with the exception of the one now under notice, we find that that finger has only *three* bony phalanges*. There are, however, several characters present which appear to belong exclusively to the present genus, such as the form of the snout and nostrils, the singular markings on some of the membranes, and the peculiar quality of the fur.

EXPLANATION OF PLATE LIV.

Fig. 1. *Mystacina tuberculata*, three-fourths of the natural size.

a. Head of the same, of the natural size.

b & c. Cranium of the same, of the natural size.

d. Magnified representation of the front teeth of the same.

Fig. 2. Magnified representation of the front teeth of *Nyctinomus dilatatus*, showing the resemblance between them and the same parts in *Mystacina tuberculata*.

3. ON THE JAMAICAN CYCLOTUS, AND THE DESCRIPTION OF TWENTY-ONE PROPOSED NEW SPECIES AND EIGHT NEW VARIETIES OF THAT SUBGENUS FROM JAMAICA BY THE HON. EDWARD CHITTY.

Before entering upon the task of description, it seems advisable to offer a few observations upon the difficulty which has hitherto surrounded this group of *Cyclostomidae* inhabiting Jamaica.

The late Professor C. B. Adams, in *Contr. to Conch.*, No. 8, p. 140, *et seq.* wrote an article upon it; and although the required study enabled him to add seven new species to the former Jamaican list, a perusal of his paper will show that he laboured under great doubts and without clear satisfaction as to the result. The fact is, that almost all the species in the *Jam. Cat.* of Adams†, 1851, from No. 68 (for *C. Duffianus*, No. 67, is not a Jamaican, but a South American species—*fide* Adams and Mr. Bland, who found duplicates in South America), to No. 77 inclusive, run so much into one another in outward form of the mere shells, *wanting the opercula*, that it is next to impossible to classify them. There is also the difficulty of young and old shells intermingled, which, as regards some of the species, renders the "confusion worse confounded," particularly in the young of *C. Jamaicensis*, and the more mature of *C. crassus*.

The group in question, and many others, lead me to the firm conviction that, unless the differences are very marked, a single specimen

* A similar peculiarity occurs in the genus *Centurio*, which, when first described by Dr. Gray, was thought to be a native of the Old World, but there was some doubt as to the exact locality from which it had been received. But other examples have been since obtained from the New World, and its near alliance with the tailless *Phyllostomidae* satisfactorily established. The existence therefore of *four* phalanges in this finger in *Centurio* cannot be considered, as in *Mystacina*, as an exception to a general rule, but on the contrary as a further extension of it.

† Whenever the name "Adams" is mentioned in these communications, the late Professor C. B. Adams, of Amherst College, America, is referred to, unless otherwise specified.

is not to be trusted; and that it is only by a multitude of specimens, perfect as regards maturity and possession of opercula, that truth can be arrived at, and species determined.

The difficulty with Adams, as with myself, has hitherto been the want of the original types of the fundamental shells, so to speak. I allude especially to the types of *C. corrugatus*, Sow.; *C. subrugosus*, Sow.; *C. Jamaicensis*, Chemn.; and *C. asperulus*, Sow. [Of *C. suturalis* there never was a doubt.] That difficulty is evidenced by his note of interrogation "?" at p. 143, (*id.*) after "1 *C. corrugatus*," and his description of "No. 1, *C. corrugatus*" below, which most clearly refers to a species, which to my certain knowledge he has distributed indiscriminately as *C. corrugatus* and *C. jugosus*. So he made up the collection which some time ago I presented to the British Museum. I know that the presence or absence of the umbilical keel was a guide he was always looking for. He did not seem to understand Sowerby's description "umbilico magno, crenulato, intus transversim striato." *Vid.* Cont. Conch., p. 143. And beyond a doubt, his description of the operculum of *C. corrugatus* at p. 143, *id.* cannot for a moment be reconciled with Pfeiffer's in Cat. Phaneropneumona, p. 13.

Mr. Cuming's liberality in lending his choicest specimens for science's sake is too well known to require my commendation. To him I am now indebted for the loan of his types of *C. corrugatus*, *C. jugosus*, *C. subrugosus*, *C. Jamaicensis*, *C. seminudus*, *C. varians*, *C. crassus*, and *C. asperulus*, all of which have passed through Pfeiffer's hands: and I have examined those in the British Museum.

C. asperulus is not in my collection, though amongst those I am about to propose as new species, some approach very near to it. The two specimens (one with part of the operculum) in the Cumingian Museum, and those in the British Museum are somewhat like in character to Jamaica shells, especially *C. crassus*, in regard to absence of umbilical keel, and *C. rudis-planusque* (after mentioned) as regards operculum; and I do not wish to cast a doubt as to its habitat being Jamaica, though I have not fallen in with it.

Pfeiffer, in Cat. Phan. p. 13, has indicated that *C. corrugatus* was in the British Museum when he wrote; but unfortunately the specimens there under that name vary so much in their opercula, that it is impossible to say to which he referred. In fact, his description is believed to have been taken from one in the Cumingian Museum. But there again, equal doubts and uncertainty exist. Some shells, all named by Pfeiffer, having opercula of the character of those of *C. Jamaicensis*, are marked "*C. corrugatus*," and others are similarly marked with the addition of "var.," the opercula of which answer his description in Cat. Phan., p. 13, and have the precise character of that which it is my intention to adopt as the true *C. corrugatus*, those characters being totally dissimilar. Thence an interminable confusion exists, which it is very difficult to disentangle.

It seems to me that Sowerby and Pfeiffer have had only single specimens to deal with, and not knowing how many forms of opercula there are, have certainly not been very minute in their descrip-

tions, and have not perhaps set sufficient value on those differences, which they had an opportunity of observing; while Adams saw great differences, but from the want of *many* specimens feared to give specific importance to them.

