooth, straight, or sinuous; outer lip somewhat sinuous, with a notch or slit near the suture; operculum corneous, annular, not always present. Dist.—World-wide; low water to 100 fathoms.

Sub-Genus Drillia. Gray.
Turriculated; aperture oval, oblique, about one-third the length of (adult) shell; canal short, twisted; columella lip strongly callous above.

Sub-Genus Bela. Gray.
Shell oval, fusiform; spire produced; canal short; sinus small near the suture; columella flattened; aperture narrowly ovate, nearly half the length of shell; operculum pointed at both ends.
Sub-Genus Clathurella. Carp.

Differs from *Mangelia* in the more ventricose form and more evident canal; from *Clavatula* in the emargination of outer lip; from *Bela* and *Daphnella* in texture and sculpture; shell fusiform or turriculate, cancellated surface; columella lip without callosity, except a small posterior tooth; *no operculum*; aperture nearly half the length of (adult) shell.

Sub-Genus Daphnella. Hinds.

Shell fusiform, thin, fragile, usually striated; aperture elongated, oval, usually less than half the length of (adult) shell; canal very short. Small and elegant shells, distinguished from *Dejeania* by their elongated body-whorl tenuity and sculpture. *No operculum*.

Sub-Genus Cithara. Schum.

Shell fusiform, polished, longitudinally ribbed; aperture linear, truncated in front, slightly notched behind; outer lip margined, denticulate within; inner lip frequently finely striate; *no operculum*.

Sub-Genus Mangelia. Leach.

Shell fusiform, mostly longitudinally ribbed; spire elongated, turriculate, acuminate; canal short, more or less truncate; columella smooth; aperture usually fully half the length of shell; sinus near the suture; *no operculum*.

(xx.) Family Conidae.

Genus Conus. Lam. (153-157.)

Shell thick, obconic; whorls enrolled upon themselves; spire not elevated or short, smooth or tuberculate; aperture elongate, narrow, margins parallel, truncate at base; outer lip with a slight sutural sinus. *Dist.*—Principally developed in the equatorial region.

(xxii.) Family Cypraeidae.

(Shell convolute, enamelled; spire concealed; aperture narrow, channeled at each end; *no operculum*.)

Genus Cypraea. Linn. (158-164.)

Shell ventricose, convolute, covered with shining enamel; spire concealed; aperture long, narrow, with short canal at each end; *inner lip crenulated*; outer lip inflected and crenulated.
Sub-Genus *Trivia*. Gray.
Distinguished by being striated over the back, frequently interrupted by an impressed dorsal sulcus.

Sub-Genus *Cyprae-ovula*. Gray.
Pyrimform, oval, ventricose. Surface covered with revolving striae.

Genus *Ovulum*. Brug. (165.)
Shell ventricose, convolute, *attenuate, and sub-acuminate at both ends*; outer lip of adult thickened and inflected.

Sub-Genus *Volva*. Bolten.
Distinguished by being ventricose *in middle*, and in having both extremities prolonged into canals.

(xxii.) Family *Cassididae*.
Genus *Cassis*. Lam. (166-170.)
Shell sub-globular or triangular, usually solid, thick (Tasmanian species excepted), last whorl large, varicose; aperture longitudinal, narrow; outer lip with a thickened, reflected margin, dentate within; inner lip rugosely plicate; operculum oval, narrow, with median apex. *Dist.*—Mostly tropical and sub-tropical; voracious, living in sandy localities, preying upon bivalve molluscs.

Sub-Genus *Semicassis*. Klein.
Shell oval, with revolving ribs; spine moderate, sharp.

Sub-Genus *Casmaria*. H. and A. Adams.
Shell generally smooth; whorls simple or sub-plicate, spire moderate; inner lip smooth, callous; outer lip margined, smooth or slightly crenulated on the inner edge.

(xxiii.) Family *Naticidae*.
(Shell globular or oval; spire, usually short; aperture, semilunar, *without canal or anterior notch*; outer lip sharp; columnella callous, more or less reflected over the umbilicus; operculum pauci-spiral, corneous, or with an exterior calcareous layer.)

Genus *Natica*. Lam. (171-177.)
Shell sub-globular; spire slightly elevated; aperture half round. A *spiral columnella callus entering the umbilicus*. *Dist.*—World-wide.
Sub-Genus MAMILLA. Schum. (Ruma, H. and A. Adams.)
Shell ovate, conic, rather thin, with pointed spire; whorls fasciated; mouth oblong; inner lip narrow, reflected; umbilicus not fusciculated.

Genus SIGARETUS. Lam. (178.)
Shell ear-shaped, with minute spire, and very large aperture, externally with revolving striae, colour usually white, with sometimes a thin corneous epidermis; operculum minute, horny, sub-spiral. Dist.—United States, West Indies, China, Peru, Australia.

Genus LAMELLARIA. Montagu. (179.)
Shell ear-shaped, thin, pellucid, fragile; spire very small; aperture large, patulous; inner lip receding; no operculum. Dist.—Norway, Great Britain, Mediterranean, New Zealand, Philippines.

(xxiv.) Family CALYPTRIDÆ.
(Shell limpet-like, with the apex more or less spiral; interior simple, or divided by a shelly process or plate, variously shaped, to which the adductor muscles are attached.)

Genus INFUNDIBULUM. Montfort. (180.)
Syn.—Trochita, Clypeola, Trochella.
Shell conic trochiform, spiral; summit central; whorls convex, plicate not umbilicated; aperture large, containing a spiral, transverse lamina or plate, extending obliquely from the centre to the outer margin of the shell. Dist.—Mostly tropical and sub-tropical.

Genus CALYPTRA. Lam. (182.)
Shell conical, more or less angular, with sub-central sub-posterior sharp apex; aperture basal, with a central lamina, half-cup shaped, attached to apex and open in front. Dist.—World-wide.

Genus LEGRANDIA. Beddome. (181.)
Shell emarginuliform; internal plate like Crepidula; radiately ribbed; front edge fissured. Dist.—Tasmania.

Genus CREPIDULA. Lam. (183-184.)
Shell oval, limpet-like, with a posterior generally lateral spiral apex; interior with a shelly plate covering its posterior half. Dist.—World-wide.
Genus HIPPONYX. Defrance. (185-187.)
Shell thick, obliquely conical, non-spiral; apex somewhat posterior and curved backwards; muscular impression, horse-shoe shaped; base of attachment shelly. Dist.—Almost world-wide.

Sub-Genus AMALtheA. Schum.
Like Hipponyx, but without shelly base; impression crescent-shaped. This form is usually found attached to living shells.

(xxiv.) Family SOLARIIDÆ.
(Shell orbicular, depressed, or trochiform; aperture generally angular; umbilicus usually wide and deep; operculum corneous, spiral.)

Genus SOLARium. Lam. (188-189.)
Shell depressed, conical, angular at periphery; aperture, sub-quadrangular, lip simple; umbilicus wide, spiral, its margins crenulated; operculum horny, sub-spiral. Dist.—Tropical, world-wide.

Genus ADEORRIS. S. Wood. (190.)
Shell depressed, orbicular, widely umbilicated; whorls not numerous, smooth or striate, the last somewhat angular; aperture rounded, the outer lip arcuate, simple, sharp; operculum shelly, sub-spiral. Dist.—West Indies, China, Australasia.

(xxvi.) Family SCALARIIDÆ.
Genus SCALARIA. Lam. (191-202.)
Shell mostly white and lustrous; turreted; many whorled; whorls round, sometimes separate, ornamented with numerous transverse ribs; aperture round; peristome continuous; operculum horny, few whorled. Dist.—Mostly tropical.

Sub-Genus CROSSEA. A. Adams.
Shell turbinate, umbilicated, white; whorls convex, cancellated, simple or with varices; aperture roundish, anteriorly angular, somewhat produced and canaliculate; umbilicus surrounded and narrowed by a callus. Occurs also fossil in Australia and Tasmania, in rocks of Eocene age.
Family IANTHINIDÆ.

Genus IANTHINA. Lam. (203-205.)

Shell thin, translucent, trochiform or globular–turbinate; nucleus minute, styliform, sinistral; whorls few, rather ventricose; aperture four sided; columella tortuous; lip thin, notched at the outer angle; base of the shell deep violet; spire nearly white. Dist.—Pelagic in Atlantic and Pacific Oceans.

Family TURRITELLIDÆ.

Genus TURRITELLA. Lam. (206-210.)

Shell elongated, awl-shaped, many whorled, with revolving stripe; aperture rounded; operculum, many whorled, with a fimbriated margin, usually whitish or brownish, with sometimes red-brown spots or flames. Dist.—World-wide, ranging from Laminarian Zone to 100 fathoms.

Family VERMETIDÆ.

(G.) Shell (adult) irregularly spiral, or contorted tubular; operculate.

Genus VERMETUS. Adamson. (211.)

Shell irregularly spiral, adult stage, or contorted, tubular, operculate. Dist.—Tropical and sub-tropical. World-wide.

Genus SILICIARIA. Brug. (212-213.)

Shell tubular: spiral at first, afterwards irregular; tube with a continuous slit; operculum spiral.

Family EULIMIDÆ.

(Shell turriculated or turbiniform, smooth, milk white, polished; aperture oval or rounded, sometimes angular in front; columella without plications; operculum corneous, sub–spiral, when present.

Genus EULIMA. Risso. (214-220.)

Shell small, white and polished; slender, elongated, with numerous level whorls; spire often curved to one side; obscurely marked on one side by periodic mouths, which form prominent ribs internally; apex acute; aperture oval, pointed above; outer lip thickened internally; inner lip reflected over the pillar; not umbilicated; operculum horny, sub–spiral. Dist.—World-wide—5 to 90 fathoms.
Genus Stylina. Brod. (221.)

Syn.—Stylina.

Shell hyaline, pellucid, thin, globular or subulate, smooth, polished; whorls numerous; apex very sharp, sometimes bent; nucleus sinistral; aperture sub-oval, angulated posteriorly, rounded in front; inner lip smooth, arcuated; outer lip slightly sinusous, thin, simple, no operculum. Dist.—Europe, West Indies, Polynesia, Australasia.

(331.) Family Turbonillidae.

(Shell white, slender, elongated, many whorled, mostly longitudinally ribbed or spirally striate.)

Genus Turbonilla. Risso. (222-225.)

Shell slender, elongated, many whorled; whorls plaited; apex sinistral; aperture simple, ovate; peristome incomplete; columella not plaited; operculum horny, sub-spiral. Dist.—World-wide. Range from low water to 90 fathoms.

Genus Aclis. Lovén. (226.)

Shell minute, like Turritella; usually spirally striated; apex sinistral; aperture oval; outer lip prominent; axis slightly rimate, operculate. Dist.—Europe, North America, Australasia.

Genus Odostomia. Fleming. (227-229.)

Syn.—Odontostomia.

Shell subulate or ovate, typically smooth; apex sinistral; aperture ovate; peristome not continuous; columella with a single tooth-like fold; operculum horny, indented on the inner side. Dist.—Universal, from low water to 40 fathoms.

Sub-Genus Parthenia. Lowe.

Shell thin, turriculate, imperforate, usually milk white, under a very pale, thin, epidermis; whorls ribbed or striate, sometimes cancellate, vanishing at periphery of last whorl. Dist.—Japan and Tasmania.

Genus Elusa. A. Adams. (230.)

Shell subulate, turreted; whorls longitudinally plaited; aperture ovate; inner lip with a single plait; outer lip often lirate within. Dist.—China, Japan, Australasia.

Genus Syrnola. A. Adams. (231-232.)

Shell subulate, straight, vitreous, banded, polished; whorls flat; suture impressed; aperture oblong; inner lip acute, obliquely plicate in the middle; outer lip simple, acute.
Genus Eulimitella. Forbes.
Sub-Genus Styloptygma. A. Adams. (233.)
Shell elongated, pupiform, turriculate, solid, smooth or slightly ribbed, polished; whorls inflated middle of spire, numerous; apex sinistral; aperture sub-quadranular. Dist.—Europe, Japan, Australasia.

(33iii.) Family Littorinidae.
(Shell spiral, turbinate or globular; peritreme entire; interior not nacreous; operculum corneous, spiral or pauci-spiral.)
Genus Littorina. Férussac. (234-238.)
Shell turbinated, thick, pointed, few whorled; aperture rounded; outer lip acute; columella rather flattened, imperforate, operculum, pauci-spiral. Dist.—Universal on sea shores.
Genus Risella. Gray. (230-241.)
Shell depressed, trochiform, with flattened whorls and keeled periphery; not umbilicated; aperture rhomboidal; marked with brown inside the margin; operculum pauci-spiral, distinguished from Trochus, which they resemble, by their non-nacreous interior. Dist.—Australasia, sea shore.
Genus Fossarbus. Philippi. (242-244.)
Shell minute, turbinate, perforate, sculptured; inner lip thin; aperture semi-lunate; operculum not spiral. Dist.—Almost world-wide; among weed at low water.

(33iv.) Family Planaxidae.
Genus Alasa. H. and A. Adams. (245-247.)
Shell ovate, conical or elongated, sub-diaphanous; whorls plicate or varicose; apex sub-mammillate; aperture ovate, the columella more or less truncate. Dist.—Japan, West Indies, Australasia.
Sub-Genus Diala. A. Adams.
Whorls not varicose, sometimes nodulate around the middle; columella straightish, not truncated; labrum not thickened. Dist.—Philippines, Japan, Australasia.

(33v.) Family Cerithiidae.
Shell spiral, elongated, many whorled, frequently varicose; aperture channelled in front, with a less distinct posterior canal; lip generally expanded in the adult; operculum, horny, spiral.
Genus Cerithium. Brug. (248-259.)

Shell turreted, many whorled, with indistinct varices; aperture small, with a tortuous canal in front; outer lip expanded; inner lip thickened; operculum horny, spiral. Dist.—Almost world-wide.

Sub-Genus Bittium.

Shell elevated, with numerous granular whorls and irregular varices; anterior canal short, not recurved; inner lip simple; outer lip not reflected; usually with an exterior rib; operculum four whorled.

Genus Triforis. Deshayes. (260-261.)

Shell sinistral, sculptured, granular; whorls numerous, terminating below in a small aperture with tubular anterior canal; opposite this canal is sometimes a second one upon a varix, marking the position of a former aperture; operculum orbicular, few-whorled. Dist.—East Indies, Polynesia, Panama, West Indies, Mediterranean, Australasia.

Genus Potamides. Brong. (262.)

Shell often large sized, turreculated; whorls angulated and coronated; aperture prolonged in front into a nearly straight canal; outer lip thin, sinuous; epidermis thick, olive brown; operculum many whorled. Dist.—Tropical and sub-tropical; fresh and brackish streams and swamps.

(xxxv.) Family Rissoellidae.

Genus Tatea. Tenison-Woods. (263.)

Shell minute, elongate, pyramidal, attenuate, with brownish-black epidermis; spire elevated, acuminate; whorls flattish (8); aperture pyriform; inner lip reflected; operculum horny and thin, with a vertical sub-marginal claw. Dist.—Only one representative, T. Huonensis, T. Woods. Found under stones at low water in tidal estuaries in Tasmania.

(xxxvi.) Family Rissoidea.

Shell small, spiral, turreted or depressed, often more or less umbilicated; aperture more or less rounded, never truly channeled in front; peritreme continuous.

Sub-Family Rissoininae.

Shell small, ovate, or turreted with a thick corneous or calcareous pauci-spiral operculum, with internal process, articulated (marine).
Genus Rissoina. D'Orb. (264-274.)

Shell turreted, whorls numerous, ribbed or cancellated; aperture semi-lunar; lip slightly thickened within, somewhat expanded, faintly channeled anteriorly; operculum corneous, thick, semi-lunar, pauci-spiral with an interior process. Dist.—World-wide (marine).

Sub-Family Rissoin.a.

Shell small, ovate or elongate; operculum pauci-spiral, not provided with an internal process (marine).

Genus Rissoa. Frem. (275-289.)

Shell minute, white or horny, conical, pointed, many whorled; smooth, ribbed or cancellated; aperture rounded; peristome entire or continuous; outer lip slightly expanded and thickened; operculum sub-spiral. Dist.—Universal (marine).

Sub-Genus Setia. H. and A. Adams.

Shell thin, oval-oblong, or sub-conic; whorls few, ventricose spotted; spire short; apex obtuse; aperture sub-orbicular.

Sub-Genus Ceratia. H. and A. Adams.

Shell sub-cylindrical, spirally striated, white, thin, sub-pellucid; whorls rounded; summit of spire obtuse; aperture sub-oval; peristome continuous; the outer lip thin and sharp.

Sub-Genus Cingula. Fleming.

Shell thin, elongated, smooth or spirally striate, spotted or banded; aperture pyriform or oval; outer lip sharp, with an external varix.

Sub-Genus Al-vania. Risso.

Shell oval, turbiniform; spire rounded, usually cancellated; aperture sub-circular; crenulated within; outer lip with a marginal exterior varix.

Sub-Family Hy-drobiin.a.

Shell very small, or of moderate size, never exceeding two-fifths of an inch in length, globose, ovate or elongated, generally umbilicated or rimate, and covered with a periostraca, for the most part of an olive colour; whorls numerous (4-8) smooth or rarely ribbed or carinated; never cancellated; aperture more or less ovate or rounded, rarely sub-acute or effuse anteriorly; peristome continuous; outer lip usually simple and acute; operculum pauci-spiral, corneous. Dist.—Lakes, rivers and lagoons, sea-level to 4,000 altitude; mostly inhabiting fresh water but some entering brackish water; herbivorous.
Genus **HYDROBIA**. Hartmann. (290-293.)

Shell minute, ovate or elongated, smooth, *sub-perforate*; spire conic; whorls generally flat; apex acute; aperture ovate; inner lip *not thickened*; operculum corneous; rostrum rather long; tentacles somewhat tapering but blunt at the extremity; foot somewhat pointed behind. *Dist.*—World-wide *fresh and brackish waters.*

Genus **BITHYNELLA**. Moquin-Tandon. (294-303.)

