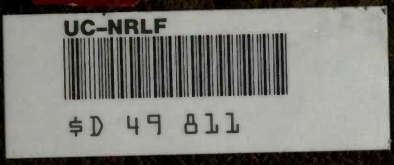


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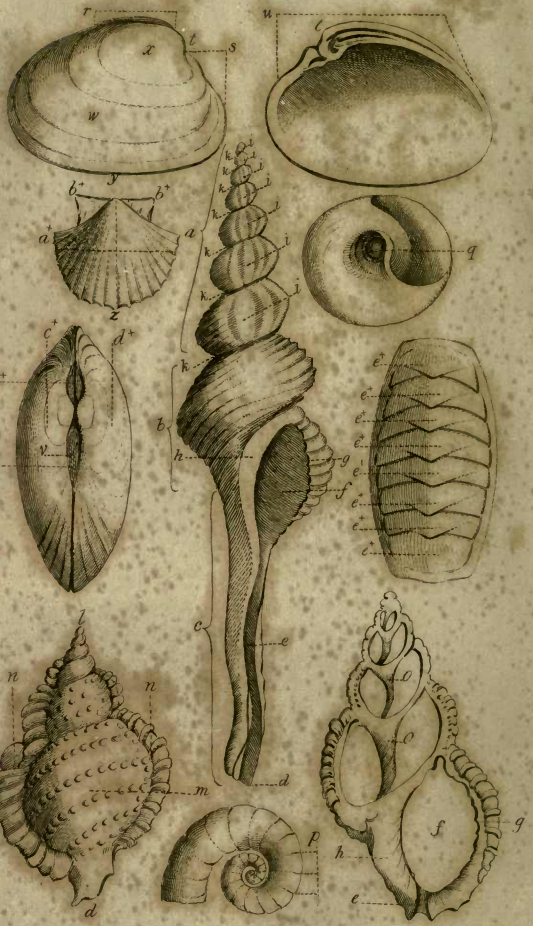
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LAMARCK'S

GENERA OF SHELLS,

WITH A

CATALOGUE OF SPECIES.

TRANSLATED FROM THE FRENCH

BY AUGUSTUS A. GOULD, M. D.

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INTRODUCTION.

THE science of Conchology has, within a very short period, risen into notice amongst us, and has already become a fashionable study, extensively and passionately cultivated. The means of pursuing it, however, are very limited. Nearly all the works we have, and these are but few, are arranged on the Linnæan system. His arrangement of shells, like his arrangement of all the kingdoms of nature, is very simple, though very artificial. His divisions are few and comprehensive, soon acquired and easily retained. But no one makes any considerable advance in the study of Conchology, before he discovers great discrepancy in individuals belonging to the same Linnæan genus; and he learns that there is another system, already in general use among naturalists, founded on natural characters, and more in accordance with the present state of knowledge. This system, or some modification of it, he finds is destined to supersede all others, and this he must learn. The works which contain it are in a foreign language, of considerable magnitude, and are possessed and read but by very few. So that the limited knowledge of Lamarck's genera, which is ordinarily acquired, is wholly traditional.

To supply, in some measure, this deficiency, the following translation and abridgment of Lamarck's work has been made, containing the substance of three large octavo volumes in French. Two translations, at least, have been made in England, both of which have been consulted. One by Crouch, beautifully illustrated, bears a high price, and is not easily obtained. The other by Mr Leach, published in numbers, in the London Quarterly Journal of Science, &c., 1823, is of course seldom to be met with.

Each of the above translations is illustrated by a figure of the type of each genus. To supply, in some degree, the omission of these engravings, a list of species has been affixed to each genus. The assistance which this may render will be readily perceived. The Linnæan genera and species are supposed to be more or less known. Now if we have what is called by Linnæus, Venus Islandica, and we look at the list of species, we find it, not under Venus, but under Cyprina. Being thus certified of the genus, we study this shell instead of a plate, comparing it with the generic description, and thus have a type of the genus by which to arrange other individuals in our cabinet. Thus we may proceed with other genera and species.

A plate exhibiting the parts of a shell, Wood's Synopsis of Lamarck's subdivision of the Linnæan genera, an index, showing also the accentuation and derivation of the generic names, and a glossary of technical terms, have also been annexed.

A few more modern and well characterised genera have been placed in the margin; and other species than those described by Lamarck, have been added. Those at the end of the list, separated from the rest by a dash, are American species, described by Barnes, Say,

Lea, Conrad and others, in American works, and not included in Lamarck's enumeration.

This compilation is intended for those only who study recent shells, and not for those who would study that department of the animal kingdom which ordinarily bears shells. All reference to the inhabiting animal is therefore omitted, and those genera which bear no shell, or are only found in a fossil state, are merely defined in their proper places, and the names of fossil species are not mentioned. It is supposed that those who would pursue the study to these particulars, will have access to the original work.

A. A. G.

INDEX.

EXPLANATION OF THE PLATE.

a. Spire
b. Body whorl
c. Beak
d. Base
e. Canal
f. Aperture
g. Labrum, or outer lip
h. Labium, or columellar lip
i. Whorls
k. Suture
l. Apex, or vertex
m. Back
n. Varices
o. Columella
p. Septa, or dissepiments
q. Umbilicus
r. Area, or anterior slope
s. Areola, or posterior slope
t. Beaks
u. Hinge
v. Ligament
w. Disc
x. Umbo, or nates
y. Base
z. Length
*a** Breadth
*b** Auricles
*c** Left valve
*d** Right valve
*e** Valves
*f** Lunule, or anus
*g** Corselet, or escutcheon

SYNOPSIS

OF

LAMARCK'S ANALYSIS OF THE LINNÆAN GENERA.

Linnæus.	Lamarck.
Chiton.	Chiton.
	Chitonellus.
Lepas.	Tubicinella.
	Coronula.
	Balanus.
	Acasta.
	Creusia.
	Anatifera.
	Pollicipes.
	Cineras.
	Otion.
Pholas.	Pholas.
	Gastrochæna.
Mya.	Mya.
	Panopœa.
	Glycymeris.
	Anatina.
	Corbula.
	Unio.
	Hyria.
	Vulsella.
Solen.	Solen.
	Sanguinolaria.
	Hiatella.
Tellina.	Tellina.
	Tellenides.
	Pandora.
	Psammobia.
	Psammotea.
	Cyclas.
	Cyrena.
Cardium.	Cardium.
Mactra.	Mactra.
	Lutraria.
	Crassatella.

Linnæus.	Lamarck.
Donax.	Donax.
	Capsa.
	Petricola.
Venus.	Venus.
	Venerupis.
	Corbis.
	Lucina.
	Crassina.
	Galatea.
	Cyprina.
	Cytherea.
	Venericardia.
Spondylus.	Spondylus.
	Plicatula.
Chama.	Chama.
	Cardita.
	Cypricardia.
	Isocardia.
	Etheria.
	Tridacna.
	Hippopus.
Arca.	Arca.
	Cucullea.
	Pectunculus.
	Nucula.
Ostræa.	Ostræa.
	Crenatula.
	Perna.
	Malleus.
	Pedum.
	Lima.
	Gryphea.
	Pecten.
Argonauta.	Argonauta.
	Carinaria.

- Anomia.
- Anomia. — Lacuna. Crania. Orbicula. Terebratula. Hyalæa.
- Mytilus.
- Mytilus. — Saxicava. Anodonta. Iridina. Modiola. Avicula. Meleagrina.
- Pinna.
- Pinna.
- Nautilus.
- Nautilus. — Orthocera. Nodosaria. Spirula. Cristellaria. Orbiculina. Polystomella.
- Conus.
- Conus.
- Cypræa.
- Cypræa.
- Bulla.
- Bulla. — Bullæa. Bulimus. Achatina. Physa. Ovula. Terebellum.
- Voluta.
- Voluta. — Auricula. Ancilla. Tornatella. Turbinella. Cancellaria. Columbella. Mitra. Marginella. Volvaria. Oliva.
- Buccinum.
- Buccinum. — Concholepas. Phasianella. Planaxis. Cassidaria. Cassis. Purpura. Monoceros. Harpa.
- Dolium. Eburna. Terebra.
- Trochus.
- Trochus. — Pyramidella. Solarium. Rotella.
- Nerita.
- Nerita. — Navicella. Neritina. Natica.
- Strombus.
- Strombus. — Pirena. Cerithium. Rostellaria. Pteroceras.
- Murex.
- Murex. — Fasciolaria. Fusus. Pyrula. Struthiolaria. Ranella. Triton. Ricinula. Pleurotoma.
- Turbo.
- Turbo. — Pupa. Clausilia. Scalaria. Delphinula. Turritella.
- Helix.
- Helix. — Paludina. Carocolla. Anastoma. Helicina. Bulimus. Succinea. Cyclostoma. Planorbis. Lymnæa. Melania. Melanopsis. Valvata. Ampullaria. Janthina. Sigaretus.
- Haliotis.
- Haliotis. — Stomatia.
- Patella.
- Patella. — Lingula. Umbrella. Parmophorus. Emarginula. Fissurella. Pileopsis. Calyptræa. Crepidula. Ancylus. Stomatella.
- Dentalium.
- Dentalium.
- Serpula.
- Serpula. — Siliquaria. Spirorbis. Vermilia. Aspergillum. Septaria. Vermetus.
- Teredo.
- Teredo. — Galeolaria. Magilus. Fistulana.

GENERA OF SHELLS.

ANNULATA

Forms the Ninth Class of Lamarck's Division of the Animal Kingdom.

SEDENTARY ANNULATA

Compose the third Order of this class. They are usually found attached to marine substances, and inhabit membranous or horny tubes, more or less encrusted with grains of sand and fragments of shells.

DORSALIA.

ARENICOLA — has no shell.

SILIQUARIA. Shell tubular, irregularly contorted, tapering posteriorly, sometimes spiral at base, open at its anterior extremity, having a longitudinal, subarticulate fissure throughout its length.

S. anguina, muricata, lævigata, terebella, lactea, lima, spinosa.

MALDANIA.

Tube open at both extremities.

CLYMENE. Tube slender, open at both ends, encrusted exteriorly with grains of sand and fragments of shells.

C. amphistoma.

DENTALIUM. Tube testaceous, nearly regular, slightly curved, gradually tapering towards the posterior extremity, and open at both ends.

(a.) Tube with longitudinal ribs or striæ.

D. elephantinum, aprinum, sulcatum, fasciatum, octogonum, deforme, novemcostatum, sexangulare, striatum, dentalis, pseudo-antalis, radicula.

(b.) Tube without ribs or striæ.

D. antalis, arietinum, corneum, nigrum, politum, eburneum, clava, fissura, coarctatum.

AMPHITRITEA.

Tube membranous or corneous; more or less sandy.

PECTINARIA. Tube an inverted cone, membranaceous or paper-like, sandy, not attached.

P. belgica, capensis.

SABELLARIA. Tubes numerous, united in a common honeycomb mass above; composed of agglutinated grains of sand and fragments of shells; orifices cup-shaped.

S. alveolata, crassissima.

TEREBELLA. Tube elongated, cylindrical, attenuated and pointed at base, membranous,

with grains of sand and fragments of shells adhering; open at apex only.

T. conchilega, cristata, ventricosa.

AMPHITRITE. Tube elongated, cylindrical, attenuated at base, membranaceous or coriaceous, generally naked exteriorly.

A. ventilabrum, penicillus, magnifica, vesiculosa, volutacornis, infundibulum.

SERPULEA.

Tube solid and calcareous.

SPIRORBIS. Tube testaceous, convoluted into an orbicular, discoidal spire; flattened and fixed at base.

S. nautiloides, spirillum, carinata, lamellosa, tricostale.

SERPULA. Tubes solid, calcareous, irregularly convoluted, grouped or solitary, attached to marine bodies; aperture terminal, rounded, very simple.

S. vermicularis, fascicularis, intestinum, contortuplicata, plicaria, glomerata, decussata, protensa, infundibulum, annulata, cereolus, filograna, vermicella, filaria, pellucida, minima, echinata, sulcata, costalis, dentifera, sipho, arenaria.

VERMILIA. Tube testaceous, cylindrical, insensibly tapering posteriorly, more or less contorted, fixed by the side to marine bodies; aperture rounded, margin often armed with one, two, or three teeth.

V. rostrata, triquetra, bicarinata, eruca, subcrenata, plicifera, scabra, tœniata.

GALEOLARIA. Tubes testaceous, very numerous, cylindrical, subangular, raised, undated, grouped, fixed at base, open at summit; aperture orbicular, edge terminating at one side by a tongue. Operculum furnished above with from five to nine pieces attached to the edge by one side.

G. cæspitosa, elongata.

MAGILUS. Base of the shell convoluted into a short, oval, snail-like spiral; four contiguous whorls convex, the last largest, and prolonged into an undulated tube. Tube convex above, carinated beneath, slightly depressed and plaited at the sides. Folds lamellar, undulated, thicker at one side than the other.

M. antiquus.

CLASS X.—CIRRHIPEDA.

Shell sessile, or elevated on a flexible, tendinous pedicle, sometimes movable, sometimes fixed; the inside covered by the mantle of the animal.

ORDER I.—SESSILE CIRRHIPEDA.

Shells fixed on marine bodies.

TUBICINELLA. Shell univalve, operculated, tubular, erect, surrounded with transverse ribs,

truncated at both extremities, open at summit, closed at base by a membrane.

T. balænarum.

Coronula. Shell sessile, apparently univalve, suborbicular, conoid or obtusely conic, truncated at extremities; parietes very thick, interiorly excavated into longitudinal cells. Operculum with four obtuse valves.

C. diadema, balænaris, testudinaria, denticulata.

Balanus. Shell sessile, attached, univalve, conic, truncated at summit, closed at base by the adhering testaceous lamina; aperture subtriangular or elliptical. Operculum interior, quadrivalve; valves movable.

B. angulosus, sulcatus, tintinnabulum, nigrescens, cylindraceus, calycularis, roseus, ovularis, miser, amphimorphus, perforatus, lævis, spinosus, radiatus, palmatus, stalactiferus, plicatus, duplocomus, patellaris, semiplicatus, galeatus, subimbricatus, rugosus, plancianus, pustularis, crispatus, punctatus, fistulosus, latus — geniculatus.

Acasta. Shell sessile, ovate, subconic, composed of separable pieces; cone formed of six equal, adnate, lateral valves, having an orbicular plate at base, internally concave, resembling a patella or basin. Operculum four valved.

A. montagui, glans, sulcata.

Creusia. Shell sessile, fixed, orbicular, convexo-conic, quadrivalve; valves unequal, ad-

nate, with distinct sutures. Operculum interior, bivalve.

C. stomia, spinulosa, verruca.

PYRGOMA. Shell sessile, univalve, globose. ventricose, convex above, perforated at summit, aperture small, elliptical. Operculum bivalve;

P. cancellata.

ORDER II.—PEDUNCULATED CIRRHIPEDA.

Body supported by a coriaceous, movable, tubular pedunclé, the base of which is fixed to marine substances.

Shell composed of contiguous pieces.

ANATIFERA. Shell compressed at sides, five valved; valves contiguous, unequal, lower one of the side valves largest.

A. lævis, villosa, dentata, striata, vitrea.

POLLICIPES. Shell compressed at sides, multivalve; valves nearly contiguous, unequal, thirteen or more, lower one of the side valves smallest.

P. cornucopiæ, mitella, scalpellum, villosus.

Shell composed of distant pieces.

CINERAS. Shell of five oblong, separate valves, not covering the body entirely, two at the aperture, the others dorsal.

C. vittata.

OTION. Shell of two small, semilunar, separate, testaceous valves, adhering laterally near the aperture.

O. Cuvieri, Blainvillii.

CLASS XI.—CONCHIFERA.

Shell always bivalve, wholly or partly covering the animal; sometimes free, sometimes fixed; valves mostly joined at the margin by a hinge or ligament; the shell is sometimes enlarged by testaceous, accessory pieces, not belonging to the valves.

Order I.—CONCH. BIMUSCULOSA.

Shell presenting in the interior two separate and lateral muscular impressions.

Section I.—CONCH. CRASSIPEDA.

Shell gaping at the sides when shut.

TUBICOLARIA.

Shell either contained in a testaceous tube, distinct from its valves, or encrusted, wholly or in part, in the parietes of this tube, or projecting from it.

The conchifera of this family are borers, and bury themselves in stones, wood and thick shells, but some remain in the sand. These, as well as the pholades, consist essentially of two similar, equal and regular valves, jointed like a hinge. In consequence of their having accessory pieces, but which do not properly belong to the valves, these shells have been mistaken for multivalves.

Aspergillum. Sheath tubular, testaceous, tapering and open anteriorly, and terminated posteriorly by an enlarged mass, presenting at one side the two valves imbedded in its pari-

etes; terminal disc of the club convex, pierced by numerous sub-tubular holes, with a central fissure.

It has been erroneously supposed that the aspergillum is fixed to rocks by its smaller end, which is necessarily open.

A. Javanum, vaginiferum, Novæ Zelandiæ, agglutinans.

Clavigella. Sheath tubular, testaceous, tapering and open anteriorly, and terminated posteriorly by an oval, subcompressed mass, bristled with spiniform tubes; mass presenting at one side one valve imbedded in its parietes, the other free in the tube.

C. cristata, echinata, tibialis, Brocchii.

Fistulana. Sheath tubular, generally testaceous, more turgid and closed posteriorly, attenuated anteriorly, open at summit, containing a free, bivalve shell; valves equal and gaping when closed.

F. clava, corniformis, gregata, lagenula.

Septaria. Tube very long, gradually attenuated at base, divided interiorly by vaulted partitions, anterior extremity terminated by two other slender tubes, not divided interiorly.

The septariæ are little more than large Fistulanæ, and scarcely deserve to be made into a separate genus.

S. arenaria.

Teredina. Sheath testaceous, tubular, cylindrical, posterior extremity closed, presenting

the two valves of the shell; anterior extremity open.

T. personata, vacillum.

TEREDO. Tube testaceous, cylindrical, tortuous, open at both extremities, independent of the shell, and covering the animal; shell bivalve, situated posteriorly outside of the tube.

The teredines do great mischief to ships, by boring their planks, &c.

T. navalis, palmulatus.

PHOLADARIA.

Shell without a tubular sheath, having accessory pieces which do not belong to the valves, and gapes anteriorly; ligament external.

PHOLAS. Shell bivalve, equivalve, transverse, gaping at each side; various accessory valves above or below the hinge; inferior or posterior margin of the valves recurved outwards.

The additional valves are always smaller than the true valves, and must be considered as accessory, because their number varies with the species.

P. dactylus, orientalis, candida, dactyloides, silicula, costata, crispata, callosa, clavata, — oblongata, truncata, cuneiformis, pusillus.

GASTROCHŒNA. Shell bivalve, equivalve, subcuneiform, widely gaping; anterior opening very large, oval, oblique; the posterior

very slight. Hinge linear, marginal, without teeth.

