

**Rudiments of conchology : intended as a familiar introduction to the science, with explanatory plates, and references to the collection of shells in the British Museum / by the author of "The geographical present," &c.;**

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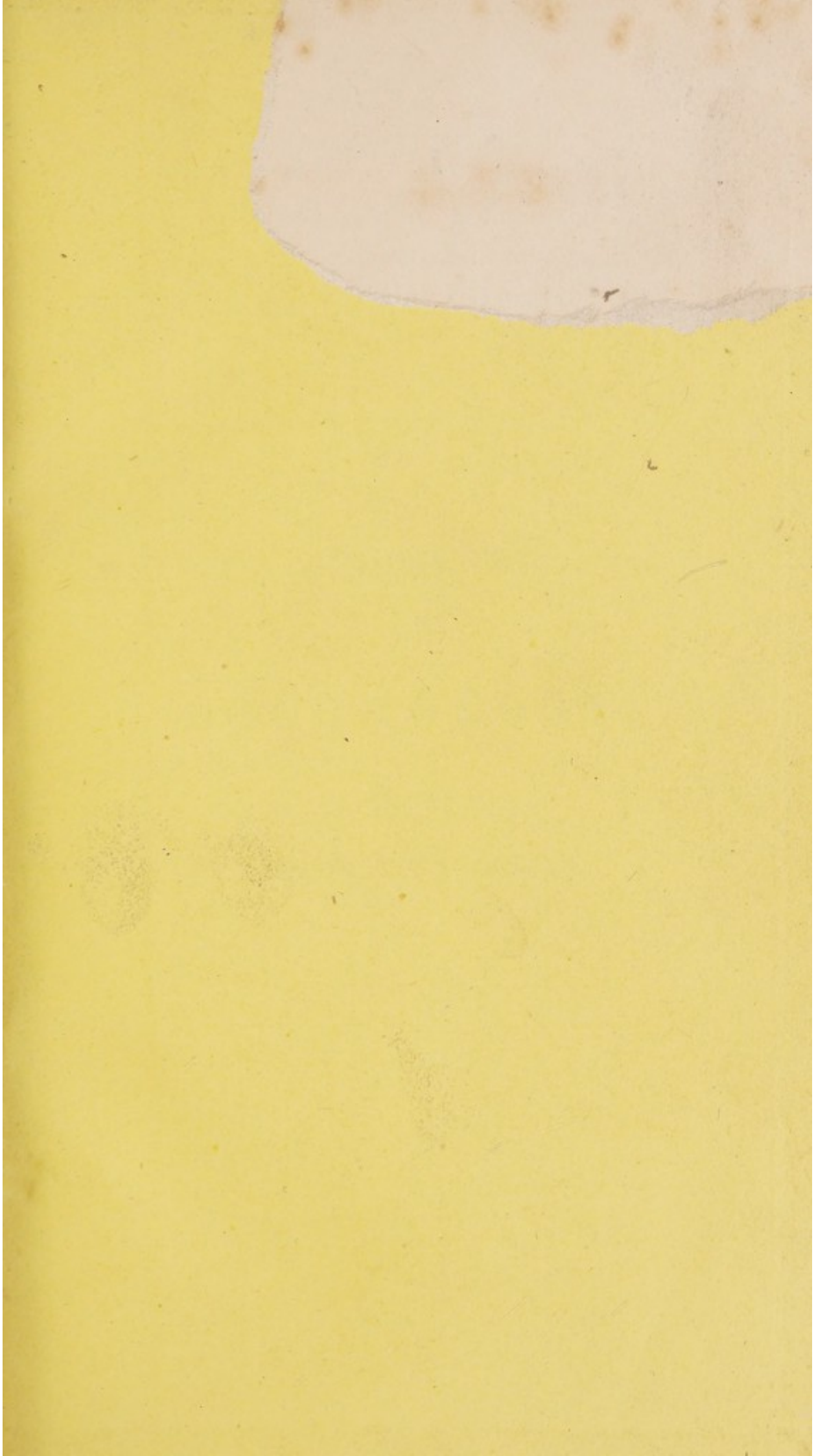
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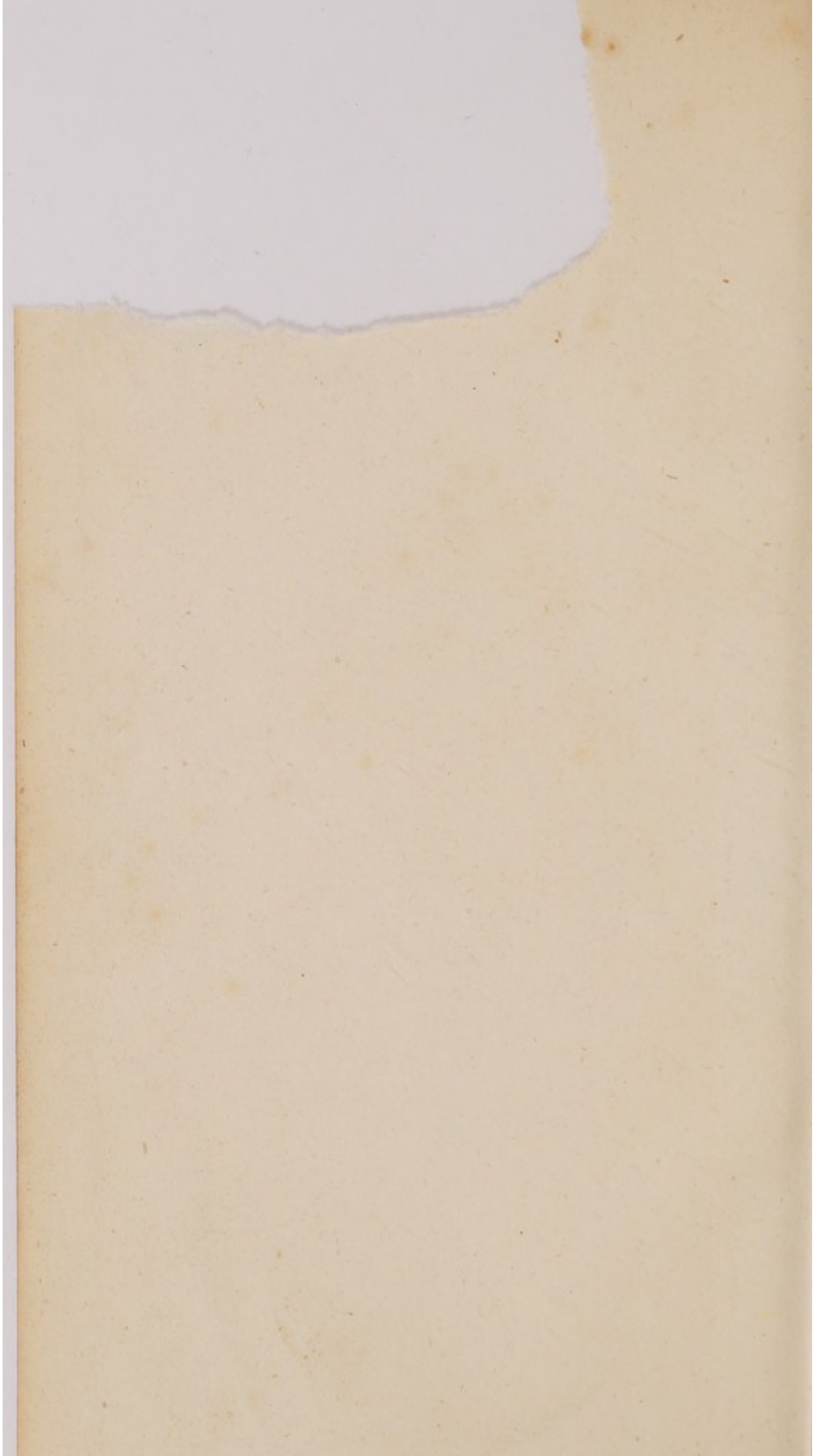
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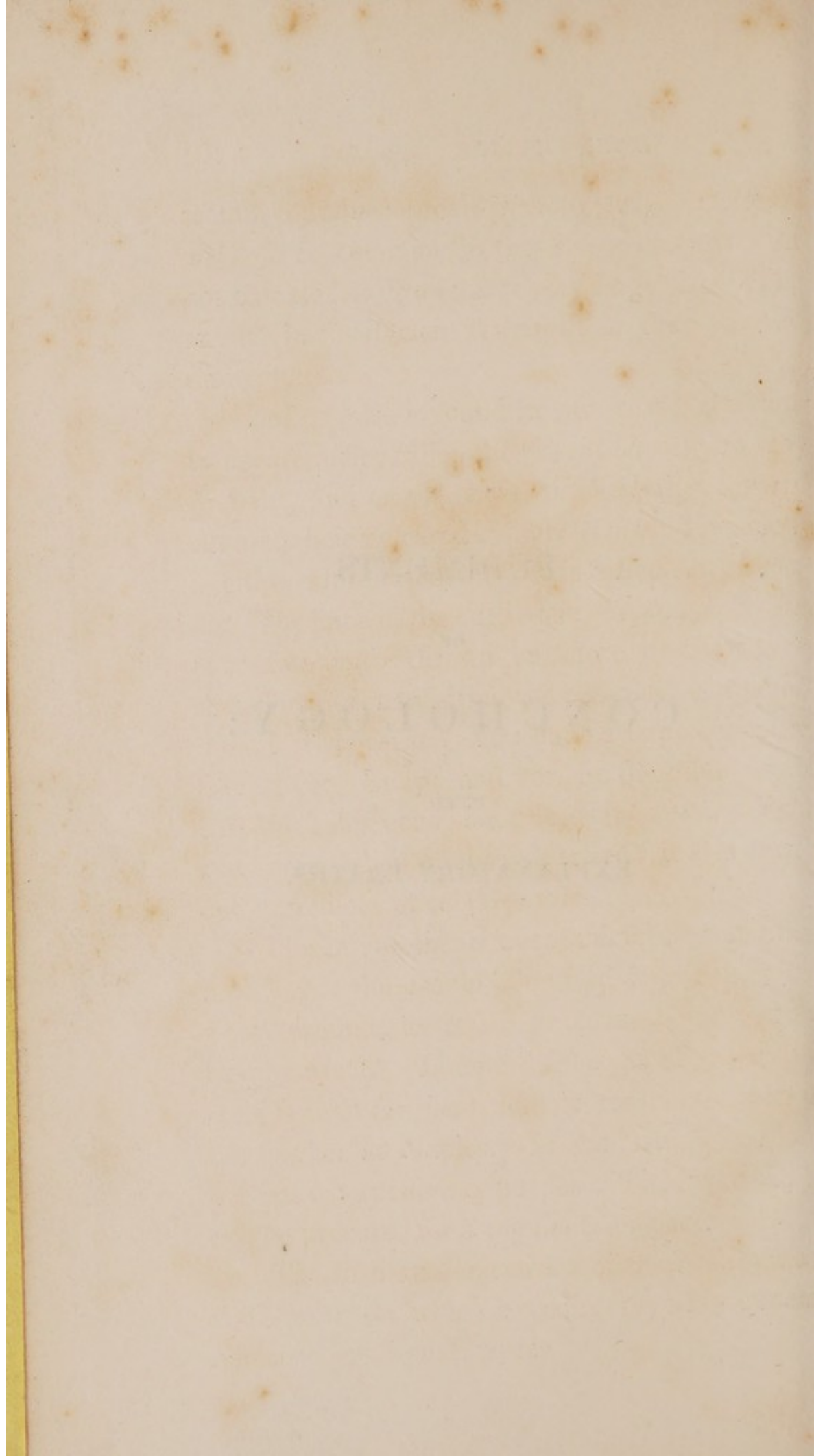
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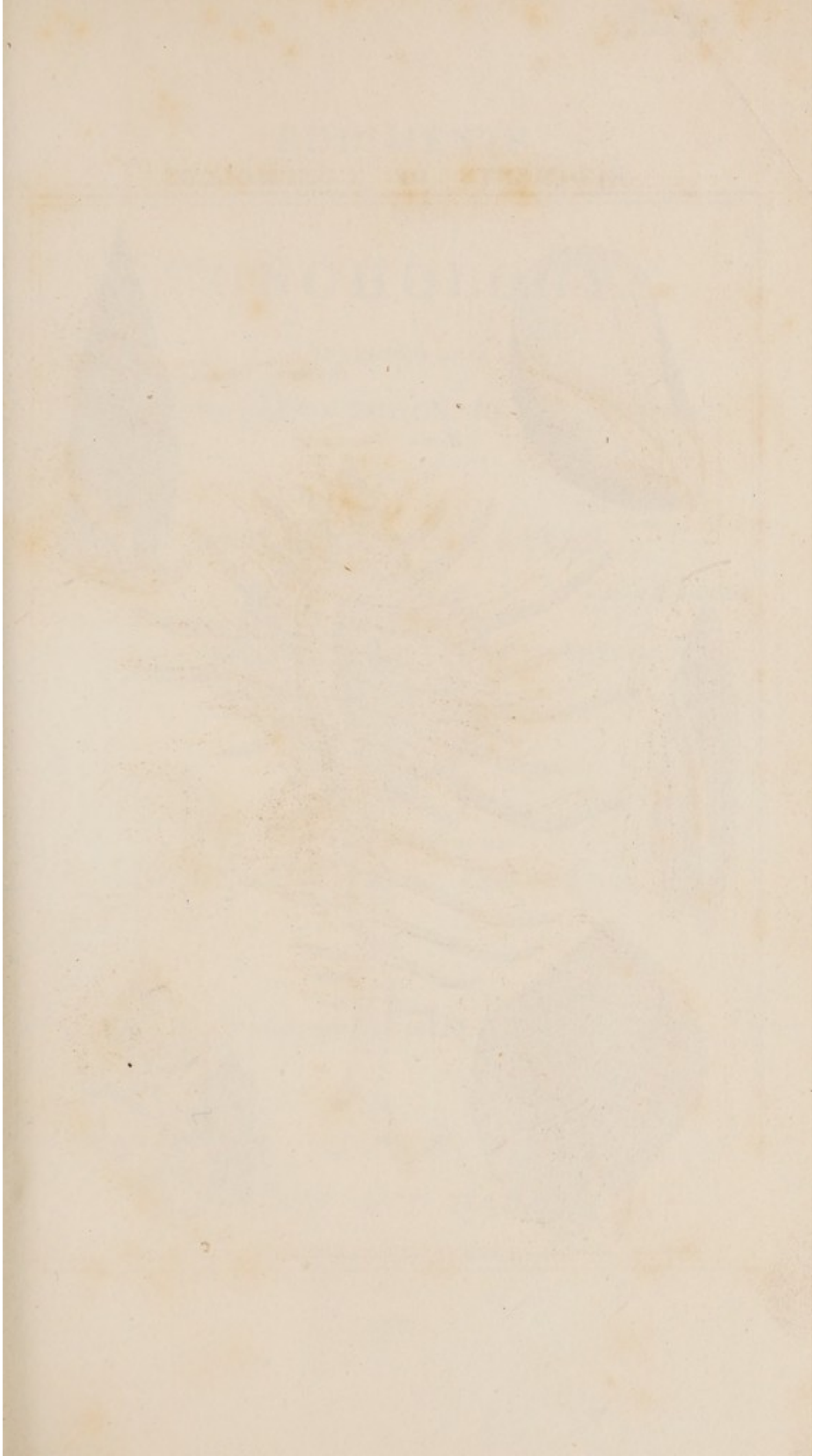
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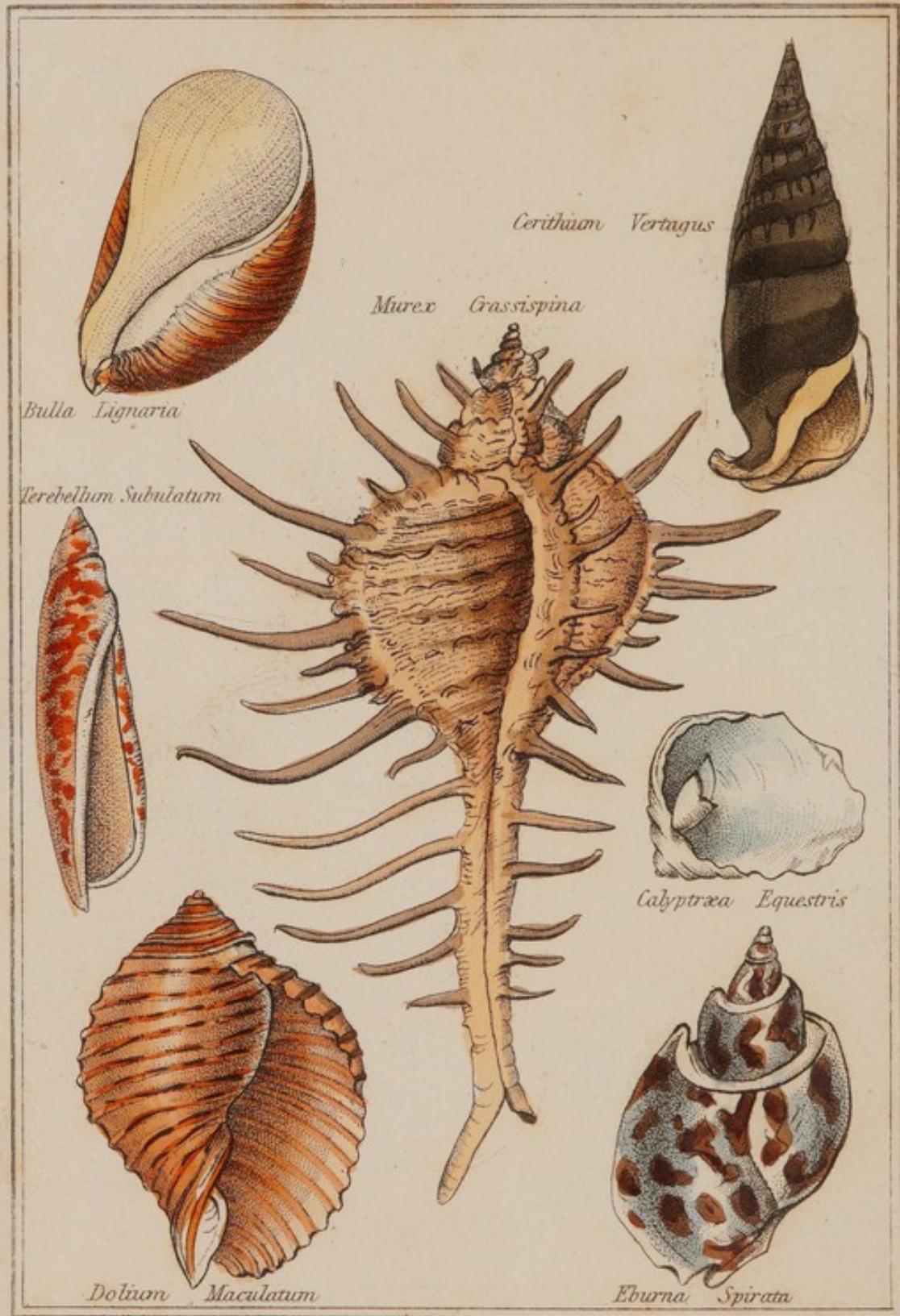
RUDIMENTS  
OF  
CONCHOLOGY;  
WITH  
EXPLANATORY PLATES.







RUDIMENTS OF CONCHOLOGY.



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RUDIMENTS  
OF  
CONCHOLOGY:

INTENDED AS A  
FAMILIAR INTRODUCTION TO THE SCIENCE.

WITH  
EXPLANATORY PLATES,

AND  
REFERENCES TO THE COLLECTION OF SHELLS IN  
THE BRITISH MUSEUM.

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BY THE AUTHOR OF  
"THE GEOGRAPHICAL PRESENT," &c.

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A new and improved Edition.

LONDON:  
DARTON AND HARVEY,  
GRACECHURCH STREET.

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1837.

LONDON :  
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## ADVERTISEMENT.

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THE Compiler of the following pages has derived the greater part of the information contained in them from "The Conchology of Lamarck," from "Burrows's Elements of Conchology," and other introductory treatises.

In the present Edition of this little Work many alterations and additions have been made, with the hope of rendering it more useful to the young student.

Faint, illegible text, possibly bleed-through from the reverse side of the page. The text is too light to transcribe accurately.

✓ ERRATA.

Page 3, *for* Plate 1, *read* Plate 2.

Page 16, line 8, *for* squamosa, *read* squamosus.

Page 20, *for* candidas, *read* candida ; and *for* Plate 3, *read*  
Plate 2.

Page 25, *for* Plates 4 and 5, *read* Plates 3 and 5 ; and *for*  
gædaropus, *read* gæderopus.

Page 27, *for* ephippium *read* ephippium.

Page 35, line 12, *dele* not.

Page 36, line 14, *read* Plate 2.

Page 42, *read* Bruguieres ; and *for* Pollicipes, *read* Pollicipes.

Page 64, line 3, *read* Parmophorus—line 6, *read* Plate 3.

Page 68, line 5 from bottom, *read* Carocolla.

Page 76, line 6, *for* Valvata *read* Voluta.

Page 90, line 4, *read* anglicanum.

1871

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RUDIMENTS  
OF  
CONCHOLOGY.

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CHAPTER I.

INTRODUCTORY.

“A BOX full of shells!” said Charles to his sister Lucy, who was looking over her treasures with great attention. “What can you want so many little shells for?”

“This box and its contents are the gifts of my cousin Jane,” replied Lucy: “she said that I might have her whole collection, if I could find any pleasure in looking at shells without knowing anything about them. But I am not *quite* ignorant of the subject.”

“Shells are pretty enough,” said Charles; “but how troublesome to distinguish the differences between each kind! I like plants better than shells.”