Shell minute, elongated-ovate, usually somewhat pupiform, imperforate, or simply rimate; apex obtuse; aperture oval or rounded; peritreme continuous; outer lip sharp or slightly thickened; operculum corneous, nucleus moderately large, not very close to basal margin. Tentacles tapering blunt at the tip; foot rather narrow, rounded behind; very bifid. *Fresh water,* ascending to 4,000 feet altitude in Tasmania. *Dist.*—Europe, America, Australasia?

Genus **POTAMOPYRGUS**. Stimpson.

Shell ovate-conic, imperforate; apex acute; whorls coronated with spines; aperture ovate; outer lip acute; operculum corneous; rostrum *moderate*; tentacles very long, slender, tapering, and pointed; eyes on very prominent tubercles; foot rather short, broadest in front, and strongly auriculated. *Dist.*—Fresh water, New Zealand, Tasmania, Cuba.

Genus **POTAMOPYRGUS**. *Hutton non Stimpson.* (294-303.)

Shell ovate-conic or oval, imperforate; body whorl more than half the length of shell; aperture ovate, the outer lip acute; peritreme continuous or discontinuous; operculum horny, sub-spiral, without any internal process. *Animal* with the foot rather short, broadest, and slightly expanded in front; tentacles very long, slender, tapering and pointed; eyes on very prominent tubercles. *Dentition*, median tooth *trapezoidal*; inferior margin more or less trilobate; first lateral broad and excavated in the middle, contracted into a long peduncle, the denticles nearly equal; second lateral pointed at the inner extremity; the shank broad and thickened on its outer margin; third lateral with the inner extremity broad and rounded, constructed at its junction with the very broad shank which is thickened on its outer margin. Number of transverse rows of teeth, 55 to 69. Formula of the denticles: 7 or 9; 9 or 11; 20 to 23; 30 to 40. *Hutton's new definition of Potamopyrgus would exactly*
fit the numerous species in Australia, Tasmania, and New Zealand, hitherto variously assigned to *Paludestrina*, *Annicola*, and latterly *Bithynella*. It is doubtful, however, whether the greatly modified definition may not have the effect of severing some of the original forms embraced under Stimpson's original definition of *Potamopyrgus*. A new name, say *Huttonia*, for the Australian, Tasmanian, and New Zealand forms, with the definition given by Professor Hutton, is suggested as the best course to adopt in the classification of Australasian species determined by the dentition characteristics.

**Genus Brazieria.** Petterd. 1888. (304.)

Shell minute, globosely rounded, solid, imperforate; spire small; body whorl large; aperture very oblique; outer lip acute; inner lip thickened; operculum horny, sub-spiral. Animal very similar to *Beddomeia Lownectonensis*, Johnston. Dist.—Fresh water streams, North-Western Tasmania—River Wye, Surrey Hills, and tributaries of the Arthur River. The shell originally described by Tenison-Woods as *Ampullaria Tasmanica*, and later transferred to genus *Annicola*, is here provisionally referred to Petterd's new genus, *Brazieria*.

**Sub-Genus Beddomeia.** Petterd. 1888. (305-310.)

Shell globosely conical, thin, umbilicate or sub-umbilicate; spire short; body whorl inflated; aperture ovate; columella margin more or less thickened; operculum horny, pauci-spiral. Animal with a somewhat broad foot; tentacles long, slender and pointed; eyes sessile at outer base of same; muzzle broad and projecting. Dentition as in *Potamopyrgus*, Hutton now Stimpson, but the trapezoidal median tooth has quite a different arrangement of the inferior basal row, which consists of two ovate elevations on either side of a curved central tooth.

Formula of denticles on median tooth \[
\frac{7 \text{ or } 9}{2-1-2}.
\]

Formerly the writer doubted the wisdom of erecting a new genus for the forms now included as above; but if the difficulty of the alteration of Stimpson's genus *Potamopyrgus* be surmounted, or if the name *Huttonia*, as suggested, be adopted for Professor Hutton's new definition as applied to Australasian forms, there is little doubt but that the sub-genus erected by Mr. Petterd would be most fitting for Australasian forms of this group.
Sub-Family Pomatiopinae.

(Shell and operculum as in Rissoinæ. Foot with lateral sinus. Amphibious.)

Genus Pomatiopsis Tryon. (311-312.)

Shell elongated, frequently decollated, perforate, smooth; whorls very convex; aperture round; peristome continuous, slightly expanded or reflected. Air breathing animal, preferring damp location in the vicinity of streams or lagoons. Dist.—United States, Central America, Australia, Tasmania, Flinders’ Island.

(xxxvii.) Family Assiminiidae.

Genus Assiminea Leach. (313.)

Shell small, oval, conical, with moderate spire; aperture rounded, oval, with sharp lip entire; columella lip somewhat thickened. Dist.—Europe, Asia, America, Tasmania.

(xxxviii.) Family Valvatidae.

Genus Valvata Mueller. (313*)

Shell depressed, conical (in the typical group), umbilicated; covered by a thin greenish epidermis; operculum orbicular, corneous, multispiral. Animal with a produced muzzle; tentacles long and slender, eyes at their bases; foot bilobed in front; branchial plume long, pectinated, partly exerted on the right side when the animal is walking; lingual teeth broad, uncini 3 lanceolate; all toothed and denticulated. Dist.—Freshwater, mundane.

(xxxix.) Family Truncatellidae.

Genus Truncatella Risso. (314-317.)

Shell small, sub-cylindrical or turbinate, with elevated spire; apex obtuse or truncated; whorls striated transversely; aperture oval, entire; peristome continuous; operculum corneous, sub-spiral. Animal with short diverging tentacles; eyes centrally behind; head bilobed; foot short, rounded at each end. Dist.—On stones and seaweed between tide marks.

(xl.) Family Neritidae.

Genus Nerita Linn. (318.)

Shell thick, smooth or spirally grooved; epidermis horny; outer lip thickened and sometimes denticulated within; columella broad and flat, with its inner edge straight and toothed; operculum shelly. Dist.—Nearly all warm seas, living on rocks and stones at low water.
(xli.) Family Liotiidae.

(Shell depressed, spiral, white ribbed, sometimes cancellate, or nodulous; aperture orbicular, rarely pearly within; operculum corneous inside; outside with a calcareous coat of pearl-like shelly particles, spirally arranged.

Genus Liotia. Gray. (319-324.)

Shell turbinated or depressed, varicose, perforated or umbilicated; whorls ribbed or cancellated; aperture rounded, pearly within; peristome thick, callously margined. Dist.—Tropical and sub-tropical.

Genus Cylostrema. Martyn. (325-333.)

Shell orbicular, depressed, widely umbilicated, spine short; whorls transversely striated or cancellated; aperture round, not nacreous; peristome continuous, simple. Dist.—Japan, Philippines, West Indies, Australasia.

(xlii.) Family Rotellidae.

Genus Rotella. Lam. (334.)

Shell depressed, lenticular, the spire depressed, conical; aperture semi-orbicular; outer lip sharp; base with a convex rounded umbilical callus. Dist.—India, China, Japan, Philippines, Australasia.

(xliii.) Family Phasianellidae.

Genus Phasianella. Lam. (335-339.)

Shell elongated, polished, richly coloured; whorls convex; aperture oval, not pearly; inner lip callous, outer thin; operculum shelly, callous outside, sub-spiral inside. (Pheasant-shell.) Dist.—Large species, Australasia; small species, India, Philippines; very small species, West Indies, Mediterranean, Great Britain.

(xlv.) Family Turbinidae.

Genus Turbo. Linn. (340-342.)

Shell spiral, turbinated, solid, nacreous inside; whorls convex, smooth, grooved or tuberculated; aperture large, rounded, slightly produced in front; operculum shelly and solid, callous outside and smooth, or variously grooved and mamillated, internally horny and pauci-spiral. Dist.—World-wide; rocks and weeds at low water, along the shore. (Top-shell.)
Sub-Genus TURBO. (Restricted.)
Shell smooth, or tuberculate, covered by a smooth epidermis; inner lip flattened, more or less produced in front; no umbliculus, operculum spiral on its inner face, convex and smooth or granular (not ridged) externally.

Sub-Genus SENECTUS. Humph.
Shell solid, with revolving squamose or spinose ridges covering the whorls; axis usually narrowly perforated; aperture usually slightly produced in front, with sometimes a short channel.

Sub-Genus MARMOROSTOMA. Swains.
Shell thick, smooth or tuberculate; aperture rounded in front; columella callus covering the axis, which is umbilicated, however; the umbilicus often at the upper end of a curved channel in the callus; operculum spiral, with central nucleus, and an indistinct sub-central external rib.

(xlv.) Family TROCHIDÆ.
(Shell usually conical, with flattened base, nacreous inside; operculum corneous, multispiral.)

Genus TROCHUS. Linn. (343-388.)
Shell pyramidal, with nearly a flat base; whorls, numerous, flat, variously striated; aperture oblique, rhombic, pearly inside; columella twisted, slightly truncated; outer lip thin; operculum, horny, multispiral. Dist.—World-wide; low water to 15 fathoms, the smaller species to 100 fathoms.

Sub-Genus TROCHUS. (Restricted.)
Umbilical region excavated but not perforated; columella spirally twisted above, terminating in a point anteriorly.

Sub-Genus INFUNDIBULUM. Mont. (CARINIDEA. Swains.)
Shell, conical; whorls flattened, the last angular, base concave; columella without teeth, or teeth obsolete.

Sub-Genus MINOLIA. A. Adams.
Shell globosely conoidal, widely and profoundly umbilicated; whorls rounded, clathrate; suture canaliculate; last whorl, subsolute towards the aperture; umbilicus perspective; aperture circular, pearly within; peristome, continuous, thin, acute.

Sub-Genus ASTELE. Swainson. (Tas. Journal, 1855.)
Shell nacreous, pyramidal or trochiform; unarmed; body whorl convex; columella, none; umbilicus large, closed only by the terminal whorl of the spire; aperture, broader than high, the margin of both lips thin.
Sub-Genus Montilea. Swainson.
Shell orbicular, depressed, widely umbilicated; whorls encircled by grooves, the last rounded; umbilicus encircled by a striated callus; columella terminating anteriorly in one or two tubercles.

Sub-Genus Gibbula.
Shell conoidal, umbilicated; umbilicus cylindrical or infundibuliform; whorls frequently tuberculated above, and with channelled suture; columella sometimes terminating in a tubercular tooth.

Sub-Class Zizyphinus. Gray. (Calliostoma.) Swains.
Shell trochiform, conical, not umbilicated; last whorl angulated and usually ribbed at the periphery; aperture, quadrangular; columella simple, oblique, often ending in a tooth in front.

Sub-Genus Thalotia. Gray.
Shell ovate-turriculated, rather thick, not umbilicated; whorls flattened, with revolving ribs, which are sometimes granular; aperture, sub-rotund; columella tuberculate, truncate in front; outer lip rather thick, encrusted within.

Sub-Genus Elechnus. Humphrey.
Shell elevated, conoidal, spire sharp; whorls rather flat, smooth, polished, usually with distant revolving incised lines; aperture sub-oval; columella with a tooth-like projection in the middle; outer lip thickened within. Brilliantly coloured shells, but very pearly within (used as ornamental necklaces by the Tasmanian Aborigines).

Sub-Genus Cantharidus. Montfort.
Shell ovate, thin, outer lip acute; the columella wants the conspicuous tooth seen in Elechnus; the whorls are encircled by stria and not polished; interior highly iridescent.

Shell subulate, with sharp spire, polished, bright coloured; whorls smooth, flattened, without epidermis; aperture sub-ovate, rather large, not nacreous within; columella twisted, truncated in front; outer lip simple, sharp.

Sub-Genus Trochocochlea. Klein.
Shell elevated, turbiniform; whorls bluntly angled at the periphery, or with revolving carinae; outer lip thin, smooth within; inner lip spreading, twisted, dentate below, no umbilicus.
Sub-Genus *Euchelus*. Phil.

Shell *conoidal, turbinated umbilicated*; whorls rounded, with *granulated* revolving ribs; columella lamellarily produced into a *central tooth*; outer lip thickened and *crenulate within*; opercular whorls rather few, rapidly increasing.

Sub-Genus *Clanculus*. Montfort.

Shell *conoidal or turbinated, not umbilicated*; whorls mostly *granulous*; aperture contracted; columella spirally twisted, forming a *false umbilicus, plicated throughout* and terminating in a *multidentate varix*; outer lip *dentate within*, with sometimes a larger superior tooth.

Sub-Genus *Diloma*. Philippi.

Shell *conoidal, smooth, not umbilicated*; whorls rather few, *convex*; aperture sub-rounded; columella lip excavated *in the middle and expanded over the umbilicus region*, produced laterally to join the outer lip; outer lip thin, unarmed.

*Genus Margarita*. Leach. (—)

Shell *thin, globular, conical, umbilicated*; whorls rounded, smooth; aperture *rounded, pearly*; lip sharp, smooth. 

Dist.—Japan, California, Australasia.

(xlvi.) Family *Stomatellidae*.

*Genus Stomatella* Lam. (389.)

Shell *ear-shaped, regular*; spire small; aperture oblong, very large and oblique, *naureous*; lip thin, even edged; operculum circular, *horny, multispiral*. Dist.—On reefs and under stones at low water.

*Genus Stomatia*. Helbing. (390.)

Shell like *Haliotis*, but *without perforations*, their place being occupied by a *simple furrow*; surface rugose, smooth or spirally ridged; spire small, prominent; aperture *large, oblong*; outer mag in *irregular*. Dist.—Java, Philippines, Torres Straits, Pacific, Australasia.

Sub-Genus *Gesa*. Gray.

Shell *sub-spiral, oblong, auriform, depressed, smooth or striated*; spire flattened, *nearly obsolete*; aperture *very large*; no operculum.

(xlvii.) Family *Pleurotomariidae*.

Shell more or less conically elevated, turreted or trochiform, *with a marginal slit* in the upper part of the outer lip, or a row of perforations in the upper part of the whorl; aperture often pearly within.
Genus Schismope. Jeffreys. (391.)
Shell minute, thin, translucent, not pearly; spire laterally compressed, as in Stomatia; slit of the young shell is converted into a foramen in the adult; it does not commence until the animal is half grown. Dist.—Mediterranean, Japan, Tasmania.

(xlviii.) Family Haliotidæ.
Genus Haliotis. Linn. (392-395.)
Shell ear-shaped, large, with a small flat spire; aperture very wide, iridescent; exterior striated, dull; outer angle perforated by a series of holes, those of the spire progressively closed. Dist.—Almost world-wide.

(xlix.) Family Fissurellidæ.
Shell conical, limpet-shaped; apex recurved; nucleus spiral, often disappearing in the course of growth; anterior margin notched or apex perforated; muscular impression horse-shoe shaped, open in front.
Genus Fissurella. Lam. (396-401.)
Shell oval, conical, depressed, with the apex in front of the centre, and perforated; surface radiated or cancellated; muscular impression with the points incurved. Dist.—Universal, but mostly in warm seas.
Sub-Genus Macroschisma. Swainson.
Shell square, oval, roughly rayed, truncate at the end; perforation very large, sub-triangular, elongated.
Genus Emarginula. Lam. (402-405.)
Shell oval, conical, elevated, with the apex recurved; surface cancellated; anterior margin notched; muscular impression with recurved points. Dist.—Almost world-wide, range low-water to 90 fathoms.
Genus Parmophorus. Blainv. (406-408.)
Shell lengthened oblong depressed; apex posterior; front margin incurved; muscular impression horse-shoe shaped, elongated; shell smooth, white. Dist.—East Indies, Philippines; Australasia.

(l.) Family Patellidæ.
Shell wholly external, disc shaped, with apex anteriorly directed. (Limpets.)
Genus Acmaea. Esch. (409-417.)
Shell solid, limpet form; apex erect, or anteriorly inclined. Dist.—Mostly West Coast of North America, Europe, Australasia.
Genus *Patella*. (418-424.)

Shell conical, *more or less depressed*, oval at the base; apex sub-central or anterior, from which usually radiate ribs, which are are frequently nodose; mostly crenulated on the inner margin. *Dist.*—World-wide. (Common Limpet.)

(li.) Family *Chitonidae*.

Shell composed of *eight separate transverse imbricating plates*, lodged in a coriaceous mantle, which forms an expanded margin around them.

Genus *Chiton*. Linn. (425-433.)

Same general description as given for the family.

Sub-Genus *Chiton*. Lam.

Girdle covered with distinct scales; anterior and posterior valve with many slits, middle valve with one.

Sub-Genus *Lophyrus*. Poli. (Radsia. Gray.)

Teeth in *middle valve two or more*; differs also from Chiton in having side slits.

Sub-Genus *Lepidopleurus*. Risso. (Isnochiton.)

Scales transverse, flattened, somewhat imbricated, generally striated.

Sub-Genus *Plaxiphora*. Gray. (*Euplacifora*. Gray.)

Mantle with a double series of pores, beset with bifurcate bristles, one row at the insertion of the valves, the other at the external margin; shell with the valves broad, transverse, external.

Sub-Genus *Acanthocites*. Risso.

Mantle densely spinulose, surrounded with a series of setigerous pores; shell with the valves deeply immersed, sub-equal externally, the exposed part moderate; cordate as broad as long; plate of insertion of the anterior valve six lobed, that of the middle bilobed, that of the posterior five lobed.

Genus *Chitonellus*. Blainville. (434-435.)

Tail plate funnel shaped; laminae thrown forward; insertion plates very sagittate; slits in anterior valve 5, in middle 0-1, in posterior none; teeth very short, except of sutures; eaves distinct; sinus very deep and narrow; girdle crowded with bristles, no tufts; gills posterior.

Sub-Genus *Cryptoptax*. Gray.

Middle valve without ribs; girdle with crowded bristles, tufted.
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(liii.) **Family Philinidae**.

**Genus Philine.** Ascanius. (436)

Shell **bulliform**, not forming a single whorl, internal, white. translucent, oval, slightly convoluted; spire rudimentary. *Dist.*—West Indies, Boreal Atlantic, Mediterranean, East Indies, Australasia.