G. cuneiformis, mytiloides, modiolina.

SOLENACEA.

Shell without accessory pieces, and gaping only at the lateral extremities; ligament external.

The solenacea bury themselves in the sand, but do not perforate wood or stone.

SOLEN. Shell bivalve, equivalve, elongated transversely, gaping at both ends, with small, inconspicuous beaks; cardinal teeth small, variable in number, sometimes wanting, rarely diverging, more rarely received into grooves; ligament external.

S. vagina, corneus, vaginoides, siliqua, ensis, pygmæus, ambiguus, cultellus, planus, minutus, legumen, Dombeii, Javanicus, Caribæus, antiquatus, constrictus, coarctatus, strigilatus, radiatus, violaceus, rostratus, — costatus, centralis, viridis.

PANOPÆA. Shell equivalve, transverse, unequally gaping at the sides, a conic, cardinal tooth on each valve, and a compressed, short, ascending callosity by its side, not projecting outwards; ligament exterior, on the longer side, fixed to the callosities.

The Panopæa differs from the glycimeris, by having cardinal teeth, and by the ligament being on the longest side; from the solen by the greater projection of the beaks, and from mya by the ligament being external.

P. aldrovandi.

GLYCIMERIS. Shell transverse, widely gaping at each side; hinge callous, toothless. Nymphæ prominent; ligament exterior.

The glycimeris differs from solen and saxicava, by having the ligament on the shortest side, and also from solen, by having no cardinal tooth.

G. siliqua, arctica.

MYARIA.

Ligament internal; having one large spoon-shaped tooth in each valve, or in one only, to the cavity of which the ligament is attached. Shell gaping at one or both sides.

MYA. Shell bivalve, transverse, gaping at both ends. Left valve with a large, compressed, rounded cardinal tooth, projecting almost vertically; a cardinal fossa in the other valve; ligament interior, inserted into the tooth and fossa of the opposite valves.

M. truncata, arenaria, erodona, solemyalis, — acuta, mercenaria, hyalina.

ANATINA. Shell transverse, subequivalve, gaping at one or both sides, cardinal tooth naked, dilated, spoon-shaped, projecting inwardly, inserted on each valve, and receiving the ligament; a lamina or falciform rib adnate and running obliquely below the cardinal teeth in most.

Anatina differs from mya, by having two spoon-shaped teeth, instead of one.

A. laterna, truncata, subrostrata, longirostris, globulosa, trapezoides, rugosa, imperfecta, myalis, rupicola — papyratia, Leana.

Sect. II.—CONCHIFERA TENUIPEDA.

Lateral gaping inconsiderable.

Div. I.—Ligament internal, with or without an external ligament.

MACTRACEA.

Shell equivalve, mostly gaping at the lateral extremities; ligament internal, with or without an external one.

I. Ligament always internal.

(1.) *Shells gaping at the sides.*

Lutraria. Shell inequilateral, transversely oblong or rounded, gaping at the lateral extremities; hinge with one tooth plaited to resemble two, or two teeth, one simple, with an adjacent deltoid-oblique pit projecting inwards; lateral teeth none; ligament interior, fixed in the cardinal pits.

Lutraria is distinguished from mactra, by having no lateral teeth.

(a.) Shell transversely oblong.

L. solenoides, elliptica, rugosa, lineata.

(b.) Shell orbicular and subtriangular.

L. compressa, piperita, tellinoides, candida, papyracea, plicatella, crassiplica,—canaliculata.

Mactra. Shell transverse, inequilateral, subtriangular, gaping a little at the sides, beaks prominent; cardinal tooth on each valve compressed, grooved, with a projecting fossa adjacent; two lateral teeth near the hinge, compressed, entering; ligament interior, inserted into the cardinal fossa.

If the pit be very large, the cardinal tooth is very oblique, short, and often partly obliterated; but the lateral teeth always exist.

M. gigantea, spengleri, striatella, carinata, helvacea, grandis, stultorum, maculosa, straminea, australis, violacea, fasciata, turgida, plicataria, rufescens, maculata, subplicata, triangularis, lactea, abbreviata, ovalina, alba, solida, castanea, rufa, squalida, Brasiliana, donacia, depressa, lilacea, trigonella, deltoides, crassatella, — similis, lateralis, oblonga, solidissima, arctata, tellinoides, nucleus.

(2.) *Shell not gaping at sides.*

CRASSATELLA. Shell inequilateral, suborbicular or transverse, closed; cardinal teeth two, subdivergent, with a lateral pit; ligament interior inserted into the pit of each valve; lateral teeth wanting or obsolete.

Crassatella is distinguished from mactra and lutraria by the valves, when shut, being quite close on both sides. In a few species, the ligament appears a little on the outside. They are all sea shells, and generally become very thick by age.

C. kingicola, donacina, sulcata, rostrata, glabrata, subradiata, contraria, cuneata, erycinæa, cycladea, striata.

ERYCINA. Shell transverse, subinequilateral, equivalve, rarely gaping; cardinal teeth two, unequal, diverging, having a pit interposed; lateral teeth two, oblong, compressed, short, entering; ligament interior, fixed to the pit.

One of the cardinal teeth joining the base of the lateral tooth, has been sometimes mistaken for a bifid tooth; but the corresponding hollow on the opposite valve, shows that idea to be erroneous.

E. cardioides — striata.

II. Ligament appearing outside; or, being double, has one internal, and the other external.

Ungulina. Shell longitudinal, or subtransverse, rounded above, subequilateral; valves closed, beaks decorticated, a short, sub-bifid cardinal tooth in each valve, with an oblong marginal pit adjacent, contracted in the middle; ligament interior, inserted in the pits.

The ungulinæ are furrowed externally, and tinged red on the inside.

U. oblonga, transversa.

Solenomya. Shell inequilateral, equivalve, transversely oblong, obtuse at extremities; margined by a projecting, shining epidermis, beak not prominent, scarcely distinct; a dilated, compressed, very oblique cardinal tooth in each valve, slightly concave above, receiving the ligament; ligament partly interior and partly exterior.

The solenomyæ resemble the mya at first sight, but are allied by their characters to the solen, and still more to the anatina. They are thin shells, almost cylindrical, with diverging rays from the beaks to the border and extremities of the valves.

S. australis, mediterranea, — velum.

Amphidesma. Shell transverse, inequilateral, suboval or rounded, sometimes a little gaping at sides. Hinge with one or two teeth, and a narrow fossa for the interior ligament; ligament double; one exterior, short, and one in-

terior, fixed in the cardinal fossa; sometimes there are more or less prominent lateral teeth; the shells are generally small.

A. variegata, donacilla, lactea, cornea, albella, lucinalis, Boysii, tenuis, flexuosa, prismatica, phaseolina, corbuloides, glabrella, purpurascens, nucleola, physoides, reticulata, transversum, orbiculata, equalis, punctata, radiata, lepida.

CORBULEA.

Shell inequivalve; ligament interior.

Corbula. Shell regular, inequivalve, inequilateral, gaping none, or very little. A conic, curved, ascending cardinal tooth on each valve, and a lateral fossa; no lateral teeth; ligament interior, fixed in the fossa.

The corbulæ are distinguished from the ungulinæ and crassatellæ by the inequality of their valves, and by the strong, prominent cardinal tooth, which characterises them.

C. australis, sulcata, erythrodon, ovalina, taitensis, nucleus, impressa, porcina, semen, — contracta.

Pandora. Shell regular, inequivalve, inequilateral, transversely oblong, superior valve flattened, inferior convex; two oblong, diverging, unequal cardinal teeth in the upper valve; two oblong depressions on the other; ligament interior.

The pandora is distinguished from placuna by having two muscular impressions, and from the chamacea by the shell being regular and free.

P. rostrata, obtusa, — trilineata.

LITHOPHAGA.

Boring shells, without accessory pieces or sheath, and more or less gaping at their anterior side; ligament exterior.

SAXICAVA. Shell bivalve, transverse, inequilateral, gaping anteriorly and at the superior margin. Hinge nearly toothless; ligament exterior.

Sometimes the hinge has two distant, scarcely dentiform tuberosities. The shells are short and obtuse posteriorly, anteriorly longer, flatter, and often truncated. They are small or of moderate size.

S. rugosa, gallicana, pholadis, australis, veneriformis, distorta.

PETRICOLA. Shell bivalve, subtriangular, transverse, inequilateral, rounded posteriorly; the anterior edge sharp, slightly gaping. Hinge with two teeth in each valve, or in one only.

P. lamellosa, ochroleuca, semilamellata, lucinalis, striata, costellata, roccellaria, exilis, ruperella, chamoides, pholadiformis, fabagella, linguatula, fornicata.

VENERUPIS. Shell transverse, inequilateral, posterior side very short, anterior slightly gaping. Hinge with two teeth on the right valve, and three on the left, sometimes three on each; teeth small, approximate, parallel, slightly divergent; ligament exterior.

The hinge of venerupis appears analogous to that of venus, but it is distinguished by the cardinal teeth. They are perforating shells, and differ from the petricolæ by having three cardinal teeth, at least on one valve.

V. perforans, nucleus, irus, exotica, distans, crenata, carditoides.

NYMPHACEA.

Two or more cardinal teeth on the same valve; shell often gaping slightly at lateral extremities; ligament exterior; nymphæ generally projecting outside.

NYMPHACEA SOLENARIA.

SANGUINOLARIA. Shell transverse, subelliptic, slightly gaping at lateral extremities, superior edge arcuated, not parallel to the inferior. Hinge with two approximate teeth on each valve.

The sanguinolaria is distinguished from solen, by the superior margin not being parallel to the inferior; they also gape but little at the lateral extremities.

S. occidens, rosea, livida, rugosa.

PSAMMOBIA. Shell transverse, elliptic or oval oblong, nearly flat, slightly gaping at each side, beaks prominent. Hinge with two teeth on the left valve, and one fitting between them on the opposite valve.

The psammobiæ approach in form nearer to tellina than to solen; but besides gaping at the sides, they have not the irregular fold of the former, though they frequently have an angle or fold of the same form, on the anterior side of both valves.

P. virgata, feroensis, vespertina, florida, maculosa, cærulescens, elongata, flavicans, squamosa, alba, Cayennensis, lævigata, tellinella, pulchella, aurantia, fragilis, livida, galathæa, lusoria, fusca.

PSAMMOTEA. Shell transverse, oval or ob-

long oval, slightly gaping at sides; a cardinal tooth in each valve, sometimes only in one.

The psammoteæ are merely degenerated psammobiæ, differing merely in having only one cardinal tooth on the left valve; or sometimes one valve has no teeth, and the other two. They have not the form of the solen, and their beaks are prominent, and they are destitute of the irregular fold of the tellina.

P. violacea, zonalis, solenoides, pellucida, serotina, candida, tarentina, donacina, variegata.

NYMPHACEA TELLINARIA.

I. HAVING ONE OR MORE LATERAL TEETH.

TELLINA. Shell transverse or orbicular, generally flattened; anterior side angular, margin inflexed, or presenting at the edge a flexuous and irregular fold; one or two cardinal teeth on the same valve; two lateral teeth, often remote.

The tellinæ are readily known by the flexuous fold near the short side on their superior margin; almost all of them have also lateral teeth, which are flattened on one valve. They are marine shore shells, slightly or not at all gaping at the sides, often smooth, sometimes scaly, and in general adorned with lively colors. In the tellina, as well as the donax and capsa, the ligament is on the shorter side, and is wholly external. The valves of the same shell, though equal in contour, are not perfectly similar; sometimes one is more protuberant than the other, and sometimes the striæ of one valve, or of one of its sides, are not like those on the other.

(a. oblong.) T. radiata, unimaculata, semizonalis, macu-

losa, virgata, staurella, crucigera, Spengleri, rostrata, latirostra, sulphurea, foliacea, operculata, rosea, chloroleuca, elliptica, albinella, margaritina, strigosa, planata, punicea, depressa, pulchella, fabula, tenuis, exilis, donacina, nitida, scalaris, psammotella, — alternata, punicea, polita, iris, tenera, intastriata, lateralis, decora.

(*b. orbicular or round-oval.*) T. remies, sulcata, striatula, scobinata, crassa, lævigata, linguafelis, rugosa, lacunosa, gargadia, pristis, multangula, polygona, capsoides, decussata, Brasiliana, obliqua, umbonella, deltoidalis, nymphalis, solidula, bimaculata, sexradiata, ostracea, — flexuosa.

TELLENIDES. Shell transverse, inequilateral, somewhat flattened, gaping a little at the sides; beaks small, depressed, margin without an irregular fold. Hinge with two diverging teeth on each valve; lateral teeth two, subobsolete, the posterior approximated to the cardinal in one valve.

The tellenides differs from psammobia by having lateral teeth, from tellina, by wanting the flexuous marginal fold, and from lucina by its gaping, and not having the internal fascial impressions.

T. Timorensis — rosea.

CORBIS. Shell transverse, equivalve, without an irregular fold at the anterior margin; beaks curved inwards; two cardinal teeth; two lateral, the posterior nearest the hinge; muscular impressions simple.

The corbis is principally distinguished from the lucina by the animal inhabiting it, and by not having one of the muscular impressions lengthened into a

band, and from tellina, by wanting the irregular fold on the anterior margin.

C. fimbriata — (Fossil) lamellosa, petunculus.

LUCINA. Shell suborbicular, inequilateral, beaks small, pointed oblique. Hinge variable; two cardinal teeth, of which one is bifid, disappearing by age; two lateral teeth, the posterior nearest the cardinal; two muscular impressions distant, the posterior produced into a long band; ligament exterior.

L. Jamaicensis, Pennsylvanica, edentula, mutabilis, radula, concentrica, divaricata, carnaria, scabra, reticulata, squamosa, lactea, undata, circinaria, columbella, sinuata, pecten, lutea, digitalis, globularis.

DONAX. Shell transverse, equivalve, inequilateral, anterior side very short, very obtuse; two cardinal teeth, either on one or both valves; one or two lateral teeth, more or less remote; ligament exterior, short, in the place of the lunule.

This genus is characterised by its rather flattened and almost triangular shell, and by having one or two rather distant lateral teeth, separated from the cardinal teeth, and analogous to the lateral teeth of lucina, corbis, cyclas, mactra and tellina. They are marine shore shells, smooth or finely striated, and often decorated with lively colors.

(a.) Internal margin entire, or nearly so.

D. scortum, pubescens, cuneata, compressa, radians, abbreviata, granosa, columbella, veneriformis, australis, epidermia bicolor, vittata, triquetra.

(b.) Internal margin crenulated or toothed.

D. ringens, rugosa, Caienensis, elongata, denticulata, cardioides, meroe, scripta, trunculus, fabagella, anatinum, martinicensis, variabilis, fossor.

II. HAVING NO LATERAL TEETH.

CAPSA. Shell transverse, equivalve, closed. Hinge with two teeth in the right valve, embracing a bifid tooth in the other; lateral teeth none; ligament exterior, on the short side.

The capsæ are rather inequilateral shells, allied to the psammobiæ and certain tellinæ by their cardinal teeth, but they scarcely gape at the side, and have not the flexuous fold of tellina.

C. lævigata, Brasiliensis.

CRASSINA. Shell suborbicular, transverse, equivalve, sub-inequilateral, closed. Hinge with two strong diverging teeth on the right valve, and two very unequal teeth on the other; ligament exterior, on the longer side.

The crassina resembles a small crassatella in appearance, solidity and perfect closeness when shut, but differs in the position of the ligament. It differs from venus by having only two teeth on each valve, those of the left appearing almost like a single tooth, one of them being large, and the other but very slightly prominent.

C. Danmoniensis.

Sect. III.—CONCHIFERA LAMELLIPODA.

CONCHÆ.

Three cardinal teeth, at least, in one valve; as many or fewer in the other; sometimes lateral teeth.

The conchæ constitute one of the most beautiful and numerous families of the conchifera. Their shells are equivalve, orbicular or transverse, always regular, free, and in general very close, especially at the sides. They are more or less inequilateral, and seldom have true, radiating ribs.

CONCHÆ FLUVIATILES.

Like the naiadæ, these shells are covered with a kind of greenish epidermis, which turns more or less brown, and is often decorticated at the beaks. They are distinguished from them by the hinge, which has cardinal teeth, like the venus, near the hinge.

Cyclas. Shell ovate-globose, transverse, equivalve; beaks protuberant, cardinal teeth very small, sometimes nearly obsolete; sometimes two on each valve, one of which is folded, sometimes only one, plaited or lobed on one valve, and two on the other; lateral teeth transversely elongated, compressed, lamelliform; ligament exterior.

The cyclades are small shells, with thin valves, and never have three teeth on either. The beaks are never eroded. They are grayish green or yellowish: some smooth, others transversely striated with lightish colored bands.

C. rivicola, cornea, lacustris, obliqua, calyculata, obtusalis,

fontinalis, australis, sulcata, striatina, Saratogea, — rhomboidea, partumeia.

CYRENA. Shell rounded, triangular, turgid or ventricose, solid, inequilateral, covered by an epidermis, beaks decorticated. Hinge with three teeth on each valve; lateral teeth generally two, one of which is near the cardinal; ligament exterior, on the widest side.

The cyrenæ are generally thick and rather large, shell always covered with a greenish or brown epidermis. They are distinguished from cyclas by having three cardinal teeth in each valve. They have also lateral teeth, one of which is often placed below the corselet.

(a.) Lateral teeth serrate or dentate.

C. trigonella, orientalis, cor, fuscata, fluminea, truncata, violacea.

(b.) Lateral teeth entire.

C. depressa, Caroliniensis, Bengalensis, Zeylanica.

GALATHEA. Shell equivalve, subtriangular, covered by a greenish epidermis; cardinal teeth sulcated, two on the right valve, connivant at base; three on the other, the intermediate one advanced, distinct; lateral teeth remote; ligament exterior, short, prominent, turgid; nymphæ prominent.

The galathea is distinguished from cyrena by the peculiar form of its cardinal teeth. The muscular impressions are lateral, and appear double on each side.

G. radiata.

CONCHÆ MARINÆ.

Mostly no lateral teeth; shell sometimes covered with an epidermis, except at the beaks.

CYPRINA. Shell equivalve, inequilateral, obliquely cordate; beaks obliquely curved. Hinge with three unequal teeth, approximated at base, subdivaricate superiorly; a lateral tooth, distant from the hinge, on the anterior side, sometimes obsolete; nymphæal callosities large, arcuated, terminated near the beaks by a pit; ligament exterior, partly under the beaks.

The cyprinæ are in general rather large shells, very like the veneres, and chiefly distinguished by having a compressed lateral tooth on the anterior side; by their large nymphæ, generally terminated by an oval pit, sometimes singularly large near the beaks; by the ligament extending under the beaks, and there filling up the terminal pit of the nymphæ, and by having an epidermis.