“ Probably because you are better acquainted with plants,” observed his father, Mr. Elliot, who had just entered the room : “ however, the great naturalist, to whom you are indebted for your knowledge of plants, did not consider shells as objects beneath his attention.”

“ You mean Linnæus,” said Lucy ; “ then he, I suppose, separated shells into the three different divisions—*Multivalves*, *Bivalves*, and *Univalves*.”

“ You are right, Lucy,” replied her father.

“ Pray show me some bivalve shells,” said Charles ; “ I want to know their forms. A *bivalve* is a shell with two openings, as I should imagine : yes, I see that I am right, for you have given me an oyster and a cockle.”

“ Here are also *Venus*, *Tellina*, *Donax*, *Arca*, and *Pinna*,” observed Mr. Elliot, “ all very easy to distinguish.”

“ ‘The anchor’d pinna and his cancer friend,’ ” repeated Charles. “ So the *Pinna* is a bivalve ; but what has *Venus* to do with the matter ?”

“ That is very easy to understand,” said Lucy : “ the genus called by her name is remarkable for beauty.”

“ Now, Charles,” said Mr. Elliot, “ do you clearly comprehend the verse that you have just repeated ?”

“ I have heard that the *Pinna* is a shell-fish,

attended by a *crab*, 'his cancer friend;' but why it is called *anchor'd* I do not know, but *cancer* is Latin for crab."

"Here is a species of *Pinna*," said his father, opening a cabinet; "and these silken threads are the means by which it fastens itself to the rocks. The animal is provided with a long foot, with which it draws out the threads, or *byssus*. The *Pinna* is sometimes called the silk-worm of the sea. Lucy, do you know a univalve shell?"

"Oh yes, many!" replied Lucy, "here are rock-shells, cowries, limpets, and cones. I know the difference between a cowry and a cone; but I am not yet acquainted with a multivalve shell—will you show me one?"

"*Chiton*, or coat of mail, is a good example," said Mr. Elliot; "*Pholas* is another genus of the same division; it has the appearance of a bivalve. In the *Chiton* are several *lamina*, or plates, which are connected by a membrane while the living animal is in the shell; the membrane is pliant, and the inhabitant has the power of contracting itself into a ball, when it would avoid injury, like the insect millepes, that we find under stones in damp places. (PLATE 1.) The curious barnacle-shell, *Lepas*, is another multivalve." (PLATE 1.)

"I think we cannot have a more agreeable pursuit for our leisure hours," said Lucy, "than

the study of shells. One can bring them out or remove them so easily, that they can cause little inconvenience, which garden-pots often do in town ; and then the plants are almost sure to die, whatever care I take of them."

" Collections of shells are frequently to be seen in London," said Mr. Elliot, " which are intended for sale. There are now many places where shells are sold at moderate prices, and young collectors like yourselves can easily avail themselves of the means thus afforded, to obtain even a single specimen. While we remain in town you may visit the British Museum, and become familiar with the rare species of each genus, of which there are many costly specimens. The arrangement adopted for that collection is Lamarck's. You will find the work of this celebrated naturalist on my shelves ; it is entitled, '*Histoire Naturelle des Animaux sans Vertèbres.*' The three last volumes contain the Conchology."

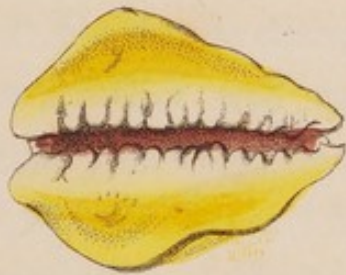
" It is in French and Latin !" exclaimed Lucy, as she opened a volume.

" Why do you both look so serious ?" asked their father. " Are you not students in those useful languages ? To what purpose do you learn a language if it be not with a view to reading the works of learned men, whose labours have opened a wide field of knowledge ?"

" But so many works on science are written in



*Chiton Squamosus*



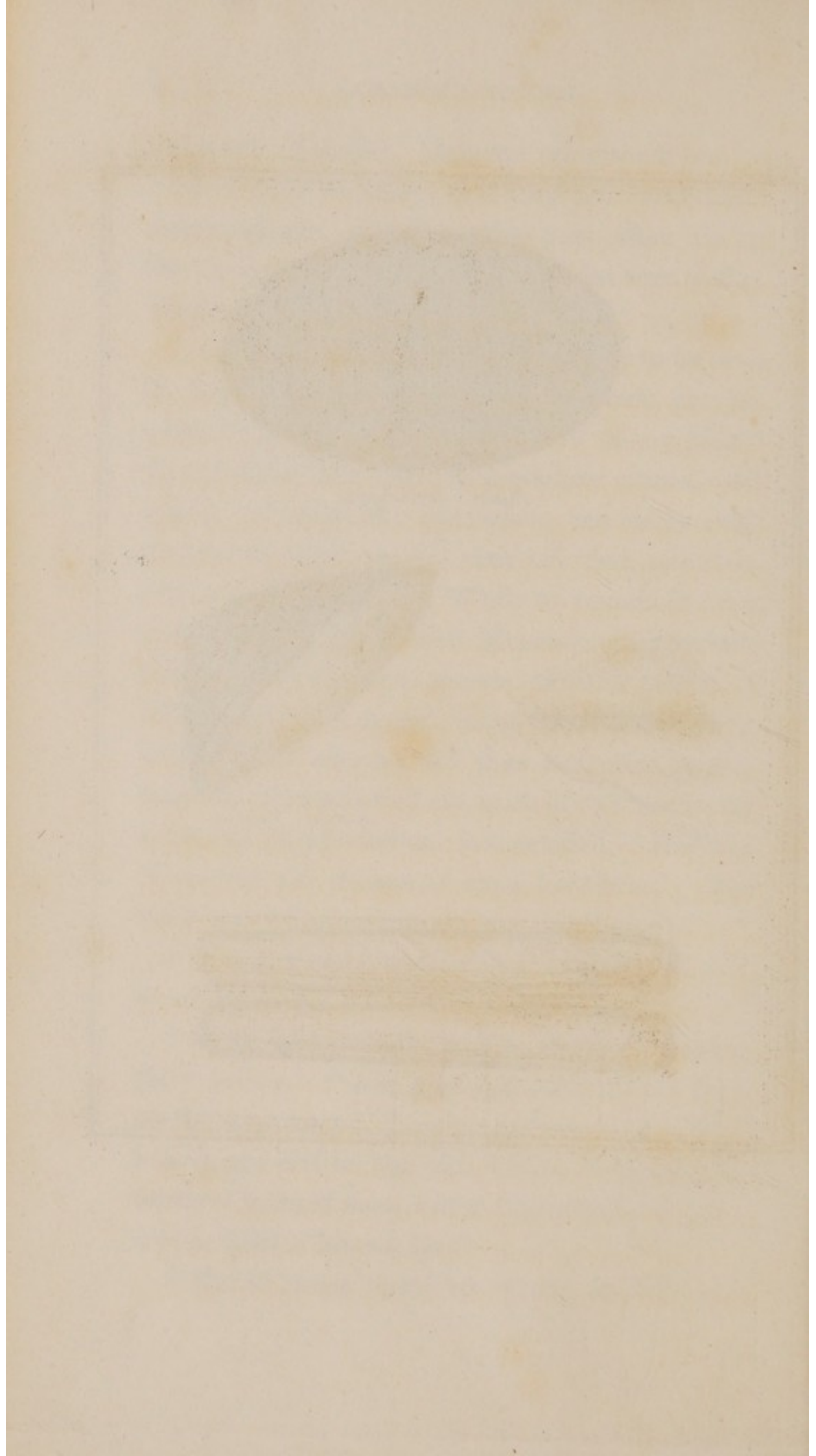
*Cypræa Moneta*



*Patella Vulgata*



*Solen Siliqua*



Latin," said Lucy. "Linnæus, however, has been translated, I know; and as for *British* botany, we have our own authors in my own dear language."

"The Latin language being universally studied by men of science, it has become the medium of communication between the learned of most countries," observed Mr. Elliot. "I should consider a young person of your age, Lucy, very ignorant who could not read and understand the general style of Lamarck with the occasional aid of the dictionary."

"Do not be discouraged, brother," said Lucy, "my father will assist us: remember how frequently he helps us with our lessons now, provided we do our best. I am resolved to obtain some knowledge of shells this winter."

"A very good resolution," said Mr. Elliot; "and I predict that your usual delight on revisiting our favourite country dwelling will be somewhat increased next spring."

"Because I shall carry down my little collection with the pleasure of knowing more than I did last year."

"Our own coasts, rivers, and ponds afford a variety of shells. The hedge-banks, heaths, and other places, possess their inhabitants."

"Oh," exclaimed Lucy, "I quite forgot the very pretty snails I have so often admired on the

heath on a dewy morning: why, we may learn conchology in the open fields as well as botany !”

“ Well, then,” replied Mr. Elliot, “ to-morrow we will apply ourselves to the needful instruction. I must, however, remind you that I do not approve of any animal’s life being taken away in order to obtain its habitation. Empty shells are to be found, which will serve perfectly well for specimens ; and should the colour not be so bright as you could wish, you will have the delightful consciousness that your amusements have been free from cruelty, and that you have not destroyed the life of any living, harmless creature, in the pursuit of pleasure. Indeed there is as much or more gratification in searching among the rocks, or digging into the sea-sand, with a view to watch the animal in its natural place, as in possessing its empty shell : and who knows what grand discoveries you may both make !

“ But I must leave you now—be ready for me after our usual dinner-hour.”

## CHAPTER II.

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“CONCHOLOGY,” said Mr. Elliot, on resuming the conversation with his children, “is that branch of natural history which comprehends the study of testaceous animals, or animals with *shell-coverings*, and includes those of the seas, the rivers, and the land.

“All shells are formed of carbonate of lime. This you may easily prove by applying a little acid to a shell, and you will find that an effervescence takes place.

“The animals that inhabit shells are bloodless, without bones, but provided with a heart, lungs, and mouth, together with other organs needful to their conformation.

“Testaceous animals have the power of enlarging their habitations; they can also repair any injury that may occur to them.

“Many kinds of shell-fish are made use of by man, and form a valuable article of food, such as oysters, cockles, muscles, scallops. The whelk is also used, and a species of murex.

“A species of cowry is in use for money among some people of Africa; and pearls, so much



valued as articles of ornament, are obtained from the oyster and muscle genera.

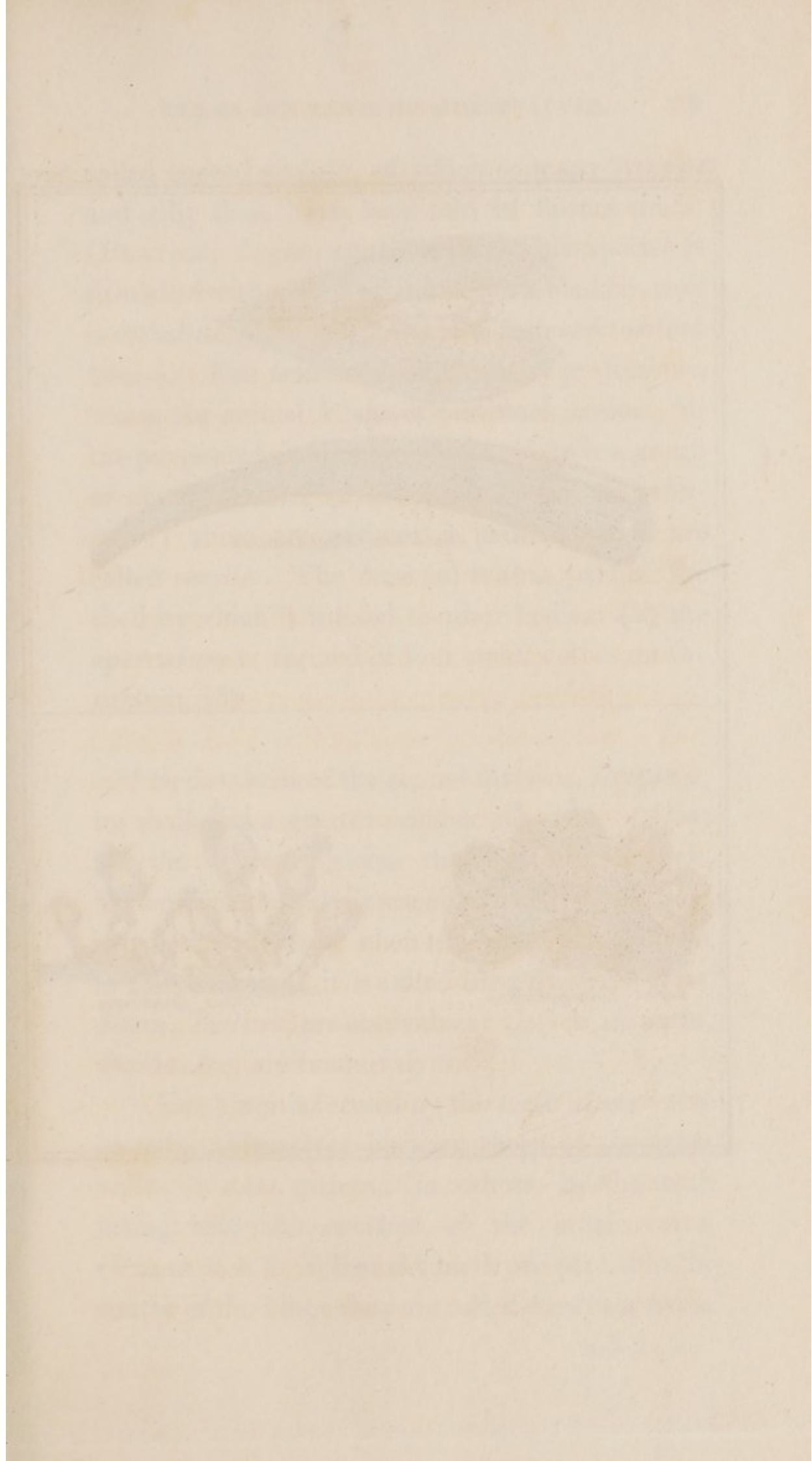
“ Within a few years, conchology has become a study of considerable importance, from its close connexion with geology. Students in the latter science must be well acquainted with fossil shells, because they form so large a portion of organic remains. Species of recent shells, or those still existing, are also often found in a fossil state, while many fossil genera are now totally unknown in our earth and waters.

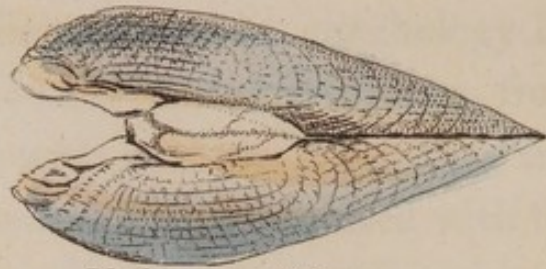
“ Thus you perceive that while you are obtaining knowledge in one science, you are preparing yourselves for making advances in another, most interesting and wonderful. You, Charles, who are likely to become a traveller, will perhaps in future years find the advantage of my present brief lessons.

“ I shall first endeavour to make you acquainted with the system of Linnæus ; it is easily learned, and you should be familiar with it, as it is still adopted by some writers on conchology.

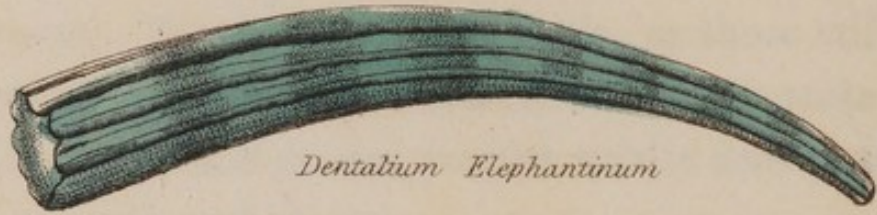
“ But in order to understand my instructions, you must have a clear idea of the terms that I use in describing a shell ; now, therefore, give me your attention while I explain some of those terms to you.

“ To begin with the first division, *Multivalves*. There is a group of *Lepadæ*, it is the species





*Pholas Candida*



*Dentalium Elephantinum*



*Lepas Tintinnabulum*



*Lepas Anatifera*

called goose-barnacle, of which so many strange and silly tales have been told in former times. (PLATE 2, *Lepas anatifera*.) This species is furnished with a kind of stem, like a bladder, and is called the *peduncle*, (*c*) and is fastened to other bodies. The *feelers* (*d*) are feathery projections, which the animal keeps in continual motion, for the purpose of catching its food. Here is a group of another kind; (PLATE 2, *Lepas tintinnabulum*;) these are without a peduncle, and are called *sessile*. The *base* (*a*) is that part of the shell by which it is fixed to other bodies: (*a*) the *operculum* is formed of four small valves on the summit. (*b*)

“ In the shells of the second division, *Bivalves*, we shall find a greater number of parts. *Valves* are the different pieces that compose a shell. When both the valves are alike in form, the shell is called *equivalve*: when the valves are different in the same shell, it is called *inequivalve*. *Mya*, *Solen*, *Tellina*, are equivalves: *Ostrea*, *Anomia*, *Pinna*, &c. are inequivalves.

“ The *hinge* is formed by the teeth of one valve inserting themselves between those of the other valve, in some genera; in others, by the teeth fitting into the *cavities* of the other valve (PLATE 3. *a*.) When the teeth are placed in the centre of the hinge they are called *cardinal teeth*.

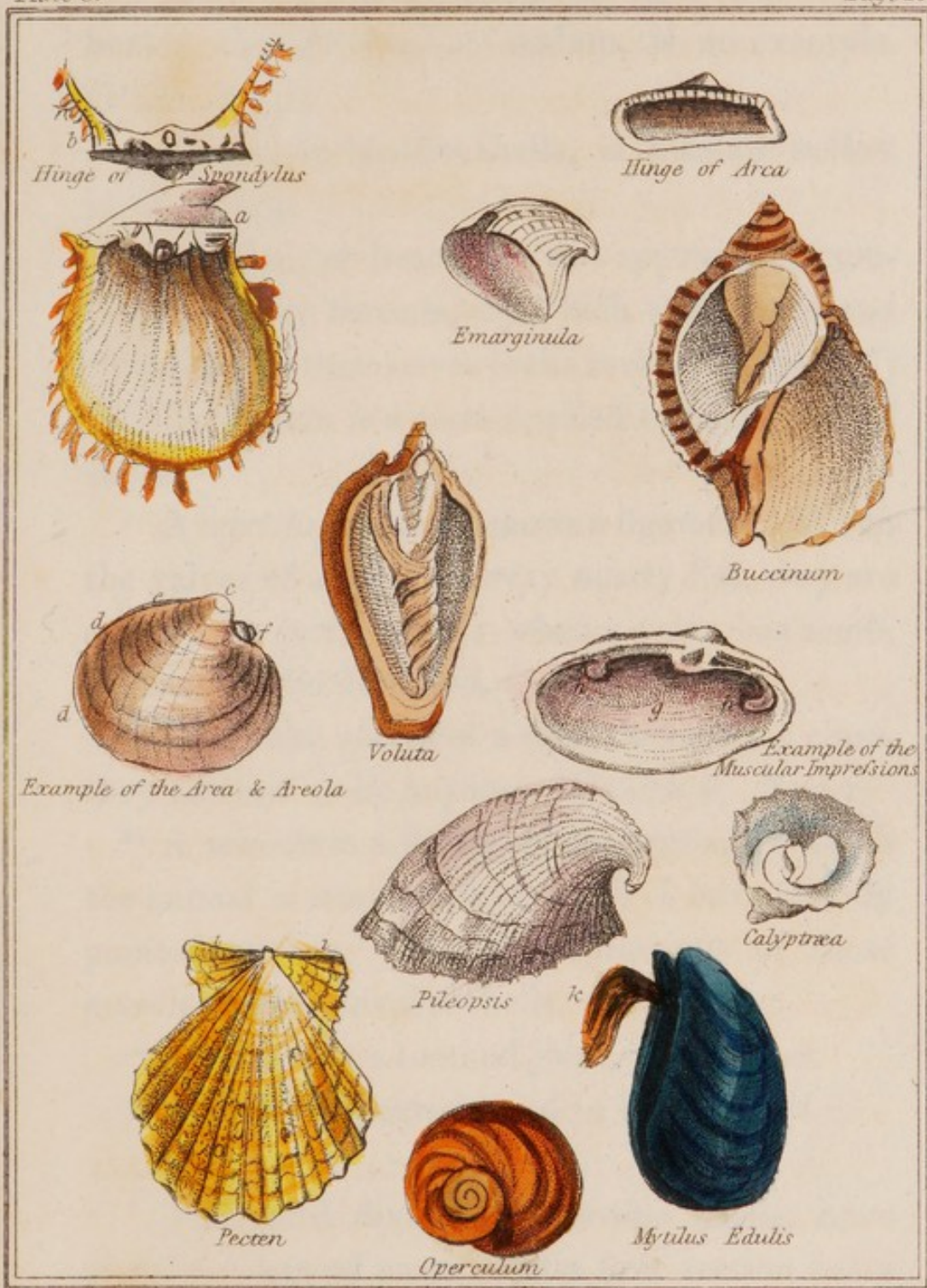
*Lateral teeth* are situated on the sides of the valves, and are generally long and flat, sometimes hollow. Some hinges are straight, others curved. Here is the hinge of *Arca*, furnished with many small teeth. (PLATE 3, b.)

