

but not very prominent shoulder, and passing from it to the suture diagonally, so as to leave a broad, subtruncated, triangular brown space at the base of both elytra, including the scutellum; this black space extends to before the middle, its hind edge is waved, a large pale testaceous irregular patch is included in it, arising from lateral edge, but not extending to the suture; it is of a pale yellowish silky white, and its well-defined edge makes the contrast with the black background singularly pleasing; behind the middle of each elytron is an oval black patch, not extending to the suture, and at some distance from the tip it has another white silky spot, well-defined; the elytra are somewhat truncated at the tip, the outer point of truncature being slightly apiculated; the hind margins of the abdomen beneath are edged with lighter-coloured pile.

A distinct species of the genus *Cereopsis*, whose name has been changed by Mr. Pascoe to *Cereopsius*, that it may not be confounded with Latham's Cere-billed Goose from New Holland—*Cereopsis*. As Mr. Pascoe has changed the name, I retain his modification, not because I deem it necessary. The strong and long first joints of the antennæ, placed near each other at the base, and separated by a notch, are well-marked; they are of a rich brownish-red colour.

3. FIRST STEPS TOWARDS A MONOGRAPH OF THE CÆCIDÆ, A FAMILY OF ROSTRIFEROUS GASTEROPODA. BY PHILIP P. CARPENTER.

History of the Group.

The remarkable Mollusks here described long escaped observation, from their extreme minuteness. The *Dentalium minutum* of Linn. (ed. 12, no. 1264), described as from the Mediterranean, "testa tam parva, ut genus nisi armatis oculis non conspiciatur," may possibly be the *Brochina glabra*, as supposed by Hanl. (F. & H. Brit. Moll. vol. iii. p. 181), though the same author prefers assigning it to the young of *Ditrupa gadus* in his Ips. Linn. Conch. p. 439. This is also supposed by Milne-Edwards (Lam. An. S. Vert. vol. v. p. 599, no. 21). According to Dr. Fleming, "none of the shells of this genus were known to Linnæus. Mr. Boys discovered the *Cæcum imperforatum*, which was inserted by Mr. Walker in the genus *Dentalium*."

The British species, supposed to be three in number, were described (as *Dentalia*) by Montague, 1803, and by other writers on native shells; but Dr. Fleming was the first to point out their generic peculiarities. In the Edinburgh Encyclopædia, 1817, article "Conchology," he characterized *Cæcum* as "Shell tubular, cylindrical, subarcuated, undivided, and closed at the apex." This he placed between *Dentalium* and *Serpula*, as the 5th genus of his Order I. Univalves, Division I. Unilocula, citing three species, *C. imperforatum*, *trachea* and *glabrum*. In his 'Philosophy of Zoology,' 1822, he altered the

generic name to *Cæcalium*, which was adopted by Macgillivray in his Mollusca of Aberdeen.

Capt. Brown, in his Ill. Rec. Conch. Gr. Br., 1827, although writing from Edinburgh, took no notice of his predecessor's labours, except to cite his figures, and proposed two genera—one, *Brochus*, for the adult; the other, *Cornuoides*, for the early state of the same species. These are placed among Annelides as the third and fourth genera of the family *Maldaniæ*, characterized as having the "branchiæ of the animal intermediate; tube open at both ends." The very loose descriptions and inaccurate figures of this work render the identification of species extremely difficult; nevertheless, as in this British work is the first publication of foreign *Cæca*, it is necessary to analyse its contents. Aided by specimens of the supposed British shells in the collection of Mr. Alder, and by a tolerably comprehensive series of known West Indian specimens, the following is offered as a fair elimination of Brown's forms:—

Genus *Brochus*.

Species 1. *trachiformis*, Brown, = *Dentalium trachea*, Mont. British.

Species 2. *striatus*, Brown, (described as destitute of a knob, but figured with one), = *Dent. imperforatum*, Mont. = *trachea*, var. British.

Species 3. *reticulatus*, Brown, = *annulatus*, adolescent. West Indian.

Species 4. *annulatus*, Brown. A good species, but West Indian.

Species 5. *glabrus*, Brown, = *Dent. glabrum*, Mont. British.

Species 6. *lævis*, Brown, (erroneously quoted as the *Dent. imperforatum* of Walk. and Mont.), ? = *Dent. glabrum*, var. British.

Species 7. *arcuatus*, Brown, = *Dent. glabrum*, Mont., adolescent: v. infra. British.

Genus *Cornuoides*.

Species 1. *major*, Brown, ? = *Cæcum trachea*, jun. British.

Species 2. *minor*, Brown, = *Brochina glabra*, jun. British.

There is no evidence that the author had himself seen the shells he described from Walker's figures as *Cornuoides*. The same errors are repeated in the second edition (which is that cited in the following pages), bearing date 1844.

In 1828, Fleming in his Hist. Brit. An. p. 237, places his *Cæca* (postea *Cæcalia*) along with Foraminifera in the genus *Orthocera*, under Mollusca Cephalopoda,—a proceeding which Philippi characterizes as "horribile dictu;" but, without breaking up the tube, it was not worse to regard the plug with its knob as a chamber and siphuncle, than to disregard the plug altogether and treat the shell as a *Dentalium*. The same species are again cited, but not the same shells, the *Orthocera trachea* being the *Brochus annulatus* of Brown.

In 1834 (according to Bronn, 'Lethæa,' p. 985) Zborzewski de-

scribed the *Cæcum trachea* under the name *Odontina*, in the *Mém. Soc. Nat. Moscou*, vol. iii. p. 310, pl. 27. f. 5. This rare work had not been seen by Philippi; nor have I been able to meet with a copy containing the above citation.

In the celebrated *Moll. Sic. Utr.* vol. i. p. 102, 1836, Philippi redescribes the *Cæcum trachea* as *Odontidium rugulosum*, and assigns his new genus a place among the Pteropods. This place is retained in vol. ii. p. 73, where he cites the English synonyms, and quotes Cantraine, who had previously figured the shell as a *Creseis*.

In 1842, Mr. Searles Wood catalogued four fossil species from the Coralline Crag, in the *Ann. and Mag. Nat. Hist.*, for the first time directing attention to the shape of the plug as a guide in specific determination. In the *Monogr. Crag Moll.* (vol. i. of the important works published by the Palæontological Society), 1848, the species are further illustrated and figured, being arranged between *Vermetus* and *Litorina*. The types were presented to the British Museum, but without names.

Previously to the publication of Philippi's views, W. Clark, Esq., in 1834, had discovered the animal of *Cæcum trachea*, and ascertained its true relationships. It was not, however, till 1847 that he published his observations in the *Ann. Nat. Hist.* ser. 2. vol. iv. p. 180. In his *Moll. Test. Mar. Brit.*, 1855, pp. 322-331, he minutely describes the animals of the two British species, resigning his MS. designation of *Dentaliopsis*, and inserting Fleming's genus, with *Turritella*, in the family *Vermetidæ* *.

In 1851, the British species were carefully described and the animal of *C. trachea* figured in Forbes & Hanl. *Brit. Moll.* vol. iii. pp. 176-183. Prof. Forbes placed the genus in *Turritellidæ*, and confirmed many of the observations of Mr. Clark. Mr. Hanley experienced difficulty in assigning Brown's species, saying that "the genus *Cæcum* has not been studied with that due attention to its foreign members which alone entitles us to pronounce upon what are the permanent characters by which its species are determinable." This want it is the object of the present paper to aid in supplying.

In the same year (Oct. 15th, 1851), Mr. Stimpson presented a Monograph of the species found in the United States, to the Bost. Nat. Hist. Soc. It is published in their 'Proceedings,' and contains descriptions of the shells of two species from Florida, and one from New England. In his 'Shells of New England' is given a figure of *C. pulchellum*, and an account of its animal (p. 36), agreeing in the main with Clark's observations on *C. trachea*.

In 1852, the late lamented Prof. C. B. Adams published his Monograph of the Shells of Panama in the 'Annals of the Lyceum of Nat. Hist. New York.' At pp. 160-163, 310, 311, eight supposed

* I have to record my greatest obligations to Mr. Clark for the kindness with which he has supplied me with the records of his laborious researches, and favoured me with perfectly fresh British specimens. A few of his observations (as, e. g., that ?*Skenea rota* = *Cæcum trachea*, jun.; that the young *Cæca* are fixed; that the operculum of *Brochina glabra* is analogous to that of *Siliquaria*) have not been confirmed.

species are described and arranged in the family *Litorinidæ*, between *Turritella* and *Chemnitzia*. According to the mode of diagnosis here adopted, five of these species are resolvable into one. The types are in the Amherst College Museum; but duplicate types of six were sent by the author to Mr. Cuming, and have supplied what was wanting in the descriptions. Prof. Adams recorded that he had found several species at Jamaica; but he did not describe them.

In Woodward's valuable 'Manual of Mollusca,' 1851, p. 133, the then accessible knowledge was condensed, and the genus placed in *Turritellidæ*, between *Aclis* and *Vermetus*.

In Dr. Gray's "List of Genera," P. Z. S. 1847, p. 203, no. 775, "*? Cæcum*" appears with its synonymy in Family *Cleodoridæ* (*Pteropoda**). In the 'Fig. Moll. An.' p. 85, the group first appears as a family, between *Scalariadæ* and *Truncatellidæ*. In the 'Guide Syst. Distr. Moll.' 1857, part i. pp. 100, 101, the family is placed between *Rissoidæ* and *Melaniadæ*, and the genus *Brochina* is instituted.

In Messrs. H. and A. Adams's 'Genera of Recent Mollusca,' now publishing, vol. i. p. 355, the family *Cæcidæ* is placed between *Turritellidæ* and *Vermetidæ*. In Philippi's 'Handb. Conch. & Mal.' p. 197, the *Cæcacea* appear as a family between *Vermetacea* and *Siphonariacea*.

The naturalists of France do not appear to have been acquainted with these shells till of late years; neither in the works of Lamarck, Cuvier, Sander Rang, D'Orbigny, nor Deshayes, is there to be found any notice of their existence. This is the more remarkable, as D'Orbigny paid no little attention to the minute shells of the West Indies and South America. It is true that Chénu has copied Brown's figures of *Cornuoides major* and *Brochus "træchiformis"* in his 'Illustr. Conch.'; but it is hardly possible to recognize even the genus in them.

