

Monographs of the Palaeontographical Society

ISSN: 0269-3445 (Print) 2576-1900 (Online) Journal homepage: <https://www.tandfonline.com/loi/tmps20>

A Monograph of the Eocene Mollusca, or Descriptions of Shells from the Older Tertiaries of England. Part III. Prosobranchiata

Frederic E. Edwards

To cite this article: Frederic E. Edwards (1855) A Monograph of the Eocene Mollusca, or Descriptions of Shells from the Older Tertiaries of England. Part III. Prosobranchiata, Monographs of the Palaeontographical Society, 8:32, 123-180, DOI: [10.1080/02693445.1855.12088373](https://doi.org/10.1080/02693445.1855.12088373)

To link to this article: <https://doi.org/10.1080/02693445.1855.12088373>



Published online: 13 Dec 2019.



Submit your article to this journal [↗](#)



View related articles [↗](#)

A MONOGRAPH
OF
THE EOCENE MOLLUSCA,

OR
DESCRIPTIONS OF SHELLS FROM THE OLDER TERTIARIES
OF ENGLAND.

BY
FREDERIC E. EDWARDS.

PART III.
PROSOBRANCHIATA.

LONDON :
PRINTED FOR THE PALÆONTOGRAPHICAL SOCIETY
1854.

Reprinted with the permission of the Palaeontographical Society, London

JOHNSON REPRINT CORPORATION
111 Fifth Avenue, New York, N. Y. 10003

JOHNSON REPRINT COMPANY LTD.
Berkely Square House, London, W. 1

CORRIGENDA.

In the head-lines to sheets 17, 18, and 19, (p. 129, *et seq.*), for "Pulmonata," read "Prosobranchiata."

Page 126, line 10, for "Cypræa," read "Cyprææ."

„ 133, „ 14, for "figs. 3 a—d," read "figs. 4 a—c."

„ 134, „ 27, for "Basingstoke," read "Cuffel, near Basingstoke."

„ 155, „ 28, for "(t. 25)," read "(t. 5.)"

„ 155, „ 30, after the word size, insert "axis, 1 in. and $\frac{4}{10}$ ths; diameter $\frac{6}{10}$ ths of an inch."

„ 158, „ 14, for "figs. 4 a—c," read "figs. 4 a—d."

„ 160, „ last line but one; after axis, insert "2 inches, nearly;" and after diameter, insert, "1 in. and $\frac{1}{10}$ th "

„ 168, „ 33, for "figs. 2 a—b," read "figs. 3 a—b."

ORDER—*PROSOBRANCHIATA*. M. EDWARDS.

PECTINIBRANCHIATA,	<i>Cuvier.</i>
TUBULIBRANCHIATA,	„
SCUTIBRANCHIATA,	„
CYCLOBRANCHIATA,	„
PARACEPHALOPHORA DIOICA,	<i>De Blainville.</i>

To the free-air-breathing gasteropods succeed those which breathe, by means of gills, the air diffused through the water in which they live. In them the head is more or less fully developed, and the mouth is furnished with a riband-shaped tongue, armed with numerous series of teeth, which present great varieties of form and arrangement. In some cases the animals are hermaphrodite, the sexes being united in the same individual, but in by far the larger proportion the sexes are distinct; with very few exceptions, they are all oviparous. In the larva state they are always furnished with spiral shells, which, in some cases, as the animals approach maturity, become rudimentary or altogether disappear; but more generally the shells become largely developed, so as to contain the whole animals within them. The respiratory organs exhibit many differences in structure and position, and these varied conditions were adopted by Cuvier as ordinal distinctions in the systematic arrangement proposed by him. De Blainville, on the other hand, availed himself of the modifications in the reproductive apparatus, and divided his second class "*paracephalophora*," into the sub-classes *dioica*, in which the male and female sexual organs are in different individuals, and *monoica*, in which the two sexes are united in the same individual. To these he added a third division, *hermaphrodita*, in which he described the generative apparatus as female only, a modification the existence of which subsequent investigation has disproved. It appears, however, by the observations of Milne Edwards, that the water-breathing gasteropods form two natural and well-defined divisions, which that eminent naturalist has called respectively, *opisthobranchiata* and *prosobranchiata*, from the position of the gills in relation to the heart.* In the first of these divisions, which corresponds with the *nudibranchiata*, *testibranchiata*, and *inferobranchiata* of Cuvier, and with the *monoica* and *hermaphrodita* of De Blainville, the respiration is effected by

* Etym. *οπισθε* (in the after part, behind), and *προῶσον* vel *πρῶσον* (advanced, pushed forward), respectively prefixed to *βραγχια* (the gills).

arborescent or fasciculated gills, which are not enclosed in a special cavity, but are more or less completely exposed, either on the back or on the sides towards the hinder part of the body. The reproductive apparatus is hermaphrodite (not in the sense used by De Blainville, but meaning that the sexes are united in the same individual), and the shell is either wanting or is merely rudimentary in the adult state. In the second division, the abdomen, which is developed proportionately with the cephalic and locomotive masses, is always protected by a shell, generally of sufficient size to contain the whole animal. The mantle forms over the cervical region a vaulted chamber, more or less capacious, in which the branchiæ are lodged and the excretory orifices are placed. The reproductive organs, male and female, are borne by different individuals. This division comprises Cuvier's four remaining orders of the *branchifera*, and corresponds with De Blainville's sub-class *dioica*. The branchiæ are composed of simple and parallel plates, arranged, somewhat like the teeth of a comb, along a vascular stem, and, for the most part, are placed obliquely across the back, or are attached to the right side of the neck.

In some genera in this order, the edge of the mantle is prolonged into a canal or siphon, which can be extended at pleasure, so as to permit the free passage of water into the branchial chamber, while the animal itself remains within the shell; and where this siphon exists, the front of the aperture of the shell presents a notch, or is produced into a channel in which the siphon rests. In other genera the respiratory siphon is altogether wanting, or its place is supplied by a lobe developed from the neck, and in these genera the aperture is without the anterior notch or channel. Sometimes a posterior tube exists with a corresponding notch or canal in the shell; but the function of this posterior tube is simply to provide for the more easy efflux of water or the ejection of the anal excretions from the branchial chamber. The head of the prosobranchiate gasteropod is provided with tentacles, which serve as organs of touch, and probably of smell, and with a proboscis which in some genera is retractile or exsertile. The eyes, with which organs all are endowed, are generally placed either at the bases, or on the extremities, or the sides of the tentacles; but in some genera they are carried on pedicels specially appropriated for them.

The presence or absence of the respiratory siphon has been used for the subdivision of the present order into two sections: 1st, *Siphonostomata*, corresponding with De Blainville's order *siphonobranchiata*, and comprising such of the prosobranchiata whose proboscis is retractile, and the margin of whose mantle is prolonged into a siphon, and whose shell is, consequently, notched or produced into a channel in front: and 2d, *Holostomata*, consisting of those in which the proboscis is not retractile, and the animal not being provided with a respiratory siphon, the aperture of the shell is entire. The genera comprised in the first section are all zoophagous, and are inhabitants of the sea or of brackish water; those in the 2d section are, for the most part, phytophagous; the greater number live in salt or brackish water; some, however, are inhabitants of fresh

water. This subdivision, although very convenient, is not, as Mr. Woodward* remarks, altogether satisfactory; inasmuch as several genera occur among the *holostomata* in which the proboscis is retractile, or the shells are notched or furnished with an anterior canal.

By far the greater part of the present order are furnished with an operculum, but many are without that protection.

Since Lovén published the result of his examination of the dental apparatus of Mollusca, much attention has been paid to the subject, and great importance is attached to the condition of the lingual teeth. But the assistance derived from this character, however valuable it may prove to malacologists, can be available indirectly only to the palæontologist.

Family—CYPRÆIDÆ.

Genus 20th. CYPRÆA.† *Linn.* 1740.

PERIBOLUS, *Adanson*, 1757; *De Blainville*, 1825.

CYPRÆA, *Lamarck*, 1801; *De Blainville*, 1825.

CYPRÆA, *Montf.*, 1810.

COCCINELLA, *Leach*, 1820.

TRIVIA—CYPROVULA—LUFONIA, *Gray*, 1830.

Gen. Char.—Shell oviform, oblong or sub-globular, convolute, enamelled, generally smooth, sometimes pustulous, transversely ribbed, or cancellated: spire short, depressed visible only in the young state, when adult, concealed by the enamel; aperture long, narrow, terminating at each extremity in a short canal; outer lip inflected, crenulated; inner lip crenulated.

The animal of Cypræa has a broad, sub-lunate head, terminating in a short retractile muzzle, and bearing long subulate tentacles on bulgings, at the outer bases of which the eyes are placed. The foot is broad, truncated in front, pointed, and sometimes much produced behind; the mantle terminates in a siphon in front, and the lateral margins, as the animal approaches maturity, expand into lobes, generally equal, but frequently more or less unequal, and which can be extended at pleasure, so as entirely or nearly to cover the shell, the edges meeting on the back or on the right side, according as the lobes are equal or unequal. By these lobes is deposited the testaceous matter which forms the enamel-like covering of the shell, characteristic of the family; the line of juncture being usually indicated, in recent cowries, by a groove or a streak of a fainter colour. The outer surfaces of the lobes are generally covered

* 'A Manual of the Mollusca,' p. 122.

† Etym., from *Cypris*, one of the names of Venus.

with filaments, sometimes with numerous papillæ, and in some instances they are smooth. The branchial organ consists of a single plume, and the dental apparatus is composed of a series of rows of teeth, each row formed of one broad uncinated central tooth, and three hooked lateral teeth on each side.

In the young state, the Cowry presents a very different appearance to that which it ultimately assumes. In the early stage of growth the outer lip is thin, sharp, and simple, neither involute nor crenulated; the aperture is wide and effuse in front, and the spire is well-marked. In this state the shell is quite smooth, and without the enamel and coloration which subsequently form its chief beauty.

Various generic divisions of the *Cypræa* have been proposed by different authors; but they appear to depend mainly on conchological distinctions, the animals, in so far as they are at present known, not presenting essential differences from the true *Cypræa*; and these genera, therefore, are more usually regarded as sections merely of the present genus. A slight variation in the dental apparatus, and the papillose surface of the lobes appear to distinguish the genus *Trivia*,* the only section of the present genus which is represented in our Eocene Fauna.

As a genus, the living Cowries have a wide range, extending from the shores of Greenland to the equator. The largest and most beautiful species are, however, inhabitants of the tropical seas, where they are found in shallows under coral-reefs or rocks. Upwards of 150 species have been figured and described; of these one species only (*Cyp. Europæa*), is found on our coasts.

In the fossil state, a few species, referred to this genus, from the upper cretaceous formations in Pondicherry, at Martignes (Bas du Rhone), and at Faxoè, in Denmark, have been described by Professor E. Forbes, Matheron, and Sir C. Lyell; but in the eocene and subsequent formations, the genus has a much larger development. From the lower and middle beds of the Paris Basin, twelve species have been described by Lamarck, Deshayes, and Melleville; from the miocene and more recent beds of Touraine, Dax, and Bourdeaux, and the pleiocene formations of Piedmont and Turin nearly seventy species have been described by Dujardin, Grateloup, Brocchi, Basterot, Sismonda, and others; and from the Crag of England, and the synchronous deposits in Belgium, several other species have been described by MM. Sowerby, Searles Wood, Nyst, and Philippi. Of the English eocene *Cyprææ*, five species only have hitherto been described; to these I now add four new species, three of which belong to the section *Trivia*.

No. 71. *CYPRÆA INFLATA*. *Lamarck*. Tab. XVI, fig. 4a, b.

CYPRÆA INFLATA, *Burtin*. 1784. *Oryct. de Bruxelles*, t. 17. fig. T.

— — *Lamk*. 1802. *Ann. du Mus.*, vol. ii, p. 389, No. 2, vol. vi, t. 44, fig. 1.

* *Messrs. Adams' 'Genera of Recent Moll.,' vol. i, p. 264.*

- CYPRÆA INFLATA, *Lamk.* 1822. *Hist. nat.*, vol. vii, p. 407, No. 11.
 — — *Brogn.* 1823. *Sur les terr. tert. &c. du Vicent.* p. 62.
 — — *Defr.* 1826. *Dict. des Sci. nat.*, vol. xliii, p. 35.
 — — *Bronn.* 1831. *Ital. Tertiargeb. &c.*, p. 15, No. 33.
 — — *Gray.* 1832. (*Add. to Mon. Cyp.*). *Zool. Journ.*, vol. iv, p. 76, No. 30.
 — — *Desh.* 1824—37. *Desc. des Coq. foss., &c.*, vol. ii, p. 724; t. 97, figs, 7, 8.
 — — ? *Galeotti.* 1837. *Mém. sur la const. géog. &c. de Brab.*, p. 148, No. 69.
 — OVIFORMIS, ? *Galeotti.* 1837. *Mém. sur la const. géog. &c. de Brab.*, p. 183, No. 12.
 — INFLATA, ? *Nyst.* 1843. *Coq. &c.*, de Belg., p. 607.
 — — *Sowerby.* 1850. *Dixon's Geol. &c. Suss.*, p. 108, t. 8, figs. 4-5.

C. testá ovatá, inflatá, anticè attenuatá, posticè sub-obtusá, lævi: aperturá elongatá, angustá, flexuosá, basi dilatatá, vix emarginatá; columellá obsoletè plicato-dentatá; labro incrassato, extús sub-marginato, intus regulariter dentato, anticè compresso.

Shell ovate, ventricose, swelled out in the middle, attenuated in front, rather obtuse behind, smooth: aperture elongated, curved, narrow, but somewhat wider in front, where it terminates in a short wide canal, obscurely notched. The outer lip much produced, and the posterior extremity bent suddenly towards the apex of the spire, forming between it and the posterior extremity of the body-whorl, an oblique narrow groove, which represents the posterior canal found in some of the *Cyprææ*; the outer lip thickened, depressed on the surface, flattened in front on the inner surface, where it joins the anterior canal, and presenting a prominent ridge along the outer margin; the teeth, which are short and placed on the inner edge only, become obsolete on the flattened part of the lip. The columella presents four or five oblique folds in front, and is obscurely dentated behind.

This *Cypræa* occurs rather numerous in the *calcaire grossier*; our English specimens are generally of a larger size than those found in the French formations.

Size.—Axis, 1 inch and 5-10ths, nearly; diameter, 1 inch: occasionally larger specimens occur.

Localities.—Bracklesham Bay, where it is common; but the specimens are generally distorted. *French:* Grignon, Parnes, Mouchy, Amblainville, Thury-sous-Chaumont, (fide D'Orb.) The species is recorded by Brogniart and by Bronn as occurring at Ronca (Vicent.) but the identity is questionable. Casts of *Cyprææ* occur in the sands of Rouge-Cloître, St. Josse-ten Noode, Groenendael and Orp-le-Grand, in Belgium, which also have been referred, although with doubt, to the present species. The shells from Dax and St. Paul, which were described by Grateloup as belonging to *C. inflata*, appear to belong to a distinct species, which D'Orbigny has named *C. pseudo-inflata*; and the shells from the Piacentin, referred by Brocchi to this species, also appear to be distinct, and have been described by Sismonda under the name *C. labrosa*.

No. 71*. *CYPRÆA OVIFORMIS*. Sowerby. Tab. XVI, f. 1a—i.

CYPRÆA OVIFORMIS, Sow. 1812. Min. Con., vol. i, p. 17, t. 4, 3 lower fig.

— — Defr. 1826. Dict. des Sci. nat., vol. xliii, p. 40.

OVULUM RETUSUM, Sow. 1834. (Wetherellon Hampstead Heath Well,) Geol. Trans., 2d. Series, vol. v, p. 136, t. 8, fig. 19.

NON *CYPRÆA OVIFORMIS*, Galeotti. 1837. Mém. sur la const. géog. &c. de Brab., p. 183, No. 12.

C. testá sub-globosá, anticè attenuatá, lævi : aperturá posticè elongatá, flexuosá, angustissimá, anticè latiori, extremitatibus canaliculatá, ad basin emarginatá ; labro posticè et in medio compresso et incrassato, anticè acuto, expanso, eatus marginato, intus regulariter dentato ; labio anticè compresso, in callum fastigiosum ad basin tendentem lateraliter expanso ; columellá planulatá, anticè concavá, dentato-plicatá.

Shell sub-globose, narrowing gently towards the base, where it is produced into a short wide beak or canal, slightly notched in front, smooth : aperture elongated, curved, very narrow, but expanding a little before it enters the anterior canal ; the outer lip prolonged at the posterior extremity, thickened ; compressed until nearly opposite the wide part of the aperture, where it becomes thin and elevated, and is flattened on the inner surface ; a narrow raised border, more or less prominent in different individuals, runs along the outer margin, and joins the thin elevated part of the lip. The teeth are numerous, short, not extending beyond the inner margin, and almost obsolete on the anterior part of the lip. The inner lip, towards the front, expands into a narrow ridge-like prominence, which extends to the very base ; and at the posterior extremity rises into an angular callus, forming the left wall of the posterior canal. The columella is flattened, hollowed towards the front, and covered with numerous slender pliciform teeth.

The projecting margins, imparting to the front of the aperture the resemblance of a wide trough, form a character by no means common among the *Cyprææ* ; it is found, although not so prominently, in *C. exerta* (Desh.), a species from the *sables inférieurs* of the Paris Basin, and in the English *C. Bartonensis*. A short and very globose variety (fig. 1d) occurs at Whetstone, in which the projecting margins are farther apart, and the trough, consequently, is wider than in the type. The specimen figured, which is from Mr. Wetherell's collection, has lost part of the anterior canal.

In the young state, this *Cypræa* is almost pyriform, being much more produced and attenuated in front ; and it is covered with very numerous transverse raised lines, traversed by sharp, perspicuous lines of growth ; the aperture is much lengthened and curved at the posterior extremity, wide, and very effuse in front, and the columella is twisted. In this state it has the appearance of an *Ovula*, and, in fact, an immature individual of the species obtained by Mr. Wetherell, from the well sunk at the Lower Heath, Hampstead, has been described by Mr. Sowerby as *Ovulum retusum*. A selection from the beautiful series of specimens in Mr. Wetherell's cabinet, with the aid of some

specimens in my own collection, enables me to show that the *Ovulum retusum* is, as I have stated, only the young shell of the present species. The shells represented by fig. 1e, 1f, and 1i, are young *Cyprææ*, in the first stage of growth, without teeth on either lip, and before the outer lip has become involute, but presenting the transverse lineation of the so-called *Ovulum retusum*, fig. 1i, being, in fact, taken from one of the original specimens so described. In the next specimen, fig. 1g, the shell has apparently attained the second or intermediate stage, the columellar teeth having been formed, and the lateral expansion of the left lip having commenced; and we find these characters associated with the transverse lineation. The specimen, fig. 1h, is a fully formed shell of *C. oviformis*, in which, a portion of the shell having been broken away, the interior volutions, exhibiting the transverse lineation, are disclosed.

Size.—Axis, 1 inch and 3-10ths; diameter, 1 inch.

Localities.—Primrose Hill, Highgate, Hampstead, Haverstock Hill, Copenhagen Fields; Barnet, Whetstone, Potter's Bar, Sheppey.

No. 72. *CYPRÆA BOWERBANKII*. *Sowerby*. Tab. XVII, fig. 1a—d.

CYPRÆA OVIFORMIS, *Sow.* (1812.) *Min. Con.*, vol. i, p. 17; t. 4, upper fig.

— *BOWERBANKII*, *Sow.* (1850.) *Dixon's Geol. &c., Suss.*, pp. 108 and 189, t. 8, figs. 1 and 2.

C. testá oviformi, ventricosá, lævi: aperturá angustá, arcuatá, anticè sub-effusá, latè emarginatá; labro inflexo, marginato, posticè producto, anticè compresso, dentato-plicato, dentibus anterioribus elongatis; columellá dentatá, dentibus anticis pliciformibus; denti primá magná, proeminenti, rotundatá.

Shell egg-shaped, ventricose, smooth: aperture curved, narrow, effuse in front, without a posterior canal, and widely but not deeply notched at the base; outer lip incurved, produced posteriorly, flattened towards the front; teeth on the flat part elongated, oblique; the anterior tooth on the columella large, round, prominent, and very oblique.

The specimen represented by fig. 1a and 1b, and for the use of which I am indebted to Mr. Sowerby, is the Highgate shell, from which the upper figure in tab. 4 of 'Mineral Conchology,' was taken; it has not attained maturity, the teeth not being formed on the outer lip. It will be seen that the aperture in fig. 1b is wider in front than that in fig. 1d, which is taken from a fully grown shell: this difference is to be attributed partly to the immature state of the outer lip of the specimen, and partly to the front of the columella being represented with a curve too deep. In other respects the Highgate shell agrees with those from Bracklesham Bay. The figs. 1c and 1d, are taken from specimens which form part of the late Mr. Dixon's collection.

According to the strict rules of nomenclature, the specific name *oviformis* ought, perhaps, to be retained for this shell; but the species which occurs not unfrequently at Highgate and the neighbouring localities, and which is figured on the same plate, is so generally known as *C. oviformis*, that I have applied the name to that species.

Size.—Axis, 3 inches and 1-10th; diameter, 2 inches and 2-10ths.

Localities.—Highgate, where it is very rare; Bracklesham Bay, where it is not uncommon.

No. 73. *CYPRÆA GLOBULARIS*. *F. E. Edwards*. Tab. XVI, fig. 3a, b.

CYPRÆA GLOBOSA, *J. Sow.* 1850. *Dixon's Geol., &c., Sussex*; p. 189, t. 8, fig. 3.

C. testá globosá, lævi, anticè rostratá, vix emarginatá; aperturá sub-rostrá, angustá, posticè sub-canaliculatá; labro inflexo, compresso, intús dentato, dentibus numerosis, fere equalibus; columellá dentato-plicatá, anticè compressá.

Shell globose, smooth, with a short, straight, rather narrow canal; scarcely notched in front; aperture nearly straight, narrow, terminating posteriorly in an obscure canal; outer lip broad, compressed, curved inwards, with numerous regular teeth, nearly equal in size, placed on the inner edge; columella furnished with numerous pliciform teeth.

The nearly globular form and short narrow beak of this exceedingly rare *Cypræa* distinguish it from all its congeners. The specimen from which the figures are taken forms part of Mr. Dixon's collection, and is, I believe, unique. The specific name proposed by Mr. Sowerby having been previously used by Dujardin for a different species from the Faluns of Touraine, I have substituted the present name for it.

Size.—Axis, nearly 2 inches; diameter, 1½ inch.

Locality.—Bracklesham Bay.

No. 74. *CYPRÆA BARTONENSIS*. *F. E. Edwards*. Tab. XVII, fig. 6a—b.

C. testá ovatá, ventricosá, subtús depressiusculá, anticè attenuatá, lævi; spirá prominulá, vix obtectá, sulco obscuro circumdatá; aperturá lineari, angustissimá, anticè latiori, posticè elongatá, utráque extremitate sub-rostratá et emarginatá; labro extus marginato, anticè compresso, regulariter dentato; columellá subrectá, planulatá, anticè concavá, dentato-plicatá, dentibus posticis elongatis.

Shell ovate, ventricose, flattened beneath, attenuated in front, rather obtuse behind; spire somewhat elevated, scarcely concealed by the enamel, and encircled by an obscure sulcus formed by the suture: mouth nearly straight, very narrow, a little wider in front, produced behind, and presenting at each extremity a short canal, slightly notched; outer lip broad, thickened, so as to form a curved raised border along the outer

margin, flattened towards the base, and furnished with numerous regular teeth, of which the posterior ones are pliciform. The anterior canal is defined by an obscure, nearly vertical plait on the outer lip, and a curved elevated plait at the base of the columella; inner lip thickened, and spread out at the base, forming a prominent callus towards the front of the whorl, plicated along the whole length on the inner margin, and produced at the posterior extremity into a bluntly pointed projection which forms the left wall of the posterior canal. Columella nearly straight, flattened, and presenting towards the front end, a deep three-sided concavity connected with the body whorl by a short, wide depression; columellar teeth pliciform, the posterior ones longer and more oblique than the others.

This species, the prettiest of the English Eocene cowries, resembles *C. media*, (Desh.) more closely, perhaps, than any other of the fossil Cyprææ; but the elevated spire, the anterior callus, and the strongly marked posterior canal impart to it a distinct character.

Size.—Axis, rather more than 1 inch: diameter, 7-10ths of an inch nearly.

Locality.—Barton, where it is not very common.