(liv.) **Family Tornatellidae**.

Shell **spiral**, ovate, convolute or involute, spire more or less elevated; surface mostly *spiral*ly punctated; aperture usually high and narrow, truncate or roundish in front; columella solid.

**Genus Tornatina.** D'Orb. (437)

Shell oval, elongated, conical or fusiform, with revolving punctated siphon; aperture long and narrow, widened in front, entire; lip sharp; columella thickened, but without plications. *Dist.*—Almost world-wide.

**Genus Ringicula.** Desh. (438)

Shell minute, ventricose, with small spire; aperture notched; columella callous, deeply plaited; outer lip thickened and reflected. *Dist.*—In all warm seas.

(lv.) **Family Cylichnidae**.

Shell external, spiral, more or less cylindrical; nearly white; no operculum.

**Genus Cylichna.** Loren. (439-440)

Shell strong, cylindrical, smooth, or punctate-striate; spire minute or truncated; aperture narrow, rounded in front; columella callous, with one plait. *Dist.*—Chiefly deep water shells, Greenland, Britain, Red Sea, Australasia.

(lvi.) **Family Bullidae**.

Shell spiral, ventricose, rather thick, maculated and banded in the typical genus, white in others; spire involute, external, but usually partly covered by the lateral lobes of the foot.

**Genus Bulla.** Linn. (441)

Shell oval, globular, smooth, spotted, marbled or zoned; spire concave; aperture as long as the shell; inner margin without columella; outer lip trenchant. *Dist.*—Universal.
Genus **Haminea**. Linn. (442)  
Shell oval, globular, spiral, ventricose, *cornecous*, thin, covered by a slight *smooth epidermis*; spire involute; lacks the colours of Bulla.

(lvi.) Family **Lophoceridae**.  
Genus **Akera**. Muller. (443.)  
Shell like Bulla, thin, flexible, globosely cylindrical; spire truncated; whorls channelled; aperture long, expanded and deeply sinuated in front; outer margin disunited at the suture; columella open, exposing the whorls.  
Dist.—Greenland, Great Britain, Mediterranean, East Indies, Australasia.

(lvii.) Family **Aplysidae**.  
Shell wanting or rudimentary, and covered by the mantle; oblong, trigonal or slightly convoluted; large, slug-like animals.  
Genus **Aplysia**. Gmelin. (444-445.)  
Shell oblong, convex, *flexible and translucet*, with a posterior slightly incurved apex. (Sea-hare.)  
Dist.—West Indies, Norway, Britain, Mediterranean, Mauritius, China, Australasia.

(lviii.) Family **Vitrinidae**. (Laud Shells.)  
Shell usually thin, corneous, transparent, spiral, of few rapidly enlarging whorls.  
Genus **Vitrina**. Drap. (446-448.)  
Shell imperforate, very thin, depressed; spire short, last whorl large; aperture large, lunate or rounded; columella margin slightly inflected; peristome often membranous.  
Dist.—Universal, mostly inhabit cold or temperate countries or mountain regions of warm countries.

(lx.) Family **Helicidae**. (Laud Shells.)  
(Shell spiral, usually thicker than in the Zonitidae, and mostly with reflected lip, the aperture edentulous or contracted by teeth.)  
Genus **Helix**. (449-518.)  
Shell of variable form, smooth, rugose, striate, ribbed or tuberculate, sometimes pilose; orbicular convex, planorbid, trochiform subtruncated, or short bulimiform (monsterities sinistral, or with the whorls more or less uncoiled); aperture oblique, oval or
semi-lunar, with or without interior teeth on the margin or parietal wall; lip simple or thickened internally or reflected, umbilicus covered, widely open. Dist.—Universal.

Genus Bulimus. (519-520.) Land Shells.

Shell ovate-oblong or turriculated, solid, sub-perforate or imperforate; whorls few, the last ventricose and large; aperture longitudinal; columella widened, rarely plicate; peristome thickened, reflected; the lip usually joined by a callus. Dist.—Mostly South American.

(i.) Family Pupideæ. (Land Shells.)

Shell generally minute, multispiral, cylindrical, with obtuse summit (pupiform); aperture small, usually contracted by internal teeth or lamellæ.

Genus Pupa. (521.)

Shell usually very small, cylindrical or oval-oblong; umbilicus slight or a mere slit; plicate, striate or costellate brown or horn-colour; columella plicate or sub-dentate; lip reflected, usually dentate or plicate within, the extremities usually joined by a raised callus. Dist.—Universal, boreal and tropical.

(ixi.) Family Limacideæ. (Terrestrial Land Slugs.)

Shell rudimentary, a calcareous plate, not spiral, concealed under the mantle, and covering the respiratory cavity.

Genus Limax. (522.)

Shell-plate testaceous thin, flat, longer than wide, with concentric striae of increase, internal. Dist.—Universally distributed.

(ixii.) Family Arionideæ.

(Animal naked, with or without mucous pore; mantle concealing a shell-plate, or a few calcareous grains which represent it; jaw strongly ribbed; central tooth tricuspidate, the median cusp long and narrow; laterals and marginals bicuspidate.)

Genus Cystopecta. (523.)

Body attached for half its length to the back of the foot; mantle very large, enveloping the whole animal in repose, but from beneath which the head and the tip of the tail alone are visible from above when the animal is crawling; tentacles four; tail with a mucous spore at the tip; mandible like that of Arion; lingual teeth resembling those of Testacella. No shell. Dist.—Tate. Tasmania.
(lxiii.) Family Succineidae.

Genus Succinea. (524-525.)

Shell oval, very fragile and transparent; spire short; the whorls few, and very rapidly enlarging; aperture oval; outer lip thin, not reflected, united below by a very broad curve with the thin, smooth columella. Dist.—World-wide; sub-aquatic, living in damp places, near the margin of streams.

(lxiv.) Family Auriculidae.

(Shell oblong-oval, covered by a thin epidermis; spire short, conoidal, very rarely sub-elongated; last whorl large; rounded at the base; aperture longitudinal, narrow, ear-shaped; inner wall of the aperture with two or three plications, peristome thickened internally, without teeth.)

Genus Cassidula. (526-529.)

Shell sub-perforated, cassidiform, solid; spire short, conoidal; last whorl very large, attenuated to the base, where it is usually carinated or angulated around the axis; aperture narrow, sinuous; inner lip dentately plicate; columella plication strong; outer lip thickened within by a strong callosity with toothed edge. Dist.—Ceylon, East Indies, Philippines, Australasia, Polynesia.

Genus Alexia. (527.)

Shell oblong-oval, thin, spire acuminate; last whorl large, rounded at base; columella with an oblique plait; aperture contracted by teeth, and sometimes by a callosity of the outer lip. Dist.—United States, West Indies, Madeira, Europe.

Genus Marinula. (528.)

Shell oval-oblong, imperforate, solid, smooth; spire short, sharp; aperture oval; inner lip rather thick, excavated with three plications, the posterior largest; outer lip simple, sharp. Dist.—Australia, Mediterranean, W. Coast of America.

Genus Ophicardelus. (529.)

Shell oval-oblong, umbilicated, smooth; spire elevated-conic; aperture oval, elongated, angulated above; inner lip reflected, with two spiral plications, one of which surrounds the umbilicus; outer lip thin, simple. Dist.—Australia, Polynesia.
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

(lxv.) Family Limnæidae.

Shell thin, horn-coloured, mostly spiral, sometimes patelliform, capable of containing the entire animal, contracted; aperture simple, rounded; lip sharp.

Genus Limnæa. (530-533.)

Shell normally dextral, oval-oblong, thin, corneous, translucent; spire sharply rounded, more or less acuminated; last whorl ventricose; aperture oval, ample, rounded in front; columella lip with an oblique plait entering above. Dist.—Europe, Asia, America, North of the Equator, Polynesia.

Genus Amphipleura. (534-535.)

Shell globular, ventricose, thin, transparent; spire very short, depressed; aperture very large; columella without fold; outer lip sharp. Dist.—Europe, East Indies, Australia, Philippines.

Genus Physa. (536-547.)

Shell ovate, sinistrally spiral, thin, polished; aperture rounded in front. Dist.—North America, Europe, East Indies.

Genus Planorbis. (548-551.)

Shell discoidal, biconcave, the whorls visible on both sides; aperture small, rounded, margin usually simple, sometimes expanded. Dist.—World-wide.

Genus Ancylus. (552-554.)

Shell conical, limpet-shaped, thin; apex posterior turned to the left; aperture with entire basal margin; interior with a sub-spiral muscular scar. Dist.—North and South America, Europe, Australia.

Genus Gundlachia. (555-556.)

Shell very small, thin, obliquely conic, apex inclined posteriorly and to the right; base two-thirds closed by a flat, straight-edged shelf, leaving a semicircular aperture. Dist.—United States, Cuba, Tasmania.

(lxvi.) Family Amphibolidae.

Genus Amphibola. (557-559.)

Shell sub-globose, rather thick, rugose, umbilicated; spire short, whorls shouldered above, umbilicated; aperture sub-oval; columella lip callous; columella flattened and reflected; outer lip sinuous posteriorly; operculum corneous, sub-spiral. Dist.—New Zealand.
Family LIMNEIDÆ.

Shell thin, horn-coloured, mostly spiral, sometimes patelliform, capable of containing the entire animal, contracted; aperture simple, rounded; lip sharp.

Genus LIMNÆA. (530-533.)

Shell normally dextral, oval-oblong, thin, corneous, translucent; spire sharp, more or less acuminated; last whorl ventricose; aperture oval, ample, rounded in front; columella lip with an oblique plait entering above. Dist.—Europe, Asia, America, North of the Equator, Polynesia.

Genus AMPHIPLEPIDÆ. (534-535.)

Shell globular, ventricose, thin, transparent; spire very short, depressed; aperture very large; columella without fold; outer lip sharp. Dist.—Europe, East Indies, Australia, Philippines.

Genus PHYSA. (536-547.)

Shell ovate, sinistrally spiral, thin, polished; aperture rounded in front. Dist.—North America, Europe, East Indies.

Genus PLANORBIS. (548-551.)

Shell discoidal, biconcave, the whorls visible on both sides; aperture small, rounded, margin usually simple, sometimes expanded. Dist.—World-wide.

Genus ANCYLUS. (552-554.)

Shell conical, limpet-shaped, thin; apex posterior turned to the left; aperture with entire basal margin; interior with a sub-spiral muscular scar. Dist.—North and South America, Europe, Australia.

Genus GUNDLACHIA. (555-556.)

Shell very small, thin, obliquely conic, apex inclined posteriorly and to the right; base two-thirds closed by a flat, straight-edged shelf, leaving a semicircular aperture. Dist.—United States, Cuba, Tasmania.

Family AMPHIBOLIDÆ.

Genus AMPHIBOLA. (557-559.)

Shell sub-globose, rather thick, rugose, umbilicated; spire short, whorls shouldered above, umbilicated; aperture sub-oval; columella lip callous; columella flattened and reflected; outer lip sinuous posteriorly; operculum corneous, sub-spiral. Dist.—New Zealand.
(lxvii.) Family Siphonariidae.
Genus Siphonaria. (560-562.)
Shell solid, porcellaneous; apex central or sub-central; provided with more or less elevated radiating ribs or ridges, which by their projection render the margin irregular. Dist.—Cape, India, Philippines, Australia, New Zealand, Pacific, Galapagos, Peru, Cape Horn, West Indies, West Coast of North America.

CLASS SCAPHOPODA.
(lxviii.) Family Dentaliidae.
Genus Dentalium. (563-564.)
Shell tube-like, gradually tapering posteriorly, longitudinally ribbed, margin of the aperture sharpened, posterior end with an internal, slightly projecting tube, which is provided with a dorso-ventrally elongated opening; the outer layer having a very slight emargination dorsally and ventrally. Dist.—Universal.

CLASS PELECYPODA.
(lxix.) Family Gastrochænidae.
Shell equivalent, gaping; valves thin, edentulous, united by a thin external ligament, sometimes cemented to a shelly tube when adult; adductor impressions 2, pallial line sinuated.
Genus Aspergillum. (565.)
Shell small, equilateral, cemented to the lower end of a shelly tube, the umbones alone visible externally; tube elongated, closed below by a perforated disc, with a minute central fissure; siphonal end plain, or ornamented with ruffles. Dist.—Red Sea, Java, Australia, New Zealand; in sand.
Genus Gastrochæna. (566.)
Shell elongated, narrow, contained within a shelly tube; posterior adductor nearly central, with a pedal stipe in front; siphonal inflection angular, with its apex joining the pallial line; tube round, straight, tapering upwards, transversely striated, closed at the lower end when complete, and furnished with a perforated diaphragm behind the valves. Dist.—Madagascar, India, Philippines, Australia; burrowing in sand or mud.
(lxx.) Family Teredidæ.
Genus Teredo. (567.)
Shell globular, open in front and behind, lodged at the inner extremity of a burrow partly or entirely lined with shell; valves three lobed, concentrically striated, and with one transverse furrow; hinge margins reflected in front, marked by the anterior muscular impressions; umbonal cavity with a long, curved, muscular process.
Dist.—Norway, Britain, Black Sea, Tropics, Australasia, 119 fathoms.

(lxxi.) Family Photinidæ.
Genus Barna. (568.)
Shell oval, oblong, anteriorly gaping; with a single lanceolate dorsal accessory valve; umbonal process reflected, closely applied. Dist.—Australia, Burmah, Red Sea, Europe, Patagonia, Philippines.

(lxxii.) Family Solenidæ.
Genus Solen. (569.)
Shell very long, sub-cylindrical, straight, margins parallel, ends gaping; beaks terminal, or sub-central; hinge teeth, one in each valve; ligament long, external; anterior muscular impression elongated; posterior oblong; pallial line extending beyond the adductors; sinus short and square. Dist.—World-wide, except Arctic Seas; 100 fathoms.

(lxxiii.) Family Saxicavidæ.
Shell equivalve, thick, gaping at the extremities; hinge with a single cardinal tooth; ligament external, prominent, solid, inserted in a nymphal callosity; pallial impression irregular, sinuous.
Genus Saxicava. (570.)
Shell when young symmetrical, with two minute teeth in each valve; adult rugose, toothless; oblong, equivalve gaping; ligament external; pallial line situated, not continuous. Dist.—Universal.
Genus Panopea. (571.)
Shell equivalve, thick, oblong, gaping at each end, ligament external on prominent ridges; one prominent tooth in each valve; pallial sinus deep. Dist.—Northern Seas, Mediterranean, Capo, Australia, New Zealand, Patagonia; low water—90 fathoms.
(lxxiv.) Family Corbulide.  
Shell small, inequivalve, thick, gaping in front; hinge consisting of a single recurved tooth in one valve, received into a fosset or notch in the other.

Genus Corbula. (572-573.)
Shell thick, inequivalve, gibbose, closed, produced posteriorly; right valve with a prominent tooth in front of the cartilage pit; left valve smaller, with a projecting cartilage process; pallial sinus slight; pedal scars distinct from the adductor impressions. *Dist.*—United States, Norway, Britain, Mediterranean.

Genus Neama. (574.)
Shell globular, attenuated, and gaping behind; right valve a little the smallest; umbones strengthened internally by a rib on the posterior side; cartilage process spatulate in each valve (furnished with a movable ossicle—Deshayes), with an obsolete tooth in front, and a posterior lateral tooth; pallial sinus very shallow. *Dist.*—Norway, Britain, Mediterranean, Canaries, Madeira, China, Moluccas, New Guinea, Chili; from 12-200 fathoms.

(lxxv.) Family Anatide.  
Shell often inequivalve, thin, interior naureous; surface granular; ligament external, thin; cartilage internal, placed in corresponding pits and usually furnished with a free ossicle; muscular impressions faint, the anterior elongated; pallial line usually sinuated.

Genus Anatina. (575-578.)
Shell oblong, vestricose, sub-equivalve, thin and translucent, posterior side attenuated and gaping; umbones fissured, directed backwards, supported internally by an oblique plate; hinge with a spoon-shaped cartilage process in each valve, furnished in front with a transverse ossicle; pallial sinus wide and shallow. *Dist.*—India, Philippines, New Zealand, Japan, United States.

Genus Myodora. (579-583.)
Shell trigonal, rounded in front, attenuated and truncated behind; right valve convex, left flat; interior pearly; cartilage narrow, triangular, between two tooth-like ridges in the left valve, with a free sickle-shaped ossicle; pallial line sinuated; structure like Anatina; outer cells large, rather prismatic. *Dist.*—New Zealand, New South Wales, Philippines.
Genus **Myochama**. (584-585.)

Shell inequivalve, **attached by the dextral valve, and modified by the form of the surface of attachment**; posterior side attenuated; left valve gibbose; cartilage internal, between two tooth-like projections in each valve, and furnished with a movable ossicle; anterior muscular impression curved, posterior rounded, pallial sinus small. **Dist.**—Australasia; attached to Crassatella and Trigonia in 8 fathoms water; the fry, (as indicated by the umbones) is free, regular and Myodora-shaped.

**(lxxvi.)** Family **Mactridae**.

Shell **equivalve, trigonal**, close or slightly gaping; ligament (cartilage) internal, sometimes external, contained in a deep triangular pit; epidermis thick; hinge with two diverging cardinal teeth, and usually with anterior and posterior laterals; pallial sinus short, rounded.

**Genus Mactra.** (586-588.)

Shell nearly equilateral; anterior hinge-tooth A shaped, with sometimes a small laminar tooth close to it; lateral tooth doubled in the right valve. **Dist.**—All seas, especially within the tropics; 35 fathoms.

**Genus Lutaria.** (589.)

Shell **oblong, gaping at both ends**; cartilage plate prominent, with 1 or 2 small teeth in front of it in each valve; pallial sinus deep, horizontal. **Dist.**—United States, Brazil, Britain, Mediterranean, Senegal, Cape, India, New Zealand, Sitka.

