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Mollusca of H.M.S. 'Challenger' Expedition.—Part XII.

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[Read December 15, 1881.]

Fam. Cancellariidæ.	Fam. Columbellidæ.
Volutidæ.	Olividæ.
Fasciolariidæ.	

The Volutes are the most interesting of the 'Challenger' Mollusca. In particular I may mention *Volutilithes abyssicola*, Adams and Reeve, known hitherto only in the form of a single, very young shell, got by the 'Samarang' off the Cape of Good Hope in 132 fathoms. Of this the 'Challenger' got three specimens from the same locality, presenting in their full-grown form features of so much importance as to require a complete revision of the species, especially in its relations to the Miocene forms of the genus.

Even more interesting is the new Volute form of *Provocator* from Kerguelen Island, 105 fms., presenting the apex of an *Ancillaria*, the suture of a *Bullia*, the pillar-plaits of a *Voluta*, and the lip-sinus of a *Pleurotoma*.

The gem of the whole collection, however, is the very remarkable and beautiful *Wyvillea alabastrina*, from 1600 fms., or nearly 10,000 feet, in the Antarctic Sea, which very much exceeds in size any thing yet obtained from the great ocean-depths. The specimen having been secured in life, Professor Huxley has undertaken the minute dissection and description of the animal, which was preserved in spirit.

There are many other forms of interest embraced in this part of my Report which I need not enumerate here. I may add, however, in this place that the exigencies of the official Report and the embarrassments of my own professional work compel me to deal more summarily with the material entrusted to me than I have hitherto thought it right to do. This will explain the omission of many groups which, embracing only very small or badly preserved specimens, require a greater amount of minute study than time allows me now to give. These may possibly be overtaken afterwards, but must be neglected now.

Fam. CANCELLARIIDÆ, *Adams.*

CANCELLARIA, *Lam.*

1. *Cancellaria imbricata*, n. sp.
2. *C.* (*Admete*) *specularis*, n. sp.
3. *Cancellaria* (*Admete*) *carinata*, n. sp.

1. CANCELLARIA IMBRICATA, n. sp.

St. 142. Dec. 18, 1873. Lat. 35° 4′ S., long. 18° 37′ E. Off Cape of Good Hope. 150 fms. Sand. Bottom temperature 47°.

Shell.—Oval, with a smallish, high, subscalar, blunt spire, a semicircular mouth, and a rough spirally striated surface; yellowish white. *Sculpture.* Longitudinals—on the upper whorls there are some slight rather distant ribs, which pass over on the later whorls into rough imbricated adpressed laminæ covering the whole surface. Spirals—there are flatly rounded threads parted by intervals of twice their breadth; below the suture 2 are feeble, 4 in the middle are strong, 5 on the base are narrow and sparse, and 5 to 6 on the snout are slight and close: besides these, there are minute spirals and lines of growth which reticulate crisply the whole surface. *Colour* porcellaneous white beneath a yellowish surface, which is quite stripped of epidermis. *Spire* high, rather small, conical, subscalar. *Apex* blunt and globose, consisting of $1\frac{3}{4}$ rounded embryonic whorls, of which the extreme tip is very much depressed on one side. *Whorls* 5 in all, well rounded, the earlier small and of slow increase, the last large, with a short base and a small snout. *Suture* impressed. *Mouth* rather large, semicircular. *Outer lip* regularly rounded and open, strongly seamed within by the spirals of the surface. *Inner lip*: a very thin glaze spreads broadly over the body, but narrows and thickens on the small hollowed and twisted pillar, leaving a very minute chink in front; there are below the middle of the pillar two strongish, very oblique white teeth; and the twisted edge of the pillar is prominent and sharp. H. 0·8. B. 0·5. Penultimate whorl, height 0·16. Mouth, height 0·46, breadth 0·3.

The specimen of this species is perhaps not quite full-grown. The whole aspect of the shell suggests an *Admete*; but the teeth on the pillar are stronger than is usual in that group. It is much shorter in the spire, broader in the whorls, and more delicately sculptured than *C. turrita*, Sow.

2. CANCELLARIA (ADMETE) SPECULARIS, n. sp.

St. 149 b. Jan. 17, 1874. Lat. 49° 28′ S., long. 70° 30′ E. Near entrance of Royal Sound, Kerguelen. 30 fms. Mud.

St. 151. Feb. 7, 1874. Lat. 52° 59′ 30″ S., long. 73° 83′ 30″ E. Off Heard Island. 75 fms. Mud.

Shell.—Small, ovate, striated, with a shortish, scalar, blunt-tipped apex, a rounded base, very small snout, and semicircular mouth. *Sculpture.* Longitudinals—there are strongish numerous hair-like lines of growth. Spirals—below the suture is a shoulder marked by an angulation carrying a thread; the shoulder is indistinctly scored with spiral threads: from the angulation to the snout there are several well-marked threads parted by shallow broader furrows; toward the point of the snout is a twisted scar. The whole surface is scored by fine, almost microscopic lines. *Colour* porcellaneous white under the thin dirtyish yellow epidermis. *Spire* rather short and broad, conical, scalar. *Apex* blunt, round, a little bent in at the tip. *Whorls* 5½, rounded, slightly angulated near the top, with a slight shoulder above the angle, of rather regular increase; the last has a somewhat produced base and a very small snout. *Suture* impressed. *Mouth* rather large, semicircular. *Outer lip* regularly rounded and open; seamed within by the spirals of the surface. *Inner lip* well defined, narrow, having a talc-like iridescence*, very straight on the pillar, on the front of which the glaze turns sharply over to the inner side, and leaves there a very slight chink in front: at the point of the pillar the edge is twisted and is bluntly prominent, and above this are one or two faint folds. H. 0·45. B. 0·27. Penultimate whorl, height 0·1. Mouth, height 0·22, breadth 0·16.