In the 'B.M. Cat. Maz. Moll.' pp. 312-329, were described, in August and September 1856, eighteen species of *Cæcum*, grouped under three heads according to sculpture, viz. *Elephantulum*, *Anellum*, and *Fartulum*. At the same time I prepared descriptions of the remaining foreign species. The whole have now been subjected to a rigid examination, after the study of about 1000 additional specimens, principally from Mazatlan, the West Indies, and Teneriffe. The best series of types of all the species at my disposal I have presented to the British Museum. These will aid future students in correcting the errors into which I have doubtless fallen, not from want of patient care, but of materials and judgment. Other series of types are prepared for public museums in America and on the Continent.

Station and Geographical Distribution.

The established European species are only two in number—*Cæcum trachea* and *Brochina glabra*; but these have been found from Scotland to the Mediterranean. The living specimens have been taken

* See 'B.M. Cat. Pteropoda,' p. 3, no. 7, where the error is corrected.

in the Coralline zone ; but their favourite haunts have not been made known. Of these, the *C. trachea* is recorded as fossil in the Sub-appenine beds.

On reaching the Canaries, we lose the European species ; but at the great depth of 50 fathoms Mr. M'Andrew dredged many hundreds belonging to five species or varieties of the *Anellum* and *Fartulum* groups. They were all pure white and very fresh ; but most were pierced by Proboscififers, and not one was found with its operculum. It is doubtful, therefore, whether the gravel-sand was their place of residence. No species has yet been found either on the Guinea Coast, at the Cape, or at Port Natal.

The tropical regions of America appear to be the head-quarters of the group, both for the number of species and of individuals. The only species which has been found living adheres to groups of *Vermeti* in the Laminarian zone. But the coarse sponge of commerce, known to be from the West Indian region by the shells which are found abundantly in it, as well as from the same *Cæca* being obtained in shell-sand from the Antilles, has supplied the principal part of the Atlantic species. Although most of the shells are dead, enough have been found with their opercula to prove that they live at no great distance. Here we find the handsome group *Elephantulum* ; here the most delicately sculptured forms in each division ; and here the abnormal genus *Meioceras*, presenting in the mode of growth a singular approach to *Vermetus*. It is remarkable that the type of this genus is also found fossil in Barbadoes, both in its young and adult state, in company with species still living in the island, but now of smaller size (*Dr. Cutting*). The European types are both found here sparingly ; but whether they are conspecific is not yet decided.

On crossing the peninsula, we find eighteen species belonging to the three groups of *Cæca*, all of which can be easily separated from the (perfect) West Indian forms. Here again the "analogue" of *Brochina glabra* occurs in limited numbers ; of its identity, even generically, it is vain to speak till the opercula have been found. Most of the Mazatlan *Cæca*, to the number of at least 1200, were found on breaking up the shells of large *Spondyli*, &c., where their form is peculiarly adapted to traversing the numerous worm-eaten passages in which they seem to reside*. Numbers were found in every stage of growth (one only, however, with the nuclear coils, which are extremely perishable), which materially aided in ascertaining the principles of specific variation ; and eleven species were found with their opercula, of which some were nearly flat.

The Indo-Pacific fauna appears as bare of *Cæca* as the American seas are rich. The *C. annulatum* reappears at Aden, and the *C. regulare* from Singapore and Australia : from the latter country we have a new species related to *Brochina glabra* ; and Japan has recently furnished us with two species, one at least distinct ; but

* A few, however, were found, with their opercula, among the sand from the Olivellas, &c.

among all Mr. Cuming's dredgings at the Philippines, not a single specimen has been found.

The earliest known appearance of *Cæcidæ* on our globe was in the Eocene epoch ; three species having been found in the London clay, belonging to the remarkable type *Strebloceras*, which is as it were a permanently undeveloped *Cæcum*. In the Coralline Crag we have three species which have since perished, while the recent *B. glabra* appears to connect the ancient with the present condition of our seas. No species have been found in the Eocene tertiaries of the Paris basin (teste Deshayes, MS.) ; but one is said to have been described by Grateloup from the middle epoch*. In Italy, species have been found in the ?middle and later tertiaries ; one of which is the *C. trachea*, now living in the same seas.

Specific Characters.

It is possible that all Cæcids are smooth, or nearly so, in their nuclear and first tubular stage, assuming the characteristic sculpture of the species either gradually or suddenly. The young shells are much longer in proportion, and generally more bent, than the adult ; the ribs and rings are either crowded or loose according to circumstances ; and the mouth is often either sharp or thickened, straight or slanting, according to age. To found species on shape and sculpture, therefore, is more hazardous than in most shells ; but there is one character which, with certain slight exceptions, is found generally reliable. This is the shape (not the mere amount of prominence) of the plug, which, instead of being of homogeneous texture and simply flat or convex as in other septa-making and decollated univalves, always presents, in every successive stage of increase, the same marked peculiarities of form and the same striæ of growth. This character having been generally overlooked by previous authors, fresh diagnoses have been written for all the known species, in order that, by the use of terms in the same sense, the forms might be more easily compared together. The *liræ* are longitudinal riblets from apex to aperture, corresponding with spiral sculpture in other shells ; the *annuli* form the concentric or transverse sculpture. The *septum* is the plug covering the decollated portion ; its *margo lateralis*, the profile when the shell lies on its side. The plug itself is either *ungulate*, when the whole surface rises gradually towards the back like a horse's hoof ; or *mucronate*, when it tapers to a point ; or *mamillate*, when it is rounded, without apex ; or it is intermediate between these forms. The groups described under *Cæcum* can scarcely be regarded even as subgenera, so very gradually do they pass one into the other ; but they are found convenient, to avoid the frequent repetition of characters, and to aid in the identification of species.

* Teste Desh. in lit. But Dr. Gray, who has kindly consulted for me the *Conchologie Fossile*, 1840, is unable to find any allusion to the genus.

All our knowledge of the animals being in the papers of Clark and Stimpson, it is not thought necessary to repeat their statements.

All the measurements are in decimals of an inch.

Family CÆCIDÆ, Gray.

Testa nucleosa spiralis, postea tubularis, regularis, haud affixa : apertura orbiculari.

Operculum corneum, multispirale : margine haud fimbriato.

Turritellidæ, pars, Forbes, Stimps., Woodw.

Vermetidæ, pars, Clark.

Genus CÆCUM, Fleming.

Testa nucleosa planata : animal una in plana solute orbiculari crescens : testa animali crescente iterum iterumque decollata, septo regulari, varie constructo, partem decollatam tegente ; superficie seu annulata, seu lirata, seu lævi ; apertura plerumque primum constricta, postea expansa.

Operculum concavum seu subplanatum ; sutura sæpius linea elevata instructa, interdum lævi.

Syn. *Cæcalium*, Macgil.—*Brochus* + *Cornuoides*, Brown.—*Odonatina*, Zborz.—*Odontidium*, Phil.—*Cæcum*, Forbes & Hanl.—*Dentaliopsis*, Clark, MS.—? *Corniculina*, Münster.*—*Dentalium*, *Orthocera* seu *Creseis*, pars, auct.

The distinguishing characters of the restricted genus are (1) the frequently decollated, orbicular growth, the nuclear whirls being in the same plane as the adult ; and (2) the concave or flattened operculum.

Sect. A. ELEPHANTULUM.

Cæca insigniora ; t. tereti, elongata, regulari ; adulta liris longitudinaliter sculpta ; apertura parum declivi.

The shells in this group are like a minute *Dentalium elephantinum*, and are distinguished by their (comparatively) large size, tapering form, and longitudinal sculpture. They are for the most part rare.

1. CÆCUM SUBSPIRALE, Cpr.

C. (Elephantulum) t. maxime elongata, lentissime augente, tenuissime lirata, liris parallelis ; juxta aperturam annulo subtemente ; septo mucronato, superficie subplanato, mucrone laterali, dextrorsum sito, parvo ; apice rotundato, subspirali :

* The *Corniculina Ehrenbergii* of Münster, 'Beiträge zur Geognosie und Petrefacten-kunde des Südöstlichen Tirols,' 1841, pp. 118, 119. pl. 12. f. 3, *a, b, c*, is described and figured as a chambered Cephalopod, the siphuncle (? plug) seen at the narrow end being also described and figured at the larger opening. It is from the Middle Tertiaries of Castelfurquato (Parma), and only half a line in length ; and is supposed by Mr. Woodward, *Man. Moll.* p. 133, to be an imperfectly observed *Cæcum*.

operculo concavo, tenui; anfr. plurimis, lira tenui spiraliter ascendente.

Long. test. jun. .05, lat. .007—.01.

Long. test. adult. .155, lat. .025—.03 (aperturam versus).

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 315.

This is the largest known Cæcid, and easily recognized by the shape and the very peculiar plug, the apex of which appears like a minute *Vitrinella* set sideways on the otherwise flat surface. About twenty specimens were found.

2. CÆCUM ABNORMALE, Cpr.

C. (Elephantulum) t. curtissima, valde arcuata, tenuiore; lirulis tenuissimis circ. xxx., aperturæ tumenti supereuntibus; septo mucronato, prominente; mucrone obtusiore, omnino dextrorsum sito; margine laterali (i. e. hac specie dorsali) concavo, rapide ascendente: operculo? . . .

Long. .06, lat. .023.

Hab. Mazatlan, three sp. Mus. Brit. &c.

Maz. Cat. p. 316.

The shells of this species are extremely short, and yet so bent that the plug and the inside can be seen at once, while the apex of the plug is on the extreme right, so that the front view of the shell gives its profile.

3. CÆCUM INSCULPTUM, Cpr.

C. (Elephantulum) t. juniore vitrea, adulta solida; liris validis quadratis et interstitiis profundis ornata; aperturam versus haud tumente; septo unguato, subprominente, apice obtuso, paululum dextrorsum verso, margine laterali subrecto: operculo? . . .

Test. jun. long. .053, lat. .013—.017.

Test. adult. long. .133, lat. .023—.028.

Hab. Mazatlan, extremely rare. Mus. Brit. &c.

Maz. Cat. p. 315.

Known by the square ribs with deep interstices, and the unguate plug.

4. CÆCUM LAQUEATUM, C. B. Ad. (diagn. auct.).

C. (Elephantulum) t. gracili; lirulis circiter xx. haud acutis, interstitiis haud profundis; septo submamillato, submucronato; mucrone parvo, obtuso, subsinistrali; margine laterali convexo: operculo? . . .

Long. .11, lat. .028.

Hab. Panama, 2 sp. (*C. B. Ad.*). Mus. Amherst, Cuming.

C. B. Ad. Pan. Shells, pp. 162, 311, no. 215.

Known by the remarkable plug, which appears mamillate, but has a small apex projecting at the side.