C. gigas, Islandica, Pedomontana, tenui-stria.

CYTHEREA. Shell equivalve, inequilateral, suborbicular, triangular or transverse. Hinge of the right valve four toothed, three of which are divergent and approximate at base, the other solitary, under the lunule. The other valve with three diverging teeth, approximate at base, with a remotish pit, parallel to the margin; lateral teeth none.

The cytherea is distinguished from the venus by having four cardinal teeth on one valve, and three teeth and the pit on the other. They are all sea shells, solid, in general variously and beautifully colored, free, with the beaks curved and moderately prominent. The oval pit on the left valve corresponds to the insulated tooth of the right.

I. INTERNAL MARGIN OF THE VALVES VERY ENTIRE.

(*a.*) *Anterior cardinal tooth, with a striated canal or dentated border.*

C. lusoria, petechialis, impudica, castanea, zonaria, meretrix, graphica, morphina, purpurata, casta, corbicula, tripla, — convexa.

(*b.*) *Anterior cardinal tooth without striated canal or dentated border.*

C. gigantea, erycina, lilacina, impar, erycinella, pectoralis, planatella, florida, nitidula, chione, maculata, citrina, albina, læta, mactroides, trigonella, sulcatina, hebræa, castrensis, ornata, picta, tigrina, venetiana, juvenilis, rufa, guineensis, dione, arabica, trimaculata, immaculata, pellucida, hepatica, lucinalis, lunaris, lactea, exoleta, lincta, concentrica, prostrata, interrupta, tigerina, punctata, umbonella, undatina, scripta, nummulina, muscaria, pulicaris, mixta, abbreviata, — occulta.

II. INTERNAL MARGIN OF THE VALVES CRENATED OR DENTATED.

C. pectinata, gibba, ranella, divaricata, testudinalis, cuneata, placunella, rugifera, plicatina, flexuosa, macrodon, lunularis, squamosa, cardilla, cygnus, dentaria.

VENUS. Shell equivalve, inequilateral, transverse, or suborbicular. Hinge with three approximate teeth in each valve, the lateral ones diverging at summit; ligament exterior, covering the labia.

The veneres are amongst the most beautiful of the conchiferæ. They are not distinguished by their general form from the cythereæ, but are more commonly transverse than orbicular. The middle cardinal tooth, which is often bifid, is straight, whilst the lateral are oblique and diverging; a few species have all the cardinal teeth straight. They are found in all seas, and live in the sand, a short distance from the shore.

I. INTERNAL MARGIN OF THE VALVES CRENATED OR DENTATED.

(*a.*) *Shells with lamellar striæ.*

V. puerpura, reticulata, pygmæa, corbis, crenulata, discina, verrucosa, rugosa, casina, crebrisulca, plicata, cancellata, subrostrata, — castanea, inequalis, elevata, præparca.

(*b.*) *Shells without lamellar striæ.*

V. granulata, pectorina, marica, cingulata, cardioides, grisea, elliptica, Dombeii, mercenaria, lagopus, gallina, gallinula, pectinula, sulcata.

II. INTERNAL MARGIN OF THE VALVES VERY ENTIRE.

V. lamellata, exalbida, rufa, dorsata, hiantina, crassisulca, corrugata, Malabarica, papilionacea, adspersa, punctifera, turgida, litterata, sulcaria, textile, texturata, geographica, rariflamma, decussata, pallastra, glandina, truncata, retifera, anomala, galactites, exilis, scalarina, Scotica, aurea, virginea, marmorata, ovulea, laterisulca, callipyga, opima, nebulosa, phaseolina, carneola, florida, petalina, bicolor, floridella, catenifera, pulchella, sinuosa, tristis, rimularis, vulvina, vermiculosa, flammiculata, conularis, strigosa, aphrodina, Peronii, aphrodinoides, elegantina, flammea, undulosa, pumila, ovata, inquinata — grata, notata.

VENERICARDIA. Shell equivalve, inequilateral, suborbicular, generally with longitudinal radiating ribs; cardinal teeth two, oblique, inclining to the same side.

The venericardiæ seem to connect the conchæ with the cardiacea; their radiating ribs give them perfectly the appearance of cardium, and the hinge would resemble the venus if it had a third diverging tooth on each valve. It appears to differ from cardita merely by wanting the lunular tooth, two oblique teeth representing the lateral tooth of cardita, which is always channelled. They are chiefly fossil.

V. planicosta, petuncularis, imbricata, australis, acuticosta, mitis, senilis, lævicosta, concentrica, decussata, elegans — tridentata.

CARDIACEA.

Cardinal teeth irregular, either in their form or situation; or generally accompanied by one or two lateral teeth.

The cardiacea are ventricose shells; almost all are furnished with radiating, longitudinal ribs, and when viewed at the fore part are heart shaped. They are equivalve, regular, and sometimes gaping.

CARDIUM. Shell equivalve, subcordiform, beaks protuberant, valves dentated or plaited on the internal edge. Hinge with four teeth on each valve, the two cardinal approximate and oblique, the two lateral articulating crosswise with their opponents; two lateral, remote, entering.

The prominent, cordate beaks of this genus, are very remarkable. The convex side of the valves is generally furnished with longitudinal ribs, more or less prominent, frequently striated, imbricate or spinous; but the interior is smooth, and only furrowed towards the margin. The ligament is external and very short; there are two, faint, muscular impressions. They are

found in all seas, and generally live buried in the sand near the coasts.

(*a.*) *No particular angle on the beaks, and the anterior side at least as large as the posterior.*

C. costatum, Indicum, ringens, Asiaticum, tenuicostatum, fimbriatum, Brasilianum, apertum, papyraceum, bullatum, ciliare, echinatum, pseudolima, aculeatum, erinaceum, tuberculatum, isocardia, muricatum, angulatum, marmoreum, elongatum, ventricosum, rugosum, sulcatum, serratum, lævigatum, biradiatum, æolicum, pectinatum, rusticum, edule, Grœnlandicum, latum, crenulatum, exiguum, minutum, roseum, scobinatum, — Mortoni, pinnulatum.

(*b.*) *Beaks carinated, or having an angle; posterior side often larger than the anterior.*

C. unedo, medium, fragum, retusum, tumoriferum, hemicardium, cardissa, inversum, Junoniæ, lineatum.

CARDITA. Shell, free, regular, equivalve, inequilateral. Hinge with two unequal teeth; one short, straight, under the beaks, the other oblique, marginal, prolonged under the corselet.

The carditæ may be easily confounded with the venericardiæ, if sufficient attention be not paid to the direction of the two teeth, which in the latter are both oblique and turned to the same side, which is not the case in cardita. They differ from chama in not being inequivalve, or irregular, nor ever fixed by the lower valve to marine substances. Some species are said to fix themselves by a sort of byssus, like the arca and mytilus.

(*a.*) *Shell subcordate or oval, more transverse than longitudinal.*

C. sulcata, ajar, turgida, squamosa, gallicana, intermedia, rudista, Etrusca, tarpezia, bicolor, depressa.

(*b.*) *Shell more longitudinal than transverse.*

C. phrenitica, crassicosta, rufescens, calyculata, subaspera, nodulosa, sinuata, concamerata, aviculina, citrina, sublævigata, corbularis, lithophagella, crassa.

CYPRICARDIA. Shell free, equivalve, inequilateral, obliquely or transversely elongated. Hinge with three teeth beneath the beaks, and a lateral tooth prolonged under the corselet.

The cypricardiæ differ from the carditæ, which they resemble in general form, by having, like the venus, three teeth, instead of one only, under the beaks.

C. Guiniaca, angulata, rostrata, corralliophaga.

HIATELLA. Shell equivalve, very inequilateral, transverse; gaping at the superior margin. Hinge with a small tooth on the right valve, and two oblique teeth, somewhat longer, on the left; ligament exterior.

H. arctica.

ISOCARDIA. Shell equivalve, heart shaped, cordate, ventricose; beaks distant, diverging, rolled spirally to one side; cardinal teeth two, compressed, entering, one of which is curved and sunk under the beak; lateral tooth elongate, under the corselet; ligament exterior, forked on one side.

I. cor, arietina, Moltkiana, semisulcata.

ARCACEA.

Cardinal teeth small, numerous, entering, disposed in each valve in a straight, arched or broken line.

The arcacea are very remarkable by the hinge of their shells, which are equivalve, regular, the beaks commonly distant, the ligament entirely external, and the muscular impressions lateral. Several have a velvety epidermis; some adhere to rocks by tendinous threads, and the shell gapes more or less at the superior margin. They are all sea shells, and live near the shore.

CUCULLÆA. Shell equivalve, inequilateral, trapeziform, ventricose; beaks distant, separated by the facet of the ligament; anterior muscular impression, with an angular or auricular margin. Hinge linear, straight, with minute transverse teeth; having at each extremity, two to five ribs parallel to it; ligament entirely exterior.

The cucullæa are large, very tumid shells, with the anterior side obliquely truncated, forming a broad, cordate, flattened corselet, slightly elevated towards the middle. The hinge is that of the arca, but as the shell grows old, it is displaced, and leaving the remains of its former margins at the extremities, gives rise to two parallel ribs by which it is terminated, which is not seen in the arca.

C. auriculifera, crassatina.

ARCA. Shell transverse, subequivalve, inequilateral, beaks distant, separated by the area

of the ligament. Hinge linear, straight, without ribs at the extremities; teeth numerous, crowded, alternately inserted into each other; ligament exterior.

The arca is readily known by the peculiar form of its hinge. When placed on the superior margin, they resemble a boat, whence their name. They often gape at the superior margin, in consequence of the tendinous fibres which the animal puts out to fix himself to the rocks. The space between the beaks forms a rhomboidal flat, or sometimes a hollow facet, marked with furrows, which receives the ligament.

(*a.*) *Superior margin not crenulated within.*

A. tortuosa, semitorta, Noæ, tetragona, umbonata, sinuata, avellana, cardissa, ventricosa, retusa, sulcata, ovata, barbata, fusca, Magellanica, Domingensis, lactea, trapezina, pistachia, pisolana, cancellaria, callifera, irudina.

(*b.*) *Superior margin crenulated within.*

A. Kelbingii, scapha, antiquata, rhombea, granosa, auriculata, inæquivalvis, Indica, senilis, Brasiliana, corbicula, squamosa, Cayenensis, bisulcata — staminea, lienosa, ponderosa, pexata, incongrua, transversa.

PECTUNCULUS. Shell orbicular, nearly lenticular, equivalve, subequilateral, closed. Hinge arcuated with numerous oblique, uniformly arranged, alternately inserted teeth; those in the middle obsolete, almost wanting; ligament exterior.

The pectunculi are distinguished from the arca by the orbicular form of the shells, and especially by the arched hinge; the teeth are less numerous, farther apart and larger, and they never gape. The beaks are

not very distant, yet are always separated by a narrow, furrowed, rather hollow facet, to which the ligament is attached, and which distinguishes them from the nuculæ. The shells are all marine, and resemble the pectines by their form, and by the internal margin being always crenate. Many species acquire considerable thickness by age, and such a change of form as renders it difficult to distinguish them.

(*a.*) *Distant, longitudinal furrows, and frequently fine transverse or longitudinal striæ.*

P. glycimeris, pilosus, undulatus, marmoratus, scriptus, pennaceus, rubens, angulatus, stellatus, pallens, violacescens, zonalis, striatularis, nummarius.

(*b.*) *Prominent and radiating longitudinal ribs, with or without transverse striæ.*

P. castaneus, pectiniformis, pectinatus, radians, vitreus.

NUCULA. Shell transverse, ovate triangular, or oblong, equivalve, inequilateral; no area between the beaks. Hinge linear, broken, many toothed, interrupted in the middle by an oblique, spoon-shaped pit; teeth numerous, subacute, often produced as in the pecten; beaks contiguous, curved backwards; ligament marginal, partly inferior, inserted into the cardinal fossa or pit.

The nuculus is distinguished from the pectunculus and arca, not only by the broken, angular line of their hinge, but also by the ligament, which is partly internal, and by wanting the facet between the beaks. They are small sea shells, somewhat triangular, and more or less pearly on the inside.

N. lanceolata, rostrata, pella, Nicobarica, obliqua, margaritacea — limatula, proxima, nucleus, recurva.

TRIGONIANA.

Cardinal teeth lamellar, transversely, striated.

The teeth of the trigoniana differ from those of the arcacea by the striæ being on separate laminæ, instead of being on the hinge itself.

TRIGONIA. Shell equivalve, inequilateral, triangular, sometimes suborbicular. Cardinal teeth oblong, flattened at the sides, divergent, furrowed transversely; two are on the right valve, furrowed on both sides, and four on the other, furrowed on one side only; ligament exterior, marginal.

The trigoniæ are regular, free, very inequilateral sea shells, and all, except one species, only known in a fossil state, fourteen of which are enumerated.

T. pectinata.

CASTALIA. Shell equivalve, inequilateral, triangular; beaks decorticated, recurved posteriorly. Hinge with two lamellar teeth, striated transversely; one posterior, remote, abbreviated, sub-trilamellate, the other anterior, elongated, lateral; ligament exterior.

The castalia resembles a trigonia in appearance, but differs from it in the number and situation of its teeth, which have more resemblance to those of the unio, between which and the trigonia it seems to be intermediate. It appears to be a river shell.

C. ambigua.

NAIADA.

Fresh water shells, the hinge of which is sometimes furnished with an irregular, simple, or divided cardinal tooth, and a longitudinal one, which extends under the corselet; sometimes no tooth, or furnished with irregular, granular tubercles throughout; muscular impression posterior, compound; beaks decorticated, often eroded.

The naiada are well distinguished from the fresh water conchæ by their hinge and inhabitant. The shell is free, regular, equivalve, inequilateral, always transverse; the epidermis is greenish, inclining to brown, and always wanting at the beak. The muscular impressions are lateral and quite separate; that of the posterior side is composed of two or three distinct, unequal impressions, which distinguishes them from the other bimuscular conchifera.

UNIO. Shell transverse, equivalve, inequilateral, free; beaks decorticated, suberoded; muscular impression posterior, compound; hinge with two teeth on each valve; one cardinal, short, irregular, simple or bipartite, substriated, the other elongated, compressed, lateral, prolonged under the corselet; ligament external.

The unio is very distinct from the anodonta, which it resembles in shape, by its hinge. Each valve has a short cardinal tooth, that on the left generally simple, that on the right divided into two lobes, besides a lateral tooth. The two teeth articulate together when the valves are shut. The shell is generally formed of a very brilliant mother of pearl. The lamina of the margin of the shell, above the lateral tooth, has a trun-

cation or sinus, which seems to receive a portion of the ligament.

(a.) Cardinal tooth short, thick, not crested, and substriated.

U. sinuata, elongata, crassidens, Peruviana, rariplicata, purpurata, ligamentina, obliqua, retusa, rarisulcata, coarctata, purpurascens, brevialis, rhombula, carinifera, georgina, clava, recta, naviformis, glabrata, rotundata, littoralis, semirugata, nana, delodonta, sulcidens.

(b.) Cardinal teeth short, compressed, raised, and often crested.

U. rostrata, pictorum, Batava, corrugata, nodulosa, varicosa, granosa, depressa, Virginiana, luteola, marginalis, augusta, manca, spuria, australis, anodontina, suborbiculata.

N. American. U. ridibundus, monodonta, undulatus, abruptus, phaseolus, tetralasmus, dehiscens, interruptus, globulus, declivis, lapillus, camptodon, lugubris, radiatus, ovatus, carinosus, nasutus, cylindricus, subtentus, plicatus, rectus, torsus, mytiloides, metanever, scalenius, cornutus, verrucosus, tuberculatus, gibbosus, cuneatus, ventricosus, siliquoideus, triangularis, parvus, Æsopus, calceolus, lanceolatus, donaciformis, ellipsis, irroratus, lacrymosus, ater, rubiginosus, heterodon, sulcatus, planulatus, circulus, multiradiatus, occidens, securis, iris, zigzag, patulus.

HYRIA. Shell equivalve, obliquely triangular, eared, truncated at base, and straight. Hinge with two short teeth; one posterior or cardinal, divided into numerous, diverging portions, the interior of which are smallest; the other anterior or lateral, lamellar, very long; ligament external, linear.

The hyria is distinguished from the unio, by its general form, and by the cardinal tooth, particularly that of the right valve, which is divided into numerous lamel-

lar folds, the innermost very small, and has the appearance of a bundle of very unequal, diverging laminæ. This compound tooth is rather depressed, and always inclines towards the posterior side of the shell, instead of rising perpendicularly to the plane of the valve.

H. avicularis, corrugata.*

ANODONTA. Shell equivalve, inequilateral, transverse. Hinge linear, toothless; a cardinal lamina, smooth, adnate, truncated, or forming a sinus at its anterior extremity, terminating the base of the shell; two muscular impressions, remote, lateral, subgeminate; ligament external, linear, descending at its anterior extremity into the sinus of the cardinal lamina.

The anodontæ are fresh water shells, usually very thin, and often of a large size. They greatly resemble the unio, but have neither cardinal nor lateral tooth, the hinge presenting merely a smooth interior margin or laminæ, situated immediately below the nymphæ, and terminated anteriorly by a truncation or sinus. The shell is pearly, and covered with a thin, greenish, false epidermis; beaks oblique, partly inclining to the posterior margin.

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*SYMPHYNOTA. — *Say.* Shell fluviatile, bivalve; valves connate at the dorsal margin.

S. lævissima, bialata, alata, complanata, compressa, gracilis, tenuissima, ochracea, cygnea.

ALASMIDONTA. — *Say.* Shell transverse, equivalve, inequilateral; hinge with a primary tooth in each valve; cicatrices three.

It is separated from anodonta by its primary tooth, and from unio, by being destitute of the lamelliform teeth.

A. undulata, marginata, ambigua, confragosa.

(a.) No distinct angle at the posterior extremity of the cardinal line.

A. cygnea, anatina, sulcata, fragilis, cataracta, rubens, crispata, uniopsis, Pennsylvanica, intermedia, suborbiculata.

(b.) A distinct angle at the posterior extremity of the cardinal line.

A. trapezialis, exotica, glauca, sinuosa, Patagonica.

IRIDINA. Shell equivalve, inequilateral, transverse; beaks small, recurved, almost straight; muscular impressions as in anodonta. Hinge long, linear, attenuated at the middle, tubercular, almost crenulate throughout; tubercles unequal, frequent; ligament exterior, marginal.

The principal difference between the anodonta and iridina, consists in the tuberculated hinge of the latter. The shell is rather thick, brilliant pearly, reddish, especially internally, and iridescent.

I. exotica.

CHAMACEA.

Shell inequivalve, irregular, fixed; hinge with one thick tooth, or without teeth; two separate and lateral muscular impressions.

The ligament is external, and sometimes sunk irregularly towards the interior; the hinge is somewhat allied to the tridacnea. The shells are often lamellar and spinous, their beaks always irregular, sometimes large and contorted. They are attached to rocks, corals, and often to each other.