In form this species resembles *A. viridula*, Fabr., = *Couthouyi*, Jay, of the British Museum; but that species has not the talc-like inner lip, is not so well shouldered, nor is the shoulder defined by a spiral thread, and the spirals in general are much stronger; the body-whorl is larger, more tumid, and more contracted on the base. Dr. Kobelt very kindly copied out and sent me the diagnoses of two species of *Cancellaria* from the Straits of Magellan, with which he thought I might wish to compare this of the 'Challenger.' These are *C.* (*Admete*) *australis*, Philippi, and *C.* (*A.*) *Schythei*, Phil. I have not, I think, seen either of these; but they both seem to be very much more strongly ribbed and spiralled than the present or following species. One of the specimens from Kerguelen contains the animal; but I failed to extract it, and only ascertained that there was no operculum.

* From this feature I have derived the name of the species.

In this specimen the folds on the pillar-lip are more distinct than on the Heard-Island specimen.

There is an *Admete* from St. 149 c, Kerguelen, Royal Sound, 60 fms., which is too much broken for identification, but which is probably this species.

3. CANCELLARIA (ADMETE) CARINATA, n. sp.

St. 149 d. Jan. 20, 1874. Lat. 49° 28′ S., long. 70° 13′ E. Royal Sound, Kerguelen. 28 fms. Mud.

Shell.—Broadly ovate, carinate, spiralled, with a very short, blunt, scalar spire. *Sculpture.* Longitudinals—there are only fine, sharp, unequal puckerings on the lines of growth. Spirals—a sharp flanged keel lies about the middle of the whorls; above this is the horizontal, slightly concave shoulder, on which are no spirals; below the keel the whole surface is scored with fine prominent rounded unequal threads, parted by broader intervals; those on the snout are feeble. *Colour* white. *Spire* very short and depressed, but rising in broad shallow steps. *Apex* small, raised. *Whorls* 5, flattened or even slightly concave above, strongly keeled and angulated in the middle, of regular increase; the last is very large and ventricose, with an elongated but convex base and a very small snout. *Suture* impressed, very horizontal. *Mouth* fully half the size of the shell, oval, angulated at the keel and at the base of the pillar. *Outer lip* rounded and open, advancing a little in front of the point of the pillar. *Inner lip* thinly spread on the body, with a small chink in front behind the pillar, the edge of which is narrow and twisted, with two indistinct folds above it. H. 0·4. B. 0·28. Penultimate whorl, height 0·07. Mouth, height 0·3, breadth 0·17.

I failed to extract the animal from the shell; but plainly it had no operculum. The extreme bluntness and tabulation of the spire give a very peculiar aspect to this species.

Fam. VOLUTIDÆ, *Gray.*

Gen. VOLUTILITHES, *Swains.*

VOLUTILITHES ABYSSICOLA, *Ad. & Reeve.*

Adams & Reeve, Zool. Samarang, Moll. p. 25, pl. vii. fig. 6 (*Voluta*); Adams, Genera, I. p. 167, II. p. 618, III. pl. xvii. fig. 8; Chenu, Man. f. 980; Reeve, C. I. 1849, pl. xxii. fig. 58; Fischer, Journ. de Conch. 1871, p. 305; v. Martens, Jahrbücher d. malak. Gesell. 1874, p. 140; Kobelt, Jahr. d. malak. Gesell. 1877, p. 312.

St. 141. Dec. 17, 1873. Lat. 34° 41′ S., long. 18° 36′ E. 25 miles S.S.E. from Cape of Good Hope. 98 fms. Sand and gravel. Bottom temperature 49°·5 F.

St. 142. Dec. 18, 1873. Lat. 35° 4′ S., long. 18° 37′ E. 45 miles S.S.E. from Cape of Good Hope. 150 fms. Sand. Bottom temperature 47° F.

Shell.—Fusiform, thin, with a rather high subscalar spire, a small rounded apex, a very long base, a slightly thickened, reverted, and toothed outer lip, a long narrowish mouth, a twisted many-toothed pillar, and an expanded inner lip. *Sculpture.* Longitudinals—there are on the last whorl about 70 riblets or flatly rounded threads following the lines of growth, which last roughly and closely score the whole surface. Spirals—there are from 30 to 40 rather higher and broader threads covering the whole surface; those below the suture are slightly stronger than the others; the first in particular is so, and is followed by a deeper furrow; all these in crossing the longitudinals tend to rise into small tubercles: below the suture is a very small flattened shoulder with an outward droop; this on the upper whorls is slightly excavated. The whole surface is fretted with fine microscopic scratches. *Colour* pale ashy brown, glossy. *Spire* subscalar, high, its height being to its breadth in the proportion of 13 to 6. *Apex* small, eroded. *Whorls* 8, flatly convex, very slightly shouldered below the suture. *Suture* very oblique and strongly marked. *Mouth* very small for the genus, long and narrow, with a small open canal in front. *Outer lip* very slightly sinuated and ascending above, narrowly reversed, and a little thickened, with many close-set, equal, short, narrow teeth; at the point it is very slightly sinuated and patulous, but not reversed. *Inner lip* spreads in a broad thin glaze across the body; it is slightly oblique, hardly concave, a little twisted and bent back in front, with (about the middle) 8 to 10 larger or smaller teeth somewhat irregularly distributed. H. 3·8. B. 1·5. Penultimate whorl, height 0·6. Mouth, height 2·6, breadth 0·75.