I should not have adopted the independent course of disregarding previous naming or descriptions, nor attempt to propose new species, had I possessed a few specimens of each only. But having of almost every species plenty of perfect specimens, and having them so arranged that I know the precise habitat of almost all, I feel there is abundant justification for my proceeding. Sowerby's description of the operculum of *C. corrugatus* is (doubtless from causes before alluded to) so very meagre, that it is utterly impossible to say to what shell he referred. Pfeiffer, Gray, and Adams have all been misled: for every Jamaican *Cyclotus* has its operculum "*extus laminā elevatā.*" But it will be found that the description which I shall give of the operculum of *C. corrugatus*, does not militate with, but only enlarges upon Pfeiffer's, which is "with whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded lamina." While the shells which Adams has distributed, (and at p. 143, Cont. Conch. has described with a "?") as *C. corrugatus*, and which Gray has marked "*C. corrugatus* var." in the British Museum, militate very strongly with Pfeiffer's description, and also exactly agree with the opercular type of *C. jugosus*, which type is so peculiar that it can hardly be supposed that Sowerby would not have especially noted it.

Aided by what now appear marked differences in other parts of the shells, my principal guide to the new species I am about to propose has been the *Operculum*. I am aware that some have to a certain degree discarded the operculum as a specific test: yet a careful examination of my Jamaican *Cyclotus*,—the careful gathering together, all from one extensive and rich field,—will tend to the conviction that such a repudiation is not correct. We find the forms of opercula constant in all other subgenera and species of *Cyclostomidæ*, with equal certainty in shape and sculpture; and by more than analogy the opercula of the Jamaican *Cyclotus*, accompanied by differences in other parts of the shell, are specific guides and of specific importance.

I propose for consideration that there are *six distinct forms of opercula* in the Jamaican *Cyclotus*.

FORM § I. *that of C. corrugatus*, Sow.

Sowerby, in Pro. Z. S., 1843, p. 30, describes the operculum of it as "*testaceo, extus laminā elevatā, convolutā; intus corneo, polito,*" testaceous with elevated convolute lamina outside (or on the upper side), and horny and polished on the under side.

Pfeiffer, in Cat. Phan. p. 13, describes it as "with whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded lamina."

I should describe the *typical* form of the operculum of that which I adopt as *C. corrugatus*, "with lamina rising more or less, and well separated from the plane of the operculum, bending outwards;

the upper margin, more or less dilated and reflected, so as to lie more or less parallel to the plane of the operculum, but not so much as to touch each consecutive whorl. Plane of operculum plain."

FORM § II. *that of C. varians, Ad.*

Operculum with outward-spreading whorls raised from its plane, the upper margins of which are thickened and inflected, and reflected, so as to meet and touch each consecutive whorl; and form a corrugated, almost entire, planular surface; and when broken in half, forming on either side something like a number of italic capitals, *TT* *T T*, or the rails of a railway. Where concave on the outer surface, the concavity is formed by the increasing height of the lamina, the under side (as far as I have seen) being always planular.

FORM § III. *that of C. seminudus, Ad.*

Operculum with slightly elevated, bluntly thickened, and broadly expanding whorls, the edges of which are wholly appressed to, and not separated from the plane.

FORM § IV. *that of C. Jamaicensis, Chemn.*

Operculum with moderately raised narrow lamellar whorls, which are flattened and blunt at the margin, and very slightly and narrowly expanded and reflected outwards; the plane of the operculum always excentrically and sharply striated by lesser raised laminae.

FORM § V. *that of C. Rupis-Fontis, Chitty.*

Operculum with well-raised whorls, which are sharpened at the margin, and stand almost vertical with the plane, the margin being neither reflected nor inflected.

FORM § VI. *that of C. jugosus, Ad.*

Operculum with highly raised whorls, the margins of which are sharp, and more or less inflected, convex interiorly and concave exteriorly.

These differences are broad enough whereon to found sub-subgenera, but from that I abstain.

Under FORM § I. I place my *C. corrugatus* and var. *a*, *C. Portlandensis*, *C. notatior*, and var. *a*, *C. notatus*, *C. Novæ-Spei*, *C. cycloatus*, *C. dubiosus*, and *C. suturalis*.

Under FORM § II. *C. varians* and var. *a*, *C. subrugosus*, *C. corrugator*, and var. *magna*, *C. gemma*, and *C. zigzag*.

Under FORM § III. *C. seminudus*, *C. De Burghæanus*, *C. rudisplanusque*, *C. pretiosus*, *C. Bairdianus*, *C. ruber*, and *C. asperulus*.

Under FORM § IV. *C. Jamaicensis*, *C. Novus-Saltus*, *C. dentistigmatus*, *C. crassus*, and *C. inutilis*.

Under FORM § V. *C. Rupis-Fontis*, and *C. corrugatissimus*.

Under FORM § VI. *C. jugosus*, and vars. *rufilabris*, *parvus* and *striatus*, *C. pallescens*, *C. Westmorlandensis*, *C. nodosus*, and *C. Beswicki*.

N. B. Of *C. perpallidus*, the operculum is still unknown.

I do not place much value on the outward form, sculpture, and size of these *Cyclotus*, and, wanting the opercula, regard the classification of them as very difficult; I will, however, proceed to the more particular description of each species and variety as I find them in my own private cabinet, taking them in the order already mentioned.

§ I.