DICERAS. Shell inequivalve, adherent; nates conic, very large, divaricate, turned into

irregular spires; tooth very large, thick, concave, sub-auricular, prominent in the largest valve; two muscular impressions.

The diceras somewhat resembles isocardium, but is more nearly allied to chama. It differs from them by its hinge, and the singular form of the beaks.

Fossil. Fiftythree species enumerated.

Chama. Shell irregular, inequivalve, adherent; beaks incurved, unequal. Hinge with a single thick tooth, oblique, subcrenate, inserted into the fossa of the opposite valve; two distant, lateral muscular impressions; ligament external, depressed.

This genus now consists of irregular, coarse, rough, scaly, or spinous shells, with very unequal valves, and only one thick, oblique, transverse, callous tooth, usually crenate or furrowed. The beaks are curved inwards, and only one of them projects at the base of the shell. They live in shallow water, attached by the larger valve to rocks, corals, or to each other. They are seldom brilliantly colored.

(*a.*) *Beaks turning from left to right.*

C. lazarus, damæcornis, gryphoides, crenulata, unicornis; florida, limbula, æruginosa, asperella, decussata.

(*b.*) *Beaks turning from right to left.*

C. arcinella, radians, cristella, albida, ruderalis, croceata, Japonica.

Etheria. Shell irregular, inequivalve, adherent; beaks short, as it were sunk in the base of the valves. Hinge toothless, undate, subsinuate, unequal; two distant, oblong, lateral

muscular impressions; ligament external, tortuous, somewhat penetrating within the shell.

The etheriæ are very rare shells, and little known, being attached to rocks in deep water. They resemble ostreæ in form, but are allied to the chamæ by their muscular impressions, and are only distinguished from them by having no tooth at the hinge. They are rather large, and attached by the lower valve.

(*a.*) *An oblong callosity in the base of the shell.*

E. elliptica, trigonula.

(*b.*) *Without the callosity.*

E. semilunata, transversa.

CONCHIFERA UNIMUSCULOSA.

Shell presenting internally one muscular impression, nearly in the centre.

SECT. I.—LIGAMENT MARGINAL, ELONGATED ON THE MARGIN, SUBLINEAR.

TRIDACNEA.

Shell transverse, equivalve, muscular impression under the middle of the superior margin, and produced to each side under it.

The shells of this family are regular, solid, and remarkable by their sinuous or wavy superior margins.

TRIDACNA. Shell regular, equivalve, inequilateral, transverse, gaping at the lunule. Hinge with two compressed, unequal, advanced and entering teeth; ligament marginal, external.

The tridacna is perfectly distinguished from hippopus by the lunule being always open and gaping, through which the animal protrudes a byssus, by

which it is suspended to the rocks, however large and heavy it may be. The T. gigas is the largest shell known. The largest known is said to weigh five hundred pounds.

T. gigas, elongata, squamosa, crocea, mutica, serrifera, pustulosa.

Hippopus. Shell equivalve, regular, inequilateral, transverse, closed at the lunule. Hinge with two compressed, unequal, anterior and entering teeth; ligament marginal, exterior.

The hippopus differs from tridacna by having the lunule shut; wherefore it cannot fix itself to the rocks by a byssus, and consequently must have a different organization from that of the preceding genus.

H. maculatus.

MYTILACEA.

Ligament at the hinge subinternal, marginal, linear, very entire, occupying a great part of the anterior margin; rarely foliated.

Modiola. Shell subtransverse, equivalve, regular, posterior side very short; beaks nearly lateral, depressed on the short side. Hinge toothless, lateral, linear; ligament cardinal, mostly interior, received into a marginal groove; muscular impression sublateral, elongated, securiform.

The modiolæ differ from the mytili in being rather transverse than longitudinal shells, the beaks not being truly terminal, the posterior side extending a little beyond them; moreover, they are rarely fixed by a

byssus. They usually gape a little at the middle of the contracted margin of the posterior side.

M. papuana, tulipa, albicosta, Guyanensis, Adriatica, pulex, vagina, picta, sulcata, plicatula, semifusca, securis, purpurata, barbata, discrepans, discors, trapesina, cinnamonea, silicula, plicata, semen, lithophaga, caudigera,— Americana, castanea.

MYTILUS. Shell longitudinal, equivalve, regular, pointed at base, fixed by a byssus; beaks nearly straight, terminal, pointed; hinge lateral, generally toothless; ligament marginal, subinterior; muscular impression elongated, clavate, sublateral.

The mytili are all sea shells, and are not foliated, nor gaping at the superior margin, in which they differ from the pinna, which they otherwise resemble.

(*a.*) *Shell with longitudinal furrows.*

M. magellanicus, erosus, crenatus, decussatus, hirsutus, exustus, bilocularis, ovalis, ustulatus, Domingensis, Senegalensis,— hamatus, lateralis.

(*b.*) *Shell without longitudinal furrows.*

M. elongatus, latus, zonarius, canalis, ungulatus, violaceus, opalus, smaragdinus, perna, afer, achatinus, ungularis, planulatus, borealis, augustanus, corneus, Galloprovincialis, edulis, abbreviatus, retusus, hesperianus, incurvatus, lineatus, lacunatus,— cubitus, leucophæatus.

PINNA. Shell longitudinal, wedge shaped, equivalve, gaping at summit, pointed at base; beaks straight. Hinge lateral, toothless; ligament marginal, linear, very long, subinterior.

The pinnæ are all sea shells, generally very large, thin in proportion to their size, often brittle; its fracture exhibits delicate transverse striæ like gypsum.

P. rudis, flabellum, semi-nuda, angustana, nobilis, squamosa, marginata, muricata, pectinata, saccata, varicosa, dolabrata, ingens, vexillum, nigrina, subquadrivalvis.

MALLEACEA.

Ligament marginal, sublinear, either interrupted by crenulations or serial teeth, or wholly simple; shell subinequivalve, foliated.

The mallacea differ from the mytilacea by the foliated texture of the shell, and by being irregular and inequivalve. The ligament also is not perfectly internal.

Crenatula. Shell subequivalve, flattened, foliate, somewhat irregular; no peculiar aperture for the byssus. Hinge lateral, linear, marginal, crenulate; crenulations in regular series, callous, somewhat excavated, receiving the ligament.

The hinge of the crenatula a good deal resembles that of the perna, but presents a row of callous and rather concave indentations, which receive the ligament, whereas the perna has a row of linear, parallel, truncated teeth, articulating with those of the opposite valve, the ligament being inserted in the interstices. The crenatulæ are rare shells, generally thin, sometimes almost membranous and brittle.

C. avicularis, modiolaris, nigrina, bicostalis, viridis, mytiloides, phasianoptera.

Perna. Shell subequivalve, flattened, somewhat deformed, texture lamellar; hinge linear,

marginal, composed of sulciform, transverse, parallel teeth, not opposed, between which the ligament is inserted; a sinus for the byssus a little gaping under the end of the hinge; parietes callous.

The hinge of the perna differs from that of the arca by the cardinal teeth of one valve not articulating with those of the other, but lying upon them when the valve is shut. The ligament is also differently situated. They more resemble crenatulæ. They are sea shells, with small, nearly equal beaks, situated at one of the extremities of the hinge.

P. ephippium, obliqua, isogonum, avicularis, femoralis, canina, marsupium, sulcata, vulsella, nucleus.

Malleus. Shell subequivalve, rough, deformed, generally elongated, sublobate at base; beaks small, divergent. Hinge toothless; an elongated conic groove, under the hinge, traversing the area of the ligament obliquely; ligament subexternal, short, received into the sloping area of each valve.

The mallei are distinguished from the pernæ by their hinge; from the aviculæ by the conical pit, below the beaks, and by the valves being, though irregular, of the same size, and having no sinus on the left valve. They are coarse, irregular shells, remarkable for their form, with little beauty externally, but are rather brilliant pearly internally.

M. albus, vulgaris, normalis, vulsatellus, anatinus, decurtatus.

AVICULA. Shell inequivalve, fragile, rather smooth, base transverse, straight; extremities produced, the anterior caudiform, or tail-like; a notch in the left valve. Hinge linear, unidentate, beneath the beaks; area of the ligament marginal, narrow, channelled, not traversed by the byssus.

When the valves are spread open, the shell has a rude resemblance to the wing of a bird, whence its name. They are sea shells, generally smooth externally, thin, and pearly within. Their beaks are oblique, small, and not prominent.

A. macroptera, lotorium, semisagitta, heteroptera, falcata, crocea, Terentina, atlantica, squamulosa, papilionacea, physoides, virens, trigonata, phalænacea, hirudo.

MELEAGRINA. Shell subequivalve, rounded, quadrate, scaly externally; inferior cardinal margin straight, not caudate anteriorly; a sinus for the byssus at the posterior base of the valves; left valve at this part narrow and emarginate. Hinge linear and toothless; area of the ligament marginal, elongate, subexterior, dilated in the middle.

The meleagrina is distinguished from avicula by the form of the shell, which is nearly equivalve, by never having the tail nor cardinal teeth, and by the widening of the ligamental facet at the middle part. The aperture for the byssus also occasions a callous, re-entering angle on each valve. It often contains true pearls.

M. margaritifera, albina.

SECT. II. — LIGAMENT NOT MARGINAL, CONTRACTED INTO A SMALL SPACE UNDER THE BEAKS; ALWAYS VISIBLE, AND NOT FORMING A TENDINOUS CORD UNDER THE SHELL.

These shells are generally auriculated at the base or extremity of the cardinal margin. They are all inequivalve, for though in many the valves are of the same size, one of them is always more convex than the other.

PECTENIDES.

Ligament interior or semi-interior; shell generally regular, compact, not foliated.

PEDUM. Shell inequivalve, somewhat eared, inferior valve gaping; beaks unequal, distant. Hinge toothless; ligament partly exterior, inserted in an elongated, canal-shaped fossa, under the beaks; inferior valve emarginate near its posterior base.

The pedum is a free, regular, inequivalve shell; and the singular notch of the lower valve shows that the animal has the power of attaching it by a byssus.

P. spondyloideum.

LIMA. Shell longitudinal, subequivalve, eared, slightly gaping on one side between the valves; beaks distant, internal face inclined outwards. Hinge toothless; cardinal fossa partly exterior, receiving the ligament.

The lima has no notch on the lower valve; the little ears, though small, are distinct. It differs from the

ostrea by being regular, free, and almost equivalve, and from pecten by its remote beaks and cardinal pit. They are sea shells, and generally white.

L. inflata, squamosa, glacialis, annulata, fragilis, linguatula.

PLAGIOSTOMA. Shell subequivalve, free, subauriculated, cardinal base transverse, straight; beaks rather distant, their inner sides expanding into transverse, flattened, external facets, one straight, the other obliquely inclined. Hinge without teeth; a conical, cardinal pit, under the beaks, partly internal, opening outwards, and receiving the ligament.

It is only known in the fossil state.

PECTEN. Shell free, regular, inequivalve, eared; inferior edge transverse, straight; beaks contiguous. Hinge toothless; cardinal fossa wholly interior, triangular, receiving the ligament.

The pectines are almost always radiated with fine or coarse ribs. The base of the shell is terminated by a straight, transverse line, beyond which the beaks never project. The valves are generally thin, of equal size, but the upper one almost constantly flattened. They are always eared, and the largest ear is on the posterior side, and beneath it is a sinus.

(a.) Ears equal, or nearly so.

P. maximus, medius, Jacobæus, bifrons, ziczac, Laurentii, pleuronectes, obliteratus, Japonicus, magellanicus, purpuratus, lineolaris, radula, rastellum, turgidus, flagellatus, asper-

sus, flavidulus, plica, glaber, sulcatus, virgo, unicolor, griseus, distans, isabella, — concentricus, Pealii, ornatus, dislocatus.

(*b.*) *Ears unequal.*

P. nodosus, pallium, pes felis, tigris, imbricatus, histrionicus, sauciatus, opercularis, lineatus, flabellatus, irradians, flexuosus, inflexus, dispar, quadriradiatus, Islandicus, asperrimus, senatorius, aurantius, florens, varius, sanguineus, sinuosus, ornatus, pellucidus, Tranquebaricus, gibbus, miniaceus, pusio, hybridus, sulphureus, lividus, hexactes.

PLICATULA. Shell inequivalve, without ears, attenuated at base, superior margin plaited, rounded; beaks unequal, and without external facet. Hinge with two strong teeth on each valve; a pit between the two teeth, receiving the ligament, which is entirely exterior.

The plicatula differs from the pecten by having cardinal teeth, and being without ears, and from spondylus, by having no external facet and no spines.

P. ramosa, depressa, cristata, reniformis, australis.

SPONDYLUS. Shell inequivalve, adherent, eared, spiny or rigid; beaks unequal; inferior valve presenting a cardinal area external, flattened, divided by a fissure, which increases with age. Hinge with two strong cardinal teeth in each valve, with an intermediate ligamentary fossa connected by a sulcus to the external fissure; ligament internal.

The spondyli are distinguished from the ostreæ by the cardinal teeth; they are generally covered with spines, which are occasionally very large, disposed in rows or radiating striæ or ribs. The lower valve is always largest and most convex, and is terminated at the beak by a kind of flattened, inclined, triangular facet, which appears as if cut with a knife, and increasing by age.

S. gædaropus, Americanus, arachnoides, candidus, multilamellatus, costatus, variegatus, longi-spina, regius, avicularis, coccineus, crassi-squama, spathuliferus, ducalis, longitudinalis, microlepos, croceus, aurantius, radians, zonalis, violascens.

Podopsis. Shell inequivalve, subregular, adhering by the inferior beak, not auriculated, the lower valve largest, most convex, and the beak most produced; hinge toothless; ligament interior.

Fossil.

OSTRACEA.

Ligament internal or semi-internal; shell irregular, foliated, sometimes very thin.

The ostracea are seldom auriculated at base, and still more rarely radiated externally; in many species the shell is fixed to marine bodies by the lower valve, which is always the largest.

(*a.*) *Ligament semi-internal; shell foliated, and often very thick.*

Gryphæa. Shell free, inequivalve; inferior valve large, concave, terminated by a projecting beak, curved spirally inwards; superior

valve small, flat, like an operculum. Hinge toothless; an oblong cardinal pit.

The curved beak of these shells usually projects considerably, either above the upper valve or laterally. They are almost always free shells, and are all fossil, but one species.

G. angulata *vel* tricarinata.

Ostrea. Shell adherent, inequivalve; irregular; beaks distant, becoming very unequal by age; the superior valve becoming displaced during life. Hinge toothless; ligament semi-interior, inserted into the cardinal fossa; fossa of the inferior valve increasing with age to a great length.

The shell of the ostrea is rude, rugged, often scaly, sometimes singularly plaited at the margins, and frequently very thick. It does not curve upwards like that of the gryphæa. The texture of the valves is loose, foliated; the lower one, which is the largest, and by which it adheres to marine bodies, is more convex than the upper.

(1.) *Margins simple or waved, not plaited.*

O. edulis, hippopus, borealis, Adriatica, cochlearis, cristata, gallina, mumisma, lingua, tulipa, Brasiliana, scabra, rostralis, parasitica, denticulata, spathulata, ruscuriana, Virginica, Canadensis, excavata, mytiloides, sinuata, trapezina, tuberculata, rufa, margaritacea, gibbosa, australis, elliptica, haliotidea, deformis, fucorum — semicylindrica.

(2.) *Margins plaited.*

O. cornucopiæ, cucullata, doridella, rubella, limacella, erucella, folium, labrella, plicatula, glaucina, fusca, turbinata, crista-galli, imbricata, hyotis, radiata.

Vulsella. Shell longitudinal, subequivalve, irregular, free; beaks equal. Hinge with a prominent callosity on each valve, depressed above, and exhibiting a conical and obliquely arcuated pit for the ligament.

The vulsella is allied to the ostreæ, but always has the valves nearly equal; the beaks equal, though somewhat separate; an equal, projecting callus in the interior of each valve under the beaks; and it is never fixed by its lower valve. They are often found in sponges; some species gape a little at the posterior side.

V. lingulata, hians, rugosa, spongiarum, mytilina, ovata, deperdita.

(*b.*) *Ligament internal; shell thin, papyraceous.*

Placuna. Shell free, subequivalve, irregular. Hinge internal, presenting on one valve two sharp, longitudinal ribs, in form of V; on the other, two corresponding impressions.

The valves of the placunæ are thin, transparent, and of the same size. They are large, orbicular or subtriangular, and sometimes triangular. Their texture is foliated.

P. sella, papyracea, placenta, pectinoides — pertusa, quadrifasciata.

Anomia. Shell inequivalve, irregular, operculated; adhering by the operculum; lower valve pierced, commonly flat, with a hole or notch at the beak; the other larger, concave, entire; operculum small, elliptic, osseous, fixed

to foreign bodies, to which is attached the interior muscle of the animal.

The operculum of the anomia has been absurdly mistaken for a third valve. The perforated flat valve is usually considered the lower one, because it is that which rests on the bodies to which it is attached.

A. ephippium, patellaris, cepa, electrica, pyriformis, fornicata, membranacea, squamula, lens.

SECT. III. — LIGAMENT EITHER WANTING OR UNKNOWN, OR REPRESENTED BY A TENDINOUS CORD, WHICH SUPPORTS THE SHELL.

RUDISTA.

Ligament, hinge and animal unknown, shell very unequivalve; no distinct beaks.

SPHÆRULITES. Shell inequivalve, orbicular, globose, somewhat depressed above, echinated externally with large, subangular, horizontal scales; upper valve smallest, rather flat, opercular; internal surface with two unequal, subconical, curved and prominent tuberosities; lower valve largest, rather ventricose, external margin with radiated scales; cavity obliquely conical, forming at one side by the folding of the margin, a crest or projecting keel; internal side of the cavity transversely striate. Hinge unknown. Fossil.

RADIOLITES. Shell inequivalve, externally striated; striæ longitudinal, radiating; lower valve turbinated, and largest; the upper con-

vex, or depressed conic, opercular. Hinge unknown. Fossil.

Calceola. Shell inequivalve, triangular, turbinated, flattened beneath; the larger valve hollowed or hood-shaped, obliquely truncated at the aperture; cardinal margin straight, transverse, a small notch or indentation in the middle; superior margin arched; the small valve flat, semi-orbicular, opercular, having a tubercle on each side of the cardinal margin, and in the middle a pit with a small lamina. Fossil.

Birostrites. Shell inequivalve, two horned, disc of the valves obliquely elevated conically, unequal, obliquely diverging, nearly straight, horn-shaped, the one enveloping the other at base. Fossil.

Discina. Shell inequivalve, rounded, oval, somewhat depressed; valves nearly equal in size, each having a very distinct, central, orbicular disc; disc of the superior valve not perforated, rising into a mamillary protuberance; that of the other valve very white, with a transverse slit.

The identity of discina and orbicula has been so satisfactorily proved, that the former is now given up.

