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PROCEEDINGS

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OF LONDON.



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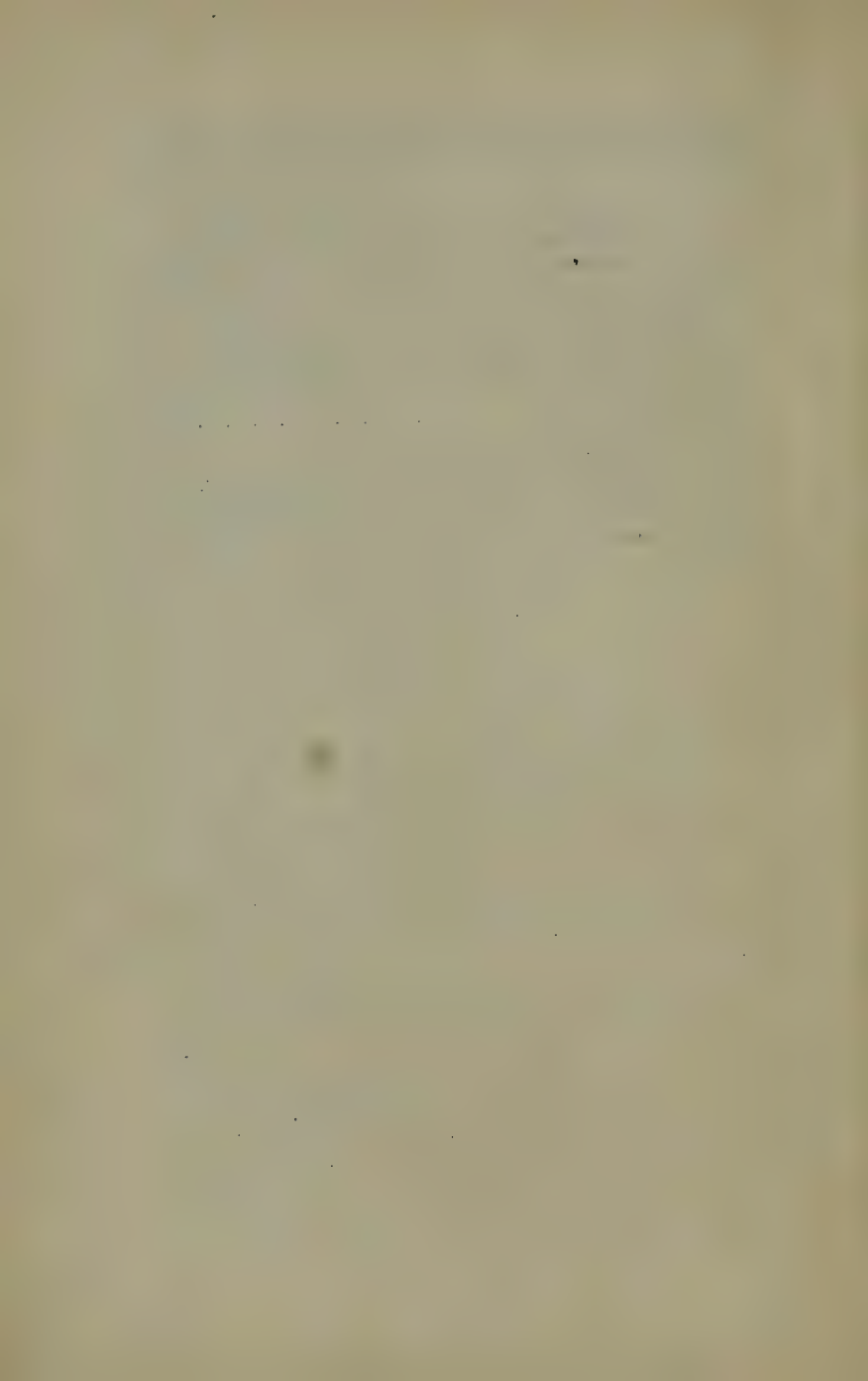
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PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 8, 1850.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

1. CONTRIBUTIONS TO THE KNOWLEDGE OF THE ANIMAL OF
NAUTILUS POMPILIUS. BY J. VAN DER HOEVEN.

There are hitherto but three original figures of the animal of *Nautilus Pompilius*. The first is that of Rumphius, in his 'Amboinsche Rariteitkamer' (No. xvii. at p. 62); the second that of Prof. R. Owen in his accomplished 'Memoir on the Pearly Nautilus' (London, 1832, pl. 1); the third, drawn by Mr. Laurillard, was given by Prof. Valenciennes in the 'Archives du Muséum d'Hist. natur.,' ii. 1841, pl. 8.

The figure of Rumphius could only be deciphered after the discovery of a new specimen. As Prof. Owen has observed, the animal is represented in that figure in an inverse position. Guided by that observation, it is possible to explain some parts in that enigmatical figure, but many obscurities still remain, and the whole gives the impression of a drawing made by recollection, and after the doubtful suggestions of a discomposed memory. This seems still more probable, because the text informs us (p. 61) that the figures to which the indications of the description allude, have been lost.

The animals represented by Prof. Owen and Valenciennes were detached from the shells before they were presented to those distinguished cultivators of comparative anatomy and structural zoology. This circumstance explains some imperfections in the figures given by both. Prof. Owen, for instance, gives an incorrect form to that production of the mantle which covers the convex part of the shell's circumvolution projecting in the aperture, or to the part which the author calls "the dorsal fold" (see his pl. 1 *b*); the superior free

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margin of the mantle is lower than it ought to be, as it conceals in the natural state a great part of the funnel and the inferior half of the eyes. In regard to the last circumstance, the drawing of Laurillard given in M. Valenciennes' paper is more correct; but in other particulars it is deficient, chiefly because the soft part of the integuments which forms the visceral sac was torn off and wholly wanting. It ought to be observed also, that those two figures represent the animal replaced in a shell of the same species indeed, but not its own.

I suppose then that it may be perhaps of some interest to publish some drawings* I made, chiefly after two specimens, one of which was kindly presented to me in 1848 by Prof. Reinwardt; the other I received lately from our settlements in the East, by the kind exertions of His Excellency Mr. T. C. Baud, formerly His Majesty the King of the Netherlands' Minister for the Colonial Department.

The first figure (1) represents the animal from the left side in its own shell, which has been opened with a file at such a height, that the whole last chamber was visible, together with a part of the three following compartments. The hood (*a*), composed according to Prof. Owen by the conjunction in the mesial line of the two superior, excessively large digitations, covers with its projecting margin the superior surface of the pedunculated eye (*b*). The inferior half of the eye is concealed by the superior margin of the mantle, which covers also the greatest part of the digitations or lateral processes of the head (*c, c*). The extremity of the funnel (*d*) is visible and uncovered, the rest being contained in the anterior part of the mantle. There is no perforation or excision at this part of the mantle†, but the margin of it is entire and slightly convex.

The mantle (*f, f', f', i*) has its anterior part of a more thick and fibrose texture and a yellowish colour; the posterior part (*i*) forms a thin and nearly transparent membranous sac, containing the different viscera. The free superior margin of the mantle ascends behind the hood (*f'*) and forms the dorsal fold of Prof. Owen's memoir; but at the side view only a small portion of this fold is visible. Beneath the posterior part of the hood, the mantle offers on each side a large aponeurotic flat piece (*g*), of a bluish white colour and a kidney-like shape, being convex at its anterior side and somewhat concave at the posterior border. This plate is the posterior insertion of a strong muscular mass—the great muscle of the shell—which goes from this attachment in an oblique course, converging with that of the opposite side, to its anterior termination at the cartilage of the head. From this oblong patch arises a narrow aponeurotic stripe, both at the superior and at the inferior extremity of it. The oblong plate may be considered as an expansion and development of this band, which, encircling the whole mantle, separates its posterior soft part or the visceral

* The drawings, being on too large a scale for this work, will be published in the Transactions of the Society, vol. iv. Pl. 5, 6, 7, 8. The references are to those plates.—D. W. M.