C. CORRUGATUS, Sow. Proc. Z. S. 1843, pp. 29, 30.

Sowerby's entire description is, "*C. testâ orbiculatâ, subdepressâ, crassiusculâ, albidâ, apice rufescente; epidermide tenui, fuscâ, indutâ; spirulâ subprominulâ, acuminatusculâ; anfractibus quinque, rotundatis, transversim striatis et corrugatis; suturâ distinctâ, aperturâ circulari, subeffusâ, supernè angulatâ et in canalem inconspicuam desinente; peritremate tenuiusculo, margine acutiusculo, latere umbilicali incrassato; umbilico magno, margine crenulato, intus transversim striato. Operculo testaceo, extûs laminâ elevatâ, convolutâ, intûs corneo, polito.*"

C. CORRUGATUS, Pfr. Cat. Phan. p. 13.

Shell subturbinate-depressed, solid, regularly all over angularly wrinkled, white, with a deciduous fulvid epidermis; *spire* short, reddish, rather acuminate; *whorls* 5, convex, the last one cylindrical, nearly flat beneath, *with a nodulous ridge around the umbilicus*, which is open, and of a middle size; *aperture* a little oblique, nearly circular, with a slight angle above, inside whitish; *peristome* straight, blunt; its margins joined into an angle, which often is doubled; right margin slightly sinuate; left margin shortly affixed to the penult whorl. *Operculum* concave externally, with 9 very narrow whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded laminæ. Height 14, greatest breadth 22, least breadth 19 mill.—Cat. Phan. p. 13.

C. CORRUGATUS, Chitty.

The shell I adopt as *C. corrugatus* I describe as "depressed-turbinate: colour blueish-white, with an epidermis of rich red-brown and yellowish-brown; just below the suture and apex, rich red-brown; salmon-colour tinge within the aperture. *Sculpture*, the $3\frac{3}{4}$ upper whorls, excepting the nuclear apex, with the lines of growth strongly but finely defined, without wrinkles. Thence the lines of growth become coarser and coarser throughout the remainder; coarser and coarser wrinkles diagonally from right above to left below on the penult whorl, the wrinkles gradually assuming a zigzag form, till they become very coarse at the periphery of the last whorl, and then eccentric curvilinear grooves which terminate and are deepest, but are not tooth-marked at the umbilical keel, which is well raised, the terminating fourth part of the last whorl becoming comparatively smooth. *Spire*, moderately elevated, with convex outlines. *Whorls*, $5\frac{1}{4}$, moderately rounded, rather flattened above, and spreading below, with moderate suture; the terminal half of the last

whorl much depressed above, at, and behind the aperture. *Aperture*, rather oblique in incomplete shells, subelliptical and subangular above, like a hanging pear—in finished shells, subcircular, rather dilated below on the right side, and the angularity above becoming almost obsolete by the thickening of the outside. *Peritreme*, well thickened and blunt all round. *Umbilicus*, deep and comparatively narrow; greatest breadth, that is from side to side at the *umbilical keel**, about 0·36, and least breadth 0·28. *Umbilical keel*, narrowly and roundly pinched up, the striae of growth extending over it imbricatedly from the hollow. *Operculum*, greatest breadth 0·51, least breadth 0·46—slightly concave externally, with about† 9 outward bending, spiral whorls of laminae rising from its plane, the summits of which spread, and are reflected outwards, but widely separated from one another, nearly parallel to the plane, and striated eccentrically, as like water flying off a turned wheel by centrifugal force; lamina well detached above from the plane, and from each other whorl. Height of shell, 1 inch; greatest breadth 1·2, least breadth 1 inch‡.

C. CORRUGATUS, var. *a* (?), Chitty.

This shell differs from *C. corrugatus* in being much smaller. Height 0·8, greatest breadth 0·94, least breadth 0·75; greatest breadth of *umbilicus* 0·27, least breadth 0·2; greatest breadth of *operculum* 0·43, least breadth 0·37. The corrugation is finer. It is sometimes *quasi* smooth below, and marked with bands like *C. Jamaicensis* with transverse raised sub-obsolete lines. *Umbilical keel* is less prominent.

Whorls 5. Whorls of operculum about 6 or 7.

C. PORTLANDENSIS, Chitty. Portland.

Form, depressed-turbinate. *Colour*, blueish-white with a deep bistre brown epidermis; apex blood-red sometimes. *Sculpture*, $3\frac{1}{3}$ of upper whorls coarse, striae of growth becoming thenceforth deeply corrugated vertically on the upper part of the last whorl until about the last third, where the corrugation ceases; the striae of growth are finer and a few pits occur, and a few transverse obsolete ridges appear. No corrugation at the periphery: a few pits, and a slight corrugation surround the outside of the umbilical keel. Umbilical keel and striae of growth within the umbilicus are much stronger than in *C. corrugatus*. *Spire*, and outlines like *C. corrugatus*. *Whorls*, $5\frac{1}{3}$, last whorl and about $\frac{1}{4}$ th of penult whorl depressed above, below the suture. *Aperture*, like *C. corrugatus*, but rather more expanded on right than on left side; oblique to axis, as *C. corrugatus*. *Peritreme*, like *C. corrugatus*. *Umbilicus*, much wider in

* The measurement of the *umbilicus* in all instances is taken from side to side from the inner edge of the *umbilical keel*, taking care that the *points* of the compasses shall be at a right angle with the axis of the shell.

† The nuclear centre and second whorl are probably never seen in mature shells, from their extreme delicacy while young, which causes the appearance of being devoid of laminae in the extreme centre.

‡ All my measurements are in decimals of an inch.

proportion than *C. corrugatus*: greatest breadth 0·32, least breadth 0·26. *Operculum*, of general character of that of *C. corrugatus*: greatest breadth 0·45, least breadth 0·41; whorls, about 10, much closer approaching each other than in *C. corrugatus*, and spread of margin much less; slightly concave. Height 0·85, greatest breadth 1·07, least breadth 0·88.