This interesting species has hitherto been known only in the solitary type specimen obtained by Sir E. Belcher in H.M.S. 'Samarang,' 1843, off the Cape at a depth of 132 fms., and described by A. Adams and L. Reeve in the Mollusca of the Expedition. That specimen being a very young shell, a redescription from the specimens of the 'Challenger' was necessary. Of these there are three—one, the largest, described above; the second

with $6\frac{3}{4}$ whorls, but with a fully developed outer lip, itself an aftergrowth on an earlier lip-edge still existing within the mouth; the third has 6 whorls, but has the sharp thin edge and undeveloped pillar-teeth of the 'Samarang' specimen. The later development of the shell greatly detracts from the "sharply defined pattern of lattice-work," the sculpture becoming much less crisp, the elongation and contraction of the body-whorl diminishes the relative breadth, the increasing obliquity of the whorls elevates the spire, and the subsutural canal ceases to be excavated and becomes merely a small oblique shelf. All these changes modify considerably the relations of this Volute to the Eocene species referred to by Adams and Reeve, and also by Mr. Edwards in his 'Eocene Mollusca' (Palæont. Soc.), pp. 146, 155, and in particular to *V. crenulata*, Lam. (see Edwards, p. 154, pl. xx. f. i.); but while diminishing some features of distinction dwelt on by these authors, they so strongly develop others, that the difference between the living and the fossil species stands out more strongly than ever. The size and form are, indeed, so utterly dissimilar, as at once to constitute a marked distinction. At the same time, the species does interestingly represent the older forms, in shape and sculpture recalling *V. digitalina*, Lam., *V. crenulata*, Lam., and *V. elevata*, Sow., perhaps in particular; the thickening and toothing of the outer lip resembles exactly that of *V. luctatrix*, Solander, and *V. ambigua*, Sol., while the toothing of the pillar is like that of *V. nodosa*, Sow. Of course whatever generic value "*Volutilithes*" of Swainson may have, Adams's definition of the genus as having a "columella with numerous faint rudimentary or obsolete plaits; outer lip thin, simple," must be modified. It never suited more than one or two of the fossil species, perhaps not even these; it proves inaccurate for the one living representative of the group except in its immature state.

Provocator, n. gen.

Shell smooth, fusiform; having the apex of *Ancillaria*, the enamelled suture of *Bullia*, the pillar-folds of *Voluta*, and the sinus of *Pleurotoma*.

I believe this very curious form to be essentially a Volute, in which genus the group of *Cymbium*, and forms like *V. scapha*, Gmel., *V. imperialis*, Lam., and many others present the sutural sinus, while *Zidona* has the enamelled spire. The name of *Challen-*

geria being preoccupied, I have been obliged to reproduce it as I could in Latin.

PROVOCATOR PULCHER, n. sp.

St. 149 j. Jan. 29, 1874. Lat. 48° 43′ S., long. 69° 15′ E. West Christmas Harbour, Kerguelen. 105 fms. Mud.

St. 150. Feb. 2, 1874. Lat. 52° 4′ S., long. 71° 22′ E. Between Kerguelen and Heard Island. 150 fms. Rock. Bottom temperature 35°·2 F.

Shell.—Smooth, fusiform, rather thin, with a high, sharp, slightly enamelled apex, a contracted and elongated base, a straight two-toothed pillar, a large mouth, a prominent angulated and patulous outer lip, and a strongly marked sinus at the enamelled suture. *Sculpture.* Longitudinals—the smooth surface is scored with fine hair-like flexuous lines of growth. Spirals—there are some lines in the substance of the shell which are best recognized without a lens: there are also some irregular white lines connected with some slight thickening of the glaze; below the scar of the sutural sinus is an obsolete angulation. Besides all this, the surface of the enamel of the shell is obsoletely tubercled obliquely. *Colour* rich buff, thinly overlaid with a whitish glaze; this for some distance below the suture is covered with a dullish buff enamel. *Spire* high, conical, subscalar. *Apex* small and sharp, being originally mamillated, but subsequently eroded and enamelled. *Whorls* 7 to 8, at the top very slightly shouldered and angulated, then flatly convex. *Suture* oblique, completely buried in a thick coat of glaze which fills the sutural angle, and which embraces the whole apex. *Mouth* large, pear-shaped, with a shallow, broad, obliquely truncated canal in front. *Outer lip* thin and rounded on the edge; it is cut off from the body by a strongly marked sinus, below which it advances prominently into a rounded angle, retreating slightly, but steadily, from this point throughout its whole course; it is straight and slightly contracted above, roundly angulated and patulous below the middle, straight and patulous and cut off backwards from this point to the edge of the canal. *Inner lip* scarcely convex above, little concave in the middle, direct with a very slight twist and no swelling below; near the edge are two narrow, slight, white, very oblique teeth, of which the upper is sometimes absent: the narrow sharp lamina of the pillar-edge in front is the extreme point of the shell. H. 3·6. B. 1·8. Penultimate whorl, height 0·8. Mouth, height 2, breadth 0·95.

This is an extremely peculiar form of great beauty. It is higher and narrower than the measurements would suggest, the outthrow of the outer lip being great, but of short continuance. It has a strong general resemblance to *Ancillaria glabrata*, L., or *A. Vernedei*, Sow., or other smaller species of that form, of which it simulates the subperipheral band. In *Voluta pallida*, Gray, some of the peculiar features of this species—such as the sutural sinus, the enamelled spire, and the outthrow of the outer lip at its lower corner—are found, though in a much feebler form.

The swelling on the pillar which is characteristic of the Volutes, and is really the scar of the old columellar sinus, is in this species quite absent in front, but is just recognizable on the back of the shell in the flexure of the lines of growth.

CYMBIOLA, *Swains.*

CYMBIOLA LUTEA, n. sp.

St. 166. June 23, 1874. Lat. 38° 52′ S., long. 169° 20′ E. About 200 miles west of Cape Farewell, New Zealand. 275 fms. *Globigerina*-ooze. Bottom temperature 50°·8.