5. CÆCUM OBTUSUM, Cpr.

C. (Elephantulum) t. elongata, tenue lirata; aperturam versus haud tumente; septo submamillato, parum tumente, apice obtusissimo dorsum versus spectante: operculo? . . .

Test. jun. long. .04, lat. .01—.014.

Test. adult. long. .132, lat. .017—.026.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 317.

About a dozen specimens were found of this species. The plug is mamillate in front, but unguulate behind.

6. CÆCUM PLICATUM, n. s.

C. (Elephantulum) t. curtior, longitudinaliter valde plicata; plicis xii.—xvi., acutis; apertura t. adolescente stellata, t. adulta annulata; interdum annulis indistinctis aperturam versus; plerumque superficie concentrice minutissime striata; septo mucronato, superficie subplanato, mucrone dactyliformi subiter ascendente, apice obtuso: operculo?

Test. adol. long. .07, lat. .01—.017.

Test. adult. long. .105, lat. .017.0—28.

Hab. Sponge, W. Indies. Mus. Brit. &c.

Thirty-eight specimens of this species were found, of which some were white; others orange, perhaps coloured by the sponge. It is known by its strong plications and finger-shaped plug. Two young specimens were found much straighter than the rest, and with the plications finer, which may belong to a distinct species.

Three dead specimens, received by Mr. Bean from the Mauritius, do not present any characters by which they can be separated from this species, except that the mucro is shorter, which is probably due to their being worn.

7. CÆCUM LIRATUM, n. s.

C. (Elephantulum) t. "C. mamillato" simili, sed lirulis creberrimis subobsoletis ornata; septo magis elevato.

Lat. .025.

Hab. Cor. Crag, Sutton. 1 sp. in Mus. Brit.

Only a fragment has been observed of this species, which is named as being the earliest known *Elephantulum*. It is to be hoped that those who are able to obtain access to the locality of Crag Cæca will investigate the species.

8. CÆCUM LIRATOCINCTUM, Cpr.

C. (Elephantulum) t. tenue lirata, liris plus minusve acutis, confertis seu subdistantibus; plerumque annulis obsoletis, sub liris monstrantibus; septo submucronato, subungulato; mucrone dactyliformi, apice prominente, laterali, acuto; margine late-

rali concavo : operculo valde concavo, anfr. circ. xii. ; lira prominente spirali, marginem quasi duplicante.

Test. jun. long. .047, lat. .017.

Test. adult. long. .14, lat. .02—.032.

Var. *tenuiliratum* : *t. liris crebris, tenuibus ; apice parum prominente.*

Var. *subobsoletum* : *t. alba, alabastro simili ; liris paucis interdum vix monstrantibus.*

? Var. *subconicum* : *t. septo maxime elevato, subconico.*

Hab. Mazatlan, rare. Mus. Brit. [? Singapore, 1 sp. Mus. Brit.]

Maz. Cat. p. 317.

Although about seventy specimens were found of this species (the least uncommon of the *Elephantula*), I cannot fix definitely the limits of the species, and one or more of the above varieties may prove distinct. The principal feature is the appearance of rings under the ribs.

A terminal fragment of an *Elephantulum*, picked out of mud in the burrow of a *Lithophagus* in an E. Indian *Plicatula* received from Singapore, presents no characters by which it can be separated from this species. Perfect specimens will, however, probably prove it to be distinct.

9. CÆCUM HEPTAGONUM, Cpr.

C. (Elephantulum) t. septangulata ; annulis rotundatis confertis cincta, angulos longitudinales supracurrentibus ; apertura planata, extus heptagonis forma, intus circulari, sulco concentrico ornata : septo? : operculo? . . .

Lat. .02.

Hab. Mazatlan. Mus. Brit.

Maz. Cat. p. 319.

Only a mouth-piece was found of this very remarkable species.

10. CÆCUM IMBRICATUM, n. s.

C. (? Elephantulum) t. haud parva, tereti ; primum lævi ; dein longitudinaliter multangulata, sulcis creberrimis, angustis concentricis quasi annulata ; adulta, liris longitudinalibus obtusis, angulatis viii.—xiv. polygonata, a sulcis concentricis xxv.—l. ut in adolescente interrupta ; apertura stellata ; septo subungulato, submucronato, plerumque valde prominente ; margine laterali subconcavo ; apice extante, latiore, marginibus dextrali et sinistro declivibus : operculo?

Test. jun. long. .06, lat. .008—.014.

Test. adol. long. .087, lat. .012—.023.

Test. adultæ long. .11, lat. .017—.027.

Hab. Sponge, W. Indies. Mus. Brit. &c.

This extremely beautiful species (like *C. heptagonum*) is exactly intermediate between *Elephantulum* and *Anellum*. The sculpture

resembles a number of polygonal flat tiles piled one on another. The concentric sculpture is strongest in the young shell, the longitudinal in the adult. Thirty-three specimens have been examined.

Sect. B. ANELLUM.

Cæca typica; t. adulta annulata.

That this is the typical condition of the genus is shown by the tendency that shells in the other groups have to assume the ringed character, especially about the mouth.

11. CÆCUM ANNULATUM, Brown (diagn. auct.).

C. (Anellum) t. majore, elongata, solida; annulis validis xx.—xxx., rotundatis, extantibus, cincta, plerumque distantioribus, præsertim aperturam versus; lirulis longitudinalibus crebris, minimis, extantibus, et interstitia et annulos transeuntibus; septo mucronato, margine laterali concavo; mucrone subiter ascendente, valido, dactyliformi, subdextrorsum sito; t. juniore annulis acutioribus, lirulis obsoletis: operculo?

Test. jun. long. .053, lat. .008—.014.

Test. adolesc. long. .108, lat. .016—.035.

Test. adultæ long. .122, lat. .022—.035.

Hab. [South Coast of England (*Alder*); Killough, Lough Strangford, Ireland (*Brown*)] ; W. Indies, sponge of commerce ; Aden (*Bean, MS.*). Mus. Brit. &c.

Brochus annulatus, Brown, Ill. Conch. Gr. Br. 1844, p. 125. pl. 56. f. 12.

+ *Brochus reticulatus*, Brown, loc. cit. p. 124, pl. 56. f. 11.

Cæcum annulatum, Forbes & Hanley, Br. Moll. vol. iii. p. 181. pl. 88. f. 7.

Orthocera trachea (pars), Flem. Hist. Br. An. 1828, p. 237 [non *Dentalium trachea*, Mont.].

The name *reticulatum* would have been far more characteristic of this beautiful species ; but as it was given to the adolescent state, and *annulatum* to the adult, which is well figured in the Br. Moll., the latter is retained. Fifty-three specimens of various ages have been examined from the W. Indian sponge, and have been carefully compared with Mr. Alder's supposed British specimen. This has the posterior rings much closer than usual. The characteristic longitudinal threads, which reticulate both the rings and the hollows, are scarcely seen in the young shell, which, even in the earliest stages found, is distinctly and somewhat sharply ringed. In this state it is known from *C. regulare* by the very prominent finger-shaped mucro. Many adult specimens were found having an additional ring remaining beyond the plug ; but even then the mucro is conspicuous.

The Aden specimens are too much rubbed to determine with confidence ; but in the most perfect the characteristic finger-shaped mucro, the reticulated sculpture, and the thickened distant rings

near the mouth, will not justify specific separation merely on geographical grounds.

12. CÆCUM ELONGATUM, Cpr.

C. (Anellum) t. elongata, tereti; primum lævi, dein annulis rotundatis parum extantibus instructa, interstitiis minimis; septo unguato, apice parum elevato, subobtusato; margine laterali subrecto: operculo? . . .

Test. jun. long. .06, lat. .008—.017.

Test. adult. long. .103, lat. .015—.023.

? Var. semilæve. *T. huc et illuc annulata; huc et illuc lævi.*

Long. .112, lat. .025—.028.

Hab. Mazatlan, very rare. Mus. Brit. &c.

Maz. Cat. p. 319.

About a score of specimens were found, including the ? variety, which may be distinct. The shape approaches *Elephantulum*.

13. CÆCUM SUBIMPRESSUM, Cpr.

C. (Anellum) t. elongata, solidiore; annulis creberrimis, rotundatis, haud extantibus, interstitiis subimpressis; septo mucronato; margine laterali vix concavo; mucrone parvo, obtuso, ad dorsum sito: operculo concavo, linea elevata suturam definiente.

Test. jun. long. .058, lat. .008—.016.

Test. adult. long. .115, lat. .017—.03.

Hab. Mazatlan, very rare. Mus. Brit.

Maz. Cat. p. 320.

This species differs from *C. elongatum* in the narrow mucro. About a dozen specimens were found.

14. CÆCUM PULCHELLUM, Stimps.

C. (Anellum) t. satis elongata, solidiore, pallide fusca; t. adolescente gracili, annulis paucis distantioribus; t. adulta annulis circiter xxv. validis, rotundatis, interstitiis plus minusve æquantibus; septo? mamillato, haud extante; margine laterali parum convexo: operculo concavo, anfr. circiter viii.

Long. .1, lat. .025.

Hab. New Bedford Harbour, U.S., adhering to groups of *Vermeti* in laminarian zone.

Stimpson in Proc. Bost. Soc. N. H. Oct. 1851; Shells N. Eng. p. 36. pl. 2. f. 3.

The above description of the plug, which was not noticed by Stimpson, is supplied from the figure. If correct, it is the only *Anellum* known with a purely mamillate plug.

15. CÆCUM TRACHEA, Mont. (diagn. auct.)

C. (Anellum) t. haud parva, solidiore, rufo-fusca, haud opaca; t. juniore lævi; adolescente tereti; adulta cylindrica, annulis

creberrimis, xl.-l., *vix expressis*, *contiguis cincta*; *interstitiis parvis*, *minutissime longitudinaliter striulis ornatis*; *apertura acuta*, *vix declivi*, *vix contracta et postea expansa*; *septo subungulato*, *submucronato*; *marginē laterali recto*; *apice subdextrorsum sito*, *obtusos*, *plus minusve elevato*: *operculo vix concavo*, *linea spirali elevata*, *anfr. circiter xv.*, *apertura æquante*.

Test. jun. long. .076, lat. .013—.018.

Test. adolesc. long. .128, lat. .015—.03.

Test. adult. long. .128, lat. .025—.032.

Variat *marginē laterali convexo*, *interdum tumente*.