No. 75. CYPRÆA TUBERCULOSA. *Duclos*. Var. COOMBII. *Sowerby*. Tab. XVI, fig. 2, Tab. XVII, fig. 5.

OVULA TUBERCULOSA, *Duclos*.

CYPRÆA DESHAYESII, *Gray*. (1832). (Add. to Mon. Cypr.,) Zool. Journ., vol. iv, p. 83, No. 64*.

— — *G. Sow.* (1832). (Notes on Gray's Additions to Mon. Cypr.,) Zool. Journ., vol. iv, p. 221.

OVULA TUBERCULOSA, *Desh.* (1824-37). Desc. des coq. foss., &c., vol. ii, p. 717, t. 96, fig. 16, t. 97, fig. 17.

— — *Desh.* (1844). 2d edit. Lam. Hist. nat., vol. x, p. 478, No. 3.

CYPRÆA COOMBII, *J. Sow.* (1850). Dixon's Geol. &c., Sussex, pp. 108 and 188, t. 8, fig. 6.

OVULA TUBERCULOSA, *D'Orb.* (1852). Podrome de Paléont., vol. ii, p. 314, No. 297.

C. testá magná, trigoná, ventricosá, lævi, dorso aliquando tuberculatá, subtus planulatá: aperturá elongatá, angustissimá, ferè edentulá, arcuatá, anticè latiori, utrâque extremitate canaliculatá; canali posteriori ad spiram reflexo, canali anteriori recto: labro compresso posticè exserto, sub-auriculiformi, lateraliter expanso.

Shell large, trigonal, ventricose, smooth, sometimes presenting one or two tubercles on the back; base flattened, posterior end very broad, flattened, almost truncated: aperture elongated, curved, very narrow, rather wider in front, nearly if not altogether toothless, with a wide canal at each extremity; the anterior canal straight, the posterior one curved and bent upwards towards the spire; outer lip broad-edged, expanding at the posterior extremity into an ear-shaped projection.

The French specimens of the *Cypræa tuberculosa* are smaller and less triangular in form than our English shells; and the flattened posterior extremity is circumscribed by two lateral callosities which rise, one on each side, towards the back. This singular character, which forms a prominent feature in the specimen figured by M. Deshayes, and which I am assured by that gentleman is constant in the French shells, is wanting in the very few English specimens I have seen. Notwithstanding these differences, the English shells present such close affinities to the French specimens, that they must be regarded rather as a strongly marked local variety than as a distinct species. The dorsal tubercles, from which the specific name is taken, are stated by Mr. Sowerby not to be a constant character; they certainly appear to vary much in size and position, for in the figure and description given by M. Deshayes they are represented as of considerable size, and as ranged longitudinally about the middle of the shell; while in Duclos's original figure, they appear to be much smaller, and are placed transversely near the posterior extremity. The English specimen now figured, presents an even surface; but one, formerly in Mr. Bowerbank's museum, and which, unfortunately, has fallen to pieces, had a single large tubercle near the middle.

With regard to the genus to which this singular shell should be referred, a difference of opinion exists. The absence, or nearly obsolete condition, of the columellar teeth would seem to require that it should be placed, as in fact all the French authors have placed it, among the *Ovulæ*; but the pyriform shape, the aperture, and the general aspect of the shell belong rather to *Cypræa*. Dr. Gray has pointed out the analogy between it and the tuberculated variety of the recent *C. mus*, and asserting in fact, that M. Deshayes's specimen has a very few obscure teeth on the lips, he has stated that, in his opinion, the shell is evidently a cowry, an opinion from which Mr. George Sowerby has not dissented. On this authority, I have retained the shell in the present genus, of which, as Mr. James Sowerby has suggested, it may form with *C. mus*, a sub-genus.

Size.—Axis, 6 inches and 6-10ths; diameter, 5 inches.

Localities.—Bracklesham Bay, where it is rare. *French*: Rétheuil, Cuise-Lamotte, Pierrefonds, (Oise), (fide D'Orb).

Section—TRIVIA.

No. 76. *CYPRÆA PLATYSTOMA*. *F. E. Edwards*. Tab. XVII, fig. 7a—f.

C. testá parvá, ovato-oblongá, ventricosá, anticè attenuatá, transversim lineatá, apice elevato; lineis angulosis, numerosis, regularibus, sulco dorsali perspicuo, mediano, interruptis; spatiis inter lineas concavis; aperturá latá, posticè sub-productá, flexuosá, canaliculatá, anticè brevi latoque canali exeunti, viæ emarginatá; labro extús late marginato, in medio leviter arcuato.

Shell small, ovately oblong, ventricose, attenuated in front, almost pyriform; trans-

versely ridged; apex elevated; ridges slender, sharp-edged, numerous, (18 to 20), regular, interrupted by a dorsal sulcus; the spaces between the ridges regularly concave; aperture wide, with parallel margins, somewhat produced and curved behind, terminating in a short, wide canal, and slightly notched in front; the outer lip, towards the middle, is curved correspondingly with the shape of the body-whorl, and presents a wide but not much raised border along the outer edge. The dorsal sulcus, which is very distinct, becomes wider and deeper at each extremity. The transverse ridges are more numerous on the right lip than across the back, as several short ones rise out of the aperture, which scarcely extend beyond the outer margin. In the young shell, (fig. 7a—c), the right lip is obscurely dentated towards the front, but is otherwise smooth; it presents a raised border along the outer edge.

Size.—Axis rather more than 4-10ths of an inch; diameter, 3-10ths of an inch.

Localities.—Highcliff, and Alum Bay: (Strat. No 29, Prestwick).

No. 77. CYPRÆA WETHERELLII. *F. E. Edwards*. Tab. XVII, fig. 3a—d.

CYPRÆA PEDICULUS? *Webst.* (Observations on the strata over the Chalk, &c.,) *Geol. Trans.*, 1st Ser., vol. ii, p. 204.

C. testá parvá, sub-globosá, transversim lineatá; lineis tenuibus, numerosis; sulco dorsali vix conspicuo non interruptis; aperturá sub-medianá, leviter arcuatá, posticè productá, sub-canaliculatá.

Shell small, nearly globose, slightly attenuated in front, transversely ridged; ridges thin, angular, not interrupted by the obscure dorsal sulcus, few in number as they emerge from the aperture, but becoming numerous by the bifurcation of some, and by the appearance of new ridges between others; aperture nearly central, narrow? slightly curved, produced behind, forming a short wide canal; outer lip ?

The specimen of this *Cypræa* from which the description and figure are taken is imperfect; the outer lip and the front of the columella are both broken, and the shelly matter on part of the back is decomposed, exposing a cast in the pyrites with which the interior of the shell is filled; but the posterior extremity of the outer lip and the triangular elevation which formed the left wall of the posterior canal remain. The continuation of the transverse ridges across the back of the shell, uninterrupted by the dorsal sulcus, is plainly shown.

This *Cypræa* is one of the many additions to our Eocene Fauna for which we are indebted to the indefatigable zeal of Mr. Wetherell, with whose name I designate the species. The specimen from which the figures are taken, was found in one of the cuttings made at Whetstone, on the formation of the Great Northern Railway. Another, and apparently a younger, specimen was also obtained by Mr. Wetherell from the railway cutting at Primrose hill.

Among the fossil Cyprææ found in the Paris basin, is one belonging to the present section, which Lamarck considered to be identical with the recent *Cyp. pediculus*, but which, M. Deshayes, in his 'Description des coquilles fossiles,' &c., has shown to be distinct, and has named *C. Lamarckii*. Mr. Webster (*loc. cit.*) has recorded a fossil cowry as occurring at Highgate, and at Stubbington, which he also refers to *C. pediculus*. I have not met with any Cypræa belonging to this section, either from Stubbington or Bracklesham Bay; but it is not improbable that the Highgate specimen mentioned by Mr. Webster belonged to the present species, which, however, is more globose than *C. Lamarckii*, with a wider aperture, and more numerous transverse lines.

Size.—Axis, rather more than 3-10ths of an inch; diameter, 3-10ths of an inch.

Localities.—Whetstone, near Barnet; Primrose-hill.

No. 78. CYPRÆA PRESTWICHII. *F. E. Edwards*. Tab. XVII, fig. 2a—c.

C. testá parvá, ovato-oblongá, ventricosá, anticè attenuatá, canaliculatá, víx emarginatá, transversim lineatá; lineis numerosis, tenuibus, irregularibus, sulco dorsali, sub-mediano, obscuro, interruptis; aperturá angustá, lineari; labro involuto.

Shell small, ovately oblong, ventricose, attenuated towards the anterior extremity, with a short canal, slightly notched in front, and covered with transverse ridges, interrupted on the back by an obscure, nearly medial sulcus; ridges slender, sharp-edged, numerous (18 to 20), irregular; aperture linear, narrow; outer lip incurved.

This Cypræa is not so pyriform as *C. platystoma*; the apex is not so elevated, the transverse ridges are less regular and not so numerous, particularly over the outer lip; and the aperture is linear without any posterior curve. The more globose form, the elongated aperture, and the posterior canal of *C. Wetherelli*, distinguish it from that species.

I am indebted for this cowry to Mr. Prestwich, to whom I have dedicated it.

Size.—Axis, rather more than $\frac{1}{4}$ of an inch; diameter, 2-10ths of an inch.

Locality.—Basingstoke.

Genus 21st.

AMPHIPER
LICUM, *H*
CYPHOMA, .
OVULA, *Lan*
OVULUS, *Mc*
CALPURNUS,
ULTIMUS, *Mc*

SCYMNIA, *Leach*, 1819.

SIMNIA, *Risso*, 1826.

CALPURNA, *Fleming*, 1828.

VOLVA, *Fleming*, 1828.

CYPRÆLLA, *Swainson*, 1840.

CARINEA, *Swainson*, 1840.

Sect. VOLVA, *Bolten*, 1798.

RADIUS, *Montf.*, 1810.

RADIUS, *Schum.*, 1817.

BIROSTRA, *Swainson*, 1840.

Gen. Char.—Shell ovate, gibbous, more or less attenuated or produced, and emarginate at each extremity; smooth, convolute upon a nearly horizontal plane; spire concealed: aperture longitudinal, elongated, narrow behind, more expanded in front; outer lip generally inflected, thickened, denticulated; inner lip smooth.

The Ovulæ present great similarities to the Cyprææ, both in the organization of the animal and the construction of the shell. The principal distinctions between the animals appear to be in the condition of the muzzle, and in the mantle, the surface of which, in the true Ovulæ, is always smooth. The shells are distinguished by the absence of teeth on the left margin of the aperture, and by the prolongation of the two extremities; but, like the Cowries, they are, when fully formed, smooth and polished, owing to the enamel-like coating secreted by the extended margins of the mantle.

The genus was first separated by Gronovius, under the name *Amphiperas*, and was afterwards defined by Bruguière under the present name, by which it has been generally received. Several dismemberments have been proposed by Bolten, Fleming, Leach, Swainson, and others, on conchological distinctions only. In one of these, the genus *Volva* proposed by Bolten for the well-known oriental shell, called the "weaver's shuttle," (*Ovula volva*), the animal, according to Mr. Adams,* presents certain peculiarities, consisting of a row of nipple-like tubercles along the edge of the mantle, and of a narrow foot folded longitudinally and adapted for crawling upon the round slender stems of the Gorgoniæ and other zoophytes on which the animal feeds, which modifications appear to confirm the separation; but the other proposed divisions are for the present received as sections only of the present genus until more accurate knowledge of the anatomy and habits of the animals is acquired.

The living *Ovulæ* are not very numerous, and are, for the most part, inhabitants of warm climates; they are found principally in the seas of China, Western America, and the West Indies; one species only is found on our own shores. The fossil *Ovulæ* are very few; seven species from the cretaceous formations, five of which were described as *Cyprææ*, are referred by D'Orbigny to this genus; two species, exclusive of *O. (Cypræa) tuberculosa*, before described, occur in the Eocene tertiaries of France, and three are found in the more recent formations.

* 'Zoology of the Voyage of H. M. S. *Samarang*,' p. 19.

No. 79. OVULA? ANTIQUA. *F. E. Edwards.* Tab. XVII, fig. 3a—b.

O. testá elongato-ovali, sub-ventricosá, posticè sub-acuminatá, lævi : aperturá angustá, posticè elongatá, in canali brevi, mediocriter lato, exeunti, anticè effusá.

Shell of a lengthened oval form, somewhat ventricose in the middle, slightly acuminate at the posterior extremity, smooth: aperture elongated, narrow behind; posterior canal short, moderately wide. The anterior extremity is broken; it appears to have been rather more obtuse than the posterior one. The last volution is smooth, but the surface of the preceding volution presents numerous transverse striæ, perspicuous towards the posterior extremity, and becoming obsolete as they approach the middle of the whorl; these striæ are very fine, so much so as to be barely perceptible by the naked eye.

The only specimen I have seen forms part of Mr. Wetherell's collection; it is too imperfect for a detailed description, or even for ascertaining satisfactorily the genus to which it belongs. It is apparently an immature shell just emerging from the first stage of growth before the outer lip has become thickened or involute, and when the absence of teeth on the columella is not conclusive of the genus. It may be the young shell of a *Cypræa*, resembling the *C. acuminata* of Melville, and, therefore, I have referred it to the present genus with doubt, and have named it provisionally only.

Size.—Axis, $\frac{1}{2}$ an inch; diameter, 2-10ths of an inch.

Locality.—Primrose Hill.

Genus 22d. MARGINELLA.* *Lamarck.*

PORCELLANA, PERIBOLUS, *Adanson*, 1757.

DACTYLUS, *Humphrey*, 1797.

MARGINELLA, *Lamarck*, 1801.

MARGINELLUS, *Montfort*, 1810.

PERSICULA, *Schum.*, 1817.

VOLVARIA, (sp.) *Lamarck*, 1822.

MARGINELLA, GLABELLA, } *Swainson*, 1840.

VOLUTELLA, GIBBERULA, }

PHÆNOSPIRA, CRYPTOSPIRA, *Hinds*, 1844.

Gen. Char.—Shell oval, oblong, smooth, enamelled; spire short, sometimes almost concealed: aperture elongate, narrow, truncate, sometimes broadly but not deeply notched in front; outer lip thickened externally, inner margin sometimes smooth, generally crenated; columella with distinct plaits, more or less numerous.

* Etym., Diminutive of *Margo*, a rim or margin.

This genus was first separated by Adanson, and afterwards by Humphrey, for shells previously referred either to *Voluta* or *Mitra*. Subsequently Lamarck defined it more exactly under the present name, by which it is now known. The animal resembles that of *Cypræa* in all essential particulars, and like it, is furnished with lobes to the mantle, which can be extended over the shell so as to cover the spire, which thus acquires an enamel-like covering resembling that of the Cowries. The condition of the spire, the number and the arrangement of the columellar plaits, and the simple or crenated state of the outer lip, have been used as characters for the separation of the *Marginellæ* into various genera; but these divisions do not appear to be warranted by generic distinctions in the animals and consequently, have not been generally adopted, but have been regarded as sections merely of the present genus. Mr. G. Sowerby (*Gen. Shells*), has suggested that the *Marginellæ* may be classed under two natural sections; the first comprising the species in which the spire is distinct, the columella furnished with four folds at the base, and the outer lip characterised by a thick fold-like border along the outer margin; the other consisting of the species in which the spire is short, almost concealed, the columellar plaits more numerous, the anterior plaits being the larger, and the outer lip but slightly thickened. The first section corresponds with *Glabella* (Swain.) and *Phænospira* (Hinds); the latter represents *Persicula* (Schum.), *Volutella*, *Gibberula*, *Marginella* (Swain.), and *Cryptospira* (Hinds).

The recent *Marginellæ* are numerous; they chiefly inhabit the tropical and subtropical seas, where they are found in shallow waters; they appear to abound on the coasts of Africa, and some few small species, belonging to the second section, are found in the Mediterranean. In the fossil state they first appear during the tertiary epoch. In the French eocene beds, eleven species occur, of which seven have been described by Lamarck and Deshayes; and of these, several are found in England, Germany, and Belgium. Six species from the corresponding formations in Alabama (U.S.), have also been described by Conrad and Lea: and in the more recent deposits in Europe and the United States, twenty additional species have been found.

Section A. Spire apparent.

No. 80. MARGINELLA EBURNEA. *Lamarck*. Tab. XVIII, figs. 1 a—c.

- MARGINELLA EBURNEA, *Lamk.* 1803. Ann. du Mus., vol. ii, p. 61, No. 1; and vol. vi, t. 44, fig. 9.
- | | | |
|---|---|---|
| — | — | <i>Roissy.</i> 1804. Buff. Moll., vol. vi, p. 9, No. 4. |
| — | — | <i>Lamk.</i> 1822. Hist. nat., vol. vii, p. 359, No. 15. |
| — | — | <i>Brogn.</i> 1823. Sur les ter. tert., du Vicent., p. 64, No. 1. |
| — | — | <i>Defr.</i> 1823. Dict. des sci. nat., vol. xxix, p. 145. |

MARGINELLA EBURNEA, <i>Desh.</i> 1830. En. Méth. (Vers), vol. ii, p. 413, No. 13.	
— — <i>Bronn.</i> 1831. Ital. Tertiärgb., p. 18, No. 53.	
— — <i>Desh.</i> 1824-37. Descr. des coq. foss., &c., vol. ii, p. 707, t. 95, figs. 14—16, and 20—22.	
— — <i>J. Sow.</i> 1850. Dixon's Geol., &c., of Suss., p. 107.	
— — ? <i>Phil.</i> 1851. Palæontographica (Tert. Foss. Magd.), vol. i, p. 79, No. 174.	
— — ? <i>Beyrich.</i> 1853. Die Conchyl. des Norddeutschen tert., vol. i, p. 52, t. 2, figs. 9 a, b.	
Nec. — — <i>Grat.</i> 1838. Cat. Zool., &c., de la Gironde, p. 50, No. 478.	
nec. — — <i>Grat.</i> 1845. Conch. foss., &c., de l'Adour, t. 1, (Tarrière, &c.), figs. 38—40.	
nec. — — <i>Sismon.</i> 1847. Syn. meth., &c., Pedemont. Foss., p. 42, No. 46.	

M. testá parvá, ovato-elongatá: spirá acuminatá, ultimo anfractu breviori; anfractibus convexiusculis, ad suturam confluentibus; aperturá angustá; labro posticè sinuato, extus marginato, intus mutico; columellá quadriplicatá.

Shell small, elongated, with an elevated pointed spire, rather shorter than the aperture, and formed of five or six narrow, slightly convex whorls, somewhat depressed round the sutural margin, the sutures concealed by the enamel; body-whorl conoidal; aperture elongated, narrow, obscurely notched in front; lips nearly parallel; outer lip with a wide and moderately deep sinus at the suture, thickened and presenting a raised border along the outside margin, smooth within; columella nearly straight, and furnished with four narrow, almost equal folds, the front two of which are more oblique than the others.

M. Deshayes, when he separated *M. hordeola*, suggested at the same time that it might be only a variety of the present species; Dr. Beyrich in fact maintains the identity, and that the only distinction is the difference of size. I do not concur in this opinion. Both species belong to a group, in several of which the characters depend, to a great extent, on the condition of the aperture and the general form of the shell; characters in some instances difficult to define, but which strike the eye forcibly, and from their constancy acquire specific importance. The general form of the shell in *M. hordeola* is not so broad as that of *M. eburnea*, owing to the whorls being less convex; the spire is more obtuse, and comparatively shorter; and the aperture is longer and narrower, particularly at the posterior extremity, and it is more contracted at the middle in consequence of the greater involution of the outer lip. Other species occur in the *calcaire grossier*, belonging to this group, and hitherto undescribed, but which, as I learn from M. Deshayes, will be described in the forthcoming supplement to his 'Description des coquilles fossiles,' &c. One of these (*M. contabulata*), appears to be intermediate in size between *M. eburnea* and *M. hordeola*, and, in fact, to present a close general resemblance to the former. It is unnecessary to enter upon any examination

of the characters distinguishing this new species; but it is not improbable that Dr. Beyrich may have associated specimens of *M. contabulata* with the true *M. hordeola*.

It is always hazardous, without the assistance to be derived from actual specimens, to express an opinion on questions of identity; but the figure given by Dr. Beyrich does not convey to my mind an idea of *M. eburnea*; the spire seems to be shorter and thicker, the apex to be more obtuse; the aperture to be shorter, less wide in front, less narrow behind; the outer lip is represented without the posterior sinus, and the folds on the columella appear to be more oblique. The figure agrees much better with *M. contabulata*, to which species, if it had been published, the German shell would more probably have been referred.

The present species appears to be confined to the older tertiary formations; the shells from Dax, and the neighbourhood of Bourdeaux, referred to it by Grateloup, belong to a different species, which D'Orbigny has named *M. sub-eburnea*; as do those from Turin, described by Sismonda, and to which Michelotti has given the name, *M. Taurinensis*.

Size, of the specimen figured, which forms part of Mr. D'Urban's collection, is, axis, 3-10ths of an inch; diameter, half the length of the axis. The French specimens are frequently much larger.

Localities.—Bracklesham Bay, where it is very rare. *French*: Grignon, Parnes, Courtagnon, Ermenonville, Acy, le Tombray (fide D'Orb.). *Italian*: Ronca, Val Sangonini (fide Brogn.) *German*: Osterweddingen in Magdeburg? (fide Beyr.)

No. 81. MARGINELLA BIFIDO-PLICATA. Charlesworth. Tab. XVIII, figs. 2 a—g.

M. testá minimá, ovato-globosá, ad basin viá emarginatá; spirá conicá, brevi, apice sub-obtuso; anfractibus convexis: aperturá angustá, longitudine spiram paulo superanti; labro crassissimo, compresso, extús marginato, intús acuto, posticè profundè emarginato; columellá quadriplicatá, plicis tribus posticis bifidis, pene transversis; plicá anteriori acutá, obliquá.

Shell very small, roundedly ovate, with a short, conical spire and a bluntish apex: aperture narrow, a little longer than the spire, with the margins nearly parallel: outer lip much thickened, presenting a prominent border along the outer margin, a sharp edge inwards, and a deep sinus near the suture; columella with four folds, of which the anterior one is sharp and very oblique, and the remaining three thick, bifid, and nearly transverse.

This marginella approaches very closely to a species from the Paris Basin, not yet described, but to which M. Deshayes has given the name *M. columbellina*, and a comparison with a longer series of that species than I possess, may eventually establish the identity. It appears, however, to be a broader and more ventricose shell, having a

shorter spire and a narrower aperture than *M. columbellina*, and the columellar plaits are more strongly bifid than in that species. The outer lip in the adult shell also is flattened in front, and its inner margin presents a sharp edge; whereas in the French species the outer lip is rounded and rather involute. I must state that in the young shell, the columellar plaits in *M. bifido-plicata* are thin and simple, and that the bifid character is assumed only at maturity.

The other species from the *calcaire grossier* (*M. contabulata*), to which I have before referred, appears to be a longer and narrower shell than the present one; the whorls are distinct, notwithstanding the enamel, and present an obscure channel running round the suture; the mouth is more effuse in front, the outer lip not so much thickened, the posterior sinus obscure, and the columellar plaits more oblique.

The present species is found in profusion in the Highcliff sands; and sparingly in the Barton Beds. Specimens are also found, rather plentifully, in the corresponding stratum (No. 29, of Mr. Prestwich), in Alum Bay, larger and more regular in form and with a somewhat longer spire than the type, but agreeing with it in all essential characters (figs. 2 *e—g*), and I consider the last, therefore, to be merely a local variety. It also occurs in the stratum No. 4, Prestwich, in Alum Bay, and at Bracklesham Bay. The specific name is taken from the bifid condition of the columellar plaits, a character found, however, in several other species belonging to this group, although not so strongly marked as in the present one; it was proposed by Mr. Charlesworth, in a lithographic print of the species forming part of a series of figures of shells from Highcliff and Barton, beautifully executed, under the direction of that gentleman, for distribution among the members of the "Natural History Society."

Size.—Type, Axis, somewhat less than 2-10ths of an inch; diameter, 1-10th of an inch.

No. 82. MARGINELLA GRACILIS. *F. E. Edwards*. Tab. XVIII, figs. 4 *a—c*.

M. testá minimá, tenui, subfusiformi, ad basin viæ emarginatá; spirá elevatá, conicá, apice obtuso: anfractibus quinque, convexis: aperturá elongato-ovali, in longitudine spiram superanti, postice obscurè canaliculatá; labro incrassato, extus marginato; columellá quadriplikatá, plicis tribus posticis obliquis, bifidis.