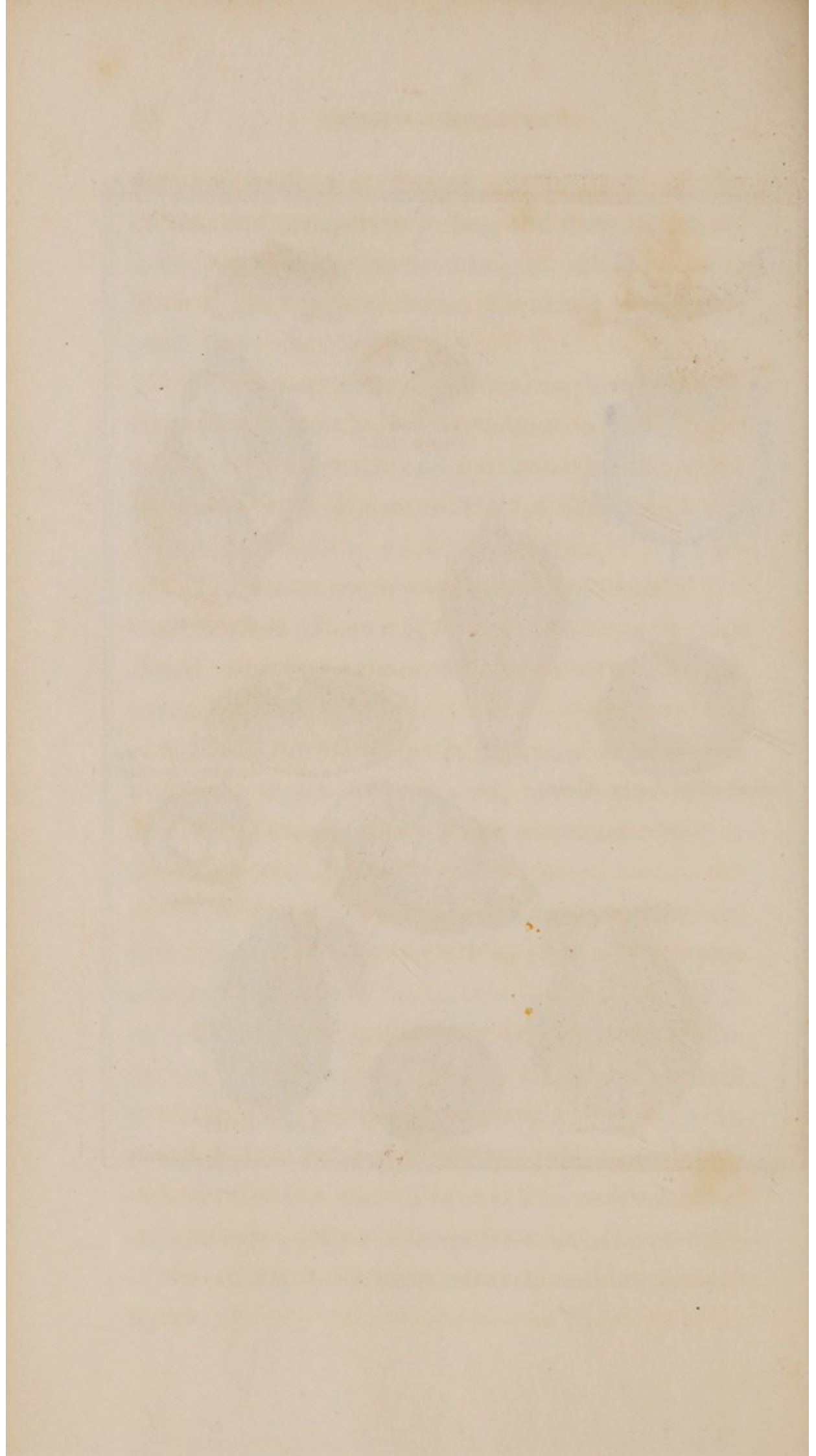
“ The *ligament* is a membrane that connects the valves, and keeps the hinge in its proper place : it is always situated near the beaks. The ligament is very perceptible in the cockle, in *Pecten*, or scallop, in *Tellina*, &c.

“ The *beaks* are the most pointed parts of the bivalve shell (PLATE 3, c.) ; when the valves are closed, the line where they meet is called the *seam*. (PLATE 3, d.)

“ The *anterior slope* is that part of the shell where the ligament is placed, and is also called the *area*. (PLATE 3, e.) The *posterior slope*, or *areola*, is the other side of the beaks. (f.)

“ The *lunula* is a crescent-like depression on either the area or areola. The edge of the valve is called the *margin* ; it is often finely *crenulated*, or toothed. The interior of the valve is called the *cavity*. (g.) In the valves of this ark-shell here are two broad marks, shining and glossy. (g.) In those of the oyster and muscle that I now show you, there is but one. These marks are *muscular impressions* ; they are the parts where the muscles of the animal have been affixed, and are termed *cicatrix*.





“ *Ears* are two processes on each side of the beak; the *Pecten*, or scallop, is an example. (PLATE 3, *i.*)

“ *Sinus*, in *bivalve* shells, is a small hollow in the hinge.

“ *Byssus*, or beard, is an appendage composed of silky threads, by which the muscle and *Pinna* fasten themselves to the rocks. (PLATE 3, *f.*)

“ *Cordiform* is a term applied to heart-shaped shells.

“ A *cartilage* is the same as a ligament. When the valves of a shell are very nearly flat, they are said to be *compressed*: when a valve has teeth, it is said to be *dentated*.

“ When the valves of a shell do not shut close, they are said to be *gaping*. (PLATE 4, *Mya.*)

“ A *muscle* is a fleshy, pliant organ, by which the animal is attached to its shell. I have already pointed out to you the impressions of those muscles within *bivalve* shells.

“ A *suture* is a toothed joint, in *bivalves*.

“ A shell with ears is said to be *auricled*.

“ The third division, *Univalve* shells, have also their several parts. The first section has a regular spire. Here are two shells of this section, *Voluta* and *Buccinum*, both sawed asunder, in order to show the interior structure of the shell. (PLATE 3.) The aperture, or opening, being



turned *towards you*, the front of a univalve is seen ; reverse it, and you see the back.

“ The top, or highest part, is the *apex* ; (a) the lowest part is the *base* of the shell. (b.)

“ The *spire* (c) is formed of wreaths, or whorls, (ddd) which terminate in the apex : the lowest whorl is the body of the shell. (e.)

“ The *aperture*, opening or *mouth*, (f) as it is sometimes called, is on the right hand when the front of the shell is turned towards you. The aperture is an important distinction in univalves : some genera have a circular opening, as the *Turbo*, or periwinkle ; some longitudinal, as the cowry ; others semi-lunar, as the *Helix*, or snail genus. (For examples of these apertures see PLATES 1 and 7.)

“ The *beak* is the lengthened process (g) at the lower part of the shell.

“ The *canal*, or *gutter*, runs through the beak. (Both these parts are perceptible in *Murex* and *Strombus*, PLATE 7.)

“ *Sutures* are spiral lines which separate the whorls ; they are sometimes crenated, or notched, sometimes sulcated, or furrowed.

“ The *columella*, or *pillar*, extends through the centre of the shell withinside. The *Buccinum* and *Voluta* both show the columella. (PLATE 3.)

“ The *pillar-lip* of the aperture, or columella margin, is on the left-hand side of the shell ; the

*outer* lip on the right-hand. Occasionally this order is reversed, but not commonly.

“ The *operculum*, or lid, in univalves is that part which fits exactly into the aperture, and incloses the animal; it serves as a door to the shell. (PLATE 3.) The operculum is either horny, like that of the periwinkle, or of a harder substance, like the shell itself.

“ The *umbilicus* is a circular hole in the body of the shell. This perforation produces a very curious effect when it is very large. When the umbilicus is wanting, the shell is called *imperforate*.

“ If the spire is truncated, it is *decollated*; if it is surrounded with spires, it is *coronated*, or crowned.

“ Second section, without a regular spire. The *teeth* in univalve shells, as the cowry, are ridges upon the aperture. (PLATE 1.) In *Voluta* they are regular folds or plaits upon the columella.

“ A *fissure* is a notch or slit, as in *Patella fissura*. (PLATE 3.)

“ Some shells of this section are internally lipped, as *Patella equestris*; (*Calyptræa* of other authors, PLATE 3;) some are chambered, as the slipper-limpet; some are cap-shaped, having the apex much curved—these are the cap-limpets.

“ The *vertex* in *Patella* is as the superincumbent part of the shell.

“ The *epidermis* is the outward skin that covers the surface of some shells.

“ *Fauces* are narrow entrances, as at each end of the cowry.

“ *Tubercles* are protuberances, or knobs, on the surfaces of shells.

“ *Striæ* are raised or flat lines upon the surfaces of shells. When the surface is marked with lines longitudinally and transversely, it is *decussated*.

“ *Sulci* are furrows.

“ *Fornicated* signifies arched, greatly excavated.

“ *Umbo* is the swelling part near the beak of bivalve shells; the same as *boss*.

“ *Longitudinal*, running nearly the whole length of the shell in univalves.

“ *Concentric*, having the same centre.

“ *Convolute*, when the exterior whorls spirally invole the interior.

“ *Varices*, longitudinal, gibbous sutures formed in the shell, at certain distances on the whorls.

“ *Carinated*, having the form of the keel of a boat.”

## CHAPTER III.

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“As you both assure me,” said Mr. Elliot, “that you do not fail to make yourselves familiar with the *nomenclature*, or terms, used in conchology, I shall proceed this morning to the arrangement of Linnæus.

“This system is established upon the *outward* appearances, or external characters, of the covering bestowed by nature upon the animal, not upon the form of the animal itself.

“The three principal divisions you are already acquainted with, namely, *Multivalves*, shells composed of several parts called valves; *Bivalves*, formed of two parts; and *Univalves*, composed of one part or piece only.

“These divisions contain several *genera*, and the genera usually include many individual shells, but occasionally only one.

“The characters of every genus are permanent, and are therefore to be observed in every one of the species contained in the genus.

“Species are determined by shape, colours, or

appearances on the surface of the shell: there are sometimes many varieties of the same species.

“ The Linnæan genera are thirty-six. I have copied a list of them for you. In that tray are the specimens mentioned in your list :

ARRANGEMENT OF LINNÆUS.

FIRST DIVISION—*Multivalves* : 3 genera.

- \* *Chiton*, coat of mail, example, *C. squamosa*. *us*
- \* *Lepas*, acorn-shell or barnacle, ex. *L. anatifera* and *tintinnabulum*.
- \* *Pholas*, stone-piercer, ex. *P. candida*.

SECOND DIVISION.—*Bivalves* : 14 genera.

- \* *Mya*, trough-shell, ex. *M. truncata*.
- \* *Solen*, razor-sheath, ex. *S. siliqua*.
- \* *Tellina*, wedge-shell, ex. *T. Feroensis*.
- \* *Cardium*, cockle, ex. *C. cardissa*.
- \* *Mactra*, kneading-trough, ex. *M. stultorum*.
- \* *Donax*, wedge-shell, ex. *D. trunculus*.
- \* *Venus*, Venus, ex. *V. Paphia*.
- Spondylus*, thorny oyster, ex. *S. gæderopus*.
- Chama*, clamp-shell, ex. *C. gigas*.
- \* *Arca*, ark-shell, ex. *A. Noæ*.
- \* *Ostræa*, oyster, ex. *O. isognomon*.
- \* *Anomia*, antique lamp, ex. *A. ephippium*.
- \* *Mytilus*, muscle, ex. *M. edulis*.
- \* *Pinna*, wing-shell, ex. *P. pectinata*.

THIRD DIVISION: 2 sections.—1st. *Univalves*  
with a regular spire: 14 genera.

*Argonauta*, paper-sailor, ex. *A. argo*.

*Nautilus*, sailor, ex. *N. pompilius*.

*Conus*, cone, ex. *C. Hebræus*.

\* *Cypræa*, cowry, ex. *C. monèta*.

\* *Bulla*, dipper, ex. *B. naucum*.

\* *Voluta*, wreath, ex. *V. utriculus*.

\* *Buccinum*, whelk, ex. *B. reticulatum*.

\* *Strombus*, screw, ex. *S. pes-pelicàni*.

\* *Murex*, rock-shell, ex. *M. ramòsus*.

\* *Trochus*, top-shell, ex. *T. bifaciàtus*.

\* *Turbo*, wreath, ex. *T. muricàtus*.

\* *Helix*, snail, ex. *H. nemoràlis*.

\* *Nerita*, nerite, ex. *N. striàta*.

\* *Haliòtis*, ear-shell, ex. *H. tuberculàta*.

2d Section, without a regular spire: 5 genera.

\* *Patèlla*, limpet, ex. *P. vulgàta*.

\* *Dentàlium*, tooth-shell, ex. *D. elephantinum*.

\* *Sérpula*, worm-shell, ex. *S. triquétra*.

*Terèdo*, ship-worm, ex. *T. navàlis*.

\* *Sabella*, Sabella, ex. *S. Belgica*.

Total number of genera in the arrangement of  
Linnæus, thirty-six.

The genera marked with an asterisk, contain  
species found in Britain.

“ Multivalves may be divided into two kinds, the *pedunculated*, or those fixed to other bodies, as rocks, stones, planks, &c. ; or *free*, as the *Chiton* and *Pholas*.

“ Our first genus is *Chiton*. The shell is easily known. The fixed character is, many valves placed over each other along the back. I have already noticed the membrane which connects the valves, which is also a permanent character. It is elastic : the sides are either scaly, as in *C. squamòsus*, (PLATE 1,) and hairy, or spinous. The species are determined by the margins. Some of the *Chiton* genus are common upon our own coasts ; they are frequently found among seaweed and stones, rolled up like a ball. *C. fasciculàris* and *C. lævis* are British ; there are some other British species. The animal adheres to rocks, like the *Patella*, or limpet. The number of species forty.

“ Second genus, *Lepas*. Shell multivalve, fixed at the base ; valves erect, or *upright*.

“ Observe how much the situation of the valves differs in *Chiton* and *Lepas*. It is scarcely possible to mistake the one for the other. The feathery tentacula, or feelers, of *Lepas anatifera* are worthy notice, and in a state of motion must be yet more beautiful. (PLATE 2.) The common acorn-shell, *L. balànus*, is to be seen very frequently upon the shells of muscles, oysters,

periwinkles, whelks, in large groups. I see that you are examining the different appearance of the pedunculated and the sessile *Lepadæ*. Linnæus made two divisions; later writers have separated them into several distinct genera, which will be noticed when we attend to Lamarck's system. The species are forty-five, of which several are found on the British shores, as *L. tulipa*. *L. diadema*, *L. tintinnabulum*, *L. balanus*, *L. anatifera*, &c. The Indian, American, and Atlantic oceans afford numerous species.

“ Third genus, *Pholas*. Generic character : shell bivalve, gaping or divaricated, with several smaller hinges situated upon the hinge ; hinge recurved, with an incurved tooth.”

“ Father,” said Charles, “ I must say that the *Pholas* shell is very unlike those of the multivalve division : I think it should rank with bivalves.”

“ So many conchologists have judged ; nevertheless it possesses more than *two* valves, and, according to the system, it must be forced into the division of multivalves.

“ The *Pholades* are found in company, but each individual occupies a distinct habitation, which the animal excavates for itself, either in rocks, in wood, coral, or sponge ; but the finest specimens are usually to be seen in chalk. In proportion as the animal increases in size, it enlarges the cavity in which it is stationed. The



animal is supposed to effect this operation by means of a corroding fluid that is secreted in the body, and which it has the power of ejecting upon the substance into which it has entered.

“ The *Pholas* has the power of emitting a phosphoric liquor, which shines with brilliancy in the dark.

“ I must remind you that the accessory valves are fixed to the margin of the shell by a gelatinous substance ; this decays after the death of the animal, and consequently the smaller valves are frequently wanting.

“ The number of species is twelve. Several of them are found on our coasts. The *Pholas* genus is without colour, but the reticulations in some species are exceedingly delicate. *Pholas candida* (PLATE <sup>2</sup>8) is found on the shores of Kent ; you will be pleased with the shells. *Pholas dactylus* is larger and coarser, and not at all uncommon.

“ We have now finished our first division, and must proceed to the bivalves.”

## CHAPTER IV.

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SECOND DIVISION.—*Bivalves*: 14 genera.

“ I FEAR,” said Charles, “ that this new division will be rather difficult, for my father tells me that we must pay particular attention to the *hinges* of bivalve shells.”

“ Then *apply* yourself to the study of hinges, Charles, and your difficulties will chiefly disappear,” answered Mr. Elliot.

“ The hinge of *Mya*, the first on the list, is easily known. The generic characters are, shell gaping at one end, hinge mostly with one thick spreading tooth, not inserted into the opposite valve. The *Mya* race burrow in the sand. Here is *Mya arenaria*, a large thick shell, frequent on the shores of Kent: the large tooth is sufficiently plain in *this* species. *Mya truncata* (PLATE 4) is as common, and the curious membranous case, which you will find attached to one end of the shell, is a guide to the species. Both these species are without colour, and have little to attract in their outward appearance. The genus,

however, according to Linnæus, varies exceedingly, and contains forty-one species.

“ *Solen*. Shell bivalve, open at both ends, tooth of the hinge subulate, or awl-shaped, reflex, often double.

“ In this genus, the great length, in comparison with the breadth of the shells in many of the species, is remarkable: some are exceedingly brittle. Our example, *Solen siliqua* (PLATE 1) is a British species. The hinge is not in the centre of the shell, but nearer to one end of it. Some are shaped like the handle of a knife or a razor, others are bent resembling the blade of a scimitar. The *Solen* lives in the sands of the sea-shore, often burying itself two feet deep, and retaining its shell in a vertical position: thirty-five species.

“ The genus *Tellina* is remarkable for the beauty of the shells, and, according to the arrangement of Linnæus, contains ninety-seven species. The exterior is sometimes marked with radiations: the surface of some shells is very finely polished, while in others it is covered with striæ and undulations. The species that you have placed before me, Lucy, is *Tellina Feroensis*; the shell is finely striated, and has also radiations. (PLATE 4.)

“ The generic characters are chiefly these: shell compressed towards the anterior slope, teeth

of the hinge mostly three, the lateral ones smooth, in one valve. Two or three small species are common on our coasts. I should also observe that there is a convex fold on one valve and a concave fold upon the other. Many of the *Tellina* genus are found buried in the sea-sands.

“ *Cardium*. Generic character: shell equi-valve, convex, ribbed, striated, or grooved, the margin toothed: hinge with two teeth near the beak, and a lateral one on each side: fifty-four species.

“ Observe how the beaks of this common *Cardium*, cockle, turn inwards, and the bosses project. Another striking character is the ribs, that are generally longitudinal, and not concentric or transverse, as in *Tellina*, and, as you will see, in *Venus*. *C. aculeatum* has small spines on the valves; *C. costatum*, the ribbed cockle, is one of the finest species of this genus, and *C. cardissa* is a beautiful shell. (PLATE 4.) The common cockle is *Cardium edule*.

*Mactra*. Generic character: shell bivalve, unequal sided, middle tooth of the hinge complicated, with a small hollow on each side, and lateral side-teeth: thirty-seven species.

“ The shells of this genus are usually thin, brittle, and remarkably light. *Mactra stultorum* is a common species. (PLATE 4.)

“ *Donax*. Margin of the shell often crenulate,

the anterior slope very obtuse ; hinge with two cardinal teeth, and one lateral tooth.

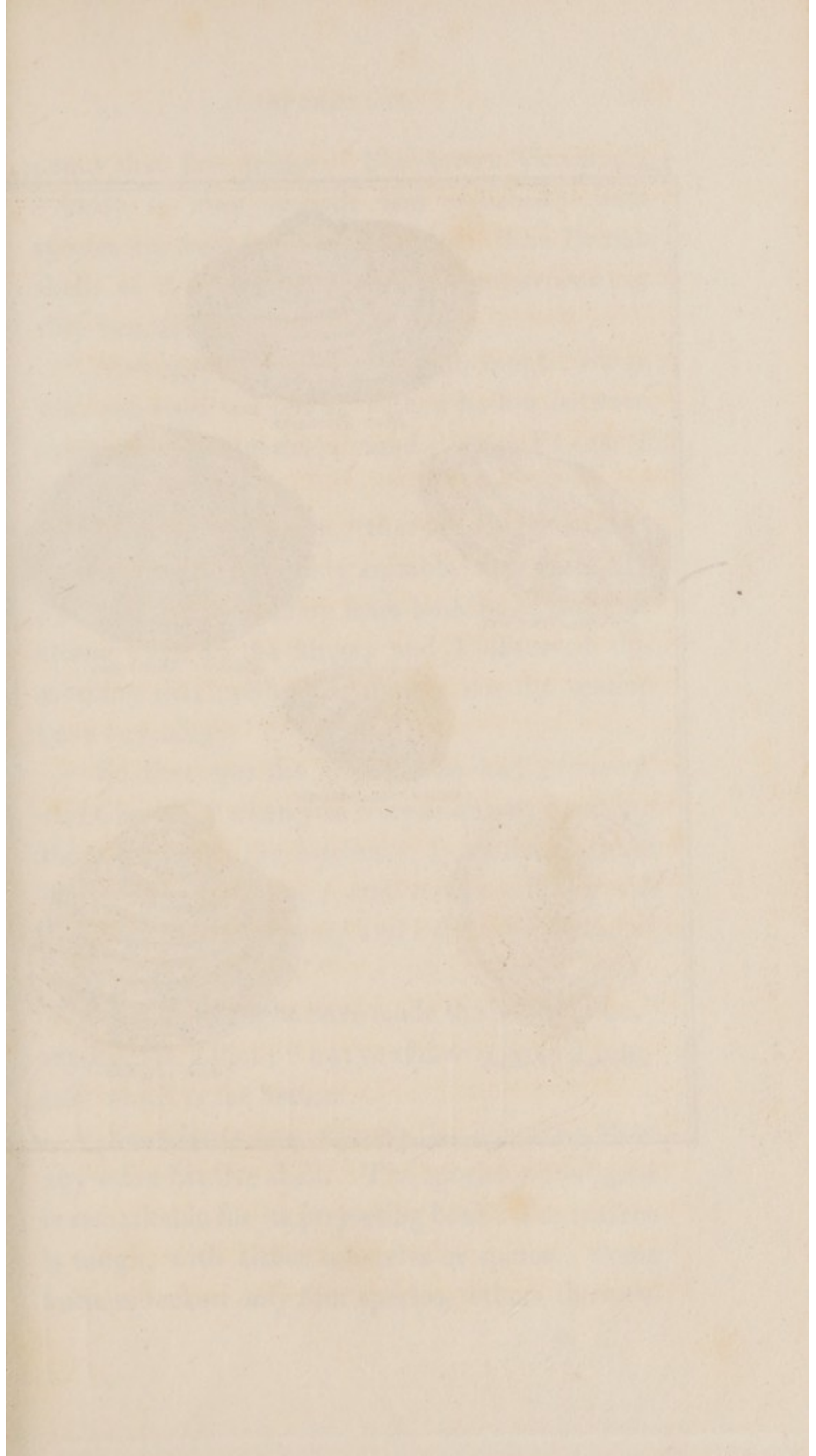
“ The most striking characteristic of *Donax* is the broad, thick extremity of one end, gradually lessening towards the other. A rich purple tint is very frequent in these shells. *Donax denticulatus* and *trunculus* are common British examples. (PLATE 4.) You must remark the ligament of *Donax*, which is exterior.