**(lxxvii.)** Family **Paphiidae**.

**Genus Paphia.** (590-595.)

Shell **trigonal, thick, compressed, closed**; ligament internal, in a deep, central pit; a minute interior hinge-tooth, and 1—1 lateral teeth in each valve; muscular scars deep; pallial sinus small. **Dist.**—West Indies, Mediterranean, Crimea, India, New Zealand, Tasmania, Chili; sands at low-water.

Sub-Genus **Mesodesma.** Dcsh.

Shell **oval, sub-equilateral**; lateral teeth short, smooth, sub-equal; siphonal inflection distinct.

Sub-Genus **Donacilla.** Lam.

Shell **elongate, cuneiform, slightly truncate posteriorly**; anterior lateral teeth elongated; posterior short; siphonal sinus distinct.
Sub-Genus Anapa. Gray.
Shell sub-trigonal, ventricose, truncate posteriorly; lateral teeth sub-equal, compressed, smooth; siphonal inflection obsolete.

(lxxviii.) Family Semelidae.
Genus Semelis. (596-598.)
Shell rounded, sub-equilateral, beaks turned forward; posterior side slightly folded; hinge-teeth 2·2, laterals elongated, distinct in the right valve; external ligament short, cartilage internal, long, oblique; pallial sinus deep, rounded. Dist.—West Indies, Brazil, India, China, Australasia, Peru.

(lxxix.) Family Tellinidae.
Shell free, compressed, usually closed and equi-valve; cardinal teeth, 2 at most, laterals 1—1, sometimes obsolete; muscular impressions rounded, polished; pallial sinus very large; ligament on shortest side of the shell; external structure obscurely prismatic-cellular; prisms fusiform, nearly parallel with surface, radiating from the hinge in the outer layer, transverse in the inner.

Genus Tellina. (599-606.)
Shell slightly inequivalve, compressed, rounded in front, angular and slightly folded posteriorly, ambones sub-central; teeth 2·2, laterals 1—1, most distinct in the right valve; pallial sinus very wide and deep; ligament external, prominent. Dist.—In all seas, especially the Indian Ocean. Most abundant and highly coloured in the Tropics. Low water—coral zone, fifty fathoms. Wellington Channel, Kara Sea, Behring’s Straits, Baltic, Black Sea.

Genus Gari. (607-609.)
Shell transverse, oval-oblong, flat, equi-valve, sub-equilateral, concentrically plicate, a little gaping on each side and covered by a thin epidermis; hinge narrow, with two small cardinal teeth, sometimes divided, in each valve; beaks small; ligament long and prominent; margins simple; muscular impressions rather large, equally distant from the hinge, the anterior oblong, the posterior rounded; pallial impression distant from the margin, with a narrow, profound sinus. Dist.—Norway, Britain, India, New Zealand, Pacific; littoral—coralline zone, 100 fathoms. G. Gari is eaten in India.
Genus **Hiatula.** (610-611.)

Valves *oval-oblong, compressed*, ventral margin usually *incurved* posteriorly, where the valves are attenuated; broadly rounded anteriorly; beaks sub-median, not prominent, violaceous, under an olive epidermis; ligament thick, swollen; one or two very small cardinal teeth in each valve; muscular impressions rounded, distant; pallial impression *very sinuous*. *Dist.*—W. Indies, Red Sea, India, Madagascar, Japan, Australia, Tasmania, Peru.

((lxxx.) Family **Veneridae.**

(Shell *regular, closed, sub-orbicular or oblong*; ligament external; hinge with usually three diverging teeth in each valve; muscular impression oval, polished; *pallial line sinuated.*)

Genus **Venus.** (612-623.)

Shell thick, *ovate, smooth, sulcated, or cancellated*; margins minutely crenulated; cardinal teeth 3-3; pallial sinus *small, angular*; ligament prominent; lunule distinct. *Dist.*—World-wide. Low water, 140 fathoms. *V. Astartoides*, Behring's Sea. *V. Verrucosa*, Britain, Mediterranean, Senegal, Cape, Red Sea, Australia?

Sub-Genus **Chione.** Megerle. (*Murcia*, Romer. **Omphaloclathrum.** Klein.)

Shell *oval, triangular or sub-cardiform*; margins finely crenulated; hinge narrow, solid, with *three teeth in the right valve, two in the left*, the anterior tooth longest; ligament narrow; pallial sinus *shallow*. Mantle-margins folded and dentate; siphons short, unequal, the branchial doubly ciliated, the anal ciliated.

Genus **Cytherea.** (624-631.)

Shell like Venus; *oval-triangular, smooth*; margins simple; hinge with *three cardinal teeth and an anterior tooth beneath the lunule; pallial sinus moderate, angular*. *Dist.*—Same as Venus. Recent. 150 sp.

Sub-Genus **Callista.**

Shell *oval, transverse, inequilateral*; pallial sinus sub-oval, profound. Mantle-margins folded and cirrous above the siphons; siphons united, ciliated at their extremities.

Sub-Genus **Gouldia.**

Shell *sub-trigonal, oval, shining, inflated.*
Genus Dosinia. (632-636.)
Shell orbicular, compressed, concentrically striated, pale, ligament sunk; lunule deep; hinge like Cytherea, margins even; pallial sinus deep, angular, ascending. Dist.—Boreal, Tropical Seas. Low water, 80 fathoms.

Sub-Genus Gouldia.
Shell sub-trigonal, oval, smooth, shining, inflated.

Genus Tapes. (637.)
Shell oblong, umbones anterior, margins smooth; teeth, three in each valve, more or less bifid; pallial sinus deep, rounded. Dist.—Norway, Britain, Black Sea, Senegal, Brazil, India, China, New Zealand. Low water, 100 fathoms.

(lxxx.) Family Cyrenidae.
Shell sub-orbicular, closed, ligament external; epidermis thick, horny; umbones of aged shells eroded; hinge with two or three cardinals and lateral teeth; pallial line with a small inflexion.

Genus Corbicula. (638.)
Shell sub-oval, trigonal, inequilateral, covered by a greenish epidermis; cardinal teeth very small, elongated, one sometimes bifurcated in the right valve, two diverging in the left valve; lateral teeth longitudinal, compressed, striated; ligament prominent, thick; pallial impression with a slight or well-marked sinus. Dist.—India, East Indies, Philippines, S. America.

Genus Pissidium. (639-640.)
Shell sub-oval, trigonal, inequilateral, covered by a greenish epidermis; cardinal teeth very small, elongated, one sometimes bifurcated in the right valve, two diverging in the left valve; lateral teeth longitudinal, compressed, lamelliform, double in the right valve. Dist.—Universal. Fresh water lakes and rivers, Tasmania.

Genus Sphærium. (41.)
Syn. Cyclus.
Shell thin, oval or sub-orbicular, inflated, covered by a greenish epidermis; cardinal teeth very small or rudimentary, one more or less bifurcated, one in the right and two oblique ones in the left valve; lateral teeth compressed, lamelliform, the anterior shortest; ligament short; margins plain, muscular impressions scarcely apparent, sub-marginal; pallial impression simple. Dist.—Universal.
(lxxxii.) Family Petricolidae.
Genus Rupearia. (642-647.)
Shell elongated, moderately tumid, surface rugosely striated and ribbed, distinctly gaping posteriorly; hinge in the right valve with two cardinal teeth, and a third very small, but usually obsolete, anterior; the middle one is prominent, curved as in Petricola; the posterior is longitudinally lamellar, low and bifurcate; in the left valve are three distant and very unequal cardinal teeth; the middle one is similarly projecting as the corresponding tooth in the other valve. Rupe. lamellifera, Conrad; may be considered as a type of a group. Dist.—Europe, Pacific, etc.

(lxxxiii.) Family Cardiidae.
Genus Cardium. (648-651.)
Shell ventricose, close or gaping posteriorly; umbones prominent, sub-central; radially ribbed; margins crenulated; pallial line more or less situated. Dist.—World-wide; from sea shore to 140 fathoms. Gregarious on sands and sandy mud.

(lxxxiv.) Family Chamidae.
Genus Chama. (652.)
Shell attached usually by the left umbo; valve foliaceous, the upper smallest; hinge tooth of free valve thick, curved, received between two teeth in the other; adductor impressions large, oblong, the anterior encroaching on the hinge-tooth. Dist.—Tropical seas, especially amongst coal reefs: fifty fathoms. West Indies, Canaries, Mediterranean, India, China, Australasia.

(lxxxv.) Family Lucinidae.
Shell orbicular, free, closed; hinge-teeth 1 or 2; laterals 1—1; or obsolete; interior dull, obliquely furrowed; pallial line simple; muscular impressions two, elongated, rugose, ligament external or sub-internal.
Genus Lucina. Brug. (653-655.)
Shell orbicular, white, sometimes divaricately striate; umbones depressed; lunule distinct; margins smooth or minutely crenulated; ligament oblique, semi-internal; hinge-teeth 2—2, laterals 1—1 and 2—2 or obsolete; muscular impressions rugose, anterior elongated within the pallial line, posterior oblong; umbonal area with an oblique furrow. Dist.—Universal.

Valves divaricately striate.

Genus Lophites. Poli. (656.)
Shell almost equilateral, cancellated or sculptured by flexuous strics; lunule short, cartilage quite internal; teeth one cardinal in the right and two in the left valve; laterals remote, and sometimes indistinct. Dist.—Atlantic, Mediterranean, W. Indies, Australasia.

(lxxxvi.) Family Unculinae.

Genus Mysia. (657.)
Shell sub-orbicular smooth; ligament double, rather long, submarginal; hinge-teeth 2:2, of which the anterior in the left valve, and posterior in the right are bifid; muscular impressions polished, anterior elongated. Dist.—West Indies, Rio, Britain, Mediterranean, Red Sea, West Africa, India, Corea, Australia, California.

(lxxxvii.) Family Erycinidae.
Shell very small, thin, fragile, usually transparent, and sometimes gaping, rounded or transverse, laterally depressed; hinge narrow, with one or two cardinal teeth, the lateral more or less elongated, compressed sometimes wanting; muscular impressions small, not well-marked; pallial line simple.

Genus Lasaea. (658-659.)
Shell minute and roundish, oval; beaks straight; cartilage long, placed at the shorter end of the shell, contrary to that in Kellia; left valve with a minute thorn-like cardinal tooth; and in each valve two remarkably strong lateral teeth. Dist.—Universal.

Genus Kellia. (660-661.)
Shell small, thin, sub-orbicular, closed, beaks small; margins smooth; ligament internal, interrupting the margin, or on the thickened margins; cardinal teeth 1 or 2, laterals 1—1 in each valve. Dist.—Norway, New Zealand, California.

(lxxxviii.) Family Crassatellidae.

Genus Crassatella. (662-664.)
Shell solid, ventricose, attenuated behind, smooth or concentrically furrowed; lunule distinct; ligament internal;
margin smooth or denticulated; pallial line simple; hinge-teeth 1·2, striated in front of cartilage-pit; lateral teeth 0—1, 1—0; adductor impressions deep, rounded; pedal small, distinct. Dist.—Australia, New Zealand, Philippines, India, West Africa, Canaries, Brazil.

(lxxxix.) Family Astartidae.
Shell thick, solid, equivalve, the cardinal teeth always well developed, 2—3 in each valve; lateral teeth sometimes present on one or both sides, ligament always external, strong; muscular scars ovate, the anterior usually with a small deep superimposed pit, produced by the retractile muscles of the foot; pallial line entire.

Genus Cardita. (665-668.)
Shell oblong, radiately ribbed; ligament external; margins toothed; hinge-teeth 1·2, and an elongated posterior tooth; pallial line simple; anterior pedal scar close to adductor. Dist.—Universal.

Genus Mytilicardia. (669-670.)
Shell elongated, very inequilateral, with squamous radiating ribs; hinge with an anterior triangular cardinal tooth; posterior cardinal tooth double in the left valve; no anterior laterals. Foot rounded, grooved, byssiferous. Dist.—Universal.

(xc.) Family Unionidae.
Genus Unio. (671.)
Shell nacreous; epidermis thick and dark, oval or elongated, smooth, corrugated, or spiny, becoming very solid with age; anterior teeth 1·2, or 2·2, short, irregular; posterior teeth, 1·2, elongated, laminal. Dist.—Fresh water. Universal.

(xci.) Family Trigoniidae.
Genus Trigonia. (672.)
Shell trigonal, nacreous internally, thick, tuberculated or ornamented with radiating or concentric ribs; posterior side angular; ligament small and prominent; hinge-teeth 2·3, diverging, transversely striated; centre tooth of left valve divided; pedal impressions in front of the posterior adductor, and one in the umbo of the left valve; anterior adductor impression close to the umbo; pallial line simple. Dist.—Australia.
Family Nuculidae.

Shell oval, or trigonal, small, nacreous within; hinge composed of a great number of transverse teeth, interrupted by a central pit for the reception of the ligament, which is internal or external.

Genus Nucula. (673-674.)

Shell trigonal, with the umbones turned towards the short posterior side, smooth or sculptured; epidermis olive, interior pearly; margins crenulated; hinge with prominent internal cartilage pit, and a series of sharp teeth on each side; pallial line simple. Dist.—Northern and Arctic Seas; 10—180 fathoms; Siberia, Melville Island, New England, Britain, Mediterranean, Cape, Japan, Australia.

Genus Leda. (675-676.)

Shell resembling Nucula; oblong, rounded in front, produced and pointed behind; margins even; pallial line with a small sinus; umbonal area with a linear impression joining the anterior adductor. Dist.—Northern and Arctic Seas; 10—180 fathoms; Siberia, Melville Island, New England, Britain, Mediterranean, Cape, Japan, Australia.

Family Arcidae.

Shell regular, equivalent, with strong epidermis; ligament exterior, occupying an area between the beaks; hinge with a long row of similar comb-like teeth; pallial line distinct; muscular impressions sub-equal; structure corrugated, with vertical tubuli in rays between the ribs of striæ.

Genus Arca. (677-681.)

Shell equivalent, or nearly so, thick, sub-quadrate, ventricose, strongly ribbed or cancellated; margins smooth or dentated, close or sinuated ventrally; hinge straight, teeth very numerous transverse; umbones anterior, separated by a flat, lozenge-shaped ligamental area, with numerous cartilage grooves; pallial line simple; posterior adductor impression double; pedal scars two, the posterior elongated. Dist.—World-wide, most abundant in warm seas; low-water, 230 fathoms.

Genus Pectunculus. (682-685.)

Shell orbicular, nearly equilateral, smooth or radiately striated; umbones central, divided by a striated ligamental area; hinge with a semi-circular row of transverse teeth; adductor sub-equal; pallial line simple;
margins crenated inside. Dist. — West Indies, Britain, India, New Zealand, West America; ranging from 8 to 60, rarely 120 fathoms.

Genus Limopsis. (685.)
Shell orbicular, convex, slightly oblique, ligamental area with triangular cartilage pit in the centre; hinge with two equal curved series of transverse teeth. Dist.—Red Sea (Nyst.), Japan, Britain, Tasmania. Mr. M'Andrew has dredged L. Pygmaea living on the coast of Finmark.

(xciv.) Family Mytilidae.
Shell equivalue, oval or elongated, closed, umbones anterior, epidermis thick and dark, often filamentose; ligament internal, sub-marginal, very long; hinge edentulous; outer shell-layer obscurely prismatic-cellular; inner more or less nacreous; pallial line simple; anterior muscular impression small and narrow; posterior large, obscure.

Genus Mytilus. (686-691.)
Shell wedge-shaped, rounded behind, smooth in the typical species; umbones terminal, pointed; hinge-teeth minute or obsolete; pedal muscular impressions two in each valve, small, simple, close to the adductors. Dist.—World-wide, Ochotsk, Behring's Sea, Russian Lcc-meer, Black Sea, Cape Horn, Australasia.

Genus Modiola. (692-694.)
Shell oblong, inflated in front; umbones anterior, obtuse; hinge toothless; pedal impressions three in each valve, the central elongated; epidermis often produced into long beard-like fringes. Dist.—Universal.

Genus Modiolaria. (695.)
Shell rhomboidal, sculptured by two rows of striæ (one on each side), which radiate from the beaks, leaving the middle portion smooth; umbones incurved; hinge edentulous or crenulated, hinge-plate finely notched. Dist.—Temperate and Arctic Seas.

(xcv.) Family Aviculidae.
Shell inequivalve, very oblique, resting on the smaller (right) valve, and attached by a byssus; epidermis indistinct; outer layer prismatic-cellular, inferior nacreous; posterior muscular impression large, sub-central, anterior small within the umbo; pallial line irregularly
BY R. M. JOHNSTON, F.L.S. 115

dotted; hinge-line straight, elongated; umbones anterior, eared, the posterior ear wing-like; cartilage contained in one or several grooves; hinge edentulous or obscurely toothed.

Genus Avicula. (696-697.)
Shell obliquely oval, often thin diaphanous, very inequivalve, eared, the posterior ear produced wing-like; right valve with a byssal sinus beneath the anterior ear; cartilage pit single, oblique; hinge with one or two small cardinal teeth, and an elongated posterior tooth, often obsolete; posterior muscular impressions (adductor and pedal) large, sub-central; anterior (pedal scar) small, umbonal. Dist.—Mexico, South Britain, Mediterranean, India, Pacific, Australasia; 20 fathoms.

Genus Crenatula. (698.)
Shell thin, oblong compressed, byssal sinus obsolete; cartilage pit shallow, crescent-shaped. Dist.—N. Africa, Red Sea, China, in sponges.

Genus Vulsella. (699.)
Shell oblong, striated, sub-equivalve, with an inner pearly and outer fibrous layer; umbones straight, eared. Often found imbedded in living sponges. Dist.—Red Sea, India, Australia, Tasmania.

(xcvi.) Family Pinnideæ.
Genus Pinna. (700.)
Shell equivalve, wedge-shaped; umbones quite anterior; posterior side truncated and gaping; ligamental groove linear, elongated; hinge edentulous; anterior adductor scar apical, posterior sub-central, large, ill-defined pedal scar in front of posterior adductor. Dist.—U. S., Britain, Mediterranean, New Zealand, Tasmania, Australia, Pacific, Panama.