Shell. Fusiform, strongish, pale buff, with a high blunt spire, largish mouth, slightly reverted outer lip, and four teeth on the pillar. *Sculpture.* Longitudinals—On the upper whorls there are a few slight narrow ribs, which are almost obsolete on the later whorls; the lines of growth are many and hair-like. Spirals quite obsolete. The columellar swelling in front is very small and slight. *Colour* ashy white over pale buff, entirely without gloss; the outer lip and the body-glaze are rich buff, paler inwards. *Spire* high, a little irregularly bent, subscalar. *Apex* blunt, mamillary, impressed. *Whorls* $6\frac{3}{4}$: they are convex, above contracted into the suture, perpendicular below; after the first three they increase rapidly; the last is slightly ventricose, long, attenuated in front. *Suture* oblique, slightly impressed, irregular. *Mouth* long, but not wide, oblique, with its two sides nearly parallel, bluntly pointed above, ending below in a broad, shallow, slightly emarginated, minutely bordered canal. *Outer lip* patulous, thin, but expanded and rounded on the edge; it rises on the penultimate whorl at its junction, and is here drawn back into a slight sinus with a very reverted edge. *Inner lip* spreads widely as a thin glaze on the body; above it is scarcely convex, hardly concave in the middle, perpendicular below, where are four, not strong, equal, concealed, pale-coloured, very oblique teeth;

obliquely cut off, twisted and rounded in front into a prominent thin point. H. 2·75. B. 1·25. Penultimate whorl, height 0·53. Mouth, height 1·73, breadth 0·6.

This species is suggestive of many others, and may be compared with *Voluta rupestris*, Gm., *V. pacifica*, Sol., *V. lyriformis*, Vigors, and *V. fulminata*, Lam.; but resembles most *V. megaspira*, Sow., having the same long thickened lip and form of body-whorl, but in that species the spire is higher and is fine.

Wyvillea, n. gen.

Animal a typical *Volute*.

Shell ovate, cymbiform, thin, rough; spire high scalar; apex mamillate and irregular; suture canaliculate; mouth large, ovate; inner lip with a widespread thinnish callus; pillar perpendicular, with a very slight turn; it has no teeth, but an abrupt break of the edge about the middle of its length.

This genus differs from *Cymbiola* of Swainson (the description of which by Adams I have nearly followed) notably in the texture of the shell, which is extremely delicate but rough on the surface, in the suture, which is canaliculate, and in the straight pillar, which is without teeth, but has an abrupt break on the edge. In all the Volutes the last tooth consists of a lamina attached to, or consisting of, the edge of the pillar, the twist on which throws this lamina out as an oblique fold whose abrupt slope looks up the pillar. In *Wyvillea*, on the other hand, the lamina has scarcely a turn at all, and only presents a tooth in consequence of being suddenly arrested and diminished in size; from this results a tooth whose abrupt slope looks down the pillar.

In connexion with this genus it may be well to recall the *Halia* of Risso, which has some vague features of superficial resemblance; but in that genus the columellar tooth, which is almost terminal, results from the extreme and sudden twisting of the pillar.

I have not given a detailed description of the animal, as Prof. Huxley has undertaken the dissection and full representation of it in all its parts.

Wyvillea alabastrina, n. sp.

St. 147. Dec. 30, 1873. Lat. 46° 16′ S., long. 48° 27′ E. Off Marion Island and the Crozets. Bottom temperature 34°·2. *Globigerina*-ooze. 1600 fms.

Animal has an enormous bifid foot, square in front, pointed

and high behind; compared to this part the head, mantle, and body are small; the snout is largish and subcylindrical, above it the great velum extends widely, and is collected into a subconical protuberance at the corners, from which rise the rounded conical tentacles; no trace of eyes exists. Above the head is the mantle, expanded on the left into the rather short, stumpy, and proboscis-like siphon, which is open below. The reproductive organs, possibly to some extent everted at death, appear like a large tumour on the neck, a considerable way behind the right tentacle. The skin is not tubercled. There is no operculum.

Shell.—Large, high, thin, white, alabaster-like in texture, with an oval body, a smallish high scalar spire, ending in an irregular, blunt but pointed, twisted apex; it has a large oval mouth, a narrow, patulous, not reverted, outer lip, a broad, shallow, truncated canal in front, a broadly spread inner lip, and a straight, toothless, but interrupted pillar. *Sculpture.* The whole surface is minutely granulated, and has the appearance of having been dipped in thin, rather sandy whitewash, and then roughly wiped, especially round the suture. Longitudinals—there are rounded irregular lines of growth, which are generally slight, but all round the mouth-edge a few become somewhat strong. Spirals—there are a few unequal and irregular, broad, scarcely raised threads; near the suture are a few irregular, sharper, quite superficial lines like the marks of rough wiping. *Colour* alabaster-white, with a roughened, dead, eroded surface. *Spire* high, rather small, scalar. *Apex* is blunt, but projects sharply to one side in an excentric and irregular manner. *Whorls* $5\frac{1}{4}$, of rapid increase, droopingly shouldered above, then convex, perpendicular below, with a slight tendency to contraction above the suture; the last especially is ventricose and oval, with very regular curves. *Suture* very oblique, deeply impressed, and a little canaliculate. *Mouth* oval, straight, rounded above, and not at all sinuated; it ends below in a broad, open, shallow, scarcely emarginated canal. *Outer lip* very regularly curved, with a narrow straight edge, which is prominent and patulous, but not in the least reverted; it does not rise at all on the body-whorl. *Inner lip* spreads on the body very widely, but somewhat thinly, as a straw-coloured glaze; above it is very oblique, but scarcely convex; it forms an angle at its junction with the pillar, which is perpendicular and scarcely twisted; the rounded edge is formed by a narrowish thickened white callus, which about halfway down is suddenly contracted and

slightly turned round so as to form a kind of tooth or projecting corner, below which the whole edge is smaller. H. 6·6. B. 3·15. Penultimate whorl, height 1·3. Mouth, height 4·1, breadth 2.