“ Our next genus ranks highest for beauty among the bivalves, and takes its name from the goddess *Venus*. The species amount to one hundred and sixteen in the Linnæan system, but other authors have formed several new genera.

“ Shell bivalve, having the lips incumbent on the anterior margin ; hinge with three teeth, all approximate, the lateral ones diverging at the lip.

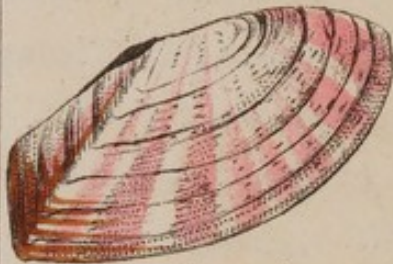
“ I am afraid,” said Lucy, “ that we shall find this genus very difficult : I wish you would tell us the new genera that have been formed out of it.”

“ Learn first to know the general appearance of *Venus*, and remark especially the *teeth*. You may also bear in mind that the *beaks* are almost always turned to the posterior slope, and from the ligament. The area and areola are also very conspicuous : the area is generally large, and differently coloured to the disk. *Venus Paphia* is pretty. (PLATE 4.) The spinous species, *V. Diòne*, is more beautiful, and is the only shell of the





*Mya truncata*



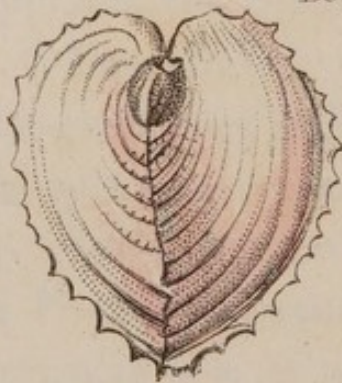
*Tellina feroensis*



*Mactra stultorum*



*Donax denticulata*



*Cardium cardissa*



*Venus paphia*

enus that has spines. The brown Venus, *V. lionè*, is very smooth and polished; both species are frequent in collections. The British shells of this genus are neither numerous nor very beautiful.

“*Spondylus*. Valves unequal, rough; hinge with two recurved teeth, with a hollow between them; shell sometimes eared. (See PLATES 43 and 5.)

“I think,” said Lucy, “that the English name, *thorny oyster*, is not very suitable: it is more like a scallop; but it differs from both in having two strong teeth in the hinge, and I observed this morning that neither the oyster nor the scallop have any hinge.”

“So that was the object you had in view,” said Charles, “when you were so quietly handling those shells in the kitchen: I confess I could hardly help laughing; and now my father will say that *you* are ‘*Eyes*,’ and I the ‘*No Eyes*,’ of ‘*Evenings at Home*.’”

“Perhaps I might have made the observation,” replied Mr. Elliot; “but you have reproved yourself, which is far better.

“*Spondylus* can scarcely be mistaken from any other bivalve shell. The species *gædaropus* is remarkable for its projecting beak; the surface is rough, with either tubercles or spines. Some authors reckon only four species, others thirteen.



The *Spondyli* are frequently found attached to rocks at some depth in the ocean. The animal is eaten on the coasts of the Mediterranean. We have no British *Spondylus*.

“*Chama*. Shell thick; hinge with a thick tooth, sometimes crenate, obliquely inserted into a corresponding channel. (PLATE 5.) The shells of this genus vary greatly, which you will perceive upon comparing *C. gigas* and *C. cor*. (See PLATE 9, *Isocardia cor*.) The *Chama* genus is usually ribbed, foliated, or scaly. *C. Lazarus* is a beautiful species: *C. cor* is a British species, and the only one. The whole number is twenty-five.

“Here is *Noah's-ark*, an example of the genus *Arca*, and is found on our own coasts. The long hinge beset with sharp teeth, inserted into each other, renders the genus sufficiently marked; but in some species the hinge is curved. The form varies exceedingly. The number of species is forty-five. (PLATE 5.)

“*Ostrea*. In this well-known genus we lose sight of the *toothed* hinge. Take that *Pecten*, or scallop, which belongs to one division of *Ostrea* in this system, and tell me what holds the valves together. Charles is silent; what says Lucy?”

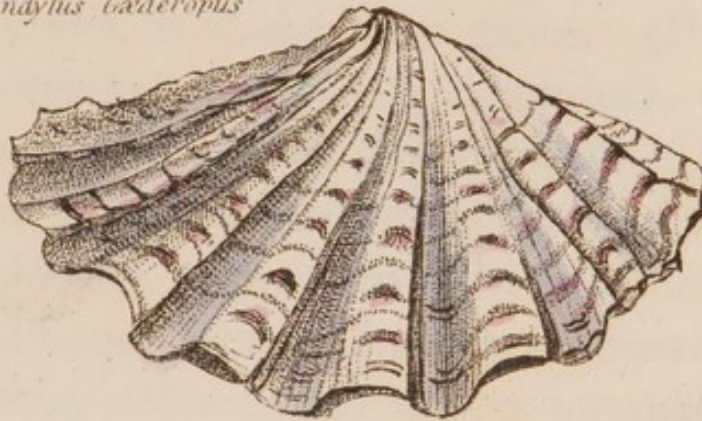
“Here are the remains of the same kind of substance which we saw in *Donax* and in *Venus*. I think it is called the *ligament*.”



*Spondylus Gaderopus*



*Arca Noë*



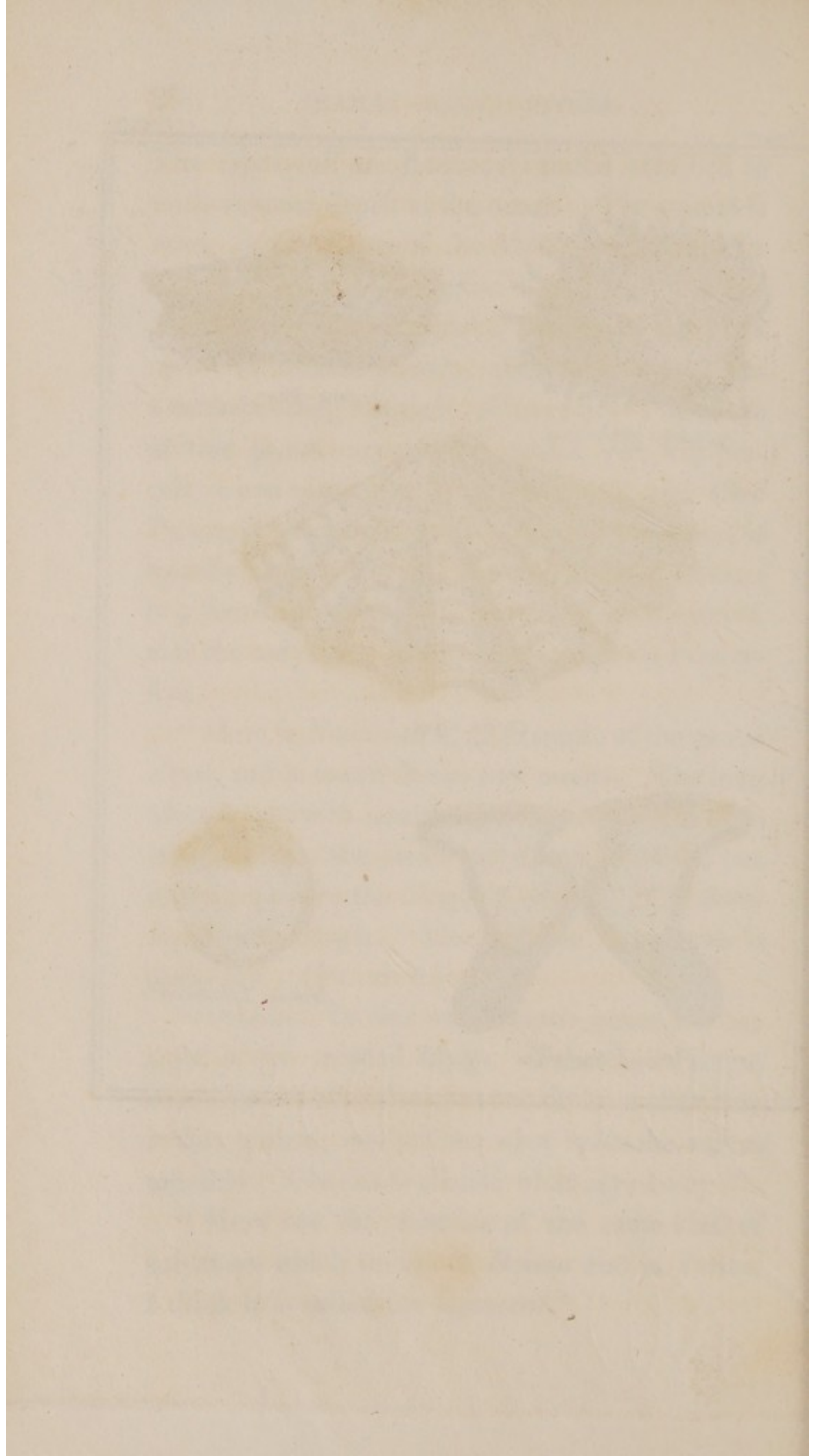
*Chama Gigas*



*Ostrea Isognomon*



*Anomia Ephippium*



“ Very well remembered,” continued her father. “ The generic character of this very large portion of bivalves is, shell bivalve, usually with unequal valves: hinge without teeth, having a hollow cavity or sinus, and sometimes grooved. Here is a young common oyster, and, according to the rule of our present system, this shell, *Ostrea isognomon*, is of the same genus, (PLATE 5.) The number of species is eighty-four, of which thirteen are British. The old shells of common oysters are often covered with *Serpula*, *Lepas*, and *Anomia*, and some kinds of corallines.

“ The next genus, *Anomia*, is remarkable for the thin, delicate, and almost transparent appearance of the shells. The valves are unequal, and frequently perforated near the apex; hinge toothless; in the flat valve, two bony rays.

“ *Anomia epthippium* has a large perforation, through which the animal passes a ligament, and attaches itself to other substances. These shells are often to be found on oysters. (PLATE 5.) Species thirty-two.

“ *Mytilus*. The principal characters are, shell bivalve, rough, often affixed by a thick byssus, or beard; hinge without teeth, with a hollow line extending lengthways. (PLATE 3.)

“ The common muscle, *Mytilus edulis*, must be well known to you, and also the fine polish that the shells will take when cleared of the rough

exterior by artificial means, *Mytilus barbatus* is not unfrequent on our shores; the colour is brown, and the shell is shaggy. Number of species, forty-nine.

“ Our last bivalve genus is *Pinna*. The generic characters—shell bivalve, brittle, erect, gaping at one end, throwing out a byssus; hinge without teeth. (PLATE 6.)

“ The *Pinna* race are found plentifully in the Mediterranean, the Indian, American, and Atlantic oceans: the British seas afford three species. The genus is noted for producing a fine byssus, that is manufactured in Italy into various articles, as gloves. The animal is sometimes used as an article of food.

“ An ancient writer asserts that the *Pinna* is attended by a crab, that finds a habitation in its shell, and repays the favour by giving notice, by a gentle nip, when a fish comes within reach; the *Pinna* opens the valves of the shell, and secures the prey, which serves for the food of both. Now, Charles, you know the whole sense of the quotation—

“ ‘ The anchor'd pinna and his cancer friend. ’ ”

## CHAPTER V.

THIRD DIVISION.—*Univalves.*

“FATHER,” said Lucy, the next time they met to pursue their study, “I think we have made ourselves familiar with the various hinges of the bivalve shells, which are becoming favourites with us; but from the variety of fine specimens which you have on your table, I see that we shall be much gratified in examining the univalve division.”

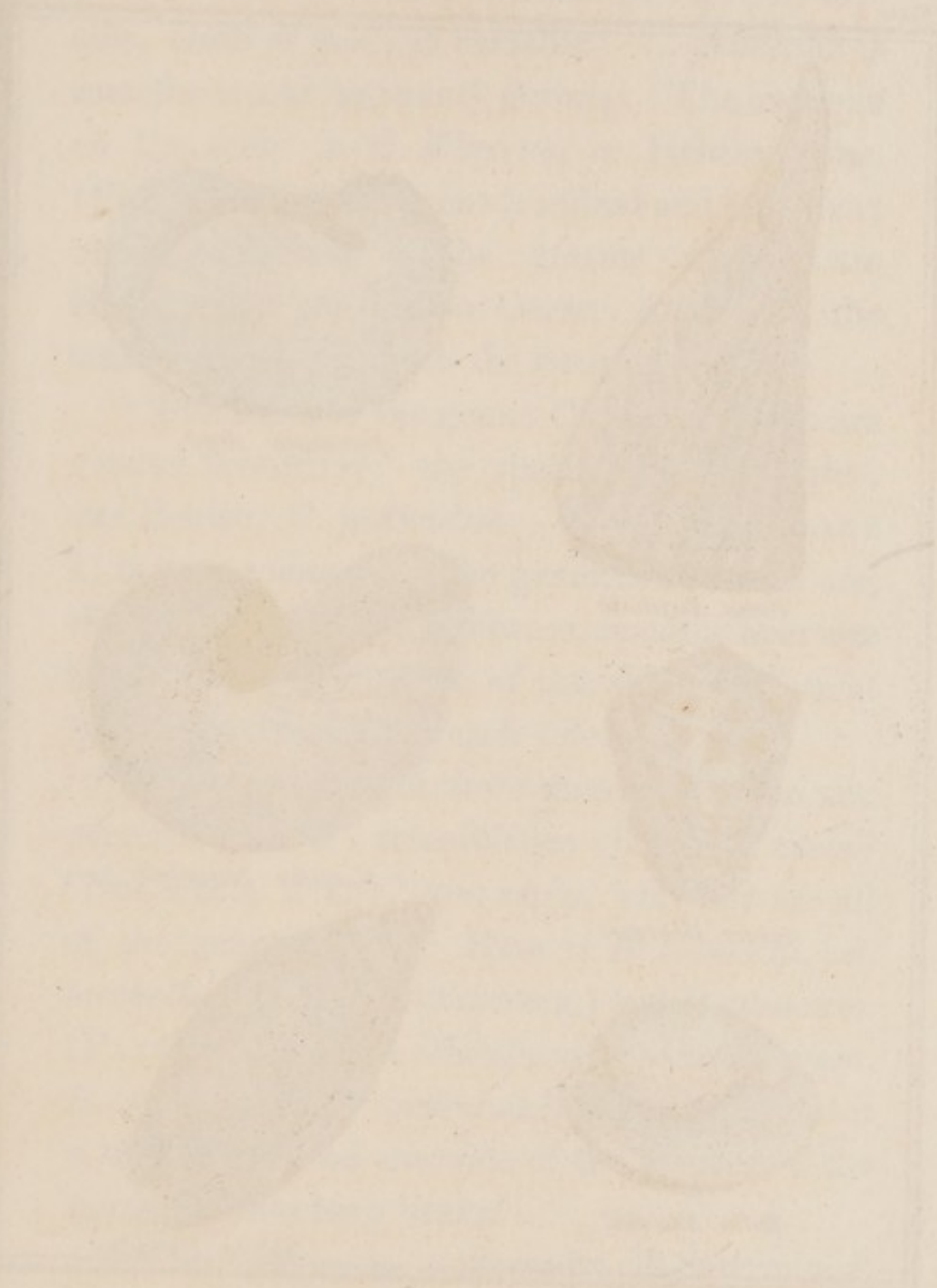
“My first genus is very beautiful,” replied Mr. Elliot; “it is *Argonauta*, or paper-sailor. The shell is univalve, involute, unilocular, or without chambers: the aperture cordate. (PLATE 6.) These shells are spiral, and remarkably brittle. The argonauts are supposed to be the shells that taught mankind the use of sails in the earliest ages of society. In calm weather the animal rises with its shell to the surface of the water, and spreads its arms over the edge; these arms answer the purpose of oars. It then spreads a membrane for a sail, which can be turned in any direction, and is impelled forwards by the

breeze: two other arms serve as rudders to direct the course. The animal first raises itself to the surface of the sea by ejecting a quantity of water; if danger occurs, it absorbs water, and thus, by making itself heavier, sinks to the bottom. The species are few in number.

“ *Nautilus*, pearly sailor, has several characteristics of *Argonauta*; but the former is conchaminate, the latter without chambers in the shell. The generic characters of *Nautilus* are, shell univalve, divided into several compartments, communicating with each other by an aperture. *Nautilus pompilius* is often cut through, or bisected, to display the chambers of the shell. In the East, the shells are formed into drinking-cups. Sometimes the outer coat of the shell is removed, and the pearly surface finely carved. This genus, according to Linnæus, consists of fifty-eight species, some of which are fossil. (PLATE 6.)

“ In the following genera we must pay particular attention to the *aperture* of the shell, which is a generic distinction in most univalves.

“ The first is *Conus*, a large and beautiful genus, including many rare and valuable species. Shell univalve, turbinata, aperture effuse, or having the lips separated by a sinus, linear, without teeth, pillar smooth. In their natural state the shells are usually covered with an epi-







*Pinna Pectinata*



*Argonauta Argo*



*Conus Hebraeus*



*Nautilus Pompilius*



*Bulla Naucum*



*Voluta Utriculus*

dermis ; but will bear a brilliant polish. *C. textilis*, cloth of gold, is valuable. *C. generalis* is sometimes sold for twenty guineas. The example on the table is *C. Ebræus*, or Hebrew cone. (PLATE 6.) Species one hundred and fifty-five ; not one British. The greater number are brought from the Indian Ocean ; some from the seas of Africa and from the South Sea.

“ The shells of the genus *Cypræa*, cowry, are general favourites : the species are fifty-eight ; one British, *C. pediculus*. *C. moneta* (PLATE 1) is very common. The generic characters are, shell univalve, involute, obtuse, smooth ; aperture linear, the whole length of the shell ; effuse at both ends, toothed on each side.

“ Look carefully at those three shells : do you perceive much resemblance between them ? ‘ Not much, if any,’ you reply, yet they are all of the genus *Bulla*. Here is *B. lignaria*, *B. terebellum*, (see FRONTISPIECE,) and *B. naucum*. (PLATE 6.) There are other forms, as the *B. ovum*, *B. volva*, the first somewhat like a cowry ; but it is toothed only on one side of the aperture ; the second has two long beaks.

“ This genus is confessedly ill-determined. *B. naucum* and *B. ampulla* are examples of the common characters of the genus. The species are sixty-one.

“ *Voluta* is also a large genus, containing one

hundred and eighty-six species. Shell univalve, aperture without a beak, and somewhat effuse; columella *plaited*. This latter character we meet with for the first time. Here is the common *Voluta*. (PLATE 6.) The genus has been much diminished by forming other very striking genera out of it, as I shall soon show you, under the names of *Mitres*, *Olives*, *Gondolas*, &c. *Voluta musica*, the music-shell, is remarkable, and not at all rare.

“ *Buccinum* is another large genus. The shell univalve, spiral, gibbous; aperture ovate, ending in a canal turning to the *right*, with a short beak; pillar-lip expanded. Species, one hundred and seventy-two.

“ You must recollect that when the apex of the shell is turned *downwards* the canal turns to the right, when it is turned *upwards* the canal will be to the left hand. My example is *Buccinum reticulatum*, a very common species upon our own shores.” (PLATE 7.)

“ Is not this genus reduced by other authors?” asked Charles.

“ Greatly,” replied Mr. Elliot: “ you will meet with tuns, helmets, harps, and needles. Species of the *Buccinum* genus are found in the African, American, Indian, European, and Southern oceans. Eighteen occur upon our coasts.

“ *Strombus* contains forty-four species. Shell univalve, spiral, aperture much dilated, the lip expanding, ending in a canal inclining towards the left.

“ You must notice the sinus in the outer lip, near the base of the shell. *Strombus gigas*, the West Indian conch, is very large. Some species have the lip ending in claws. *Strombus pes-pellicani*, the pelican's-foot, has four palmated claws : (PLATE 7 :) it is a British shell. The city of Santa Cruz, in America, is paved with the shells of *Strombus gigas*.

“ The genus *Murex* is both large and beautiful. Shell univalve, spiral ; aperture oval, ending in a straight canal.

“ These shells are of very unequal form ; their surfaces frequently covered with spines, knobs, or foliations. Some are remarkable for the great length of the beak, (FRONTISPIECE,) such as the woodcock, the snipe's-head, and Venus's-comb. The *Murex* before you is foliated. (PLATE 7.) The species are one hundred and seventy-one. Several are found on British coasts, but they are not remarkable for beauty.