Hab. British Seas, in coralline zone (v. *Forbes & Hanl.*); *Magnisi*, near Syracuse, very plentiful in sand (*Philippi*); Piedmont (*Jeffreys*); N. and S. of Spain and Mediterranean (*M'Andrew*); fossil at Palermo (*Philippi*); Subappennine beds (*Horne*).

Dentalium trachea, Mont. Test. Brit. vol. ii. p. 497. pl. 14. f. 10; Maton & Rack. Linn. Trans. vol. viii. p. 239; Dillw. Rec. Shells, vol. ii. p. 1068; Brit. Mar. Conch. p. 5. f. 61; Wood, Ind. Test. ed. Hanl. p. 192.

+ *Dentalium imperforatum*, Ad. Micr. pl. 14. f. 8; Mont. *loc. cit.* p. 496; Mat. *loc. cit.* p. 238; Turt. Conch. Dict. p. 39; Brit. Mar. Conch. p. 4; Dillw. p. 1067; Wood, p. 192 (not f. 12).

= *Orthocera imperforata*, Flem. Brit. An. p. 237.

= *Odontidium rugulosum* (pars), Phil. Moll. Sic. vol. i. p. 102. pl. 6. f. 20; vol. ii. p. 73.

= *Creseis rugulosa*, Cantraine, p. 32.

= *Brochus trachiformis*, Brown, Ill. Conch. G.B. p. 124. pl. 56. f. 10 (male).

+ *Brochus striatus*, Brown, *loc. cit.* (male), pl. 56. f. 13.

Brochus trachiformis, Chénu, Ill. Conch.

Cæcum trachea, Flem. Enc. Edinb. art. Conchology; Clark, Ann. Nat. Hist. series 2. vol. iv. p. 180; Forbes & Hanl. Br. Moll. vol. iii. p. 178. pl. 69. f. 4, & pl. KK. f. 1; Clark, Test. Mar. Brit. Ins. p. 327; Adams, Gen. vol. i. p. 355. pl. 38. f. 6, 6a; Jeffr. Mar. Test. Piedm. (Ann. Nat. Hist. Feb. 1856), p. 30; M'Andr. Rep. Moll. N. Atl. (Br. Ass. 1856) p. 149; Horne, Foss. Vien. & Subappen. pl. 46. f. 19, a, b, c*.

+ *Cæcum imperforatum*, Flem. *loc. cit.*; Gray, Guide to Moll. B.M. part i. p. 100.

?jun. = *Serpula recta*, Walker, Flem. Enc. pl. 205. f. 8.

= *Cornuoides major*, Brown, *loc. cit.* pl. 56. f. 49; Chénu, *loc. cit.*

Although the name *trachea* was given to the tapering adolescent state of this typical species, and *imperforatum* to the adult, the former name has come into current use, probably because the other represents the generic and not a specific character. It is one of the

* The *Dentalium incurvum*, Renier, f. 39 a, b, of the same plate, looks like a rubbed *Cæcum*; but neither figure nor description is sufficiently accurate for identification.

largest species of the *Anellum* group, known by its very faintly expressed ribs, plug intermediate between the mucronate and unguate forms, and mouth not thickened, but with a slight contraction and expansion like that of a preserve jar. The reticulating striulæ in the interspaces are only seen in very fresh specimens. The shell is then glossy, and to a slight extent transmits the light. The operculum in well-preserved specimens is almost flat; but the drying of the animal sometimes draws it into a concave form. The ten outer volutions are conspicuously marked by a spiral rib. The shell in its young state is quite smooth, and by no means accords with Mr. Clark's surmise, that ?*Skenea rota* may be the nuclear portion. At this period it is known at once from *C. glabrum* by the sharply angular plug. Whether the *Cornuoides major* and *minor* of Brown are the young of the same species, or one of *C. trachea* and the other of *C. glabrum*, cannot easily be ascertained, except from the comparative size.

15 b. CÆCUM (?TRACHEA, var.) OBSOLETUM.

C. (Anellum) t. "C. trachæ" simili; sed multo minore, gracili; postice annulis distantibus, antice sublævi; tota superficie minutissime longitudinaliter corrugata; septo subungulato, margine laterali concavo.

Long. .095, lat. .015—.02.

Hab. Salamis (*Bean*). 1 sp. Mus.

This solitary shell may be a starved form of the common species; but as it may belong to an Ægean type not yet investigated, it is kept provisionally separate.

16. CÆCUM GURGULIO, ? n. s.

C. (Anellum) t. parva, solida; annulis xxx.—xxxv. rotundatis, subexpressis cincta; interstitiis minimis; septo mucronato, mucrone parvo, subdextrorsum sito, margine laterali recto: operculo?

Long. .077, lat. .017—.02.

Hab. W. Indies, sponge of commerce. Mus. Brit. &c.

?= *Odontidium rugulosum* (pars), *Phil. loc. cit.*

The West Indian specimens quoted by Philippi probably belong to this form, which may possibly prove to be a dwarf variety of *C. trachea*. Seven specimens were found, one only of which was perfectly fresh. This displays no sign of the longitudinal corrugation characteristic of *C. trachea*: moreover the plug is decidedly mucronate, though very short; and the rings are both fewer and larger than in the European species.

17. CÆCUM TUMIDUM, n. s.

C. (Anellum) t. tereti, sublævi seu annulis obsoletis ornata; apertura haud contracta, annulo tumido cincta; septo mamil-

lato, plus minusve tumente; margine laterali convexo, dorsum versus subangulato: operculum ?—.

Long. .11, lat. .018—.024.

Hab. Sutton, Cor. Crag. Mus. Brit. &c.

= *C. trachea*, Searles Wood, Crag. Moll. p. 115. pl. 20. f. 5 (? pars), non Mont. et auct.

It is with great hesitation that I venture to differ from so accurate an authority as the author of the 'Crag Mollusca:' nevertheless, having subjected all the specimens in the British Museum, as well as some sent me by Mr. Wood, to a very rigid examination under the microscope, I have not been able to find a single specimen that can be strictly affiliated to *C. trachea*. Of the minute sculpture in a crag shell, little can be said; the majority of specimens are almost smooth. The recent species is, however, peculiar in the character of the aperture, never showing even an approach to the swelling mouth of the fossil; and the plug of the latter is completely mamillated, though with a flattening and incipient apex at the dorsal side. When compared with the swollen variety of the recent shell, the front of the latter displays an irregularity of outline which contrasts strongly with the beautifully rounded fossil, and proves it to be of abnormal growth. The B.M. specimens being somewhat mixed on the tablets, it is probable that the magnified plug in the figure of this species is really an individual of *C. mamillatum*, with the mucro rubbed off.

18. *CÆCUM FIRMATUM*, C. B. Ad. (diagn. auct.)

C. (Anellum) t. robusta, satis tereti; t. jun. primum lævi, dein annulis circ. xxiii.—xxxiii., primum acutioribus, dein parum quadratis; interstitiis subquadratis, interdum evanidis; septo subungulato; apice parum prominente, subdextrorsum sito, obtusiore; margine laterali subrecto: operculo vix concavo, suturis minus definitis.

Test. jun. long. .067, lat. .006—.012.

Test. adol. long. .063, lat. .013—.017.

Test. adult. .1, lat. .016—.025.

Hab. Panama, common (*C. B. Adams*); Mazatlan, rare, off *Spondylus* and among *Olivellæ*. Mus. Brit.

Pars = *Cæcum firmatum*, C. B. Ad. Pan. Shells, no. 213, pp. 161, 311.

+ *C. eburneum*, C. B. Ad. no. 212. pp. 161, 311.

+ (adolesc.) *C. monstrosum*, C. B. Ad. no. 216. pp. 162, 311.

+ (adolesc.) *C. pygmæum*, C. B. Ad. no. 218. pp. 163, 311.

+ (jun.) *C. diminutum*, C. B. Ad. no. 211. pp. 161, 310.

Maz. Cat. p. 320.

Known from *C. trachea* by the stout subquadrate rings. If the mode of specific diagnosis adopted by Prof. Adams had been followed in this monograph, the number of species (wherever the specimens were sufficiently abundant) would have had to be increased fivefold.

19. CÆCUM QUADRATUM, Cpr.

C. (Anellum) t. parva, curta, solida, annulis quadratis xii.—xx. cincta, interstitiis profundis, quadratis; apertura subcontracta, annulis concurrentibus; septo mucronato; mucrone parvo, ex-tante, angusto, subdextrorsum sito; margine laterali concavo: operculo valde concavo, anfr. circ. x., linea spirali expressa.

? Var. compactum. *T. interstitiis parvis seu evanidis, annulis maxime planatis.*

Long. .072, lat. (interst.) .016, (annulis) .02.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 322.

The extreme forms are very different; but no uniform character has been observed by which they can be separated.

20. CÆCUM CLATHRATUM, Cpr.

C. (Anellum) t. haud parva, solidiore, annulis valde distantibus, acutioribus, extantibus cincta; interstitiis concavis; septo sub-planato, mucronato; mucrone minimo, obtuso, pæne in dorsum sito; margine laterali in adulto haud conspicuo, planato: operculo? . . .

Test. jun. long. .057, lat. .007—017.

Test. adult. long. .102, lat. (interst.) .026, (annul.) .03.

Hab. Mazatlan, very rare. Mus. Brit. &c.

Maz. Cat. p. 322.

An extremely beautiful species, remarkable for its size, nearly flat plug, and distant rings with curved interspaces.

21. CÆCUM FLORIDANUM, Stimps.

C. (Anellum) "t. valde arcuata, solida, alba, nitida; annulis circa xxxii. acutis, elevatis cincta, interstitiis multo latioribus; apertura parum obliqua, haud contracta; interdum annulo lato aperturam superante;" septo? . . . : operculo?

Long. .075, lat. .02, poll.

Hab. Florida.

Stimpson in Proc. Bost. Soc. Nat. Hist., Oct. 15th, 1851.

22. CÆCUM REGULARE, n. s.

C. (Anellum) t. satis tereti, tenuiore, alba, subdiaphana; annulis subacutis, regularibus xx.—xxiv. cincta, interstitiis conspicuis; apertura declivi, contracta, haud incrassata; septo mucronato, mucrone parvo, haud conspicuo, subdextrorsum sito; margine laterali parum elevato, subconvexo: operculo?

Test. jun. long. .04, lat. .007—014.

Test. adult. long. .085, lat. .018—024.

Hab. W. Indies (*Woodward*); Singapore, 2 spec. from *Litho-phagus* burrow in *Plicatula*; Australia, 1 young sp. in *Petalocochus nerinæoides*. Mus. Brit. &c.