D. ostreoides.

Crania. Shell inequivalve, suborbicular; inferior valve nearly flat, perforated on its internal face by three unequal, oblique holes;

superior valve convex, sub-gibbous, with two prominent callosities within.

The three holes in the crania do not seem to perforate it completely, unless by accident, when removed from the body to which it was fixed by the outer surface; hence they cannot be the issues of muscles. These holes give the lower valve the appearance of a death's head.

C. personata.

BRACHIOPODA.

The shell of the brachiopoda is more or less inequivalve, and opens by a hinge; the true ligament of the valve is not known. The shell always adheres to marine bodies.

ORBICULA. Shell suborbicular, inequivalve; no conspicuous hinge; inferior valve very thin, flat, adhering to marine bodies; superior subconic with an acute vertex more or less prominent.

The lower valve is sometimes so thin as to be scarcely perceptible, whence Muller supposed it to be a univalve shell, and referred it to the patellæ.

O. norvegica.

TEREBRATULA. Shell inequivalve, regular, subtriangular, attached to marine bodies by a short, tendinous pedicle; beak of the larger valve produced, often curved, perforated at summit by a round hole or a notch; hinge with two teeth; two nearly osseous, slender, elevated, forked, variously ramified branches

spring from the disc of the small valve, and serve as a support to the animal.

T. vitrea, dilatata, pisum, globosa, rotundata, flavescens, dentata, dorsata, sanguinea, caputserpentis, truncata, psittacea. Fossils numerous.

LINGULA. Shell subequivalve, flattened, oval oblong, truncated at summit, somewhat pointed at base, elevated on a fleshy, tendinous pedicle, fixed to marine bodies. Hinge toothless.

L. anatina.

MOLLUSCA.

Body sometimes naked, either destitute of any solid internal parts, or inclosing a shell or other hard substance, and sometimes provided externally with a shell, covering or sheathing, but never composed of two opposite valves, united by a hinge.

ORDER I.—PTEROPODA.

Some only, are furnished with a thin, cartilaginous or horny shell.

HYALÆANA.

HYALÆA. Shell horny, transparent, ovate globose, tridentate posteriorly, open at summit and two posterior sides.

The shell of the hyalæa appears to consist of two valves cemented together. The valves are unequal; the largest above, rather flattened beneath, the other below, tumid, subglobular, and shortened anteriorly. On each side of the shell is a very open fissure to admit water to the branchiæ.

H. tridentata, cuspidata.

CLIO. Has no shell.

CLEODORA. Shell gelatino-cartilaginous, transparent, like an inverted pyramid, or lanceolate, truncated and open superiorly.

C. pyramidata, caudata.

LIMACINA. Shell thin, fragile, papyraceous, spiral; whorls in discoidal order, like planorbis.

L. helicialis.

CYMBULIA. Shell gelatino-cartilaginous, very transparent, crystalline, oblong, shoe-shaped, truncated at summit; aperture lateral and interior.

C. Peronii.

PNEUMODERMON. No shell.

ORDER II.—GASTEROPODA.

Some are naked, others have a dorsal shell, not enveloping; others again have a shell more or less hidden in a mantle.

TRITONIANA.

Without shells, either external or internal.

PHYLLIDIANA.

Some are without shells either external or internal; others are wholly or partly covered by a shell, sometimes composed of one single piece, sometimes of a range of movable and distinct pieces.

PHYLLIDIA. No shell.

CHITONELLUS. Shell multivalve; valves alternate, mostly longitudinal, united to each

other by their extremities in form of a caterpillar.

The valves of the shell, whilst the animal is alive, are separate; but when dead and contracted, several of them appear to be united.

C. lævis, striatus.

CHITON. Shell multivalve, arranged in a single longitudinal series; valves movable, imbricate, transverse, lateral extremities connected by a folding back of the mantle.

The shell is generally composed of eight valves; sometimes of seven, or only six; the middle valves are longer than those at the extremities.

C. gigas, squamosus, Peruvianus, spinosus, fascicularis, marginatus, Magellanicus.

PATELLA. Shell univalve, not spiral, shield-like, or like a depressed cone; concave and simple beneath, margin without fissure, summit entire, inclined anteriorly.

The patellæ are widest at the posterior side, and the outline of the shell is generally oval. Most of them have ribs, radiating from the summit to the margin.

P. apicina, granatina, oculus, barbara, plicata, laciniosa, saccharina, angulosa, barbata, longicosta, spinifera, aspera, luteola, pyramidata, umbella, plumbea, cærulea, radians, scutellaris, Safiana, testudinaria, cochlear, compressa, granularis, deaurata, Magellanica, stellifera, vulgata, mamillaris, lineata, leucopleura, notata, Tarentina, punctata, punctura-ta, Javanica, tuberculifera, miniata, viridula, pectinata, Galathea, pellucida, tricostata, australis, cymbularia, — amœna, alternata.

SEMI-PHYLLIDIANA.

PLEUROBRANCHUS. Shell internal, dorsal, thin, flattened, often oblique, oval.

P. plumula, Peronii.

UMBRELLA. Shell external, orbicular, somewhat irregular, nearly flat, slightly convex above, white, with a small apicial point in the centre, edges sharp; internal face a little concave, with a callous, colored disc, pitted in the centre, and surrounded by a smooth limbus.

V. Indica, Mediterranea.

CALYPTRICIANA.

Shell always external, covering the animal.

PARMOPHORUS. Shell oblong, subparallelopiped, somewhat convex above, blunt at extremities, notched anteriorly by a slight sinus, a small apicial point above, towards the posterior part, inclined backwards.

P. australis, breviculus, granulatus.

EMARGINULA. Shell conic, shield-like, vertex inclined; posterior margin split or emarginate.

The shells of this genus are generally small; some of them in the form of a cone, inclined towards the anterior margin, which is always the narrowest, and opposite to that which has the fissure. In others, the cone is very much flattened.

E. fissura, rubra.

FISSURELLA. Shell shield-like, or depressed

conic, concave beneath, vertex perforated; spire none; foramen ovate or oblong.

F. picta, nimbosa, crassa, Græca, nodosa, Cayenensis, lilacina, rosea, Barbadensis, radiata, viridula, hiantula, pustula, fascicularis, Javanicensis, depressa, Peruviana, gibberula, minuta, alternata.

Pileopsis. Shell obliquely conic, curved forwards, apex hooked, subspiral; aperture round-elliptic; anterior margin shortest, acute, subsinuate; posterior broader and rounded, an elongated, arched, transverse muscular impression under the posterior margin.

P. Ungarica, mitrula, intorta, subrufa, spirirostris, retortella, pennata, squamæformis.

Calyptræa. Shell conoid, orbicular at base; vertex erect, imperforate, pointed; base round, cavity with a convolute lip, or a spiral diaphragm.

C. extinctorium, lævigata, equestris, tectum-sinense, — striata.

Crepidula. Shell ovate or oblong, generally convex on the back, concave beneath; spire strongly inclined to the margin; aperture partly closed by a horizontal lamina.

C. fornicata, porcellana, aculeata, unguiformis, dilatata, Peruviana, — depressa, glauca, plana, intorta, convexa.

Ancylus. Shell thin, obliquely conic; apex acute, curved backwards; aperture oval; margins very simple.

A. lacustris, fluviatilis, spina rosæ, — rivularis.

ACERA. No shell.

BULLÆANA.

BULLÆA. Shell very thin, partially convoluted, and spiral at one side, without columella or spire; aperture very large, patulous above.

B. aperta.

BULLA. Shell ovate globose, convolute, no columella nor projecting spire; aperture the whole length; right margin sharp.

B. lignaria, ampulla, striata, naucum, physis, fasciata, aplustre, hydatis, cornea, fragilis, solida, — solitaria.

LAPLYSIANA.

LAPLYSIA. Shield dorsal, semicircular, subcartilaginous.

L. depilans, fasciata, punctata, radiata.

DOLABELLA. Shell oblong, subarcuate, hatchet-shaped; contracted, thick, callous and nearly spiral at one side; the other broader, flatter and thinner.

D. Rumphii, fragilis.

LIMACIANA.

ONCHIDIUM. No shell.

PARMACELLA. No described shell.

LIMAX. A coriaceous shield.

TESTACELLA. Shell minute, external, subauriform, apex obsoletely spiral; aperture very large, oval, obliquely dilated; left lip involute.

T. haliotidea.

VITRINA. Shell small, very thin, depressed, terminated superiorly by a short spire; last whorl very large; aperture large, rounded-oval; left margin arquated, slightly inflexed.

V. pellucida.

ORDER III.—TRACHELIPODA.

Shells spirivalve, unsheathing.

SECTION I.—TRACH. PHYTIPHAGA.

Aperture of shell entire; base without any ascending notch or canal.

COLIMACEA.

Shell spirivalve, with no other projecting parts on the exterior than the striæ of growth; right margin of the aperture often recurved or reflexed outwards.

HELIX. Shell orbicular, convex or conoid, sometimes globular, spire not much elevated; aperture entire, broader than long, very oblique, contiguous to the axis; margins disjoined by the prominence of the penultimate whorl.

The helix is distinguished from the pupa, by the general form of the shell, which is never cylindrical, and by the borders of the aperture being disunited; from the bulimus, by the aperture being rather transverse than longitudinal, and its plane very oblique and almost perpendicular to the axis of the spine; and from planorbis by the left margin of the aperture being contiguous to the axis of the shell. The margin of the adult helix is always reflected outwards, which it never is in aquatic shells. The helix is readily

known by the projection of the penultimate whorl into the aperture.

H. vesicalis, gigantea, polyzonalis, monozonalis, pulla, lineolata, mutata, pomatia, aspersa, vermiculata, Alonensis, versicolor, naticoides, picta, galactites, hæmastoma, melanotragus, extensa, lucana, globulus, melanostoma, cælatura, microstoma, maculosa, Richardi, Bonplandii, planulata, labrella, ungulina, pellis-serpentis, Senegalensis, unidentata, cepa, heteroclites, discolor, lactea, zonaria, guttata, Madagascarensis, Javanica, Peruviana, simplex, cidaris, citrina, algira, verticillus, olivetorum, planospira, Barbadensis, sinuata, hippocastanum, bidentalis, argilacea, vittata, alauda, arbustorum, candidissima, nemoralis, hortensis, sylvatica, Pisana, splendida, serpentina, Niciensis, variabilis, fruticum, neglecta, cespitum, ericetorum, intersecta, carthusianella, carthusiana, diaphana, concolor, velutina, obvoluta, Cookiana, pileus, papilla, punctifera, plicatula, planorbella, scabra, cariosa, crenulata, planorbula, macularia, maritima, strigata, muralis, rugosa, cornea, linguifera, incarnata, cinctella, cellaria, nitida, plebeium, personata, hispida, rotundata, apicina, striata, conspurcata, conica, conoidea, pulchella, — albolabris, hirsuta, perspectiva, lineata, thyroidus, minuta, labyrinthica, multilineata, appressa, palliata, inflecta, clausa, obstricta, elevata, interna, chersina, gularis, ligera, solitaria, jejuna, concava, dealbata, profunda, alternata, irrorata, inornata, indentata, fallax, egena, tridentata, monodon.

CAROCOLLA. Shell orbicular, more or less conoid or convex above, outline sharp and angular, or keeled; aperture broader than long, contiguous to the axis; lip subangular, often dentated or plaited beneath.

The sharp edge of the last whorl, their being always orbicular, and sometimes considerably depressed, are the characteristics of this genus.

C. acutissima, albilabris, angistoma, labyrinthus, lucerna, inflata, Gualteriana, bicolor, mauritiana, Madagascarensis, marginata, lychnuchus, planata, planaria, hispidula, lapicida, albella, elegans.

ANASTOMA. Shell orbicular, spire convex, obtuse; aperture rounded, dentated on both sides, within ringent, looking towards the spire; lip reflected.

The singular position of the aperture, directed upwards towards the spine of the shell, is the characteristic of this genus, and peculiar to it.

A. depressa, globulosa.*

HELICINA. Shell subglobose, imperforate; aperture entire, semi-oval; columella callous, transverse, flattened, margin acute, forming an angle at the inferior base of the lip; operculum horny.

The helicinæ resemble small neritæ, but the latter are sea shells. They are distinguished from the helices by their transverse columella, which is callous, depressed, and thin at the lower part. They are land shells, and inhabit warm climates.

H. neritella, striata, fasciata, viridis, — major, orbiculata, occulta.

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*POLYGYRA. — *Say.* Shell discoidal, more or less carinated on the upper edge of the whorls; umbilicated; aperture longer than broad; lips thickened, toothed, or folded and continued, folds concave beneath; pillar lip raised above the preceding whorl, and concave beneath.

P. auriculata, avara, septemvolva, plicata.

PUPA. Shell cylindrical, generally thick; aperture irregular, semi-oval, rounded and subangular inferiorly; margins nearly equal, reflected outwards, disjoined above; a columellar lamina, firmly fixed, being interposed.

P. mumia, uva, sulcata, candida, labrosa, fusus, tridentata, fasciolata, zebra, unicarinata, maculosa, clavulata, ovularis, germanica, cinerea, tridens, quadridens, polyodon, variabilis, frumentum, secale, avena, granum, fragilis, dolium, umbilicata, muscorum, — armifera, corticaria, rupicola, contracta, exigua, fallax, ovata, pentodon.

CLAUSILIA. Shell generally fusiform, slender, somewhat obtuse at summit; aperture irregular, rounded oval; margins united, free, reflected outwards.

The essential character of the clausilia is, that the two borders of the aperture are completely united, free in their contour, and reflected outwards.

C. torticollis, truncatula, retusa, costulata, corrugata, inflata, teres, denticulata, collaris, papillaris, plicatula, rugosa.

BULIMUS. Shell ovate, oblong or turreted; aperture entire, longitudinal; margins very unequal, disunited above; columella straight, smooth, entire at the base, not channelled.

The last whorl of the spine of the bulimus is larger than the penultimate; the shell is never orbicular, like the helix; it differs from the pupa by the great inequality of the two margins of the aperture, the right of which is sometimes considerably thickened.

B. ovatus, hæmastomus, gallina, sultana, zigzag, undatus, Richii, inversus, citrinus, sultanus, Pythogaster, ovoideus, interruptus, Peruvianus, Favannii, Kambeul, calcareus, decollatus, Lyonetianus, inflatus, radiatus, fragilis, Guadalupensis, Mexicanus, multifasciatus, Bengalensis, Caribæorum, octonus, terebraster, articulatus, acutus, ventricosus, montanus, hordaceus, lubricus, — multilatus, multilineatus.

ACHATINA. Shell ovate or oblong; aperture entire, longer than broad; lip sharp, never reflected. Columella smooth, truncated at base.

This genus is well distinguished from the former by the right margin being never reflected, and by wanting that on the left; the columella being always naked, very smooth, and truncated at the base.

(*a.*) *Last whorl ventricose, not depressed.*

A. perdrix, zebra, immaculata, purpurea, acuta, bicarinata, mauritiana, castanea, ustulata, vexillum, virginea, Priamus.

(*b.*) *Last whorl depressed or attenuated towards the base.*

A. glans, Peruviana, albo-lineata, fusco-lineata, fulminea, folliculus, acicula — solida.

SUCCINEA. Shell ovate or ovate conic; aperture ample, entire, longer than broad; lip acute, not reflexed, uniting inferiorly with the smooth, thin, sharp columella. No operculum.

The succineæ live habitually on land, near water, which they occasionally frequent. They are distinguished from the bulimus by the right margin being never reflected, and from the lymnæa by their columella being free from folds.

S. cucullata, amphibia, oblonga — ovalis, campestris.

AURICULA. Shell sub-oval or ovate oblong; aperture longer than broad, very entire at base, narrowing upwards where its margins are disunited, columella with one or more plaits. Lip with the margin sometimes reflected, sometimes simple and sharp.

Land shells, and distinguished from bulimus by the folds on the columella.

(a.) Shells with the margin reflected outwards.

A. auris-midæ, a. Judæ, a. Sileni, a. leporis, a. Gelis, scarabæus, bovina, caprella, myosotis, minima.

(b.) Shells with the margin simple and acute.

A. Dombeiana, coniformis, nitens, monile.

CYCLOSTOMA. Shape of shell variable; whorls cylindrical, aperture circular, regular; margins continuous, dilated or reflected by age. An operculum.

Land shells, never pearly, generally thin, and without scales or tubercles on the outside; distinguished from the paludina by the outward reflection of the margin of the adult shell; whilst in paludina it is always sharp, and not reflected; from the pupa by the regularity of the aperture, which is never angular.

C. planorbula, volvulus, carinata, sulcata, unicarinata, tricarinata, obsoleta, rugosa, labeo, interrupta, ambigua, semilabris, flavula, fasciata, mumia, quaternata, ferruginea, decussata, lineolata, mammillaris, ligata, lincinella, orbella, fimbriata, multilabris, elegans, patulum, truncatulum — lapidaria, marginata, dentata.

LYMNEANA.

Shell spirivalve, the external surface mostly smooth; the right margin of the aperture always sharp and not reflected.

PLANORBIS. Shell discoidal, spine depressed, scarcely prominent; whorls apparent above and below; aperture oblong, lunated, very distant from the axis; margin never reflexed. Operculum none.

Fresh water shells, generally thin, brittle, diaphanous; the whorls of some are subcylindrical, of others carinate or angular. Aperture sublongitudinal, with an internal projection formed by the penultimate whorl.

P. cornu-arietis, corneus, carinatus, lutescens, orientalis, spirorbis, vortex, deformis, contortus, hispidus, nitidus, imbricatus — armigerus, trivolvis, bicarinatus, parvus, parallelus, exacuus, campanulatus, glabratus.

PHYSA. Shell convolute, or oblong; spire prominent. Aperture longitudinal, narrowing superiorly. Columella twisted. Lip very thin, sharp, produced somewhat beyond the plane of the aperture. No operculum.

Fresh water shells, thin, brittle, and generally reversed; distinguished from bulla by their projecting spire, and from lymnæa by the aperture not being dilated, the right margin projecting a little above its plane.

P. castanea, fontinalis, hypnorum, subopaca, rivalis — gyrina, elongata, heterostropha, ancillaria.

LYMNÆA. Shell oblong, sometimes turreted; spire prominent. Aperture entire, longitudinal. Lip sharp, its inferior part rising

upon the columella, forming a very oblique fold as it enters the aperture. No operculum.

The very oblique fold on the columella, distinguishes it from bulimus, and the regular, uninterrupted plane of the aperture from the physa.

L. columnaris, stagnalis, palustris, Virginiana, luteola, acuminata, auricularia, ovata, peregra, intermedia, leucostoma, minuta, — columella, elongata, catascopium, reflexa, appressa, elodes, desidiosa, macrostoma, emarginata, humilis, modicella, obrussa, pinguis, galbana.

MELANIANA.

Margins of the aperture of the shell disunited, the right always sharp.