† Professor Owen speaks of a large aperture through which the funnel passes. (Memoir on the Nautilus, p. 9.)

sac (*i*) from its free and thicker anterior part. The thin and membranous posterior part of the mantle is of a bluish white colour, but being imperfectly transparent, it seems to be dark at all places where it covers the bulky liver, whose colour is a dark red-brown, or chocolate-like purple. At the inferior part of the free portion of the mantle is a convexity (*h*), where lies a glandular laminated organ, secreting, as it seems, a covering to the eggs, and which projects at this place, being partly visible through the integuments. This glandular mass connected with the female generative system is situated behind the gills, at the inner surface of the mantle.

A more complete idea of the external form of the animal may be had by comparing the two following figures. Fig. 2 represents the animal taken out of the shell from a dorsal aspect. The circumference appears oblong, and of an irregular oval form. The whole is divided into two chief parts; the first is the hood, exactly filling up the shell's aperture*; the second part was concealed in the lower and posterior part of the terminating chamber of the shell. The dorsal fold (*f'*) appears now wholly visible; it forms a thin lamellar production of the mantle, and ascends to the protuberant internal labium or anfractus of the revolved shell. Hence the upper surface of this fold is excavated, forming the exact counterpart of the shell's protuberance. Under that fold is a smaller plate of nearly the same form, but adherent to the posterior declivous surface of the hood, and only free at its circumference. This plate is of an aponeurotic texture and a white colour: at both sides it is united to the dorsal fold, and below it seems to have an intimate connexion with the two side parts of the funnel, and indeed to be a continuation of those parts. The dorsal or superior part of the aponeurotic band, which forms, as we have said already, the continuation of the oblong side-plate (fig. 1 *g*), is here visible at *g, g*. Three small longitudinal bands or tendinous inscriptions (*h, h, h*) seem to give some firmness to the dorsal part of the abdominal portion of the mantle. Near the posterior end of this visceral sac, nearer however to the superior surface of it, is the beginning of the siphon (*j*); it seems nearly superfluous to say that this siphon is a tubular production of the visceral part of the mantle, protected by a calcareous covering, and penetrating by the central perforation of the several septa in all the following compartments of the shell.

At the inferior surface (fig. 3) a part of the funnel is visible in the middle of the digitations of the head. The inferior face of those digitations is of a white colour, contrasting with the brown and dark colour of the hood and of the superior surface of the digitations which are nearest to it. The free inferior and anterior margin of the mantle appears rounded and somewhat convex; it conceals the basal part of the funnel and of the appendages of the head.

More instructive is an inferior view of the animal if the mantle has

* It may be allowed to hazard here the opinion, that the two juxtaposed fossil shells, known by paleontographs as *Aptychus*, were two shelly supports of the hood of *Ammonites*, extinct Cephalopods not very different in structure from the *Nautilus*, and belonging, like that genus, to Prof. Owen's tetrabranchiate group.

been removed or reflected backwards; in this manner the branchial cavity is visible (fig. 4).

The two overlapping sides of the funnel form a striking particularity of the structure of the Nautilus. It is interesting that the embryo in the dibranchiate group, as we learn from Dr. Kölliker's observations*, shows the funnel composed in the beginning of two lateral separate parts. The embryonic condition in the dibranchiate Cephalopods proves thus to be a persistent structure in the tetrabranchiate group.

Between the basal part of the second pair of gills the anal aperture is visible. This part has been misrepresented by Prof. Valenciennes. It seems that a longitudinal fold connecting the integuments of the viscera with the two large shell-muscles was disrupted in his specimen, and that the author believed this to be the rectum. The oviduct in this supine position is situated at the left side, before the anus, and terminates with a transverse bilabiated and protuberant aperture or vulva. [Consequently, when the animal is in its natural position in the shell, the termination of the oviduct lies at the right side.]

There are three little slits on each side at the roots of the branchiæ. The first pair of those apertures is situated at the anterior surface of the first branchia, near the posterior margin of the large shell-muscle. Between the first and second branchiæ are the two other slits, very near to each other, and at the outward side of them is a little depressed papilla, affixed to the posterior surface of the root of the first branchia. The first and the last slits are the exterior openings of two lateral blind sacs, containing the follicular appendages of the branchial arteries; the second slit communicates with the pericardium†. At the first slit I once found a calcareous reddish-white and friable concrement; I believed it to contain uric acid, but the chemical inquiry of my friend Prof. Van der Boonchesch has not confirmed my supposition.

Behind the anus there are on each side two small and depressed caruncles, very similar to that mammillary eminence or papilla we have seen at the root of the first branchia. External to those caruncles and behind them is a series of small orifices, not unlike to the openings of the Meybomian follicles on the human eyelids. These are the emunctories of the glandular organ, for the secretion of the covering matter of the ova.

* *Entwicklungsgeschichte der Cephalopoden.* Von Dr. A. Kölliker; Zurich, 1843, 4to, p. 41 etc.

† The three pairs of openings have been first observed by Prof. Valenciennes. This point of the anatomy of the Nautilus has been chiefly elucidated by the observations of my friend Prof. W. Vrolik (*Tijdschrift voor de natuurkundige Wetenschappen, uitgegeven door de Eerste Klasse van het Koninklijk-Nederlandsche Instituut*, ii. 1849, p. 312-315). Prof. Owen describes in his memoir but one of those openings, and it is therefore questionable what opening he speaks of. It seems however to me to be the second, because Prof. Owen describes the mammillary eminence which is nearest to this slit, and chiefly because the author observes that the orifice "conducts from the branchial cavity to the pericardium." (*Memoir on the Nautilus*, p. 27.)

The head still requires some further description. In order to give a more correct idea of the mutual superposition of the numerous digitations and processes which exist in the Nautilus, instead of the eight or ten arms of the dibranchiate Cephalopods*, I have represented them from the left side, in three comparative figures, so as they follow each other from the exterior surface of the head to the interior covering of the mandible (see fig. 5-7).

In the first place (fig. 5), the mantle *f* being reflected, the hood (*a*), the different digitations (*c, c*), and the funnel (*d*), are visible. The large pedunculated and perforated eye (*b*) has two tentacles (ophthalmic tentacles, Owen), one before its anterior margin, the other behind, which are however not distinctly seen without reclining the surrounding parts, and bending the eye-peduncle*. Only a few tentacles are protruded from their sheaths, and partly visible. I never saw them protruded to such an extent as in M. Laurillard's figures. The number of these digitations seems not to be exactly the same in all specimens. Instead of nineteen digitations on each side, as in Prof. Owen's specimen, I twice found only eighteen. M. Valenciennes found only seventeen in his specimen. That the hood is formed according to the ingenious supposition of Prof. Owen, by two large digitations conjoined along the mesial line, has been mentioned above. The hood indeed contains two tentacles, and in this manner the whole number of exterior or digital tentacles varies from eighteen to twenty on each side.

The second layer of tentacular processes is brought into view by cutting off the hood and the external digitations. Fig. 6 gives a view of this dissection. In this figure *b* is the eye, *d* the funnel, as in the foregoing figure; *c, c* are the cut parts of the tentacles contained in the digital processes. The layer now visible is formed by that set of tentacular sheaths which Prof. Owen calls the *external* or superior labial processes (fig. 6 *k, k*). For a reason explained in the following part of my paper, I would be disposed to prefer the name of *external labial process* to that of *superior*. The membrane covering the mandibles and the muscular mass of the mouth, and terminating in the fringed lip encircling those parts, is to be seen at a little distance above this layer (at *m*), and shows numerous circular folds. Beneath this layer a small part of the third layer (*l*) is visible.