Twelve specimens of this species have been examined from the W.

Indies, and three from the Eastern Seas, as well as one pseudo-British specimen from Mr. Alder's cabinet*. They are all very constant and regular in the arrangement of the rings, never presenting so many as are recorded for *C. Floridanum*, and further differing in the contraction of the mouth. More exact information about the Florida species may, however, prove them identical.

23. *CÆCUM GRACILE*, n. s.

C. (Anellum) t. valde tereti, parva, annulis circiter xxiv. subdistantibus, subacutis ornata; apertura haud contracta, haud declivi, annulo valido cincta; septo?, margine laterali subplano: operculo? . . .

Long. .09, lat. .012—.017.

Hab. Japan (*Stimpson*). Mus. Smithsonian.

Dr. Gould, to whom is entrusted the duty of describing the shells of the U.S. Japanese Exploring Expedition, has kindly allowed me to include the *Cæca* brought back by Mr. Stimpson in the present Monograph. They consist of but two specimens. One is a young shell, with the plug broken off, closely resembling *C. elongatum*, var. *semilæve*, from Mazatlan. The other is the shell here described, which, though dead and worn at the plug, is adult, and clearly distinct from any other recorded species. It is much more slender even than *C. elegantissimum*, with the rings closer and not so sharp.

24. *CÆCUM ELEGANTISSIMUM*, Cpr.

C. (Anellum) t. diaphana, vitrea, nitida, alba, arcuata, tereti, subelongata; apertura parum declivi, parum contracta; t. jun. lævi; t. adolescente et adulta liris concentricis distantibus (xiv.—xviii.) acutis cincta; interstitiis elongatis, elegantissime arcuatis; septo submucronato, subungulato; apice obtuso, parvo, haud valde prominente; margine laterali concavo: operculo? . . .

Test. jun. long. .042, lat. .006—.013.

Test. adult. long. .1, lat. .014—.023.

Hab. Teneriffe, in gravel sand, 50 fms. (*R. M'Andrew*). Mus. Brit. &c.

= *Cæcum trachea*, M'Andr. Geogr. Distr. Test., Liverpool, 1854; B.M. List Canary Shells, p. 29 (non Mont. et auct.).

C. elegantissimum, Cpr. in M'Andr. Rep. Moll. N. E. Atl., Brit. Assoc. 1856, p. 149.

More than 300 specimens of this exquisitely beautiful species were dredged by R. M'Andrew, Esq., in company with *C. vitreum* and *C. pollicare*. It differs from *C. undatum* in its glossy texture, slender form, and very distant rings: also in the plug, which is intermediate between the mucronate and unguulate forms. The young shell is quite smooth; and as soon as the rings commence, they are distant as in the adult.

* See Note in Brit. Moll. vol. iii. p. 180. The other specimen on the same card was *Meioceras cornucopiæ*, also from the W. Indies.

24 b. CÆCUM (? ELEGANTISSIMUM, var.) SEARLES-WOODII.

C. (Anellum) t. parva, gracillima, elongata, alba, subdiaphana, subvitrea; annulis subobsoletis, creberrimis, subacutis cincta, seu interdum sublævi; septo ungulato, apice subdextrorsum sito; margine laterali subrecto: operculo?...

Test. adol. long. .046, lat. .007—.012.

Test. adult. long. .068, lat. .008—.013.

Hab. Teneriffe, in gravel sand, 50 fms., very rare (*R. M'Andrew*).
Mus. Brit. &c.

= *Cæcum Searles-Woodii*, Cpr. in M'Andr. Rep. Moll. N. E. Atl., Br. Ass. 1856, p. 149.

Twenty-three specimens were found differing from *C. elegantissimum* as above stated. It is annulated from a very early stage; the rings are closer (about twenty-four in the young shell), scarcely sharp, and often obsolete; the growth is scarcely tapering and very slender; and the plug is unguate, turned somewhat to the right. Whether it prove to be a dwarfed condition of *C. elegantissimum*, or a distinct species, it is named in remembrance of the author of the invaluable Monograph of the Crag Mollusca, where the plugs of *Cæca* were first described.

25. CÆCUM UNDATUM, ? n. s.

C. (Anellum) t. obesa, curta; t. jun. lævi; t. adulta annulis x.-xv. acutis cincta; interstitiis concavis, undatis; antice et postice contracta, planis decollationis et aperturæ ad ang. circ. 115°; apertura contracta, dein paululum reflexa, acuta; septo ungulato; apice acuto, elongato, prominente; margine laterali recto: operculo concavo, anfr. circ. xv., sutura distincta.

Variat *t. minus obesa, annulis subobsoletis.*

Test. jun. long. .042, lat. .01.

Test. adol. long. .067, lat. .01—.02.

Test. adult. long. .074, lat. .021.

Hab. Mazatlan, abundant in worm-eaten shells of *Spondylus cal-cifer*, &c. (? Panama, 1 sp., *C. B. Ad.*). Mus. Brit. &c.

Maz. Cat. p. 323; Brit. Ass. Rep. 1856, pl. 9. f. 4 a-o.

Test. adol. ? = *C. parvum*, *C. B. Ad. Pan. Shells*, pp. 163, 311: "t. arcuata, gracili, vix tereti; albida; annulis xv. acutis, distantibus, haud multum elevatis; apice laterali, prominente. Long. .065, lat. .019." Sp. un. Mus. Amherst.

At least 500 specimens have been examined of this species, in almost every stage of growth; both young and adults, to the number of about fifty, containing their opercula. By this means the mode and variation in growth were ascertained, and the knowledge gained applied to the other species where connecting links were not accessible. The "monstrosum" stage, in which the tube hitherto smooth and slender suddenly alters its angle of growth and diameter, assuming sharp rings, is very remarkable. The *posterior* contrac-

tion of the tube in the adult shell of this and some other species is also well worth attention.

Sect. C. FARTULUM.

Cæca lævia: *t. sæpius utrinque contracta, apertura declivi.*

In form and texture, some of the species approach the adult state of *Meioceras*: others pass into the more typical groups. They are named from their likeness in shape to a little sausage.

26. CÆCUM LÆVE, C. B. Ad. (diagn. auct.).

C. (Fartulum) t. juniore "C. undatum" *fere exacte simulante, paulum graciliore; t. adulta eidem simili, sed lævi, nitida, subdiaphana, brunneo tincta; antice et postice minus contracta; aperturam versus interdum tumente; operculo concavo, suturis minus distinctis.*

Test. jun. long. .035, lat. .005—.01.

Test. adult. long. .07, lat. .018.

Hab. Panama, 2 sp. (*C. B. Ad.*); Mazatlan, not uncommon. Mus. Brit.

C. B. Ad. Pan. Shells, pp. 162, 311; Maz. Cat. p. 325.

So like is this shell, even in many minute particulars, to *C. undatum*, that a single specimen might have been taken for an extreme variety of it. A careful examination of at least 200 specimens, however, clearly proves their distinctness.

27. CÆCUM BIMARGINATUM, n. s.

C. (Fartulum) t. "C. læve" fere exacte simulante; planis truncationis ad angulum 100°; septo unguato, apice minus elevato, subdextrorsum sito; margine laterali recto seu paulum convexo: operculo multispirali, subplanato, bimarginato.

Long. .078, lat. .015—.022.

Hab. Singapore, nestling in *Lithophagus* burrow in *Plicatula*; Australia, nestling in *Petalococonchus nerinæoides*. Mus. Brit.

The fortunate discovery of a specimen with the operculum *in situ*, presenting a double rim round the edge, as in some of the *Cyclostomidæ*, furnished a satisfactory character to distinguish the E. Indian from the very similar Mazatlan species. The attempt to extract it was, however, unsuccessful; and the original specimen from *Plicatula* perished after the description had been written. Five others from the neighbouring seas, but without opercula, are provisionally allotted to the same species. (See however note * to sp. 41, *infra*.)

Two young specimens of uncertain locality (from shell-washings), but probably from the E. Indies, are doubtfully referred to this species on account of the similarity in the plug (Br. Mus.).

28. CÆCUM FARCIMEN, Cpr.

C. (Fartulum) t. "C. lævi" simili, sed albida, apertura minus

contracta ; annulis rotundatis paucis, subobsoletis, aperturam plerumque præcedentibus ; septo submucronato ; apice subprominente, haud acuto ; margine laterali subtumido : operculo concavo, suturis distinctis, peripheriam versus linea elevata instructis.

Long. .064, lat. .019.

Hab. Mazatlan, very rare in *Spondylus* ; and living among *Olivellæ*. Mus. Brit.

Maz. Cat. p. 326.

This species differs from *C. læve* not only in the more slender shape and submucronate plug, but also in the spiral rib round the outer whorls of the operculum, which was found in four specimens.

29. CÆCUM VITREUM, Cpr.

C. (Fartulum) t. subelongata, vitrea, nitida ; apertura parum declivi, vix contracta et postea reflexa ; aperturam versus tumidiore ; septo prominente, mucronato ; margine laterali recto seu subconcavo ; mucrone plus minusve obtuso, subdextrorsum sito : operculo ? . . .

Test. jun. long. .038, lat. .007—011.

Test. adol. long. .073, lat. .01—018.

Test. adult. long. .107, lat. .017—023.

Hab. Teneriffe, 50 fms. gravel (*M'Andrew*). Mus. Brit. &c.

Cæcum glabrum, M'Andr. Geogr. Distr. Test. 1854 ; B.M. Cat. Shells Canar. p. 29 (non Mont.).

Cæcum vitreum, Cpr. in M'Andr. Rep. Moll. N.E. Atl., Br. Ass. 1856.

More than 100 specimens were found of this species, which is characterized by its somewhat tapering shape, and obtusely mucronated plug. The surface sometimes displays annular lines of growth.

29 b. CÆCUM (? VITREUM, var.) CLARKII.

C. (Fartulum) t. "C. vitreo" simili, sed minore, magis tereti ; septo unguato ; apice obtusiore : operculo ? . . .

Variat margine laterali valde convexo, tumente.

Test. jun. long. .042, lat. .008—013.

Test. adult. long. .082, lat. .013—015.

This is probably a distinct species from *C. vitreum* ; but as the plugs in each form are more variable than usual, the species is not constituted till more is known. About fifty specimens were found. It is named after the first discoverer of the animal in this interesting genus.

Hab. Teneriffe, 50 fms. gravel (*M'Andrew*). Mus. Brit. &c.