“ The top-shell, *Trochus*, is univalve, conic, spiral ; the aperture either angular or rounded ; columella oblique : some of the apertures have a tooth-like projection. (PLATE 7.) Species, one hundred and thirty. Several kinds occur in

Britain. New Zealand, Friendly Isles, Red Sea, and most other seas, afford the various species. Two of this genus have the power of collecting parts of shells and other testaceous substances, which adhere strongly to the whorls of the shell: it is called the Conchologist. The other, named Mineralogist, is loaded with stones, pebbles, ores, &c. When heavily laden they are considered rarities.

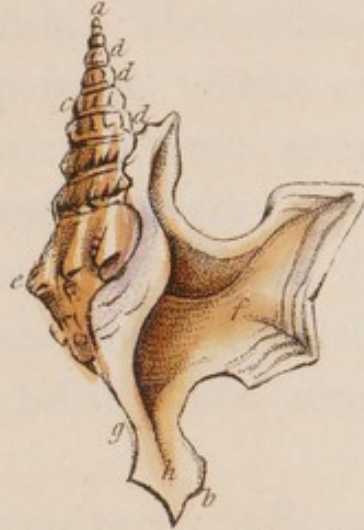
“There is a great similarity between the genera *Turbo* and *Trochus*. You must observe the generic distinction carefully. Shell univalve, spiral; aperture contracted, orbicular, entire. The one hundred and sixty-seven species have been much divided by other writers. The golden-mouthed *Turbo* is a very fine shell. This genus also contains the common periwinkle, an inhabitant of most European shores. Sailors report that if the animal is seen creeping high up the rocks, it foretells stormy weather. *Turbo muricatus* is a pretty shell.” (PLATE 7.)

“Now we can tell the next genus,” said Lucy. “*Helix*, snail. But what a number of different shapes, father, those shells have! they are not all snails, I should think, that you have placed on the table.”

“According to Linnæus they are all of the genus *Helix*, which contains two hundred and sixty-seven species. Many kinds are land-



*Buccinum Reticulatum*



*Strombus Pes-pelicanus*



*Murex Ramosus*



*Turbo Muricatus*



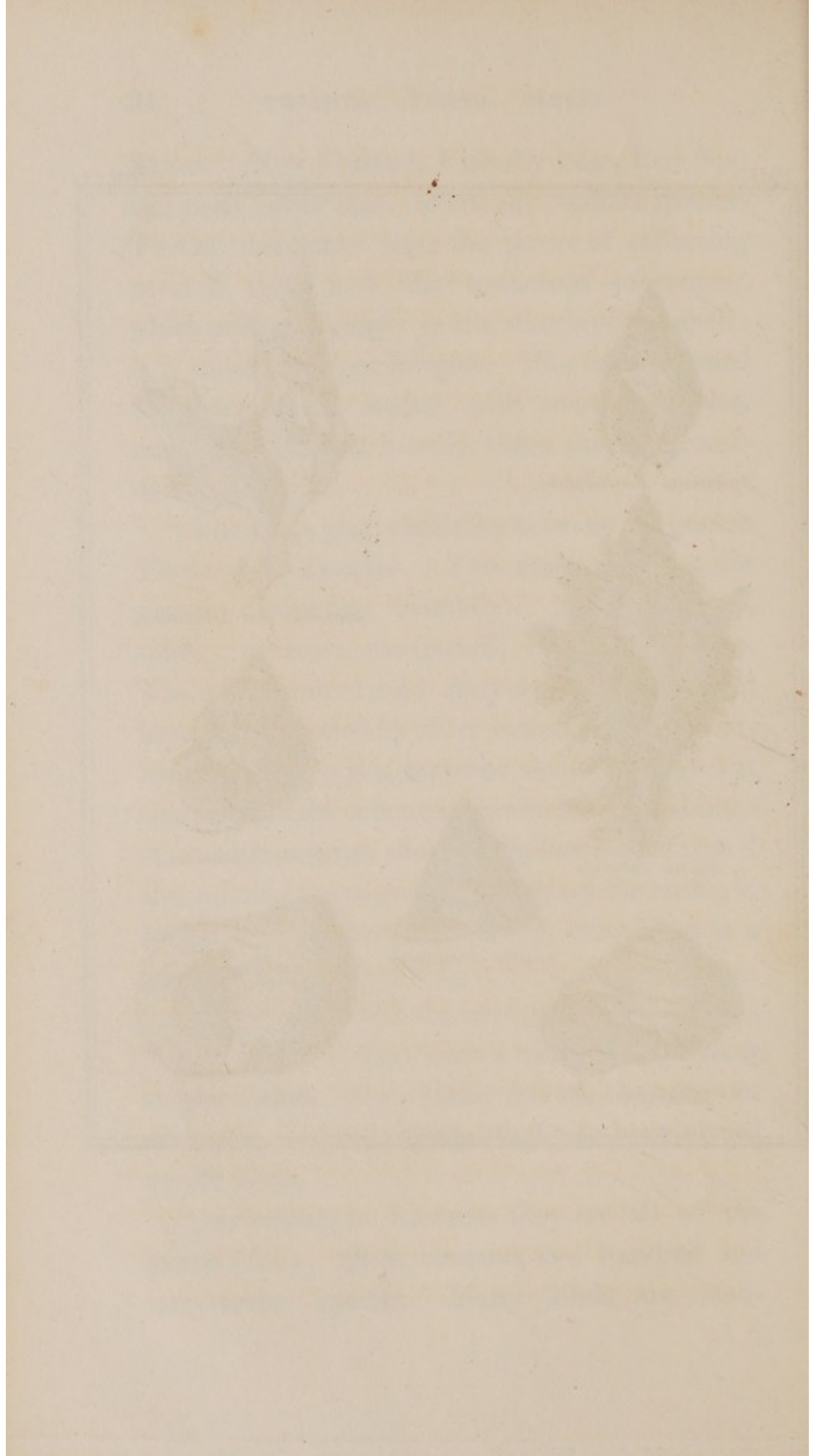
*Trochus Bifaciatus*



*Helix Nemoralis*



*Nerita Striata*



shells; others live in fresh water; few inhabit the sea.

“ Shell univalve, spiral, brittle; aperture contracted, semilunar, or roundish. The common snail is well known to most persons. *Helix nemoralis*, the wood-snail, is very pretty; sometimes it is pink, with brown bands, or plain yellow, or yellowy banded with brown. (PLATE 7.) The greater part of this genus consists of shells remarkable for their thin, brittle, and semi-transparent substances.

“ The *Nerita* genus is **not** very pretty: (PLATE 7:) the texture of the shell is in general much thicker than that of *Helix*. The shell is spiral, gibbous, pillar-lip transversely truncated, flattish. Seventy-six species. *Nerita polita* is a handsome species: those most valued are from the South Sea.

“ We have now lost sight of the pillar-lip, and in the genus *Haliotis* we find a flat, ear-shaped shell, the spire nearly hidden, the disk perforated lengthways with pores. Species twenty-one. The animals that inhabit the ear-shells fasten themselves so firmly to the surfaces of rocks, that much force is needful to disengage them: during the fine nights of summer, the animal feeds on the herbage that grows on the sea-shore. The sea-ear from New Zealand, and that from California, are superb shells of considerable size. The British species, *Haliotis tuberculata*, is not uncommon. (PLATE 8.)



Without a regular spire: 5 genera.

“ You are well acquainted with *Patella*, the limpet: one species of this genus is very common on the rocks by the sea-side. (PLATE 1.) In the *Patella* genus we lose sight of a spire; the shell is nearly conic, and shaped like a basin. The species are very numerous, exhibiting great variety of form; the number is two-hundred and forty.

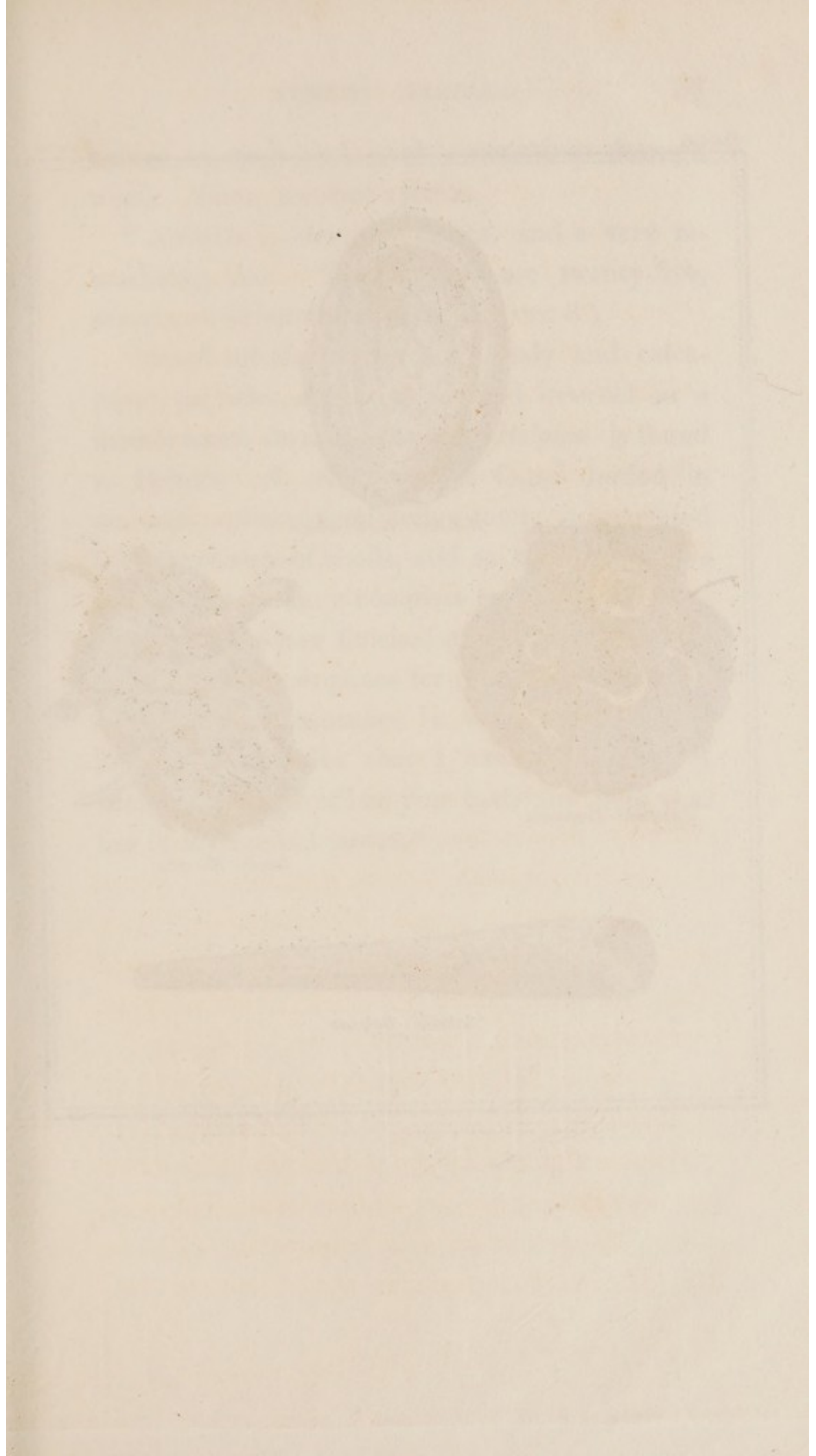
“ The form of *Dentalium* is easily known. The shell is univalve, nearly straight, tubular, not chambered, and open at both ends.

“ The species called elephant's-tooth is slightly curved, the colour green, (PLATE 2.) It is found in the European and Indian seas. There are only twenty-two species. *Dentalium entalis*, the dog's-tooth, is very common.

“ The *Serpula* genus is remarkable. The shells are tubular, frequently closed at one end. They are often found in clusters, adhering to rocks, stones, fuci, shells, &c.

“ There is *Serpula triquetra* upon a *pecten*, (PLATE 8.)

“ From the appearance of this piece of timber you may form some idea of the devastation committed by the *Teredo*, or ship-worm. (PLATE 8.) The shell is tubular and flexuose; two





*Haliotis Tuberculata*



*Serpula Triquetra*



*Teredo Navalis*



*Sabella Belgica*

valves at each end, and penetrating through wood. There are four species.

“*Sabella* is the last genus, and a very remarkable one. The species are twenty-five, several of which are British, (PLATE 8.)

“Shell tubular, formed of sandy and calcareous particles, agglutinated, and inserted in a membranous sheath. *Sabella Belgica* is found in Britain. *S. chrysodon* is found buried in sea-sand, often several inches long; it is covered with fragments of shells, and so brittle that it is not easy to obtain a complete specimen.

“We have now finished our Linnæan genera, and here we must pause for the present. If you wish for any assistance in your study of the thirty-six examples that I have given you, I shall be ready to afford you both any help that lies in my limited power.”

CHAPTER VI.

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“Lucy and I have been collecting a variety of species,” said Charles to his father, “since our last lesson in conchology. We have also seen several large collections of shells, one of which was arranged according to Lamarck. I was much pleased with the new genera taken from *Buccinum*, *Bulla*, *Turbo*, and others.

“We are desirous of gaining information on this new system, if you can spare a little time to attend to us.”

“Willingly,” replied Mr. Elliot; “I anticipated such a request, and have been making lists of the genera belonging to each system; so that, upon meeting with a new genus, you may be able to ascertain with some accuracy its place in the old arrangement.

“Lamarck founds his system upon the structure and form of the animals, so far as they have been ascertained, and with which the exterior, or shell, must necessarily coincide. The conchology occupies the three last *classes*, and *one order* of another class, in the well-known work which I have before mentioned to you.

“To begin with the 3rd Order of the 9th Class :—

Class, *Annularia*. Order, *Sedentaria*,  
Annulated Worms.

LAMARCK.		LINNEUS.	
<i>Siliquaria</i> ,	taken from	<i>Serpula</i> .	
<i>Dentalium</i> ,	—	<i>Dentalium</i> .	
<i>Pectinaria</i> ,	—	<i>Sabella</i> .	
<i>Sabellaria</i> ,	—	<i>Sabella</i> .	
<i>Spirorbis</i> ,	}	—	
<i>Serpula</i> ,			<i>Serpula</i> .
<i>Vermilia</i> ,			
<i>Galeolaria</i> .			
<i>Magilus</i> .			

“There has been much variation in the opinions of naturalists respecting the proper place of genus *Dentalium*. Cuvier, a very celebrated writer, agreed nearly with Lamarck; but still more recently it has been considered as nearest to a new genus, *Fissurella*, (*Patella*.) The fossil-shells are found in London clay in great numbers; in the marle at Folkstone, &c.

“*Spirorbis*. All the species are minute, fixed upon sea-weeds, and other marine substances. The animal which inhabits them is of a deep red colour.

“ *Galeolaria* is a New Holland genus.

“ *Magillus* is found in the Isle of France ; the shell is sometimes three feet in length.

“ Class 10th. *Cirrhipeda*, contains two orders : the first, *sessile*, or placed upon some other body ; the second, *pedunculate*, and fixed at the extremity of the pedicle to other substances.

“ The class takes its name from the *Cirrho*, or feathery tentacula. The genus *Lepas* only is contained in the *Cirrhipeda* class.

“ 1st Order. Shells Sessile.

Genera.

<i>Tubicinella.</i>	}	All included in <i>Lepas</i> .
<i>Coronula.</i>		
<i>Balanus.</i>		
<i>Acasta.</i>		
<i>Creusia.</i>		
<i>Pyrgoma.</i>		

“ The first genus contains but one species ; the shell is buried up to its aperture in the skin and fat of whales.

“ The second, *Coronula*, is found inserting itself in the sea-turtle, &c.

“ *Balanus* is known to you as the acorn-shell ; a genus widely diffused ; abounding on rocks, shells, and wood, in large colonies.

“ *Acasta* is found upon sponge.

“ For examples of *Creusia*, we must examine our *madrepores*, and other corals; the shells of this genus are either affixed or buried in them.

“ *Pyrgoma* likewise adheres, or penetrates into corals.

“ In the ‘Penny Cyclopædia,’ under the word *Cirrhipeda*, you will find much useful information, and some plates that will give you a good idea of this class. In the British Museum you may see many of the species, and may thus make yourselves familiar with them.

“ 2nd Order. Shells pedunculated.

<i>Pentalasmis</i> , ( <i>Anatifera</i> .)	}	<i>Lepas</i> .
<i>Pollicipes</i> .		
<i>Cineras</i> .		
<i>Otion</i> , ear-barnacle.		

“ We have already noticed *Pentalasmis*, or barnacle, (PLATE 2.) The generic name is changed by later writers; so are those of the two last.

“ *Pollicipes* resembles *Pentalasmis*, with a shorter pedicle, which is rough. The natives of Goree are said to eat a large species of *Pentalasmiſ*.”

“ I think we shall not fail to recollect the



*Cirrhipeda* class," said Lucy; "the forms of the shells are remarkable: and those that live on *Madrepores* I shall search for immediately; but what a number of new genera are taken from the single one of *Lepas*!"

"Since the time of Linnæus," replied Mr. Elliot, "many more observations have been made upon the shells that he had examined; many new shells, both genera and species, have been found; and there is little doubt that, if Linnæus had now been living, he would have found his own genera inadequate, and would have established new ones. I fear you will have to regret the opposite extreme, and complain of the multiplicity of new genera, and new names. Our object is to become familiar with the shells, and by knowing the Linnæan name, and that bestowed by Lamarck, two authorities very generally cited, you may understand what species is alluded to by modern conchologists. The names of Bruguières, Leach, Gray, and Sowerby will often occur among many others.

"For example: let us take the plate of a remarkable multivalve; you find that it is named *Scapellum vulgare*, and that it is so called by Leach. Below, you find '*Pollicipes scapellum*, Lamarck;' and on referring to our comparative lists we find that the shell was a *Lepas*, (*L. scapellum* of Linnæus.)"

“ But they have kept the specific name,” observed Charles.

“ And made it the generic,” said Mr. Elliot: the peculiarities and variations are deemed insufficient to found a new genus.

“ Here we shall pause for the present; and then proceed to the 11th Class.”

## CHAPTER VII.

ELEVENTH CLASS.—*Conchifera*.

Two Orders.—1st. *Bimusculosa*, two muscular impressions.

2nd. *Unimusculosa*, one muscular impression.

“THIS class,” observed Mr. Elliot, “contains all the bivalves of Linnæus, and some genera taken from the univalves and multivalves.

“The animals of this class are *shell-bearers* or *carriers*, they remain constantly fixed in their habitations: the body is fastened to the shell by one or two strong muscles: when the shell is vacant we find the *cicatrix*. Refer to your explanation of terms, and you will find the word.

“The body is soft, without joints, without head or eyes; it is wrapped in a mantle or tunic. The mouth, always hidden in the tunic, is merely an opening to admit food, without jaws or teeth. The shell is always bivalve; the valves united

by a hinge or a ligament; sometimes there are accessory pieces to the valves.

“ Some of the *Conchifera* are furnished with a kind of foot, which enables them to move with their shells, to draw out fibres by which they fasten themselves to marine bodies. The muscles that fasten the animals to their shells are thick and strong; their use is, to close the valves by contracting; when the muscle is relaxed, the elastic ligament is sufficient to open them. The *Conchifera* are all aquatic; some inhabit fresh water, the others dwell in the sea.

“ The class contains nineteen families and two orders. The first order, *Bimusculosa*, contains thirteen families. The first includes genera that you will scarcely expect to find among the bivalve shells.

“ 1st Family, *Tubicolaria*, contains,  
*Aspergillum*, Watering-pot .. *Serpula*.  
*Clavagella* ... .. ———  
*Firtuluna* .. .. .  
*Septaria*..... *Serpula*.  
*Teredina* .. .. . Fossil genus.  
*Teredo* .. .. . *Teredo*.

“ *Aspergillum Javanum* is a rare and curious shell from the Indian seas, (PLATE 9.) The whole family is remarkable, and was referred,

you perceive, to a very different order. *Clavagella* was till lately considered as existing only in a fossil state. The researches of recent travellers have discovered *Clavagella* at Port Jackson, in Australia.\* There is a specimen in the British Museum. The valves are enclosed in the tube.

“ The valves of *Teredo* are noticed as forming part of the Linnæan generic character, you will recollect. Lamarck considers them as true *Conchifera*. In many specimens of *Teredo* the valves are wanting, and the tube only remains.

“ The family *Pholadaria* contains,

*Pholas* ..... *Pholas*, stone-piercer.

*Gastrochœna*..... *Pholas* and *Mya*.

“ Notwithstanding the accessory pieces of the hinge, *Pholas* is placed among bivalve shells, the essential character of which is to have two valves united by a hinge. The *Pholas* has a foot or strong muscle, very thick and short. In the next genus, composed of *Pholas hians* and *Mya dubia* there are no secondary valves.

“ Allied to this family is *Xylophaga dorsalis*, a curious shell. One specimen has been lately found at Gravesend, upon a stick.

\* See Penny Cyclopædia, article *Clavagella*.

“ *Solenacea* includes

<i>Solen</i> .....	<i>Solen.</i>
<i>Panopæa</i> .....	<i>Mya.</i>
<i>Glycimeris</i> .....	<i>Mya.</i>

“ The *Solen* is furnished with a muscle, called by some writers a tongue. By the aid of this instrument they descend two feet deep in the sand. The tongue is first projected from the shell, and cuts a hole. It then assumes the form of a hook, and draws down the shell into the hole. This operation is repeated until the shell disappears. *Panopæa* is a large shell—it is in the Museum.

“ 4th Family, *Myaria*.

<i>Mya</i> .....	<i>Mya</i> , or gaper.
<i>Anatina</i> .....	<i>Mya.</i>

“ The animal of *Mya* has also a foot : it buries itself in the sand. You know the broad tooth of the *Mya* genus. *Anatina* has a tooth on each valve.