(xcvii.) Family Spondylideæ.
Genus Spondylus. (701.)
Shell irregular, attached by the right valve, radiately ribbed, spiny or foliaceous; umbones remote, eared; outer valve with a triangular hinge-area, cartilage line a central groove, nearly or quite covered; hinge of two curved interlocking teeth in each valve; adductor impression, double. Dist.—West Indies, Canaries, Mediterranean, India, Australasia, Torres Straits, Pacific, W. America, 105 fathoms.
(xcviii.) Family Pectinidae.
Genus Pecten. (702-706.)
Shell sub-orbicular, regular, resting on the right valves, usually ornamented with radiating ribs; beaks approximate, eared; anterior ears most prominent; posterior side a little oblique; right valve most convex, with a notch below the front ear; hinge margins straight, united by a narrow ligament; cartilage internal, in a central pit; adductor impressions double, obscure; pedal impression only in the left valve, or obsolete. Dist.—World-wide, Nova-Zembla, Cape Horn; 200 fathoms.

(xcix.) Family Limidae.
Shell eared, white, gaping at the sides; hinge edentulous, with a central, triangular cartilage-pit.
Genus Lima. (707-708.)
Shell equivale, compressed, obliquely oval; anterior side straight, gaping, posterior rounded, usually close; umbones apart, eared; valves white, smooth, punctate, striate, or radiately ribbed and imbricated; there is usually a thin, brownish epidermis; hinge-area triangular, cartilage-pit central; adductor impression lateral, large, double; pedal scars two, small. Dist.—Norway, Britain, West Indies, Canaries, India, Australia, 1-150 fathoms. The largest living species (L. excavata, Chemn) is found on the Coast of Norway.

(c.) Family Anomidae.
Genus Placumanomia. (709.)
Shell adherent, sub-equivale, irregular, flattened; hinge with two thick divergent elongated lamella in the inferior, corresponding with two long pit in the upper valve; upper valve with only two muscular impressions, the pedal scar radiately striated; the byssal plug is often fixed in the lower valve, and its muscle becomes (functionally) an adductor. Dist.—West Indies, Britain, New Zealand, California, Behring’s Sea, Ochotsk; 50 fathoms. Mocine, California. P. macrochissa, Dcsh.

(ci.) Family Ostreidae.
Genus Ostrea. (701-713.)
Shell irregular, attached by the left valve; upper valve flat or concave, often plain; lower convex, often plaited or
foliageous, and with a prominent beak; ligamental cavity triangular or elongated; hinge toothless; structure sub-nacreous, laminated with prismatic-cellular substance between the margins of the laminae. 

Dist.—Tropical and temperate seas, Norway, Black Sea, Australasia, etc.

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**BRACHIOPODA.**

(cii.) Family Terebratulidae.

Shell minutely punctate; usually round or oval, smooth or striated; ventral valve with a prominent beak, perforated near or at the apex, and attached by a portion of the valve itself; hinge with two curved teeth; dorsal valve with a depressed umbo, a prominent cardinal process between the dental sockets, and a slender shelly loop. (Lamp shell.)

Genus Waldheimia. (714.)

Shell smooth or plaited, dorsal valve frequently impressed; foramen complete; loop elongated or reflected; septum of smaller valve elongated. Dist.—Norway, West Indies, Java, Australia, California, Cape Horn; low water, 100 fathoms.

Genus Kraussia. (715-716.)

Shell small, transversely oblong; hinge-line nearly straight; beak truncated, laterally keeled; area flat; foramen large, deltidium rudimentary; dorsal valve longitudinally impressed, furnished inside with a forked process, rising nearly centrally from the septum; interior often strongly tuberculated. The Apophyses are sometimes a little branched. Dist.—S. Africa, Sydney, New Zealand; low-water to 120 fathoms. K. rubra, Pallas.

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**DESCRIPTIVE TERMS.**

**EXPLANATION OF TERMS COMMONLY USED IN DESCRIBING THE EXTERNAL CHARACTERS AND FORMS OF VARIOUS KINDS OF SHELLS.**

Shells are said to be external when the animal is contained in them, and internal when they are concealed in the mantle; the latter, with many species devoid of shelly covering, are termed naked mollusca. The greater number of shells have but one shell (usually a closely-set spiral tube or cone,) and are termed univalves; the others are mostly composed of two valves (bivalve) hinged together, generally under the beak or
Some bivalves, as in Pholas and Barnea, have one or two accessory plates near the hinge, while the Chitons have eight imbricating valves like an articulated limpet, and are termed multivalves. The conical or flatly conical shells of the limpet group are usually simple and not spiral. The following are a list of terms applied to the principal distinguishing character of shells generally.

**UNIVALVES.**

<table>
<thead>
<tr>
<th>Form of Shell</th>
<th>Example fig. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. (a) Regularly spiral.</td>
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</tr>
<tr>
<td>1. Elongated, subulate, elevated</td>
<td>32</td>
</tr>
<tr>
<td>2. Turreted, turriculate, an elongated shell with the whorls angulate or shouldered on their upper part</td>
<td>33</td>
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<tr>
<td>3. Cylindrical, pupiform</td>
<td>44, 45</td>
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<tr>
<td>4. Short, bucciniform</td>
<td>5</td>
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<tr>
<td>5. Fusiform, spindle-shaped</td>
<td>2, 3</td>
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<tr>
<td>6. Contabulated, short, with shouldered whors</td>
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</tr>
<tr>
<td>7. Globular, rounded</td>
<td>16</td>
</tr>
<tr>
<td>8. Depressed, lenticular</td>
<td>19</td>
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<tr>
<td>9. Discoidal, having the form of a disc or quoit</td>
<td>21, 22</td>
</tr>
<tr>
<td>10. Convoluted, aperture about as long as the shell, nearly or quite concealing the spire</td>
<td>24, 25, 26, 28</td>
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<tr>
<td>11. Trochiform, pyramidal, conical, with a flat base</td>
<td>11</td>
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<td>12. Turbinated, conical, with rounded base</td>
<td>9, 18</td>
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<tr>
<td>13. Cone shaped, obconic</td>
<td>27</td>
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<tr>
<td>14. Few whorled, whorls rapidly increasing</td>
<td>13, 36</td>
</tr>
<tr>
<td>15. Many whorled, whorls slowly or gradually increasing</td>
<td>12, 39</td>
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<tr>
<td>16. Ear-shaped</td>
<td>23</td>
</tr>
<tr>
<td>17. Subulate, awl-shaped</td>
<td>38</td>
</tr>
<tr>
<td>18. Acicular</td>
<td>40</td>
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<tr>
<td>(b) Irregularly spiral, evolute</td>
<td>31</td>
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<tr>
<td>(c) Tubular, tusk-like, tooth-like</td>
<td>46</td>
</tr>
<tr>
<td>(d) Boat-shaped, slipper-shaped</td>
<td>14, 15</td>
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<tr>
<td>(e) Conical or limpet-shaped</td>
<td>57, 58, 59</td>
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<tr>
<td>(f) Multivalve and imbricated</td>
<td>47</td>
</tr>
</tbody>
</table>

*See accompanying Plate.*
II. Apex, the posterior end of shell, or nucleus

1. The nucleus may be reversed or sinistral, turning to the left as in the body whorls of Physa

2. Dextral, turning to the right, normal condition

3. Oblique, when the nuclear whorls are set at an angle, unconformable with the body whorls

III. Whorl, a single complete revolution of the spiral cone

1. Periphery, that part marking its greatest circumference

2. Suture, the line of channel formed by the junction of the whorls

3. Body-whorl usually capacious, the last turn ending with the aperture

IV. Base, anterior extremity opposite end to apex, usually the front of the aperture

1. Oblique, as in

2. Concave, as in

3. Convex, as in

4. Flat, as in

V. Aperture, the open mouth of the shell, the interior of which may be simple or entire, or may be channeled by a gutter or canal, more or less produced or everted (2.3). The aperture is:

1. Longitudinal, when its greatest diameter is parallel to the axis of whorls

2. Transverse, reverse of longitudinal

3. Oblique, greatest diameter oblique to the axis

4. Rounded, the circle slightly interrupted

5. Auriform, ear-shaped

6. Ovate, egg-shaped

7. Oblong, rounded above and below, longer than wide

8. Lunate, semi-lunar, semi-circular

9. Triangular
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

10. Linear, narrow ... ... 26
11. Quadrate, squarish ... ... 13
12. Patulous, dilated at its entrance ... ... 24 35
13. Compressed, diminished at its entrance ... ... 5, 6, 33-34
14. Produced, lengthened out ... ... 24 35
15. Sometimes truncated, stunted, cut short abruptly at the end ... ... 5, 6, 33-34

VI. Peristome. Sometimes peritreme. Margin of aperture. It is: — ...
1. Continuous or entire, as in ... 8, 9, 21, 44
2. Interrupted, when the left side of aperture is formed only by the body-whorl ... ... 5
3. The left side is formed either by the inner or columella lip (labrum) or partly by the body-whorl or parietal wall. The right side is formed by the outer lip (labrum.)

VII. Outer lip may be: —
1. Thin and sharp ... ... 7
2. Thickened ... ... 1
3. Reflected, curled outwards ... ... 8
4. Inflected, curled inwards ... ... 25
5. Expanded, swollen ... ... 1
6. Digitate.
7. Fringed, fringed with spines.
8. Emarginate, incised, or slit ...
9. Elfinæ, when basal or anterior extremity is slightly produced, depressed, or reflected 32, 33, 34
10. Sinuous, bent or curved interiorly. It may be: —
11. Dentate, toothed ... ... 3, 29
12. Plicate or lamellate, when the teeth become rib-like.
13. Ringent, having large plications, nodules or teeth.
14. Deflected, deflexed, bent aside or backwards.

VIII. Inner lip or columella margin may have characters like those described under outer lip.

IX. Umbilicate. Perforate. When the base of the axis or columella, around which the whorls are coiled, is open
or hollow (12a.) It is sub-umbilicated, or sub-perforate when partly covered over by shelly matter (16). It is not umbilicated or non-perforate, where the axis of the shell is solid.

**Sculpture or Colour Markings.**

X. These are:

1. Longitudinal, when taking the direction of the axis.
2. Revolving or transverse, when they follow the spiral.
3. Canaliculate. Suture deeply channeled ...
4. Cingulate. Encircled by revolving ribs ...
5. Carinate, revolving sculpture prominent, sharp ...
6. Sulcate, encircled by channels ...
7. Plicate, costate, ribbed. Sculpture longitudinal ...
8. Nodosely, tuberculately, granosely plicate, when the ribs are broken up into tubercles or granules; mostly caused by the intersection of revolving sculpture ... ...
9. Striate, covered by fine close lines, either longitudinal or revolving.
10. Punctate, pitted. Frequently punctate, striate, i.e., 9 & 10 combined ...
11. Granulate, nodose, tuberculate, covered with nodules of small or large size, but not ribbed ...
12. Muricate, spinous, echinate when the nodules are sharp pointed.
13. Decussate, cancellate, longitudinal and revolving sculpture, crossing at right angles.
14. Reticulate, sculpture not crossing at right angles, irregularly decussate.
15. Clathrate, longitudinal and revolving lines both distant, forming a pattern somewhat like the iron bars of a prison window.
16. Coronate, the upper part of the whorls having a series of revolving tubercles or spines .... 4
17. Varicose, when the external thickening of the outer lip of aperture occurring in some shells during rest-periods is not absorbed when growth is resumed, but remains crossing the whorls, rib-like, at regular intervals .... .... 1

XI. Operculum. A horny or shelly lid which closes the aperture of a large number of univalve shells. It is —
1. Concentric when nucleus is central or sub-central.
2. Imbricated or lamellar when nucleus is marginal.
3. Claw-shaped or unguiculate, nucleus apical or in front.
4. Spiral, revolving gradually and growing on one edge.
5. Pauci-spiral, few rapidly increasing whorls.
6. Sub-spiral, scarcely spiral.
7. Multi-spiral, many whorled.
8. Articulated when it has a projection.
9. Radiated, modification of the articulated form in which the spiral is not so evident.

XII. BIVALVES.

Arcuated, bent in the form of an arch.
Auriform, ear-shaped.
Auricled, having appendages like ears. ... (53)
Byssus, a beard.
Gibbous, bulging, swollen.
Compressed, squeezed together.
Concamerated, arched over, vaulted.
Concave, hollowed out ... ... (53)
Concentrically rayed or ribbed, curved, with the umboe as a centre.
Cordate, cordiform, heart-shaped.
Crenulated, notched at the margin, scalloped ... ... ... (53)
Cuneiform, wedge-shaped
Cylindrical, round, like a roller or cylinder.
Cymbiform, boat-shaped.
Denticulated, set with small teeth as in Arca.
Dexter valve, right valve.
Divaricating, spreading out widely.
Dorsal margin, the side on which the hinge is placed.
Elliptical, having the form of an ellipse.
Elongated, lengthened, drawn out.
Gap, gaping: when the valves are shut in some bivalves, as in P. bolas, an opening is disclosed called the gap.
Globose, globular.
Hemispherical, in the shape of a half-globe.
Inequilateral, when the anterior and posterior sides make different angles with the hinge. Equilateral, having both sides alike.
Inequivalve, when one valve is more convex than the other, or dissimilar in other respects, as in the common oyster.
Equivalve, having both valves alike.
Lenticulate, doubly convex, of the form of a lens.
Ligament, a solid body, softer than a cartilage, but harder than a membrane, which connects the valves. 
External ligament usually attached to ridges on the posterior, hinge-margin behind the umbones.
In some bivalves, as in Mactra, the ligament is internal, lodged in a cartilage furrow or pit.
Limb, the margin in bivalve shells.
Lobated, rounded at the edge.
Lunule, a crescent-like mark or spot, situated near the anterior and posterior slopes.
Nacreous, pearly.
Oblong-ovate, egg-shaped or oval.
Obsolete, indistinct, not well defined.
Papyraceous, thin as paper.
Pectinated, resembling the teeth of a comb.
Pinnated, winged.
Quadrangular, having four right angles.
Radiately, rayed or ribbed, rays or ribs springing from umboe, in the direction of limb or margins.
Ridge, the upper part of a slope.
Scalloped, indented at the edges.
Serrated, having teeth like a saw.
Serrulculated, very minutely serrated.
Sub-arcuate, somewhat arched.
Sub-diaphanous, somewhat transparent.
Transverse, breadth greater than length.
Trapeziform, shaped like a trapezium.
Trigonal, having three angles, deltoid.
Turgid, swollen.
Ventral margin, the margin opposite the hinge-margin.
Ventricose, inflated or swelled in the middle.
Umbo, the beak or round part which turns over the hinge.

Note.—Many of the terms relating to the sculpture of univalves, are also applicable to the sculpture of bivalves.

Length, Breadth and Thickness.
The hinge line of bivalves indicates the direction of the length of the shell, and the actual length is the maximum distance between lateral margins.
The breadth is the greatest diameter measured transversely to length.
The thickness is the greatest diameter of an imaginary line passing through one or both valves.

Ligament.
The valves of the Pelecypods are bound together by a ligament, (49) and usually articulated by a hinge furnished with interlocking teeth. The shell is closed by (either one or two) powerful adductor muscles (53) but opens spontaneously by the action of the ligament when the animal relaxes, and after it is dead.
The apex, beak or umbo (49c) is the point from which the growth commences and is situated near the hinge. The beaks are either straight, as in Pecten, curved as in Venus or Cardium, or spiral, as in Isocardia.

Right and Left Valve.

When a shell is placed so that the dorsal margin is furthest from the observer, with the exterior side of valve uppermost, the position of the ligament to the right indicates the left valve, if to the left the right valve.

The lunule is a small cordate or semicircular impression under and anterior to the beaks. When this appears to the right the valve is right, and vice-versa.

The sinus or flexure (fig. 49c) of the pallial impression (48c) when present is seen under the ligament. When the inside surface is viewed with the dorsal margin furthest from observer, if to the right it indicates the right valve, and vice-versa. Sometimes there are posterior lateral teeth, or laminae of the hinge-margin, and are found on the right or left side accordingly as the valve is right or left. Thus the pallial sinus, the external ligament, (49c) and the posterior slope (49c) are to the right side, (the internal surface being exposed with the beak furthest from observer,) in the right valve (49), and vice-versa. Linnaeus and the older naturalists were wont to describe the front of the shell as the back and the right valve as the left.
HINGE-LINE AND TEETH.

The dorsal margin on which the ligament and teeth are situated is termed the hinge-line. It is long and straight in Area, short in Vulsella, and curved in most genera.

The central teeth immediately under umbo are called hinge or cardinal teeth (48c), those on each side are lateral teeth (48b), either the cardinal or the lateral teeth may be lacking in many shells, while in some teeth are entirely absent.

EDENTULOUS.

The dentition formulae are usually stated as follows:—Cardinal teeth 2 3 or \( \frac{3}{2} \)—meaning 2 in the right valve, 3 in the left; lateral teeth, 1—1, 2—2, or 1 anterior and 1 posterior in right valve, 2 anterior, and 2 posterior lateral teeth in the left valve.

ADDUCTOR OR MUSCULAR IMPRESSIONS. (49c.)

The greater number of bivalves have two adductor muscles, whose impressions or scars on the shell, nearly equal in size, are situated respectively on the anterior and posterior sides at the extremities of the hinge-line. In Mytilus, Modiola, these two adductor impressions are unequal, the posterior one being very much larger. In the Pectens, Oysters and Limas, there is only one strong adductor impression (53c), placed more centrally. The single muscular scar is not quite central, but nearer the posterior than the anterior side.

EPIDERMIS. SCARF OR SKIN.