C. NOTATOR. Chitty. St. Elizabeth.

Form, colour, and *sculpture* much like *C. corrugatus*, finer in proportion. *Whorls* 5, a slight depression only on upper part of last whorl. *Umbilical keel*, not so distinctly raised, but broader in proportion: greatest breadth 0·25, least breadth 0·2. *Operculum*, of *C. corrugatus* character, slightly concave: raised lamina of 8 whorls, the margin scarcely reflected. Height 0·59, greatest breadth 0·8, least breadth 0·61.

C. NOTATOR, var. *a*, Chitty. Yallahs Hill.

Is much smaller and finer in sculpture, and the umbilical keel is much less prominent in proportion. Height 0·46, greatest breadth 0·61, least breadth 0·53.

C. NOTATUS, Chitty. Trelawny.

Sculpture, fine and almost smooth, with a slight corrugation on the upper part of latter half of the last whorl, which is devoid of depression in its upper part. *Umbilicus*, greatest breadth 0·17, least breadth 0·16. *Umbilical keel*, almost obsolete. *Operculum*, character of *C. corrugatus*, more concave than preceding; spiral lamina, about 8 whorls, upper margin scarcely reflected. Height 0·58, greatest breadth 0·64, least breadth 0·56.

C. NOVÆ-SPEI, Chitty. New Hope, Westmoreland.

This shell is very much corrugated on the last and a quarter of the penult whorls, and eccentrically and very deeply round the umbilical keel; from all others of its size it may be distinguished, even in worn shells, by the appearance of pits or indentations on its exterior, as though the keel (which is very prominent) had been bitten into its shape by pointed distant teeth. *Umbilicus*, greatest breadth 0·24, least breadth 0·18. *Operculum*, character of *C. corrugatus*; lamina 8 or 9 whorls, margin rather more broadly expanded and flattened than in *C. notatus*, slightly concave. Height 0·63, greatest breadth 0·82, least breadth 0·71.

C. CYCLOATUS, Chitty. New Hope.

Form, as usual. *Colour*, a broad band of rich brown-red extending round above and below the periphery, whence its name—and above and below, light dingy yellow. *Sculpture*, fine striæ of growth on upper three whorls, the remainder much coarser, corrugated below the suture, and below that, pitted; smooth and shining at the periphery; much pitted outside the umbilical keel, coarse lines of growth inside umbilicus. *Spire*, much depressed. *Whorls*, $4\frac{2}{3}$ rds, well

rounded with deep suture. *Aperture*, subcircular, angular (as usual) above. *Peritreme*, slightly indented above. *Umbilicus*, large, greatest breadth 0·27, least breadth 0·24. *Umbilical keel*, much raised on the inside, and moderately so on the outside. *Operculum*, more concave than the preceding; sculpture partakes of that of *C. corrugatus* and of *C. Jamaicensis*, the spiral lamina bending outwards, and its margin slightly reflected horizontally, as in the former, and the plane being strongly striated, as in the latter; 7, or perhaps, 9 whorls, convex on under side. Height 0·61, greatest breadth 0·88, least breadth 0·72.

C. DUBIOSUS, Ad., and *C. SUTURALIS*, Sow. See Cat. Phan. p. 12.

Habitat of *C. dubiosus* is north of "Holland Estate," near the "Ys" river. It is very scarce; and I never could obtain more than one small lot, of about nine or ten specimens, many not fresh; and only one with the operculum, the spiral lamina of which is very like in all respects to that of *C. suturalis* (see *id.*, p. 12); but has at least 7 whorls; these in both shells bend outwards, like to my type of *C. corrugatus*, with margins well reflected outwards, but scarcely horizontally, though more so in *C. dubiosus* than in *C. suturalis*; the under side of operculum is flat. *C. suturalis* is found in the higher mountains which run from Manchester, as far as New Hope, Westmoreland, in the west end of the island; but not, I think, near the spot where the former is found, though passing it.

§ II.

C. VARIANS, Ad. See Cat. Phan., p. 15, and *ante*, p. 145, as to formation of lamina on operculum. *Operculum*, planulate on the under side. Height 0·72, greatest breadth 0·9, least breadth 0·72.

C. VARIANS, var. *a.*, Chitty.

Is of a darker colour; the *operculum* is slightly more concave; the last part of the last whorl is nearly smooth, devoid of sculpture; the *umbilical keel* is not so wide, and the shell is much less depressed in proportion to its breadth. Height 0·72, greatest breadth 0·86, least breadth 0·67.

C. SUBRUGOSUS, Sow. See Cat. Phan., p. 15.

The description of operculum, wanting there, I am able to supply; Class *varians*, more planular, with 9 or 10, or perhaps more whorls of the spiral lamina; planulate below.