Bowdich's figure ('Conchology,' pt. 1. p. 68, pl. xviii. f. 2) of *Voluta* (*Cymbium*) *æthiopica*, Linn., is the best representation I know of the animal of *Voluta*, and might almost be taken to represent the 'Challenger' species. It is copied by Gray in Moll. Anim. I. xxvii. 4. Of all the mollusks got by the Expedition, this is certainly the most valuable. It is large; the shell is singularly beautiful in form and colour; it comes from a great depth and an unknown sea; and its generic features are very peculiar. It is unfortunate that it is somewhat broken. In the act of its capture, or in the extraction of the animal, the shell must have been slightly crushed, and the fragments lost. To me it came most carefully packed in cotton-wadding; but one or two small pieces of shell were found loose in the box, and these I could replace. Under my care, however, in spite of the most extreme solicitude, it met with sore disaster, probably in landing from the continent, when the sailors handle luggage more roughly than even at Suez in days of old. The breaking was so bad that the shell looked like a wreck; the bits, however, were got into their places and fixed with cement, and some professional restorer may finish the work more delicately than I could do it. In any case this unique treasure is not lost.

Volutomitra, *Gray*.

Volutomitra fragillima, n. sp.

St. 149 d. Jan. 20, 1874. Lat. 49° 28′ S., long. 70° 13 E. Royal Sound, Kerguelen. 28 fms. Mud.

Shell.—Ovate-ventricose, thin, smooth, with a short spire, a long base, a large oblong mouth, and 4 teeth on the pillar. *Sculpture.* Longitudinals—there are many fine hair-like lines of growth. Spirals—there are very many broadish, but obsolete, rounded threads; the front of the snout is obliquely crossed by about 15 stronger and more regular threads. *Colour* subpellucid white under a very thin yellowish smooth epidermis. *Spire* short and broad. *Apex* bluntly mamillate, not elevated, but rising a little on one side. *Whorls* nearly 6, convex, rounded above, sloping below. *Suture* a little impressed and strongly marked. *Mouth* oblong, somewhat oblique, rather large, pointed above, prolonged into a longish, open, truncated, but not emarginated canal. *Outer*

lip thin, sharp, regularly curved, quite straight above, where it is slightly and widely hollowed back on the edge, prominent and patulous below, a little pinched in at the canal. *Inner lip* scarcely convex above, and very little concave at the base of the pillar, which is somewhat oblique and direct; there are four oblique, rather strong teeth, of which the two in the middle are the strongest; a very thin, narrow, definite-edged glaze extends down the edge of the mouth. H. 0·57. B. 0·3. Penultimate whorl, height 0·1. Mouth, height 0·39, breadth 0·12.

Without the animal it is, of course, not easy to distinguish between this form and *Admete*, but the apex is larger and the pillar-teeth stronger than they are in that genus. The generic features are well marked in this species, which, however, resembles no other known to me.

Fam. Fasciolariidæ, *Adams.*

Fasciolaria, *Lam.*

1. *F. rutila*, n. sp. | 2. *F. maderensis*, n. sp.

Fasciolaria rutila, n. sp.

St. 142. Dec. 18, 1873. Lat. 35° 4′ S., long. 18° 37′ E. Off the Cape of Good Hope. 150 fms. Sand. Bottom temperature 47° F.

Shell.—Long, narrow, fusiform, not ribbed, finely spiralled, with a high, narrow spire of rounded whorls, a blunt mamillary apex, a contracted rounded base, prolonged into a long, lop-sided, slightly reversed snout. *Sculpture.* Longitudinals—there are none but small, rude lines of growth. Spirals—there are very many small, rounded, pretty equal threads parted by shallow rounded furrows of about their own breadth; on the snout these threads are feebler, sharper, and more remote. *Colour* white under a thin, brown, smooth, persistent epidermis; the inside of the mouth is tinged with buff, which is deeper on the inner lip than elsewhere. *Spire* very high, narrow, conical, but a little bent. *Apex* consists of 1 to 2, large, mamillary, but cylindrical whorls. *Whorls* 8 in all, high, narrow, of rapid increase, convex, rounded, contracted below as well as above, where they slightly lap up on the preceding whorl; the last whorl is larger than all the rest, is slightly tumid, rounded on the base, which is contracted, especially on the left, and is produced into a very long, narrow, lop-sided bent, and slightly reversed snout. *Suture* deep, but very open.

Mouth oval, direct, pointed above, prolonged into a long, oblique, narrow, open, twisted canal, which is a good deal reverted in front. *Outer lip* narrow, blunt, very finely crenulated on the edge; it is very regularly arched, and not at all patulous till it approaches the canal, where it is increasingly patulous to the point; in this part of its course its curve is concave. *Inner lip*—there is a diffuse white callus above; its whole curve is concave to the edge of the canal, where it is obliquely truncate, sharp, and twisted; its edge in front is extremely narrow and sharp; there are two slight, oblique, white teeth close to the pillar-edge. *Operculum* oval, with a pointed, almost claw-like apex; it is thinnish, horny, sharp-edged, strongly marked with lines of growth on its outer face, and having on its inner face a broad, flat, glossy swelling along its outer margin. H. 4 in. B. 1·44. Penultimate whorl, height 0·7. Mouth, height 2·2, breadth 0·78.

This is an exceptional form, having the apex of a *Fusus* (a feature shared by *Fas. coronata*, Lam.), and having a long, thin, bent canal and no longitudinal ribs or tubercles,—features which, though present in some species (as, for instance, *Fas. tulipa*, L., and *F. papillosa*, Sow.), are uncommon, especially united. It is also peculiar from the slimness of its form and the thinness of its shell. It is not a *Turbinella*, for its pillar-teeth are only two, are slight and very oblique; the operculum, too, is small and thin. No Volute has so high a spire, so small a mouth, so long and narrow a canal, nor an operculum of the form which this presents (see Journ. de Conch. 1877, p. 97).