Shell very small, slender, tapering nearly equally towards each extremity; spire elevated, conical, with an obtuse apex; whorls five, convex, the last whorl scarcely notched at the base: aperture of a lengthened oval shape, moderately wide, and rather longer than the spire; outer lip thickened within, and presenting a narrow, slightly raised border along the outer margin, and a small obscure channel at the suture; columella with four folds, of which the posterior three are bifid, and rather oblique.

This may be merely a variety or an immature state of *M. bifido-plicata*, and, as I have only two specimens before me, I have separated it with much hesitation. The

shell is, however, narrower and slenderer, somewhat resembling *M. hordeola* in shape, but more regularly fusiform. One of the specimens has the outer lip thickened and margined, and it appears therefore, to have attained maturity; but the posterior sinus characteristic of this group and which is so strongly marked in *M. bifido-plicata*, is wanting, and is represented by an obscure, scarcely perceptible channel at the suture. The lip itself is not involute as in *M. hordeola*, but is simply thickened, and the front is round, not flattened, as in *M. bifido-plicata*.

The specimen figured is from Mr. D'Urban's cabinet.

Size.—Axis, 2-10ths of an inch; diameter, rather less than 1-10th of an inch.

Locality.—Barton, where it is scarce.

Marginella dentifera. (Lamarck.) This species is recorded in the list of "The Fossils of Bracklesham and Selsey," published in Mr. Dixon's '*Geology, &c., of Sussex*,' p. 107, on the authority of a specimen which formed part of my collection, but which, unfortunately, has been broken: I am not aware that any other individual has been found. The species is very rare in France; and as Mr. Sowerby, by whom the list was prepared, did not himself see the specimen, the identification cannot be relied on; I have therefore not included *M. dentifera* among the English eocene Marginellæ.

Section B. Spire concealed or nearly so.

No. 83. MARGINELLA OVULATA. *Lamarck*. Tab. XVIII, figs. 5 *a—c*.

- MARGINELLA OVULATA, *Lamk.* 1803. Ann. du Mus., vol. ii, p. 61; vol. vi, t. 44, fig. 10.
 — — *Roissy.* 1804. Buff. Moll., vol. vi, p. 10, No. 6.
 — — *Lamk.* 1822. Hist. nat., vol. vii, p. 359, No 17.
 — — *Defr.* 1823. Dict. des sci. nat., vol. xxix, p. 145.
 — — *Desh.* 1824-37. Desc. des coq. foss., &c., vol. ii, p. 707, t. 94 bis, figs. 27—29.
 — — *Desh.* 1830. Enc. méth. (Vers), vol. ii, p. 416, No. 20.
 — — *Bronn.* 1831. Ital. Tertiärggeb., p. 18, No. 52.
 — — *Bronn.* 1838. Leth. geog., p. 1106, t. 42, fig. 44.
 — — *J. Sow.* 1850. Dixon's Geol., &c., of Sussex, p. 107, t. 7, fig. 38.
 — — ? *Beyrich.* 1853. Die Conchylien des Norddeutschen tert., vol. i, p. 49, t. 2, fig. 10*a—b*.
 MILIACEA? *Philippi.* 1851. Palæontographica (Tert. foss. Magd.), vol. i, p. 79, No. 177.
 Nec. — OVULATA, *Grat.* 1838. Cat. Zool., &c. de la Gironde, p. 50, No 481.
 nec. — — *Grat.* 1845. Conchy. foss., &c., de l'Adour, t. 1, fig. 35.
 nec. — — *Sism.* 1847. Syn. meth., &c., Pedemont. foss., p. 46.

M. testá ovato-oblongá, ad basin late emarginatá; spirá brevissimá: aperturá elongato-

angustá; labro sub-marginato, intús crenulato, posticè dilatato; columellá rectá, quinquies plicatá.

Shell oblong, ovate, with a very short obtuse spire, formed of but few whorls, the sutures of which are barely separated from each other; the body-whorl, which of itself forms almost the entire shell, is widely but not deeply notched in front. The mouth is long, narrow, and curved at the posterior extremity; the columella straight and, generally, furnished with five folds, occasionally with six or even more; the anterior folds are larger and more oblique than the others, which decrease in size as they ascend the columella. The outer lip is curved, expanding near the suture into a rounded wing-shaped projection; it is finely crenulated within, slightly thickened, and presents a narrow raised border running along the outer margin.

Some confusion appears to exist between the present species and a living species common in the Mediterranean (*M. miliacea*), placed by Lamarck in his genus *Volvaria*. This latter species is mentioned by Dujardin as occurring in the miocene formation in the neighbourhood of Tours; and Philippi and Sismonda have also recorded it as found in the upper miocene of Piedmont. Dujardin's shell, however, appears to be distinct, and the identification of the last is very questionable. The same species is also cited by Grateloup, although with a query, as identical with the present species, to which he has referred some shells from the miocene beds of Bourdeaux and Dax; but which, as well as certain shells from the synchronous beds of Turin, described by Michelotti as *M. ovulata*, belong to a different species to which D'Orbigny has given the name *M. sub-ovulata*. On the other hand, a *Marginella* from the miocene beds near Vienna, formerly considered to belong to the present species, has been regarded by Hörnes as identical with *M. miliacea*, and Philippi has also recorded a shell from Westeregeln, as belonging to the recent species. Dr. Beyrich, however, has pointed out with much precision, the specific differences between the *M. miliacea* and *M. ovulata*, and he seems to think that the shells mentioned by Hörnes and by Philippi, belong in fact, to the present species, which, apparently, is confined to the older tertiary formations; while, as yet, there is no ground for considering that *M. miliacea* occurs in any formation older than the upper miocene, if it occur even in that.

Whether or not the German shells are referable to the present species, is a doubtful question. The figure given by Dr. Beyrich does not agree with the French shells; the spire is more produced; the aperture, consequently, is proportionally shorter, and it is wider in front; the outer lip, apparently, is without the wing-shaped projection so characteristic of the true *M. ovulata*; and the folds on the columella are more distant and more oblique. Bronn's shell, so far as an opinion can be formed from the somewhat coarse and indistinct figure given by him, appears to agree much better.

The specimen figured is, I believe, unique, and although not in a very good state of preservation, is sufficiently so for determining the identity.

Size.—The French specimens of this species vary considerably in size, some ex-

ceeding half an inch in length ; while others, in a state of maturity, barely attain half that size. The figured specimen is nearly 4-10ths of an inch long, by $\frac{1}{4}$ of an inch wide.

Localities.—Bracklesham, where it is very rare. *French*: Grignon, Parnes, Mouchy, Courtagnon, Creil, Vexin, Acy (fide D'Orb.). *Italian*: Castel-Gomberto, near Vicenza (fide Bronn), Magdeburgh (fide Phil.), Westeregeln? (fide Beyr.), Gainfahren? (fide Hörnes).

No. 84. MARGINELLA PUSILLA. *F. E. Edwards*. Tab. XVIII, figs. 6 a—c.

M. testá minimá, ovali; spirá exsertiusculá, apice obtuso: aperturá elongatá, mediocri, anticè profundè emarginatá; labro extús marginato, intús crenulato; columellá sub-rectá, quinquies vel sexies plicatá, plicis fere transversis, sub-æqualibus.

Shell minute, oval; spire slightly elevated, with an obtuse apex: aperture elongated, moderately wide and deeply notched in front; outer lip thickened along the outer margin, and finely crenulated within; columella nearly straight, with five or six folds, of which the anterior two are the longer and slightly oblique, and the others are almost transverse and nearly equal in size.

This pretty little Marginella appears to be perfectly distinct from all its congeners. It occurs rather plentifully in the Highcliff sands; but apparently disappears in the Barton sands and clay, as I have not met with any specimen from those deposits. It reappears in the fluvio-marine formation in Headon Hill, in which it is found sparingly.

Size.—Axis, not quite 2-10ths of an inch; diameter, 1-10th of an inch.

No. 85. MARGINELLA SIMPLEX. *F. E. Edwards*. Tab. XVIII, figs. 8 a—c.

M. testá ovato-oblongá; spirá brevissimá, pænè obtectá; aperturá elongatá, posticè angustá, antice latiori, ad basin latè emarginatá; labro extús incrassato, intus mutico; columellá quinquies vel pluries plicatá.

Shell small, ovate-oblong; spire short, depressed, almost concealed; aperture elongated, narrow behind, effuse, and widely but not deeply notched in front; outer lip thickened along the margin, smooth, uncrenulated within; columella with two distant slightly oblique folds in front, and three or more obscure, nearly transverse, folds behind.

This species so closely resembles *M. ovulata* in its general aspect, that a hasty comparison would lead to the two being regarded as identical: there are, however, several differences which entitle the present shell to specific distinction. The spire is shorter and more depressed, and the anterior folds on the columella are more distant, and not so oblique; but that which particularly distinguishes *M. simplex* is the condition of the

outer lip, which is smooth within, nearly straight, and without the posterior dilatation which characterises *M. ovulata*.

Locality.—Estuary bed at Mead-end, near Hordwell.

Size.—Axis, rather more than 3-10ths of an inch ; diameter, 2-10ths of an inch.

No. 86. MARGINELLA VITTATA. *F. E. Edwards*. Tab. XVIII, figs. 7 a—c.

M. testá ovulatá ; spirá brevissimá, depressá: aperturá elongatá, mediocri, antice effusá, profundè emarginatá; labro incrassato, intús obsoletè crenulato; columellá quadriplicatá, plicis anterioribus fere æqualibus.

Shell ovate-oblong, with a very short, depressed, almost hidden spire : aperture long, moderately wide, curved at the posterior extremity, effuse in front, and deeply notched at the base ; outer lip thickened along the outer margin, feebly crenulated within ; columella with three thickish, nearly equal folds in front, and an obscure one behind.

Although nearly resembling *M. ovularis* (Lamk.), this present species is easily distinguished from that by the general shape, which is shorter and broader, by the depressed spire, by the aperture, which is wider and without the contraction at the middle characteristic of the French species, and by the folds, which are not so numerous, and not quite so oblique. The narrower aperture, the smooth uncrenulate outer lip, the more numerous folds, and the greater size of *M. simplex*, separate that species from the present one.

One of the specimens exhibits faint traces of several transverse bands, from which circumstance the specific name is taken ; these bands are of a dark brown colour.

Locality.—Headon Hill.

Size.—Axis, 3-10ths of an inch ; diameter, rather more than half the length of the axis.

Family—VOLUTIDÆ.

Genus 23d. VOLUTA. *Linn.* 1767.

VOLUTA, *Scopoli*, 1777.

— *Bruguère*, 1792.

— *Lamarck*, 1801.

— *Montfort*, 1810.

MUSICA, *Humphreys*, 1797.

PLEJONA, *Bolten*, 1798.

FULGURARIA, *Schum.*, 1817.

SCAPHELLA—HARPULA—VOLUTILITHES, *Swainson*, 1840.

Gen. Char.—Shell sub-ovate or elongately fusiform, more or less ventricose ; volu-

tions smooth, longitudinally ribbed, transversely sulcated or cancellated; spire short, apex pointed, or more or less mammellated; aperture longitudinal, large, notched at the base; outer lip thin and sharp-edged in the young state, sometimes thickened and plicated within at maturity; columellar plaits more or less numerous, oblique, the anterior plaits the largest.

The genus *Voluta*, as characterised by Linnæus, comprised the various shells in which the columellæ were plaited; and it represented, in fact, as a French author* has remarked, that group of genera which constituted Lamarck's family of *columellata*. After numerous dismemberments, the genus was defined first by Bruguière, and subsequently by Lamarck; but, even as thus restricted, a more extended knowledge of the animals has led to a still further curtailment of it by the withdrawal of the genera *Cymba* (Brod.) and *Melo* (Brod.)

The animal is of an oval form, with a large broad foot, extending beyond the shell on every side; the head is large, terminating in a short thick muzzle, and bearing short triangulated tentacles, at the outer bases of which the eyes are seated. The mantle, which is sometimes extended so as to cover the sides of the shell, is furnished with two lobes in front, between which it is produced into a short siphon, bent backwards towards the shell.

The recent *Volutes* are numerous, and many of them are of considerable size, and distinguished by the beauty of their colouring; they are, for the most part, inhabitants of equatorial seas, frequenting sandy bottoms. In the fossil state they are equally numerous; they first appear in the earlier cretaceous deposits, and nearly twenty species from the several formations of that epoch at Pondicherry, and in different parts of Europe, have been described by Professor E. Forbes and by Dr. Mantell, Matheron, D'Orbigny, and others. More than twice that number have been described by MM. Lamarck, Deshayes, J. Sowerby, Nyst, Philippi, and other authors, from the Eocene formations in Europe, and by Conrad and Lea from those of Maryland and Alabama, in the United States; while upwards of twenty species have also been described from the more recent formations.

On a comparison between the recent *Volutes* and their Eocene congeners, the prevailing characters of the two groups may be stated, in general terms, to be that, in the recent shells, the apex of the spire is broadly mammellated, the volutions are smooth or longitudinally costated, and the columellar folds thick and prominent; while, in the fossil shells, the apex is generally pointed, the volutions for the most part are transversely striated, sometimes cancellated, and the columellar folds are indistinct or comparatively feeble. These distinctions induced Mr. Swainson to separate the fossil species under the generic name *Volutilithes*, taking *Vol. spinosa* (Lam.) as the type. A cursory examination of the two groups, however, will suggest, I think, that a generic

* C. d'Orbigny's 'Dictionnaire Universel d'Histoire Naturelle.' Art., *Volute*.

separation is unnecessary. The mammellated apex, which is formed by the large development of the shell in embryo, cannot be regarded as a character of generic value; in fact, we find, among the recent Volutes, on the one hand, every degree of development between the broadly mammellated apex of *Vol. imperialis* and the pointed, almost mucronate, spire of *Vol. Harpa*; and among the fossil Volutes, on the other hand, we may trace the apex gradually enlarging from the small conical pullus of *V. luctatrix* and *V. spinosa* through *V. cithara*, *V. muricina*, &c., into the papillary pullus of *V. Wetherelli*, and thence into the mammellated apex of the Crag species, *V. Lamberti*. Similar variations may be observed in the condition of the columellar plaits. The characters in question, therefore, cannot, I think, be regarded as of generic value, however useful they may be for the division of the genus into groups.

Since the genus *Volutilithes* was proposed, the recent species *V. abyssicola* has been discovered. This Volute, which was dredged off the Cape of Good Hope at the great depth of 132 fathoms, presents a very close resemblance to some of the Eocene species, and appears to be the sole living representative of the group.

By far the greater part of the numerous eocene species which belong to this genus, are ribbed, or crowned with spines, and transversely furrowed; and the specific characters are taken chiefly from the varied conditions or the absence of these ornaments, and also from the condition of the outer lip, and the columellar folds. With regard to the specific distinctions which depend on the condition of the ribs and spines, or on the transverse sulcation, it must be borne in mind that these characters are subject to considerable modification by age; and that in almost all the species, the shells, even those which are simple and smooth at maturity, are, in their very early state, ribbed and coronated, as well as transversely sulcated. In some species, these ornaments disappear after the first three or four whorls; in others they become gradually more or less obliterated as the shells are enlarged; and the ribs in the young shells are, almost invariably, more numerous, and extend further over the whorl than in mature specimens. The character of the spines is subject to considerable modification, and the number of the columellar folds is also liable to slight variation in the same species. These characters, therefore, must be used with caution, and with a due regard to the apparent age of the specimens. The characters which appear to be the most certain are those which depend on the condition of the pullus or embryonic shell, on that of the notch at the base of the shell, and on the more or less effuse state of the inner lip. The condition of the notch, in case the notch itself is not preserved, will be found represented by the ridge at the base of the columella, called the "comb" or "crest," which is due to the reflexion of the base of the shell caused by the notch, and will be more or less prominent, according to the greater or less depth of the notch.

The following distribution of the English species into groups is made solely with a view to assist the student in the frequently perplexing task of arrangement; and it is

not proposed as possessing any value, except in so far as it may contribute towards the attainment of that end.

Section A. Pullus small, conical.

a. Shell turbinate or pyriform; costated or coronated; inner lip effuse; columellar plaits few.

a. Transversely furrowed.

No. 87. VOLUTA LUCTATRIX. *Solander*. Tab. XVIII, fig. 3. Tab. XIX, fig. 3 *a—e*.

LIMINGTON THORNEY-RIBS, *Petiver*, 1764. *Gazophylacium*, t. 78, fig. 11.

STROMBUS LUCTATOR, *Solander*, 1766. *Brand. Foss. Hant.*, p. 30, figs. 64 and 67.

— DUBIUS — — — — — fig. 68.

VOLUTA MUSICALIS, *Webster*, 1814. *Geol. Trans.*, 1st ser., vol. ii, p. 204.

— LUCTATOR *Sowerby*, 1816. *Min. Con.*, vol. ii, p. 29, t. 115, fig. 1.

— — — 1823. — — — vol. iv, p. 134, t. 397.

V. testá elongato-turbinatá, costatá, transversim sulcatá, antice late emarginatá; apice acuto: anfractibus superne concavis, angulatis, uná serie spinarum, costas coronantium, donatis; spinis brevibus, cuspidatis: aperturá in medio effusá, antice angustatá; columellá duas plicas obliquas prominentes gerenti; labro ad marginem crenulato, intus laevi, in juventá sæpe plicifero, incrassato.

Shell elongately top-shaped, contracted in front, longitudinally ribbed, transversely furrowed; whorls angular at the shoulder, concave between the angle and the suture, and widely, but not deeply, notched in front; ribs sharp, curved, extending over nearly two thirds of the whorls, and crowned by a single row of erect, laterally compressed spines. In young shells the ribs are numerous, and a second row of small, irregular spines runs round the sutural margin; but the ribs become more distant, and the second row of spines disappears as the shell approaches maturity. The furrows are numerous, regular, rather broad and flat, and roughened by the prominent lines of growth. Spire elevated and pointed, the embryonic shell consisting of two or three very small, roundish, whorls; aperture angular behind, effuse at the middle; columella round, nearly straight, furnished with two unequal, oblique, prominent folds towards the front, the anterior one of which is the larger, and generally with two or three smaller ones behind. The outer lip in the young shell thickened and frequently plicated within; the plaits, however, when they do occur, disappear as the shell is enlarged, and in adult specimens the inner surface of the lip is smooth; in all stages of growth the outer lip is crenulated on the margin. Not infrequently, specimens occur in which the pearly matter, deposited by the margin of the mantle, remains; it is spread over the front of the body whorl, extending backwards almost to the suture.

Lamarck has cited *Strombus luctator* (Brand., fig. 64) as identical with his *V. musicalis*;

the latter, however, is a shorter, thicker, and coarser shell, with a proportionally longer spire; the columellar folds are four, more transverse, and nearly equally prominent; the outer lip, in all stages of growth, is without plaits, and the inner lip, which is but little spread out, does not extend backwards beyond the suture. Brander's shell (fig. 65) does not belong to this species; and Lamarck, in fact, referred it to his *V. spinosa*, which is, however, a much less ventricose shell. It belongs to Mr. Sowerby's *V. spinosa*, var. β .; the latter is, as that gentleman suggested, a distinct species, and I have separated it under the name *V. Solandri*. Brander's *Strom. dubius* (fig. 68) is without doubt a young individual of the present species.

Size.—Axis, 5 inches nearly; diameter $2\frac{1}{2}$ inches nearly.

Localities.—Barton Cliff and the corresponding formation in Alum Bay (Stratum No. 29, Prestwich.) Bracklesham Bay?

No. 88. *VOLUTA NODOSA*. Sowerby. Tab. XIX, figs. 1 *a—h*.

VOLUTA NODOSA, Sow. 1818. Min. Con., vol. iv, p. 135; t. 399, fig. 2; vol. 7, p. 6; t. 613, fig. 1.

— — Defr. 1829. Dict. des Sci. nat., vol. lviii, p. 481.

— — Sow. 1850. Dixon's Geol. &c., of Suss., p. 103; t. 5, fig. 23.

— *DEVEXA?* Beyr. 1853. Die Conchyl. des Norddeut. tertiär., vol. 1, p. 61; t. 3, figs. 6 *a, b*, 7 *a, b*.

V. testá ovato-acutá, obscure costatá, transversim sulcatá; spirá elevatá, sub-conicá, apice acuto: anfractibus obtuse angulatis, biná serie spinarum nodiformium coronatis; aper-turá angustá, in medio latiori; labro ad marginem crenulato, intus plicato; labio late ex-panso; columellá triplicatá.

Shell ovate, pointed, obscurely ribbed, transversely furrowed; spire elevated, almost conical, with a small pointed apex; whorls, five or six, slightly convex, obtusely angulated at the shoulders; the ribs, which in the fully-grown shell are obscure and scarcely extend to the middle of the whorl, terminate at the shoulder in a row of blunt, nodiform spines; a second row of blunt spines, corresponding with the first, runs round the sutural margin, but becomes almost obsolete on the last whorl. The space between the suture and the shoulder is moderately wide, slightly concave, obscurely sulcated; the furrows on the whorls are narrow, concave, and separated by wide flat spaces, roughened by sharp conspicuous lines of growth. The aperture is rather narrow at each extremity, wider in the middle; the outer lip bluntly angulated towards the posterior extremity, crenulated on the margin, and plicated within; the inner lip is spread over the front of the body-whorl, extending backwards to the spines on the preceding whorl, and much thickened; the columella is a little flattened, and furnished with three folds, the anterior one of which is distant from the others, and large and prominent.

The present species, founded on a specimen from Barton Cliff, is widely spread, and ranges downwards to our older Eocene formations; since the Volutes which

occur so abundantly in the neighbourhood of London, as well as some from Bracklesham Bay, although they present points of difference, yet, on the whole, agree so closely with the type that they cannot be regarded otherwise than as local varieties. In the Highgate shells (figs. 1 *c*, *d*,) the second row of spines disappears more early than in the Hampshire specimens, and the sutura margin is much thickened; the columella and the folds upon it, in the younger specimens, resemble those of the type, but, in the mature shell, the columella is more flattened, and additional folds arise among the normal ones, which latter become thicker and more prominent, the whole assuming a callus-like appearance; the outer lip also is thickened, and the principal spines are not so nodiform. The identity of the Bracklesham Bay shells (figs. 1 *e*, *h*,) with the present species is not so obvious; in them the whorls are wider and more sharply angulated on the shoulder, the ribs are generally more distant, and the spines acute and larger; but among the Highgate shells individuals occur in which the whorls are more sharply angulated, and the spines sharp and projecting. In the thickened sutural margin, the thick, plicated outer lip, the condition of the columella, and the character of the columellar folds, the Bracklesham Bay shells agree with those from Highgate, and I am unwilling, therefore, to consider them to be distinct from the present species.

Dr. Beyrich (*loc. cit.*) has described a Volute from Westeregeln, in Magdeburg, which he has named *V. deveva*, and which he considers to be identical "with a species from Barton not described by Mr. Sowerby;" and, he adds, that "most certainly" his species cannot be the young condition of "*V. nodosa*, for which the species in question from Barton seems to have been considered." Dr. Beyrich refers to the Highgate Volute, figured in vol. 7, Min. Con. (t. 613, fig. 1), which, he says, "in fact resembles the *V. deveva* of Barton;" and also to the Bracklesham Bay Volute figured in Mr. Dixon's work; and this last, he adds, "judging from the figure, is scarcely distinguishable from the Barton species." One of the prominent characters of the Hampshire shells is the very obtuse angle at which the whorl is bent at the shoulder, giving a sub-conical form to the spire. This character distinguishes the Highgate shells, although, as I have stated, it is less strongly marked in those from Bracklesham Bay; it is also found in the Westeregeln shells, and is particularly noticed by Dr. Beyrich; but I know of only one other Volute from the Hampshire beds which possesses it (*V. ambigua*, Sol.), and this species, even in the costated variety, is perfectly distinct. I am at a loss, therefore, to conceive what the Barton shell is to which Dr. Beyrich refers. His *V. deveva* agrees so closely with the Highgate form, both in description and figure, that considering, as I do, the Highgate shell to be merely a local variety of the Hampshire *V. nodosa*, I should have cited *V. deveva* as identical without hesitation, had not that gentleman expressly stated that it could not be referred to the present species.

Size.—Axis, 2 inches; diameter, 1 inch.

Localities.—Barton, Bracklesham Bay, Highgate, Sheppey. *German*, Westeregeln in Magdeburg? (fide Beyr.)