MELANIA. Shell turreted. Aperture entire, ovate or oblong, effuse at base. Columella smooth, incurved. A horny operculum.

M. asperata, truncata, coarctata, punctata, corrugata, subulata, lævigata, clavus, decollata, amarula, thiarella, spinulosa, granifera, carinifera, truncatula, fasciolata, — nupera, depygis, Virginica, semicarinata, laqueata, canaliculata, elevata, conica, catenaria, multilineata, simplex, proxima.

MELANOPSIS. Shell turreted. Aperture entire, ovate oblong. Columella callous superiorly, truncated at base, separated from the lip by a sinus. Operculum.

The callus on the upper part of the columella distinguishes melanopsis from melania, as well as its being truncated at base, like the achatina, which is never the case in melania.

M. costata, lævigata.

PIRENA. Shell turreted. Aperture longitudinal; lip sharp, with a sinus at the base and another at the summit. Base of columella curved towards the lip. Operculum horny.

Principally distinguished from melanopsis by having no callus on the columella, and from that genus and melania by a sinus both at the base and summit of the right lip.

P. terebralis, spinosa, aurita, granulosa — scalariformis.

PERISTOMIANA.

Shell operculated, conoidal or subdiscoidal: margin of the aperture united.

VALVATA. Shell discoidal or conoid; whorls cylindrical, not modifying the spiral cavity. Aperture rounded; margins united, sharp. An orbicular operculum.

V. piscinalis — tricarinata.

PALUDINA. Shell conoid; whorls rounded or convex, modifying the spiral cavity. Aperture round-oval, longitudinal, angular at summit. Lips united, sharp, never curved outwards. Operculum, round, horny.

The paludinæ generally live in fresh water, though some inhabit brackish, and even salt water. They are distinguished from the valvatæ by the somewhat elongated and angular form of the aperture.

P. vivipara, achatina, Bengalensis, unicolor, impura, muriatica, viridis, — decisa, vivipara, subpurpurea, intertexta, ponderosa, integra, porata, limosa, decipiens, lustrica, grana, subglobosa.

AMPULLARIA. Shell globular, inflated, umbilicated at base, without callosity on the pillar lip. Aperture entire, oblong; margins united. Lip sharp, not reflexed. Operculum.

The last whorl is at least four times as large as the penultimate. The columellar lip projects, and is reflected over the umbilicus, forming a half funnel, but no callus. The shells are generally large.

A. Guyanensis, rugosa, fasciata, canaliculata, effusa, Guiniaca, virens, carinata, avellana, intorta, fragilis.

NERITACEA.

Shell fluviatile or marine, semiglobular or flattened oval, without columella, the left margin of the opening resembling a half partition.

(1.) *Fresh water shells.*

NAVICELLA. Shell elliptic or oblong, convex above, concave beneath; spire straight, bending over to the lip. Columella flattened, sharp, narrow, toothless, almost transverse. Operculum solid, flat, with a subulate lateral tooth.

Distinguished from nerita and neritina by the summit not being spirally convolute. The transverse left lip never covers half the cavity.

N. elliptica, lineata, tessellata.

NERITINA. Shell thin, semiglobose or oval, flattened beneath, not umbilicated. Aperture semicircular, pillar lip flattened and sharp: no teeth nor crenulations on the internal surface

of the outer lip. Operculum with a lateral tooth.

N. perversa, pulligera, dubia, zebra, zigzag, gagates, lugubris, corona, brevispina, crepidularia, auriculata, Domingensis, fasciata, lineolata, semi-conica, strigilata, meleagris, virginea, fluviatilis, viridis, Bœtica.

(2.) *Marine shells.*

NERITA. Shell solid, semiglobose, flattened beneath, without umbilicus. Aperture semi-orbicular, entire; pillar lip flattened, septiform, sharp, often toothed; teeth or crenulations on the internal face of the outer lip. Operculum with an apophysis.

The spire is but little elevated above the last whorl. The operculum is crescent shaped, horny or calcareous, and exactly closes the aperture. The nerita differs from neritina by the internal face of the right margin being crenate, and from natica by having no umbilicus.

N. exuvia, textilis, undata, peloronta, chlorostoma, atrata, polita, albicilla, chamœleon, versicolor, Ascensionis, Malaccensis, lineata, scabricosta, plicata, tessellata, signata.

NATICA. Shell subglobose, umbilicate. Aperture entire, semi-circular; pillar lip oblique, not toothed, callous: callosity modifying the umbilicus and sometimes covering it. Outer lip sharp, always smooth within. An operculum.

Distinct from nerita by the umbilicus, and by the columellar margin not being crenate but smooth and callous, and by the smoothness of the interior of the right lip.

N. glaucina, albumen, mamillaris, mamilla, melanostoma, aurantia, conica, plumbea, ampullaria, canrena, cruentata, millepunctata, vitellus, helvacea, collaria, monilifera, labrella, rufa, unifasciata, lineata, fulminea, maculosa, vittata, castanea, Marochiensis, arachnoidea, zebra, zonaria, Chinensis, Javanica, cancellata,—triseriata, duplicata, rugosa, heros, pusilla.

JANTHINEA.

JANTHINA. Shell ventricose, conoid, thin, pellucid. Aperture triangular: columella straight, produced beyond the base of the lip: lip having a sinus in the middle. No operculum.

J. communis, exigua.

MACROSTOMIANA.

Shell ear shaped, aperture much dilated, the margins disunited, no columella, no operculum.

SIGARETUS. Shell subauriform, nearly orbicular, pillar lip short and spiral. Aperture entire, much dilated, longer than broad, margins disconnected.

S. haliotideus, concavus, lævigatus, cancellatus — perspectivus, maculatus.

STOMATELLA. Shell orbicular or oblong, auriform, imperforate. Aperture entire, ample, sublongitudinal; lip effuse, dilated, gaping.

Distinguished from stomatia by not having the transverse rib of that shell, nor the right lip so much elevated: and from haliotis, by wanting the foramina which mark that genus.

S. imbricata, rubra, sulcifera, auricula, planulata.

STOMATIA. Shell earshaped, imperforate; spire prominent. Aperture entire, oblong, ample; lips equally raised. A transverse, tuberculous rib along the back.

Distinguished from haliotis by the dorsal rib being imperforate.

S. phymotis, obscurata.

HALIOTIS. Shell earshaped, generally flattened; spire very short, sometimes depressed, nearly lateral. Aperture very large, longer than broad, entire in its perfect state. Disc perforated with holes disposed in a line parallel to to the pillar lip, and near it, the last beginning by a notch.

H. Midæ, iris, tubifera, excavata, australis, tuberculata, striata, asinina, glabra, lamellosa, unilateralis, rugosa, canaliculata, tricostalis, dubia.

PLICACEA.

Aperture of the shell not effuse; columella plaited.

Distinct from the auriculæ by their general form and projecting spire; and from voluta, mitra, &c. by having no notch at the base of the aperture.

TORNATELLA. Shell convolute, ovate cylindrical, generally striated transversely, and free from epidermis. Aperture oblong, entire; lip sharp. One or more folds on the columella.

T. flammea, solidula, fasciata, auricula, nitidula, pedipes.

PYRAMIDELLA. Shell turreted, destitute of

epidermis; aperture entire, semioval; lip sharp. Columella produced inferiorly, subperforate at base, with three transverse plaits.

P. terebellum, — dolabrata, plicata, corrugata, maculosa.

SCALARIANA.

Shell without plaits on the columella; margins of the aperture circularly united.

The shells of the scalarianæ have a tendency to form a loose spire, so that the whorls are often disunited and do not rest on one another.

VERMETUS. Shell thin, tubular, loosely spiral; spire adhering by its apex; aperture circular; margins united. Operculum.

This shell greatly resembles a serpula: but its animal is not one of the *annulata*, but a true *molluscum*.

V. lumbricalis.

SCALARIA. Shell subturreted, with longitudinal, elevated, interrupted, nearly sharp ribs; aperture nearly circular; the two margins uniting and terminated by a thin, recurved rim.

S. pretiosa, lamellosa, coronata, varicosa, communis, australis, raricosta, — multistriata, lineata, clathratulus.

DELPHINULA. Shell subdiscoidal or conical; umbilicated, solid; whorls rough or angular. Aperture entire, round, sometimes triangular; margins united, generally fringed or rimmed.

Distinguished from turbo by the united margins.

D. laciniata, distorta, turbinopsis, — laxa.

TURBINACEA.

Shell turreted or conoidal; aperture round and oblong, not effuse, margins disunited.

All sea shells, and appear to be operculated. When placed on the base, the axis is always more or less inclined, never vertical.

SOLARIUM. Shell orbicular, in form of a depressed cone, umbilicated; umbilicus open, crenulated, or dentated on the internal margin of the spires; aperture subquadrangular. Columella wanting.

The crenate umbilicus of the solarium sufficiently distinguishes it from the trochus and planorbis.

S. perspectivum, granulatum, lævigatum, stramineum, hybridum, variegatum, luteum.

ROTELLA. Shell orbicular, shining, without epidermis; spire very short, subconic; inferior face convex, callous; aperture semicircular.

Distinguished from trochus by the lower surface being remarkably callous, and from helicina by the callus not being confined to the columellar lip, but extending over a large portion of the lower side of the shell.

R. lineolata, rosea, suturalis, monilifera, Javanica.

TROCHUS. Shell conical; spire elevated, sometimes abbreviated; outline more or less angular, often thin and sharp; aperture transversely depressed; margins disunited above.

Columella arcuated, more or less swelling at base. Operculum.

Many trochi have a brilliant, pearly surface, and several have longitudinal ribs, which, we believe, are never found in the turbo.

T. imperialis, longispina, solaris, Indicus, radians, pileus, calyptræformis, fimbriatus, brevispina, rotularius, stella, stellaris, rhodostomus, spinulosus, costulatus, inermis, agglutinans, cœlatus, tuber, magus, merula, argyrostomus, Cookii, Niloticus, pyramidalis, noduliferus, cœrulescens, obeliscus, virgatus, maculatus, granosus, squarrosus, incrassatus, flammulatus, elatus, marmoratus, mauritianus, imbricatus, triserialis, crenulatus, asperulus, acutus, lineatus, ziziphinus, conuloides, conulus, jujubinus, Javanicus, annulatus, dolarius, granulatus, granatum, moniliferus, iris, ornatus, bicingulatus, calliferus, umbilicaris, undatus, Pharaonis, sagittiferus, carneolus, cinerarius, excavatus, nanus, pyramidatus, erythroleucos.

Monodonta. Shell ovate or conical; aperture entire, rounded; margins, disconnected above; columella arcuated, truncated at base. Operculum.

Distinguished from trochus chiefly by the more circular form of the mouth: from turbo by the columella being truncated at base and forming the characteristic tooth-like projection in the aperture.

M. bicolor, pagodus, tectum-persicum, papillosa, coronaria, Ægyptiaca, carchedonius, modulus, tectum, labio, australis, canalifera, viridis, fragaroides, constricta, tricarinata, articulata, lugubris, punctulata, canaliculata, seminigra, rosea, lineata.

Turbo. Shell conoid or subturreted; out-

line never compressed ; aperture entire, rounded, not modified by the penultimate whorl : margins separate above. Columella arcuated, flattened, not truncated at base. Operculum.

The axis of the shell is generally more inclined than that of the trochus.

T. marmoratus, imperialis, torquatus, Sarmaticus, cornutus, argyrostomus, chrysostomus, radiatus, margaritaceus, setosus, Spenglerianus, petholatus, undulatus, pica, versicolor, smaragdus, cidaris, diaphanus, rugosus, coronatus, crenulatus, hippocastaneum, muricatus, littoreus, ustulatus, Nicobaricus, neritoides, retusus, rudis, obtusatus, pullus, cœrulescens, cancellatus, costatus, — irroratus, canaliculatus, palliatus, vestita, obligatus.

Planaxis. Shell ovate, conical, solid ; aperture ovate, sublongitudinal. Columella flat, truncated at base, separated from the outer lip by a narrow sinus. Interior surface of the right magin furrowed or lineated, and a callosity running under the summit.

The planaxis is distinguished from phasianella by the truncation of the columella : it is transversely furrowed externally, and generally small in size.

P. sulcata, undulata.

Phasianella. Shell oval or conic, solid ; aperture ovate, longer than broad, entire ; lips separate above, the right sharp, not reflected. Columella smooth, compressed, attenuated at base. Operculum calcareous or horny.

P. bulimoides, rubens, variegata, elegans, Peruviana, nebulosa, sulcata, Mauritiana, angulifera.

TURRITELLA. Shell turreted, not pearly; aperture rounded, entire; lips disunited above, the right having a sinus. Operculum horny.

Distinguished from turbo by the general form of the shell and by the sinus on the right lip, a constant character. Most of the species are transversely carinated or striated, but none of them have vertical ribs, varices or tubercles.

T. duplicata, terebra, imbricata, replicata, fuscata, cornea, brevialis, bicingulata, trisulcata, exoleta, carinifera, australis, Virginiana, — concava, æqualis, alternata, reticulata, impressa, bisuturalis.

SECT. II. — TRACHELIPODA ZOOPHAGA.

Shell spirivalve, ensheathing: aperture either canaliculate, notched or inclined at the base.

CANALIFERA.

Shell with a canal more or less long at the base of the aperture, the right lip of which does not change its form by age.

DIV. I. — NO CONSTANT VARIX ON THE OUTER LIP.

CERITHIUM. Shell turreted; aperture oblong, oblique, terminated at its base by a short canal, truncated or recurved, never emarginate. A slight channel at the upper extremity of the lip. Operculum, small, orbicular, horny.

The spire of the shell constitutes at least two thirds

of its whole length: the last whorl being but little larger than the preceding one, the shell has the form of an elongated pyramid: surface generally striated or tubercular and sometimes varicose.

C. giganteum, palustre, sulcatum, telescopium, ebeninum, nodulosum, vulgatum, obeliscus, granulatum, aluco, echinatum, erythræonense, muricatum, radula, crassum, decollatum, obtusum, semigranosum, asperum, lineatum, vertagus, fasciatum, subulatum, heteroclites, zonale, semiferrugineum, torulosum, tuberculatum, morus, ocellatum, litteratum, atratum, eburneum, punctatum, lima, perversum, — muscarum, septemstriatum, ferrugineum, dislocatum.

PLEUROTOMA. Shell either turreted or fusiform; terminated inferiorly by a straight canal more or less elongated. Lip at its upper part having a fissure or emargination.

P. imperialis, auriculifera, muricata, echinata, flavidula, interrupta, crenularis, cincta, unizonalis, lineata, spirata, fascialis, bimarginata, buccinoides, cingulifera, virgo, babylonia, undosa, marmorata, tigrina, crispa, albina, nodifera.

TURBINELLA. Shell turbinated or subfusiform, channelled at base. Columella with three to five compressed, transverse plaits.

Distinguished from voluta by the canal at the base of the aperture: from murex by having no varices, and from fasciolaria by the direction of the folds on the columella.

T. scolymus, rapa, napus, pyrum, pugillaris, rhinoceros, cornigera, ceramica, capitellum, mitis, globulus, leucozonalis, rustica, cingulifera, polygona, carinifera, infundibulum, craticulata, lineata, nassatula, triserialis, variolaris, ocellata.

CANCELLARIA. Shell oval or turreted; aperture sub-channelled at base; canal very short or wanting. Columella plaited, the folds few or numerous, for the most part transverse; lip furrowed within.

C. reticulata, asperella, scalarina, scalariformis, nodulosa, cancellata, senticosa, citharella, spirata, obliquata, rugosa, ziervogeliana.

FASCIOLARIA. Shell subfusiform, channelled at base, without varices. Columella having two or three very oblique folds near the canal.

Distinguished from fusus by the folds on the columella, and from turbinella by their oblique direction.

F. tulipa, distans, trapezium, aurantiaca, filamentosa, coronata, ferruginea, Tarentina.

FUSUS. Shell fusiform or subfusiform; channelled at base, ventricose at the middle or inferiorly, without varices. Spire elevated and elongated. Lip entire; columella smooth. Operculum horny.

F. colosseus, longissimus, colus, tuberculatus, Nicobaricus, distans, torulosus, incrassatus, multicarinatus, sulcatus, antiquus, despectus, carinatus, proboscidiferus, Islandicus, morio, coronatus, cochlidium, corona, raphanus, filosus, polygonoides, verruculatus, lignarius, Syracusanus, strigosus, varius, crebricostatus, afer, rubens, sinistralis, Nifat, articulatus, buccinatus, aculeiformis, scalarinus, contrarius, — corneus, cinereus, bicolor, decemcostatus, fluviatilis.

PYRULA. Shell sub-pyriform, channelled at base, ventricose above, without varices; spire

short sometimes flattened. Columella smooth. Lip entire.

The pyrula differs widely from fusus, by its short spire, and by the remarkable inflation of the last whorl, being always at the upper part of the shell.

P. canaliculata, carica, perversus, candelabrum, tuba, bucephala, vespertilio, melongena, reticulata, ficus, ficoides, spirata, spirillus, elongata, ternatana, bezoar, rapa, papyracea, galeodes, angulata, squamosa, nodosa, citrina, abbreviata, neritoidea, deformis, lineata, plicata.

Div. II. — Lip constantly with callus, in all species.

Struthiolaria. Shell oval, spire elevated; aperture oval, sinuated, terminated at base by a very short canal, straight, entire. Pillar lip callous, expanded, outer lip sinuate, thickened without.

The struthiolaria is distinguished from buccinum by having no notch at the base of the canal, and by the varix on the right lip. — It has no other varix.

S. nodulosa, crenulata.

Ranella. Shell ovate or oblong, sub-depressed, channelled at base, with two rows of varices exteriorly; aperture rounded or sub-ovate; varices more or less oblique, at each half of a turn, forming a longitudinal series on each side.

Distinguished from struthiolaria and murex by the position of the varices and somewhat flattened form of the shell.

R. gigantea, leucostoma, candisata, argus, crumena, spinosa, bufonia, granulata, granifera, semigranosa, bitubercularis, ranina, anceps, pygmæa, lævigata, — caudata.

MUREX. Shell ovate or oblong, channelled at base, with rough tubercular or spiny varices without. Aperture rounded; varices three or more on each whorl, the inferior obliquely joined to the others by a longitudinal series. Operculum horny.

The struthiolaria has only one varix, which is on the right lip: the ranella two, at opposite sides of the shell, and the murex three or more on each whorl, forming longitudinal rows on the shell, inclining towards one side near the summit of the spire.

(1.) *Shells with slender, abrupt tails, always longer than the aperture.*

M. cornutus, brandaris, crassispina, tenuispina, rarispina, ternispina, brevispina, haustellum, tenuirostrum, motacilla.

(2.) *Tails thick, not abrupt, more or less long.* — (*a.*) *Three varices.*

M. inflatus, elongatus, palmarosæ, brevifrons, calcitrapa, adustus, rufus, axicornis, cervicornis, aculeatus, microphyllus, capucinus, asperrimus, phyllopterus, acanthopterus, tripterus, trigonularis, uncinarius, hemitripterus, gibbosus, triqueter, trigonulus.