Fasciolaria maderensis, n. sp.

St. VII. p. Feb. 10, 1873. Lat. 28° 35′ N., long. 16° 5′ W. Off Teneriffe. 78 fms. Coral.

Shell.—Biconical, fusiform; as the shell lies on its mouth, the periphery in the centre of the back is exactly in the middle of the shell's length; solid, angulated, rough and opaque; ribbed and spirally ridged, with an umbilical chink. Mouth angularly pear-shaped, with a long, narrow, slightly oblique canal; toothed on the pillar and within the outer lip. Epidermis strong and horny. Operculum dark brown and claw-shaped. *Sculpture.* Longitudinals—there are 8 to 10 broad, low, rounded, irregular ribs; they diminish in number up the spire; they scarcely appear above the suture or on the base; the lines of growth are numerous, unequal, sharpish, but rather coarse. Spirals—there are spiral

ridges which, in crossing the ribs, rise into narrow blunt prickles, which are vaulted but scarcely open in front; of these ridges there is one on the upper whorls, three on the body-whorl, each accompanied below by its shadow, which is sometimes double; of these the highest and strongest is remote from the suture, and forms a marked shoulder; on the snout are two strongish threads, and towards its point four or five much smaller ones. The whole surface is covered with feeble microscopic striæ. *Colour* a rich buff below a darker epidermis, which is strong, horny, and persistent. *Spire* high, scalar, conical. *Apex* small and prominent. *Whorls* 9 to 10, angular, with a long, sloping, slightly concave shoulder defined by the prominent and sharp keel, below which the whorls contract a little to the inferior suture; the body-whorl is short, and contracts into a long, conical, straight, narrow snout. *Suture* slight, irregular, impressed, oblique. *Mouth* bluish white, with a narrow dirty yellowish edge; small, deep, oval, angulated above and at the keel, with a long, narrow, deep, slightly oblique canal in front; exclusive of the canal, the mouth is nearly one third of the whole length of the shell. *Outer lip*—sharp and wrinkled on the edge, patulous, with many small, close-set, deep-stretching, ridge-like teeth within; it is straight above, angulated at the keel, convex in the middle, concave as it approaches the canal, along which it is straight. *Inner lip*—a thick patulous glaze with a sharp and prominent edge, behind which is a long narrow umbilical chink; close to the upper angle of the mouth is a long feeble tooth, and in the front of the mouth and deep within are three very slight pillar-folds; the beginning of the canal is defined by a sharp little tubercle, answering to which is the lowest of the outer lip-teeth. *Operculum* thick, horny, dark brown, claw-like, with curved lines of growth; on its inner face are many concentric fine lines, with a broad, thick, rounded, polished, exterior border. H. 1·7. B. 0·95. Penultimate whorl, height 0·3. Mouth, height 1, breadth 0·5.

This species is not at all uncommon in museums under the name of *F.* (or *Turbinella*) *carinifera*, Lam., and is the species figured by Reeve as that of Lamarck, which is from the Pacific, and, though similar, is certainly different. In spite of the absence from the Geneva Museum of Lamarck's own specimens, of which (*teste* his own entry on the margin of his copy of the 'Animaux s. Vert.,' 1st edition, VII. 108, sp. 16, preserved at Geneva) he had three, and in spite of his omitting to mention the strong *basal*

carina of *T. carinifera*, I am persuaded that Lamarck had before him the Pacific species. That species differs from *F. maderensis* in being ruddy inside and outside; it lacks the two little teeth on outer and inner lip at the origin of the canal; the junction of snout and base is much more strangulated; there is a much stronger basal carina; the mouth is more open, the outer lip being much more patulous; the snout is not so regularly attenuated; the longitudinal ribs are more numerous and rise more roundly, not being flattened horizontally and pointed; the shoulder below the suture is less drooping, and the outer lip joins the body at the third, not at the second carinal spiral, thus leaving two, not merely one, spiral threads on the earlier whorls.

F. lignaria, L., a Mediterranean species, is a much narrower form, of stouter build, broader in the snout, and quite differently ribbed and spiralled. I should have liked to compare this Atlantic species with *Turbinella recuvirostra*, Wagner. The differences are obvious enough on the surface; but I do not know the species well enough to judge how far these are constant. I have with much hesitation described this as a new species, thinking so well known a form must have been already published; but, after much inquiry, I have quite failed to identify it. My reason for calling it *maderensis* is that I have long had it from Madeira, and I am not quite sure whether my *Chascax maderensis* is not a very aberrant variety. The enormous umbilicus of that species is certainly very striking; and the total absence of teeth, not only on the outer lip, but even on the pillar, is a further notable feature of difference —a feature so notable that I think my friend Dr. Kobelt, had the shell itself been before him, would hardly have suppressed *Chascax* as a mere *Fasciolaria*. Still, withal, while protesting against hasty judgment, I feel it is possible that *Chascax maderensis* and the present form may ultimately prove to be one species; and in that case it will be an advantage that they have the same specific name.

Fam. COLUMBELLIDÆ, *Ad.*

COLUMBELLA, *Lam.*

1. *C.* (*Pyrene*) *strix*, n. sp. | 2. *C.* (*Pyrene*) *stricta*, n. sp.

COLUMBELLA (PYRENE) STRIX, n. sp. (*Strix*, a chamfre.)

St. 24. March 25, 1873. Lat. 18° 38′ 30″ N., long. 65° 5′ 30″ W. North of Culebra Island, St. Thomas, Danish West Indies. 390 fms. Coral-mud.