No. 89. VOLUTA AMBIGUA. *Solander*. Tab. XIX, figs. 4, *a—c*.

- STROMBUS AMBIGUUS, *Soland.* 1766. Brand. Foss. Hant., p. 32; t. 5, fig. 69.
 VOLUTA BICORONA, *Webster.* 1814. Geol. Tran., 1st Ser., vol. ii, p. 204.
 — AMBIGUA, *Sowerby.* 1823. Min. Con., vol. iv, p. 135; t. 399, fig. 1.
 Nec — — *Lamk.* 1811. Ann. du Mus., vol. xvii, p. 78, No. 12.
 nec — — *Ib.* 1822. Hist. natur., &c., vol. x, p. 352, No. 12.
 nec — — *Desh.* 1824-37. Desc. des coq. foss., vol. ii, p. 691; t. 93, figs. 10, 11.
 nec — — (Var. *Monstrosa*) *Sow.* 1816. Min. Con., vol. ii, p. 31; t. 115, fig. 5.
 nec — — *Mant.* 1822. Foss. of the S. Downs, p. 108; t. 18, fig. 8.
 nec — — *Grat.* 1845. Conchyl. foss., &c., de l'Adour, t. 1, figs. 14, 15.
 nec — — *Rouault.* 1850. Desc. des foss., &c., de Pau. (Mém. de la Soc. Géol. de France, 2d ser., vol. iii, p. 457; t. 18, figs. 15, 16.)
 nec — — *D'Arch.* 1850. Desc. des foss. du groupe Nummul. (Mém. de la Soc. Géol. de France, 2d ser., vol. iii, p. 447.)

V. testá ovato-oblongá, costellatá, transversim sulcatá, ad basin emarginatá; spirá conicá, elevatá, apice acuto: anfractibus convexis, per-obtuse angulatis; costellis numerosis, irregularibus, tuberculis per-minutis, acutis, terminantibus: aperturá postice sub-canaliculatá, angustatá, in medio effusá; labro intus incrassato, plicato, ad marginem crenulato; columellá sub-rectá, rotundatá, bis vel ter plicatá.

Var. COMPRESSA testá costatá; anfractibus angulatis; costis pro-eminentibus, sub-distantibus, compressis, tuberculis nodiformibus coronatis.

Shell ovately oblong, longitudinally ribbed, transversely furrowed, widely, not deeply notched in front; spire conical, elevated, pointed; whorls convex, scarcely angulated at the shoulder; ribs numerous, irregular, slender, extending nearly to the base of the shell, and terminating above in a single row of very small spines or pointed tubercles; in the young state a second row of imperfect spines runs round the whorl near the suture, but disappears as the shell is matured. The space between the suture and the row of tubercles is nearly flat, and presents a slender, but prominent, raised line running along the middle, and sometimes an additional faint one on each side of the centre line. The furrows are rather numerous, irregular, and traversed by very fine, but conspicuous, lines of growth. The aperture is contracted at the posterior extremity, effuse at the middle; the outer lip much thickened, plicated within, and crenulated on the edge; the columella round, straight, and furnished with two nearly equal prominent oblique folds in front, and sometimes one or two obscure ones behind.

The rounded shoulders, convex whorls, and conical spire, impart to this Volute a regularity of form which distinguishes it from all its congeners. The margins of the mantle of the animal appear to have been capable of considerable extension, for the porcellanous matter deposited is occasionally found widely spread, covering the whole

of the under surface of the body-whorl, and reaching almost to the very apex of the spire.

A Volute from the lower *calcaire grossier* has been referred by Lamarck, and subsequently by Deshayes, to Brander's *Strom. ambiguus*; the French shell, however, is quite distinct, not only as to the spire, which, owing to the flattened sutural margin of the whorls, has a turreted aspect, but also as to the condition of the spines, the columella, and the columellar folds. Lamarck's shell is, in fact, the *V. elevata* of Sowerby. Deshayes has also cited Brander's fig. 70 for his *V. ambigua*; that shell is, however, equally distinct; it is the *V. suspensa* of Sowerby. Lamarck's *V. bicorona*, for which that author, as well as Deshayes, has cited Brander's fig. 69, is distinguished from this species by the double row of tooth-like spines which crowns the whorls, by the shorter and less conical spire, and by the smooth outer lip.

Specimens frequently occur in the sands of Barton, in which the ribs are less numerous, more prominent, and laterally compressed; the tubercles assume the form of erect, blunt spines: the outer lip is thin and crenulated, and, in many instances, smooth within, although in others a comparatively feeble internal plication is found. These specimens present a close resemblance to immature shells of *V. luctatrix*, and, on a cursory examination, might be referred to that species. The largest of the many I have seen, barely exceeds in size the individual figured (fig. 4, *c*), and, in all instances, the conical form of the spire and the obtusely angulated condition of the whorls which characterise the present species are found. I am induced, therefore, to regard these shells as forming a variety of *V. ambigua* rather than of *V. luctatrix*.

The Volute from the chalk formations of Sussex, described by Dr. Mantell, does not belong to the present species to which that author referred it, and D'Orbigny ('Prod. de Pal.,' vol. ii, p. 154, No. 171) has named it *Pseudo-ambigua*. Grateloup's shells, from Dax, Gaas, and Lesbarritz, belong to Lamarck's *V. ambigua*, to which species they are referred.

Size.—Axis, rather more than 2 inches; diameter, 9-10ths of an inch.

Localities.—Barton; Alum Bay (Stratum No. 29, Prestwich).

No. 90. VOLUTA DIGITALINA. *Lamarck*. Var. LIMA. *Sowerby*. Tab. XIX, figs. 2 *a—c*.

BUCCINUM SCABRICULUM, *Sol.* 1766. *Brand. Foss. Hant.*, p. 33; t. 5, fig. 71.

VOLUTA DIGITALINA, *Lamk.* 1811. *Ann. du Mus.*, vol. 17, p. 77, No. 10.

— — *Ib.* 1822. *Hist. Nat.*, vol. vii, p. 351, No. 10.

— LIMA, *J. Sow.* 1823. *Min. Con.*, vol. iv, p. 136; t. 398, fig. 2.

— DIGITALINA, *Defr.* 1829. *Dict. des Sci. nat.*, vol. lviii, p. 477.

— — *Desh.* 1824-37. *Desc. des coq. foss.*, vol. ii, p. 693; t. 93, figs. 1, 2.

— LIMA, *Morris.* 1843. *Cat. Brit. Foss.*, p. 168.

— SCABRICULA, *D'Orb.* 1850. *Prod. de Pal.*, vol. ii, p. 415, No. 1468.

— CRENULATA. *Sow.* 1850. *Dixon's Geol., &c., of Sussex*, t. 5, fig. 22.

V. testá ovato-oblongá, costatá, transversim sulcatá, antice sub-profunde emarginatá; spirá brevi, acuminatá: anfractibus convexiusculis, uná serie spinarum dentiformium coronatis, ad margines suturales planatis; costis numerosis, angustis, acuti-nodosis, ad basin tendentibus: aperturá elongato-angustá; labro intus incrassato, plicato, ad marginem crenulato; columellá triplicatá.

Shell oblong-oval, ribbed, transversely sulcated, rather deeply notched at the base; spire short, pointed; the ribs narrow, rather numerous, extending to the very base of the whorl: whorls rather convex, crowned by a single row of short, erect, sharp tooth-like spines, between which and the suture the margin is flattened, forming a narrow channel or ledge, which runs round the spire and gives a turreted aspect to the shell. The furrows are separated by a narrow line, which rises into small pointed knobs, where it crosses the ribs, and are roughened by numerous sharp, perspicuous lines of growth; the last furrow, immediately in front of the spines, is wider than the rest. The aperture is long and narrow; the outer lip thickened, plicated within, and crenulated on the margin; the inner lip is not much spread over the body whorl, and does not extend backwards beyond the suture.

In the French shells the ribs are close and broader; the elevated parts, where they are crossed by the furrows, are consequently blunter and more nodiform than in the English shells; the ribs also, instead of being crowned with erect pointed spines, terminate in thick round knobs, which extend partly over the margin towards the suture, and the outer lip, although thickened, appears to be not plicated within. Dr. Beyrich considers *V. lima* to be a different species to *V. digitalina*; but in all respects, except those pointed out, the two agree so well that, notwithstanding this high authority to the contrary, I regard the French shell as a local variety only of Brander's *Bucc. scabriculum*.

The shell from Bracklesham Bay, figured in Mr. Dixon's work (t. 5, fig. 22) as *V. crenulata*, belongs in fact to this species. DeFrance, indeed, suggests that *V. scabricula* may probably be only a variety of *V. crenulata*, modified by local conditions. It is difficult to ascertain to what extent specific characters may be modified by external conditions; but the different sculpture, the narrower aperture, the deeper notch, the less effuse inner lip, and the thickened plicated outer lip of the shells under description, appear to me to justify their being retained as a distinct species.

Size.—Axis, 1 inch and 4-10ths nearly; diameter, 6-10ths of an inch nearly.

Localities.—Barton, Alum Bay (Stratum No. 29, Prestwich), Highcliff, Bracklesham Bay. *French*: Valmondois, Betz, Monneville, Tancrou (fide Desh.).

No. 91. VOLUTA ELEVATA. *Sowerby*. Tab. XX., figs. 2. *a—d*.

- VOLUTA AMBIGUA, *Lamk.* 1811. Ann. du Mus., vol. xvii, p. 77, No. 12.
 — — — *Id.* 1822. Hist. nat. &c., vol. vii, p. 352, No. 12.
 — — — *Desh.* 1824-37. Descr. des coq. foss., vol. ii, p. 691 ; t. 93, figs. 10, 11.
 — ELEVATA, *Sow.* 1840. Min. Conch., vol. vii, p. 7 ; t. 613, fig. 4.
 — AMBIGUA, *Gratel.* 1845. Conch. foss. &c., du bassin de l'Adour, Supp. Volutes, t. i, figs. 14, 15.
 — — — *D'Arch.* 1850. Desc. des foss. du groupe Numm. (Mem. de la Soc. Géol. de France, 2d ser., vol. iii, p. 447).
 — — — ? *Rouault.* 1850. Desc. des foss. &c. des environs de Pau (Idem, 2d ser., vol. iii, p. 457).
 — SUB-AMBIGUA, *D'Orb.* 1850. Prod. de Paléont., vol. iii, p. 10, No. 150.

V. testá oblongo-ovatá, sub-turritá, transversim sulcatá, longitudinaliter costatá ; spirá elevatá, acutá : anfractibus convexiusculis, ad margines suturales planatis ; sulcis posticis latioribus ; costis fere ad basin tendentibus, duas vel tres series spinarum dentiformium inter sulcos posticos gerentibus : labro ad marginem crenulato ; labio parum expanso ; columellá tri-plicatá.

Shell of a lengthened oval form, longitudinally ribbed, transversely furrowed, deeply notched at the base ; spire elevated with a small pointed apex : whorls slightly convex, with the sutural margins depressed so as to form a narrow flat space, which runs round the spire ; furrows numerous and regular until they approach the shoulder of the whorl, where the last three or four become gradually wider ; the longitudinal ribs, which are more or less numerous in different individuals, extend almost to the very base of the whorl, and are surmounted by several rows of short tooth-like spines rising out of the spaces which separate the posterior furrows. The outer lip is smooth within, and crenulated on the margin by the transverse sulci ; the inner lip is but slightly spread out, and does not extend backwards beyond the suture ; the columella bears three very oblique folds, of which the anterior one is the largest.

This species was founded on a shell from the neighbourhood of London ; it occurs also at Bracklesham Bay, but in the specimens from that locality the spire is not so elevated, and the shell is altogether shorter and broader.

The French shells referred by Lamarck to Brander's *Strombus ambiguus*, belong to the present species ; but in them, as in the Bracklesham Bay shells, the spire is less elevated, and the shell is broader. In other respects they agree with the type.

A beautiful series of this Volute was obtained from the Artesian well at Southampton by Mr. Keele, for the use of which I am indebted to the kindness of that gentleman. One of this series is represented by figs. 2 *c, d* ; figure 2 *b* is taken from a specimen from Highgate.

M. Rouault has described some shells from Bos d'Arros, in the neighbourhood of Pau, which he considers to be varieties of Lamarck's *V. ambigua*; but, judging from the figures given, they appear to be equally distinct from that species, and from Solander's *Stromb. ambiguus*. M. D'Archiac merely records the species without figure or description; but one of the localities given by him is Bos d'Arros, and the shells to which he refers may, therefore, belong to the same species as those described by M. Rouault. I have on this account cited his work, as well as that of M. Rouault, with a query. The shells from Dax and its neighbourhood, figured by Grateloup, D'Orbigny considers to belong to a distinct species, which he has named *V. sub-ambigua*; but, judging from the figures and from the only specimens I have seen from that locality, they appear to belong to Lamarck's *V. ambigua*, and I retain them as identical with the present species, although presenting some trifling differences.

Size.—Axis, 1 inch and 9-10ths; diameter not quite 9-10ths of an inch.

Localities.—Highgate, Camden Town, Hornsey, Nuneham, Southampton, and Bracklesham Bay. *French*: Rétheuil, Cuise-Lamotte, Dax, Gaas, Lesbarritz, (fide Grat.), Biaritz, Bos d'Arros, Les Corbières (fide D'Arch.), Valognes? (fide Rouault)?

No. 92. *VOLUTA CRENULATA*. Lamarck. Tab. XX, figs. 1. *a—b*.

		<i>VOLUTA CRENULATA</i> . Lamk. 1802. Ann. du Mus., vol. i, p. 478, No. 8. vol. xvii, p. 77, No. 9.
—	—	<i>Ib.</i> 1816. Tableau Encyc. et Méth., t. 384, fig. 5.
—	—	<i>Ib.</i> 1822. Hist. natur., &c., vol. vii, p. 351, No. 9.
—	—	<i>Defr.</i> 1829. Dict. des Sci. nat., vol. lviii, p. 476.
—	—	<i>Desh.</i> 1833. Encycl. méthod. (Vers.) vol. iii, p. 1145, No. 28.
—	—	<i>Ib.</i> 1824-37. Descr. des coq. foss., &c., vol. ii, p. 693; t. 93, fig. 5—9.
—	—	<i>Bronn.</i> 1838. Lethæa geognost., p. 1106; t. 42, fig. 4.
—	—	? <i>Brogn.</i> 1823. Sur les terr. &c. du Vicent., p. 63.
—	—	? <i>Bronn.</i> 1831. Ital. Tertiärgeb., &c., p. 18, No. 55.
Non.	—	<i>Sow.</i> 1850. Dixon's Geol., &c., of Sussex, t. 5, fig. 22.

V. testá oblongo-ovatá, costas longitudinales creberrimas, acutas, dentato-crenatas, ad basin tendentes et sulcis transversis numerosis decussatas, gerenti, anticè parum emarginatá; spirá brevi, sub-turritá, apice acuto: anfractibus ventricosis, superne bi-canaliculatis, duplici serie spinarum dentiformium coronatis; columellá quadriplicatá.

Shell ovate-oblong, rather ventricose, transversely furrowed, longitudinally ribbed, and but slightly notched in front; spire short, with a small pointed apex: whorls convex, depressed at the sutural margin, presenting a narrow channel round the spire, crowned by a double row of short, erect, pointed spines, which correspond with the posterior extremities of the ribs; the ribs, which are crowded, narrow, and extend to the very base, are cancellated by deep, transverse furrows, and at the points of section rise into tubercles, which, near the base of the whorl, are short and nodiform, but which, as they approach

the posterior margin, become gradually elevated and sharp, until at length the tubercles between the last three or four furrows assume almost the character of the spines which crown the whorls. The transverse furrows are numerous, and the last, which separates the two rows of spines, is much wider than the others. The aperture is moderately wide; the outer lip thin and crenulated on the margin by the furrows, but smooth within; the inner lip spread widely over the body whorl, extending backwards a little beyond the aperture; the columella presents four not very oblique folds, of which the anterior one is the largest and most prominent, and the posterior two are feeble.

In the French specimens of this beautiful Volute the ribs are more numerous and stronger, and the tubercles at the points of decussation are consequently more nodiform, and are less elevated than in the English shells. A similar variance characterises the French *V. digitalina*, as I have before observed, and as our specimens of the present species agree very well in other respects with the French shells, I can only regard them as a local variety.

It is this species which the recent *V. abyssicola* most nearly resembles; but although that interesting shell presents a striking analogy with it, the much closer, more sharply defined, and more delicate character of the cancellation which ornaments the surface, the shorter spire, the more oblique and more slender columellar folds, and the less expanded inner lip sufficiently distinguish it.

Brogniart, in his list of fossil shells from the tertiary formations of the Vicentin, mentions the present species, but remarks that it approaches more nearly to the Barton form than to that from the Paris Basin; an observation which is repeated by DeFrance. As *V. digitalina* is the Barton Volute which presents the nearest affinity to *V. crenulata*, it is to that species I presume that these authors refer; it is doubtful, therefore, whether the Vicentin shells ought not to be referred to *V. digitalina* rather than to the present species, and as I have not had an opportunity of examining any specimens, I have cited the Italian Volutes, but with doubt. The shell represented by fig. 22 (t. 25) in Mr. Dixon's work, and referred by Mr. Sowerby to this species, appears to me, as I have already observed, to belong to *V. digitalina*.

Size.—

Localities.—Bracklesham Bay. *French*: Parnes, Grignon, (fide Desh.). *Italian*: Ronca, Val Salgonini, (fide Bronn et Brogn.)?

No. 93. VOLUTA SOLANDRI. *F. E. Edwards*. Tab. XX, figs. 6. *a—d*.

STROMBUS LUCTATOR, *Soland*. 1766. Brand. Foss. Hant., p. 30; t. 5, fig. 65.

VOLUTA SPINOSA, *Webster*. 1814. Geol. Trans., 1st ser., vol. ii, p. 204.

— — *Sow*. 1816. Min. Con., vol. ii, p. 30, t. 115, fig. 2—4.

— — *Morris*. 1843. Cat. Brit. Foss., p. 168.

V. testá ovato-oblongá, longitudinaliter costatá, transversim sulcatá; spirá mediocri,

apice acuto : anfractibus ventricosus, biná serie spinarum armatis ; spatio inter series concavo : aperturá ovato-elongatá, in medio effusá, anticè parum coarctatá ; labro tenui, simplici ; labio expanso, posticè incrassato ; columellá leviter arcuatá, bis vel ter plicatá.

Shell oblong, ventricose, longitudinally ribbed, transversely furrowed; spire moderately elevated, with a small pointed apex; the ribs, which are more or less numerous in different specimens, extend over nearly the whole length of the whorls, and terminate posteriorly in a row of erect, sharp spines. Close to the edges of the whorls rises a second row of smaller spines, the space between it and the suture forming a channel round the spire more or less deep, according to the height of the spines. The two rows of spines are connected by raised lines, and the intermediate space is concave. On the last whorl or two of the fully formed shell, the second row of spines frequently becomes obsolete, and is replaced by a sharp, elevated ridge. The furrows, in young specimens, extend over the whole surface of the whorl, but, as the shell advances towards maturity, the posterior ones become faint, and at length are frequently almost obliterated. The mouth is contracted in front, effuse near the middle, and deeply notched at the base. The outer lip is in all stages of growth thin, sharp-edged, and quite smooth within; the columellar lip is moderately spread out over the body whorls, and thickened behind, and does not extend backwards beyond the suture. The columella, which is slightly arched, presents in the young state, two unequal, not very oblique plaits, in front of which a third obscure plait generally appears at maturity.

Brander's shell (fig. 65), referred by Solander to *V. luctatrix*, and by Lamarck to *V. spinosa*, presents nevertheless characters sufficiently distinct to entitle it, as Mr. Sowerby long ago suggested, to be considered as belonging to a separate species. In addition to the distinction afforded by the rows of spines, which are more equal and more permanent in this species than usual, it will be seen, on comparison with *V. luctatrix*, that in *V. Solandri* the shell is shorter and broader, the spire not so much elevated, the outer lip always sharp edged, and without plication, the inner lip not so effuse, the columella arched, and the columellar folds neither so numerous nor so large; and, on a comparison with *V. spinosa*, that the shell is not so turbanate, the spire more elevated, and the whorls more ventricose.

Size.—Axis, 2 inches nearly; diameter, rather more than 1 inch.

Locality.—Barton.

No. 94. *VOLUTA SCALARIS.* Sowerby. Tab. XX, figs. 5 a—c.

VOLUTA SCALARIS, Sow. 1843. Min. Con., vol. vii, p. 32; t. 625, fig. 4—5.

V. testá ovatá, ventricosá, anticè attenuatá ; spirá elevatá, apice acuminato : anfractibus costatis, biná serie spinarum coronatis, transversim sulcatis, ad margines suturales depressis, inter series spinarum concavis ; costis numerosis ; sulcis sub-distantibus, æqualibus : labro simplici, acuto ; labio parum expanso ; columellá sub-rectá, triplicatá.

Shell ovate, very ventricose, much attenuated and deeply notched in front; spire elevated; apex pointed. The whorls, six or seven, longitudinally ribbed, transversely furrowed; ribs numerous and sharp in young specimens, more distant and rounded in mature shells, and crowned with a double row of erect, sharp, nearly equal spines; the furrows, which are rather distant and regular, extend up to the front row of spines, but in fully formed shells often become obliterated over the posterior part of the last whorl. A narrow flat border runs round the whorls between the suture and the second row of spines, and the space between the two rows is concave. The outer lip is thin, sharp, and quite smooth within; the inner lip is not much spread out, and does not extend backwards beyond the suture; the columella, which is slightly curved, presents three folds.

This shell so closely resembles *V. Solandri* that it may, perhaps with greater propriety, be regarded as a dwarf variety of that species, rather than as being distinct from it. It is, however, more ventricose, with a longer spire and more nearly equal spines; the inner lip is less spread over the ventral surface of the body whorl, and the notch is not so deep.

The species occurs in abundance at Highcliff, but in the specimens from that locality the spines are blunt, almost nodiform, and the furrows more numerous. The same variety occurs at Alum Bay, and occasionally, though rarely, at Barton.

Size.—Axis, 1 and 2-10ths of an inch nearly; diameter, 7-10ths of an inch.

Localities.—Barton, Highcliff, Alum Bay (Strat. No. 29, Prestwich).

No. 95. *VOLUTA RECTICOSTA*. *Sowerby*. Tab. XX, fig. 3.

VOLUTA RECTICOSTA. *Sow.* 1850. *Dixon's Geol., &c., of Suss.,* p. 188; t. 5, fig. 18.

V. testá ovato-oblongá, costatá, transversim sulcatá, anticè subrostratá, parum emarginatá; spirá mediocri apice acuto: anfractibus ventricosis, duplici serie spinarum coronatis; spatio inter series spinarum concavo; costis numerosis, rectis, tenuibus, primam seriem spinarum gerentibus; labro tenui.

Shell oval-oblong, ribbed, transversely furrowed; spire moderately elevated, terminating in a small pointed apex; whorls ventricose, contracted rather suddenly in front, so as to give a beak-like form to the base, crowned with two not very distant rows of short, erect, sharp spines; ribs numerous, thin, straight, scarcely extending beyond the middle of the whorl, and each terminating in a spine; the margins of the whorls between the two rows of spines concave. The outer lip thin, sharp edged, and smooth within. The basal furrows are strongly marked, and extend higher up the whorl than is usually the case. The notch in front is not deep.

The figure is taken from the original specimen described and figured by Mr. Sowerby; this specimen, which forms part of Mr. Dixon's collection, is unfortunately somewhat crushed and distorted. No traces of the inner lip remain, and the aperture

is filled with the matrix, so that the columellar folds cannot be seen. Mr. Sowerby, in his description, expressed an opinion that this shell might probably be the same as *V. ambigua* (Lamk.); the two rows of spines and the hollow space between them, however, appear to distinguish it. I am more inclined to refer it to *V. scalaris*, or to regard it as a young shell of *V. solandri*; but the short spire, numerous straight ribs, and the deep basal furrows distinguish it apparently from the former; while these characters, as well as the general form of the shell, which is more ventricose and more contracted in front than in *V. solandri*, appear to separate it from the latter species. A young specimen from Stubbington, in M. D'Urban's collection, presents the same characters as the one figured; and additional specimens may establish the species; in the meantime I retain it, but with some doubt.

Size.—Axis, 1 inch and 2-10ths; diameter, 6-10ths of an inch.

Localities.—Bracklesham Bay, Stubbington.

No. 96. VOLUTA SUSPENSUS. *Solander*. Tab. XX, figs. 4 a—c.