This third layer is brought into view by removing the second (see fig. 7). In this figure *k, k* are the cut parts of the tentacles of the external labial process, and *l* is the *internal* or inferior *labial process* of the left side. The folded membrane *m* is now almost wholly visible. The internal labial processus consists of a flattened stalk, which ascending expands in a compressed paddle, whose superior margin is straight and perforated for the exertion of the tentacles. There is some likeness to a glove whose fingers are cut off. The description of Rumphius mentions all the digitations and pro-

* Under the eye is a part, first noticed by Valenciennes, a little hollow caruncle, with bilabiated aperture, which seems to be the true organ of smell (see fig. 8). It is only visible by bending the eye behind and above, and adheres to the root of its stalk.

cesses as superimposed flaps, each in shape of a child's hand*. This comparison answers chiefly to the internal labial processes.

The number of tentacles in those two pair of labial processes is not exactly the same in different specimens, nor even in the same specimen at both sides. The description of Rusophilus gives sixteen tentacles to the external labial processes, but does not mention their number in the internal processes. Prof. Owen found twelve tentacles, Prof. Valenciennes thirteen in each of those four processes. In the external processes Prof. W. Vrolik observed twelve tentacles on each side, as was observed also by me. The internal processes seem to have in general a somewhat larger number; Prof. Vrolik observed in this layer fourteen on each side; I found also fourteen at the left and sixteen at the right side. The external labial processes are united in the mesial line at the ventral side above the funnel by a membrane with numerous fine folds on the inside; the internal approach here nearer to each other and are united in a similar manner; the commissure presents on the inside, towards the dorsal surface, seventeen or eighteen eminent, compressed, longitudinal folds, like the parallel ridges in the olfactory cavity of Fishes. This part is, according to Prof. Owen's opinion, the organ of smell; but I believe that those folds are only rudimental digitations completing the circle of the internal labial processes, and similar to the more numerous and smaller folds of the external circle, or even to the fringed margin of the lip round the mandibles.

In respect to the observation of Valenciennes concerning the mandibles, it is perhaps not unnecessary to note that I saw them in different specimens always covered with a calcareous white matter, as has been observed in the first accurate description of the animal by my eminent friend Prof. Owen.

The sexual difference of the Nautilus requires still further elucidation. Prof. Owen's description was relative to a female, and also all the other specimens observed by subsequent authors, or preserved hitherto in the museums, seem to be of female specimens. Hence it seems to follow that males are rarer; a similar circumstance of unequal number has been noted in many other animals of several classes. The recent observations of Kölliker and some other authors having elucidated the true nature of that abnormal animal form, not unlike to separated arms of Cephalopods, found in the shell of the (always female) *Aryonauto*, and formerly described as a genus of worms under the name of *Hectocotyle* by Cuvier, would lead us to expect similar males of the Nautilus living like parasites with the female in her shell. There exists however not the least indication in the different memoirs of Owen, Valenciennes and Vrolik, that such parasites were present. I can say that in Nautilus the sexual difference is not so great, and that the male lives in a shell like the female. I was fortunate enough to observe one specimen of a male, which was kindly presented to me by my colleague at the Faculty of Sciences of the Leyden University, the Professor of Botany, W. H. de Vriese. The differences it showed

* "Zijnde ieder lap gefatsoeneerd als een hand van een kind." (Amboinsche Rareitëtkamer, p. 60.)

in the conformation of the head may be ascribed either to sexual difference or to monstrosity. This must remain unsettled till another male can be observed; but I incline to the first opinion, a similar aberration of structure not having been observed in any of the hitherto dissected females.

I have already described this male in a former paper*, but I believe it will not be superfluous to give here the translation of the chief matter of my Dutch memoir on this specimen, together with some additional remarks and corrections.

At the inner surface of the circle of digitations, which were eighteen at each side, without the hood, there was a prolongation of the integuments rising up to another more internal circle. This prolongation unites at the ventral side by a free and thin margin to the connecting basal part of the digitations. At the inner surface of this connexion of the external digitations, there are many transverse dimples parallel to the transverse margin of this commissure: many little holes give a reticulated appearance to this part. The prolongation becomes thicker and expands on each side in a processus divided in eight digitations of different size, including each a tentacle, similar to those contained in the external digitations of the head, but smaller, as usual in other specimens. On account of their place, those processes seemed first to me to be analogous to the *superior labial processes* of Prof. Owen's memoir, because they are situated at the dorsal side, and consequently I described them under that name in my former publication; but as they are internal or nearer to the mandibles than the other pair of similar processes, I now believe them to be analogous to the inferior labial processes in the female, notwithstanding their superior position. The fold of the integuments connecting those processes at the central side to another in the mesial line divides in two plates; the exterior adhering to the commissure of the external digitations already described; the interior united to the covering of the mandibles. Between those two plates a pair of depressed cushion-like parts is placed, coming in contact to another in the middle, and nearly wholly adherent at their inferior surface to the inner plate. They have nearly 8 lines in length and $4\frac{1}{2}$ in breadth. Their free, superior and internal margin is divided by incisions in ten or eleven small tetragonal parts; the right part having eleven, the left ten of those digitations. The relative position seems to prove them to be analogous to the folds between the internal labial processes, which are considered as the olfactory apparatus by Prof. Owen. I believe they afford an additional argument against this opinion, because they are doubtless only rudimental digitations.

Beneath those internal labial processes there is at each side outwards to them a fold in the inner surface of the external circle of digitations. At the right side a processus is exerted from this fold;

* Tijdschrift voor de natuurkundige Wetenschappen, uitgegev. door de eerste Kl. v. h. Koninkl.-Nederl. Instit. i. 1848, p. 67-75. A short abstract of this description was communicated by me at the Oxford Meeting (1847) of the British Association, and is inserted in the Report of the Seventeenth Meeting of the British Association; London, 1848; Transactions of the Sections. p. 77.

it consists of the conjunction of the sheaths of four tentacles; three of those tentacles are placed on a common flat expansion; the fourth is contained in a separate slip, placed beneath the three other tentacles. At the left side, instead of this external labial process, there was a great conoid body, the length of which was nearly $2\frac{1}{2}$ inches; this part was laterally compressed; at the basis its measure from the dorsal to the ventral side was found to be 1 inch 10 lines; from the right to the left side only 1 inch. This part was proved to me by dissecting it to be formed by the union of four unusually developed tentacular slips, one of which was shorter and more free, the three other chiefly composing the singular body. This part occupied a great space in the interior of the circle, which was formed by the external tentaculiferous digitations of the head, and perhaps its great development may have been the cause of the more imperfect condition of the other three labial processes.

I regret that this specimen was in a bad state of preservation; its abdominal sac being dilacerated and the viscera destroyed by maceration. Hence I am not able to give a description of the male organs of generation, but that the specimen was a male seems to me unquestionable. At the same place where in other specimens the vulva adheres to the ground of the branchial cavity, was a short conic part, evidently the penis, somewhat bent at the basis towards the ventral side, having an obtuse and perforated top. A very narrow canal was found to go from this aperture to the root of the penis, and to expand there in a pouch, of a firm parchment-like texture. This bladder contained a conglobate tube of a brown colour, having a little more than 1 line in diameter. The length of this tube could not be determined, because, by any attempt to unravel it, it broke into pieces. Microscopic investigation proved that this tube was formed by two membranes, the external transparent, the inner thicker, coloured, brittle, and offering circular stripes or fibres. In the interior of the tube there was a thread or band, coiled up in a spire with close circumvolutions, like the spiral fibre of the *tracheæ* of insects. This fibre was not of exactly equal broadness in its whole extent; its broadest parts had a diameter of nearly 1-48th of a line. This fibre seemed composed of an external transparent membrane, including an internal part of a yellowish brown colour. Between the fibre and the tube containing it were observed several free microscopic parts; some greater, of a brown colour, oblong or navicular; some smaller, uncoloured, and still of different size. How different this conglobated tube, contained in the spermatic vesicle, may be from the *Needham-machines* or spermatophores of other Cephalopods, I still believe that we ought to consider it as a similar sperma-containing apparatus. It seems highly desirable that a travelling naturalist may have the opportunity of observing the male Nautilus in a recent state.