All bivalve shells are clothed with an epidermis, scarf, or skin. Inconspicuous in some, but remarkably developed in others.
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</tr>
<tr>
<td>26</td>
<td>Census of New Tasmanian Marine Shells</td>
<td>*1877</td>
</tr>
<tr>
<td>27</td>
<td>Fresh water Shells of Tasmania</td>
<td>*1875</td>
</tr>
<tr>
<td>28</td>
<td>On some Marine Shells (recent additions not embraced in Census)</td>
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</tr>
<tr>
<td></td>
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<td></td>
</tr>
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</tr>
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</tr>
<tr>
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</tr>
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</tr>
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<td>Title</td>
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<tr>
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<td>--------</td>
<td>-------</td>
</tr>
<tr>
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<td>Johnston, R. M.</td>
<td>Table showing the general distribution of Tasmanian Land Shells</td>
</tr>
<tr>
<td>36</td>
<td>Tenison-Woods</td>
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<td>54</td>
<td>Tate, Prof. Ralph</td>
<td>On the Australian Pectens, confounded with the New Zealand P. laticostatus. Gray. (Proc. Roy. Soc. Tas.)</td>
</tr>
<tr>
<td>55</td>
<td>Brazier, John</td>
<td>The Trochide and other Genera of Mollusca from Tasmania, with their synonyms. (Proc. Roy. Soc. Tas.)</td>
</tr>
<tr>
<td>56</td>
<td>Johnston, R. M.</td>
<td>Notes with respect to the Land and Fresh Water Mollusca of King's Island. (Proc. Roy. Soc. Tas.)</td>
</tr>
</tbody>
</table>
Index

BY R. M. JOHNSTON, F.L.S.

Year of

Publication.

57 Petterd, W. F.—Contributions for a Systematic Catalogue of the Acquatic Shells of Tasmania. (Proc. Roy. Soc. Tas.) ... ... ... ... ... 1888

58 Johnston, R. M.—Critical Observations on recent contributions to our knowledge of the Fresh Water Shells of Tasmania. (Proc. Roy. Soc. Tas.) ... ... ... ... ... 1888


60 Tenison-Woods—On the Anatomy and Life History of Mollusca peculiar to Australia. Prize Essay. (Roy. Soc. N.S.W.) ... ... ... ... ... 1888

61 Tate, Prof. Ralph—Supplement to a list of the Lamellibranchs and Paliobranchs, etc., of South Australia, with a census of the Molluscan Fauna of Australia. (Trans. Roy. Soc. S. A.) ... ... ... ... ... 1888

CLASSIFIED LIST OF SPECIES.

(The numbers to the extreme right refer to index number of the publications containing fuller particulars or descriptions recorded in the Bibliography pages 71, 72.)

CLASS CEPHALOPODA.

(i.) Family OctipiDIA. (sp. 2.)

1 Octopus maurus. Lutken ... ... ... ... ... 27, 46

2 Pinnoctopus cordiformis. Quoy ... ... ... ... 46

(ii.) Family Argonautida. (sp. 1.)

3* Argonauta tuberculata. Shaw ... ... ... ... ... 27, 46

(iii.) Family Loliginida. (sp. 2.)

4 Sepioteuthis Lessoniana. Forss ... ... ... ... ... 46

(blimena. Quoy and Gaim. ... ... ... ... ... 46

(iv.) Family Onychoteuthida. (sp. 2.)

5 Onychoteuthis Bartlingii. Lesson ... ... ... ... ... 27, 46

6 Ommastrephes Sloani. Gray ... ... ... ... ... 46

(v.) Family Spinalida. (sp. 1.)

7* Spirula Peronii. Lam. (D. Lewis Gray) ... ... ... ... ... 27

(vi.) Family Nautilida. (sp. 1.)

8 Nautilus Pompilius, Linn. ... ... ... ... ... J
### Class Gastropoda: Provisional Aid to the Study of Tasmanian Mollusca

#### (vii.) Family Muricidae (sp. 20.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td><em>Murex trifermis</em></td>
<td>Reeve</td>
<td></td>
</tr>
<tr>
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<td><em>Murex zeasatus</em></td>
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</tr>
<tr>
<td>11</td>
<td><em>Angasi Crosse</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><em>Arosalpinx typica</em></td>
<td><em>T. Woods</em></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td><em>Typhus arcatus</em></td>
<td><em>Hind's Voyage of Sulphur</em></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td><em>Trophon umbilicatus</em></td>
<td><em>T. Woods</em></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td><em>squamosissima</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
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<td>17</td>
<td><em>Braxieri T. Woods</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td><em>Assisi</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
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</tr>
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<td></td>
</tr>
<tr>
<td>21</td>
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<td></td>
</tr>
<tr>
<td>22</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><em>Purpara textilosa</em></td>
<td><em>Lam.</em></td>
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<td><em>humilis Crosse</em></td>
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<td><em>succincta Martyn</em></td>
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<td><em>madreporarum Sow.</em></td>
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<td><em>(?) littorinoides T. Woods</em></td>
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#### (viii.) Family Tritoniidae (sp. 8.)

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<tr>
<td>29</td>
<td><em>Triton cutaceus</em></td>
<td><em>Linne</em></td>
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<tr>
<td>30</td>
<td><em>Spergleri Bilhoven</em></td>
<td>*(Regarded by <em>T. Woods</em> as a variety of <em>T. cutaceus)</em></td>
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<tr>
<td>31</td>
<td><em>Waterhousei Ad. and Angas</em></td>
<td>May also be simply a small variety of <em>T. cutaceus</em></td>
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<tr>
<td>32</td>
<td><em>Quyui</em></td>
<td><em>Reeve</em></td>
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<tr>
<td>33</td>
<td><em>subdistortus Lam.</em></td>
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<td>34</td>
<td><em>Ranella leucostoma Lam.</em></td>
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<tr>
<td>35</td>
<td><em>vexillum</em></td>
<td><em>Sow.</em></td>
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<tr>
<td>36</td>
<td><em>epitrema</em></td>
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#### (ix.) Family Fasciolidae (sp. 9.)

<table>
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<th>No.</th>
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<tbody>
<tr>
<td>37</td>
<td><em>Fusus dilatata</em> Quoy and Gaim.*</td>
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<td>38</td>
<td><em>pyrulatus</em> Reeve Icon*</td>
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<td>39</td>
<td><em>Nova-Hollandica Reeve Icon</em></td>
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<td>40</td>
<td><em>Tasmanicus Adams and Angas</em></td>
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<td>41</td>
<td><em>Legrandi</em> T. Woods*</td>
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<td></td>
</tr>
<tr>
<td>No.</td>
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<td>Author(s)</td>
<td>Page</td>
</tr>
<tr>
<td>-----</td>
<td>-------------</td>
<td>-----------</td>
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<td>43</td>
<td>Fasciolaria fusiformis</td>
<td>Valenciennes</td>
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</tr>
<tr>
<td>44</td>
<td>Fasciolaria corona</td>
<td>Lam.</td>
<td>27</td>
</tr>
<tr>
<td>45</td>
<td>Fasciolaria trepalam</td>
<td>Linne. (Reeve considers this form a variety of F. coronata.)</td>
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</tbody>
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(x.) Family Buccinidae. (sp. 15.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Siphonalia Clarkei</td>
<td>T. Woods</td>
<td>27</td>
</tr>
<tr>
<td>47</td>
<td>Siphonalia turrita</td>
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<td>Siphonalia fuscozonata</td>
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</tr>
<tr>
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<td>Cantharus Petterli</td>
<td>Brazier (Tritonida. Woods and Brazier)</td>
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<td>Pisania reticulata</td>
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<tr>
<td>51</td>
<td>Pisania Tasmanica</td>
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</tr>
<tr>
<td>52</td>
<td>Cominella tenuiscostata</td>
<td>&quot;</td>
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<tr>
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<td>Cominella alveolata</td>
<td>Kiener</td>
<td>27</td>
</tr>
<tr>
<td>54</td>
<td>Cominella lactea</td>
<td>Reeve, Tom</td>
<td>27</td>
</tr>
<tr>
<td>55</td>
<td>Cominella Tasmanica</td>
<td>T. Woods</td>
<td>27</td>
</tr>
<tr>
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<td>Cominella costata</td>
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<td>57</td>
<td>Cominella Angasi</td>
<td>Croze</td>
<td>27</td>
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<td>Cominella albo-lirata</td>
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</tr>
<tr>
<td>59</td>
<td>(Josephus), Tasmanica</td>
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<td>60</td>
<td>Eburna (Zemiva), Australis</td>
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</table>

(xi.) Family Nassidae. (sp. 5.)

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<th>No.</th>
<th>Description</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Nass Fasciata</td>
<td>Lam.</td>
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</tr>
<tr>
<td>62</td>
<td>Nass pauperata</td>
<td>Lam.</td>
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</tr>
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<td>63</td>
<td>Nass rufosincia</td>
<td>A. Adams</td>
<td>27</td>
</tr>
<tr>
<td>64</td>
<td>Nass Jacksoniana</td>
<td>&quot;</td>
<td>27</td>
</tr>
<tr>
<td>65</td>
<td>Nass Tasmanica</td>
<td>T. Woods</td>
<td>27</td>
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</tbody>
</table>

(xii.) Family Volutidae. (sp. 7.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>Voluta Angasi</td>
<td>Sow.</td>
<td>27</td>
</tr>
<tr>
<td>67</td>
<td>Voluta fusiformis</td>
<td>Swainson</td>
<td>27</td>
</tr>
<tr>
<td>68</td>
<td>Voluta papilaris</td>
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<td>27</td>
</tr>
<tr>
<td>69</td>
<td>Voluta mitriformis</td>
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<td>27</td>
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<tr>
<td>70</td>
<td>Voluta mamilla</td>
<td>Gray</td>
<td>27</td>
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<tr>
<td>71</td>
<td>Kingii, Cox. (Probably only a variety of V. Angasi)</td>
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<td>27</td>
</tr>
<tr>
<td>72</td>
<td>Schaueri, Cox</td>
<td>&quot;</td>
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</tbody>
</table>

(xiii.) Family Mithridae. (sp. 14.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>Mitra Badia</td>
<td>Reeve</td>
<td>27</td>
</tr>
<tr>
<td>74</td>
<td>Mitra gibra</td>
<td>Swainson</td>
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</tr>
<tr>
<td>75</td>
<td>Mitra Australis</td>
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</tr>
<tr>
<td>76</td>
<td>Mitra pica</td>
<td>&quot;</td>
<td>27</td>
</tr>
</tbody>
</table>
87 Erato pellucida. T.-Woods ... ... ... 27
88 Marginella Muscaria. Lam. ... ... ... 27
89 turbinata. Sow. ... ... ... 27
90 formicula. Lam. ... ... ... 27
91 Volutiformis. Reeve ... ... ... 27
92 Tasmanica. T.-Woods ... ... ... 27
93 Stanislas. " ... ... ... 27
94 minutissima " ... ... ... 27
95 Allerti. " ... ... ... 27
96 Petterdi. Beddome ... ... ... 27

(xv.) Family OLIVIDAE. (sp. 5.)

97 Olivella Australia. T.-Woods ... ... ... 27 31
98 Oliva hieroglyphica. Reeve ... ... ... 27
99 Ancillari marginata. Lam. ... ... ... 27
100 fusiformis. Petterd ... ... ... 33
101 obtusa " ... ... ... 33

(xvi.) Family COLUMBELLIDAE. (sp. 12.)

102 Columella semi-convexa. Lam. ... ... ... 27
103 Lincolniensis. Reeve ... ... ... 27
104 irrorata. " ... ... ... 27
105 Roblini. T.-Woods ... ... ... 27
106 Xavienana. " ... ... ... 27
107 Lagrandii. " ... ... ... 27
108 miltostoma " ... ... ... 27
109 badia " ... ... ... 27
110 (Aesopus) pilosa. Angas ... ... ... 27
111 minima. " ... ... ... 27
112 dictia. T.-Woods ... ... ... 31
113 rosea (1) Reeve. Probably identical with C. semi-convexa. Tate. ... ... ... 44
(xvii.) Family CANOEALIDA. (sp. 4.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species Name</th>
<th>Authority</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>114</td>
<td>Cancellari kunigata</td>
<td>Sow.</td>
<td>27</td>
</tr>
<tr>
<td>115</td>
<td>undulata</td>
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<tr>
<td>116</td>
<td>Tasmanica</td>
<td>T. Woods</td>
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</tr>
<tr>
<td>117</td>
<td>excavata</td>
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</table>

(xviii.) Family TEREJIDAE. (sp. 6.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species Name</th>
<th>Authority</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>118</td>
<td>Terebra bicolor</td>
<td>Angas. (Ad. Angas and Woods)</td>
<td>27</td>
</tr>
<tr>
<td>119</td>
<td>- (Hastula) Brasieri</td>
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</tr>
<tr>
<td>120</td>
<td>- Sp. indet.</td>
<td>T. Woods</td>
<td>27</td>
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<td>121</td>
<td>addita</td>
<td>Dass.</td>
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<td>122</td>
<td>- Kieneri</td>
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<td>- nitida</td>
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(xix.) Family PLEUROTOMIDAE. (sp. 29.)

<table>
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<tr>
<th>No.</th>
<th>Species Name</th>
<th>Authority</th>
<th>Page</th>
</tr>
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<tr>
<td>124</td>
<td>Pleurotoma (Drillia) Coxi</td>
<td>Angas</td>
<td>27</td>
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<tr>
<td>125</td>
<td>- incorusta.</td>
<td>T. Woods</td>
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<td>126</td>
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<tr>
<td>134</td>
<td>- Legrandi</td>
<td>Beddome</td>
<td>49</td>
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<tr>
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<td>- miliaris.</td>
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<td>- (Clathurella) Philomenae</td>
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<tr>
<td>137</td>
<td>- granulosissima</td>
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<td>- sculptilior</td>
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<td>- Le-Tournelleuxiana</td>
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<td>- Harrisoni</td>
<td>T. Woods</td>
<td>31</td>
</tr>
<tr>
<td>149</td>
<td>- delicatula</td>
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<td>- trachys</td>
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<tr>
<td>152</td>
<td>- cancellata.</td>
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### (xx.) Family Conidae. (sp. 5.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
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<tbody>
<tr>
<td>153</td>
<td>Conus Novae-Hollandiae</td>
<td>Adams</td>
<td>27</td>
</tr>
<tr>
<td>154</td>
<td>pontisialis</td>
<td>Lam.</td>
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<td>Sow.</td>
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<td>rutila.</td>
<td>C. Macleay and T. Woods</td>
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<tr>
<td>157</td>
<td>Carmeli.</td>
<td>T. Woods</td>
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</table>

### (xxi.) Family Cypraeida. (sp. 8.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>158</td>
<td>Cypraea Annulus</td>
<td>Linne</td>
<td>27</td>
</tr>
<tr>
<td>159</td>
<td>angustata.</td>
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<tr>
<td>160</td>
<td>pipera.</td>
<td>Soland.</td>
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<tr>
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<td>Comptoni.</td>
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<tr>
<td>162</td>
<td>(Cypraea) umbilicata.</td>
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<td>27</td>
</tr>
<tr>
<td>163</td>
<td>Scotti.</td>
<td>Brod.</td>
<td>27</td>
</tr>
<tr>
<td>164</td>
<td>(Trivia.) Australia.</td>
<td>Lam.</td>
<td>27</td>
</tr>
<tr>
<td>165</td>
<td>Ovulum. (Volva.) Maccoyi.</td>
<td>T. Woods</td>
<td>27</td>
</tr>
</tbody>
</table>

### (xxii.) Family Cassidae. (sp. 5.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>166</td>
<td>Cassis. (Semi-cassia)</td>
<td>Lam.</td>
<td>27</td>
</tr>
<tr>
<td>167</td>
<td>tumida.</td>
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</tr>
<tr>
<td>168</td>
<td>(Cassaria) pyrum.</td>
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<td>27</td>
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<tr>
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<td>nivosa.</td>
<td>Brazier</td>
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</tr>
<tr>
<td></td>
<td>T. Woods as a variety of C. pyrum</td>
<td></td>
<td>27</td>
</tr>
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<td>170</td>
<td>(Cassaria) Paucairugus</td>
<td>Menke</td>
<td>27</td>
</tr>
</tbody>
</table>

### (xxiii.) Family Naticida. (sp. 9.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>171</td>
<td>Natica conica.</td>
<td>Lam.</td>
<td>27</td>
</tr>
<tr>
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<td>Tasmanica. T. Woods</td>
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</tr>
<tr>
<td>174</td>
<td>nana.</td>
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<tr>
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<td>Strangei.</td>
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<td>(Mamilla.) umbilicata.</td>
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<td>177</td>
<td>&quot; globosa. T. Woods.</td>
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<td>a white variety of N. umbilicata</td>
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<td>178</td>
<td>Sigaretus zonalis.</td>
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</tr>
</tbody>
</table>

### (xxiv.) Family Calyptraeida. (sp. 8.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Infundibulum calyptraeiformis.</td>
<td>Lam.  (Prochius, T. Woods)</td>
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<tr>
<td>181</td>
<td>Legrandia Tasmanica.</td>
<td>Beddome</td>
<td>43</td>
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<td>Calyptrae Harrisoni.</td>
<td>Beddome. (Genoria, Beddome)</td>
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</tr>
<tr>
<td>183</td>
<td>Crepidula (sp 1)</td>
<td>Waterhouse Island</td>
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</tr>
<tr>
<td>184</td>
<td>(sp 1) Frederick Henry Bay</td>
<td></td>
<td>27</td>
</tr>
</tbody>
</table>
(xxv.) Family Solaridae. (sp. 3.)
188 Solarium, luteum. Lam. ... ... ... 27
189 ... Sp. indet, Recherche ... ... ... 27
190 Adeorbid picta. T.-Woods ... ... ... 27

(xxvi.) Family Scalidae. (sp. 12.)
191 Scalaria Australia. Lam. ... ... ... ... 27
192 ... (Crista) varieosa. Lam. ... ... ... 27
193 ... granulosa. Quoy ... ... ... ... 27
194 ... aculeata. Sow. ... ... ... ... 27
195 ... delicatula. Cross. ... ... ... ... 27
196 ... Jukensiana. Forbes ... ... ... ... 27
197 ... linolata. Sow. ... ... ... ... 27
198 ... Philipinarum ? Sow ... ... ... ... 27
199 ... ... ... ... ... ... ... ... ... ... ... ... ...
200 ... (Crista) labiata. T.-Woods ... ... ... 27
201 ... ( ... ) concinna. Angas, B. ... ... ... 49
202 ... ( ... ) cancellata. T.-Woods. (Delphinula Johnstoni, Beddome) ... ... ... 49

(xxvii.) Family Ianthinidae. (sp. 3.)
203* Ianthina communis. Lam. ... ... ... ... 27
204* ... exigua. Lam. ... ... ... ... 27
205 ... bipartita. Gray ? ... ... ... ... 27

(xxviii.) Family Turritellidae. (sp. 5.)
206 Turritella Tasmatica. Reeve ... ... ... ... 27
207 ... granulifera. T.-Woods ... ... ... ... 27
208 ... Tasmantica. ... ... ... ... 27
209 ... acuta. ... ... ... ... 27
210 ... sinuata. Reeve ... ... ... ... 27

(xxix.) Family Verrucidae. (sp. 3.)
211 Vermetus dentiferous. Lam. ... ... ... ... 27
212 Siliquaria Australia. Quoy. (Tenagodus, T.-Woods) 27
213 ... Weldii. T.-Woods. ( ... ... ) ... ... ... 27

(XXX.) Family Eulimidæ. (sp. 8.)
214 Eulima Tasmatica. T.-Woods ... ... ... ... 27
215 ... mican. ... ... ... ... 27
216 ... proxima. Sow. ... ... ... ... 27
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>217</td>
<td>Eulima marginata</td>
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<td>31</td>
</tr>
<tr>
<td>218</td>
<td>—— apheles</td>
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<td>219</td>
<td>—— Legrandi</td>
<td>Beddome</td>
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<td>—— Petterdi</td>
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<td>Stylifor Tasmanica</td>
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</table>

(xxxi.) Family Turbonillidae (sp. 12.)