MUREX SUSPENSUS. *Soland.* 1766. Brand. foss. Hanton., p. 32; t. 5, fig 70.

VOLUTA CRENULATA. *Webster.* 1814. Geol. Trans., 1st series, vol. ii, p. 204.

— AMBIGUA, VAR. MONSTROSA. *Sow.* 1816. Min. Con., vol. ii, p. 31; t. 115, fig. 5.

— SUSPENSUS. *Sow.* 1823. Min. Con., vol. iv, p. 137.

V. testá ovato-oblongá, sub-turritá, costatá, transversim sulcatá, ad basin sub-productá, parum emarginatá; spirá elevatá, acuminatá, canali lato, marginibus anfractuum repente inflexis septo, circumdatá: anfractibus sub-ventricosus, dentato-crenatis; costis obscuris, distantibus, uná serie spinarum coronatis: aperturá postice acute angulatá, antice coarctatá; labro simplici tenui; columella buplicatá.

Shell oval-oblong, turreted, ribbed, transversely furrowed; spire elevated, pointed; whorls somewhat ventricose, the posterior margins suddenly bent inwards, forming round the spire a broad deep canal, bounded by a sharp denticulated ridge. The ribs, numerous in the young shells, but becoming more distant towards maturity, extend nearly to the base of the whorl, and terminate posteriorly in sharp, tooth-like spines. At the posterior extremities of the ribs, the whorl is depressed, and presents a narrow flat space, which forms, as it were, a platform from which the sharp ridge bounding the spiral canal rises. The furrows at the base are broad and rounded; the others distant and angular. The aperture is contracted, and produced in front, wide in the middle, sharply angulated behind; the outer lip thin and smooth within: the columella nearly straight, presenting two very unequal folds.

This is the rarest of the Barton Volutes; it may be readily distinguished by the broad deep channel which runs round the spire.

Size.—Axis, 3 inches; diameter, 1 inch and 6-10ths.

No. 97. VOLUTA TRICORONA. *Sowerby*. Tab. XX, figs. 7 *a—d*.VOLUTA TRICORONA. *Sow.* 1843. *Min. Con.*, vol. vii, p. 6; t. 613, fig. 2.

V. testá ovato-rhomboidali, costatá, transversim sulcatá, antice profunde emarginatá; spirá brevi, apice acuto; anfractibus obtuseangulatis, triplici serie spinarum nodiformium coronatis; costis numerosis, angustis, fere ad basin tendentibus; sulcis transversis irregularibus, lineis incrementi decussatis: aperturá elongato-ováli, postice subcanaliculatá; labro simplici, lævi; labio effuso; columellá biplicatá.

Shell rhomboidal-ovate, longitudinally ribbed, transversely furrowed; spire short, apex small, pointed: whorls bluntly angulated at the shoulder; ribs rather numerous, narrow, extending almost to the base, and surmounted by three rows of short nodiform spines; furrows rounded, shallow, crowded and irregular on the posterior part of the whorl, deep, distant, and regular towards the base; decussated by thick conspicuous lines of growth: aperture of a lengthened ovate shape, deeply notched in front, and terminating behind in a short, wide canal; outer lip thin, smooth within; columella nearly straight, flattened on the anterior surface, and furnished with two folds, of which the front one is thick and very oblique. Only imperfect traces of the inner lip remain in the specimens I have seen, but it was apparently widely spread, covering the front of the body whorl, and stretching backwards far up the spire.

This Volute, which appears to be peculiar to the lower formations, is very rare. In the general form it resembles *V. denudata* so much that a worn individual might easily be mistaken for one of that species. The *V. denudata* is, however, distinguished by its single row of thick nodiform tubercles, the rounded dome-like shape of the posterior margin, and the smooth upper surface of the body-whorls. Fig. 7 *d* is taken from the original specimen figured in 'Mineral Conchology.' This, and also the specimens represented by figs. 7 *a, e*, form part of Mr. Wetherell's collection.

Size.—The largest specimen I have seen has lost the upper part of the spire, but when perfect, the dimensions would have been, axis, 2 inches, nearly; diameter 1 and 1-10th of an inch.

Localities.—Primrose Hill, Copenhagen Fields, Potter's Bar.

No. 98. VOLUTA PUGIL. *F. E. Edwards*. Tab. XXII, figs. 1 *a—c*.VOLUTA SPINOSA. *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 107; t. 5, fig. 16.— — var. PLATYSPINA. *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 107; t. 7, fig. 29.

V. testá ovato-oblongá, antice attenuatá, obscure costatá, transversim sulcatá; spirá brevi, apice acuto: anfractibus convexiusculis, unicá serie spinarum coronatis; spinis magnis, dis-

pansis; *sulcis transversis distantibus, ad basin latis, profundis*: *operturá postice sub-caniculató, antice late emarginató*; *labro tenui, simplici*; *labio effuso, postice incrassato*; *columellá arcuatá, quater vel quinques plicatá.*

Var? PLATYSPINA, *fig. 1 c.* *Testá tuberculis nodiformibus, crassis, lateraliter compressis, coronatá.*

Shell ovately oblong, contracted at the base, obscurely ribbed, transversely furrowed, with a short, rather conical, and pointed spire: whorls angulated at the shoulder, and crowned with a single row of large, wide-spreading spines. The bases of the spines are prolonged into thick, obscure ribs, which do not extend beyond the middle of the whorls. In the young state, the ribs are numerous, and surmounted by two rows of small, sharp spines; as the shell increases in size, the ribs become more distant, and the row of spines nearest to the suture disappears, and is replaced by a sharp, elevated ridge. The transverse furrows are distant, and broad and deep at the base. The aperture is contracted in front, obscurely channelled close to the suture, and widely, but not deeply, notched in front; outer lip thin, sharp edged, and smooth within; inner lip widely spread, thickened posteriorly, and extending backwards as far as the suture; columella flattened in front, curved, and furnished with four or five folds, of which the one in front is the largest. In the last whorls, the sutural margin is spread over the preceding whorl up to the spines, which, in some instances, are covered by it.

In the specimen represented by fig. 16, tab. 5, in Mr. Dixon's work, the outer lip is broken off, and the shell consequently presents the turbinate form which characterises *V. spinosa* (Lamk.); and this circumstance probably induced Mr. Sowerby to refer it to that species; from which, however, it is distinguished by the transverse furrows, and the arched and flattened columella.

In the specimen (fig. 1 c) for which the variety *platyspina* was proposed by Mr. Sowerby, the spines on the last whorl are converted into large, thick, laterally-compressed, knob-like tubercles. The animal had, apparently, attained great age; and, as I am not aware of any similar specimen having been found, I am inclined to regard the individual in question as a monstrosity rather than as a variety.

The present shells much resemble *V. athleta* in the character of the spines, and in the conditions of the inner lip and the columellar folds; but the deep transverse furrows, which continue to be strongly marked even in adult specimens, entitle them, apparently, to specific distinction.

Size.—Axis, ; diameter,

Locality.—Bracklesham Bay.

Section A. (*Pullus* small, conical.

- a. Shell turbinate or pyriform; costated or coronated; } continued.
 inner lip effuse; columellar plaits few.)
 β. Transversely furrowed at the base only.

No. 99. VOLUTA ATHLETA. *Solander*. Tab. XXI, figs. 7 a—e.

STROMBUS ATHLETA. *Soland.* 1766. *Brand. Foss. Hanton.*, p. 31; t. 5, fig. 66.

VOLUTA — *Sow.* 1823. *Min. Con.*, vol. iv, p. 133; t. 396, figs. 1—3.

— — *Defr.* 1829. *Dict. des Sci. nat.*, vol. lviii, p. 480.

— — *Desh.* 1824-37. *Desc. des coq. foss.*, vol. ii, p. 689; t. 93, figs. 12—13.

V. testá rhomboidali, spinis magnis dispansis coronatá, ad basin sub-profunde emarginatá; spirá brevi, acuminatá: anfractibus postice lævibus, ad basin obsolete transversim sulcatis: aperturá effusá; labro tenui, simplici; labio parum effuso, postice incrassato; columellá depressá, leviter arcuatá, tri-plicata.

Var. FORTIS (tab. 21, fig. 7 e) testá ovato-turbinatá, breviori, latiori; anfractibus antice valde attenuatis.

Shell rhomboidal, crowned with large spreading spines, and widely, but not deeply, notched at the base; spire rather short and pointed. In young individuals, the whorls are transversely furrowed, obscurely ribbed, and surmounted by two rows of short, erect spines; but as the shell approaches maturity, the ribs become effaced, the second, or sutural row of spines disappears, and is replaced by an irregular sharp elevated line, and the spines of the first row become large, distant, and spreading; the transverse furrows disappear after the first three or four whorls, and the shell is afterwards smooth, except at the base, where a few faint, almost obsolete, transverse furrows appear. The aperture is elongate, and rather wide; the outer lip smooth and simple; the inner lip moderately spread over the body whorl, thickened at the upper part, and not extending backwards beyond the suture; columella flattened in front, slightly curved, and presenting one broad prominent fold in front, and two or three others, small and indistinct, behind.

A variety occurs at Highcliff, which appears to correspond with the shell described by M. Deshayes, more closely than do the Barton shells; it is more turbinate, shorter, and comparatively wider than the type, and the whorls are much attenuated in front.

The smooth and ventricose body and flattened columella distinguish this species; and at maturity, the large spreading spines give a strongly marked character to it.

Size.—Axis, 3 inches, nearly; diameter, 1 inch and 7-10ths, nearly.

Localities.—Barton, Alum Bay (No. 29, Prestwich). For the variety, Highcliff. *French*: Monneville, Houdan (fide Desh.).

No. 100. VOLUTA DENUDATA. *Sowerby*. Tab. XXI, figs. 5 a—c.VOLUTA DENUDATA. *Sow.* 1840. *Min. Con.*, vol. 7, p. 6; t. 93, fig. 3.— — — 1850. *Dixon's Geol. Suss.*, p. 120; t. 15, fig. 7.

V. testá ovato-oblongá, postice lævi, antice transversim sulcatá, profunde emarginatá; spirá conicá, brevi, apice acuto; costis brevibus, crassis, ad extremitates posteriores nodigeris; anfractu ultimo superne concamerato: aperturá elongato-ovali, postice angustá; labro simplici, intús lævi; labio expanso, incrassato; columellá tri-plicatá.

Shell oblong-ovate, ribbed, smooth, except towards the base, where it is transversely furrowed; spire short, conical; apex small, pointed; ribs thick, short, scarcely extending to the middle of the whorl, and terminating posteriorly in coarse, nodiform tubercles; whorls rather ventricose in front, obtusely angulated at the shoulders; the space between the tubercles and the suture convex, imparting a dome-like shape to the lower part of the spire. The aperture is of a lengthened oval form, narrow, obscurely channelled behind, widely and deeply notched in front; the outer lip simple, smooth within; inner lip much spread over the front of the body whorl, extending backwards far up the spire, and thickened. The columella is flattened in front, and presents one thick, prominent fold in front, and two or three smaller ones behind. In the young shell, the whorls are crowned with three rows of small, nodiform spines, and the margins between the front row and the suture are somewhat depressed. The two posterior rows, which correspond with the front row, rise out of faint, elevated lines, which traverse the sutural margin; as the shell is enlarged, these spines are lost, and the transverse lines become stronger; the direction of the suture also becomes less decurrent, so that each succeeding whorl envelops more of the preceding one, and the margin of the last, in fact, covers the front row of spines upon the whorl next to it; the margins also become convex, and assume the dome-like shape characteristic of the later whorls.

Size.—Axis, 3 inches, nearly; diameter, 1 and 7-10ths of an inch, nearly.

Localities.—Bognor, where it is very common, and (*vide Sow.*) Brentford.

No. 101. VOLUTA SPINOSA. *Linnaeus*. Tab. XXI, figs. 4 a, b.

Lister. *Hist. Conchyl.*, t. 1033, fig. 7?

Gualtieri. 1742. *Index Test. Conch.*, t. 55, fig. E?

CONUS SPINOSUS. *Linn.* 1758. *Syst. Nat.*, 10th edit., p. 715, No. 271.

BUCCINUM (SP.) *Walch*. 1764. *Das Steinreich System., &c.*, t. 11, fig. 2 a.

STROMBUS SPINOSUS. *Linn.* 1767. *Syst. Nat.*, 12th edit., p. 1212.

— — *Favanne*. 1780. *D'Argen. Conchyl.*, 3d edit., t. 66, fig. I, 9.

— — *Schröter*. 1783. *Einleit. in die Conch.*, vol. 1, p. 443, No. 24.

— — *Gmel.* 1788. *Linn. Syst. Nat.*, 13th edit., p. 3518, No. 27.

- STROMBUS SPINOSUS. *Chemn.* 1795. *Conchyl. cab.*, vol. xi, t. 212, figs. 3002—3.
- VOLUTA SPINOSA. *Lam.* 1802. *Ann. du Mus.*, vol. i, p. 477, No. 2, and vol. xvii, p. 74, No. 2.
- — *Roissy.* 1804. *Buff. Moll.*, vol. v, p. 440, No. 7.
- — *Lam.* 1816. *Tableau Encyclop. et Méth.*, t. 392, fig. 5 *a—b*.
- — — 1822. *Hist. Nat.*, vol. vii, p. 348, No. 2.
- — *De France.* 1829. *Dict. des Sci. Nat.*, vol. lviii, p. 474.
- — *Desh.* 1832. *Encycl. Méthod. (Vers)*, vol. iii, p. 1143, No. 22.
- — — 1824—37. *Desc. des Coq. Foss.*, vol. ii, p. 690; t. 92, figs. 7—8.
- — ? *Galeotti.* 1837. *Mém. sur la Const. Géog., &c., de Brabant*, p. 149, No. 71, t. iii, fig. 16.
- — ? *Nyst.* 1843. *Coq., &c., de Belg.*, p. 589.
- — *Morris.* 1843. *Cat. Brit. Foss.*, p. 168.
- — ? *Philippi.* 1851. *Palæontogr. Tert. Foss. Magdeb.*, p. 78, No. 169.
- Nec. — — *Sow.* 1816. *Min. Con.*, vol. ii, p. 30; t. 115, figs. 2—4.
- nec. — — — 1850. *Dixon's Geol., &c., of Suss.*, p. 107; t. 5, fig. 16.
- nec. — — var. PLATYSPINA. *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 107; t. 5, fig. 29.

V. testá turbinatá, ad basin transversim striatá, longitudinaliter partim costatá; anfractibus acute angulatis, unicá serie spinarum coronatis; spirá brevi, apice acuto; labro tenui, simplici; columellá quadri-plicatá.

Shell turbinate, resembling in shape two unequal cones placed base to base, the smaller of which is formed by the short pointed spire; whorls nearly straight, longitudinally ribbed, much narrowed in front, and acutely angulated at the shoulder; the margin between the spines and the suture rather concave. The ribs, which extend only about half-way over the whorl, terminate at the shoulder in a row of short, pointed spines. The sutural margin is bordered by an elevated line, which, occasionally, in young shells, rises into small, pointed tubercles opposite to the spines. The whorls at the base are traversed by several oblique furrows, which disappear towards the middle of the shell, where the ribs take their rise. The mouth is narrow, and somewhat quadrilateral, owing to the angularity of the upper part of the whorl; the outer lip thin and smooth within; inner lip but little spread out. The columella, which is rather flattened in front and nearly straight, presents one large prominent plait in front, and three, sometimes four, feeble ones behind and, according to M. Deshayes, a large smooth callus at the posterior extremity formed by the thickening of the inner lip.

The shells from Barton, described by Mr. Sowerby (*loc. cit.*), and referred by him to this species, present characters sufficiently distinct, as I have before observed, to require that they should be separated. I have not met, in fact, with any shell from the Hampshire beds corresponding with the true *V. spinosa* of the Paris basin, unless the *V. depauperata* be regarded as a local variety; but the species occurs not unfrequently at Bracklesham Bay.

The French specimens are generally ornamented with numerous pale orange-coloured bands; but the English matrix has been less favorable for the preservation of the colouring matter, and specimens retaining traces of the original marking are very rare.

The shells described in Mr. Dixon's work as *V. spinosa*, and *V. spinosa*, var. *platyspina*, (p. 107, t. 7, f. 22,) do not belong to this species; nor, apparently, do those described by Galeotti from St. Josse-ten-Noode, St. Gilles, Forêt, and Afflighem in Brabant; in them, the ribs are thick, round, and prominent; and the whole surface presents a transverse sculpture. Philippi records a specimen of the present species from Westeregeln, in the Museum at Halle; but as Dr. Beyrich does not mention the species among the Volutes described by him from that locality, I have cited Philippi with a query.

Size.—Axis, 1 inch and 3-10ths; diameter, nearly 8-10ths of an inch.

Localities.—Bracklesham Bay; Southampton. *French*: Grignon, Courtagnon, Parnes. *German*: Westeregeln in Magdeburg (fide Phil.)?

No. 102. VOLUTA DEPAUPERATA. *Sowerby*. Tab. XXI, figs. 8 a—c.

VOLUTA DEPAUPERATA, *Sowerby*. 1823. Min. Con., vol. iv, p. 133, t. 396, fig. 4; vol. vii, p. 32, t. 625, fig. 6.

— — *Defr.* 1829. Dict. des Sci. nat., vol. lviii, p. 481.
non — — *Desh.* 1824-37. Desc. des coq. foss., &c., vol. ii, p. 684, t. 92, figs. 5, 6.

V. testá ovato-oblongá, partim costatá, antice transversim sulcatá, postice levi; spirá brevi, apice acuto; anfractibus sub-ventricosis, postice acute angulatis, uná serie spinarum donatis, margine suturali sub-convevo: labro simplici, tenui; labio parum expanso; columellá buplicatá.

Shell oval-oblong, longitudinally ribbed, transversely furrowed in front, otherwise smooth, with a short pointed spire: whorls rather ventricose, acutely angulated at the shoulder. The ribs, which are not numerous, extend over about two thirds of the whorl, and terminate at the shoulder in a row of short erect spines. In young shells a second row of small pointed tubercles, corresponding with the spines, runs round the suture; but they soon disappear, and generally are replaced by an irregular raised line. The margin of the whorls, between the shoulder and the suture is slightly convex. The aperture is of a lengthened-oval shape, rather effuse and widely but not very deeply notched in front; the outer lip thin and smooth; the inner lip but slightly spread out; the columella rounded, nearly straight, and furnished with two unequal folds. The surface of the shell is ornamented with transverse, narrow, orange-coloured bands, resembling those

in the French specimens of *V. spinosa*, with which species the present one is closely analogous, and of which it appears to me to be merely a local variety. It is in fact, only distinguished by the more ventricose whorls, the more effuse aperture, the rounded columella, and the greater obliquity of the columellar folds.

Brander's shell (fig. 67), referred by Mr. Sowerby to this species, belongs to *V. luctatrix*; and the French shells which M. Deshayes has described as *V. depauperata* also appear to be quite distinct; they are longer, narrower, and more regular in form, and have a more elevated and thicker spire; and the surface of the whorl is obscurely striated.

Size.—Axis, 1 inch and 9-10ths; diameter, not quite 1 inch.

Localities.—Barton (fig. 8 *a*), and the fluvio-marine formation at Hordwell, and at Colwell Bay (figs. 8 *b*, *c*), in which latter place it occurs in abundance.

No. 103. VOLUTA GEMINATA. *Sowerby*. Tab. XXI, figs. 3 *a*, *b*.

VOLUTA GEMINATA, *Sow*. 1823. Min. Con., vol. iv. p. 136; t. 398, fig. 1.

V. testá ovatá, ventricosá, antice coarctatá, costatá, sub-turritá; spirá mediocriter elevatá, apice acuto; anfractibus postice lævibus, ad basin transversim sulcatis, ad margines suturales depressis; costis pro-eminentibus, sub-crassis, postice biná serie spinarum nodiformium coronatis; aperturá oblongo-ovali, antice angustiori; labro tenero, simplici; labro late expanso, postice incrassato; columellá arcuatá, tri-plicatá.

Shell ovate, ventricose, contracted towards the base, ribbed; spire moderately elevated, apex very small, pointed; whorls five or six, smooth on the middle and at the posterior extremities, transversely furrowed toward the base, and flattened at the sutural margin; ribs prominent, rather thick, rounded, extending to the transverse furrows, and surmounted by two rows of short, erect, connected, nodiform spines, with a rounded, depression between them; the flattened margins of the whorls form a shallow obscure channel round the spire, imparting to it a turret-like aspect. The aperture is of a lengthened-oval shape, narrowing toward the base; the outer lip thin, sharp, and smooth within; the columellar lip much spread out over the body-whorl, but not extending backwards beyond the suture; the columella much curved, and furnished with three oblique folds.

The present species appears to be confined to the neighbourhood of Lyndhurst, where it was first discovered many years ago by Sir Charles Lyell.

Size.—Axis, rather more than 1 inch and 3-10ths; diameter, 7-10ths of an inch, nearly.

No. 104. *VOLUTA HORRIDA*. *F. E. Edwards*. Tab. XXI, figs. 2 *a—c*.

V. testá oblongo-ovatá, costatá, postice lævi, antice transversim sulcatá; anfractibus duplici serie spinarum dentiformium donatis; costis numerosis, lateraliter compressis, fere ad basin tendentibus, postice tuberculatis et in mucrones primam seriem spinarum formantes, prolongatis; sulcis transversis latis, profundis, costas fortiter decussantibus; spatio inter series spinarum concavo; labro tenui, simplici; columellá uniplicatá.

Shell ovate-oblong, armed with two rows of short, upright, pointed spines, ribbed, smooth behind, transversely furrowed in front; ribs numerous, thick, angular, compressed sideways toward the aperture and terminating posteriorly in sharp conical points forming the front row of spines. The ends of the ribs, immediately in front of the spines present a rounded depression at the anterior margin of which they rise into small tubercles. The transverse furrows are wide and deep, strongly decussating the ribs. The posterior margins of the whorls, between the rows of spines, are sunken and concave; the outer lip is thin, sharp-edged, smooth within?; the columella presents a single very oblique fold.

The sharp erect conical spines and the prominent ribs, deeply cut by the transverse furrows are characters so distinct, that I am unwilling not to record the species, although the only specimen I possess has lost the spire and is otherwise imperfect. It appears to be a young shell, and the actual character of the outer lip cannot be stated with certainty; there are not any traces of the columellar lip preserved.

Size.—Axis, (without the spire) $\frac{1}{2}$ inch, nearly; diameter, rather less than 3-10ths of an inch.

Locality.—Bracklesham Bay; very rare.

No. 105. *VOLUTA FORBESII*. *F. E. Edwards*. Tab. XXI, figs. 1 *a—d*.

V. testá turbinatá, costatá, postice lævi, antice transversim sulcatá; spirá elevatá, apice acuto; costis sub-distantibus, vix ad sulcos tendentibus, postice in tuberculos lateraliter compressos elevatis, deinde biná serie brevium spinarum coronatis; aperturá elongato-ovali, angustá, postice sub-canaliculatá, antice late emarginatá; labro intús incrassato, ad marginem acuto; labio effuso; columellá rectá, biplicatá.

Shell turbate, ribbed, transversely furrowed at the base, smooth behind; spire elevated, pointed, with a small conical apex; ribs rather distant, extending scarcely beyond the middle of the whorls, rising at the posterior extremities into large, prominent, laterally compressed tubercles, and crowned with a single row of short, erect, tooth-like spines. The sutural margin is depressed and bordered by a raised line, which occasionally rises into minute pointed tubercles; aperture of a lengthened oval form,

narrow, obscurely channelled behind, and widely notched in front; the outer lip thickened within, thin and sharp at the edge; inner lip moderately spread over the body-whorl, and presenting at the suture a callus-like thickening, which forms the left side of the posterior canal; the columella nearly straight, and furnished with two or three not very oblique folds, the front one of which is the most prominent.

The present species approaches closely to *V. geminata*, but is much more turbinate, resembling in general form *V. spinosa*; and the anterior tubercles are different in their character; in the present species they are simply an enlargement of the ribs themselves, while in *V. geminata*, a transverse line runs round the shoulder, and rises into tubercles where it crosses the ribs; the aperture in *V. Forbesii* is also narrow and more regularly ovate. This species is found in Hempstead Cliff; and I have dedicated it to the late much lamented Prof. E. Forbes, by whose researches the position of that formation in the tertiary series, so long misunderstood, has been ascertained.

Size.—Axis, 7-10ths of an inch; diameter, 4-10ths of an inch.