C. CORRUGATOR, Chitty. Gutter's Hill.

Form, much depressed-turbinate. *Colour*, light red-brown, inclined to pink, with a light brown epidermis. *Sculpture*, fine striæ of growth on the 1st and 2nd whorls, except on the nuclear apex; from about the completion of the 2nd whorl, the diagonal (from right above to left below) corrugation becomes very strongly and regularly defined, terminating, in regularity,

at about one half of the last whorl, where the corrugation becomes coarse, irregular, and ill-defined, till little more than coarse striæ of growth are seen behind the aperture. From the periphery downwards, the corrugations on the last whorl, for about its first half, are much closer together than those above, and lie almost horizontally, but inclining from left above to right below; and, outside the umbilical keel, the rest of the whorl below the periphery is much pitted. Striæ of growth inside the umbilicus rather fine. *Spire* much depressed, with convex outlines. *Whorls* nearly 5, well rounded with a deep suture. *Aperture* well rounded, slightly subangular above. *Peritreme* rather reflected, and spread on the right, sometimes double above; thickened (as is usual) on the left, and slightly detached from body-whorl. *Umbilicus* broad; greatest breadth, 0·35; least breadth, 0·31. *Umbilical keel* well developed. *Operculum* moderately concave above, planulate below, rather inclined to that of *C. corrugatus* form, from the cross lines on the margin of the spiral lamina being less developed, but otherwise like the *C. varians* type in general character of closeness to one another. 8 or 9 *whorls*, and still a vacuity in the centre. Height 0·7, greatest breadth 0·98, least breadth, 0·84.

Var. *minor*, Chitty, is much smaller; being, height 0·53, greatest breadth 0·8, least breadth 0·65.

Var. *magna*, Chitty, is much more conical; height 0·8, greatest breadth 0·92, least breadth 0·81.

C. GEMMA, Chitty. New Hope.

Form, very much depressed-turbinate. *Colour*, bluish-white, with a light brown epidermis. *Sculpture*, like to *C. corrugator*, but corrugation commences almost at the first quarter of the 3rd whorl; corrugation very marked in proportion to size, as in *C. corrugator*; sometimes in zigzag vertically, sometimes with diagonal arrow-head-shaped indentations, the points being on the periphery, on the last whorl. *Spire*, much depressed, with convex outlines. *Whorls*, $4\frac{1}{4}$, well rounded with a deep suture, last whorl much depressed. *Aperture*, widely expanded, especially on the right side and below, slightly angular above. *Peritreme*, well expanded on right side, more separated from body-whorl on left than in *C. corrugator*. *Umbilicus*, broad; greatest breadth, 0·21, least breadth, 0·16. *Umbilical keel*, almost obsolete. *Operculum*, same as in *C. corrugator*, with about 9 whorls. Height 0·41, greatest breadth 0·66, least breadth 0·51.

C. ZIGZAG, Chitty. Trelawny.

Form, depressed-turbinate. *Colour*, white, with light brown epidermis. *Sculpture*, like *C. corrugator* in the upper whorls, only very much finer and closer, and more regularly corrugated, in zigzag form, on the last whorl, and finely corrugated all over the under side, except behind the aperture, round the umbilicus. *Spire*, moderately elevated, with convex outlines. *Whorls*,

$4\frac{3}{4}$, well rounded, with a deep suture at the upper whorls, and a moderate one above the last whorl. *Aperture*, subcircular, diam. 0·34, expanding rather on the umbilical than on the opposite side, slightly detached from the body-whorl; angular above. *Peritreme*, slightly sinuate. *Umbilicus*, narrow, greatest breadth 0·15, least breadth 0·13. *Umbilical keel*, well produced. *Operculum*, small (diameter 0·25) with spiral lamina of 9 whorls, and perhaps more; much more concave than in *C. varians*, and less so than *C. corrugator*; planulate beneath. Height 0·6, greatest breadth 0·75, least breadth 0·58.

§ III.

C. SEMINUDUS, Ad. See Ad. Contrib. Conch., pp. 143, 146; Cat. Phan., p. 15.

In order to carry out my views as to the specific value of the opercula, it is necessary I should enlarge upon Adams's description, which is as follows:—"Operculum quite concave, with the spiral lamella scarcely elevated, but much thickened and appressed on the exterior side." My description is:—Operculum concave on the upper side, and convex on the under side, with 5 or 6 distant whorls of spiral lamina, scarcely elevated, and much thickened; the margins spreading widely outwards horizontally into a surface covered by excentric lines, so as to join each succeeding whorl, and *apparently* not detached; closely appressed to the plane, though in reality (as seen on breaking the operculum in half) not soldered to it. This operculum, from its centre, represents the base of an amphitheatre, each whorl resembling very broad steps or seats rising towards the exterior; greatest diameter 0·34, least breadth 0·32. *Umbilicus*, greatest breadth 0·41, least breadth 0·34. *Habitat*, north-west border of Manchester, and Bogue estate, St. Elizabeth.

C. DE BURGHÆANUS, Chitty. ? Westmoreland.

Form, globose-conic. *Colour*, bluish-white, with an epidermis, light brick-red, on the upper whorls, turning into a pale straw-colour for about $\frac{1}{8}$ th below the suture, on part of the penult, and on the last whorl, and rich red-brown over the remainder, which is sometimes interrupted by straw-coloured bands at the periphery and round the umbilical keel. *Sculpture*, lines of growth on $3\frac{1}{2}$ of the upper whorls, thence it becomes finely corrugated below the suture on the penult whorl, very coarsely so on the last whorl, sometimes extremely so, and knotted at the sinuation in the peritreme, all below being smooth and shining, except for the continuance of the lines of growth, a few distant blunted spiral lines, and a few pittings scattered below at the junction of the umbilical keel and aperture. Within the umbilicus, the lines of growth are very coarse. *Spire*, well elevated with convex outlines. *Whorls*, 5, well rounded with a well-impressed suture. *Aperture*, rather oblique, well expanded below. *Peritreme*, light-brown, more sinuate above than *C. seminudus*, and sometimes very

deeply sinuated; in age not so much thickened as in *C. seminudus*, but in one instance of a larger (than typical) old shell, very much produced from the body-whorl. *Umbilicus*, narrow; greatest breadth 0·3, least breadth 0·24. *Umbilical keel*, well developed, not very broad. *Operculum*, planular above, with a slightly elevated, broad, rounded lamina, of about 5 whorls far apart, and the last much farther from the outer edge of the operculum; the margins broadly reflected and expanded on the plane of the operculum and covered with sharp excentric striæ; on the under side, the centre is elevated at the nucleus, then concave and broadly raised all round the edge; greatest breadth 0·43, least breadth 0·4. Height of shell 0·84, greatest breadth 0·99, least breadth 0·82. Named in compliment to Mrs. De Burgh.