Imperfect as they are, I trust those last observations to be still of some interest for comparative anatomy, as giving the first account of that which seems now to be the chief *desideratum* in our knowledge of the Nautilus, the disposition and structure of the male generative apparatus.

EXPLANATION OF THE FIGURES.

(Published in the Transactions Z. S. vol. iv. Pl. 5-8.)

- Fig. 1—8 belong to the female *Nautilus*; fig. 9—14 to the male specimen, which is described at the end of my memoir.
- Fig. 1. A female *Nautilus* in its shell, from the left side.
- Fig. 2. The same specimen seen from above, and taken out of the shell.
- Fig. 3. The same, from below.
- The following letters indicate the same parts in those three figures: *a*, the hood; *b*, the eye; *c c*, the digitations; *d*, the funnel; *f f f' i*, the mantle; *i'*, its visceral part; *f'*, the dorsal fold of the mantle; *g*, the aponeurotic insertion of the shell-muscle.
- In figs. 1 and 3, *h* indicates the place where the laminated gland is situated. In fig. 2, *h h h* are three aponeurotic inscriptions on the visceral sac; *j* is the siphon.
- Fig. 4. Branchial cavity and funnel of the same. *f*, funnel; *g*, mantle, reflected; *e e*, shell-muscles; *h h*, first pair; *h' h'*, second pair of branchiæ; *a*, anus; *b*, vulva; *c*, caruncle at the root of the first branchia; *d*, two pair of similar papillæ at the bottom of the branchial cavity. 1, 2, 3, three pair of slits (at the left side of the figure the first is to be seen; the two others are represented on the right side of the figure).
- Fig. 5. Side view of the head, the mantle *f* being reflected: *a*, hood; *b*, eye; *c c*, digitations; *d d*, funnel.
- Fig. 6. The same, after removing the digitations; *c c*, transverse sections of their tentacles; *k k*, external labial processes; *l*, internal ditto; *m*, membrane covering the mandibles.
- Fig. 7. The same, after removing the external labial processes, cut off at *k k*.
- Fig. 8. Caruncle at the peduncle of the eye; organ of smell, *a*.
- Fig. 9. Head of a male *Nautilus* seen from above; the hood has been divided by a longitudinal section; *g g* are the internal labial processes; below them, at the right side, is placed and partly visible at *i*, the external labial processus. The place of it occupies at the left side a large conoid body, *a*; *m m* is the fringed lip inclosing the mandibles.
- Fig. 10. The conoid body of the foregoing figure, separately seen from the inner surface, together with the incumbent internal labial processus of the left side.
- Fig. 11. Lateral view of the internal labial processus of the right side, with the mandibles and the surrounding lip.
- Fig. 12. View of the inferior surface of the muscular mass of the mouth, with the two cushion-like incised bodies, representing here the folds between the internal labial processes.
- Fig. 13. Penis. *B*, a longitudinal section of it.
- Fig. 14. A portion of the circumvolved spermatophore or tube contained in the bladder at the basis of the penis.

Leyden, 8 Dec. 1849.

2. DESCRIPTION OF A NEW GENUS OF BATRACHIANS FROM SWAN RIVER. BY DR. H. SCHLEGEL, CURATOR OF THE ROYAL ZOOLOGICAL MUSEUM, LEYDEN. (EXTRACTED FROM A LETTER TO J. E. GRAY, ESQ.)

“The following notice I hope is sufficient to give an idea of a new Toad which was discovered at Swan River by Dr. Pries:—

“*MYOBATRACHUS*, n. g.

“Tongue small; no teeth except two small horizontal fangs in the intermaxillary bone; eustachian tubes separated, opening behind the eyes. Legs short, enveloped at the base in a duplicature of the skin

of the sides of the body. Fingers 4, the second longest; toes 5, cylindrical, tapering, not armed. Eyes lateral, middle-sized.

“**MYOBATRACHUS PARADOXUS.**

Above brownish grey, beneath greyish.

Hab. Australia; Swan River. Mus. Leyden.

The Prince of Canino has made for this animal a family, which he has named **MYOBATRACHIDÆ.**”

Mr. Gray observed, that a toad which he described and figured in Capt. Grey's Travels in Australia, under the name of *Breviceps Gouldii*, agrees with the animal described by Dr. Schlegel in all particulars, and especially in possessing the two horizontal horny appendages on the intermaxillary, which Dr. Schlegel described as horizontal fangs; they are partly sunk into the integument of the palate. Admitting the propriety of the proposed generic distinction, the animal will therefore now stand in the catalogues as *Myobatrachus Gouldii*.

The presence of the teeth in the intermaxillary separates this animal from the *Breviceps* of South Africa.

3. DESCRIPTIONS OF SOME APPARENTLY NEW SPECIES OF LONG-CORN COLEOPTERA IN THE COLLECTION OF THE BRITISH MUSEUM. BY ADAM WHITE, F.L.S., ASSISTANT IN THE ZOOL. DEPT. BRIT. MUS.

(Annulosa, Pl. XIII.)

PRIONACALUS ATYS. Pl. XIII. fig. 4.

In the 'Annals and Magazine of Natural History,' vol. xv. p. 108, I have described under the name of *Prionacalus Cacicus*, a curious genus from Mexico, allied to *Psalidognathus*, G. R. Gray. I regarded the two specimens as male and female of the same species, but it would seem that they are both males, and as they are considerably different, must be different species; what was deemed the male may retain the name *Prionacalus Cacicus*; it is figured on plate 8. fig. 1. of the above volume. The other specimen may be named *Prionacalus Iphis*; it is figured on plate 8. f. 2. Since the above we have received a third species from the Andes of Peru, where it was found by Prof. Jameson of Quito; the following short specific characters may distinguish the three:—

P. CACICUS.

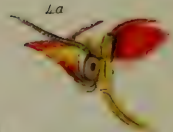
Head behind the eyes without a prominent spine, the lateral margin behind, produced into a slight process directed backwards; a strong crested ridge over each eye, at the end directed outwards; antennæ, palpi and legs rufous, antennæ blackish at the base; jaws, excepting at the end and on the edges (where they are smooth) roughly punctured: head, thorax and elytra, at the base, somewhat roughly punctured, the elytra more delicately punctured towards the end.

Hab. Mexico.



1. LAMIA (CEROSTERNA) TRIFASCIELLA 2. BIMIA BICOLOR 3. COLOCOMUS MOROSUS.
 4. PRIONACALUS ATYS 5. PYRODES TENUICORNIS 6. CALLOCTENUS PULCHER.





1. TRICHOPLATA VITTATA 2 & 3 CALIGATUS ANGASI 4 & 5 PALPATA LAMBERTELLA.



P. ATYS.

Head midway between the eyes and the hind margin, with a small wide spine; a slight, crested, straight ridge over each eye, the space between slightly grooved; antennæ thickish. In colour it is of a dark pitchy brown; the apex of the elytra somewhat ferruginous; legs pitchy brown; tarsi and tips of tibiæ ferruginous; palpi of a clear ferruginous; sculpture much as in last.

Hab. Andes of Peru.

P. IPHIS.

Deep black, coarsely punctured and rugose; antennæ at the ends, palpi, tibiæ at apex and tarsi reddish; head midway between the eyes and hind margin, with a strong wide spine on each side; head with the two keels over the eyes short and straight, the space between them deeply grooved.

Hab. Mexico.

CALOCOMUS MOROSUS. Pl. XIII. fig. 3.

Antennæ ferruginous, black at the base; 13-jointed, very strongly serrated on the outside, the terminal joint deeply notched, nine at least of the terminal joints with the outer edge elongated at the tip: head, thorax, scutellum, abdomen and legs pitchy black; head, thorax and scutellum thickly punctured; elytra thickly and finely punctured, the punctures of the base coarser; elytra wide, shorter than the abdomen, ferruginous, in some places darkish brown.

Hab. Bolivia. From the Collection of Mr. Bridges.