“ Second Section contains four families.

“ *Mastracea* has the following genera :

<i>Lutraria</i> .....	<i>Mactra.</i>
<i>Mactra</i> .....	<i>Mactra.</i>

<i>Crassatella</i> .....	<i>Mactra</i> .
<i>Erycina</i> .....	————
<i>Ungulina</i> .....	————
<i>Solenomya</i> .....	<i>Mya</i> .
<i>Amphidesma</i> .....	<i>Tellina</i> .

“ *Crassatella* is a genus from the seas of New Holland. The shell is very thick, with a brown epidermis. A fossil species is found at Hordwell cliff. There are several species also found in the chalk. *Mactra*, *Lutraria*, and *Erycina* are found in a fossil state. *Crassatella sulcata* is common in London clay.

“ The family *Corbula* contains two genera.

<i>Corbula</i> .....	————
<i>Pandora</i> .....	<i>Tellina</i> .

“ *Corbula* comes chiefly from the Asiatic Seas. There is *one* species, formerly *Mya inequivalvis*, from the British Ocean; fossil species several. *Pandora rostrata* is British, and is said to be met with at Weymouth. It is a pretty shell. The ligament of these is internal.

“ *Lithophaga* includes

<i>Saxicava</i> ... ..	<i>Mytilus</i> .
<i>Petricola</i> .....	
<i>Venerupis</i> , or Venus of the rocks.	

“ These genera consist mostly of small shells, inhabiting stones, into which they bore holes. *S. rugosa* is British. *Venerupis perforans* is found on our coasts in stones. The valves of these shells have no accessory pieces like *Pholas*.

“ *Nymphacea* is the next family, containing, in the first section,

<i>Sanguinolaria</i> .....	<i>Solen.</i>
<i>Psammobia</i> .....	<i>Tellina.</i>
<i>Psammotæa</i> .....	————

“ In the genus *Psammobia* we find our *Tellina Feroensis*. (PLATE 4.) The shells of this and the preceding genus resemble the solens in a trifling degree, being a little open at the sides. In form they are near *Tellina*, but have not the fold on the anterior valve, but an angle on *each* valve. The ligament is exterior.

“ In the second section are—

<i>Tellina</i> .....	<i>Tellina.</i>
<i>Tellinides</i> .....	<i>Tellina.</i>
<i>Corbis</i> .....	<i>Venus.</i>
<i>Lucina</i> .....	<i>Venus and Tellina.</i>
<i>Donax</i> .....	<i>Donax.</i>
<i>Capsa</i> .....	<i>Donax.</i>
<i>Crassina</i> .....	<i>Venus.</i>



“There is but one species of *Tellinides* from the island of Timor. The genus *Corbis* is fossil, with one exception, *Corbis fimbriata*, from the Indian Ocean. *Lucina* is a pretty genus of shells. *L. carnaria* is frequently found in collections. The interior of the valves is of a deep red colour: the muscular impressions are very distant from each other; one is greatly lengthened out; the valves delicately striated. *Capsa* is taken, you perceive, from *Donax*.

“*Tellina* is found fossil on the borders of the Red Sea, also in the county of York. Of *Donax* and *Mactra* the fossil species are few.

“In the third section of this order we find six families. 1st. *Conchæ*, which are of two kinds, fluviatic, living in fresh-waters; and marine, or living in the sea. Of the first are,

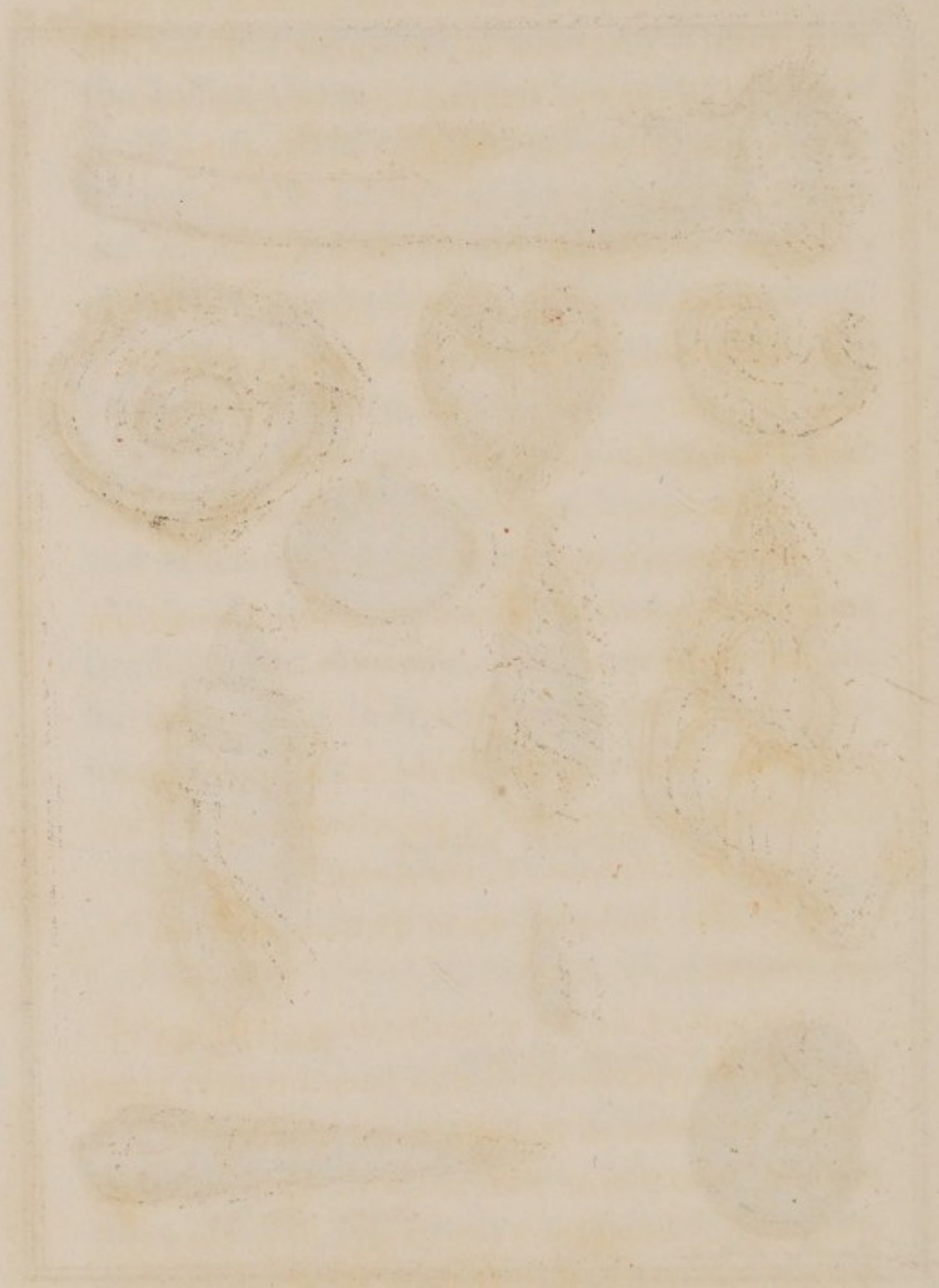
*Cyclas*, taken from *Tellina*.

*Cyrene*, partly from *Tellina* and *Venus*.

*Galathea*, *Venus paradoxa*, (one species.)

“*Cyclas rivicola* (PLATE 9) will give you an idea of this genus: it is *Tellina cornea* of Linnæus. The species are very common in lakes, rivers, and ponds: it abounds in river-sand, from which you may often procure perfect specimens. Lamarck observes that it is rare in France; but appears common in the Thames.





“ *Cyrene* is a foreign genus.

“ In the *Conchæ marinæ* the genera are very numerous. They are all assembled under the *Venus* of Linnæus. Lamarck reduced the genus ; but it has been yet further divided by later writers.

*Cyprina,* }  
*Cytherea,* } From *Venus*, Lamarck's genera.  
*Venus,* }

But *Pullastra*,

*Astarte*,

*Venerupes*,

and *Potamophila* have been since withdrawn from the original genus.

“ *Pullastra* was the name of a species, and includes *V. pullastra*, *V. papilionacea*, *V. decussata*, *V. litterata*, *V. virginea*.

“ *Astarte* includes some British species, *V. Scotica*, &c.

“ *Potamophila* is a scarce river-shell from Ceylon. Some species have also been brought from Congo by African travellers. The form is triangular, very thick, covered with an olive-green epidermis. Lamarck's two genera have been still further reduced ; but I shall refer you to the Museum for their new names. Observe, in

*Venus* there are three cardinal teeth, close together, on each valve, with divergent lateral teeth. *V. lamellata* is rare and beautiful, from the seas of New Holland. There are many species of *Venus* in a fossil state. In *Cytherea* we find four cardinal teeth on the *right* valve, three of them near together, the fourth quite apart. The *left* valve has three cardinal teeth. *C. Dionè*, the thorny Venus, is a pretty shell with spines. You may easily procure it.

“*Astarte* has some fossil species in the crag and green sand : *A. obliquata* is one species.

“*Venericardia* is wholly a fossil genus : one species is found in the crag, *V. senilis*.

“ The family *Cardiacea* contains

*Cardium* ..... Cockle

*Cardita* ..... *Chama* (some species.)

*Cypricardia* ..... ———

*Hiatella* ..... *Mya*.

*Isocardia* ..... *Chama*.

“*Isocardia cor* is British. (PLATE 9.) There is a beautiful species, *Isocardia moltkiana* from the East Indies, which is much valued by collectors.

“ In the family *Arcacea* we find,

*Cucullea* ..... *Arca*.

*Arca* ..... *Arca*, ark-shell.

*Pectunculus* ..... *Arca*.

*Nucula* ..... *Arca*.

“The hinge of *Arca* in this arrangement is always *straight*, furnished with a number of teeth; the ligament is external. The shells are open at one end, for the animal throws out at the aperture a number of threads, by which it fastens itself to the rocks. The species are thirty-seven, and also several fossil.

“The orbicular form of *Pectunculus*, and its arched hinge, distinguish this genus from the preceding one. They are allied to the *Pectens* by their form, and their crenulated internal margin.

“The hinge of *Nucula* is set with little teeth on each side, like a comb. It is pearly within, and sometimes small pearls are found in the shell. *Pectunculus costatus* is found in London clay.

“*Trigoniana* is a small family containing *Trigonia* and *Castalia*. The first is a fossil genus chiefly. Some species are found in the Portland stone, or oölite beds.

“The next family contains the *Nayada*, chiefly composed of fluviatic, or fresh-water shells. They are covered with an olive-brown epidermis, which is constantly found eroded, or destroyed at the beaks. The muscular impressions are lateral and much separated; one of

them is formed of two or three distinct irregular impressions.

*Unio*, taken chiefly from *Mya*.

*Hyria* ..... *Mya*.

*Anodon* ..... *Mytilus*.

*Iridina* ..... Very rare genus.

“ *Unio* has two teeth on each valve; one is cardinal, the other lengthened out. The ligament is exterior—the shell pearly. *Unio pictorum* is common in rivers. The shell is used to hold small masses of gold or silver for artists, under the name of *shell-gold*.

“ *Anodon* is also to be met with in our rivers.

“ *A. anatina* is eaten by ducks and crows. The latter, when the shell proves too hard to penetrate, mount with it into the air, and letting it fall, pick out the fish from the broken shell.

“ *Chamacea* has only three genera.

*Diceras*.

*Chama* ..... *Chama*.

*Etheria*, a rare genus, from the Indies and Madagascar.

“ *Diceras* is a fossil genus—only two species known according to Lamarck.

“ Linnæus had assembled in his genus, *Chama*,

shells with equal and with unequal valves, shells fixed to other marine bodies, with those that are free; some with *one*, others with *two* muscular impressions. In the present genus, *Chama*, the shells are irregular, thick, scaly, or spinous. The hinge has one thick tooth, often notched: the beaks are bent inwards. They are found in the Indian, American, and Mediterranean seas. There are several fossil species.

“The first order, *Bimusculosa*, is finished. In our next lesson we shall proceed to the families and genera contained in the second, *Unimusculosa*.”



CHAPTER VIII.

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CLASS.—*Conchifera*.

Second Order.—*Unimusculosa*.

“ 1st family, *Tridacnacea*.

*Tridacna* ..... *Chama*.

*Hippopus* ..... *Chama*, (one species.)

“ In the first genus we find the great *Tridacna gigas*, the largest and heaviest shell yet known. It sometimes weighs five hundred pounds. The hinge has two teeth, the lunula is open, the valves equal, the ligament exterior.

“ *Mytilacea*.

*Modiola* ..... *Mytilus*.

*Mytilus* ..... *Mytilus*.

*Pinna* ..... *Pinna*.

“ The greater part of these genera attach themselves to marine substances by a byssus. The *Modiola* genus are rarely found fixed. The ligament internal, lodged in a marginal gutter. Beaks

nearly lateral; hinge without teeth. The genus *Pinna* is unaltered. Small crustaceous bodies, resembling the crab, are sometimes found in the shells of the *Pinna*.

“ *Malleacea*.

*Crenatula* ..... Rare and little known.

*Perna* ..... *Ostrea*.

*Malleus*..... *Ostrea*, hammer-oyster.

*Avicula* ..... *Mytilus*.

*Meleagrina* ..... *Mytilus*.

“ The first genus is found in the seas of warm climates. The shells are thin and foliated. The hinge of *Perna* differs widely from that of the oyster. It is linear, formed of sulcated teeth. There is a sinus under the extremity of the hinge, for the passage of the byssus. Compare *P. isognomon* with the common oyster, and you will find few points of resemblance between them. (PLATE 5.) *Perna ehippium* is also a curious species, very pearly within. The *hammers* are rugged and singular in form. They are all foreign, from the oriental seas.

“ *Avicula*, or Swallow, so called from the resemblance of the shells to a bird flying, was considered as a single species by Linnæus. Lamarck makes eighteen species in his new genera. *Meleagrina* has two species. The pearl-bearing

muscle, as it is called, is found in the Persian Gulf, the Gulf of Mexico. &c. The interior of the shell is coated with thick pearl, and within it are formed those globular substances known by the name of pearls.

“ Family, *Pectenida* : genera—

*Pedum*.....Only species, from India, rare.

*Lima* .....*Ostrea*.

*Plagiostoma*.

*Pecten*.....*Ostrea*, scallop.

*Plicatula*.....*Spondylus*.

*Spondylus*....*Spondylus*, thorny-oyster.

*Podopsis*.

“ The genus *Lima* is longitudinal, auricled, or eared; hinge without teeth, with a hollow receiving the ligament. These are very pretty shells, generally white, almost transparent, resembling the *Pecten*. *Lima* comes from the American seas, and is a species easily obtained. There are also several fossil species.

“ *Plagiostoma* is wholly a fossil genus, of which several species are found in this country, in lias, &c.

“ The pectens are so easily known that I need only mention some fine species, such as *P. pallium*, a splendid shell, from the Indian seas : *P. pleuronectes* is a finely polished, smooth species from the Indian Ocean.

“ The genus is divided into sections, viz. ears equal, ears unequal. You may find some common species on our own shores, and you may procure fossil species : they are numerous.

“ *Plicatula* is a genus taken from *Spondylus*. *Spondylus gæderopus*, from the Mediterranean, is a common shell in collections.

“ *Podopsis* is a fossil genus.

“ *Ostracea*.

“ The oysters and pectens differ so widely that they do not even rank in the same family.

“ In the *Ostracea* are,

*Gryphæa*... *Ostrea*.

*Ostrea*.....The same.

*Vulsella*.

*Placuna* .....*Anomia*.

*Anomia*.....The same—Antique lamp.

“ There is but one recent species of the first genus ; but many fossil.

“ The oyster is said to possess the most limited faculties of all shelly tribes. Immovable upon the rock or marine substance to which it is fastened, it receives no other nourishment than what the waves contribute, and indicates no other sign of life than opening and closing the valve of the shell. This genus still retains a great number of species : one section has the margin of the shell

either *simple*, or *waved*, the other *folded*. *O. edulis*, common oyster, belongs to the first division.

“ *O. folium* is of the second ; a curious species, from the Indian and American seas : the shell is fixed to wood and to the roots of trees on the sea-shores.

“ *Vulsella* is a foreign genus, from the Indian and other seas.

“ *Placuna* does not adhere to any marine substance. The valves are flat, thin, and transparent ; the very small space between them shows that the animal must be extremely flattened : there are two singular ribs at the hinge in the form of a V.

“ *P. placenta*, Chinese window-glass, is so transparent when young, that it serves instead of that material in China.

“ *Anomia*. The shells of this genus are fixed, like the oyster, to marine bodies. They live and perish on the spot where they are at first produced. I have noticed the muscle by which they attach themselves. Lamarck informs us that a hard, small operculum is to be seen at the extremity of this muscle, and fills up the *hole in the flat valve* when the muscle is contracted. (PLATE 5.)

“ The family *Rudista* contains only a few genera, which will be quite uninteresting to you at present.

“ The next, *Brachiopoda*, has  
*Crania*.  
*Orbicula*.....*Patella*.  
*Terebratula*..Some from *Anomia*.  
*Lingula*.....*Patella*.”

Lucy could not forbear interrupting her father upon hearing the name of *Patella*. “ How can that genus be mixed with the *Conchifera* ?” she inquired.

“ The shell is *bivalve*,” he replied ; “ raised upon a fleshy peduncle, and fixed to marine substances; the hinge is without teeth, having the form of a duck’s beak ; the colour a greenish tint. It is found near the Molucca isles.

“ Yet more remarkable is the *Hipponyx mitrata*, a common shell, known as *Patella mitrata*, long supposed to be a univalve, the upper valve only being known. A French naturalist discovered the lower valve, and *both* have one muscular impression in the form of a horse-shoe.

“ I think that it will be best to pause a little before we enter upon the study of the twelfth class, *Mollusca*, which contains most of the univalves of Linnæus.”

## CHAPTER IX.

TWELFTH CLASS—*Mollusca*.

“As I have observed that you have been very diligent in studying Lamarck since our last lesson,” said Mr. Elliot, “I propose to make you acquainted with the variations in the univalve genera.

“The animals of the *Mollusca* are soft, without joints, generally possessing a head, eyes, and tentacula, or feelers. They have also a fleshy membrane, called a foot, which they use for climbing. The orders, excepting the first, are named from the position of this foot. They are five in number. The first order contains very few genera. One genus, named *Cleodora*, contains a species brought from Africa. The shell is curious, transparent, and shaped like the head of a halberd.

“The animals of the second order, *Gasteropoda*, have a muscular foot, or disk, on which they rest. The families are seven. The first, *Tritonia*, I shall pass over.

“ *Phyllidiana* includes the genera—

*Phyllidia*.

*Chitonella*.

*Chiton* ..... Coat of mail.

*Patella* ..... *Patella*, or limpet.

“ The *Chiton* moves like the *Patella*, upon a disk, or foot.

“ The body of *Patella* is entirely covered by the shell. You may have many opportunities of examining the British species. *P. pellucida* is very transparent, with blue lines.

“ The family *Semi-phyllidiana* contains

*Pleurobranchus*.

*Umbella* ..... *Patella*.

“ The *Umbella* shell is flat and white, and is sometimes four inches in diameter. It is common in the Isle of France: there is another from the Mediterranean.

“ *Calyptræa* is a larger family: it has many genera taken from *Patella*:

*Parmorphorus*, Thracian-shield.

*Emarginula*,

*Fissurella*,

*Pileopsis*,

*Calyptræa*,

} *Patella*.



*Crepidula,*            }  
*Ancylus,*                } *Patella.*

*Parmophorus* is found in the seas of New Holland and New Zealand. The margin of the next genus is distinguished by a slit: the shell is conic. (PLATE 3.) *Fissurella* has the top of the shell perforated; it is called the *key-hole* limpet, from the shape of the aperture. *Pileopsis* is obliquely conic. It was with this division that the curious *Hipponyx* ranked.

“ *Calyptræa* is very thin and brittle, with an internal lip. (See FRONTISPIECE.)

“ *Crepidula* has the shell partly covered, or arched: it looks like a little slipper.

“ *Ancylus spina-rosa* is a pretty species from the south of France: the genus is fluviatic. *A. lacustris* and *fluviatilis* are both natives of our fresh-waters.

“ The next family, *Bullæana*, has

*Acera* ..... *Bulla.*

*Bullæa* ..... *Bulla.*

*Bulla* ..... The same.

“ *Acera* and the following genus have each but one species, *Bulla carnosa* and *B. aperta* of Linnæus. The original genus *Bulla* was composed of an assemblage of shells of various cha-

racters, having little resemblance except in their gibbous form. *Bulla naucum* is an example of the genus of Lamarck's system; so is *B. lignaria*. (See FRONTISPIECE.) *B. ampulla* and *B. striata* are common in collections.

“ *Aplysiana* is a small family, containing

*Aplysia*, or Sea-hare.

*Dolabella*.

“ One species of *Aplysia* is found on the Devonshire coast: the name Sea-hare marks the singularity of the two tentacula, which resemble the ears of the hare. The body is folded up in a loose skin, or mantle: upon the middle of the back it carries a circular shield, thin, transparent, and yellowish, in which it resembles the slug. These animals swim with ease.

“ *Dolabella* resembles the *Aplysia* in some degree; the genus is foreign, and one species is known to inhabit the bays of the Isle of France, where it covers itself with a portion of mud.”

“ I cannot understand why animals related to the slugs should find a place here,” said Charles.

“ Have not slugs the characteristics of the *Mollusca* class?” asked his father. “ And are you quite sure that they are without a shell?”

“ Our next family, the *Limacina*, has  
*Onchidium*.  
*Parmacella*.  
*Limax*, slug.  
*Testacella*.  
*Vitrina*.