No. 106. VOLUTA CALVA. *Sowerby*. Tab. XXI, figs. 6 *a*, *b*.

VOLUTA CALVA. *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 187; t. 7, fig. 28.

V. testá pyriformi, antice transversim obsolete sulcatá, cæterum lævi, ad basin vix emarginatá; spirá brevi, conicá, apice acuto: anfractibus angulatis, unicá sine spinarum donatis, superne concavis, marginibus anfractu precedenti adpressis: aperturá elongato-ovalí; labro tenui, simplici; labio parum effuso; columellá subrectá, bis vel ter plicatá.

Shell pyriform, obscurely ribbed, slightly notched at the base, and presenting several faint, almost obsolete, transverse furrows in front, smooth elsewhere; spire short, conical, with a small pointed apex: whorls angulated at the shoulder, and crowned with a single row of short, pointed tubercles; the margins pressed against the spire; the space between the suture and the row of tubercles concave. The aperture of a lengthened oval shape; outer lip thin, sharp-edged, smooth within; inner lip very thin and but little spread out; and the columella furnished with two nearly equal folds in front, and a third very feeble one behind.

The specimens are generally simply coronated; but, in some instances, the elevated bases of the tubercles are prolonged into very short, faint ribs. The angulated shoulder and the tubercles distinguish this species from the young shell of *V. Selseiensis*, with which only it might be confounded.

Size.—Axis, $1\frac{1}{2}$ inch, nearly; diameter, 7-10ths of an inch.

Locality.—Bracklesham Bay, where it is somewhat rare.

No. 107. VOLUTA SELSEIENSIS. *F. E. Edwards.* Tab. XXII, figs. 3 a—f.

- VOLUTA LABRELLA. *Sow.* 1840. *Min. Con.*, vol. vii, p. 8; t. 614, fig. 2.
 — — *Morris.* 1843. *Cat. Brit. Foss.*, p. 167.
 — — *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 187; t. 5, figs. 12—14.
 BULBULA. — — — — — p. 186; t. 7, fig. 35.
 nec. — LABRELLA. *Lamk.* 1802. *Ann. du Mus.*, vol. i, p. 479, No. 10, vol. xvii, p. 74,
 No. 14.
 nec. — BULBULA. *Lamk.* 1802. *Ann. du Mus.*, vol. i, p. 479, No. 11.

V. testá ovato-turbinatá, ventricosá, antice transversim sulcatá, cæterum lævi; spirá brevi, conicá, apice acuto: anfractibus prioribus costas et sulcos transversos, sese decussantes, gerentibus; anfractibus cæteris unico sulco transverso prope margines suturales exaratis, marginibus ad spiram adpressis; peripheriá anfractuum primo convexá, deinde gradatim plus plusque rotundatá: aperturá elongato-rhomboidali, antice profunde emarginatá, postice sub-canaliculatá; labro postice incrassato, antice acuto, lævi; labio parum effuso, incrassato, postice magnum callum oblongum, anfractum a spirá separantem, formanti; columellá leviter arcuatá, compressá, biplicatá.

Shell ovately turbate, ventricose; spire short, conical, with a small, pointed apex; the first two or three whorls ornamented with numerous slender longitudinal ribs decussated by transverse furrows, which disappear rather suddenly at the third whorl; the whorls then become perfectly smooth, except towards the base, where they are traversed by broad more or less conspicuous furrows. The aperture is of an elongated rhomboidal form, deeply notched in front, and terminating posteriorly in an obscure channel; the outer lip smooth within, thickened behind, and stretching outwards into a wing-like projection; the middle and front parts thin and sharp-edged; the columellar lip but little spread out, and very much thickened, forming at the posterior extremity a large callus, which gradually separates the margins of the whorls more and more widely from the spire; the columella is curved, flattened, and furnished with two oblique, nearly equal folds, and sometimes with a third feeble and indistinct one behind. The middle whorls are convex at the shoulders, but as they become more and more detached from the spire by the increasing callus, the shoulders become more and more bluntly round.

The shells referred by Mr. Sowerby to *V. bulbula* are without doubt the young of the present species; but even in this state (figs. 2 a, b), although they much resemble the French shells, they present dissimilarities which sufficiently indicate a distinct species. In *V. bulbula*, the shell is more fusiform, with a longer spire; the margins of the whorls are without the transverse furrow; the outer lip, even in the adult shell, is not thickened; the inner-lip is very thin, more widely spread over the body-whorl, and without the thickening or callus which distinguishes the present species; the columella is nearly straight and round; the folds are more slender, and placed nearer the middle of the

columella, and the basal furrows are fainter and more numerous, becoming, in fact, almost obsolete on the mature shell.

The present species certainly presents a close analogy with *V. labrella* (Lamk.) to which the adult shells have been referred; but a careful comparison will show, I think, that they are not a mere local variety of that species, but distinct from it. In *V. Selseiensis*, the whorl is more convex, and the general form of the shell is consequently more ovate and less turbinate; the shoulder is always obtusely rounded, and never presents the prominent keel which characterises *V. labrella*, nor even the angular periphery which, in some specimens, is substituted for the keel; the transverse furrows are lost after the very early whorls, while in the French species they are continued more or less distinctly until maturity. But the principal differences will be found in the condition of the lips; for in *V. labrella*, the outer lip is much less thickened, and does not assume the wing-like expansion found in the present species; the inner lip is more widely spread over the front of the body-whorl and, although thickened at the posterior extremity, does not form the large callus which, by separating the margin of the whorl from the spire, forms so conspicuous a character in *V. Selseiensis*.

Size.—Axis, 2 inches and 7-10ths nearly; diameter, rather more than 1 inch and 6-10ths.

Locality.—Bracklesham Bay, where it is not uncommon.

Section A. (Pullus small, conical) continued.

b. Shell fusiform; costated, transversely striated; inner lip narrow.

a. Columellar plaits few.

No. 108. VOLUTA ANGUSTA. *Deshayes. Tab. XXIII, figs. 3 a, b.*

VOLUTA ANGUSTA, *Desh.* 1824-37. *Desc. des Coq. Foss.*, vol. ii, p. 697; t. 94, figs. 5, 6.

— — *Sow.* 1844. *Min. Con.*, vol. vii, p. 34, t. 626, figs. 1-3.

— — *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 107, t. 5, fig. 19 (non t. 7, fig. 37).

V. testá elongatá, sub-fusiforimi, angustá, costatá, ad basin late emarginatá; spirá productá sub-conicá, apice acuto: anfractibus depresso-convexiusculis, superne tenuissime striatis; ultimo anfractu spiram longitudine fere æquanti; postice tuberculoso-costatá, ad basin lævi: aperturá elongatá, angustá; columellá rectá, obscure triplicatá; labro acuto, simplici; labio angusto.

Shell fusiform, much elongated, narrow, ribbed, and widely but not very deeply notched at the base; spire conical, produced, nearly as long as the last whorl; apex small, pointed: whorls depressedly convex; ornamented with exceedingly fine transverse striæ; ribs distant, not prominent, extending to nearly the middle of the whorl, and

rising at the shoulder into obtuse laterally compressed tubercles ; the transverse striæ are lost on the middle and front parts of the last whorl, and are only faintly traceable towards the sutural margin. The aperture is elongated, narrow, with nearly parallel margins ; the outer lip simple, sharp-edged, angular at the posterior extremity, smooth within ; inner lip narrow ; the columella is nearly straight, and, according to M. Deshayes, is furnished with three folds, of which one only is visible in front, but the other two are seen when the outer lip is broken.

The much-varying forms of *V. muricina*, suggested to M. Deshayes the probability that this might eventually prove to be merely a narrow variety of that species, to which in fact it bears a very strong resemblance : the transverse striation is common to both species, and much value, cannot, I think, be attributed to the greater or less number of the feeble posterior columellar folds. I should be strongly inclined, therefore, to regard this as a variety of *V. muricina*, were it not for the difference in the size of the pullus, which, in *V. angusta*, is much smaller than in *V. muricina* ; and, as it is uncertain how far external conditions may influence the development of the shell in embryo, I have retained the species.

The shell represented in Mr. Dixon's work, t. 7, fig. 37, does not, in my opinion, belong to this species ; for the pullus, though small, is obtuse, not conical and pointed ; and the notch is very deep : it is, I think, a large specimen of *V. uniplicata*.

Size.—Axis, 3 inches nearly ; diameter, 9-10ths of an inch.

Localities.—Bracklesham Bay. *French* : Rétheuil, Soissons, Cuise-Lamotte, (fide Desh.)

No. 109. VOLUTA COSTATA. *Solander*. Tab. XXII, figs. 5 a—d.

- VOLUTA COSTATA, *Soland.* 1766. *Brand. Foss. Hant.*, p. 24 ; t. 3, fig. 45.
 — — *Sow.* 1821. *Min. Con.*, vol. iii, p. 163 ; t. 290, figs. 1 (non figs. 2 and 4).
 Nec — — *Grat.* 1847. *Conchyl. foss.*, &c. de l'Adour ; Supp. t. 1, fig. 14a—b.
 nec — — *Sow.* 1850. *Dixon's Geol. &c.*, of Suss., p. 107 ; t. 5, fig. 24.

V. testá ovato-fusiforini, costatá, lineis transversis ornatá ; spirá elevatá, conicá ; apice acuto : anfractibus convexiusculis ; costis angustis inermibus ; aperturá oblongo-ovali, ad basin sub-profunde emarginatá ; labro simplici, tenui ; labio angusto ; columellá sub-rectá, quadri-plicatá.

Shell ovately fusiform, longitudinally ribbed and ornamented with numerous transverse raised lines ; spire conical, elevated, being as long or nearly as long as the aperture, and terminating in a small pointed pullus ; whorls six or seven, exclusive of the pullus, and rather convex ; the ribs simple, narrow, sharp, slightly curved and extending to the base, numerous on the early whorls, but becoming more distant as the shell is enlarged. The transverse lines, which are decussated by the lines of growth, are very slender, and irregular ; every third or fourth line being thicker and more

elevated than the others, except towards the base, where the more prominent lines are placed nearer to each other, and the intermediate ones become very faint or altogether obsolete.—Aperture of an oblong-oval form, rather deeply notched in front; outer lip simple, sharp-edged and smooth within; inner lip very narrow, and thin; columella nearly straight, and furnished with two oblique folds in front, and two or three slender, obscure ones behind.

Brander's specimen in the British Museum, is unfortunately mislaid, and I have not been able to refer to it; but, judging from the description and figure given in his '*Fossilia Hantoniensia*,' the present Volute must be the true *V. costata* of Solander; for the word *inermis*, used by that naturalist in his description, cannot be applied to the shells, distinguished by the thick nodiform terminations of their ribs, which have been referred by Mr. Sowerby to that species.

D'Orbigny (Prod. de Paléont., vol. ii, p. 352, No. 267) has recorded this Volute as identical with the *Cochlea mixta* of Chemnitz, (*V. costaria*, Lamk.); but in that species the shell is longer and narrower, the surface quite smooth, except at the base; and the columella curved and furnished with two folds only. The two shells appear to me to be quite distinct from each other.

The shell from Bracklesham Bay figured in Mr. Dixon's work (t. 5, fig. 24) as *V. costata*, is a specimen of *V. Maga*; and those from Dax and Saubrigues, which Grateloup has considered to be identical with Solander's shell (fig. 45) appear to belong to a different species; they are represented as sub-turreted, with numerous rounded ribs, and with many folds on the columella, extending nearly to the posterior extremity of the aperture.

Size.—Axis, 2 inches nearly; diameter, 8-10ths of an inch nearly.

Locality.—Barton.

No. 110. VOLUTA HUMEROSA. *F. E. Edwards*. Tab. XXII, figs. 6 *a*, *b*.

VOLUTA COSTATA. *Sow*. 1821. Min. Con., vol. iii, p. 163; t. 290, figs. 2 and 4 (non fig. 1.)

Testá ovato-fusiformi, sub-turritá, costatá, transversim tenuissime lineatá, ad basin profunde et late emarginatá; spirá productá, apice acuto: anfractibus sub-planis; costis distantibus, crassis, rotundatis, postice nodigeris; aperturá ovato-rhomboidali, postice sub-canaliculatá; labro incrassato, intus lævi; labio angusto, crasso; columellá flexuosá, bis vel ter plicatá.

Shell ovately fusiform, sub-turreted, longitudinally ribbed, transversely finely striated; the base deeply and widely notched, and much bent backwards; spire elevated, but shorter than the last whorl; apex small, pointed: whorls five or six, exclusive of the embryonic whorls, very slightly convex, and flattened at the sides; ribs distant, broad, obtuse, reaching almost to the base, and at the posterior extremities

swelling into large, rounded tubercles. Aperture ovately rhomboidal, terminating behind in a narrow, but conspicuous, channel; outer lip smooth within, thickened towards the suture, otherwise thin and sharp-edged; inner lip narrow, thick, particularly at the posterior extremity, where it forms almost a callus; columella curved, and furnished with two prominent folds in front, and sometimes a third faint one behind.

The *Volutes* which I propose to separate under the present specific name, have been confounded hitherto with the preceding species (*V. costata*, Sol.); they appear, however, to be specifically distinct. The shells are broad, obtusely angulated at the shoulders, with flattened sides; the ribs are more distant, thicker, and rounder, and on the last two whorls rise at the shoulder into large tubercles; the transverse lineation is more regular, and the aperture wider, and not contracted behind; the inner lip is much thicker, the columella more curved, and furnished with two folds, or, occasionally only, with a third faint one behind; and the base is much more bent backwards, owing to the deeper anterior notch. Specimens occasionally occur in which, owing to the tubercles being less prominent than usual, the spire is more regular in form, and the shells present a general resemblance to *V. costata*; but the whorls still preserve the flatness of the sides, and the ribs their characteristic roundness; and the condition of the columella and the inner lip show, in fact, that the individuals in question are merely a variety of the present species.

Size.—Axis, 2 inches and 2-10ths; diameter, 1 inch and 1-10th nearly.

Localities.—Barton, and Bracklesham Bay.

Section A. (*Pullus small, conical.*

b. Shell fusiform; costated, transversely striated; inner lip narrow) } *continued.*

β. Columellar plaits numerous.

No. 111. *VOLUTA MAGA.* *F. E. Edwards.* Tab. XXII, figs. 2 *a—f.*

VOLUTA MAGORUM. *Sow.* 1821. *Min. Con.*, vol. iii, p. 164; t. 290, fig. 3.

— — *Morris.* 1843. *Cat. Brit. Foss.*, p. 168.

— *HARPULA.* *Sow.* 1840. *Min. Con.*, vol. vii, p. 7; t. 614, fig. 1.

— — *Morris.* 1843. *Cat. Brit. Foss.*, p. 167.

— *COSTATA.* *Sow.* 1850. *Dixon's Geol., &c., of Suss.*, p. 107, t. 5, fig. 24.

— *MAGNORUM (ex errore).* *D'Orb.* 1850. *Prod. de Paléont.*, vol. ii, p. 353, No. 281.

— *DECORA?* *Beyr.* 1853. *Die conchyl. des Norddeut. tertiarg.* vol. i, p. 73; t. 4, figs. 5 *a—b.*

Nec. — *MAGORUM.* *Brocc.* 1814. *Conchol. foss., Subapen.*, vol. ii, p. 307; t. 4, fig. 2.

nec. — *HARPULA.* *Lamk.* 1802. *Ann. du Mus.*, vol. i, p. 478, No. 9, and vol. xvii, p. 78, No. 13.

V. testá ovato-fusiforimi, unduloso-costatá, inermi, transversim tenuissime striatá, ad basin profunde emarginatá; spirá obtusá; apice sub-acuto; anfractibus sex vel septem,

depresso-convexis : *aperturá oblongo-ovali, antice effusá ; labro ad marginem tenui, acuto, intús incrassato ; labio angustissimo, crasso ; columellá leviter arcuatá, pluries plicatá, plicá penultimá majori.*

Shell ovately fusiform, ribbed, transversely furrowed, deeply notched, and bent backwards at the base ; spire elevated, obtuse, with a small conical pullus ; whorls six or seven, exclusive of the embryonic shell, convex, flattened at the sides, and separated by a deep suture. Ribs numerous, thick, rounded, slightly waved, and prolonged to the base ; transverse furrows shallow, irregular, becoming faint, frequently almost obsolete, over the middle of the whorl. Aperture of an oblong-oval shape, wide in front, narrowing behind ; outer lip simple, sharp-edged, and thickened within ; inner lip very narrow, thick ; columella slightly curved and furnished with ten or twelve folds, of which the front one is very oblique and moderately prominent, and the last but one larger and more transverse ; the others rise almost to the suture, becoming feebler and more transverse as they ascend the columella. The ridge or crest on the columella, found in all the deeply notched species, is half concealed by the thick inner lip, but bulges out beyond the contour of the whorl.

The specimen of *V. magorum* figured by Brocchi was imperfect, and his description is short and unsatisfactory ; it is, therefore, difficult to decide whether the shells described by Mr. Sowerby have been correctly referred by him to the Subapennine species. Judging, however, from Brocchi's figure and description, the *V. magorum* appears to be a more regularly convex shell, attenuated more equally at the extremities, and to have a more conical spire than the English shells. It is stated, also, to be smooth ; but much reliance cannot be placed on this character, for Brocchi describes the shell as *convertita in ispato*, and the transverse furrows may have become obliterated in that process. The ribs are more numerous, and are slender and straight ; the columellar folds also are more oblique, and the three front ones are nearly equal. The aperture appears to have been but slightly notched in front, inasmuch as the uninterrupted contour of the body whorl does not present the ridge caused by the retroflexion of the base, which always accompanies a deep notch. These distinctions, I think, show that the English shells, although closely allied to, are yet distinct from, Brocchi's species, or at all events that they cannot be safely considered as belonging to it.

The shells (figs. 2 *a, b*) referred by Mr. Sowerby to *V. harpula* (Lamk.), are only young shells of the present species, and are distinguished from the French species as well by the transverse striation as by the shorter and more obtuse spire, the more distant, thicker, and rounded ribs, the thinner outer lip, and the greater obliquity of the columellar folds.

Dr. Beyrich (*loc. cit.*) has described a Volute from Westeregeln (*Voluta decora*) which resembles the present species so closely that it is difficult to separate the two. The chief differences appear to be that the transverse striation is perceptible on the

spire only, just below the suture, and on the front half of the body whorl; the whorls, although described as "almost flat," appear from the figure to be roundedly convex, and to be contracted towards the base, the columella is without the ridge, the presence of which evidences a deep notch, and the columellar folds appear to be nearly equal in size. In all other respects the two species agree. As to the transverse striation, that character becomes feeble on the last whorl of some of the English shells, and the absence of it in the only specimen of *V. decora*, possessed by Dr. Beyrich, and from which his description is taken, may be due to an imperfect preservation of the surface; the only difference, in fact, of specific value, is the character of the notch. Dr. Beyrich himself expresses great doubt whether the *V. magorum* of Sowerby is the same as his shell, and, without an actual comparison of the shells, I cannot venture to affirm their identity. If they should prove to belong to the same species, the name *V. decora* imposed by Dr. Beyrich will supersede the one I have given.

Individuals of the present species occur, although very rarely, at Bracklesham Bay, and usually retain traces of their ornamental colouring, consisting of numerous dark brown transverse bands, which I have not found in specimens from other localities.

Size.—Axis, 2 inches and 3-10ths; diameter, 1 inch.

Localities.—Barton, Highcliff, Alum Bay (Strat. No. 29, Prestw.), Bracklesham Bay. *German*: Westeregeln in Magdeburgh (fide Beyrich) ?

No. 112. VOLUTA BRANDERI. *Deshayes*. Tab. XXII, figs. 4 a, b.

VOLUTA BRANDERI. *Desh.* 1824—37. *Descr. des Coq. foss., &c.*, vol. ii, p. 701; t. 90, figs. 15—16.

— — — *Defr.* 1829. *Dict. des Sci. nat.*, vol. lviii, p. 477.

V. testá ovato-oblongá, turritá, longitudinaliter costatá, cæterum lævi; spirá mediocri, acuminatá, apice acuto: anfractibus convexiusculis; costis crassis, rotundatis: aperturá elongatá, angustá, ad basin profunde emarginatá; labro incrassato, simplici; labio angusto; columellá triplicatá et rugis transversalibus instructá.

Shell oval-oblong, turreted, longitudinally ribbed, otherwise smooth; spire moderately elevated, and terminating in a small, conical pullus: whorls six or seven, slightly convex; ribs rather numerous, thick, round, extending in front almost to the base, and prolonged backwards to the very edge of the whorl, where they terminate abruptly, forming, with their truncated extremities, a flattened ledge, which gives a turreted aspect to the spire. The only specimen I possess consists of the spire, the front part of the shell being broken away; but in the French shells the whorls are traversed at the base by several undulating striæ; the aperture is of a lengthened oval shape, deeply notched in front; the outer lip is much thickened, and smooth within; the inner lip is narrow, and the columella presents three moderately oblique folds in front,

of which the middle one is the largest and most prominent, and several transverse raised lines behind. Fig. 4 *b*, taken from a French specimen, is introduced for comparison, and to shew the perfect shell.

In general appearance, this Volute resembles *V. magu*; but it is quite smooth excepting where a few faint lines traverse the base; the spire is turreted, more slender, and tapering; and the ribs more numerous and more prominent.

Mr. Sowerby has described* a Volute from the tertiary formation in Cutch (*V. dentata*), which somewhat resembles the present species; but the ribs terminate posteriorly in erect, pointed tubercles, the surface of the shell is concentrically striated, the outer lip is plicated within, and the columella presents only two, nearly equal, prominent folds.

Size.—According to M. Deshayes, axis, 1 inch and a half; diameter, three-quarters of an inch.

Localities.—Bracklesham Bay. *French*: Monneville, Valmondois (fide Desh.); Les Clergis, Acy (fide D'Orb.).

No. 113. VOLUTA PROTENSA. *Sowerby*. Tab. XXIII, figs. 5 *a—c*.

VOLUTA PROTENSA. *Sow*. 1840. Min. Con., vol. vii, p. 5; t. 612, figs. 6, 7.

V. testá fusiformi, protensá, transversim striatá, in juventá obscure costatá; spirá acuminatá, apice acuto: anfractibus convexiusculis, ad margines suturales depressis: apertura angustá, profunde emarginatá; labro simplici, tenui, acuto; labio angusto; columellá pluries plicatá.

Shell fusiform, elongated, transversely striated, obscurely ribbed in the young state; spire elevated, being as long as the aperture, and terminating in a small, pointed apex: whorls six or seven, rather convex, depressed round the sutural margin, and having the edge pressed against the spire: aperture narrow, deeply notched at the base; outer lip simple, thin, and sharp-edged; inner lip very narrow; columella straight, furnished with six or seven distant oblique folds ascending to the top of the columella; the fold in front is the largest and most prominent, the others thread like, and nearly equal.

This appears to be a well-marked species, quite distinct from all the other Eocene Volutes.

Size.—Axis, 2 inches; diameter, 6-10ths of an inch.

Localities.—Chalk Farm, Whetstone, Potter's Bar.

* Grant's Geology of Cutch, Geol. Trans., 2d series, vol. v, p. 322; t. 25, fig. 26.

*Section B. Pullus sub-papillary.**a. Shell pyriform; inner lip effuse; columella plaits few.*No. 114. VOLUTA CITHARA. Lamarck. Tab. XXIII, figs. 6 *a—c*.*Henckel.* 1760. Pyrotol., t. 5, fig. 9.*Favanne.* 1780. D'Argenv. Conchyl. (3d edit.), t. 166, fig. 4.*Burtin.* 1784. Oryctogr. de Bruxelles, t. 15, D.CITHARÆDUS. *Chemn.* 1795. Conchy. cab., vol. xi, t. 212, figs. 2098, 2099.VOLUTA HARPA. *Lamk.* (non LINN). 1802. Ann. du Mus., vol. i, p. 476, No. 1; and vol. xvii, p. 74, No. 1.— CITHARA. — 1816. Tab. Encyclop. et méthod., t. 324, figs. 1 *a, b*.

— — — 1822. Hist. nat., &c., vol. vii, p. 346, No. 1.