This makes the fourth species of *Calocomus*, a genus which seems, like some of the other *Prionidæ*, to be very variable in the number of joints in the antennæ; the type *C. Desmarestii* has eleven joints; this species has thirteen; while the *Calocomus Lycius*, and *C. Kreuckelyi*, described by M. Buquet, have no less than twenty-two.

PYRODES TENUICORNIS. Pl. XIII. fig. 5.

Head and thorax deeply, coarsely and irregularly punctured, washed with golden green, in some lights tinged with a deep purplish rufous; jaws golden green, tips and edges pitchy; antennæ with the first joint flattened above, golden green except at the end, which is bluish green; third joint much elongated, as long as the fourth and fifth taken together; the first six joints punctured, base of the seventh punctured, tip of the seventh joint and the whole surface of the terminal four grooved. Elytra varied with green and purplish red, much depressed, the margin and shoulders lively green; scutellum notched at the end, slightly grooved down the middle, and with a patch of coarse punctures on each side of the groove. Under parts green with æneous reflections.

Femora light green and covered with minute crowded warts; tibiæ and tarsi light rufous, the tibiæ with elongated papillæ and short hairs.

Hab. Mexico.

Of this species there are two examples in the Museum; in the one figured a purplish red tint pervades all the joints of the antennæ but

the first, and extends over the whole elytra excepting on the basal margin and the extreme edge, which are green.

This species seems to link the three genera *Pyrodes*, *Mallaspis*, and *Solenoptera*; it agrees in most particulars with *Pyrodes*.

PYRODES SMITHIANUS.

Scutellum considerably elongated at the point and notched at the base, the shoulder and the elytra close to the scutellum are produced, and near the shoulder there is a deep groove. The head and thorax are rather smooth and closely punctured; the front margin of the thorax is slightly notched in the middle; the scutellum is quite smooth on the edges, down the middle, and at the tip; the elytra are roughly punctured, the punctures often running together and forming characters like letters; there are four longitudinal ribs down each, which are branched at the end.

This *Pyrodes* is of a bronzy copper colour, the tibiæ and most of the joints of the antennæ being tinged with purple.

Hab. Brazil.

A specimen was found by J. P. George Smith, Esq., of Liverpool, on Caripi, an island thirty miles from Para: he presented it, with numerous other fine insects, to the British Museum.

CALLOCTENUS, n. g.

Body small, the elytra extending over its side and considerably beyond its extremity. Head much excavated in front. Eyes large and prominent. Thorax with a distinct tooth on the sides a little beyond the middle. Scutellum of an elongated triangular form, pointed at the end. Elytra spined at the suture and at the end of the lateral margin.

Antennæ in the male pectinated from the fourth joint, in the female serrated from the fifth: in the male the first joint is of the same length as the fourth exclusive of the appendage; the third is considerably elongated and with a protuberance at the end; from the fourth to the eighth the end is furnished with a compressed appendage narrow at the base, dilated afterwards and blunt at the tip (the ninth and other joints broken off). Antennæ in the female with the terminal joints depressed, oblique at the end, so that the inner edge is serrated. Legs moderate, simple, without serratures. Elytra spined at the suture and at the end of the lateral margin.

This genus comes between *Pæcilosoma* and *Anacolus*.

CALLOCTENUS PULCHER. Pl. XIII. fig. 6.

Hab. Venezuela.

Head, thorax, scutellum and under side of body of a dark coppery green, the head and thorax rather thickly covered with soft greyish yellow hairs; elytra with three longitudinal, considerably raised keels, between each of which is a slighter keel; in the male these latter are abbreviated, between the keels the elytra are closely punctured; the elytra in the male are of a brownish yellow, the punctured parts, except at the base, being darker in colour; in the female the elytra are

of a clear ochre yellow; in the male the antennæ are of a dull ferruginous, the base of the joints paler; the legs are ferruginous in the male, while in the female they are of the same dark coppery green as the head and thorax.

In a female specimen the elytra are of a very dark olive-green; the specimen is rather larger than the other.

Sent from Venezuela by Mr. David Dyson of Manchester.

BIMIA, n. g.

Head as wide as the thorax in front, somewhat narrowed behind, in front square and nearly perpendicular, grooved down the middle; jaws short and strong; eyes deeply notched for the insertion of the antennæ, the hinder margin widely sinuated.

Antennæ 11-jointed, shorter than the body; first joint clavate, cylindrical, slightly longer than the third; second joint small, moniliform; third, fourth and fifth joints straight, compressed, and nearly of the same length; the sixth slightly bent and compressed; the five last joints compressed and gradually smaller, the last blunt at the tip. Thorax wider than long, with a strong spine on each side about the middle, its disc depressed and slightly unequal. Scutellum largeish, hollowed slightly in the middle. Elytra rather narrow, not so long as the abdomen, soft, not meeting except at the base; the shoulders prominent, the sides nearly parallel, the ends slightly pointed; the wings large, and extending beyond the elytra and abdomen. Legs strong, slightly compressed; femora somewhat thickened; hind legs, if extended, would reach a little beyond the abdomen. Tarsi scarcely wider than the tibiæ; penultimate joint deeply cut; soles densely covered with short hairs.

This genus would seem to be placed not far from *Molorchus*, and may be allied to *Agapete*, Newman, Zoologist, iii. p. 1017: it is not unlikely that the other sex is very different in form and colour; there is only one specimen in the Museum.

BIMIA BICOLOR. Pl. XIII. fig. 2.

Hab. Australia (Perth). From the Collection of Mr. George Clifton.

The body is of a very deep shining black, closely punctured, and furnished with short hairs; head below and in front yellow, the yellow colour extending triangularly between the antennæ; eyes, antennæ, cheeks and vertex black; thorax yellow, with a black band down the middle, contracted behind; scutellum black; legs of same deep black as the abdomen, a wide yellow ring on the front tibiæ near the top; elytra pale ochre yellow, with three or four longitudinal veins which branch towards the tip; wings long and black.

LAMIA (CEROSTERNA) TRIFASCIELLA. Pl. XIII. fig. 1.

Densely covered with short yellow and black hairs; head yellow, an impressed line along the middle free from hairs; antennæ with the two first and four last joints black, the other joints yellow at the base and black at the tip; thorax yellow; spines and a band connecting them black, the band crenated in front; legs yellow, joints, tarsi

and posterior side of second and third pairs of femora black; scutellum at the end covered with yellow hairs; elytra of a clear ochre yellow, the base from the shoulder to the suture edged narrowly with black; a transverse black band before the middle, nearly but not quite touching the edge and the suture, widest toward the suture; another transverse black band just behind the middle, and neither touching the edge nor the suture, narrower than the first band, and, like it, waved both in front and behind.

Hab. China (Hong Kong). John Bowring, Esq.

This seems allied to the *L. Assamensis*, Hope. In the present unsettled state of the Longicorn Coleoptera it would be rash to found genera on mere isolated species; but it is difficult to refer the present to any of the modern genera; it comes perhaps nearest to *Cerosterna*.

The figures represent the insects of the size of nature.

January 22, 1850.

Matthew Truman, Esq., M.D., in the Chair.

The following papers were read:—

1. DESCRIPTION OF A NEW SPECIES OF CHRYSODOMUS,
FROM THE MOUTH OF THE MACKENZIE RIVER.
By J. E. GRAY, Esq., F.R.S. ETC.

(Mollusca, Pl. VII.)

Sir John Richardson, M.D., on his return from the Arctic searching expedition, kindly presented to the Museum a series of shells which he had collected between the mouth of the Mackenzie River and Cape Parry: several of them were broken by the extreme cold during the wintering of the expedition at Great Bear Lake.

The collections consisted of the new *Chrysodomus* here described, and the following species, which are exactly similar to the species brought home by Ross, Parry, and the other arctic voyagers from Baffin's Bay, and are interesting as showing that these species are found more than half-way towards the Northern Pacific Ocean; viz.

Saxicava arctica. Very like *S. rugosa*, but larger.