(*b.*) *More than three varices.*

M. brassica, saxatilis, endivia, radix, melanomathos, hexagonus, scorpio, secundus, quadrifrons, turbinatus, trunculus, anguliferus, melonulus, Magellanicus, lamellosus, erinaceus, Tarentinus, scaber, costularis, polygonulus, vitulinus, angularis, crispatus, fenestratus, cingulatus, cinguliferus, subcarinatus, torosus, lyratus, concatenatus, granarius, fimbriatus, pulchellus, aciculatus, tripteroides, tricarinatus.

TRITON. Shell oval or oblong, channelled at base; varices alternate, rare or subsolitary, never forming a longitudinal series. Aperture oblong. Operculum.

Sometimes the triton has only one varix, viz. on the right lip, which is never wanting. The varices are generally smooth, never spinous.

T. variegatum, nodiferum, australe, lampas, scrobiculator, Spengleri, corrugatum, succinctum, pileare, lotorium, femorale, pyrum, cynocephalum, tripus, canaliferum, retusum, clavator, tuberosum, vespaceum, chlorostomum, anus, clathratum, subdistortum, cancellatum, maculosum, clandestinum, rubecola, cutaceum, dolarium, tranquebaricum, undosum.

ALATA.

Shell with a more or less elongated canal at the base of the aperture, the right lip of which changes its form with age, and has a sinus at the lower part.

ROSTELLARIA. Shell fusiform or subturreted, terminated inferiorly in a canal, with a pointed beak. Lip entire or dentated, more or less dilated by age, with a sinus contiguous to the canal.

The right lip of these shells rests, at the upper part, against the elongated spire, and sometimes runs along it: the sinus at the lower part of the same lip is quite contiguous to the canal, which is not the case either with pterocera or strombus.

R. curvirostris, recticornis, pes pelicani, macroptera, columbata, fissurella.

PTEROCERA. Shell ovate oblong, ventricose, terminated inferiorly by an elongated canal. Lip dilating by age into a digitate wing, and having a sinus towards the base. Spire short.

The canal at the base is not shortened and truncated as in the strombi, but elongated and caudiform, attenuated towards the extremity and frequently closed. The sinus is not contiguous to the body of the shell as in rostellaria. The strombi differ only in wanting the digitations of the dilated wing and by their short canal.

P. truncata, lambis, millepeda, pseudo scorpio, scorpio, aurantia, chiragra.

STROMBUS. Shell ventricose, terminating in a short emarginate or truncate canal. Lip dilating by age into a simple wing, lobed or crenate superiorly, and having a sinus distinct from the canal or emargination of the base, inferiorly.

Distinguished from pterocera by the digitations of the right lip and by the canal being short, truncated or notched: from rostellaria by the sinus being separated from the canal by a portion of the lip.

S. gigas, accipitrinus, latissimus, tricornis, gallus, bituberculatus, cristatus, dilatatus, bubonius, lentiginosus, auris Dianæ, pugilis, pyrulatus, gibberulus, luhuanus, Mauritianus, canarium, Isabella, vittatus, epidromis, columba, succinctus, troglodytes, tridentatus, urceus, plicatus, floridus, papilio, lineatus, marginatus, turritus, cancellatus, canalis.

PURPURIFERA.

Shell with a short canal ascending posteriorly, or an oblique notch or demi-canal at the base of the aperture, directed towards the back.

Div. I. — Canal ascending or curved towards the back.

Cassidaria. Shell obovate, or ovate oblong. Aperture longitudinal, narrow, terminating at base, in a curved, subascending canal. Lip varicose or reflected; pillar lip covering the columella, often rough, granular, tuberculous or wrinkled.

Distinguished from cassis by being, in general, less inflated, but chiefly by its short canal, not being abruptly turned towards the back of the shell and being but slightly curved or ascending. The spire is short, without continuous varices: the columella is generally loaded with small, oblong, wrinkled tubercles lying in a transverse direction.

(*a.*) *Spire having varices.*

C. echinophora, thyrrena, cingulata, striata, oniscus, cancellata, carinata, flammea, fasciata, glauca, crumena, plicaria, areola, zebra, decussata, abbreviata.

(*b.*) *Spire without varices.*

C. rufa, pennata, testiculus, achatina, pyrum, zeylanica, sulcosa, granulosa, saburon, canaliculata, semigranosa, vibex, erinaceus, harpæformis.

Cassis. Shell inflated. Aperture longitudinal, narrow, terminated at base by a short canal, turning abrupt backwards. Columella

plaited or transversely wrinkled. Lip usually dentated.

Distinguished from buccinum by the longitudinal direction and narrow form of its aperture, by the right lip being toothed, by the flattening of the pillar lip, which generally projects considerably to the left side, and by the abrupt reflection of the base of the canal towards the back of the shell. The spire is but little elevated and often interrupted by oblique, keel-shaped varices.

C. tuberosa, Madagascarensis, cornuta.

DIV. II. — AN OBLIQUE NOTCH INCLINING BACKWARDS.

RICINULA. Shell ovate, generally tuberculous or spinous without. Aperture oblong, presenting inferiorly a semicanal, turning backwards, terminated by an oblique notch; unequally toothed on the columella and internal surface of the lip, generally contracting the aperture.

The ricinulæ are generally small shells: the spire often low and covered with tubercles or spinous points like the fruit of the ricinus. The aperture is generally tinged with purple or violet.

R. horrida, miticula, clathrata, arachnoides, digitata, aspera, morus, mutica, pisolina.

PURPURA. Shell oval, sometimes smooth, sometimes tuberculous or angular. Aperture dilated, terminating inferiorly in an oblique,

sub-channelled emargination. Columella flattened, terminating at base in a point.

The purpura is distinguished by the dilated aperture, and the flattened and generally naked columella, terminating in a point at the base, whose notch turns a little upwards posteriorly.

P. Persica, Rudolphi, patula, columellaris, succincta, consul, armigera, bitubercularis, hippocastanum, undata, hæmastoma, mancinella, bufo, callosa, neritoides, planospira, callifera, coronata, carinifera, scalariformis, sacellum, squamosa, rugosa, textilosa, sertum, Francolinus, limbosa, ligata, cruenta, lapillus, imbricata, lagenaria, cataracta, bicostalis, plicata, fiscella, thiarella, rustica, semi-imbricata, echinulata, hystrix, deltoidea, unifascialis, retusa, trochlea, clavus, fasciolaris vexillum, bizonalis, nucleus.

Monoceros. Shell oval. Aperture longitudinal, terminating inferiorly by an oblique sinus; a conic tooth at the base of the lip internally.

The only distinguishing character between the monoceros and purpura, is the projecting, horn shaped conical tooth, on the right lip, which is constant in all species.

M. imbricatum, striatum, glabratum, crassilabrum.

Concholepas. Shell ovate, inflated, semi-spiral; summit inclined obliquely to the left margin. Aperture ample, longitudinal, oblique, with a slight emargination below. Two teeth at the base of the lip. Operculum oblong, thin, horny.

This shell was formerly placed with the patellæ; but on account of the notch at the lower part of the aperture, and from its having an operculum, it differs materially.

C. Peruvianus.

HARPA. Shell oval, more or less inflated, having parallel, longitudinal, inclined, compressed and acute ribs. Aperture emarginated inferiorly; without a canal. Spire short. Columella smooth, flattened, and pointed at base.

H. imperialis, ventricosa, conoidalis, nobilis, articularis, rosea, minor, striata, mutica.

DOLIUM. Shell thin, ventricose, inflated, generally subglobular, rarely oblong, transversely banded. Lip dentate or crenulate throughout. Aperture oblong, emarginate inferiorly.

The dolium is distinguished from the harpa, terebra, eburna, &c. by having no longitudinal ribs, by their inflated, ventricose, subglobular form, the spire being much shorter than the lower whorl, whence the aperture is very large, and occupies more than two thirds the length of the shell. They are thin, and attain a large size. They are all encircled by transverse bands, which render the margin of the lip crenate throughout.

D. galea, olearium, maculatum, fasciatum, pomum, variegatum, perdix.

BUCCINUM. Shell ovate or ovate-conic. Aperture longitudinal, having at base a notch,

without a canal. Columella not flattened, turgid above, undate curved.

The buccina are marine shore shells, the greater part very small, though some obtain a medium size. Those which have a callous columella were separated into a distinct genus called nassa, which has since been reunited to buccinum.

B. undatum, glaciale, Anglicanum, papyraceum, annulatum, lævissimum, testudineum, achatinum, glans, papillosum, olivaceum, canaliculatum, crenulatum, reticulatum, Tranquebaricum, lineatum, fuscatum, lineolatum, maculosum, politum, suturale, mutabile, inflatum, retusum, ventricosum, gemmulatum, Coromandelianum, fasciatum, miga, lyratum, tricarinatum, Brasilianum, semiconvexum, fasciolatum, vinosum, tenuiplicatum, subspinosum, Ascanias, lævigatum, flexuosum, aciculatum, corniculatum, cribrarium, grana, coccinella, zebra, dermestoideum, aurantium, pediculare, — ornatum, armigerum, bezoar.

Columella callous, (Nassa.) B. arcularia, coronatum, Thersites, gibbulosum, pullus, marginulatum, pauperatum, polygonatum, neriteum, — vibex, trivittata, obsoleta, acuta, unicincta, alba, lunata.

Eburna. Shell oval or elongated; lip perfectly simple. Aperture longitudinal, emarginate at base. Columella umbilicated at its upper part and channelled below the umbilicus.

Distinguished from buccinum by the singular position of the umbilicus, of the columella, which is also produced so as to form a canal, which occupies the rest of the left lip.

E. glabrata, zeylanica, spirata, areolata, lutosa.

Terebra. Shell elongated, turreted, very

acute at summit. Aperture longitudinal, much shorter than the spire, emarginate posteriorly at base. Base of the columella twisted or oblique.

The very short columella of this shell presents a peculiar character; in its general form it much resembles the turritella, but is distinguished by its aperture, and by the notch at the posterior part of the base; from eburna by not having the channelled umbilicus, and from buccinum by the small proportion which the length of the aperture bears to the spire.

T. maculata, flammea, crenulata, dimidiata, muscaria, subulata, oculata, duplicata, Babylonia, corrugata, Senegalensis, cœrulescens, striatula, chlorata, cerithina, raphanula, cingulifera, myuros, scabrella, strigilata, lanceata, aciculina, granulosa, vittata.

COLUMELLARIA.

No canal at the base of the aperture, but a more or less distinct subdorsal notch, and plaits on the columella.

Columbella. Shell oval, spire short. Base of aperture more or less emarginate; no canal. Columella plaited. Outer lip dilated internally, narrowing the aperture.

The shells of this genus are short, small, and of considerable thickness, often striated transversely and of various colors. They are distinguished from voluta by the swelling on the inside of the outer lip and by having an operculum.

C. strombiformis, rustica, mercatoria, flavida, semipunctata, bizonalis, reticulata, hebræa, pardalina, scripta, ovulata,

nitida, fulgurans, mendicaria, turturina, punctata, unifascialis, zonalis, — labiosa, avara.

MITRA. Shell turreted or subfusiform; spire pointed at summit; base emarginated, without a canal. Columella with parallel, transverse plaits, the inferior of which are the smallest. Pillar lip thin, adnate.

Distinguished from the voluta, by the summit of the spire being quite pointed, and not terminated by a mammella, and by the columellar plaits gradually lessening towards the base. The columellar lip is sometimes visible only near the base of the columella.

M. episcopalis, papalis, pontificalis, puncticulata, millepora, cardinalis, archiepiscopalis, versicolor, sanguinolenta, ferruginea, terebralis, adusta, granulosa, crocata, casta, nexilis, olivaria, scabriuscula, granatina, crenifera, serpentina, tœniata, plicaria, corrugata, costellaris, lyrata, melongena, cinctella, vulpecula, caffra, sanguisuga, stigmataria, filosa, fissurata, lactea, cornicularis, lutescens, striatula, subulata, cornea, tringa, melaniana, scutulata, dactylus, fenestrata, crenulata, texturata, conulus, limbifera, aurantiaca, amphorella, coronata, paupercula, cucumerina, patriarchalis, muriculata, torulosa, ebenus, harpæformis, semifasciata, retusa, microzonias, ficulina, nucleola, unifascialis, bacillum, conularis, arenosa, clavulus, litterata, Peronii, obliquata, plumbea, larva, pisolina, dermestina, granulifera, oniscina, tabanula, pediculus.

VOLUTA. Shell oval, more or less ventricose, summit obtuse or mammillary, emarginate at base and without a canal. Columella plaited, the inferior folds largest and most oblique. No pillar lip.

The volutæ are distinguished from the mitræ by the lower plaits on the columella being larger than the upper, and by the obtuse and mammellated termination of the spire.

(*a.*) *Shell ventricose, inflated.* (*Cymbiola.*)

V. nautica, diadema, armata, ducalis, tessellata, Æthiopica, melo, Neptuni, cymbium, olla, proboscidalis, porcina, scapha, Brasiliana.

(*b.*) *Shell oval, spiny or tuberculous.* (*Muricina.*)

V. imperialis, pellis serpentis, vespertilio, mitis, nivosa, serpentina.

(*c.*) *Shell oval, subtuberculous.* (*Musicales.*)

V. hebræa, musica, chlorosina, thiarella, carneola, Guiniaca, lævigata, polyzonalis, fulva, sulcata, nodulosa.

(*d.*) *Shell elongate, ventricose, almost fusiform.* (*Fusoidea.*)

V. magnifica, ancilla, Magellanica, Pacifica, fulminata, Junonia, undulata, Lapponica, vexillum, valvacea, festiva, mitræformis, nucleus.

MARGINELLA. Shell ovate oblong, smooth, spire short; outer lip with a thickened margin. Aperture subemarginate at base. Columella plaited; folds subequal.

The marginellæ are smooth, polished shells, and remarkable for the varix on the right lip. They are distinguished from voluta by the equal folds on the columella, by the aperture which occupies almost the whole length of the shell, by the callus on the right lip, and by the scarcely perceptible notch at the base of the aperture.

(*a.*) *Spire prominent.*

M. glabella, radiata, nubeculata, cœrulescens, quinqueplicata, limbata, rosea, bifasciata, faba, aurantia, bivaricosa,

longivaricosa, muscaria, fornicula, eburnea, dentifera, ovulata.

(b.) Spire not prominent.

M. dactylus, bullata, cornea, avellana, persicula, lineata, tessellata, interrupta.

VALVARIA. Shell cylindrical, convolute; spire scarcely exserted. Aperture narrow, as long as the shell. Columella with one or more folds at its inferior part.

Distinguished from marginella by having in general, no varix on the outer lip, which is thin and sharp, though sometimes slight traces of a varix are perceptible. They are generally small shells.

V. monilis, pallida, triticea, oryza, miliacea, bulloides, canaliculata.

CONVOLUTA.

Shell without a canal, but emarginate or effuse at base; whorls large, compressed, turned in such a manner that the last almost entirely envelopes the others.

OVULA. Shell inflated, attenuated or subacuminated at the two extremities; margins turned inwards. Aperture longitudinal, narrow, effuse at extremities. Pillar lip, not toothed.

The ovulæ are closely allied to the cypræa in form; are sometimes rostrated at both ends, nearly smooth, and have no spire. They are distinguished from them by the left lip never having any indentations, and from bullæ by the turning inwards of the right lip.

(a.) Outer lip dentate, with folds.

O. oviformis, angulosa, verrucosa, lactea, carnea, triticea, hordacea.

(b.) Outer lip smooth.

O. gibbosa, acicularis, spelta, birostris, volva.

CYPRÆA. Shell oval or oval-oblong, convex, margins turned inwards. Aperture longitudinal, narrow, both lips toothed, effuse at both extremities. Spire very small, scarcely apparent.

The shell assumes a very different appearance at different periods of growth. When young the aperture is dilated especially at the lower part, is entirely without indentations, and the right lip is short. In the middle stage of growth it acquires the general form of the adult shell, but it has only its first layer of testaceous matter, and the spire, though very small, is not entirely covered, and its colors are still wanting. Without attention to the varying form of the shell according to age, we shall be liable to make three distinct species of the same individuals. Sometimes the spire presents a little pit, like an umbilicus; sometimes both the margins are dilated, sometimes only one and sometimes neither are prominent or inflated.

C. cervina, exanthema, argus, testudinaria, Mauritiana, mappa, Arabica, histrio, scurra, rattus, stercoraria, mus, ventriculus, aurora, tigris, tigrina, talpa, carneola, lurida, vitellus, caput-serpentis, cinerea, zonata, sordida, icterina, miliaris, variolaria, rufa, lynx, adusta, erosa, caurica, isabella, ocellata, cribraria, turdus, olivacea, stolida, hirundo, undata, zigzag, flaveola, sanguinolenta, poraria, ursellus, asellus, moniliaris, stercus-muscarum, cicercula, lota, globulus, ovulata, helvola, arabicula, staphylea, pustulata, nucleus, limacina, moneta, obvelata, annulus, radians, oniscus, pediculus, oryzæ, coccinella, australis, albella.

TEREBELLUM. Shell convolute, subcylindrical, summit acute; aperture longitudinal, narrow above, emarginate at base. Columella smooth, truncated inferiorly.

The terebellum has no epidermis; it is thin, smooth and when we look at its back, appears to be irregularly notched at the base. It most resembles the ancillaria, oliva and conus, and has a slight likeness to the young cypræa.

T. subulatum, convolutum, fusiforme.

ANCILLARIA. Shell oblong, subcylindrical; spire short, not channelled at sutures. Aperture longitudinal, scarcely emarginated at base, effuse, a callous, oblique varix at base of columella.

The ancillaria greatly resembles the oliva, but the upper edges of the whorls of the spire rest, each of them, against the preceding whorl and are not separated by a spiral canal, as in oliva. The callous, oblique varix distinguishes this genus from terebellum and buccinum. The aperture is longitudinal, but never extends the whole length of the shell.

N. cinnamonea, ventricosa, marginata, candida.

OLIVA. Shell subcylindrical, convolute, smooth; spire short, sutures channelled. Aperture longitudinal, emarginate at base. Columella obliquely striate.

O. porphyria, textilina, erythrostoma, pica, tremulina, angulata, maura, sepulturalis, fulminans, irisans, elegans, episcopalis, venulata, guttata, leucophæa, reticularis, flam-

mulata, granitella, araneosa, litterata, scripta, tricolor, sanguinolenta, mustelina, lugubris, funebralis, glandiformis, Peruviana, Senegalensis, fusiformis, undata, inflata, bicincta, harpularia, hepatica, ustulata, avellana, tessellata, carneola, ispidula, oriola, candida, volutella, tigrina, Brasiliana, utriculus, auricularia, acuminata, subulata, luteola, testacea, hiatula, obtusaria, Zeilanica, nebulosa, fabagina, conoidalis, undatella, eburnea, nana, zonalis, oryza, — mutica.