“ *Onchidium* is a genus from the shores of the Indian seas. The animals have a shield: they live near the sea, and some are known to swim, often coming to the surface to breathe the air.

“ *Parmacella* was found by an English traveller in Mesopotamia. It has a shell covered by a shield. But you have not answered my question respecting the *Limax*, or slug.”

“ I do not recollect,” replied Charles; “ yet how often we see slugs !”

“ If I may be allowed to answer,” said Lucy, “ I think that the slug has what I now understand to be a *shield*. I have often watched the animal contract itself, and seen a broad, flat piece upon the back, which I thought was a kind of shelter for it.”

“ The *Limax*, or slug,” continued Mr. Elliot, “ is, in fact, provided with a coriaceous escutcheon, or shield, beneath which the animal partly conceals itself. The *Limax agrestis*, or spinning-slug, has the power of suspending itself by

a kind of thread, formed of the viscid substance that covers the body.

“ *Testacellus* is a very interesting genus, lately found in England: the animal has a resemblance to the common slug: it carries the shield on the hinder part of the body.

“ *Testacellus scutellum* feeds on earth-worms, and can so much lengthen the body that it follows them under-ground.

“ Our next order will show great alterations in the very large genus *Helix*. I shall name to you those of Lamarck.

“ The third order of *Mollusca*, *Trachelipoda*, begins with a well-known genus, the snail, *Helix*. The term signifies that the *foot* is situated under the neck, or anterior part of the body. The families in this order are numerous: they are divided into two sections; the first includes those that breathe only in the air; the second those that can exist only in the water, and are furnished with a syphon.

“ First section: family *Colimacea*; genera numerous; animals live upon land only; tentacula generally four; during winter they enclose themselves in their shells, with a false operculum.

*Helix*, snail..... *Helix*.

*Carocolla* ..... *Helix*.

*Anostoma* ..... *Helix*.

*Helicina* ..... *Helix*.

*Pupa* ..... *Helix*.

*Clausilia*..... *Helix*.

*Bulimus* ..... *Helix*.

*Achatina*.

*Succinea*..... *Helix*.

*Auricula* ..... *Voluta*.

*Cyclostoma*.

“What a number of new genera!” said Lucy. “I see the forms of the shells vary very much; and how beautiful these little transparent shells are!”

“They will find a place shortly. Here is a well-known species, *H. aspersa*, in most of its varieties; *H. pomatia*, the apple-snail, now naturalized in the county of Surrey; *H. ericetorum*, white with brown bands, very frequent on chalky soils; *H. citrina*, transparent, pale yellow, sometimes with one dark band; *H. muralis*, from the walls of Rome; *H. bidentalis*, from Teneriffe; and the little *Helix hispida*, which you may search for in your own garden; it is small, dark brown, and rough.

“*Curocolla* has the shells more flattened than *Helix*.

“*Anostoma depressa* is a rare and curious shell.

“*Helicina* is a West Indian genus. You

saw them just now. We shall find *Helix* in two other families.

“ *Pupa* is a curious genus. The shells resemble a crysalis. A few minute species are found in Britain. *P. muscorum* I have found buried among damp moss. The larger species are natives of tropical regions. These shells are often found *decollated*.

“ *Clausilia papillaris* is a pretty shell.  
(PLATE 9.)

“ *Clausilia rugosa* is found in some parts of Britain, under old hedges, at the foot of old trees, and similar places. It is a tapering shell, with the aperture reversed, or left-handed, and bi-dentated: the colour red-brown. It is to be found in the vicinity of Dorking, in Surrey.

“ *Bulimus* is a large genus. A common small species is the *Gaudaloupe Bulimus*.

“ The largest land-shells are found in the genus *Achatina*. The greater number are African.

“ *Succinea* contains a few species. One of them, *S. amphibia*, is common near fresh-water.

“ *Auricula* has some resemblance to a *Voluta*. The aperture is longitudinal: the columella has one or more folds.

“ The forms of the species in *Cyclostoma* are variable; but the aperture is circular, and the margin revolute, or rolled back. *C. elegans* is

often to be found on hedge-banks or chalk soils. It is a pretty shell, sometimes white, often tinted with purple.

“ In the family *Lymænana*, the species are amphibious ; inhabiting fresh-water ; but rising to the surface to breathe the air. They have but two tentacula.

“ As several species are British, you may have the satisfaction of examining them for yourselves.

“ The genera are,

<i>Planorbis</i> .....	<i>Helix</i> .
<i>Physa</i> .....	<i>Bulla</i> .
<i>Lymnæa</i> .....	<i>Helix</i> .

“ *Planorbis* is a discoid shell, and one peculiarity of the genus is, that they are all reverse shells. In a discoid shell the spire is depressed ; when held up, the whorls turn from right to left, and the aperture is left-handed. The largest species is *P. cornu-arietis*,\* which is a native of Brazil. *P. corneus* is common in ponds and ditches. Empty shells are to be found at the edge of the water. (PLATE 9.) If you take the animal to examine, and study its habits, remember that you have no right to injure it, and that you have already promised me that no kind of cruelty shall take place.

\* Ram's-horn.

“ *P. vortex* is a smaller species. The outer valve is carinated.

“ *Physa* is found in fresh-water upon aquatic plants. They are small shells.

“ The animal of the *Lymnæa* genus has two flat tentacula. *L. stagnalis* is a very pretty spiral shell, common in ponds.

“ *L. auricularia* is also frequent. It is much smaller than the first species. The last whorl is swelling, and the aperture very wide. They are both thin and brittle.

“ The family *Melaniana* are chiefly foreign. The shells are covered with a dark-coloured epidermis. They are operculated.

*Melania* ..... *Helix*.

*Melanopsis*.

*Pirèna*.

“ A species of *Melanopsis* inhabits the river Orontes, in Syria.

“ There is yet another family connected with *Helix*, the *Peristomata*, containing

*Valvata*.

*Paludina* ..... *Helix*.

*Ampullaria* ..... *Helix*, partly.

“ Some of the *Valvata* genus are found in fresh-



water in Britain and other European countries. The shells are small ; they are discoid or conoid, and have an operculum. In the shells of this family the margin of the aperture is carried completely round. In *Paludina* the whorls are convex. They generally inhabit fresh-waters.

“ *P. vivipara* is found in rivers. Quantities of empty shells may be taken from the sand of the Thames.

“ Fossil species abound—Petworth marble is full of them.”

## CHAPTER X.

“THE family of the *Neriticea*,” said Mr. Elliot, as he renewed his lessons to Charles and Lucy, “are remarkable in their form. Their left-margin is truncated, without any appearance of a columella. They possess an operculum, and are either marine or fluviatic. The genera are,

*Navicella*.

*Neritina* ..... *Nerita*, *Nerite*, or hoof-shell.

*Nerita*..... *Nerita*.

*Natica* ..... *Nerita*.

“You will recollect that the order *Trachelipoda* is still continued.

“*Navicella* is a foreign genus from the Indian rivers.

“*Neritina* is a pretty genus of shells, from the European, the East and West Indian rivers. They resemble the *Nerita* genus, but are all fresh-water shells; thin, smooth, and variously marked; without any tooth or notch on the right-margin of the aperture.

“*N. virginea* is common in collections; it is marked with various lines and dots.

“*N. fluviatilis* is common in our rivers: you may find plenty in river-sand, of red and brown colours, and various sizes.

“*N. zebra* and *N. meleagris* are also pretty shells. The little *Neritina viridis*, from the West Indian streams, is one of the smallest species, of a pale pellucid green.

“*Nerita* is a marine genus. The shells are solid and semi-globose; the left-margin is truncated, the right-margin toothed, or crenulated. This genus is never umbilicated.

“*N. polita* is a handsome shell: it is thick, polished, and variously marked; the base of the aperture is yellowish.

“*N. peloronta*, the bleeding-Nerite, is marked with a crimson spot.

“*N. tessellata* is sulcated, or furrowed, chequered with black and white.

“*Natica* differs from the former genera in these particulars: the shell is umbilicated; the left-margin oblique, not toothed, callous, the callosity sometimes covering the umbilicus. The species are numerous, and several are common in collections. “*N. aurantius* and *N. millepunctata* are good shells.

“*Ianthina* is the last of the snail-like genera. Its beautiful purple colour renders the shell a

favourite. They are marine, though so fragile and transparent. The animal floats upon the surface of the sea, by means of a vesicular appendage to the foot, which, it is said, may be inflated or contracted at pleasure. *Ianthina* shines by night. *I. communis* is found in abundance in the Atlantic and in the Mediterranean.

“ The family *Macrostoma* contains,

*Sigaretus* ..... *Helix* ?

*Stomatella*.

*Stomatia*.

*Haliotis* ..... *Haliotis*, sea-ear.

“ These genera form a beautiful family, and all bear a resemblance to the human ear.

“ *Sigaretus* is white and pearly ; the shell is enveloped in the folds of the mantle belonging to the animal. There are several species, one or two of which were ranked among the *Helix* race.

“ *Stomatella* is also very pretty ; the shells are pearly. *S. auricula*, from New Holland, has the appearance of a little *Haliotis*.

“ *Stomatia* is a small genus.

“ With the genus *Haliotis* you are already acquainted. The animal appears to be very

elegantly formed, if the plate I have seen of it be correct.

“There is a number of fine specimens in the British Museum.

“The family *Plicacea* contains only,

*Tornatella* ..... *Voluta*, chiefly.

*Pyramidella*. *Voluta*

“All the species have plaits, or folds, on the columella. The shells are marine and foreign in both genera. (PLATE 9.)

“Our next family, *Scalariana*, contains the genera

*Vermetus*.

*Scalaria* ..... *Turbo*.

*Delphinula* ..... *Turbo*.

“The single species of the first genus, *Vermetus lumbricalis*, inhabits the sea near to Senegal. The shell is tubular, thin, twisted spirally; it is fixed on marine substances by the end of its thin, pointed spire. The shells are usually found in groups.

“The genus *Scalaria* is one of the most elegant among univalve shells. The singularity of the numerous ribs renders the shells easily known from all other genera of turreted *Mollusca*.

The aperture is nearly round, the whorls gibbous, or inflated with carinated ribs: the colour is usually pink or white. It is very costly. (PLATE 9.) These shells are brought from the East Indies.

“The fossil species are very elegant: they are found in the strata above the chalk.

“Two other species are common, *S. communis* and *S. lamellosa*. The first is a British species, and is called the *false Wentletrap*.

“The shells of the genus *Delphinula* are solid, thick, somewhat discoid, often armed with spines, without any apparent columella. The recent species inhabit the Indian Ocean. There are several fossil species of *Delphinula*.

“The *Turbinacea* family contains many genera, with which you will soon become familiar. I believe you are already acquainted with this shell, which, from the time it was first known to collectors, has always been celebrated for beauty. It is now called *Solarium perspectivum*. (PLATE 9.) The large, spiral, crenated umbilicus is its great peculiarity. The French call the shell *Cadran, dial*. In its natural state the shell is covered with an epidermis. There are a few fossil species, one in the oölite of our own country. The English name is *staircase trochus*.

“The genera of *Turbinacea* are,  
*Solarium* ..... *Trochus*.

*Rotella* ..... *Trochus*—wheel-shell.

*Trochus* ..... *Trochus*—top shell.

*Monodonta*.

*Turbo* ..... *Turbo*.

*Planaxis* ..... *Buccinum*.

*Phasianella* ..... *Turbo*.

*Turritella* ..... *Turbo*.

“ The genus *Rotella* contains small, flattened, wheel-shaped shells, common in most collections. They are smooth and polished.

“ *Trochus* is still a large genus. *Trochus marmoratus* is a fine species from the Indian Ocean. There are several handsome species on our own shores. *T. magus* is one of them ; it has a large, deep umbilicus, or perforation ; the spire is flattened ; the whorls are crowned with tubercles. The *Trochi* of tropical climates are thinner than those of northern latitudes.

“ When any of these shells are placed upon their *base*, their axis is always inclined : of course they never stand perfectly upright.

“ There are several fossil species.

“ The genus *Monodonta* holds a middle place between *Trochus* and *Turbo*, differing from the former in the aperture, and from the latter in the columella, which is arched and truncated at the base. They are all marine shells.

“ From the well-known genus *Turbo*, a new

one has been formed, called *Litorina*, which includes all the shells of our own coasts that formerly ranked under *Turbo*. Consequently we find the periwinkle has changed its generic name, and from *Turbo* it is altered into *Litorina*. *T. muricata* is now of the same new genus, *Litorina muricata*. (PLATE 7.)

“ *Turbo pica* is a large pearly shell known as the magpie. The golden-mouthed *Turbo* is very brilliant; the aperture appears as if gilded, so fine is the yellow tint. It comes from the Molucca Isles. *Turbo smaragdus*, from New Zealand, is a rare and beautiful species of a bright green colour.

“ *Phasianella* is a beautiful genus of shells, formerly very costly. A small but elegant species is found on our own shores, *P. pullus*, *Turbo pullus* of some authors. The colour is pink.

“ *Phasianella bulimoides*, from New Holland, is the largest of the species, and once a very rare shell.

“ The term *Turritella* will give you an idea of the form of our last genus in the family *Turbinacea*. The shells are like *little towers*, with a circular aperture. The older conchologists gave the name of *screw* to all turreted shells, without attending to the form of the aperture. Hence we find screws among *Turbo*, *Buccinum*, and *Strombus* (spindle.)



“*Turritella duplicata* is a heavy shell, often more than four inches long. It is sulcated and carinated; the colour is yellow-white. *T. bicingulata* is white, marbled with yellow; the whorls are girded with two ridges. There are several fossil species of this genus in London clay.”

“I think,” said Lucy, “that three or four genera have been taken out of *Turbo*—*Scalaria*, *Delphinula*, *Litoralia*, and *Turritella*, and that *Litoralia* is not Lamarck’s genus.”

“You are correct,” replied her father, “and indeed so many alterations are continually taking place in the generic names of shells, that I cannot enter into all the niceties of modern conchologists. However, the generic name of a shell, according to Linnæus or Lamarck, is usually given, therefore I hope you will not be greatly at a loss upon meeting with some apparently unknown genus.”

CHAPTER XI.

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“WHAT is Charles drawing from his pocket with a look of so much importance,” said Mr. Elliot, the next time they met.

“There is *Ranella crumena*, thorny-frog; *Ovula gibbosa*, the shuttle; and *Voluta musica*, the music-shell,” said Charles.

“Oh, who gave you those nice shells?” asked Lucy, “and how do you know the names?”

“Let my father say if I am correct, first,” replied Charles.

“Perfectly,” answered his father; “but I fancy that I can guess how you obtained your information. You have been buying these specimens, and had the names from the shell-vender. I hope your purchase did not cost much, for they are not rare shells?”

“No; I should not choose to spend a large sum, even from my purse, until I am a better judge of the value of shells. But as our collection is but small, I thought that Lucy would be glad to see an addition to the stock.”

“Thank you, brother,” said Lucy, “you

never forget me in your purchases or your pleasures."

"Let us return to our subject," said Mr. Elliot, "and notice the families of the next section, which are all carnivorous, living on animal substances. They have a projecting syphon, which conveys the water to them: they are all marine. The syphon passes through the base of the aperture, either into a canal, or channel, or a narrow, recurved margin. The mouth is furnished with a trunk.

"*Canalifera* contains in the first section,

*Cerithium* .....Chiefly *Murex*.

*Pleurotoma* ...*Murex*.

*Turbinella*.....*Voluta* and *Murex*.

*Cancellaria* ...*Voluta*.

*Fasciolaria* .. *Murex*.

*Fusus* .....*Murex*.

*Pyrula* .....*Murex* and *Bulla*.

"The naturalist Bruguières established the fine genus *Cerithium*, mixed by Linnæus among those of *Murex*, *Strombus*, and *Trochus*. These shells are always turreted, having a short canal at the base; the aperture oblong, oblique, with a gutter turned backwards. (See FRONTISPIECE.) Many are girded with zones, that are granulated, or beset with little tubercles. It is

remarkable that *Cerithium giganteum*, a species more than a foot in length, is found fossil in France, and as a living species in the seas of New Holland. *C. telescopium* is a fine shell from the East Indies. *C. vertagus* is smooth, tawny-white, with a recurved canal. It comes from the Moluccas. Many species occur fossil in London clay and in plastic clay: the Woolwich pits afford specimens, and also of *Turritella*.

“ *Pleurotoma*, formerly united with *Murex*, is distinguished by the singular *notch* in the right-margin of the shell. One species, the Tower of Babel, is well known, and another is common under the name of *Murex javanus*. The fossil species are numerous.

“ *Turbinella* is taken from *Murex* and *Voluta*: some species are thick, heavy shells, from the Indian seas.

“ *Cancellaria* is an elegant genus: the shells are varicose, reticulated, or cancellated; the columella has folds upon it, varying in number, the right-margin sulcated within. There are several fossil species, which are considered very beautiful.

“ *Fasciolaria trapezium*, the Persian robe, is a fine shell from the Indian seas, very common in collections.

“ The genus *Fusus* consists of spindle-shaped shells, of which *Fusus colus*, the distaff, will

give an idea. They are covered with an epidermis which conceals, in some species, the fine colours beneath.

“ *Fusus despectus* (*Murex* of Linnæus) is the largest of the British turbinated shells, and very common : it is the large whelk.

“ *Fusus contrarius*, the reverse whelk, is found fossil in the Essex crag.

“ Among the shells of the *Pyrula* genus we find *P. ficus*, the fig, placed by Linnæus among the *Bulla* race. *P. spirillus* is a pretty species, with a long canal and a flattened spire, having a tubercle at its termination.

“ Second section of *Canalifera* : shells with a varix on the right-margin.

<i>Struthiolaria,</i>	}	<i>Murex.</i>
<i>Ranella,</i>		
<i>Murex,</i>		
<i>Triton,</i>		

“ *Struthiolaria*, ostrich-foot, is a remarkable shell from New Zealand.

“ *Ranella*, thorny-frog, is frequent in collections: there are several species: *R. crumena* is easily obtained—you must purchase a specimen.

“ Notwithstanding the great reductions of the *Murex* genus, it is still large, and contains very

fine species. The shells have *three or more* varices upon each whorl; those in *Ranella* but *two*; while *Struthiolaria* has a varix only on the right-margin. The species are numerous, and common in collections. *M. saxatilis* is white, and zoned with rose-colour or purple. The foliations, or branches, are erect. The Rose-bush is pretty; and the wagtail, *M. motacilla*, will, doubtless; be a favourite with you, as well as the scoop, *M. haustellum*.

“ Notwithstanding the resemblance of the genus *Triton* to those of *Murex* and *Ranella*, there are permanent differences which make them distinguishable at first sight. I have already noticed the varices of the preceding genera; in *Triton* they never form longitudinal ranges, but are alternate, few, and nearly solitary on each whorl of the spire; these varices are generally smooth and without spines.\* *Triton variegatum*, the marine trumpet, is a large, handsome species, from the Asiatic seas. *T. lampas* and *T. lotorium* are common. *Triton anus* is very remarkable.

“ In the next family, *Alata*, we must notice a remarkable fact: the shells, while they are young, assume a different form to those more advanced in growth.

\* Lamarck.

“ The genera are three—

<i>Rostellaria,</i>	}	<i>Strombus</i> , wing-shell.
<i>Pterocera,</i>		
<i>Strombus,</i>		

“ In the first genus the shells are terminated below by a canal, or pointed beak; the right-margin entire, or toothed, more or less dilated with age, and having a sinus contiguous to the canal. There is a specimen from our own coast, *Rostellaria pes-pellicani*, the pelican's-foot: it was *Strombus* of Linnæus. (PLATE 7.) There are many of this species found in a fossil state.

“ The *Pterocera* genus is easily known by the digitated, or fingered, appearance of the right-margin. The greater part of the species become very large. Here we find the scorpion, with seven digitations, from India; the spider, with the same number, a large and fine shell, also from India.

“ *Strombus* has a short canal, the right-margin dilated with age into a simple wing, having, at the lower part, a sinus, separated from the canal at the base of the shell.

“ All the species are natives of hot climates; some attain a very large size, such as *S. gigas*, so frequently seen in shops, and as ornaments in a room. *S. gibberulus* is a pretty little shell; the white, gibbous whorls render it remarkable;

the interior of the lip is pink. *S. lineatus* has dark lines round the shell. *S. vittatus* has a very long spire; the colour is tawny, girded with white: you may easily meet with this species.

“ The family *Purpurifera* is composed of genera taken chiefly from the large Linnæan genus *Buccinum*.

“ It is thus divided:

“ First, the genera with the canal ascending, or turned towards the back of the shell—

*Cassidaria*, }  
*Cassis*,        } *Buccinum*, helmets.

“ *Cassidaria* is not a very common genus; but the helmets, *Cassis*, are both numerous and plentiful in most collections. The straight aperture slightly reminds you of a *Cypræa* perhaps, but the short canal, abruptly turned back, is a clear distinction; the right-margin generally toothed; the columella folded, or wrinkled, transversely.

“ *C. cornuta*, *C. flummea*, *C. arèola* and *vibex*, are all well-known species, *C. cornuta* has large tubercles like horns round the tip of the shell. *C. arèola* is marked with chequers. *C. rufus*, from the Moluccas, is a fine shell, with a deeply coloured red aperture.

“ In the next division the canal is oblique, and directed backwards.



*Ricinula*.....*Murex*.

*Purpura*,

*Monoceros*,

*Concholepas*,

*Harpa*,

*Dolium*,

*Buccinum*,

*Eburna*,

*Terebra*,

} *Buccinum*.

“ To these genera another has been added, called *Nassa*, of which *Buccinum arcularia* will furnish an example. The columella has a callosity very evident in the species *Pullus* and *Thersites*.

“ *Ricinula horrida* has a ringent aperture of a fine violet colour; the shell is thick, and covered with large black tubercles. The genus takes its name from a resemblance to the seeds of *Ricinus*.