Hiatella arctica. Very large size, with the hinge-teeth almost entirely obliterated.

Mya truncata.

Glycimeris siliqua. All young.

Cardium Grœnlandicum. On the shores.

Crassina semisulcata, Leach, not Müller. In the mouth of the river: eaten by the birds.

Buccinum glaciale.

The egg of a large species of *Natica* was abundant on the sands, probably *N. ampullaria*, Lamk.?

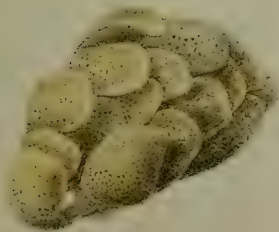
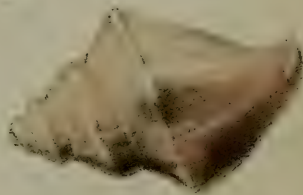
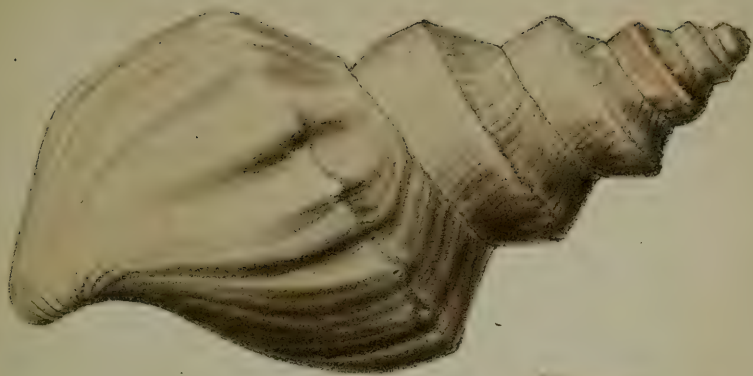


FIG. 1. *Strophomena* *Strophomena* *Strophomena*



CHRYSODOMUS HEROS. (Mollusca, Pl. VII.)

Shell elongate; spire conical, longer than the mouth; whorls convex, two or three upper with a strong central keel, rest with irregularly placed distant rounder tubercles, the last rounded, not keeled; throat white.

Var. 1. Whorls as with a strong, central, continuous keel; the last slightly nodulose.

Egg-cases ovate-oblong, erect, on an expanded base, contracted beneath; surface deeply punctated, granular.

Inhab. Arctic Ocean.

This shell is very like *Chrysodomus despectus*, but differs from that species in the form and surface of the egg-cases, as well as by the greater convexity of the whorls, and the strength and angularity of the keel on the upper whorls.

Like the other species of the genus, the white, opaque, outer coat of the shell is very much inclined to separate from the inner or central coat, which presents, where the outer coat is removed, a smooth surface of yellowish or brown colour.

Dr. Richardson observed several specimens of this shell in the sand-hills which edge the coast, some distance from the sea.

I have named this species *Heros*, as being finest of the genus, and in commemoration of the enterprise and heroic conduct under great hardship of its discoverer.

2. REMARKS ON THE MORPHOLOGY OF THE VERTEBRATE SKELETON. BY EDWARD FRY.

The objects of the present paper are,—1st, the brief statement of the probability that there are laws which govern animal form, in addition to the law of final causes; and 2nd, the *à priori* discussion of certain propositions about the vertebrate skeleton; being an attempt to illustrate the vertebrate by some invertebrate forms, and thus to show their unity of plan.

SECTION I.

The existence of laws governing animal form is rendered probable by the discovery of such laws as regards the forms of plants, all whose parts may be referred to a leaf as the fundamental archetype, as is shown not only by the correspondency in many normal conditions, but also by the transmutations of parts, and the monstrosities to which the petals, sepals, stamens, &c. are liable. Though the greater simplicity of plants, and the more numerous monstrosities to which they are liable by nature or art, render the existence of laws of the kind spoken of more readily apparent in them than in animals, the nature of the proofs and of the conclusions are alike in both cases.

It may, secondly, be remarked, by way of showing a general probability for such a scheme, that there exist unities of structure both in different animals and in different stages of development of the same animal, which are independent, so far as we know, of unity of

end ; or, in other words, that final causes do not explain all the affinities and resemblances which we are able to trace*.

And again, it must be observed, that those remarkable likenesses, which are observable in many or all animals, between their various forms and conditions up to maturity, on the one side, and the various members of the animal kingdom up to their own position in the scale, on the other hand (so that, for instance, man passes through forms resembling, but not identical with, those of many animals from the lowest monad up to his own position in the scale), are inexplicable on the theory that the forms of animals are regulated by final causes only ; but are in perfect accordance with that other which holds that there is expressed in the structure of animals some abstract idea, which running through all the frame, and modified to all purposes of need, and manifested in all variety of conditions, is yet one and the same.

It must be admitted that the force of these arguments may, to some extent, be barred by an assertion which it is difficult fully to answer, viz. that our ignorance of final causes is so great as to allow us no room to argue on the existence of other causes from their apparent inadequacy ; nevertheless as the other supposition seems to have in it no improbability, but as I think the contrary, it may be admitted as at least what best suits our present knowledge.

The belief in the existence of other laws of organization besides that of final causes does in no wise lessen or obscure the argument of natural religion derived from it, which was advanced with great pertinency by the ancient Stoical philosophers, and has been amplified by Derham, Paley and others in our own country.

I now proceed to the second portion of my paper.

SECTION II.

There are reasons derived from the structure of animals below the Vertebrata which might induce us to expect that the vertebrate skeleton should be composed of elements of a common character.

1. So soon as the nervous system assumes the form of a line or chain down the body of the animal, the whole structure puts on a segmental or annular arrangement. Thus in the Annelida the body consists of numerous segments, similar one to the other, with the exception of the anterior one or head, which is sometimes slightly different in form, but in other instances only distinguishable by the presence of a mouth. Each segment has its proper nervous ganglion, connected by two fibrous commissures with those of the neighbouring division.

2. But these segments are subject to change. Thus the *Polydesmida*, a family of the Myriapoda, exhibit the posterior part of the body composed of segments similar to those above described, whilst in the anterior part each segment is the result of the coalescence of two original ones. In the Chilipoda, the same process has

* This part of the subject has been fully illustrated by Prof. Owen in his various writings.

gone on further; so that all the apparent segments are thus composed by the anchylosis of two original ones at an early period of growth, as proved by the two pair of legs which each one bears, and the double nervous ganglia which they contain, the nervous centres of the original elements having approximated to one another without coalescence (Newport on Myriapoda, Phil. Trans. 1843).

3. But not only does the progression from lower to higher forms in the scale of the animal kingdom teach us how segments of the body originally similar may be changed—the progression of individuals does the same thing. The larval condition of insects undoubtedly corresponds very nearly with the Annelida; the arrangement of the body and the relation of each segment to the nervous system are similar. But the perfect state shows a very great modification in the form; many segments have disappeared by coalescence, whilst the equality of size originally existing between them has been lost by reason of the centralization of functions; the nervous centres have often been removed from their respective segments, yet the number remains the same; for although only nine centres appear in the abdomen (Blanchard sur les Coleoptères, Annales des Sciences Naturelles, 1846, part i.), yet the last has been shown in the Lepidoptera (Newport on *Sphinx*, Phil. Trans. 1832) to consist of two which have united.

4. The same segmental arrangement of the body, and the same ganglionic condition of the nervous centres in accordance with the rings of the body, obtain throughout many members of the class of the Articulata.

We now descend to two more particular propositions, resulting from and embraced in the foregoing, but which we nevertheless prefer to illustrate separately.

There are reasons to expect that the head of the Vertebrata should be composed of segments similar to those of the body.

1. We have already noticed the close resemblance between the anterior segment or head and the following ones in the *Polydesmidæ*.