CONUS. Shell turbinate or inversely conic, convolute. Aperture longitudinal, narrow, not toothed, effuse at base.

The olivæ are distinguished from the cylindrical cones, by the channel which separates the whorls of the spire and by the striæ on the columella; from voluta and mitra by the spiral whorls of those shells being separated by simple unchannelled sutures. It has also a prominent callus at the upper end of the columellar lip, which assists in forming the channel of the spire.

(1.) *Shell crowned.*

C. marmoreus, bandanus, nocturnus, Nicobaricus, araneosus, zonatus, imperialis, fuscatus, viridulus, regius, cedonulli, aurantius, nebulosus, minimus, sulcatus, hebræus, vermiculatus, arenatus, pulicarius, fastigatus, obesus, varius, tulipa, geographus, punctatus, tæniatus, musicus, miliaris, mus, lividus, Barbadensis, roseus, cardinalis, Magellanicus, distans, pontificalis, Caledonicus, sponsalis, puncturatus, Ceylanicus, lamellosus, pusillus, exiguus, asper.

(2.) *Shell not crowned.*

C. millepunctatus, litteratus, eburneus, tessellatus, generalis, Maldivus, Malacanus, lineatus, monile, centurio, vitulinus, vulpinus, flavidus, virgo, daucus, pastinaca, capitaneus, classiarius, vittatus, mustelinus, vexillum, Sumatrensis,

hyæna, miles, ammiralis, genuanus, papilionaceus, Siamensis, prometheus, glaucus, Suratensis, monachus, ranunculus, anemone, achatinus, cinereus, stramineus, zebra, lacteus, cingulatus, vicarius, mercator, ochraceus, betulinus, figulinus, quercinus, proteus, leoninus, augur, pertusus, nivosus, fulgurans, acuminatus, amadis, Janus, flammeus, lithoglyphus, testudinarius, venulatus, quæstoi, muscosus, narcissus, Mozambicus, Guinaicus, Franciscanus, informis, rattus, Jamaicensis, mediterraneus, puncticulatus, Mauritianus, fumigatus, eques, Luzonicus, catus, verrucosus, acutangulus, mindanus, Japonicus, pusio, columba, Madurensis, nemocanus, cancellatus, fusiformis, cœrulescens, aurora, Taitensis, Adansonii, Tinianus, Portoricanus, crocatus, amabilis, Omaicus, nobilis, aurisiacus, terminus, striatus, gubernator, granulatus, terebra, verulosus, raphanus, magus, spectrum, bullatus, cervus, stercus-muscarum, Timorensis, nimbosus, dux, tendineus, præfectus, melancholicus, strigatus, glans, mitratus, nussatella, aulicus, auratus, colubrinus, clavus, auricomus, omaria, rubiginosus, pennaceus, prælatus, panniculus, archiepiscopus, canonicus, episcopus, abbas, legatus, textile, pyramidalis, gloria maris, australis.

Order IV. — CEPHALOPODA.

The shells of those cephalopoda which are furnished with them, afford but little instruction from their form, as to that of the animals which produced them. To distinguish these shells we can only compare them with one another, and we are as yet ignorant whether the divisions we may thus establish will coincide with the principal divisions we should form of the mollusca themselves, if we had the opportunity of being better acquainted with them.

Sect. I.—POLYTHALAMOUS CEPHALAPODA.

Shell multilocular, wholly or partly developed, inserted in the posterior part of the body of the animal, often adhering.

ORTHOCERATA.

Shell straight or nearly so; no spiral.

Most of the shells of this family are unknown except in the fossil state.

Belemnites. Shell straight, elongated-conical, formed of two distinct and separable parts; viz. *external*, a solid sheath, filled at the upper part, with a conical cavity; *internal*, a conical nucleus, pointed, chambered transversely through its whole length, multilocular; chambers slightly concave on one side, and convex on the other, and perforated by a central siphon.

The belemnites, which are only found fossil and generally empty, or without the nucleus, are merely the sheath of an elongated-conical mass, not adhering, chambered, and furnished with a siphon like the orthocera and hippurites.

Orthocera. Shell elongate, straight or slightly arcuated, subconic, striated externally by numerous longitudinal ribs. Chambers formed by transverse partitions perforated by a tube, either central or marginal.

O. raphanus, fascia, raphanistrum, obliqua, acicula, legumen.

Nodosaria. Shell elongate, straight, or

slightly arcuated, subconic, with smooth nodes. Chambers formed by transverse partitions, perforated either at the centre or near the margin.

N. radicula, dentalina, siphunculus.

Hippurites. Shell tubular, cylindrico-conical, straight or slightly curved, thick, multilocular; septa transverse. An internal, lateral canal, formed by two longitudinal, obtuse, converging edges. The last chamber closed by a thick, solid operculum; edges of the operculum bevelled, and accurately adjusted to the orifice of the chamber. Fossil.

Conolites. Shell conical, straight, slightly bent; sheath thin, distinct from the contained nucleus. Nucleus sub-separable, multilocular, divided by transverse septa.

The conolites appears to differ from the belemnites, principally in not having the upper portion of the sheath, or external shell, elongated and solid, (in consequence of the termination of the cavity for the nucleus before it reaches the summit) as in those shells.

LITUOLATA.

Shell partly spiral; the last whorl straight.

Spirula. Shell cylindrical, thin, nearly transparent, multilocular; partially turned into a discoid spiral; whorls distant; the last produced into a right line. Partitions transverse,

equidistant, concave without, with a lateral, interrupted siphon. Aperture orbicular.

S. Peronii, — (Nautilus spirula, Lin.)

SPIROLINITES. Shell multilocular, partly twisted into a discoidal spiral; whorls contiguous, the last terminating in a straight line. Septa transverse, perforated by a tube.

Distinguished from spirula by the contiguity of the whorls. Only known in the fossil state; very small shells.

LITUOLITES. Shell multilocular, partly twisted into a discoidal spiral; whorls contiguous, the last terminating in a straight line. Chambers irregular, septa transverse, simple, (no siphon); the last septum pierced with from three to six holes.

Small fossil shells; the septa which form the chambers are at unequal distances, and inclined to one another; some species have scarcely one complete turn of the spiral.

CRISTATA.

Shell semi-discoidal; spire eccentric.

RENULITES. Shell kidney-shaped, flattened, furrowed, multilocular; chambers linear; contiguous, curved round a marginal axis; those farthest from the axis the longest. One fossil species.

CRISTELLARIA. Shell semidiscoid, multilo-

cular; whorls contiguous, simple, progressively enlarging. Spire eccentric, sublateral, septa imperforate.

C. squammula, papillosa, lævis, auricularis, faba, scapha, crepidula, auricula, tuberosa.

Orbiculina. Shell subdiscoidal, multilocular; whorls contiguous and compound; spire eccentric. Chambers short, very numerous; septa imperforate.

O. numismalis, angulata, uncinata.

SPHÆRULATA.

Shell globular, spheroidal, or oval; whorls of the spire enveloping, or the chambers united under one covering.

Milliolites. Shell transverse, oval-globular or elongated, multilocular. Chambers transverse, surrounding the axis, and successively covering one another; aperture very small, situated at the base of the last whorl, orbicular, or oblong.

Lamarck states that he possesses specimens in a recent state, which are found on fuci, near the Island of Corsica; but all the species he describes are fossil. The size of these tiny shells scarcely exceeds that of grains of millet, whence their name; some are globular, inclining to oval, others oblong, or somewhat triangular.

Melonites. Shell subspherical, multilocular; spire central; whorls contiguous, en-

veloping. Chambers narrow, elongated and numerous; septa imperforate.

RADIOLATA.

Shell discoidal, spire central; chambers elongated, radiating from the centre to the circumference.

From the character of the shells of this family, it follows that their spire can have but one turn, and is consequently false or imperfect.

ROTALITES. Shell orbicular, spiral, convex or conoidal at the upper part; flattened, radiating, and tubercular at the lower; multilocular. Radii wavy; aperture marginal, triangular, inclined towards the base.

The rotalites are very small shells, widest at the base, with the whorls contiguous and distinct.

LENTICULITES. Shell sub-lenticular, spiral, multilocular; exterior margin of the whorls triplicate, extending over the interior whorls, both above and below, to the centre of the shell. Septa entire, curved, produced on both sides like radii. Aperture narrow, projecting over the penultimate whorl.

The lenticulites are distinguished from the rotalites and discorbites, by the lateral prolongation of the chambers and septa, and from the nautilus by not having the siphon. They are similar to nummulites, but differ by the prolongation of the chambers and by the projection of the aperture over the penultimate whorl. They are chiefly fossil, but Lamarck tells us

that he possesses some species which are found in the sea near Teneriffe, at the depth of 125 feet.

PLACENTULA. Shell orbicular, convex above and below, multilocular. Aperture oblong, narrow, disposed as a ray in the inferior disc, or on both discs.

P. pulvinata, asterisans.

NAUTILACEA.

Shell discoidal, spire central, chambers short, not extending from the centre to the circumference.

The nautilacea differ from the radiolata, in having the spire composed of several whorls, wherefore the chambers cannot extend from the centre to the circumference; their spire is also complete, which that of the radiolata never is.

DISCORBITES. Shell discoidal, spiral, multilocular; sides simple. All the whorls visible, naked, contiguous to one another. Septa transverse, frequent, imperforate.

The discorbites differs from the nautilus, by having all the whorls of the spire visible and no siphon; from rotalites, by the aperture not inclining downward towards the base, and the spire not rising into a cone.

SIDEROLITES. Shell multilocular, discoidal; whorls contiguous, not visible externally; disc convex on both sides, and loaded with tubercular points; circumference bordered with unequal, radiating lobes. Septa transverse, imperforate. Aperture distinct, sublateral.

POLYSTOMELLA. Shell discoidal, multilocular; whorls contiguous, not apparent externally, radiated exteriorly by striæ or costæ running in the direction of the whorls. Aperture of many holes variously disposed.

These characters are common also to the lenticulites, but the aperture of the latter is simple, whilst that of the polystomella is composed of several holes, differently disposed in different species.

P. crispa, costata, planulata, ambigua.

VORTICIALIS. Shell discoidal, spiral, multilocular; whorls contiguous, not apparent externally; septa transverse, imperforate, not extending from the centre to the periphery. Aperture marginal.

The vorticialis differs from nummulites chiefly by having a distinct aperture, and from discorbites, by the spiral whorls not being visible externally. Their axis is central and confounded with the summit of the spire.

V. craticulata, strigilata, marginata.

NUMMULITES. Shell lenticular, attenuated towards the edges; spire internal, discoidal, multilocular, covered with several thin plates; exterior side of the whorls triplicate, extending from both sides to the centre of the shell and uniting. Chambers very numerous, small, alternate; septa imperforate, transverse.

NAUTILUS. Shell discoidal, spiral, multilocular; parietes simple; whorls contiguous, the last enveloping the others. Chambers numerous. Septa transverse, concave without; disc perforated by a tube; margins quite simple.

N. pompilius, umbilicatus.

AMMONEATA.

Septa sinuous, lobed and indented at the circumference, united at the inner surface of the shell and articulating with it by means of indented sutures.

AMMONITES. Shell discoidal, spiral, whorls contiguous, and all of them visible; the interior parietes articulated by sinuous sutures. Septa transverse, lobed and indented at the circumference; their discs without any siphon, but perforated by a sort of marginal tube.

The ammonites differ essentially from the nautili by the sinuous sutures of the internal parietes and by the similarly sinuous form of the septa; from the orbulites, by all the whorls being distinctly visible. They are only found in a fossil state.

ORBULITES. Shell sub-discoidal, spiral, whorls contiguous, the last enveloping the rest; internal parietes articulated by sinuous sutures. Septa transverse, lobed at the circumference, and perforated by a marginal tube.

AMMONOCERATITES. Shell horn shaped,

nearly semicircular ; parietes articulated by sinuous, branch-like, indented sutures. Septa transverse, sinuous, lobed and indented at the circumference. Tube or siphon marginal, not perforating the septa.

TURRILITES. Shell spiral, turreted, multilocular, whorls contiguous, all visible ; parietes articulated by sinuous sutures. Septa transverse, lobed and indented at the circumference. Aperture rounded.

The turrilites, instead of being discoidal, or simply arched, are elongated, straight, and form a very elevated spiral, which it seems, must terminate in a point like the turritella.

BACULITES. Shell straight, cylindrical, sometimes slightly compressed, rather conical; parietes articulated by sinuous sutures. Septa transverse, near together; disc of the septa imperforate, lobed and indented at the circumference.

The chambers of these shells are transverse and narrower than those of the turrilites.

SECT. II.—MONOTHALAMOUS CEPHALOPODA.

Shell unilocular, wholly external and enveloping the animal.

ARGONAUTA. Shell univalve, unilocular, involute, very thin ; spire bicarinate, tuberculous, re-entering the aperture.

A. argo, tuberculosa, nitida.

Sect. III.—NAKED CEPHALOPODA.

The animals of this section have no shell either internal or external, but the greater number of them contain a solid, free, cretaceous or horny substance in the interior of their body.

SEPIARIA.

The sepiaria are marine animals, none of them have any true shell; they always live in the sea, some crawling at the bottom, as the octopus; others, as the sepia and loligo, swimming freely in the water, by means of membranes or fins with which their sac is furnished. This family contains four genera,

Octopus, Loligopsis, Loligo, Sepia.

Order V.—HETEROPODA.

The body is gelatinous and transparent and the shell of some of them resembles that of the argonauta.

Carinaria. Shell univalve, conical, compressed at the sides, unilocular, very thin, hyaline; apex spiral; back sometimes with a dentated carina. Aperture oblong, entire.

C. vitrea, fragilis, cymbium.

Pterotrachea and Phyllirõe, have no shell.

GLOSSARY.

Abbreviated, shortened
Abrupt, terminating suddenly
Accessory (valves), small additional ones
Acute, sharp pointed, or edged
Adherent, fixed to rocks and other solid bodies
Adnate, growing firmly together
Alveolate, having large cells
Annulate, marked with rings
Area, or Anterior Slope, that on which the ligament is placed
Areola, or Posterior Slope, the side of the beaks opposite to the ligament
Apex, or Vertex, the point at which the shell commences
Apophysis, an excrescence, a projection
Approximate, approaching near each other
Arcuated, simply curved like an arch
Arenaceous, of a sandy consistence
Attenuated, tapering to a point
Auricular, or Auriculated, with ear-like appendages
Base, the extremity opposite the apex
Beaks, the summit of bivalves
Bifid and Bipartite, divided at the tip
Body, the last and largest whorl of a univalve
Byssus, filaments by which the animal adheres to foreign bodies
Calcareous, of the nature of lime
Callus, or Callosity, an elevation of the enamel above the surface, about the aperture
Cardinal (teeth) under the apex or beaks
Carinate, like the keel of a vessel
Caudate, or Caudiform, a tail like process
Cicatrix, impressions where the muscle is fixed
Clavate, club shaped
Columella, the pillar or axis
Connate, parts soldered together
Contorted, twisted
Connivent, converging or approaching
Convoluted, rolled upon itself
Cordate, or Cordiform, heart shaped
Corselet, the depression anterior to the beaks
Coriaceous, of leather-like consistence
Corneous, resembling horn
Crenate, or Crenulate, scolloped at the margin
Cretaceous, chalky
Crustaceous, like the shell of a lobster
Cuneiform, wedge shaped
Decorticated, with the outer skin removed
Decussated, crossing at right angles
Deltoid, like a triangle
Dentated, toothed
Denuded, destitute of covering
Diaphanous, transparent
Diaphragm, an interior transverse division
Diffuse, spreading
Digitate, like fingers
Discoidal, like a wheel or pulley
Disc, convex part of bivalves between the umbones and margin
Divaricate, or Divergent, spreading like a fan
Dorsal, on the back
Echinated, set with spines
Effuse, the lips separated by a gutter

Emarginate, notched
Epidermis, the membranous covering of a shell
Equilateral, the sides equal
Equivalve, the valves equal and similar
Escutcheon, vide Córselet
Eroded, appearing as if gnawed
Exserted, protruded

Facet, the flat summit of the inferior valve
Falciform, sickle shaped
Fixed, attached — vide Adherent
Flexuous, alternately bent and nearly straight
Fluviatile, inhabiting rivers or fresh water
Foramen, a hole or opening
Foliaceous, resembling leaves
Fossa, a cavity to receive a tooth
Fusiform, spindle shaped

Gibbous, bulging out
Geminate, in pairs

Hyaline, transparent like glass

Imbricate, one over another, like tiles
In, (in composition) has a negative power
Involute, rolled inwards

Labium, the columellar lip
Labrum, the outer lip
Lamella, or Lamina, a thin layer or scale
Lenticular, like a lens
Ligament, the substance which connects the valves
Limbus, circumference of the valves
Linear, with parallel sides
Lunated, crescent shaped
Lunule, or Anus, the depression behind the beaks

Mammilla, a nipple-like protuberance
Multilocular, with many cells or chambers
Multivalve, with more than two valves

Nacre, like pearl
Nates, vide Umbo
Nucleus, the layer of the shell, first formed
Nymphæ, or Labia, the ridges to which the ligament is attached

Obsolete, indistinct, worn away by age
Operculum, the lid which closes the aperture
Osseous, like bone

Parietes, the walls or sides
Patulous, spreading open, gaping
Papyraceous, like paper
Pectinated, like the teeth of a comb
Pedicle, or Pedunele, the fleshy support of the Lepas
Penultimate, the last but one
Posterior slope, vide Areola
Pyriform, pear shaped

Quadrate, somewhat square

Ringent, gaping
Rostrum, the elongated canal of univalves

Securiform, hatchet shaped
Septum, a partition
Sessile, fixed, without a pedicle
Sinus, an excavation or gutter
Sinuate, indented, irregular margin
Siphon, a tube passing through the chambers of Nautilus, &c.
Squamose, scaly
Striæ, thread-like lines
Sub, (in composition) means approaching to, nearly
Subulate, awl shaped
Sulcus, a groove or furrow
Summit, the tip or apex
Suture, the lines between the whorls

Testaceous, of the materials which form shells
Tortuous, twisted, winding
Tridentate, three toothed
Truncated, cut off square
Tubercle, a small eminence
Turbinated, shaped like a top nearly conic

Umbilicus, perforation in the centre of a univalve, visible underneath
Umbo, the most prominent part near the beak
Univalve, with one valve

Varices, prominences, at the stages of growth
Ventricose, swelling in the middle
Vertex, the tip of the spire or umbo
Whorl, a revolution of the spire

Errata.—Page 68, 4 lines from top, for spine read spire.
" 94, for Valvaria read Volvaria.