I have reason to fear that I *may* have distributed this shell as *C. seminudus*. Let me here observe how excellent a guide is the operculum; but for the concavity of *C. seminudus* and the flatness of this, other differences might have escaped notice. How marked are the differences, however!

	Measurements of <i>C. seminudus</i> .	Measurements of <i>DeBurghæanus</i> .
Height of shell	0·65.....	0·84
Greatest breadth	1 inch	0·99
Least breadth	0·79.....	0·82
Greatest breadth of umbilicus..	0·41.....	0·3
Least breadth	0·34.....	0·24
Greatest breadth of operculum..	0·34.....	0·43
Least breadth	0·32	0·4

C. RUDIS-PLANUSQUE, Chitty. Accompong Town, St. Elizabeth.

This shell, likewise, Adams has distributed as a variety of *C. varians*, from which it most materially differs in its operculum. It is, however, a puzzling shell, as it varies so much in its dimensions, as seen below.

Form, globose-conic. *Colour*, dark brown; sometimes light red-brown; sometimes, in age, almost black on the last whorl; sometimes with a light narrow band at the periphery; sometimes with a broad band. *Sculpture*, inconstant, generally shining and smooth, except for rather coarse striæ of growth; sometimes finely corrugated on the penult whorl and below the suture on the last whorl, and below, at the junction of the peritreme and umbilical keel; sometimes merely slightly pitted here and there; sometimes with the lines of growth very coarsely developed on the upper whorls; coarse lines of growth within the umbilicus. *Spire*, well elevated, with convex outlines. *Whorls*, $4\frac{3}{4}$, moderately rounded, with deep suture above; moderate suture at the termination of the last whorl, which is much depressed. *Aperture*, pyriform, expanded on the right. *Peritreme*, generally very sinuate on the right above. *Umbilicus*, narrow, greatest breadth 0·25, least breadth 0·22. *Umbilical keel*, well developed. *Operculum*, like *C. DeBurghæanus*, only planular on the under side.

Of the largest specimen	{ height 0.71, greatest breadth 0.82, least breadth 0.65.
Of the medium size	{ height 0.51, greatest breadth 0.67, least breadth 0.53.
Of the smallest size	{ height 0.34, greatest breadth 0.45, least breadth 0.35.

C. PRETIOSUS, Chitty. New Hope.

Form, depressed-conic. *Colour*, middling light rich brown. *Sculpture*, 1st, 2nd and 3rd and $\frac{1}{3}$ whorls (except the nuclear apex) very fine, gradually growing very strong and prominent, vertical lines of growth; the rest, finely diamond-cut above and below, except the last third of the last whorl, which is smooth, with fine lines of growth, and sometimes diamond-cut below. Lines of growth coarse within the umbilicus. *Spire*, much depressed, with scarcely convex outlines. *Whorls*, $4\frac{1}{2}$, well rounded, with a deep suture, last whorl much expanded at the aperture on the right and below. *Aperture*, much detached from penult whorl, well rounded, width and height (into the usual angle) 0.24. *Peritreme*, very slightly sinuate above, much thickened in mature shells. *Umbilicus*, wide, greatest breadth 0.15. *Umbilical keel*, moderately developed for little more than half a whorl. *Operculum*, like *C. rudis-planusque*, but with 4 whorls only, and the outer one is in proportion further from the edge. Height 0.41, greatest breadth 0.56, least breadth 0.45.

C. BAIRDIANUS, Chitty.

Form, globose-conic. *Colour*, rich red-brown, with sometimes a lighter band at the periphery and round the umbilical keel, yellowish at the suture on the last whorl. *Sculpture*, fine lines of growth on the upper whorls and fine corrugation on the penult and last; moderately coarse lines of growth within the umbilicus. *Spire*, well elevated, with convex outlines. *Whorls*, 5, well rounded, with deep suture. *Aperture*, much expanded to the left, pyriform. *Peritreme*, rather sinuate above, much projecting at the usual angle. *Umbilicus*, narrow, greatest breadth 0.2. *Operculum*, like *C. seminudus*, but with only 4 whorls, the last rising higher, further from the edge, and spreading more widely than any of this class of opercula, so as almost to form a concave surface, except towards the centre. Height 0.57, greatest breadth 0.65, least breadth 0.57.

C. RUBER, Chitty. Westmoreland.

Form, depressed-conic. *Colour*, very red-brown, especially red on the apex and internally, with a somewhat lighter band at the periphery and round the umbilicus, slightly yellow below the suture on the last whorl. *Sculpture*, very fine lines of growth on the first 3 whorls, and then coarser and coarser, yet fine diamond-cutting throughout; corrugated also below the suture just behind the aperture, and very much where the peritreme and umbilical keel meet; coarse lines of growth within the umbilicus. *Spire*, not much elevated: convex outlines. *Whorls*, 5, well rounded, deep

suture. *Aperture*, very oblique, approaching to straight on the left, and much expanded, especially above on the right. *Peritreme*, slightly sinuate above. *Umbilicus*, narrow, greatest breadth 0·24. *Umbilical keel*, strongly produced within, rather flat outside, continuous round the whorl. *Operculum*, rather concave and convex on the lower side between the types of *C. seminudus* and *C. Jamaicensis*; whorls 6, the margins rising higher before dilation than in *C. seminudus*, and being much broader and rounder than in *C. Jamaicensis*. Height 0·61, greatest breadth 0·88, least breadth 0·7.