30. CÆCUM POLLICARE, n. s.

C. (Fartulum) t. "C. vitreo" simili, sed plerumque magis tereti ; nitida, sed striulis minimis tota superficie longitudinaliter cor-

rugata; *septo unguolato, margine laterali recto, apice obtusiore*: *operculo*? . . .

Test. jun. long. .055, lat. .006—.012.

Test. adult. long. .1, lat. .015—.023.

Hab. Teneriffe, 50 fms. gravel (*M'Andrew*). Mus. Brit. &c.

On examining the smooth Teneriffe *Cæca* under a $\frac{1}{2}$ -inch achromatic, thirty-six specimens were found, in shape agreeing with *C. Clarkii*, but with the whole surface covered with irregular longitudinal corrugations resembling thumb-marks, a sculpture entirely wanting in the rest of the specimens. In the very young shells it is scarcely discernible.

31. ? *CÆCUM CORRUGULATUM*, Cpr.

? *C. (Fartulum) t. " ? Brochinæ glabriformi " simili, sed tumidiore; superficie transversim tenuissime striata, striulis minimis irregulariter corrugata; septo ? mamillato: operculo ? . . .*

Long. .075, lat. .017—.022.

Hab. Mazatlan, 1 sp., off *Chama*. Mus. Brit.

Maz. Cat. p. 327.

The only specimen found is dead and imperfect, but presents a sculpture like that of *C. pollicare*, yet in the opposite direction. It may be a *Brochina*.

32. *CÆCUM DEXTROVERSUM*, Cpr.

C. (Fartulum) t. tereti, satis elongata, tenui; septo tumido, submamillato; mucrone tumidissimo, dextrorsum versato; margine laterali valde convexo: operculo concavo, suturis vix definitis.

Test. jun. long. .023, lat. .008.

Test. adult. long. .092, lat. .024.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 328.

About thirty specimens were found, off *Spondylus*, and (living) among *Olivellæ*, of which six had their opercula. The knob on the plug is frequently worn off in the adult, leaving a mamillate appearance.

32 b. *CÆCUM* (? *DEXTROVERSUM*, var.) *ANTILLARUM*.

One young specimen only was found in the W. Indian sponge, not presenting any characters by which it can be separated from *C. dextroversum*. Additional materials, however, may prove them distinct; and it is kept provisionally separate. It measures long. .056, lat. .01—.012.

33. ? *CÆCUM SUBQUADRATUM*, n. s.

? *C. (Fartulum) t. elongata, minima, lævi, haud nitente; apertura haud contracta; septo submamillato, subungulato; margine laterali extante, supra satis convexo, lateribus rectis, par-*

allelis; apice obtusissimo, lato, ad latus quadrato: operculo? . . .

Long. .068, lat. .009—.012.

Hab. Port Elizabeth (*Bean*). Mus. Brit.

Three specimens were found, differing from all other known species in the shape of the plug. This, on a side view, has parallel sides with a somewhat rounded top; the apex, however, is at the end of one of the straight sides. The shell resembles *B. glabra* in the non-contraction of the aperture. The texture is in some parts slightly diaphanous, but opaque behind the mouth. It may be a *Brochina*.

34. CÆCUM REVERSUM, Cpr.

C. (Fartulum) t. jun. "*C. dextroverso*" *simili, sed septo subconvexo; mucrone reverso, semicylindraceo, arcuato, aperturam versus convexo, dorsum versus concavo; t. adulta? . . . : operculo? . . .*

Long. .048, lat. .012.

Hab. Mazatlan, 1 young sp. off *Spondylus*. Mus. Brit.

Maz. Cat. p. 329.

The plug is unique; the mucro resembles a small *Cæcum* lying on the slightly swollen surface, with its horns towards the back, and its back adjoining the front of the shell.

35. CÆCUM TERES, Cpr.

C. (Fartulum) t. elongata, tereti, longitudinaliter interdum subangulata; septo mucronato; mucrone subelongato, obtuso; margine laterali subrecto: operculo vix concavo.

Test. jun. long. .045, lat. .012.

Test. adult. long. .115, lat. .017—.027.

Hab. Mazatlan, very rare. Mus. Brit. &c.

This shell has the shape of *Elephantulum* without the ribs, a tendency to which, however, sometimes appears in slightly-marked angles.

36. CÆCUM MAMILLATUM, S. Wood.

C. (Fartulum) t. tereti, solida; apertura haud declivi, tumente; septo mucronato, mucrone dactyliformi; margine laterali valde concavo.

Variat *mucrone parvo, subtumente.*

Long. .15, lat. .023—.033.

Hab. Sutton, Cor. Crag, abundant. Mus. Brit. &c.

C. mamillum, S. Wood, Cat. 1842.

C. mamillatum, S. Wood, Crag. Moll. p. 116, pl. 20. f. 4 *a, c*; ? + f. 5 *a* (rubbed).

Adol. = *Cæcum m.* var. *subulatum*, S. Wood, *loc. cit.* f. 4 *b*.

Jun. = *Cæcum (?) incurvatum (?)*, S. Wood, *loc. cit.* p. 117, f. 7 *a, b*; (non *Serpula incurvata*, Walker).

This species is known from the smooth forms of *C. tumidum* by the greater proportionate length, less thickening of the mouth, and the very conspicuous mucro on the otherwise flattened plug. As Crag shells are prone to variation, it is probably not a mark of specific difference that the mucro varies in shape, being sometimes straight, sometimes bent as in the figure, sometimes long, sometimes short, sometimes swollen so as to approach *C. trachea*. It is probably one of these specimens that is figured at 5 a.*

Genus BROCHINA, Gray.

Testa Cæco similis, lævis; apertura simplici, acuta; septo mamillato. Operculum convexum; anfractibus linea elevata instructis.

It will be a remarkable coincidence, should it hereafter appear that all the shells with mamillated plug and sharp mouth have the convex operculum. At present we can only distinguish *Brochina* from *Cæcum* by the latter character. As the same terraced structure appears in the concave forms, as some of these are almost flat, and as the amount of convexity differs in different individuals, or in the same individual according to accidents in drying, this alone forms a scarcely sufficient generic character.

Brochina, Gray, Guide Moll. p. 101.—*Cæcum*, pars, auct.

37. BROCHINA GLABRA, Mont. (diagn. auct.)

Br. t. parva, tereti, lævi, tenui, subdiaphana; apertura haud contracta, haud declivi, haud tumida; septo mamillato, plus minusve elevato, apice nullo; margine laterali circulari; marginibus decollatis, haud conspicuis. Test. jun. planorbiformi, anfr. ii. et dimidio, tumidis, tenuissimis. Operculo pellucido, corneo, extante; plerumque medio planato, homoganeo; dein conico, lateribus plus minusve divergentibus, linea spirali extante, anfr. v.—vii.; interdum omnino convexo, linea spirali apicem versus ascendente.

Test. jun. spir. diam. .011.

Test. jun. elongata, long. .03, lat. .006.

Test. adolesc. long. .055, lat. .008—.012.

Test. adult. long. .068, lat. .012—.015.

Hab. British Seas (vide *Forbes & Hanley*); Mediterranean (*M. Andrew*); Piedmont (*Jeffreys*); Cephalonia (*Bean*); fossil in Cor. Crag (*S. Wood*).

?= *Dentalium minutum*, Linn. ed. xii. p. 1264; Dillw. Rec. Shells, vol. ii. p. 1068 (vide antea, p. 1).

Dentalium glabrum, Mont. Test. Br. vol. ii. p. 497 (1803); Maton

* Students have cause to regret that the invaluable series of Crag Mollusca from which the monograph was compiled were not named by the author before he so generously presented them to the British Museum. In the absence of a copy of the work in the Zoological Department, they are still unnamed, and the identification of types is retarded.

& Rack. Trans. Linn. Soc. vol. viii. p. 239; Turt. Conch. Dict. p. 40; Br. Mar. Conch. p. 4. f. 5; Wood, Ind. Test. Ed. Hanl. p. 192. no. 14. f. 12.

Cæcum glabrum, Flem. Enc. Edinb. pl. 204. f. 7, pl. 205. f. 8, 9; Forbes & Hanl. Br. Moll. vol. iii. p. 181. pl. 69. f. 5; H. & A. Ad. Gen. vol. i. p. 356; Clark, Test. Mar. Br. p. 329; Searles Wood, Crag Moll. p. 117. pl. 20. f. 6; M'Andr. Br. Ass. Rep. Moll. N.E. Atl. 1856, p. 149; Jeffr. Mar. Test. Piedm. p. 30. [Non M'Andr. Geogr. Distr. 1854; B.M. Cat. Shells Canar. p. 29.]

Brochina glabra, Gray, Syst. Distr. Moll. p. 101.

Orthocera glabra, Flem. Br. An. p. 237.

Odontidium levissimum, Cantr. Bull. Brux. vol. ix. p. 2, 1842.

Brochus glaber, Brown, Ill. Conch. Gr. Br. p. 125. no. 5. pl. 56. f. 3.

? + *Brochus lævis*, Brown, loc. cit. no. 6. f. 6*.

T. adol. = *Brochus arcuatus*, Brown, Ill. Conch. Gr. Br. p. 125, no. 7. pl. 56. f. 9; Forbes & Hanl. Br. Moll. vol. iii. p. 182.

T. jun. = ? *Serpula incurvata*, Walk. Test. Min. f. 11, 1787; Ad. Micr. pl. 14. f. 7; Maton & Rack. Trans. Linn. Soc. vol. viii. p. 246; Turt. Conch. Dict. p. 156; Dillw. Rec. Sh. vol. ii. p. 1071; Wood, Ind. Test. ed. Hanl. p. 192. no. 3. pl. 38. f. 3 m.

Vermiculum incurvatum, Mont. Test. Br. p. 518.

? = *Cornuoides minor*, Brown, Ill. Conch. Gr. Br. p. 125. no. 2. pl. 56. f. 50: " = *Serpula recta*, Walker, Flem."

[? Non ? *Cæcum ? incurvatum*, S. Wood, Crag Moll. p. 117. pl. 20. f. 7 a, b, = ? *Serpula recta*, S. Wood, Cat. 1842: ? = *Cæcum mamillatum*, jun.]

The shell is described as snow-white by Hanley. This is true of dead specimens; but when fresh it is somewhat horny in texture, and so pellucid, that the shape of the operculum within can easily be seen through the shell by transmitted light. The English specimens generally have the plug somewhat flattened, presenting not more than a third of a sphere; but many of the Mediterranean shells, especially when young, are so inflated as closely to resemble the Mazatlan species.