2. In the larval insects the similarity is great; but in the perfect one a number of the other segments become anchylosed, and enter into the composition of the head, in accordance with the law, that the more perfect an animal is, the more complex and individualized are its parts, and consequently the more is its abstract nature hidden under its teleological manifestation. The divisions between the segments entering into the composition of the head sometimes remain permanently recognizable in the external skeleton. The number of these segments has been a much-vexed question among entomologists, the numbers advocated by different naturalists having been two, three, four, five and seven. I am inclined to believe the real number of these segments to be four:—1st, because of the very slight evidence for the presence of any other, the fifth segment being considered as entirely atrophied, and no corresponding manducatory organ appearing; 2nd, from four being the only number at all discoverable in some insects, as in the *Hydroüs piceus* (see Newport on Insecta in Todd's Cyclopædia); 3rd, because the brain (*i. e.* the coalesced

ganglia of the cranial segments) of the *Necrophlagæophus longicornis* has been discovered by Newport, at the period of its bursting its shell, to consist of four double ganglia (Newport in Phil. Trans. 1843).

We next consider the reasons for supposing *that the organs composing the mouth of the Vertebrata should be the homologues of those of locomotion.* It must be remarked, that everything now to be said assists most strictly in support of the preceding proposition, and would have been introduced under that head but for the sake of conveniency in illustrating the vertebrate skeleton.

1. In the Crustaceans the jaws differ in scarcely any other character than size from the true legs used in locomotion.

2. In the Myriapoda the members of the basilar segments of the head are jointed and retain the form of true legs, but are used for prehension (Newport in Todd's Cyclopædia).

3. In Insects the tarsal joints of the cranial legs are undeveloped; the femur and coxa are small or confluent with the under side of the segment, whilst the tibiæ are alone enormously enlarged, and thus become elements in the complex mouth of Insects; their muscles, however, being attached to the basilar and posterior lateral parts of the head, just as if they still subserved the purposes of locomotion (*idem*).

4. All the parts of the complex mouth of Insects are thus referable to the segments of the head. In the Great Water Beetle this is clearly shown; the manducatory organs visibly resemble the proper organs of locomotion, and are articulated to the distinct segments (*idem*).

5. We must remark intermediate normal conditions between the true locomotive and manducatory form of leg; as in the genus *Onitis*, where the prothoracic legs are without tarsi, and the tibiæ are terminated by sharp hooks; and in the *Bubos bison*, a species of a neighbouring genus, where the tibiæ strongly approach in form the proper mandibles of the head: also,

6. A monstrous condition in a specimen of *Geotrupes stercorarius*, where the prothoracic legs were arrested in development and the tarsi were absent, so that they very closely resembled the form of the mandibles (*idem*).

SECTION III.

The spinal cord of the Vertebrata is homologous with the ganglionic cord of the Articulata.

1. The elements of the systems are alike, being in both cases cellular nervous matter and commissural fibres.

2. The experiments and investigations of recent physiologists have proved the real independence of the segments of the cord contained in each vertebra, insomuch as each performs separately from the others its own reflex actions, just as is the case in the ganglionic cord of the Articulata; so that, as far as its reflex actions are concerned, the cellular or dynamic element of the spinal cord is not one organ or centre, but a series of independent organs or centres, as is seen in

the Insects, the external longitudinal fibres serving only as commissural or communicating portions.

3. Those ganglia of the Insects which are perfectly separate in the larval condition often exhibit a tendency to fusion in the perfect condition (Blanchard *ut antea*). Thus in the Coleoptera the last abdominal ganglion is always formed by a fusion of several original ones; the first and second abdominal often form a single mass with the metathoracic, whilst in the Chafer this last is united with the mesothoracic (*idem*). In like manner the fourth and fifth segments in the perfect insect are fused together. In the *Polydesmidæ*, the two first segments which bear legs unite their nervous centres with the first subœsophageal, so as to form a short cord similar to that of the Ostracion and some other fish (Newport on Myriapoda, Phil. Trans. 1843). In the Scorpion the fusion has gone so far as to form a sort of medulla oblongata, giving rise to eight pairs of nerves (*idem*). In *Nitidula ænea* all the abdominal ganglia have united to form a short cord (Blanchard *ut antea*, plates); and in *Calandra palmarum* the ganglia of the whole body have approximated so as to form a continuous moniliform cord (so far ganglionic in appearance as that the distinction between the segments has not been obliterated), which is placed in the anterior portion of the body (*idem*, plates).

4. The ganglionic cord of Insects undergoes the same alteration at its posterior extremity that the spinal cord of the Vertebrata does by its withdrawal from the caudal vertebræ and the formation of a cauda equina, as may be clearly seen in Blanchard's plates (*ut antea*, e. g. in the *Nitidula ænea*, the *Calandra palmarum*, and the *Dyticus marginalis*).

5. In the Chilognatha, or higher order of the Myriapoda, the ganglia coalesce so as to form a uniform spinal cord, the commissural fibres no longer occupying intervening spaces as in the Chilipoda, but forming the external layer of the nervous cord (Newport on Myriapoda, Phil. Trans. 1843):

6. Whilst the true vertebrate fish *Orthogoriscus mola* exhibits exactly an opposite character in the ganglionic condition of its myelon (Owen's Lectures, ii. 173, on the authority of Arsaki).

SECTION IV.

A vertebra is the correlative in the osseous of a centre in the nervous system.

This appears to me to be the most general possible definition of a vertebra, and therefore the most philosophical. The general idea of the relation of the osseous and nervous centres involved in it, though not the relation of the segments of each one to the other, was thus expressed by Oken: "Bones are the earthy, hardened, nervous system; nerves are the spiritual, soft, osseous system—*Contentens et contentum*" (quoted by Owen, Report of Brit. Assoc. p. 242).

1. The number of vertebræ constituting the spinal cord always corresponds with the number of segments in the cord as indicated by

the number of pairs of nerves given off. When more than one pair perforate one piece of bone, it results from an ankylosis of several vertebræ, as in the sacrum; and the coccygeal vertebræ, which appear to be an exception to the definition, are not so in reality, the spinal cord passing into them in the fœtal condition, and being gradually withdrawn just in the same manner as is the case in some of the Coleoptera. As is clearly seen in them, too, the cauda equina represents the nerves of the vertebræ from which the cord has been withdrawn. Some Vertebrata, as *e.g.* the Python, retain the original relation of the vertebræ and centres throughout the whole of the spinal cord (Owen, Report *ut antea*, 221).

2. The same dependence of the vertebræ on the nervous centres is shown by the fact, that the tail which is reproduced by Lizards, in the case of the loss of that member, is a single bone, because although bone may be reproduced, the spinal cord cannot be (Owen *ut antea*, 254).

3. In accordance with this definition may also be cited the very long vertebra which is formed on that part of the spinal cord of the Anourous Batrachians which does not give off nerves, and which is not the result of ankylosis of several elements, but arises from one point of ossification (Martin St. Ange, Recherches anatomiques et physiologiques sur les Organes transitoires et la Métamorphose des Batraciens, Ann. des Sci. Nat. No. xviii. p. 401); and also the invariableness of the number of the vertebræ in the Mammalian's neck, resulting from the presence of the same number of nerves, and irrespective of the length of the vertebræ.

SECTION V.

A segment is the representative in the Articulata of a vertebra in the Vertebrata.

This view has been advocated by Geoffroy St. Hilaire, both in his "Mémoire sur la Vertèbre," in the ninth volume of the 'Mémoires du Muséum d'Histoire Naturelle,' and previously in a memoir read by him before the Academy in 1820. Nevertheless, the argument on which I would mainly rest it, is not yet universally admitted, for we find M. Emile Blanchard very recently asserting that nothing really indicates the analogy between the spinal cord of the Vertebrata and the ganglia of the Articulata.

1. We have seen what a close relation of correspondence exists in the Articulata between the segments and the ganglionic nervous centres; and we have endeavoured to prove that in the Vertebrata a vertebra is the correlative of one of the spinal nervous centres; and also that the spinal cord of the one class is the representative of the ganglionic cord of the other; whence it appears, that a segment of the Articulata and a vertebra of the Vertebrata must be homologous.