<table>
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<th>Author</th>
<th>Page</th>
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<tbody>
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<td>Turbonilla Angrisi</td>
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<td>27</td>
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<tr>
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<tr>
<td>224</td>
<td>—— Macleayana</td>
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<td>Eulimella (Styloptygma)</td>
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(xxxii.) Family Littorinidae (sp. 11.)

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<th>Author</th>
<th>Page</th>
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<td>Littorina unifasciata</td>
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<td>238</td>
<td>Risella nam.</td>
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<td>239</td>
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<td>240</td>
<td>—— aurata</td>
<td>H. and A. Adams</td>
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<td></td>
<td>—— Regarded by</td>
<td>T. Woods as a</td>
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<td></td>
<td>—— R. melanostoma</td>
<td>variety of</td>
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<td>Fossarux (Fossarina)</td>
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<td>—— Tasmanicus</td>
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<td>—— bulimoides</td>
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(xxxiii.) Family Planaxidae (sp. 3.)

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<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>245</td>
<td>Alaba (Diala) monile</td>
<td>A. Adams</td>
<td>27</td>
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<tr>
<td>246</td>
<td>—— tumida</td>
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<td>247</td>
<td>—— tumida</td>
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</table>

(xxxiv.) Family Cerithidae (sp. 15.)

<table>
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<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>248</td>
<td>Cerithium dubium</td>
<td>Sow.</td>
<td>27, 44</td>
</tr>
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<td></td>
<td>—— Tate states that</td>
<td>Sowerby's name</td>
<td>27, 44</td>
</tr>
<tr>
<td></td>
<td>—— priority over C.</td>
<td>C.</td>
<td></td>
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<td></td>
<td>—— monachus</td>
<td>C. and Fisch</td>
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<td>249</td>
<td>—— rhodostoma</td>
<td>Adams</td>
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<td>250</td>
<td>—— serotina</td>
<td>A. Adams</td>
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<td>252</td>
<td>(Bittium) granarium. Kiener</td>
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<td>253</td>
<td>turritella. Quoy</td>
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<td>Lowleyanum. Grose</td>
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<td>minimum. T.-Woods</td>
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<tr>
<td>256</td>
<td>turbonioides.</td>
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<td>258</td>
<td>(Cerithiopsis.) Atkinsoni. (Perhaps a variety of C. croce Angas)</td>
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<td>albosutura. T.-Woods</td>
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<tr>
<td>261</td>
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<td>27</td>
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<td>Potamides (Lampania) Australia. Quoy</td>
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<td></td>
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</tbody>
</table>

(xxxv.) Family Rissoellidae. (sp. 1.)


(xxxvi.) Family Rissoidea. (sp. 48.)

| 264 | Rissoina variigata. Angas | 27 |
| 265 | cineta. | 27 |
| 266 | ines. | 27 |
| 267 | turricula. | 27 |
| 268 | St. Clare. T.-Woods | 27 |
| 269 | Flindersii. | 27 |
| 270 | concatenata. | 27 |
| 271 | Gertrudis | 27 |
| 272 | Kershawi. | 31 |
| 273 | supra-scalpta. | 31 |
| 274 | uni-cirata. | 31 |
| 275 | Rissoa Agnewi. | 27 |
| 276 | cyclostoma. var. a rosea | 27 |
| 277 | melanura. | 27 |
| 278 | Angeli. (Cyclostrema ?) | 27 |
| 279 | (Setia) Brazieri. | 27 |
| 280 | sienna. Assiminea Tasmanica. T.-Woods | 27 |
| 281 | Flamina. Beddome | 49 |
| 282 | (Cingula) Atkinsoni. T.-Woods | 27 |
| 283 | (Ceratia) Maccoyi. | 27 |
| 284 | puncto-striata. | 31 |
| 285 | Marine. | 27 |
| 286 | (Alvania) cheilostoma. | 27 |
| 287 | fasciata. | 27 |
| 288 | Bayntoni | 49 |
| 289 | minutissima. T.-Woods | 27 |
291 Hydrobia Gunni? Frauenfeld. Tate and Brazier, Proc. Linn. Soc., N.S.W., 1881 ... ... 57, 58
292 Hydrobia Tasmania? Martens. Petterd, Proc. Roy. Soc. Tas., 1888 ... ... ... 57, 58
293 Hydrobia, turbinata. Petterd ... ... 57, 58
294 Bithynella (Potomapyrgus?) nigra. Quoy and Gaim ... 57, 58

295 " " utida. R. M. Johnston.
   (Fossil) ... ... 58
296 " " Dulvertonensis. T. Woods ... 57, 58
297 " " Dunrobinensis. " ... 57, 58
298 " " Simsoniana. Brazier ... 57, 58
300 " " Woodsii. Petterd ... 57, 58
301 " " Smithii. " ... 57, 58
302 " " Brownii. " ... 57, 58
303 " " marginata ... 57, 58
304 Amnicola? (Brazieria) Tasmanica. T.-Woods (Amnicola) ... 57, 58
305 (Beddomeia) Dierense. Frauenfeld. Previously referred to Amnicola ... 57, 58
306 " " Launcetonensis. R. M. Johnston.
   Referred to Petterd’s new Sub- 
genus Beddomeia ... 57, 58
307 " " Bellii. Petterd ... 57, 58
308 " " Loddere. " ... ... 57, 58
309 " " Hulli. " ... ... 57, 58
310 " " Tasmanica. T.-Woods. Valvata,
   T.-Woods ... 57, 58
311 Pomatiopsis striatula. Menke ... ... 57, 58
312 Badgerensis. R. M. Johnston ... 57, 58

(xxxvii.) Family Assiminiidae. (sp. 1.)
313 Assiminea bicincta. Petterd ... ... 57

(xxxviii.) Family Valvatidae. (sp. 1.)
313a Valvata Tasmania. T.-Woods. Beddomeia Tasmanica 

(xxxix.) Family Truncatellidae. (sp. 4.)
314 Truncatella scalarina. Cox. Petterd’s Monograph ... 27
315 Tasmanica. T.-Woods. Petterd’s Monograph ... 27
316 marginata. Kuster. " ... 27
317 micra. T.-Woods. " ... 27

(xl.) Family Neritidae. (sp. 1.)
318 Nerita atrata. Quoy ... ... ... 27
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>319</td>
<td>Liotia Tasmaniaca</td>
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<td>discoidea</td>
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<td>Phasianella tritonis</td>
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<td>Angasi</td>
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<td>Turbo (Marmorostoma) undulatus</td>
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<td>(Senectus) circularis</td>
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<td>(Gibbula) Coxi</td>
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<td>(Zizyphinus) granulatus</td>
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<td>Woods, Z. Meyeri, Philippi (Br.)</td>
<td>27, 55</td>
</tr>
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PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

354. Trochus (Infundibulum) Tasmanica. (Carinidea.) (T.-Woods) ... ... 27

355 —— (Infundibulum) aurea. Jonas. (Carinidea. T.-Woods) ... ... 27

356 Trochus (Thaletia) conicus. Gray. T. Picta, T.-Woods ... ... 55, 27

357 —— dolorosa. T.-Woods ... ... 55, 27

358 —— tessulatus. ... ... 31

359 —— dubium. ... ... 31

360 (Elenchus) badius. Woods ... ... 27

361 —— bellulus. Dunker ... ... 27

362 —— irisodontes. Quoy ... ... 27

363 —— nitidulus. Phil. Kust ... ... 27

364 Baulini ... ... ... 44

365 (Cantaria) pulcherrimus. Gray ... ... 55

366 —— Lesneri. Fischer. (T. picta, T.-Woods) ... ... 55

367* (Bankivia) varian. Bch. ... ... 27

368 (Trochochlea) Australis. Fawanno ... ... 27

369 —— constrictus. Lam. ... ... 27

370 —— tectum? Quoy and Gaim ... ... 27

371 —— compta. T.-Woods ... ... 27

372 (Euchelus) canaliculatus. Lam. ... ... 27

373 —— Tasmanicus. T.-Woods. (Plossarius Tasmanica) T.-Woods. ... ... 27

374 —— scabriculus. Ad. and Angas ... ... 27

375 —— (Clanculus) nodulosus. A. Adams ... ... 27

376 —— Aloysii. T.-Woods ... ... 27

377 —— Philomena. ... ... 27

378 —— Dominicana. ... ... 27

379 —— Raphaeli. ... ... 27

380 —— Angeli. ... ... 27

381 —— conspersus. A. Adams ... ... 27

382 —— rubens. ... ... 27

383 —— undatus. Lam. ... ... 27

384 —— Mangeri. Adams ... ... 27

385* —— variegatus. ... ... 27

386 —— gibbosus. ... ... 27

387 —— nodo-liratus. Gibbulia multicornata, T.-Woods (32) ... ... 27

388 (Astele) subcarinatus. Swainson ... ... 27

(xlv.) Family Stomatellidae. (sp. 2.)

389 Stomatella imbricata. Lam. ... ... 27

390 Stomatia (Gena) strigosa. A. Adams ... ... 27

(xlvii.) Family Pleurotomariidae. (sp. 1.)

391 Schismope Atkinsoni. T.-Woods. (Seispora, T.-Woods, 1876) ... ... 27
(xlvi.) Family **Haliotidae**. (sp. 4.)

<table>
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<th>Species</th>
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(xlix.) Family **Fissurellidae**. (sp. 13.)

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(i.) Family **Patellidae**. (sp. 16.)

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(ii.) Family **Chitonidae**. (sp. 11.)

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</table>
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

431 Chiton glaucus. " ... ... ... ... 27
432 —— (Plaxifora) petholatus. Sow. C. cincta. Sow! 27
433 —— (Acanthochites) Zelandius. Quoy. Probably identical with C. crinita Pennant, and C. fascicularis ... ... ... 27
434 Chitonellus (Cryptoplax) Gunni. Reeve ... ... 27
435 —— “ spinoa. A. Adams ... ... 27

OPISTHOBRANCHIATA.

{lilii.) Family PHILINIDÉ. (sp. 1.)
436 Philine aperta. Linne ... ... ... ... 27

{lili.) Family TORNATELLIDÉ. (sp. 2.)
437 Tornatina Maric. T. Woods ... ... ... ... 27
438 Ringicula Australis. Cross ... ... ... ... 27

{lv.) Family CYLICHNIDÉ. (sp. 2.)
439 Cylichna arachis. Quoy and Sow. ... ... ... ... 27
440 —— Atkinsoni. T. Woods ... ... ... ... 27

{lv.) Family BULLIDÉ. (sp. 2.)
441 Bulla oblonga. A. Adams ... ... ... ... 27
442 Haminea obesa. Sow. ... ... ... ... 27

{lvii.) Family LOPHOCERCIDÉ. (sp. 1.)
443 Akera Tasmanica. Beddome ... ... ... ... 49

{lvii.) Family APLYSIDÉ. (sp. 2.)
444 Aplysia concava. Sow. ... ... ... ... 27
445 —— Tasmanica. T. Woods ... ... ... ... 27

PULMONATA.

{livi.) Family VITRINIDÉ. (sp. 3.)
446 Vitrina Milligani. Pfeiffer ... ... ... ... 22, 34, 40
447 —— Verreauxi. " ... ... ... ... 22, 34, 40
448 —— fumosa. T. Woods ... ... ... ... 34, 40
<table>
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<tr>
<th>No.</th>
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<th>Scientific Name</th>
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*The three species so marked have been introduced from Europe, and are now abundant in Launceston and Hobart, in gardens or cellars.*
<table>
<thead>
<tr>
<th>Page</th>
<th>Provisional Aid to the Study of Tasmanian Mollusca.</th>
</tr>
</thead>
<tbody>
<tr>
<td>497</td>
<td><em>Helix pulchella. Mueller</em></td>
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(ix.) Family **PUPIDAE.** (sp. 1.)

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(ixi.) Family **LIMACIDAE.** (sp. 1.)

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(ixii.) Family **ARIONIDAE.** (sp. 1.)

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(ixiii.) Family **SUCCINEIDAE.** (sp. 4.)

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<td><strong>Succinea Legrandi. Cox</strong></td>
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<td><strong>Australis. Pfeiffer</strong></td>
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(ixiv.) Family **AURICULIDAE.** (sp. 4.)

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<td><strong>Cassidula zonata. H. and A. Adams. Auricula Dyeriana.</strong></td>
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<td><strong>Alexia Harrissoni. Beddome</strong></td>
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<td>528</td>
<td><strong>Marinula pellucida. Cooper</strong></td>
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<td><strong>Opilicardelus corna. Swainson. Auricula Australis.</strong></td>
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56. **Wynyardensis. Petterd**

22, 36, 40. **Weldii. T-Woods**

526, 32. **Cassidula zonata. H. and A. Adams. Auricula Dyeriana.**

49. **Alexia Harrissoni. Beddome**

27. **Marinula pellucida. Cooper**

27. **Opilicardelus corna. Swainson. Auricula Australis.**
(lxv.) Family LIMNIDEAE. (sp. 27.)

<table>
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<tr>
<td>537</td>
<td>aperta</td>
</tr>
<tr>
<td>538</td>
<td>nitida.</td>
</tr>
<tr>
<td>539</td>
<td>Huonensis. T.-Woods</td>
</tr>
<tr>
<td>540</td>
<td>Brunensis.</td>
</tr>
<tr>
<td>541</td>
<td>Tasmanicola</td>
</tr>
<tr>
<td>542</td>
<td>Huonicola.</td>
</tr>
<tr>
<td>543</td>
<td>eburnea. Sow.</td>
</tr>
<tr>
<td>544</td>
<td>attenuata.</td>
</tr>
<tr>
<td>545</td>
<td>manillata.</td>
</tr>
<tr>
<td>546</td>
<td>Tasmanica? T.-Woods</td>
</tr>
<tr>
<td>547</td>
<td>Legrandi? T.-Woods. Possibly a var. of P. nitida</td>
</tr>
<tr>
<td>548</td>
<td>Planorbis meridionalis. Brazier</td>
</tr>
<tr>
<td>549</td>
<td>Atkinsoni. R. M. Johnston</td>
</tr>
<tr>
<td>550</td>
<td>Scottiana.</td>
</tr>
<tr>
<td>552</td>
<td>Ancylus Cumingianus. Bourg.</td>
</tr>
<tr>
<td>553</td>
<td>—— Irvine? Petterd. Probably a large variety of the variable A. Cumingianus</td>
</tr>
<tr>
<td>554</td>
<td>Tasmanicus. T.-Woods</td>
</tr>
<tr>
<td>555</td>
<td>Gundlachia Petterdi. R. M. Johnston</td>
</tr>
<tr>
<td>556</td>
<td>Baltham? Petterdi. Probably a variety of G. Petterdi.</td>
</tr>
</tbody>
</table>

(lxvi.) Family AMPHIBOLIDAE. (sp. 3.)

<table>
<thead>
<tr>
<th>Page</th>
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<tbody>
<tr>
<td>557</td>
<td>Amphibola (Ampullarinus) fragilis. Quoy</td>
</tr>
<tr>
<td>558</td>
<td>—— Quoyana. Desh.</td>
</tr>
<tr>
<td>559</td>
<td>—— minuta. T.-Woods</td>
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(lxvii.) Family SIPHONARIIDAE. (sp. 3.)

<table>
<thead>
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</tr>
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<tbody>
<tr>
<td>560</td>
<td>Siphonaria Diemenensis. Quoy</td>
</tr>
<tr>
<td>561</td>
<td>denticulata. Quoy and Gaim</td>
</tr>
<tr>
<td>562</td>
<td>zonata. T.-Woods</td>
</tr>
</tbody>
</table>

CLASS SCAPHOPODA.

(lxviii.) Family DENTALIIDAE. (sp. 2.)

<table>
<thead>
<tr>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>563</td>
<td>Dentalium Tasmanicus. T.-Woods</td>
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<tr>
<td>564</td>
<td>Weldiana.</td>
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K
### Class Pelecypoda

#### (Sinuppalliat.a.)

#### (Lxxix.) Family Gastrochænid.e. (Sp. 2.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
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<th>Note</th>
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<tbody>
<tr>
<td>565</td>
<td>Aspergillus (Humphreys) Strangei</td>
<td></td>
<td></td>
</tr>
<tr>
<td>566</td>
<td>Gastrochæna Tasmanica. T-Woods...</td>
<td></td>
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</tbody>
</table>

#### (Lxx.) Family Teredid.e. (Sp. 1.)

<table>
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<tbody>
<tr>
<td>567</td>
<td>Teredo navalis. Gray</td>
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</table>

#### (Lxxi.) Family Pholadid.e. (Sp. 1.)

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<tr>
<td>568</td>
<td>Barnea Australasia. Gray</td>
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#### (Lxxii.) Family Solenid.e. (Sp. 1.)