St. 122. Sept. 10, 1873. Lat. 9° 5′ S., long. 34° 50′ W. Off Pernambuco. 350 fms. Mud.

Var. SUBACTA. St. 23. March 15, 1873. Lat. 18° 24′ N., long. 63° 28′ W. Sombrero Island, St. Thomas, Danish West Indies. 450 fms. *Globigerina*-ooze.

St. 24. As above.

Shell.—Rather small, short, and dumpy, with a high blunt spire, a small last whorl, a very contracted base, from which projects a small, slightly reverted snout; the whorls are longitudinally chamfred and have a small beaded thread round the top. *Sculpture.* Longitudinals—there are on each whorl about 13, straight, narrow, ridge-like, but low riblets, separated by shallow furrows of two to three times their breadth; these ribs and furrows run pretty continuously down the spire, with a slight sinistral twist; toward the mouth and on the base they become feeble, but are faintly traceable on the snout. The whole surface is finely scored with lines of growth. Spirals—the suture is inferiorly margined by a slight thread, which rises into small beads in crossing the riblets; in the longitudinal furrows a faint tendency to spiral scratches is visible, which on the base arrange themselves into narrow and very superficial furrows with broadish flat threads between; these become strongish and narrower on the base of the snout, but feebler again towards its front. *Colour* glossy porcellaneous white. *Spire* rather high, narrow and conical. *Apex* a small round dome of two glossy embryonic whorls, of which the extreme tip is both immersed and flattened down with scarcely any suture. *Whorls* 8 in all, conical, with straight sides, short and broad; at the top each projects very shortly and horizontally; the last is small, with a rapidly contracted base, from which projects the small slightly reverted snout. *Suture* a very little impressed, but strongly marked by the projection of the whorl below it. *Mouth* small, rather rhomboidal, pointed above, and produced below into a short open squarish canal. *Outer lip* very straight to the corner of the base, from which it is patulous and curved; in the middle one small round tubercle projects; a little way below the suture the edge is drawn back, so as to form a very slight open false sinus. *Inner lip*: there is a thin glaze on the body, the line across which is very straight, as is also the line down the pillar, where the glaze (without teeth) forms a thickish prominent border; this border is early cut off on

the sharp oblique twisted edge of the pillar in front; the pillar is short and straight, with a slightly bent-over point. H. 0·4. B. 0·15. Penultimate whorl, height 0·08. Mouth, height 0·13, breadth 0·07.

The variety *subacta* has less developed and less regular ribs, is a little longer and smaller, and has a very slightly larger apex.

This species is closely connected with the group represented on our coasts by *C. costulata*, Cant., and of which Binney, in his edition of Gould's Moll. of Massachusetts, gives several species. It is, however, very markedly different from all of these.

Columbella (Pyrene) stricta, n. sp.

St. 24. March 25, 1873. Lat. 18° 38′ 30″ N., long. 65° 5′ 30″ W. North of Culebra Island, St. Thomas, Danish West Indies. 390 fms. Coral-mud.

Shell.—Small, short, and dumpy, with a rather high, scalar, blunt spire, a short but broadish last whorl, a very contracted base, and a small slightly reverted snout; the whorls are longitudinally chamfred, have a small keel round the top, and rather broad spiral threads. *Sculpture.* Longitudinals—there are on the last whorl about 12, low ridge-shaped, straight ribs, which are not continuous from whorl to whorl, but increase rapidly in number up the spire; they are parted by furrows about three times their width; the last one, which is remote from the edge of the lip, is varicose; they become obsolete towards the point of the base. Spirals—below the suture are two well-marked furrows interrupted by the ribs and parted by a strongish thread, which forms a keel, and rises on the ribs into little tubercles; below this the whorls are more or less obsoletely scored by broad flat threads; these on the base and pillar are very distinct, though narrow, and are parted by broad, shallow, square-cut furrows. *Colour* smooth, porcellaneous white. *Spire* rather high, scalar, conical. *Apex* a blunt, round, smooth, glossy dome of 1½ embryonic whorls, whose tip is both immersed and flattened down, with a scarcely perceptible suture. *Whorls* 6, cylindrical, scarcely convex, angulated and flatly shouldered at the top; the last is short, slightly tumid, with a rapidly contracted base, from which projects the short, broad, conical, abruptly truncated snout. *Suture* angular and well marked by the projection of the shoulder below it. *Mouth* small, short, but broadish, angulated above, obliquely prolonged below into the square, open, slightly reverted

canal. *Outer lip* contracted and very slightly curved above, very patulous where the bend comes, and below this direct and oblique; it has about 10 small teeth within, of which the highest is remote from the top, and is larger than the others; just at this point is a slight open false sinus. *Inner lip*: there is a thin glaze on the body, the line across which is very straight, as is also the line down the pillar where the glaze forms a projecting border (without teeth), which runs out sharp and narrow to the very point; the point of the pillar is very obliquely cut off with a twist; the pillar itself is short, strong, and conical. H. 0·25. B. 0·13. Penultimate whorl, height 0·05. Mouth, height 0·11, breadth 0·06.

This belongs to the same group as *C.* (*P.*) *strix*.

Fam. Olividæ, *D'Orb.*

Oliva, *Brug.*

1. *O.* (*Olivella*) *amblia*, n. sp.
2. *O.* (*Olivella*) *ephamilla*, n. sp.
3. *O.* (*Olivella*) *vitilia*, n. sp.

1. Oliva (Olivella) amblia, n. sp. (ἀμβλύς, blunt.)

St. 122. Sept. 10, 1873. Lat. 9° 5′ S., long. 34° 50′ W. Off Pernambuco. 350 fms. Mud.