— — *De France.* 1829. Dict. des Sci. nat., vol. lviii, p. 474.— HARPA. *Desh.* 1833. Encycl. méthod. (Vers), vol. iii, p. 1143, No. 21.— CITHARA. *Desh.* 1824—37. Descr. des Coq. foss., &c., vol. ii, p. 681; t. 90, figs. 11, 12.— — *Sow.* 1842. Min. Con., vol. vii, p. 31; t. 625, figs. 1—3.— — *Nyst.* 1843. Desc. des Coq., &c., de la Belg., 590, No. 508.— — *Sow.* 1850. Dixon's Geol., &c., of Suss., p. 106; t. 5, fig. 17.— CITHARA. *D'Orb.* 1850. Prod. de Paléont, vol. ii, p. 353, No. 277.

V. testá ovato-oblongá, costatá, postice lævi, antice coarctatá, transversim sulcatá, late emarginatá; spirá brevi, sub-muricatá, apice sub-papillari: anfractibus convexis, ventricosis; costis distantibus, postice bispinosis: labro tenui, lævi; labio antice expanso; columelli quinques plicatá.

Var. ANGULATA (fig. 6 b) testá breviori, latiori, costis numerosioribus; anfractibus angulatis, unicá serie spinarum coronatis.

Shell ovate-oblong ventricose, contracted in front, ribbed, smooth except towards the base, where it is transversely furrowed; spire short, armed with short spines; apex conical, sub-papillary: whorls convex, rounded at the shoulder; ribs distant, extending to the middle of the whorls, crowned with two or three rather blunt, nodiform spines, which are lost on the last whorl of the fully formed shell. The aperture is effuse, and widely notched in front; the right lip is thin, sharp-edged, smooth within; the columellar lip thin, widely spread over the front part of the body whorl; columella furnished with one prominent very oblique fold in front, and three or four smaller ones behind.

The English specimens agree perfectly with the French shells, and the examination of a longer series of specimens than that to which Mr. Sowerby had access, shows that individuals occur here, as well as in France, having the spire considerably produced (fig. 6 *a*).

A short variety, (fig. 6 *b*), is also found, in which the whorls are angulated at the shoulder, the ribs are shorter, more numerous, and crowned with single, sharp, erect spines.

Size.—Axis 4 inches ; diameter, $2\frac{1}{4}$ inches.

Localities.—Bracklesham Bay. *French* : Grignon, Courtagnon, Parnes (fide Desh.), Hattencourt, Hermes (fide D'Orb.). *Belgian* : Brussels, Panisel, near Mons (fide Nyst).

Section B. (*Pullus sub-papillary*) *continued*.

b. *Shell fusiform ; inner lip narrow ; columellar plaits few.*

No. 115. *VOLUTA UNIPLICATA.* *Sowerby.* Tab. XXIII, figs. 2 *a—c*.

VOLUTA UNIPLICATA. *Sow.* 1850. Dixon's Geol., &c., of Suss., pp. 107 and 188, t. 7, figs. 45, 46.

— *ANGUSTA.* *Sow.* 1850. *Idem.*, t. 7, fig. 37.

V. testá fusiformi, obsolete costatá, in juventá transversim tenuissime striatá, ad basin obscure sulcatá, profunde emarginatá ; spirá conicá, apice sub-papillari ; anfractibus depresso-convexiusculis, obtuse angulatis ; aperturá oblongo-ovalí ; labro incrassato, intus lævi ; labio angusto, crasso ; columellá leviter arcuatá, uniplicatá.

Shell fusiform, faintly ribbed, obscurely sulcated towards the base, and deeply notched in front ; spire elongated and nearly conical ; pullus sub-papillary : whorls rather convex, flattened at the side, and obscurely angulated at the shoulder ; in the young state they are ornamented with crowded, very fine, transverse striæ. The ribs are prominent, thick, rounded, and produced nearly to the base ; but on the last two or three whorls they become obsolete, and are replaced by a row of obscure, blunt tubercles placed on the angle of the shoulder ; the transverse striation is also lost, and the body whorl is smooth, except where the shallow, faint, basal furrows appear ; the aperture is of a lengthened oval shape ; the outer lip thickened near the suture, rather sharp-edged towards the front, and smooth within ; the inner lip narrow and thick ; the columella slightly curved, and furnished with one prominent fold, placed nearer to the anterior extremity than is usually the case.

Fig. 2 *a* is taken from the shell figured in Mr. Dixon's work (t. 7, fig. 37) as *V. angusta*.

This species, which appears to be well characterised, is not uncommon.

Size.—Axis, 3 inches nearly ; diameter, 9-10ths of an inch.

Locality.—Bracklesham Bay.

No. 116. VOLUTA MURICINA. *Lamarck*. Tab. XXIII, figs. 1 *a—c*.

		<i>Lister</i> . 1685. Hist. Conchyl., t. 1033, fig. 6?
		<i>Favanne</i> . 1780. D'Argenv. Conchyl. (3d edit.), t. 66, fig. 1.
COCHLEA MIXTA?	<i>Chemn.</i> 1795. Conchyl. cab., vol. xi, t. 212, figs. 3010—3011.	
VOLUTA MURICINA.	<i>Lamk.</i> 1816. Tableau Encyclop. et méth., t. 383, fig. 1 <i>a—b</i> .	
—	—	1802. Ann. du Mus., vol. i, p. 477, No. 4; vol. xvii, p. 75, No. 5.
—	—	1822. Hist. nat., &c., vol. vii, p. 350, No. 5.
—	—	<i>Defr.</i> 1829. Dict. des Sci. nat., vol. lviii, p. 475.
—	—	<i>Desh.</i> 1833. Encyl. méth. (Vers), vol. iii, p. 1144, No. 24.
—	—	1824—37. Descr. des Coq. foss., &c., vol. ii, p. 697; t. 91, figs. 18—19; t. 93, figs. 3—4; t. 94, figs. 3—4.
—	—	<i>Sow.</i> 1844. Min. Con., vol. vii, p. 31; t. 626, figs. 4—6.
—	—	1850. Dixon's Geol., &c., of Suss., p. 107; t. 5, fig. 20.

V. testá ovato-fusiforimi, ad basin sub-productá, late emarginatá, antice lævi, postice longitudinaliter tuberculato-costatá; spirá elongatá, apice obtuso: anfractibus angulatis, in juventú tenuissime transversim striatis, ultimo anfractu spiram in longitudine vix superanti: aperturá oblongo-ovatá; labro simplici; labio angusto; columellá ter vel quater plicatá, inter plicas anteriores sulco lato exarátá.

Shell ovately fusiform, produced, and widely, but not deeply, notched at the base; spire long and pointed, with a sub-papillary apex; whorls six or seven, obscurely furrowed at the base, smooth elsewhere, wide and angulated at the shoulder, crowned with a single row of pointed, pyramidal tubercles, having their bases prolonged into obtuse ribs, which are lost about the middle of the whorl; the last whorl is conical, and rather longer than the spire. In the immature shell the whorls are ornamented with numerous, very slender, transverse striæ, which are lost as the shell approaches maturity. The aperture is of an oblong oval shape; outer lip rather thick, with a blunt margin; inner lip narrow, thickened; columella round, curved, furnished with one large, prominent fold in front, and two or three smaller folds behind, and deeply furrowed between the two front folds.

The ribs sometimes, particularly in young specimens, extend far down the whorl, almost to the base, and the tubercles are rounded: specimens also occur which are narrower, and more slender than the typical form; and, again, others are found wider and shorter, according to the condition of the ribs. Indeed, as both M. Deshayes and Mr. Sowerby have remarked, the shell is so variable in this respect, as to render it difficult to define. The transverse striation is found as well on the French as on the English shells, although that character is not noticed either by Lamarck or Deshayes.

Size.—Axis, 3 inches and 4-10ths; diameter, 1 inch and 6-10ths.

Localities.—Bracklesham Bay. *French*: Grignon, Parnes, Mouchy, Courtagnon (fide Desh.), Chaumont (fide D'Orb.).

*Section C. Pullus papillary.**a. Shell fusiform ; inner lip effuse ; columella plaits few.*No. 117. *VOLUTA WETHERELLII. Sowerby. Tab. XXIII, figs. 4 a—d.**VOLUTA WETHERELLII. Sow. 1836. Lond. and Edinb. Phil. Mag., and Journ. of Science, 3d ser., vol. ix, p. 463, note.*— — *Sow. 1840. Min. Con., vol. vii, p. 5 ; t. 612, figs. 1—5.**V. testá fusiformi, elongatá, ad basin parum emarginatá? in juventá concentricè lineatá, deinde lævi ; lineis confertis, subtilissimis ; spirá conicá, apice papillari : anfractibus sex vel septem, convexis, marginibus ad spiram adpressis : aperturá elongato-ovali ; columellá subrectá, triplicatá ; labro ? ; labio effuso.*

Shell fusiform, elongated, slightly produced in front ; spire conical, elevated, and terminating in an obtuse papillary apex : whorls six or seven, convex, with the margins pressed against the preceding volutions, and presenting a broad, shallow depression, which runs round the spire between the shoulder and the suture. The earlier whorls are ornamented with numerous concentric raised lines ; these lines are much crowded, and so very fine as to be scarcely visible by the naked eye, and do not detract from the apparently even surface ; the last whorl is smooth. Aperture of a lengthened oval form, columella nearly straight, and furnished at maturity with moderately oblique folds, of which the one in front is the smallest, and that in the middle the largest ; inner lip widely spread over the body-whorl, but not extending backwards beyond the suture ; the base, apparently, but slightly notched, as the columella does not present any prominent ridge. The outer lip is not preserved in any specimen I have seen.

This Volute presents a remarkably close analogy with the well-known Crag species *V. Lamberti* ; but it is a longer, narrower shell, with a much smaller pullus ; and the columella presents three unequal folds instead of the four nearly equal folds which characterise that species. It appears to be confined to the lower formations in the neighbourhood of London, and has not as yet been found, I believe, at Highgate.

Size.—The actual dimensions cannot be stated accurately ; those of the largest of the specimens figured must have been, axis, 5 inches, nearly ; diameter, 1 inch and 8-10ths, nearly.

Localities.—Camden Town, Chalk Farm, Haverstock Hill, Hornsey, Copenhagen Fields, Holloway, Whetstone, Potter's Bar, Bayswater, Brentford, Sheppey.

Genus 24th. MITRA.* *Lamarck*. 1801.MITRA, TURRIS, *Montf.*, 1810.CYLINDRA, IMBRICARIA, *Schum.*, 1817.TIARA, MITREOLA, CONELIX, MITRELLA, *Swains.*, 1840.VULPECULA, *Gray*, 1840.

Gen. Char.—Shell fusiform, smooth, longitudinally ribbed or cancellated; spire elevated, pointed: aperture longitudinal, narrow, notched at the base, and without a canal, or at most with a very short one; outer lip sometimes thickened, generally sharp-edged, internally smooth or crenulate; columella plaited, folds regular, nearly transverse, the anterior one the smallest.

The Mitres are distinguished from the Volutes, with which they had been associated until they were separated by Lamarck, by their more elongated, less ventricose form, and by the character of the columellar plaits, which are more transverse and regular, with the smaller one in front, a disposition the reverse of that which characterises the Volutes.

The animal has a small, narrow head, with short, pointed tentacles, on the external sides or bases of which the eyes are placed; but some species from the Mediterranean, according to M. Deshayes, bear pedicels much shorter than the tentacles, united to them, and terminated by the ocular points. The foot is narrow, truncate in front, pointed behind; and the anterior margin of the mantle is produced into a short, cylindrical canal. But that which chiefly distinguishes the animal of *Mitra*, is the great length of the proboscis, which, in some species, considerably exceeds that of the shell.

The Mitres, as defined by Lamarck, have been subdivided into several genera, dependent chiefly on conchological distinctions. In some of these divisions the animals, according to observations recently made by Dr. Gray, exhibit modifications of the lingual teeth closely resembling those characteristic of other genera; and that eminent naturalist, therefore, regards the *Mitræ* as forming a family distinct from the *Volutidæ*, with which they have usually been associated. The small, narrow foot, and elongated proboscis lead, apparently, to the same conclusion.

The living *Mitræ* are very numerous; upwards of 350 species being known; of these one is from the coast of Greenland, and some few small species are found in the Mediterranean. With these exceptions, the *Mitræ* are confined to tropical or subtropical seas, where they are found, according to Messrs. Adams, chiefly on the shores of islands, but few species inhabiting continental shores. They appear to be deep-sea molluscs, most of the species ranging in depth from 15 to 80 fathoms, although some few are littoral.

* Etym. *Mitpa*, a turban or covering for the head, worn by the Persians and other Asiatics.

TAB. XVI.

Fig.

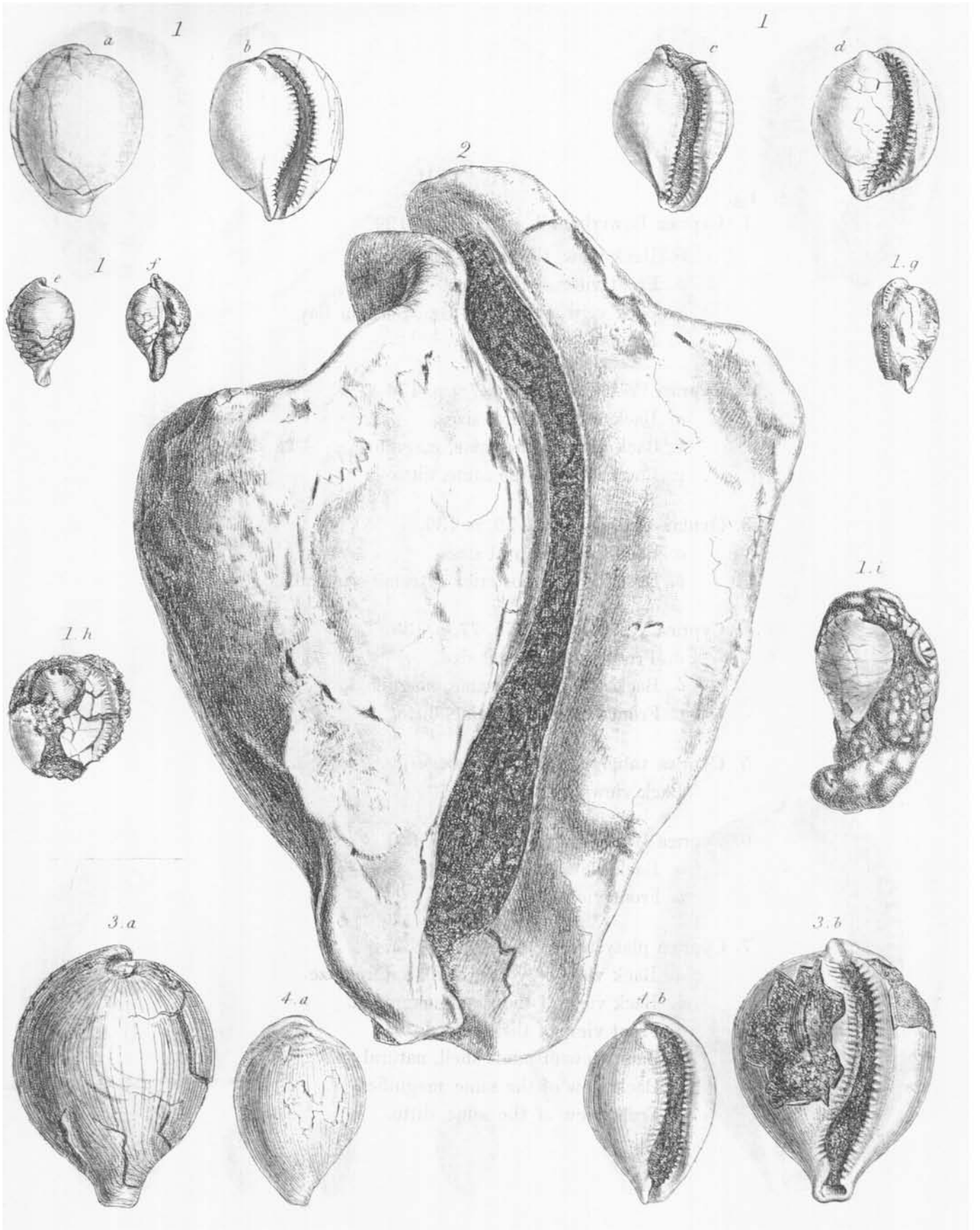
1. *Cypræa oviformis*. No. 71*, p. 128.
 - a. Back view, adult shell from Primrose Hill.
 - b. Front view of the same.
 - c. Front view, adult shell from Highgate.
 - d. Front view, adult shell (globose var.) from Whetstone.
 - e. Back view, young shell (first stage) from Barnett.
 - f. Front view of the same.
 - g. Side view, (shell in second stage), from Potter's Bar.
 - h. Side view, adult shell, showing the inner whorls.
 - i. Original specimen from the well on Hampstead Heath, described as *Ovulum retusum*.

2. *Cypræa tuberculosa* (Var. *Coombii*). No. 75, p. 131.

Front view.

3. *Cypræa globularis*. No. 73, p. 130.
 - a. Back view.
 - b. Front view.

4. *Cypræa inflata*. No. 71, p. 126.
 - a. Back view.
 - b. Front view.



TAB. XVII.

Fig.

1. *Cypræa Bowerbankii*. No. 72, *p.* 129.
 - a.* Back view, shell from Highgate.
 - b.* Front view of the same.
 - c.* Back view, shell from Bracklesham Bay.
 - d.* Front view, ditto.

2. *Cypræa Prestwichii*. No. 78, *p.* 134.
 - a.* Back view, natural size.
 - b.* Back view of the same, magnified.
 - c.* Front view of the same, ditto.

3. *Ovula*[?] *antiqua*. No. 79, *p.* 136.
 - a.* Back view, natural size.
 - b.* Back view of posterior extremity, magnified.

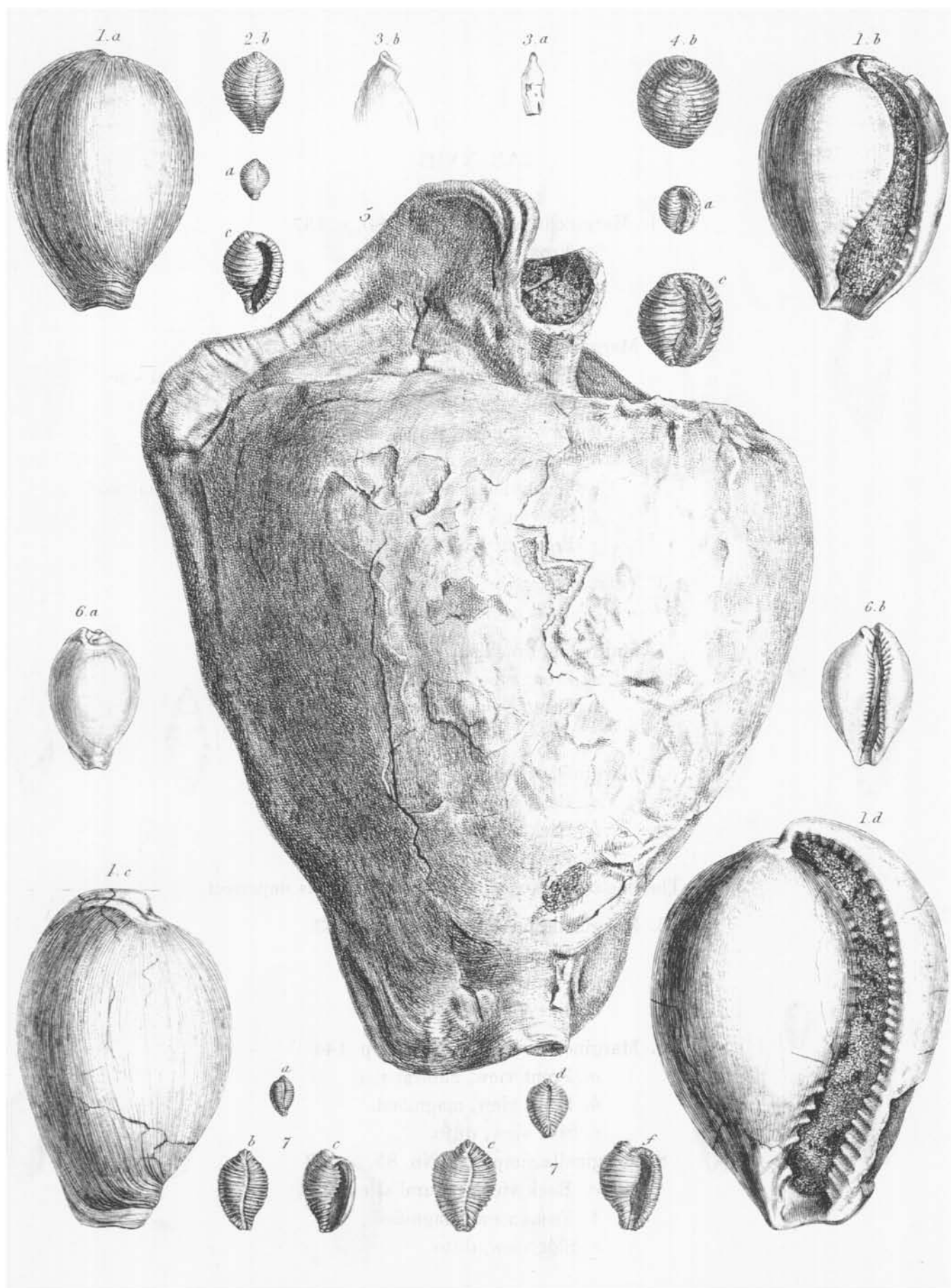
4. *Cypræa Wetherellii*. No. 77, *p.* 133.
 - a.* Front view, natural size.
 - b.* Back view of the same, magnified.
 - c.* Front view of the same, ditto.

5. *Cypræa tuberculosa*, (Var. *Coombii*). No. 75, *p.* 131.

Back view.

6. *Cypræa Bartonensis*. No. 74, *p.* 130.
 - a.* Back view.
 - b.* Front view.

7. *Cypræa platystoma*. No. 76, *p.* 132.
 - a.* Back view of young shell, natural size.
 - b.* Back view of the same, magnified.
 - c.* Front view of the same, ditto.
 - d.* Back view of adult shell, natural size.
 - e.* Back view of the same, magnified.
 - f.* Front view of the same, ditto.



TAB. XVIII.

Fig.

1. *Marginella eburnea*. No. 80, *p.* 137.
 - a.* Front view, natural size.
 - b.* Front view, magnified.
 - c.* Side view, ditto.

 2. *Marginella bifido-plicata*. No. 81, *p.* 139.
 - a.* Front view of adult shell from Barton, natural size.
 - b.* Front view of the same, magnified.
 - c.* Front view of young shell, from ditto, ditto.
 - d.* Side view of adult shell, ditto, ditto.
 - e.* Front view of adult shell, Var. from Alum Bay, nat. size.
 - f.* Side view of the same, magnified.
 - g.* Front view of the same, magnified.

 3. *Voluta luctatrix*. No. 87, *p.* 147.