This shell has been distributed by Adams as a variety of *C. varians*.

§ IV.

C. JAMAICENSIS, Chemn. See Cat. Phan. p. 13.

I will only add to that description, that the operculum, though generally planular, is sometimes very triflingly concave, and that the last lamella whorl is wide apart from the edge.

C. DENTISTIGMATUS, Chitty. Yallahs Hill and Portland.

Form, depressed-conic. *Colour*, dark olive brown, strong red-brown at the apex and within the aperture. *Sculpture*, coarse lines of growth down to the last quarter of the penult whorl, thence coarse corrugation till it becomes extremely coarse, wide and highly raised at the back of the last whorl, and becomes obsolete at the back of the aperture; below the periphery, smooth with about 14 deep eccentric tooth-like indentations running up to the umbilical keel (thence the name); lines of growth within the umbilicus, not coarse. *Spire*, well elevated, somewhat mammiform, with concave outlines. *Whorls*, $5\frac{1}{2}$, much rounded with a deep suture, last very large and ventricose. *Aperture*, rather oblique, dilated on the right side, large, red-brown within. *Peritreme*, very sinuate above. *Umbilicus*, largely open and funnel-shaped, greatest breadth 0·36. *Umbilical keel*, very prominent and wide. *Operculum*, planular above, lamina of 9 whorls rising higher and much closer than in *C. Jamaicensis*, which it much resembles otherwise; below the margins, the lamina spreads out as in *C. seminudus*, so as to touch each consecutive whorl, and appear to be appressed to the plane, but are *de facto* detached. Last whorl close to the edge, rather concave below. Height 0·9, greatest breadth 1·13, least breadth 0·9.

This shell may be readily known by the tooth-marks which give rise to its name. Its operculum and size distinguish it from *C. Novæ-Spei*.

C. NOVUS-SALTUS, Chitty. New Forest.

Form, depressed-conic. *Colour*, brown. *Sculpture*, throughout fine somewhat close regular striæ of growth, which give a silky appearance. *Spire*, moderately elevated, with convex outlines. *Whorls*, $5\frac{1}{3}$, well rounded, with a deep suture. *Aperture*, circular, not expanded. *Peritreme*, simple. *Umbilicus*, greatest breadth 0·32. *Umbilical keel*, almost obsolete, just visible. *Operculum*, concave

above; spiral lamina of 7 whorls rising as in *C. Jamaicensis*, but much narrower at the margins, which are deflected and expanded on to the plane as in *C. dentistigmatus*, but do not quite so closely approach the consecutive whorl. Height 0.76, greatest breadth 0.97, least breadth 0.77.

C. CRASSUS, Ad. See Cat. Phan., p. 16.

C. INUTILIS, Chitty. (Unique.)

Form, much depressed-conic. *Colour*, light brown; apex red-brown. *Sculpture*, fine lines of growth on the $3\frac{1}{4}$ whorls, thence (for its size) roughly corrugated, except the last quarter of last whorl, where, above, lines of growth are strong, with slight pitting; lines of growth fine within the umbilicus. *Spire*, much depressed, with convex outlines. *Whorls*, 4, well rounded, with very deep suture. *Aperture*, oblique from left to right below, dilated above and much expanded to the right, horizontally elliptical, 0.22 across, 0.2 vertically. *Peritreme*, rather sinuate above, and detached from the penult whorl. *Umbilicus*, open and large, greatest breadth 0.14. *Umbilical keel*, well defined inside umbilicus. *Operculum*, of *C. Jamaicensis* type, concave exteriorly, with lamella of 5 whorls, like *C. crassus*. Height 0.31, greatest breadth 0.46, least breadth 0.35.

§ V.

C. RUPIS-FONTIS, Chitty. Rock Spring, Hanover.

Form, globose-conic, very thick and substantial. *Colour*, deep red-brown, with a broad band of dingy yellow next below the suture on the penult whorl, lighter behind the aperture, red at the apex, light brown at the periphery, and bluish-white inside the aperture. *Sculpture*, fine lines of growth, with a slight corrugation and slight pitting below the suture on the last whorl; lines of growth fine within the umbilicus, somewhat pitted close to the exterior of the umbilical keel. *Spire*, well raised, with convex outlines. *Whorls*, $5\frac{1}{4}$, well rounded with deep suture; last slightly depressed above. *Aperture*, slightly expanded on the right. *Peritreme*, very much thickened, slightly sinuate above. *Umbilicus*, moderately open, greatest breadth 0.22, funnel-shaped. *Umbilical keel*, strongly and broadly produced outside and inside. *Operculum*, planular below and above, plane plain or smooth, lamina with 6 whorls rising high and vertically to the plane exteriorly, thickened at the base and rising with a slight outward slope, so as to make the margin comparatively sharp; termination of the last whorl sharp; last whorl distant from the upraised edge of the plane. Height 0.79, greatest breadth 0.99, least breadth 0.75.

C. CORRUGATISSIMUS, Chitty.

Form, depressed-conic. *Colour*, brown. *Sculpture*, 3 and $\frac{2}{3}$ rds of upper whorls fine lines of growth, thence very much and very coarsely corrugated above and below in zigzag form to close behind

the aperture with deep tooth-like indentations round the umbilical keel; inside the umbilical keel fine striæ of growth. *Spire*, not much elevated, with almost straight outlines. *Whorls* 5, well rounded, deep suture. *Aperture*, slightly oblique to the right below, much expanded below. *Peritreme*, much sinuate above, and sinuated throughout. *Umbilicus*, moderately open, greatest breadth 0·31, funnel-shaped. *Umbilical keel*, well developed, not very wide, deeply produced inside. *Operculum*, deep concave, lamina elevated, as in *C. Rupis-Fontis*, 7 whorls of the same character much closer together, and close to outer edge of plane; termination of last whorl inflected and thickened. Height 0·81, greatest breadth 1·1, least breadth 0·81.