I have carefully examined about thirty specimens with the opercula *in situ*, of which part were dredged by Mr. M'Andrew in the Mediterranean, part were most kindly placed at my disposal by Mr. Clark. From several of these, after softening the animal in dilute potash (till the viscera were clearly discernible through the transparent shell), I removed the opercula, and subjected them to a rigid scrutiny, by transmitted and reflected lights, under various achromatic powers up to $\frac{1}{4}$ in. I am not able to confirm all the observations recorded by Mr. Clark, and presume that some of them may

* This may be a foreign species, as the aperture is said to be somewhat contracted; but as the protuberance is further said to be central, it is probably, as Hanley supposes, a form of *B. glabra*. "*D. imperforatum*, Walker, Mont.," is cited as a synonym: perhaps the author may have been misled by the figure in Wood (no. 12), which corresponds with *D. imperforatum*, but is clearly intended to represent *D. glabrum*.

have been made from imperfect specimens. I have searched in vain for the Siliquaroid windlass and fringe and the Polystomelloid loculi. The ordinary shape is like that of a common brown basin—flat in the middle, where the spiral elements are very rarely discernible, with the sides flattened, diverging at a greater or less angle, and with a strong rib bounding the medial portion, and proceeding in about seven spiral turns (or less) to the periphery. Although presenting analogies with the opercula of some of the *Bivoniae*, it appears much more nearly related to the *Turritellidae*, from which it differs in being bent outwards instead of inwards. The peculiar characters are not so constant as might be expected, and perhaps depend in part on the amount of contraction of the animal in drying. One specimen was found with but very slight excurvation: a few were pretty regularly convex, instead of being trigonal; and in these the central area was not marked off by the rib, which proceeded to lose itself gradually towards the apex. The flattened part is about the size of the first tube of the shell; the whole diameter, about .012. The spiral rib is also found, more or less developed, in species with a concave operculum.

The *Brochus arcuatus* of Brown proves to be a veritable *Brochina glabra* in a transition state. After I had described and returned Mr. Alder's apparently plugless specimen, it came in two in his hands, displaying a duly formed plug in the middle. The decollated portion, which was abnormally persistent, having been open, seems to favour the hypothesis I had ventured to suggest from the complex character of the plugs in *Cæcidæ*, that they are not mere septa continually cast off and renewed, but an integral part of the structure, removed from time to time with additional layers. Some eminent naturalists, however, state that this is impossible.

37 b. ? BROCHINA ? GLABRA.

Hab. W. Indies, in sponge of commerce.

Very few W. Indian specimens were found of this form; and of these only three were sufficiently perfect to allow of identification. These did not present any characters by which they could be distinguished from the European species; but they await a knowledge of the operculum.

38. ? BROCHINA GLABRIFORMIS, Cpr.

? *B. t.* " *B. glabræ* " *simillima, sed septo mamillato tumentiore, fere hemisphærico: operculo?*

Long. .073, lat. .017.

Hab. Mazatlan, extremely rare. Mus. Brit. &c.

Maz. Cat. p. 327.

This species is kept provisionally separate, at least till the operculum has been examined. The shell alone affords no satisfactory mark of specific separation.

Genus MEIOCERAS*.

Testa adolescens solute spiralis, haud planata; adulta sæpe inflata. Apertura obliqua. Operculum spirale, extus concavum; anfractibus linea spirali instructis.

Cæcum, pars, Stimpson. (Pars = *Inflatulum*, B. M. Maz. Cat. p. 314, note *.)

The young shells of this group might easily be passed over as *Vermetidæ*; when perfect, however, the minute plug displays their Cæcous origin, while their peculiar growth, in a loose spiral instead of a plane, seems to warrant their separation. The young and adult shells have been found together (1) fossilized in the coral rocks of Barbadoes†, (2) in recent shell sand from the W. Indies, and (3) in the coarse sponge of commerce. The peculiarities of the adult form are easily explicable from its spiral origin. If the decollated parts had remained, *Meioceras* would bear a loose resemblance to *Helicoceras*, and *Cæcum* to *Toxoceras*. It is presumed that these creatures are more stationary in their habits than *Cæca*; their mode of growth would enable them to keep pace with sponge, but would be inconvenient in crawling through the narrow passages in which *Cæca* have been found. All the species found are glossy, without sculpture, and with a texture often partly opaque, partly transparent, in irregular concentric bands interrupted by longitudinal ribs, like the framework of inflated fashionable dress. The adult shells can scarcely be distinguished from *Fartula*, the irregularity of outline being the best criterion.

39. MEIOCERAS NITIDUM, Bean, MS.

M. t. nitidissima, vitrea seu subcornea, subdiaphana; fusca, seu albida et candida nebulosa; adolescente anfractibus paucis, rapide augmentibus; t. adulta valde gibbosa, plerumque maxime inflata, utraque extremitate constricta; apertura valde declivi, circiter angulum 130° planum apicis respiciente; margine antico maxime arcuato, postico subplanato: septo submucronato, conico, marginibus laterali et dorsali rectis, apice parum elevato, acutius, dorsali: operculo parum concavo, linea spirali extante instructo; anfractibus paucis, circiter v.

Variat t. magis elongata, minus inflata.

* μέιον, rather small; κέρας, horn.

† Not from Grignon, as erroneously stated in the note, p. 314 of the 'Mazatlan Catalogue.' Those who possess the work are requested to cancel the note altogether. The very faulty name *Inflatulum* was simply intended as a section under *Cæcum*, founded on the shape only. As the peculiar shape is found to vary even in the species, and as the true generic character is in the *Cornucopiæ*-shaped growth of the adolescent shell, I gladly adopt the excellent name given at my request by Mr. H. Adams. The finding of the fossil specimens was due to the skilful labour of the late Mary Clow, the faithful attendant of S. Worsley, Esq., long known as (though blind) the zealous investigator of the Inferior Oolite fossils of Dundry. It was to serve as eyes to guide his knowledge, that I commenced the study of shells.

? = *Cæcum nitidum*, Stimps. Monogr. Cæc. U.S. in Proc. Bost. N. H. S. Oct. 15th, 1851, p. 112*.

While size and shape are tolerably good guides in examining adult *Cæca*, they afford very little character in *Meiocerata*. As the adult shell might be formed either out of a bend in the spire or a straightened prolongation, it might assume the peculiar form of the species, or a thinner, longer condition. The spiral formation also gives more or less of twist to the axis even of the adult shell, which causes specimens to roll over at a touch, and makes the examination even of the profile of the plug a matter of difficulty. The same cause may also make the shape of the plug itself not quite so constant as usual. More than 150 specimens have been examined, of which three possessed their opercula.

Test. adolesc. long. .058, lat. .006—02.

Test. adult. normal. long. .088, lat. .013—027.

Test. adult. elong. long. .091, lat. .014—027.

Test. adult. obes. long. .068, lat. .015—03.

Hab. W. Indies, in shell sand, and sponge of commerce; fossil in coral rock, Barbadoes (*Dr. Cutting*); ? Florida (*Stimpson*). Mus. Brit. &c.

40. *MEIOCERAS CORNUCOPIÆ*, n. s.

M. t. "*M. nitidum*" *simulante; sed minore, minus inflata; t. adulescente anfractibus minus rapide augmentibus; septo mucronato, mucrone acutissimo, haud elongato, a superficie subplanato subito ascendente; margine laterali valde incurvato: operculo?*

Variat mucrone elevato.

Test. jun. long. .048, lat. .007—015.

Test. adult. elong. long. .09, lat. .012—02.

Test. adult. compacta long. .064, lat. .013—018.

About 120 specimens were found, of which one apparently possessed a thin, scarcely concave operculum. A high power, however, displayed a texture without trace of spiral elements; and it was probably formed of adventitious matter. Some forms of this species run into aberrant forms of the last: but it may in general be easily distinguished, in the young shell by the more gradual increase; in the adult by the small size and slight inflation; and in all stages by the very sharp mucro, with concave sides.

Hab. W. Indies, in sponge of commerce.

41. *MEIOCERAS CORNUBOVIS*, n. s.

M. t. "*M. cornucopiam*" *simulante; sed septo subungulato; apice angusto, submucronato; margine laterali plus minusve convexo, sæpe inflato: operculo satis concavo; extus lamina*

* Mr. Stimpson's diagnosis does not speak of the plug, and might accord with any of the three species here proposed. It will save much confusion between this and Mr. Bean's MS. name, should the two (on comparison of specimens) prove to be identical.

extante spirali fortiori, anfr. circiter xii. definiente, nucleum versus obsoleta; intus umbone satis prominente, superficie striulis minimis concentricis ornata.

Variat apice parum seu valde elevato.

Test. adult. gibbosa, long. .063, lat. .013—.022; div. sept. et apert. 130°.

Test. adult. normalis, long. .067, lat. .013—.02; div. sept. et apert. 105°.

Test. adult. elongata, long. .082, lat. .016—.022; div. sept. et apert. 105°.

About 240 specimens have been examined, of which three possessed their opercula. In one, the spiral raised bar is distinctly traceable to the very apex; in another it is only seen for about eight whorls. The same difference is recorded under *Brochina glabra**. The shells go through the same changes of form as in the last species; and many specimens display the same "crinoline" pattern in the transparent and opaque banding. It is in general easily distinguished by the shape of the plug, which, even when the apex is but slightly raised, is still somewhat tumid, while in *M. cornucopiæ* the lateral outline is concave. Aberrant specimens exist in all the species which cannot be discriminated with confidence. It is possible that the forms with the high pointed plug belong to a fourth species, perhaps a *Fartulum*, allied to *C. teres*; but they have here been distributed among the rest according to the balance of characters.

Genus STREBLOCERAS†.

Testa haud decollata; vertice nucleoso orbiculari, planæ tuberculari perpendiculariter affixo. Habitus increscentis plerumque orbicularis, seu subtortuosus.

This earliest known Cæcid preserves in its adult state the first stage of *Cæcum*,—the whorls not being decollated, nor any plug formed. The shells are too large and too numerous to be supposed rudimentary, especially when the extreme rarity of the "Cornuoides" form even in recent *Cæca* is taken into consideration. It bears the same relation to *Cæcum* that *Rimula* does to *Glyphis*‡, and, as far as the shell is concerned, forms an easy passage to *Vermetus*. The plane of growth is generally flat, as in *Cæcum*; but some specimens have a slight twist, forming an approach to *Meioceras*. In

* Having succeeded in extracting one of the opercula, .018 in diameter (in which the concavity was about .002, the inner boss about .001), I was surprised to find, on the second day's examination, that it presented fewer whorls, and those further apart, than before. On investigation, it appeared that the whole margin had bent over inwards, giving the object the appearance of an elf's "wide-awake" hat. The tiny article was then caused to balance on its reflected margin, in which position the strong ribs presented much the appearance of the lost operculum described under *Cæcum bimarginatum*.