“ *Purpura* is a large genus: in certain of the species the colouring-matter exists of which the ancients formed their famous purple dye. It is the last genus that offers any appearance of a canal at the base of the aperture.

“ *P. patula*, the scoop, from the Atlantic and Mediterranean, has the aperture remarkably dilated, the margin sulcated.

“ *P. lapillus* is a common British shell among

the chalk-cliffs of the coast; the colour varies, sometimes white, at others yellowish.

“ I shall describe a species of the singular genus *Monoceros*, by which you will scarcely fail to recognise it.

“ The columella is flattened like *Purpura patula*; just within the outer lip is a row of small teeth; but the principal peculiarity is a process, or horn, near the outer part of the lower lip, and close to the canal, from which the genus derives its name *Monoceros*, *one-horn*. It is brought from the seas of America.

“ *Concholepas Peruviana*, the only species, is also a remarkable shell. The aperture is very large, almost equal to the shell itself; the spire is near the edge; the outside is marked with ribs, or costæ; there are two short teeth on the right-margin. This shell was placed among the *Patella*.

“ The beautiful genus *Harpa*, harp-shell, is remarkable for its elevated ridges on the back of the shell, its large aperture, and its fine colouring. They are East Indian shells. *H. ventricosa* is a common species. *H. nobilis* is very fine, and also *H. costata*.

“ Equally well known are the Tuns, *Dolium*, by their globose form, the right-margin toothed, and a canal below. They reach a large size, and are light shells in proportion to their bulk.

*Dolium galeum* is sometimes the size of the human head. *D. perdix* is a choice species.

“*Buccinum* contains some British species, as *B. reticulatum*, (PLATE 7,) *B. angelicanum*, *B. undatum*, which is very common. In connexion with this species I wish you to know that a marine substance, called by sailors *sea-wash balls*, by others sea-sponge, and extremely common on all our sea-coasts, is the egg-cases of the *Buccinum undatum*. The mass is remarkably light, and composed of numerous little cells, each of which has an opening. The colour varies from yellow to white.”

“I know them well,” exclaimed Lucy, “how often I have asked the name of those nests, but never could I obtain a reply worth having! And now, father, give me leave to interrupt you a few minutes. What are those black, stiff, marine substances, with a horn-like projection at each of the four corners; they are all hollow, and open at each end, I think, and usually inflated?”

“The egg-cases of the scate.”

“Thank you, father, I will examine them again carefully when I am at the sea-side.”

“The genus *Eburna*,” continued Mr. Elliot, “is remarkable from the smoothness of the shells. *E. spirata*, the Joppa whelk, has the whorls deeply channelled. (See the FRONTISPIECE.)

The columella is umbilicated, and has a canal beneath it.

“ The *Terebra* genus is turreted; very acute at the apex. (PLATE 9.)

“ The family *Collumellaria* is next in order. The canal now disappears at the base of the shell, but there is a slope and folds on the columella. We have reached the large genus *Voluta* of Linnæus, greatly reduced by withdrawing the following genera :

<i>Columbella,</i>	}	<i>Voluta.</i>
<i>Mitra,</i>		
<i>Cymba,</i>		
<i>Melo,</i>		
<i>Voluta,</i>		
<i>Marginella,</i>		
<i>Volvaria,</i>		

“ The shells of *Columbella* are of small size; two species are very common in collections. *C. mercatoria* is a little shell striated transversely; the outer lip is thickened in the middle, and toothed; the columella is plaited: the animal is furnished with an operculum.

“ *Columbella nitida* is another pretty species, smooth and shining: you may perceive the generic marks if you look closely—two small folds on the pillar-lip, and the swelling, toothed,

outer margin. They are all West Indian marine shells.

“ *Mitra* is a large genus, and it is believed that there are three times as many species yet undescribed. The mitres are natives of warm climates, and few are common. The pillar-lip of *Mitra* is parallel, with transverse folds; the base has a slope, but no canal; the margin of the columella is thin and rolled back. *M. episcopalis*, the bishop, is white with red spots; the columella-folds are four. (PLATE 9.) *M. papalis*, the pope's-mitre, has five; the upper whorls are broken into a kind of crown.

“ In *Cymba*, the gondola, the spire ends in a tubercle, and scarcely appears; the aperture is wide: they are very pretty shells.

“ *Melo*, the melon, from the Indian Ocean, is a very fine genus; here the spire is evident.

“ *Voluta musica* will serve as an example of the genus. The animal is carnivorous.

“ *Marginella* is an oblong, smooth, and polished shell; its peculiar character is the thickened outer lip; it is a neat, small species, prettily coloured.

“ *Volvaria* is a cylindrical shell, convolute, the spire nearly hidden; the aperture straight, as long as the shell. There is a fossil species found in London clay. *V. monilis* is sometimes strung for necklaces. It comes from Senegal.

“ The last family of the order *Trachelipoda* is *Convoluta*, which contains many very fine genera.

“ They are the following :

*Ovula* .....*Bulla*.

*Cypræa* .....The same.

*Terebellum* ...*Bulla*.

*Ancillaria*.

*Oliva* .....*Voluta*.

*Conus* .....The same.

“ The general characters of this family are the following :

“ Shell without a canal, the base of the aperture sloping, or effuse, the spire compressed, the last volution almost covering the rest.

“ *Ovula*, you will recollect, was formerly confounded with the *Bulla* genus : the form is egg-shaped, the outer lip toothed in one division, smooth in the other ; the shells are white and polished, particularly *O. oviformis*, the poached-egg, from the Moluccas.

“ *O. volva*, the weaver’s-shuttle, is a rare and highly-valued species. It is nearly globular in the middle, and is terminated at each extremity by a long beak : it comes from the West Indies. *O. gibbosa* is a common species ; the shape is oblong, with a ridge in the centre.

“ You can be at no loss on seeing the shells of *Cypræa*, a large and beautiful genus, which remained unchanged for a long time. Lately, we find a few of the small species are become a new genus, *Trivia*.

“ The character of the *Cypræa* is a longitudinal aperture, toothed, in the adult state, on each side. The spire is scarcely to be seen.

“ While the shells are young they have the appearance of a *Voluta* or a cone; the aperture spreads more, and is without teeth.

“ The individuals of each species pass through three different states :

“ In the first, the form is very imperfect; it is like a thin cone, and shows no character of the genus; hence young students are perplexed if they chance to have a young cowry in their collection.

“ In the second state, the shell is still thin, with a *projecting* spire; but attains its proper form.

“ In the third, or adult state, the shell is thick, the colours are perfected, and the spire is very nearly concealed.

“ When the animal becomes too large for its habitation, it has the power of leaving it, and forming a new one.\*

“ The inhabitant of the *Cypræa* shells has two

\* Lamarck.

tentacula of a conic form, and finely pointed; the foot discous, and sometimes tongue-shaped. The mantle is two-lobed, with wing-like margins, capable of being turned back over the shell: this mantle preserves the shell from injury when the animal issues forth in search of food. The genus abounds both in the old and new world; but the larger kind chiefly in warm climates. They live on the coast, and are generally found under stones or rolled coral. A very few species are natives of the European seas.

“ The tiger-cowry is before you; a large and very common species in collections; it also frequently adorns the mantel-piece. There is a remarkable line extending along the back of the shell; at this part the edges of the *mantle*, that I have before noticed, meet: this line is conspicuous in many species.

“ *C. aurora* is a costly shell from Otaheite and New Zealand; the colour orange, with the base and extremities white. It is large, and has been sold for 60*l.* when a specimen has been obtained without any perforation. The shell is worn by the New Zealand chiefs as a badge of honour.

“ *C. exanthema* changes its appearance greatly as it advances in growth. While young, three bands extend over the back, which in its adult state disappear, and the fawn-coloured ground is



spotted over with numerous white circular marks.

“ *C. mauritania*, the moor, is a fine species, with very black sides, and tawny-yellow back with spots. It is a native of Java.

“ *C. caput-serpentis*, the serpent's-head, has dark sides, with white fauces: the back is covered with net-work colouring: the fauces, you must remember, are the narrow entrances at each end of the shell.

“ *C. Isabella*, the orange-tip, with pale flesh-colour back, and the fauces orange-colour.

“ *C. Arabica* is a common species in collections.

“ *C. mappa* is varied with deep brown or yellow lines and spots: the dorsal line is lacinated.

“ *C. talpa*, the mole, has the back fawn-colour, with three zones of pale yellow; the base and sides sometimes nearly black. It comes from Madagascar.

“ *C. vitellus*, the fallow-deer, is fawn-colour, covered with small white spots: from the Indian Ocean.

“ The wasp, *C. asellus*, is white, with three brown bands.

“ *C. helvola*, the star-cowry, has the sides dark orange; the fawn-coloured back studded with small spots. It comes from the Maldives.

“ *C. moneta*, the money-cowry, is generally white, sometimes yellow.

“ *C. annulus*, the ring-cowry, has a yellow mark round the top of the shell. The fowl-cowry, *C. moneta*, is used for money by the natives of Siam and Bengal.

“ *C. pediculus* is changed to *Trivia*, a new sub-genus from *Cypræa*. We find the following characters:--form of the columella internally concave, ribbed; shell sub-globular, cross-ribbed. *T. carnea*, flesh-coloured shell; thin, pure rose-coloured, with very thin, distant ribs; lips whitish: it has sometimes an indistinct dorsal groove.

“ *Trivia Europæa* (*Cypræa* of authors) is a globose shell, ash or flesh-coloured, with three black dots and a whitish dorsal streak; ribs close, rather thick, and whitish; base white; outer lip wide. The variety has the back without spots. *T. pediculus* has six square dorsal spots; the colour of the shell pale red; ribs rather thick-covered; dorsal line narrow; base reddish. Only one species, *C. Europæa* (or *Trivia*) is a native of our shores.

“ There are several fossil species of *Cypræa*.

“ We now pass on to a genus in which there is but one recent species, *Terebellum subulatum*, *Bulla* of Linnæus. (See FRONTISPIECE.) A fossil *Terebellum* is found in London clay.

“ The *Oliva* genus contains smooth, shining shells, common, and therefore little valued;

nevertheless they are beautiful, and of various colours.

“ The columella is obliquely striated; the aperture longitudinal and straight. The olives were placed by Linnæus among the *Volutæ*, on account of the striæ on the columella, without regard to the peculiarity of the *canal*, by which the olives are known from all other shells. This canal separates the *volutions* of *Oliva*. Many species are prettily marked by nature, others are rendered handsome by polishing. *O. subulata* is small, and pointed like a mitre. The common olive is white, with brown, waved lines. *O. irisans* is ornamented with yellow zigzag lines: it has two brown zones. *O. orixa*, the little rice-olive, is white.

“ I should have noticed the small genus *Ancilla*, formerly *Ancillaria*, which is very near both to *Terebellum* and *Oliva*. The columella has a varix at the base, which distinguishes it from *Terebellum*, and it wants the canal which separates the volutions of *Oliva*.

“ There are several fossil species.

“ The concluding genus of the third order is very large, and contains rare and costly shells. This is *Conus*, scarcely to be mistaken for any other genus except *Voluta*, and that only at a first glance.

“ The species are covered with an epidermis,

sometimes very thick; the spire has various degrees of elevation, sometimes almost flat; the operculum very small and horny. They are natives of southern and tropical seas: the animal is carnivorous: found in sandy mud, at various depths of the ocean. The species are very numerous—Lamarck makes 181 recent. Some new species have lately been discovered. Many of the cones are very beautiful, both in shape and colour, and the genus has been always in estimation among collectors. The *gloria-maris*, *cedonulli*, *ammiralis*, and some others, have been sold at very high prices, and some of the finest of these are now in England.

“ Lamarck makes two divisions: in the first is comprehended the species with coronated spires; the second those with simple spires; the latter division contains far the greater number.

“ Fossil cones occur, in London clay and crag, in England.

“ No recent species are found upon our own coasts.

“ *Conus Hebræus*, the Hebrew-cone, is easily known: (PLATE 6:) it has a white ground, and square black markings.

“ *Conus virgo* is white, with a purple base.

“ *C. marmoreus* is a fine shell. Numerous species are within reach of your purses, and I do not doubt that you will soon acquire a good col-

lection at a moderate price. You, Charles, will find more pleasure in a cone than in a top; and Lucy, who never found much pleasure in toys except in taking them to pieces, has always a ready sixpence either for a poor neighbour in distress, or for some harmless pleasure.

“ We have yet two more orders of *Mollusca* to notice, the *Cephalopoda* and the *Heteropoda*.

“ At our next lesson I shall mention the genera that are most likely to come under your observation, either fossil or recent.”

## CHAPTER XII.

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“ So many families of the fourth order, *Cephalopoda*, are found only in a fossil state, and which you will not easily meet with, that I shall not consider it needful to give you the whole catalogue,” observed Mr. Elliot to his young pupils at the beginning of the next lesson.

“ But we are exceedingly interested about fossils,” replied Charles ; “ pray do not pass any species that we may be likely to find.”

“ And I,” said Lucy, “ have much wished to ask whether the *snake-stone* ever was a shell ? it is something like a *Planorbis*, but heavy and imperfect.”

“ I will answer your question presently,” said her father. “ Tell me what genera remain to be noticed among the univalves of Linnæus ?”

“ *Argonauta* and *Nautilus*,” was the ready reply.

“ The animals inhabiting these shells are *Cephalopoda*. The word indicates the position of the feet, or more properly *arms* of the animal, which are ranged round the head like a crown.

The body is thick and fleshy, contained in a kind of bag, whence the head issues, surrounded by these arms, which vary in different genera.

“ The common *cuttle-fish*, a native of our seas, will give you an idea of a cephalopode.

“ In the first family a fossil-shell occurs that is very frequently met with.

“ Family, *Orthocerata*; genus, *Belemnite*, thunder-stone, or arrow-head. These fossil-shells occur abundantly in the chalk formations. Many superstitious notions have been attached to this extinct marine animal: of these you will find an account in the ‘Penny Cyclopædia.’

“ In the family *Lituolita* we meet with the delicate and remarkable little shell *Spirula Peronii*, distinct from *Nautilus* by the separation of the volutions: it is nearly covered by the body of the animal. The colour is white; the texture thin and brittle: it has a lateral syphon, the orifice of which is very clearly to be seen as each compartment is taken off. There is but one species; it is found in the Southern Ocean and the Moluccas. The shells are seen floating on the surface of the water when the animal is dead, and are sometimes carried to the shore. (PLATE 9.)

“ Another family of this order, *Nautilacea*, contains, among many other genera, the celebrated *Nautilus*. This genus, you are already informed, is distinguished from *Argonauta* by

its shells being many-chambered. Two or three fossil species have been found in London clay.

“ Among the various fossil-shells abounding in different strata, not known in a recent state, the one most remarkable and frequently occurring is the Ammonite, *Cornu Ammonis*, so called from the resemblance it bears to the convoluted horns of Jupiter Ammon, in mythological history. This is your *snake-stone*, Lucy, a local name, which you had better change for Ammonite. Various legends are connected with this fossil, of which you may obtain information by consulting the before-mentioned publication.

“ As you are desirous of studying geology, a knowledge of the Ammonites is very requisite, since whole sections of the genus are characteristic of certain strata.

“ They are nearly allied to the *Nautilus*. The species are very numerous; one hundred and twenty according to some authors—two hundred and seventy species are enumerated by others. They occur in Europe, Asia, and America: they have been found in the chalk with a diameter of three feet.

“ In the second division of this order the genus *Argonauta* occurs: the shell has been already described, and retains its original name. (PLATE 6.)

“ In the third division is the family *Sepiaria*, containing *Octopus*, *Loligo*, and *Sepia*. This



section contains animals without shells. *Octopus vulgaris* is common in the European seas. In hot climates it grows to a very large size. The animal has sufficient strength to draw a boat under water.

“ *Loligo* also is found in our seas ; the thin, transparent rib, called the *dorsal blade*, you may probably find on the shore, the flesh that covered the blade being cleared entirely from it. The colour is either white or brown. It is called *sea-sleeve*.

“ The bone of the cuttle-fish, *Sepia officinalis*, is so frequently thrown on shore by the waves, that few persons visiting the sea-coast can be ignorant of its form. You have a large collection there I see, Lucy ; and you are doubtless aware that this calcareous bone affords the *pounce* of the stationers, when finely pulverized : it also forms one ingredient of tooth-powder.

“ The ink of this marine animal is contained in a bag : the use of the fluid is to colour the water around, in order to conceal itself from hostile attack. The flesh of some of these animals is used for food, and is frequently seen in the market at Naples. In the British isles it is not put to any culinary purpose. The ink of *Sepia* can be prepared for a pigment, or paint.

“ The fifth and last order of the twelfth class is *Heteropoda*, which contains only a few genera, one of which I shall notice.

“ *Carinaria*, the glass-nautilus, is a rare and very precious genus, containing but three species. The first, *Carinaria vitrea*, has been found in the Southern Ocean. There is a model of the shell in the British Museum; that of Paris possesses the shell itself.

“ *C. Mediterranea* is found in the neighbourhood of Nice, and is frequent in the summer months. So thin and delicate is the shell that it is seldom found entire.

“ The shell of *Carinaria* is wholly external, and is attached to the upper part of the body, apparently to protect the organs of respiration. The body is transparent, dotted with elevated points; on the lower part is a beautiful reticulated fin, of a reddish colour; with the end of this fin it floats along, carrying its delicate shell. The habit of the animal, which swims upon its back, reverses the natural position of the shell, which is on the upper part of the body when at rest.”

“ That is one of the most remarkable creatures you have yet mentioned,” said Charles; “ I may chance to meet with a specimen when I travel.”

“ Probably,” replied Mr. Elliot; “ but our lessons are now concluded—*Carinaria* is the last genus.”

“ How greatly we are obliged to you, father!” said Lucy: “ but I hope you will still give us a little advice and assistance: we shall often be

unable to determine the genera of some shells, I am sure, especially among the bivalves."

"Most willingly: but tell me if you know the easiest method of cleaning shells when they become soiled, or when you purchase them in the natural state?"

"That is a question I wished to ask."

"A little warm water and soap will cleanse and render them bright. Some collectors rub Florence oil over their shells, which prevents them from becoming dry. A weak solution of gum-arabic is sometimes applied, in order to produce a polished and bright appearance.

"Nitric or muriatic acid, diluted, is used to take off the epidermis, or any extraneous matter; but it must be done carefully, and the shell plunged in water after the acid has been applied. But do not make a practice of polishing; shells are best in their natural state, generally speaking."

"Thank you, father!" said both the young people.

"You are welcome to any instruction I can give you," he replied; "and now farewell for to-night."

## A LIST OF SPECIES

*That may be purchased at a moderate Price.*

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Examples of the genera that may be easily obtained from the British Coast, or which are expensive, are omitted.

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<i>Dentalium entalis.</i>	<i>Pinna muricata.</i>
<i>Pectinaria Belgica.*</i>	<i>Perna ephippium.</i>
<i>Balanus tintinnabulum.</i>	<i>Meleagrina margaritacea.</i>
<i>Pentalasmis anatifera</i>	<i>Lima squamosa.</i>
<i>Corbula nucleus.</i>	<i>Spondylus gæderopus.</i>
<i>Psammobia virgata.</i>	<i>Chiton squamosus.</i>
<i>Lucina carnaria.</i>	<i>Emarginula fissura.</i>
<i>Cyprina Islandica.</i>	<i>Fissurella Græca.</i>
<i>Cytherea chionè.</i>	<i>Pileopsis Hungarica.</i>
<i>Venus tigerina.</i>	<i>Calyptræa equestris.</i>
<i>Isocardia cor.</i>	<i>Bulla ampulla.</i>
<i>Arca Noæ.</i>	<i>Helix melanotragus.</i>
<i>Pectunculus marmoratus.</i>	<i>Pupa mummia.</i>
<i>Chama arcinella.</i>	<i>Bulimus ovatus.</i>
<i>Tridacna crocea.</i>	<i>Achatina virginea.</i>
	<i>Neritina corona.</i>

\* Or *Sabella*.

- |                                |                                |
|--------------------------------|--------------------------------|
| <i>Nerita polita.</i>          | <i>Ricinula horrida.</i>       |
| <i>Natica alba.</i>            | <i>Purpura patula.</i>         |
| <i>Ianthina communis.</i>      | <i>Monoceros imbricatum</i>    |
| <i>Sigaretus haliotoideus</i>  | <i>Concholepas Peruvianus.</i> |
| <i>Pyramidella dolabrata.</i>  | <i>Harpa ventricosa.</i>       |
| <i>Scalaria communis.</i>      | <i>Dolium maculatum.</i>       |
| <i>Delphinula lacinata.</i>    | <i>Eburna spirata.</i>         |
| <i>Solarium perspectivum.</i>  | <i>Terebra maculata.</i>       |
| <i>Trochus tuber.</i>          | <i>Columbella mercatoria.</i>  |
| <i>Monodonta labio.</i>        | <i>Mitra episcopalis.</i>      |
| <i>Turbo pica.</i>             | <i>Voluta musica.</i>          |
| <i>Phasianella bulimoides.</i> | <i>Volvaria monilis.</i>       |
| <i>Cerithium vertagus.</i>     | <i>Ovula oviformis.</i>        |
| <i>Pyrula ficus.</i>           | <i>Cypræa cribaria.</i>        |
| <i>Ranella crumena.</i>        | <i>Terebellum subulatum.</i>   |
| <i>Murex haustellum.</i>       | <i>Oliva utriculus.</i>        |
| <i>Triton lotorium.</i>        | <i>Conus virgo.</i>            |
| <i>Pterocera lambis.</i>       | <i>Nautilus hians.</i>         |
| <i>Strombus lineatus.</i>      | <i>Spirula Peronii.</i>        |
| <i>Cassis areola.</i>          |                                |

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