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<tr>
<td>569</td>
<td>So</td>
<td>len vaginoides. Lam.</td>
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#### (Lxxiii.) Family Saxicavid.e. (Sp. 2.)

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<tr>
<td>570</td>
<td>Saxicava Australis. Lam.</td>
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<tr>
<td>571</td>
<td>Panopea Australia. Sow</td>
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#### (Lxxiv.) Family Corbulid.e. (Sp. 3.)

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<tr>
<td>572</td>
<td>Corbulæ Zelandica. Quoy. (Doubtful.) T-Woods</td>
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<tr>
<td>573</td>
<td>-- erythrodon. Lam.</td>
<td></td>
<td></td>
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<tr>
<td>574</td>
<td>Nereis Tasmanica. T-Woods</td>
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#### (Lxxv.) Family Anatinid.e. (Sp. 11.)

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<tr>
<td>575</td>
<td>Anatina anserifera. Spengler</td>
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<td>576</td>
<td>-- creccina. Valence</td>
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<tr>
<td>577</td>
<td>-- Tasmanica. Reeve</td>
<td></td>
<td></td>
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<tr>
<td>578</td>
<td>-- Angasi. Cross</td>
<td></td>
<td></td>
</tr>
<tr>
<td>579</td>
<td>Myodora brevia. Stutchbury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>580</td>
<td>-- ovata? Reeve. (Doubtful if identical with Reeve’s species. (T-Woods)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>581</td>
<td>-- pandoriformis. Stutchbury</td>
<td></td>
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</tr>
<tr>
<td>582</td>
<td>-- Tasmanica. T-Woods</td>
<td></td>
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<tr>
<td>583</td>
<td>-- albida.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>584</td>
<td>Myochæna anomloidæ. Stutchbury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>585</td>
<td>-- (sp. indet)</td>
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<td></td>
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#### (Lxxvi.) Family Mactrid.e. (Sp. 4.)

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<th>Note</th>
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<tbody>
<tr>
<td>586</td>
<td>Mactra rufescens. Lam.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>587</td>
<td>-- pura. Deshayes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>588</td>
<td>-- cretacea. Angas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>589</td>
<td>Latræya dissimilis. Deshayes</td>
<td></td>
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</table>
### Family Paphiidae (sp. 5)

<table>
<thead>
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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>590</td>
<td>Paphia (Anapa) triquetrun. Hanley</td>
</tr>
<tr>
<td>591</td>
<td>&quot; &quot; Tasmanica. T.-Woods. Possibly a variety of P. triquetrun.</td>
</tr>
<tr>
<td>592</td>
<td>&quot; (Domaclla) elongata. Deshayes</td>
</tr>
<tr>
<td>593</td>
<td>&quot; (Mesodesma) erycina. Lam.</td>
</tr>
<tr>
<td>594</td>
<td>&quot; precocia. Deshayes</td>
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<tr>
<td>595</td>
<td>&quot; Diemenensis. Quoy and Gaim</td>
</tr>
</tbody>
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### Family Semelidae (sp. 3)

<table>
<thead>
<tr>
<th>Page</th>
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<tbody>
<tr>
<td>596</td>
<td>Semel decora. A. Adams...</td>
</tr>
<tr>
<td>597</td>
<td>&quot; exigua. H. Adams...</td>
</tr>
<tr>
<td>598</td>
<td>&quot; Warburtoni. T.-Woods</td>
</tr>
</tbody>
</table>

### Family Tellinidae (sp. 13)

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>599</td>
<td>Tellina deltoidalis. Lam.</td>
</tr>
<tr>
<td>600</td>
<td>&quot; albinella</td>
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<tr>
<td>601</td>
<td>&quot; umbonella</td>
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<tr>
<td>602</td>
<td>&quot; diemenensis. Deshayes</td>
</tr>
<tr>
<td>603</td>
<td>&quot; Tristis</td>
</tr>
<tr>
<td>604</td>
<td>&quot; (Arcopagia) decussata. Lam.</td>
</tr>
<tr>
<td>605</td>
<td>&quot; Marie. T.-Woods</td>
</tr>
<tr>
<td>606</td>
<td>&quot;</td>
</tr>
<tr>
<td>607</td>
<td>&quot; Gari compta. Deshayes</td>
</tr>
<tr>
<td>608</td>
<td>&quot; zonalis. Lam.</td>
</tr>
<tr>
<td>609</td>
<td>&quot; Atkinsoni. Brusier</td>
</tr>
<tr>
<td>610</td>
<td>&quot; Hiutula epidermis. Deshayes</td>
</tr>
<tr>
<td>611</td>
<td>&quot; vitrea.</td>
</tr>
</tbody>
</table>

### Family Veneridae. (sp. 26)

<table>
<thead>
<tr>
<th>Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>612</td>
<td>Venus (Chione) Humphreyi. Donovan</td>
</tr>
<tr>
<td>613</td>
<td>&quot; conularis. Lam. V. Aphrodoides</td>
</tr>
<tr>
<td>614</td>
<td>&quot; lamellata. &quot; V. Scalarina</td>
</tr>
<tr>
<td>615</td>
<td>&quot; Stutchburyi. Gray</td>
</tr>
<tr>
<td>616</td>
<td>&quot; robora. Hanley</td>
</tr>
<tr>
<td>617</td>
<td>&quot; gallinula. Lam.</td>
</tr>
<tr>
<td>618</td>
<td>&quot; Maclayana. T.-Woods</td>
</tr>
<tr>
<td>619</td>
<td>&quot; striatissima. Sow.</td>
</tr>
<tr>
<td>620</td>
<td>&quot; Australis.</td>
</tr>
<tr>
<td>621</td>
<td>&quot; levigata.</td>
</tr>
<tr>
<td>622</td>
<td>&quot; fumigata (? Doubtful species</td>
</tr>
<tr>
<td>623</td>
<td>&quot;</td>
</tr>
<tr>
<td>624</td>
<td>Cytherea (Callista) Diemenensis. Hanley</td>
</tr>
<tr>
<td>625</td>
<td>&quot; planatella. Chunnis</td>
</tr>
<tr>
<td>626</td>
<td>&quot; candida (?) Deshayes. Unknown. (T.-Woods)</td>
</tr>
<tr>
<td>627</td>
<td>&quot; disrupta. Sow.</td>
</tr>
<tr>
<td>628</td>
<td>&quot; eitrina ? Lam.</td>
</tr>
</tbody>
</table>
PROVISIONAL AID TO THE STUDY OF TASMANIAN MOLLUSCA.

629 Cytherea (Callista) rutila? Deshayes. Doubtful.

(T.-Woods) 27

630 " " Victoria. T.-Woods 27

631 " (Gouldia.) Petterdi. " 27

632 Domina grata. Deshayes 27


634 coryne. A. Adams 27

635 " crocea. Deshayes 27

636 " immaulata. T. Woods 27

637 Tapes undulata. Born. Rare. 27

INTEGRIPALLIATA.

(lxxxii.) Family CYRENIDAE. (sp. 4.)

638 Corbicula Brunnea? Prime. Doubtful

(Psidium Tasmanicum. T.-Woods 28

640 " Dulvertounensis. " 28

641 Spharium (Cyclas) Tasmanica. T.-Woods 28

(lxxxii.) Family PETRICALIDAE. (sp. 6.)

642 Rupellaria Diemenensis. Quoy and Gaim 27

643 " brevis? Doubtful. 27

644 " reticulata. T.-Woods 27

645 " crenata. Lam. ... 27

646 " sub-decussata. Deshayes 27

647 " carditoides. Lam. ... 27

(lxxxiii.) Family CARDIDAE. (sp. 4.)

648 Cardium tenuicostatum. Lam. ... 27

649 " pulchellum. Reeve ... 27

650 " papyracum? Chemnitz. Probably var. of C. tenuicostatum... 27

651 " cygnorum. Deshayes 27

(lxxxiv.) Family CHAMIDAE. (sp. 1.)

652 Chama (sp. indet) ... 27

(lxxxv.) Family LUCINIDAE. (sp. 4.)

653 Lucina (Cyclas) divariata. Linne ... 27

654 " " minima. T.-Woods... 27

655 " "pecten. Lam. ... 27

656 Loripes icterica Reeve ... 27

(lxxxvi.) Family UNIULIDAE. (sp. 1.)

(lxxxvii.) Family ERYTRODAMUS (sp. 4.)
658 Lasca (Poronia? australis. Sow ... ... ... 27
659 —— ( ? scalaris. Phil ... ... ... 27
660 Kellia Atkinsoni. T. Woods ... ... ... 27
661 —— (Pythium) Tasmanica. T. Woods ... ... ... 27

(lxxxviii.) Family CRASSATELLIDAE (sp. 3.)
662 Crassatella Kingiana. Lam ... ... ... 27
663 —— aurora. Ad. and Augus ... ... ... 27
664 —— Banksii. " ... ... ... 27

(lxxxix.) Family ASTRIDEAE (sp. 6.)
665 Cardita Raoulii. Augus ... ... ... 27
666 —— Quoyi. Deshayes ... ... ... 27
667 —— Guuni. " ... ... ... 27
668 —— amaliia. " ... ... ... 27
669 Mytilicardia Tasmanica. T. Woods ... ... ... 27
670 —— excavata. Deshayes ... ... ... 27

HOMOMYARIA.

(xc.) Family UNIONIDAE (sp. 1.)
671 Unio Morlotiicu? Reeve. Very variable in form, probably one of the many varieties of U. Australis 28, 59

(xci.) Family TUGONIDAE (sp. 1.)
672 Tregonia Margaritacea. Lam ... ... ... 27

(xcii.) Family NUCULIDAE (sp. 4.)
673 Nucula Grayi. D’Orb ... ... ... 27
674 —— minula. T. Woods ... ... ... 27
675 Leda crassa. Hinds ... ... ... 27
676 —— Lefroyi. Buddome ... ... ... 49

(xciii.) Family ORTIDAE (sp. 9.)
677 Arca trapezia. Desh ... ... ... 27
678 —— fasciata. Reeve ... ... ... 27
679 —— semitorta. Lam ... ... ... 44
680 —— pistacia ... " ... ... 44
681 —— squamosa " ... ... ... 44
682 Pectunculus radians " ... ... ... 27
683 —— obliquus. Reeve ... ... ... 27
684 —— flabellatus. T. Woods. P. orbicularis Augus ... ... ... 44
685 Limopsis Tenisoni. T Woods. ... ... ... 27
### Heteromyaria

*(xciv.)* Family *Mytilidae* (sp. 10.)

<table>
<thead>
<tr>
<th>Species</th>
<th>Author</th>
<th>Page</th>
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<tbody>
<tr>
<td>Mytilus latum</td>
<td>Lam.</td>
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<tr>
<td>Tasmanicus</td>
<td>T. Woods</td>
<td>27</td>
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<tr>
<td>Dunkeri</td>
<td>Reeve</td>
<td>27</td>
</tr>
<tr>
<td>rostratus</td>
<td>Dunker</td>
<td>27</td>
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<tr>
<td>hirsutus</td>
<td>Lam.</td>
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<tr>
<td>crassus</td>
<td>T. Woods</td>
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<tr>
<td>Modiola Australis</td>
<td>Gray</td>
<td>27</td>
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<tr>
<td>Tasmanicus</td>
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<tr>
<td>Modiola Cumingiana</td>
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</tr>
<tr>
<td>Avicula pulchella</td>
<td>Reeve</td>
<td>27</td>
</tr>
<tr>
<td>(Melea gr. alba)</td>
<td>Lam.</td>
<td>44</td>
</tr>
<tr>
<td>Crenatula sordidolaris</td>
<td>Lam.</td>
<td>44</td>
</tr>
<tr>
<td>Vulsella Tasmanica</td>
<td>Reeve</td>
<td>27</td>
</tr>
<tr>
<td>Pinna Tasmanica</td>
<td>T. Woods</td>
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### Monomyaria

*(xcv.)* Family *Aviculidae* (sp. 4.)

<table>
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<tr>
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<th>Page</th>
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<tbody>
<tr>
<td>Avicula pulchella</td>
<td>Reeve</td>
<td>27</td>
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<tr>
<td>(Melea gr. alba)</td>
<td>Lam.</td>
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<tr>
<td>Crenatula sordidolaris</td>
<td>Lam.</td>
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<td>Vulsella Tasmanica</td>
<td>Reeve</td>
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<tr>
<td>Pinna Tasmanica</td>
<td>T. Woods</td>
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*(xcvi.)* Family *Pinnaidae* (sp. 1.)

<table>
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<th>Author</th>
<th>Page</th>
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<tbody>
<tr>
<td>Pinna Tasmanica</td>
<td>T. Woods</td>
<td>27</td>
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*(xcvii.)* Family *Spondylidae* (sp. 1.)

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<th>Page</th>
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<tbody>
<tr>
<td>Spondylus tenellus</td>
<td>Reeve</td>
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*(xcviii.)* Family *Pectinidae* (sp. 5.)

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<td>Pecten meridionalis</td>
<td>Tate. 51.</td>
<td>27</td>
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<tr>
<td>P. fumatus</td>
<td>Linne</td>
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<tr>
<td>asperrimus</td>
<td>Lam.</td>
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<td>bifrons</td>
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<tr>
<td>Atkiniae</td>
<td>Potterd.</td>
<td>53</td>
</tr>
<tr>
<td>Marisc.</td>
<td>T. Woods</td>
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*(xcix.)* Family *Limidae* (sp. 2.)

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<tr>
<td>Lima (Radula I) lima</td>
<td>Linne</td>
<td>27</td>
</tr>
<tr>
<td>bullata</td>
<td>Born</td>
<td>27</td>
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*(c.)* Family *Anomidae* (sp. 1.)

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<tbody>
<tr>
<td>Placunonomia Zealandica</td>
<td>Gray</td>
<td>27</td>
</tr>
</tbody>
</table>
### Tabular Synopsis of Classes, Orders, and Sub-Orders

<table>
<thead>
<tr>
<th>Classes and Sub-Orders</th>
<th>Brach.</th>
<th>Body</th>
<th>Elytra</th>
<th>Mouth Parts with</th>
<th>Respiration by means of</th>
<th>Excretion affected by</th>
<th>Shell</th>
</tr>
</thead>
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### Orders and Sub-Orders

<table>
<thead>
<tr>
<th>Orders and Sub-Orders</th>
<th>Distincting Character</th>
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<tbody>
<tr>
<td>I. Placophora</td>
<td>Shell, a single pair.</td>
</tr>
<tr>
<td>II. Echinodermata</td>
<td>Two pairs.</td>
</tr>
<tr>
<td>III. Ctenophora</td>
<td>Three pairs.</td>
</tr>
<tr>
<td>IV. Ctenophora</td>
<td>Three pairs.</td>
</tr>
<tr>
<td>V. Ctenophora</td>
<td>Three pairs.</td>
</tr>
<tr>
<td>VI. Echinodermata</td>
<td>Three pairs.</td>
</tr>
</tbody>
</table>

### Classes and Sub-Classes

- **Class I. Arthropods**: Large, soft, soft, soft, soft, soft, soft. Shell soft.
- **Class II. Echinoderms**: More or less distinct, soft, soft, soft, soft, soft, soft. Shell soft.
- **Class III. Urochordates**: Pelagic, soft, soft, soft, soft, soft, soft. Shell soft.
- **Class IV. Ctenophores**: Pelagic, soft, soft, soft, soft, soft, soft. Shell soft.
- **Class V. Ctenophores**: Pelagic, soft, soft, soft, soft, soft, soft. Shell soft.
- **Class VI. Echinoderms**: Pelagic, soft, soft, soft, soft, soft, soft. Shell soft.

### Orders and Sub-Orders

- **Order I. Placophora**: Shell, a single pair.
- **Order II. Echinodermata**: Two pairs.
- **Order III. Ctenophora**: Three pairs.
- **Order IV. Ctenophora**: Three pairs.
- **Order V. Ctenophora**: Three pairs.
- **Order VI. Echinodermata**: Three pairs.

### Distincting Character:
- Shell, a single pair.
- Two pairs.
- Three pairs.
- Three pairs.
- Three pairs.
- Three pairs.

### Class I. Arthropods
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.

### Class II. Echinoderms
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.

### Class III. Urochordates
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.

### Class IV. Ctenophores
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.

### Class V. Ctenophores
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.

### Class VI. Echinoderms
- Shell soft, soft, soft, soft, soft, soft, soft. Shell soft.
(ci.) Family Ostreidae (sp. 4.)

710 Ostrea edulis Linné ... ... ... ... 27
711 - mordax Gould ... ... ... ... 27
712 - rutupina Jeff ... ... ... ... 27
713 - Angasi Sou ... ... ... ... 27

MOLLUSCOIDA.

CLASS BRACHIOPODA.

(cii.) Family Terebratulidae (sp. 3.)

714 Waldheimia flavescens Lam. ... ... ... ... 27
715 Kraussia Lamarckiana Davidson ... ... ... ... 27
716 — Atkinsoni T.-Woods ... ... ... ... 27

CORRIGENDA.

<table>
<thead>
<tr>
<th>Page</th>
<th>For</th>
<th>Read</th>
</tr>
</thead>
</table>
| 7    | Polecypodia | Pelecypodia.
| 38   | Trochochlea | Trochochlea. |
| 48   | Parnea     | Barnea.       |
| 74   | Arosalpinx | Urosalpinx.   |
| 76   | Ancillaria | Ancillaria.   |
| 77   | &esopus    | &esopus.      |
| 77   | Cancellari | Cancellaria.  |
| 78   | Cythara    | Cithara.      |
| 78   | Cassmaria  | Cassmaria.    |
| 79   | Cirostrem | Cirsotrema.   |