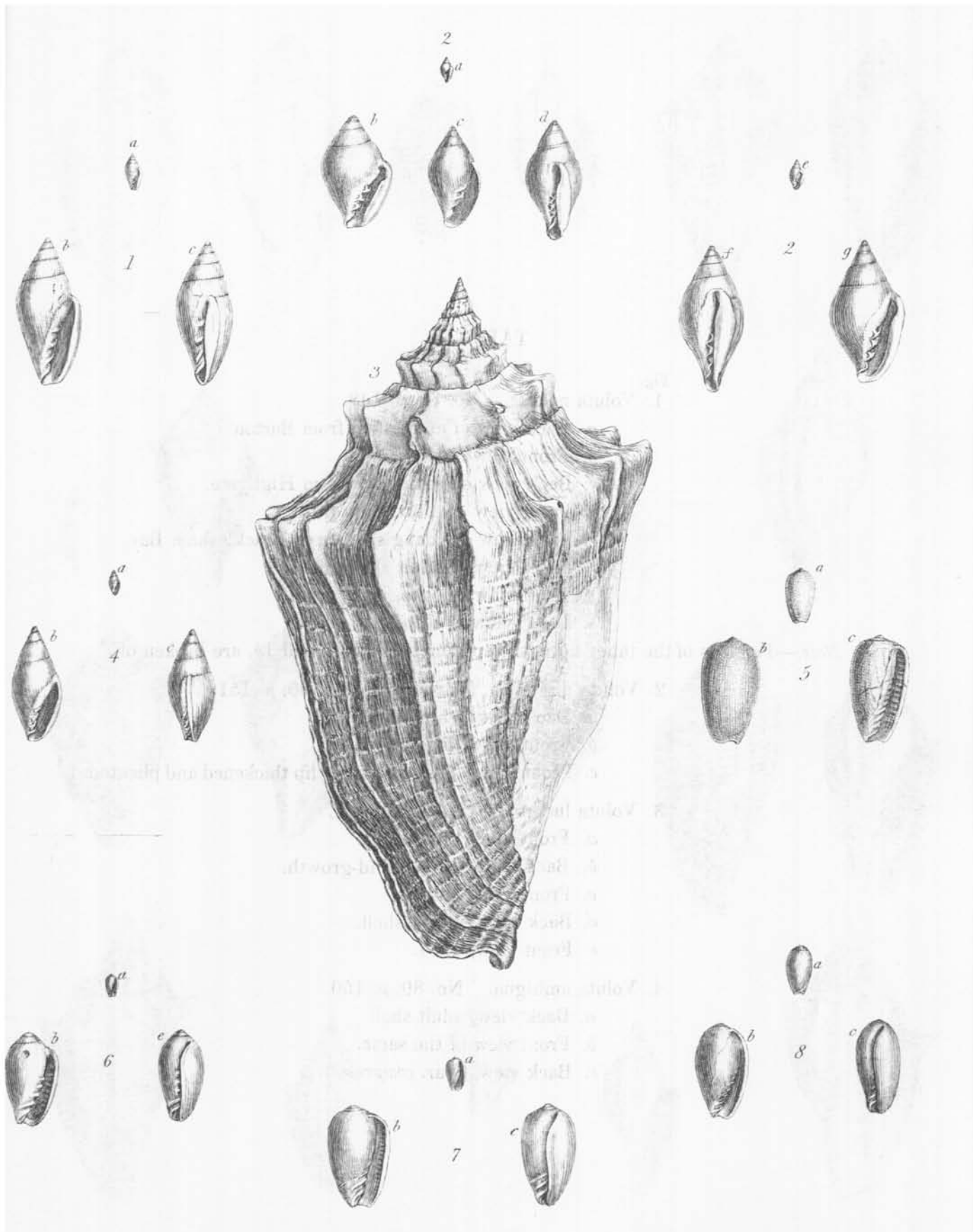
Back view, adult shell.

 4. *Marginella gracilis*. No. 82, *p.* 140.
 - a.* Front view, natural size.
 - b.* Front view, magnified.
 - c.* Side view, ditto.

 5. *Marginella ovulata*. No. 83, *p.* 141.
 - a.* Back view, natural size.
 - b.* Back view, magnified.
 - c.* Front view, ditto.
- Note.*—The posterior extremity of the outer lip is imperfect.
6. *Marginella pusilla*. No. 84, *p.* 143.
 - a.* Front view, natural size.
 - b.* Front view, magnified.
 - c.* Side view, ditto.

 7. *Marginella vittata*. No. 86, *p.* 144.
 - a.* Front view, natural size.
 - b.* Front view, magnified.
 - c.* Side view, ditto.

 8. *Marginella simplex*. No. 85, *p.* 143.
 - a.* Back view, natural size.
 - b.* Front view, magnified.
 - c.* Side view, ditto.



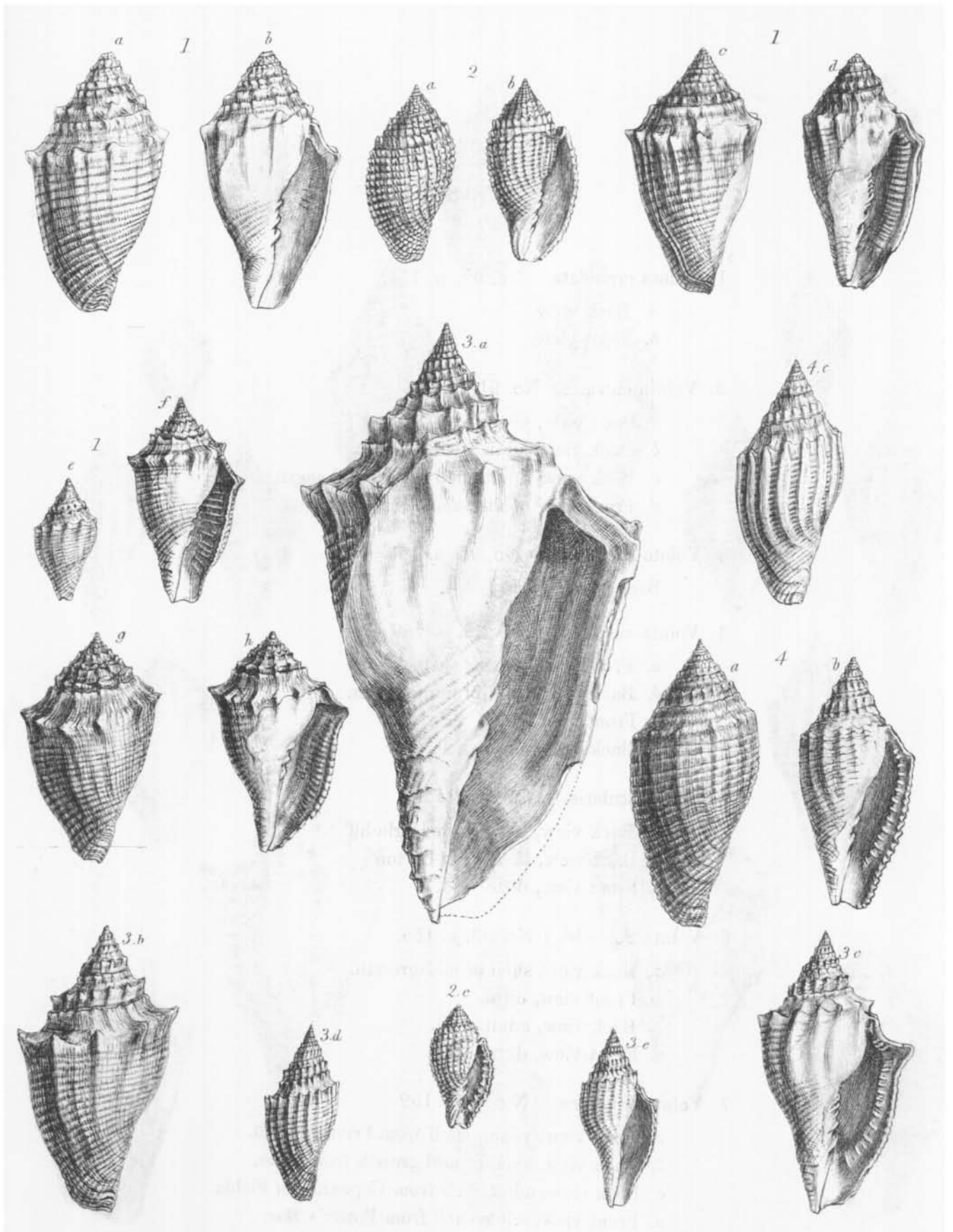
TAB. XIX.

Fig.

1. *Voluta nodosa*. No. 88, *p.* 148.
 - a.* Back view of adult shell from Barton.
 - b.* Front view of the same.
 - c.* Back view of adult shell from Highgate.
 - d.* Front view of ditto, ditto.
 - e.* Back view of young shell from Bracklesham Bay.
 - f.* Front view of adult shell, ditto.
 - g.* Back view of ditto, ditto.
 - h.* Front view of ditto, ditto.

Note.—Portions of the inner lip in the specimens, figs. 1*a* and 1*h*, are broken off.

2. *Voluta digitalina*, (Var. *lima*). No. 90, *p.* 151.
 - a.* Back view, adult shell.
 - b.* Front view, ditto.
 - c.* Front view, ditto, with outer lip thickened and plicated.
3. *Voluta luctatrix*. No. 87, *p.* 147.
 - a.* Front view, adult shell.
 - b.* Back view, shell of mid-growth.
 - c.* Front view, ditto.
 - d.* Back view, young shell.
 - e.* Front view, ditto.
4. *Voluta ambigua*. No. 89, *p.* 150.
 - a.* Back view, adult shell.
 - b.* Front view of the same.
 - c.* Back view, (Var. *compressa*).



TAB. XX.

Fig

1. *Voluta crenulata*. No. 92, *p.* 154.
 - a.* Back view.
 - b.* Front view.

2. *Voluta elevata*. No. 91, *p.* 153.
 - a.* Back view, young shell.
 - b.* Back view, adult shell.
 - c.* Back view, adult shell from Southampton.
 - d.* Front view of the same.

3. *Voluta recticosta*. No. 95, *p.* 157.

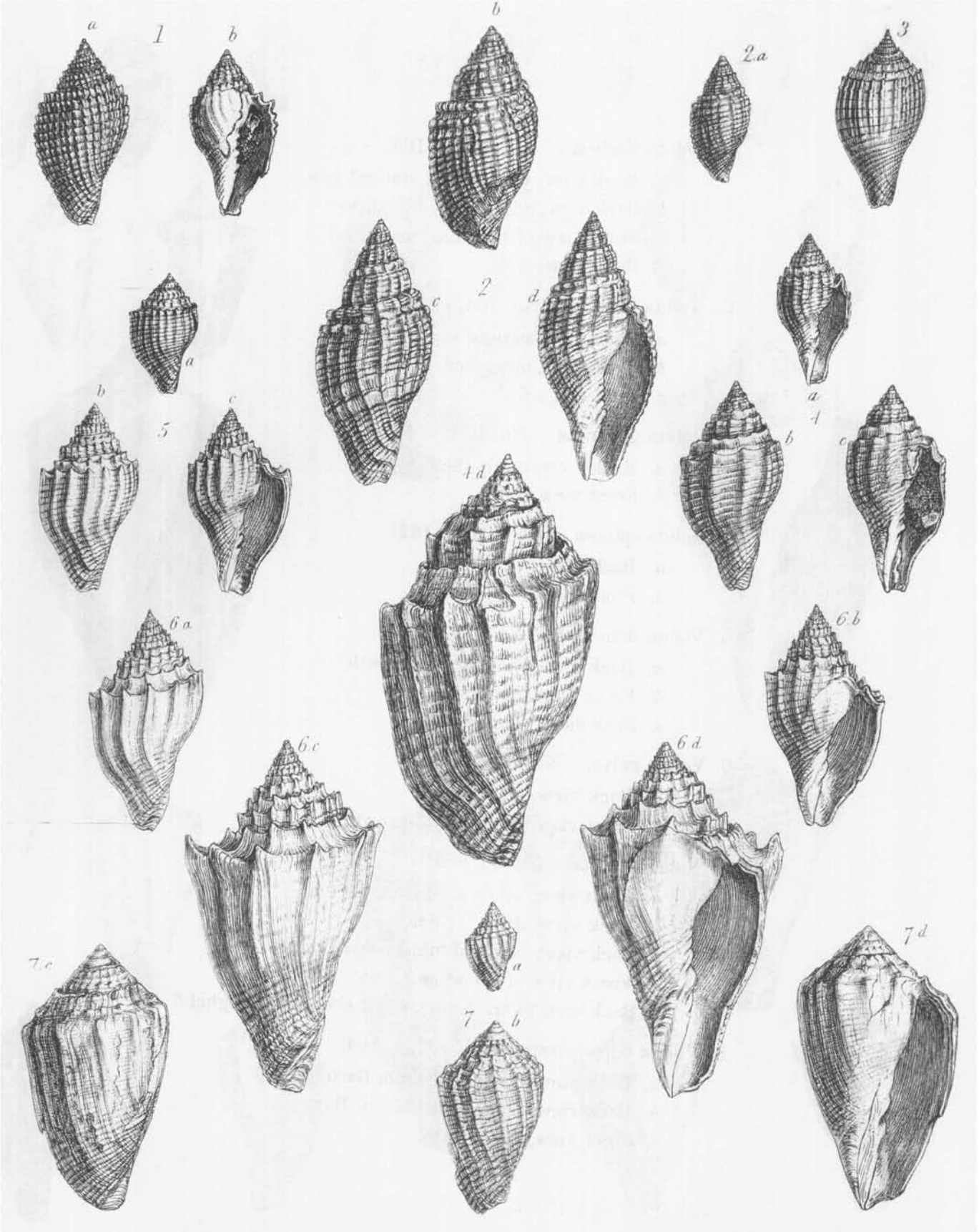
Back view.

4. *Voluta suspensa*. No. 96, *p.* 158.
 - a.* Front view, young shell.
 - b.* Back view, shell of mid-growth.
 - c.* Front view, ditto.
 - d.* Back view, adult shell.

5. *Voluta scalaris*. No. 94, *p.* 156.
 - a.* Back view, shell from Highcliff.
 - b.* Back view, shell from Barton.
 - c.* Front view, ditto.

6. *Voluta Solandri*. No. 93, *p.* 155.
 - a.* Back view, shell of mid-growth.
 - b.* Front view, ditto.
 - c.* Back view, adult shell.
 - d.* Front view, ditto.

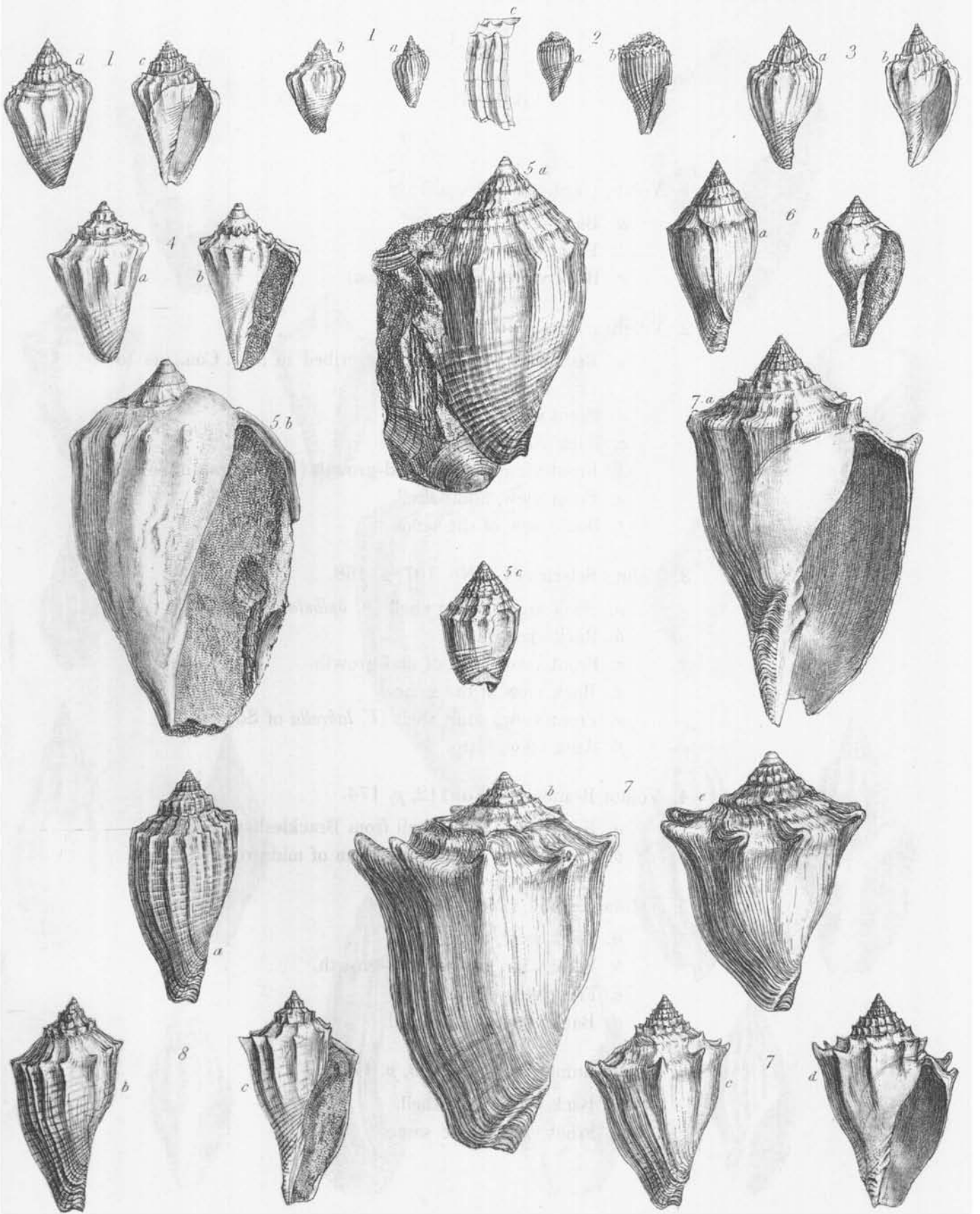
7. *Voluta tricornata*. No. 97, *p.* 159.
 - a.* Back view, young shell from Primrose Hill.
 - b.* Back view, shell of mid-growth from ditto.
 - c.* Back view, adult shell from Copenhagen Fields.
 - d.* Front view, adult shell from Potter's Bar.



TAB. XXI.

Fig.

1. *Voluta Forbesii*. No. 105, *p.* 166.
 - a.* Back view, young shell, natural size.
 - b.* Back view, adult shell, ditto.
 - c.* Front view of the same, magnified.
 - d.* Back view, ditto, ditto.
2. *Voluta horrida*. No. 104, *p.* 166.
 - a.* Back view, natural size.
 - b.* Back view, magnified.
 - c.* Ribs, magnified.
3. *Voluta geminata*. No. 103, *p.* 165.
 - a.* Back view, adult shell.
 - b.* Front view, ditto.
4. *Voluta spinosa*. No. 101, *p.* 162.
 - a.* Back view.
 - b.* Front view.
5. *Voluta denudata*. No. 100, *p.* 162.
 - a.* Back view, shell of mid-growth.
 - b.* Front view, adult shell.
 - c.* Back view, young shell.
6. *Voluta calva*. No. 106, *p.* 167.
 - a.* Back view, adult shell.
 - b.* Front view, shell of mid-growth.
7. *Voluta athleta*. No. 99, *p.* 161.
 - a.* Front view, adult shell from Barton.
 - b.* Back view, ditto, ditto.
 - c.* Back view, shell of mid-growth, ditto.
 - d.* Front view of the same.
 - e.* Back view (Var. *Fortis*), adult shell from Highcliff.
8. *Voluta depauperata*. No. 102, *p.* 164.
 - a.* Back view, adult shell from Barton.
 - b.* Back view, ditto from Colwell Bay.
 - c.* Front view, ditto, ditto.



TAB. XXII.

Fig.

1. *Voluta pugil*. No. 98, *p.* 159.
 - a.* Back view.
 - b.* Front view.
 - c.* Back view, (Var. *platyspina*).

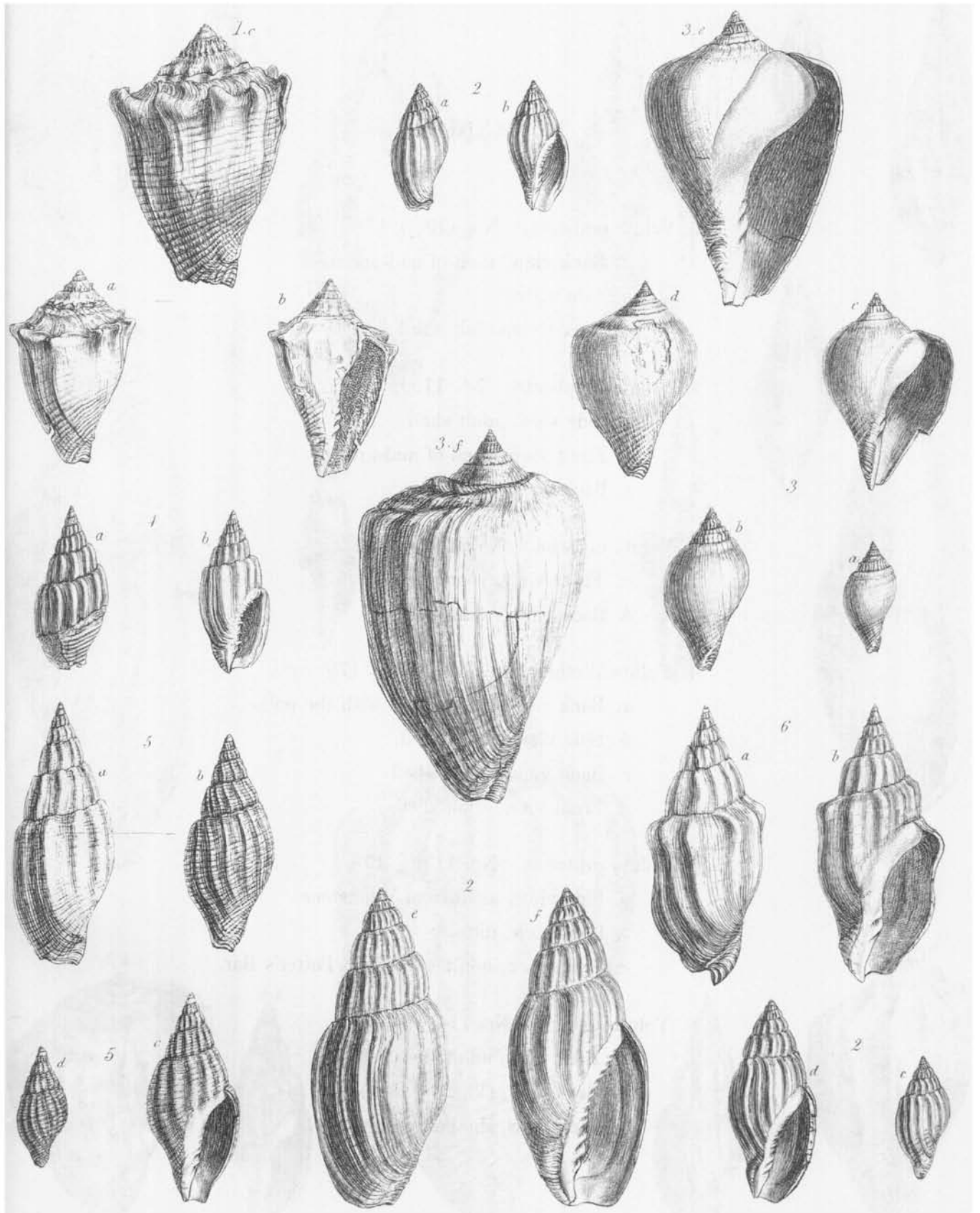
2. *Voluta maga*. No. 111, *p.* 172.
 - a.* Back view, young shell described in Min. Con., as to *V. harpula*.
 - b.* Front view of the same.
 - c.* Back view, young shell.
 - d.* Front view, shell of mid-growth (*V. Magorum* of Sow.).
 - e.* Front view, adult shell.
 - f.* Back view of the same.

3. *Voluta Selseiensis*. No. 107, *p.* 168.
 - a.* Back view, young shell (*V. bulbula* of Sow.).
 - b.* Back view, ditto.
 - c.* Front view, shell of mid-growth.
 - d.* Back view of the same.
 - e.* Front view, adult shell (*V. labrella* of Sow.).
 - f.* Back view, ditto.

4. *Voluta Branderi*. No. 112, *p.* 174.
 - a.* Back view, adult shell from Bracklesham Bay.
 - b.* Front view, French specimen of mid-growth.

5. *Voluta costata*. No. 109, *p.* 170.
 - a.* Back view, adult shell.
 - b.* Back view, shell of mid-growth.
 - c.* Front view of the same.
 - d.* Back view, young shell.

6. *Voluta humerosa*. No. 110, *p.* 171.
 - a.* Back view, adult shell.
 - b.* Front view of the same.



TAB. XXIII.

Fig.

1. *Voluta muricina*. No. 116, *p.* 178.
 - a.* Back view, shell of mid-growth.
 - b.* Side view.
 - c.* Back view, adult shell

2. *Voluta uniplicata*. No. 115, *p.* 177.
 - a.* Side view, adult shell.
 - b.* Front view, shell of mid-growth.
 - c.* Back view, ditto.

3. *Voluta angusta*. No. 108, *p.* 169.
 - a.* Front view, young shell.
 - b.* Back view, adult shell.

4. *Voluta Wetherellii*. No. 117, *p.* 179.
 - a.* Back view, young shell with the pullus.
 - b.* Side view, adult shell.
 - c.* Back view, young shell.
 - d.* Front view, adult shell.

5. *Voluta protensa*. No. 113, *p.* 175.
 - a.* Side view, shell from Whetstone.
 - b.* Back view, ditto.
 - c.* Front view, adult shell from Potter's Bar.

6. *Voluta cithara*. No. 114, *p.* 176.
 - a.* Back view, adult shell.
 - b.* Back view, (Var. *angulata*).
 - c.* Back view, shell of mid-growth.