§ VI.

C. JUGOSUS, Ad. See Cat. Phan. p. 14. *Hab.* St. Elizabeth.

C. JUGOSUS, var. *parva*, Chitty.

A small variety of this shell occurs. Height 0·52, greatest breadth 0·8, least breadth 0·61.

C. JUGOSUS, var. *striatus*, Chitty.

A still smaller variety occurs, the mouth of which is less dilated, and the sculpture is altogether less corrugated, and which, from above the periphery on the lower part of the last whorl, gives place to close, parallel, diagonal groovings. Height 0·39, greatest breadth 0·6, least breadth 0·5.

C. JUGOSUS, var. *rufilabris*, Chitty.

This I doubtfully place as a variety only; if thought otherwise, it may take specific rank as *C. rufilabris*. It is much more conical than *C. jugosus*, brownish on the lip, coarsely corrugate in the site of the obsolete umbilical keel; the umbilicus is very narrow; the end of the last whorl on the operculum is appressed to the preceding whorl. Height 0·61, greatest breadth 0·71, least breadth 0·57.

C. PALLESCENS, Ad. *Hab.* North-east corner of St. Elizabeth, Chitty. See Cat. Phan. p. 14.—Lamella 10 whorls on operculum, and much less raised than in *C. jugosus*.

C. WESTMORELANDENSIS, Chitty. Westmoreland.

Form, subglobose-conic. *Colour*, red-brown, with light brown epidermis; aperture red-brown; apex red. *Sculpture*, fine lines of growth, with slight coarse corrugation over the middle of last whorl, coarse lines of growth inside umbilical keel. *Spire*, well elevated, with slightly convex outlines. *Whorls*, $5\frac{1}{4}$, well rounded, but less above; moderate suture. *Aperture*, well rounded, slightly oblique to the left below, a little dilated on the right below. *Peritreme*, much sinuate above. *Umbilicus*, moderate size, greatest breadth 0·3. *Umbilical keel*, moderately produced. *Operculum*, planular below, but from the increasing height of the whorls of the spiral lamina, apparently concave above; 9 or 10 whorls, closer than in *C. jugosus*,

end of last whorl appressed to preceding one. Height 0·8, greatest breadth 0·97, least breadth 0·81.

C. NODOSUS, Chitty. Maroon Town, St. James.

Form, more depressed-conic. *Colour*, white, with light brown epidermis, brown at lip and on operculum. *Sculpture*, lines of growth, remarkably knotted corrugation on last whorl, pitted deep about umbilical keel, and coarse lines of growth within. *Spire*, depressed, with rather straight outlines. *Whorls*, $5\frac{1}{4}$, well rounded, with deep suture. *Aperture*, rather oblique to the left below. *Peritreme*, slightly sinuate above. *Umbilicus*, wide, greatest breadth 0·3, funnel-shaped. *Umbilical keel*, not wide, but well produced. *Operculum*, small, strong, sharp-edged lamina of 5 or 6 wide-apart whorls, rising almost equally from the flat plane, end of last thickened. Height 0·6, greatest breadth 0·85, least breadth 0·67.

C. BESWICKI, Chitty. Bogue Estate, north-east corner of St. Elizabeth.

Form, subglobose-conic. *Colour*, pinkish, with light brown epidermis. *Sculpture*, very coarse lines of growth, very slight distant corrugation on the last whorl, coarser below; fine lines of growth within umbilical keel. *Spire*, well elevated, with almost straight outlines. *Whorls*, $5\frac{1}{4}$, moderately rounded, with moderate suture. *Aperture*, oblique and much dilated to the right below, depressed above. *Peritreme*, slightly sinuate above, sharp on the right. *Umbilicus*, moderate, greatest width 0·25. *Umbilical keel*, strongly produced. *Operculum*, with lamina of about 9 much incurved close spiral whorls, which are very slightly concave on the entire margins; end of last a little incurved to preceding one. Height 0·75, greatest breadth 0·9, least breadth 0·74.

C. PERPALLIDUS. Near Moore Town, Portland.

This shell was originally brought to me by a negro named Shelly, whom I could never, even by money! excite to sufficient energy to collect more. See Cat. Phan. p. 16. Operculum still wanting.

4. DESCRIPTION OF A NEW SPECIES OF ANTELOPE (ORYX BEATRIX) FROM BOMBAY?, LATELY LIVING IN THE MENAGERIE OF THE SOCIETY. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

(Mammalia, Pl. LV.)

The African genus *Oryx* is divided into two sections, according to the form of the horn. In one, the Kookaam, or Gemsbok (*O. gazella*), the horns are straight; in the true *Oryx* (*O. leucoryx*), they are arched and recurved. The former has a black streak along the lower part of the sides, and is found over a large extent of Africa, from the Cape to Abyssinia; for *O. Biessa* of Rüppell ap-

Chitty, Edward. 1857. "ON THE JAMAICAN CYCLOTUS, AND THE DESCRIPTION OF TWENTY-ONE PROPOSED NEW SPECIES AND EIGHT NEW VARIETIES OF THAT SUBGENUS FROM JAMAICA." *Proceedings of the Zoological Society of London* 1857, 142–157. <https://doi.org/10.1111/j.1096-3642.1857.tb01219.x>.

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