Shell.—Small, oval-oblong, glossy, white, with a short blunt spire, a conical base, and a small oval mouth. *Sculpture.* Longitudinals—lines of growth very faint. Spirals microscopic and obsolete. *Colour* porcellaneous white, more or less transparent. *Spire* short, convexly conical. *Apex* bluntly rounded. *Whorls* $4\frac{1}{2}$, conical, barely convex, with a minute sharp scalar projection below the suture. *Suture* minutely channelled. *Mouth* oval, pointed and channelled above, slightly narrowed below. *Outer lip* sharp and thin, patulous; below, it projects in a blunt point on the right side, between which and the pillar is the broad, open, shallow canal. *Inner lip*: there is a thick, narrow, irregular-edged pad; this in front coils round the pillar, which is bent, twisted, short, truncated, and toothless. H. 0·15. B. 0·11. Penultimate whorl, height 0·06. Mouth, height 0·1, breadth 0·07.

In general size and proportions this a good deal resembles *O. spreta*, Gould; but that is lower in the spire, the peripheral breadth lies higher, the shell is more attenuated in front, the mouth is longer, and the pillar is more defined by a pad crossed at the point by two teeth.

2. Oliva (Olivella) ephamilla, n. sp. (ἐφάμιλλος, a match for another.)

St. 122. Sept. 10, 1873. Lat. 9° 5′ S., long. 34° 50′ W. Off Pernambuco. 350 fms. Mud.

Shell.—Very small, oblong, glossy, white, with a high blunt spire, a conical base, and a long narrow mouth. *Sculpture.* Longitudinals—the lines of growth are barely recognizable. Spirals—there is scarcely a faint appearance of these. *Colour* probably porcellaneous white in the living specimen. *Spire* high, convexly conical, minutely scalar from a very small projection below the suture. *Apex* bluntly rounded. *Whorls* 4½, with a minute projection below the suture, very slightly convex at the sides. *Suture* minutely perpendicularly * channelled. *Mouth* oblong, small, pointed and deeply channelled above, slightly narrowed below. *Outer lip* sharp, prominent, regularly arched from the body to the point of the pillar, not being in the slightest degree emarginate in front. *Inner lip*: there is a thick, irregular-edged pad, which in front scarcely coils round the front of the bent, twisted, short, truncated, and toothless pillar. H. 0·16. B. 0·07. Penultimate whorl, height 0·04. Mouth, height 0·09, breadth 0·03.

The name of this little species is meant to signalize its remarkable resemblance to some of the minute *Achatinas*, such as *Cionella acicula*, Müll., or something between that and *Lovea leacociana* Lowe. Thinking it approached *O. tehuelchana*, d'Orb., I asked Mr. E. A. Smith to compare it with the type of that species preserved in the British Museum. He replies:—"I am sure that your shell is not *O. tehuelchana*, d'Orb. This has the whorls flat at the sides and separated by a sharply defined groove at the sutures; yours has the whorls a little convex in outline and differently canaliculate at the sutures." Than *O. myridiana*, Duclos, this 'Challenger' shell is much larger, is different in colour and texture, and has a much coarser spire and apex.

3. Oliva (Olivella) vitilia, n. sp.

St. 24. Mar. 25, 1874. Lat. 18° 38′ 30″ N., long. 65° 5′ 30″ W. N. of Culebra Island, St. Thomas, Danish W. Indies. 390 fms. Coral-mud.

Shell.—Small, oval, glossy, with a short, blunt, subscalar spire, and in front blunt and rather deeply sinuated. *Sculpture* scarcely

* *I. e.* parallel to the axis, in which sense I would propose to use the word "axially."

any. *Colour* porcellaneous. *Spire* very short, roundedly conical, subscalar from the cylindrical rise of the whorls out of the perpendicularly sunk sutural channel. *Apex* very blunt and rather large, impressed. *Whorls* 5, very short, except the last, which occupies nearly the whole shell, rounded above, cylindrical below in the channel of the *suture*, which is axially impressed. *Mouth* oblong, pointed and channelled above, slightly narrowed below. *Outer lip* thin, scarcely prominent or arched, running out to a blunt point in front to the right, whence it is obliquely truncated backwards to the point of the pillar with a deepish cut. *Inner lip*: there is on the body a very thick prominent and irregular pad of glaze, which curves round the straight point of the pillar and there is 4-plaited, and, with a sharply defined edge, encircles the point of the shell. H. 0·26. B. 0·13. Penultimate whorl, height 0·035. Mouth, height 0·19, breadth 0·07.

The low spire, very blunt apex, and four plaits on the pillar-pad distinguish this species from *O. rosalina*, Duclos, or *O. rufifasciata*, Reeve (which Dr. Kobelt holds as = *O. mutica*, Say), or *O. inconspicua*, C. B. Ad. It is perhaps most like *O. pusilla*, C. B. Ad., which it resembles in lowness of spire and angularity at suture; but the spire is even lower than in that species, and the body-whorl is more tumid.

On some Points in the Morphology of the Test of the Temnopleuridæ. By Prof. P. Martin Duncan, M.B. Lond., F.R.S.

[Read December 15, 1881.]

(Plate VIII.)

Contents:—I. Introductory Remarks on the Subfamily *Temnopleuridæ*. II. Morphology of the Pits of *Salmacis sulcata*, Agass. III. The Sutures of *Salmacis sulcata*. IV. The Morphology of the pits, sutural marginal grooves, and of the sutures of Adult *Temnopleurus toreumaticus*, Agass., and of the Young form. V. The Pits and Sutures of *Salmacis bicolor* and *Amblypneustes ovum*. VI. Remarks on the pits, sutural grooves, and sutures. VII. Classificatory Conclusions.

I. *Introductory Remarks on the* Temnopleuridæ.

Desor, in his 'Synopsis des Echinides Fossiles' (1858), divided his tribe of Latistellate Regular Echini into the Oligopores and Polypores; and he separated the Oligopores—that is to say, the Echini with three pairs of pores to each ambulacral plate—into