† στρεβλός, *twisted*; κέρας, *horn*.

‡ B.M. Maz. Cat. pp. 213, 220 = *Lucapina*, pars, H. & A. Ad., non Gray, = *Capiluna*, Gray, Guide Moll. 1857, p. 166. The proof sheets of the Maz. Cat., bearing date May 1856, were submitted to Dr. Gray's inspection.

the nuclear whorls it is set perpendicularly to the plane of the adult, in this respect also differing from *Cornuoides* of Brown. As his genus must be expunged, being constituted only for young *Cæca*, the name is retained for the typical species.

42. *STREBLOCERAS CORNUOIDES* (Brown), n. s.

St. t. elongata, haud rapide augente; vertice nucleoso magno, anfr. ii. et dimidio, tumentibus; habitu increscentis subregulariter arcuato, interdum vix tortuoso; superficie lævi, seu lineis increscentibus concentricis; apertura haud contracta, haud tumida.

Long. .08, lat. tubæ .008—.015.

Lat. verticis .01—.014.

Hab. Fossil in Eocene beds, Hempstead and Barton (*Edwards*). Mus. Brit.

Twenty-three specimens of this very interesting shell were found by Mr. Edwards, and were alluded to by Searles Wood and by Forbes and Hanley: their peculiarities, however, do not seem to have been recorded till the present time. There is no trace of plug in the few specimens which have lost the nuclear whorls. Only one specimen was found from Barton, with one of the next species.

43. *STREBLOCERAS SOLUTUM*, n. s.

*St. t. elongata, tereti; vertice nucleoso minimo, anfr. ii. tumidi-
oribus; t. adolescente rapide augente, lævi; dein subito
lineis concentricis exillimis, creberrimis ornata, subcylindrica;
habitu increscentis subregulariter arcuato, seu vix tortuoso;
apertura haud contracta, haud tumida.*

Long. .082, lat. tubæ .004—.015.

Lat. verticis .0035—.004.

Hab. Upper Marine Beds, Hordwell, 6 specimens; Barton, 1 sp. (*Edwards & Higgins*). Mus. Brit.

Of this very distinct species, three broken specimens were found by Mr. Edwards in the Upper Marine beds at Hordwell, and one nearly perfect from Barton, along with *St. cornuoides*. Mr. Higgins was fortunate enough to find three specimens, of which two possessed the minute nuclear coils. These are not half the size that they are in the last species, though in the adult state it is a trifle the larger of the two. For about one-fourth of the entire length, the shell is smooth and increases rapidly: it then suddenly becomes minutely striated, and adopts the habit of growth of *St. cornuoides*.

To assist the student in the identification of species, an abstract, giving the principal distinctive characters at a glance, is here appended.

ANALYSIS OF SPECIES.

Species.	Shape and Sculpture.	Mouth.	Operculum.	Plug.	Profile of Plug.	Locality.
1. Cæcum (Elephantulum) subspirale ..	very fine parallel striæ; long ..	swelling ring ..	concave: fine spiral line.	mucr. subdextr. subspiral.	flat	Mazatlan.
2. ——— abnormale	very fine parallel striæ; extremely short, and bent.	swelling ring ..	?	mucr. dextral ..	flat	Mazatlan.
3. ——— insculptum	deeply cut square ribs	not swollen ..	?	ungulate ..	triangular	Mazatlan.
4. ——— laqueatum	fine ribs	not swollen ..	?	mam.-mucronate ..	convex, apex lateral ..	Panama.
5. ——— obtusum	fine ribs	not swollen ..	?	mam.-ungulate ..	convex, apex dorsal ..	Mazatlan.
6. ——— plicatum	short; sharp ribs, fine concentric striæ ..	swollen ..	?	mucronate ..	flattened	W. Indies; Mauritius.
7. ——— liratum	very fine ribs	?	?	mucronate ..	flattened	Cor. Crag, fossil.
8. ——— liratoinctum	ribs and obsolete rings near mouth ..	ringed	very concave: strong spiral rib.	mucr.-ungulate ..	concave	Mazatlan; ? Singapore.
——— var. tenuiliratum ..	ribs very fine	ringed .....	.....	mucr.-ungulate ..	less prominent ..	Mazatlan.
——— " subobsoletum ..	alabastrine; sculpture evanescent ..	ringed .....	.....	mucr.-ungulate ..	very prominent ..	Mazatlan.
——— " subconicum ..	normal	ringed .....	.....	mucr.-ungulate ?	? ..	Mazatlan.
9. ——— heptagonum	rounded rings, crossed by 7 corners ..	?	?	mucr.-ungulate ..	concave	W. Indies.
10. ——— imbricatum	concentric furrows, 8-14 longitudinal corners.	not swollen ..	?	mucr.-ungulate ..	concave	W. Indies; Aden.
11. ——— (Anellum) annulatum	large; strong rings, decussated	much swollen ..	?	mucronate ..	concave	Mazatlan.
12. ——— elongatum	long; faint rounded rings	swollen	?	ungulate ..	triangular	Mazatlan; ? Japan.
——— var. semilæve	rings and smooth spaces alternating ..	much swollen ..	?	ungulate ..	triangular	Mazatlan.
13. ——— subimpressum	long; close, faint, rounded rings	swollen	conc.: spiral rib	mucronate ..	subconcave	Mazatlan.
14. ——— pulchellum	stout round rings	not swollen ..	concave	mamillate ..	convex	N. England.
15. ——— trachea	close, faint, round rings; minutely decussated.	not swollen ..	conc.: spiral rib	ung.-mucronate ..	triangular	Europe, recent and fossil.
15b. ——— ? ——— var. obsoletum ..	small, slender, faint sculpture	not swollen ..	?	subungulate ..	concave	Egean.
16. ——— gurgulio	stumpy; round rings not decussated ..	not swollen ..	?	mucronate ..	triangular	W. Indies.
17. ——— tumidum	nearly smooth	much swollen ..	?	mamillate ..	convex, apex lateral ..	Cor. Crag, fossil.
18. ——— firmatum	stout rings, subquadrate	not swollen ..	concave	ung.-mucronate ..	triangular	Panama; Mazatlan.
19. ——— quadratum	small; squared rings	not swollen ..	very concave: spiral line.	mucronate ..	concave	Mazatlan.
——— ? ——— var. compactum ..	stumpy; interstices evanescent	not swollen ..	?	mucronate ..	concave	Mazatlan.
20. ——— clathratum	large; distant, rather sharp rings ..	not swollen ..	?	mucronate ..	nearly flat	Mazatlan.
21. ——— Floridanum	sharp, distant rings	swollen	?	mucronate ?	? ..	Florida.

22. — regulate.....	large, slender ; sharpish rings	slanting, con- tracted.	?	mucronate	slightly convex ...	W. Indies ; Singapore ; Australia.
23. — — — — — fragile	very slender ; sharpish rings	swollen	?	?	flattened	Japan.
24. — — — — — elegantissimum.....	long, small, glossy ; distant sharp rings.	not swollen ...	?	mucr.-ungulate	concave	Teneriffe.
24b. — — — — — ? — — — — — var. Scarles-Woodii	long, small, glossy ; close obsolete rings.	not swollen ...	?	ungulate	triangular	Teneriffe.
25. — — — — — undatum	stumpy ; distant, sharp rings	slanting	concave	ungulate	triangular	Mazatlan.
26. — — — — — (Fartulum) laeve	stumpy	slanting	concave	ungulate	triangular	Mazatlan.
27. — — — — — bimarginatum	stumpy	slanting	nearly flat : dou- ble margin.	ungulate	triangular	Singapore ; Australia.
28. — — — — — farcimen	stumpy ; a few obsolete rings	slanting	slightly concave	ung.-mucronate	slightly swollen ...	Mazatlan.
29. — — — — — vitreum	slender	rather slanting	?	mucronate	slightly concave ...	Teneriffe.
29b. — — — — — ? — — — — — var. Clarkii	more slender	rather slanting	?	ungulate	swelling	Teneriffe.
30. — — — — — pollicare	more slender ; minutely corrugated	rather slanting	?	ungulate	triangular	Teneriffe.
31. — — — — — corrugulatum	more slender ; minutely corrugated	rather slanting	?	? mamillate	convex	Mazatlan.
32. — — — — — dextroversum	large, slender	not swollen ...	slightly concave	mam.-ung. dextr.	very convex.....	Mazatlan.
32b. — — — — — ? — — — — — var. Antillarum...	large, slender	not swollen ...	?	?	?	W. Indies.
33. — — — — — subquadratum	very small, slender.....	sharp	?	mam.-ungulate	subquadrate.....	Australia.
34. — — — — — reversum	slender	sharp	?	mucr. reversed	rather convex	Mazatlan.
35. — — — — — teres	long, slender, slightly angulated	rather slanting	scarcely concave	mucronate	nearly flat	Mazatlan.
36. — — — — — mamillatum	long, solid	swollen	?	mucronate	very concave	Cor. Crag, fossil.
37. Brochina glabra	slender, small	sharp	convex : spiral rib	mamillate	convex	Europe.
37b. ? — — — — — ? — — — — —	slender, small	sharp	?	mamillate	convex	W. Indies.
38. ? — — — — — glabriformis	slender, small	sharp	?	mamillate	very convex.....	Mazatlan.
39. Meioceras nitidum	extremely inflated	very slanting..	scarcely concave: strong spiral rib, distant whirls.	submucronate	triangular	W. Indies, rec. & fossil.
40. — — — — — cornu-copie	slightly inflated	rather slanting	?	mucronate	concave	W. Indies.
41. — — — — — cornu-bovis	slightly inflated	rather slanting	concave : strong spiral rib, close whirls.	ung.-mucronate	convex	W. Indies.
42. Streblocheras cornuoides	long, smooth ; large nucleus	sharp	?	0	0	Hempstead, Eoc., fossil.
43. — — — — — solutum	slender ; small nucleus	sharp	?	0	0	Barton, Eocene, fossil.



Carpenter, Philip P. 1858. "First Steps towards a Monograph of the Caecidae, a Family of Rostriferous Gasteropoda." *Proceedings of the Zoological Society of London* 1858, 413–443. <https://doi.org/10.1111/j.1469-7998.1858.tb06397.x>.

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