2. The ossification of the centrum of a true vertebra is first peripheral, and subsequently fills up the interior with osseous matter (Owen *ut antea*, 256). Thus if we suppose a vertebra stopped in the first stage, and forming the external instead of the internal sup-

port of the body, we have a segment of an articulate creature, with only an histological difference, which must by no means be allowed to conceal from us the true nature of a part (Geoffroy St. Hilaire, *Sur la Vertèbre, ut antea*, p. 92).

3. If to this view it should be objected, that the including in the one case what is excluded in the other dispels all semblance of homology, it must be answered—

a. That notwithstanding this difficulty, the general homology of the vertebrate and articulate skeletons as wholes has long been admitted, though this more particular one of their parts has not been.

β. That the hæmal arch of the Vertebrata, whose normal office it is to enclose the main blood-vessels of the body, and which office it exclusively performs in many cases, is yet in others so developed as to enclose a mass of viscera, viz. in the thorax.

γ. In the Testudina we have an example of those vertebral elements which are usually internal, becoming external, and including not only all the viscera, but having the whole muscular system attached internally, as in the Articulata, and even the limbs arising from the inside instead of the outside of the thorax.

4. It presents no difficulty that the segments of the Articulata have no superior or inferior arches like vertebræ, because both the spinal cord and circulatory organs which those arches are respectively designed to protect are included within the body (St. Hilaire *ut antea*, p. 102).

5. To the order of development of a vertebra in the lateral processes for locomotion being produced subsequently to the body, we have an analogous case in that the Myriapoda are at birth and for some time afterwards apodal, and subsequently acquire their numerous legs (Newport on Myriapoda, *Phil. Trans.* 1841). This is also the case with some other articulate animals.

SECTION VI.

The brain of the Vertebrata is a modification of a series of four ganglia homologous with those of the spinal cord.

1. In the *Amphioxus* that part of the cord which must be regarded as the homologue of the brain, because it gives off five pair of cephalic nerves, is only distinguished from the other part of the cord by its pointed anterior extremity, its posterior part being entirely like the other ganglia; even its greatest vertical diameter is not greater (De Quatrefages on *Amphioxus*, *Annales des Scien. Nat.*, third series, vol. iv.).

2. We have already noticed that the two large cephalic ganglia of the Centipede are the result of the coalescence of a series of four ganglia, as they appear in the fœtal condition, each of these nervous centres supplying nerves to the senses. Closely corresponding with this arrangement is that displayed by many of the fish, as *e. g.* the Eel, where the brain is only a series of four closely arranged ganglia. And this same original scheme seems to me traceable throughout all the Vertebrata to man himself. There are, however, as the great

centralization and individuality of the organ would lead us to expect, many variations and modifications, which tend at first sight to conceal its real nature, as *e. g.* the removal of the olfactory ganglia to a great distance from the other elements of the brain, with which they only maintain their connexion by means of filiform crura, as in the Whiting and many fish; the amplification of the segments of the encephalon by the addition of supplementary ganglia, as the hypophysis, hypophysis, &c. as they occur in many fish, and some of which are retained in the higher orders, or the cerebrum in the cartilaginous fishes, and in all animals upwards to man, and which comparative anatomy teaches us is only to be considered as a special appendage to or development of the prosencephalic ganglia; or the extreme development of one pair of ganglia so as to obscure the others, as the cerebellum in the Sharks, Sawfish, &c. (Owen's Lectures, ii. 175); or the very diminutive size of a segment, as the cerebellum in many reptiles; or the coalescence of the pair, and consequent obliteration of the mesial division, just as is equally the case between the two halves of the spinal cord, as in the cerebellum.

3. Embryonic anatomy, too, comes in to strengthen the conclusion of comparative anatomy, that a series of four ganglia is the essential element of the brain, and that all the other parts of which it consists in adult life of the higher Vertebrata, including of course the cerebrum, are superadded.

The argument of the preceding sections, exclusive of Section I., and the conclusion to which it is intended to lead, may thus be stated:—

Considering that the head of the Insecta, Myriapoda, &c. is composed of a series of segments serially homologous with those of the body, as its brain is of ganglia serially homologous with those of the cord; that a vertebra is the general homologue of a segment as the spinal cord is of the ganglionic cord; and that the brain of the Vertebrata consists of a series of four segments; there appears a strong probability that its head in like manner shall consist of a series of four vertebræ.

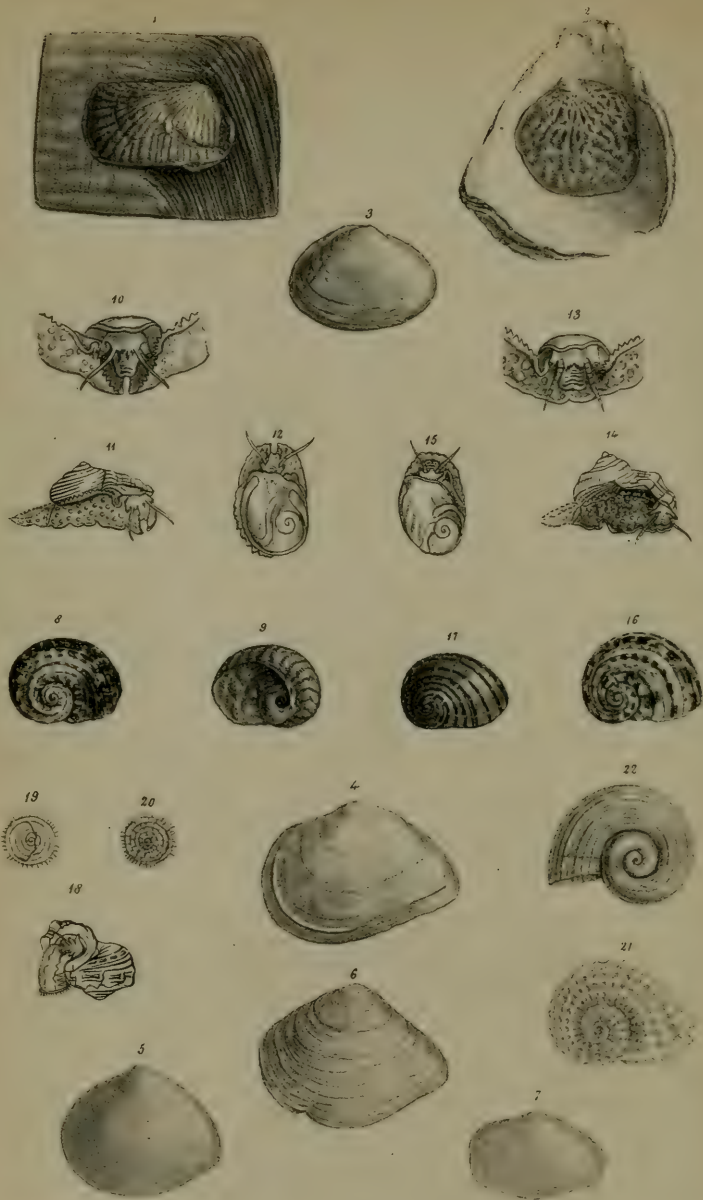
3. MONOGRAPH OF THE SPECIES OF MYOCHAMA, INCLUDING THE DESCRIPTIONS OF TWO NEW SPECIES FROM THE COLLECTION OF H. CUMING, ESQ. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. VIII.)

MYOCHAMA; Stutchbury.

Testa inæqualvis, adhærens; valva affixa dentibus duobus marginalibus, divaricatis, ad umbonem disjunctis, foveolâ trigonâ intermedid alteram testacæ appendicis extremitatem, cartilagine corned connexam, excipiente; valva libera dentibus duobus inæqualibus, parvis, divaricatis, alterâ appendicis extremitate foveolâ intermedicæ insertâ; umbones valvæ liberæ internè, alterius externè, recurvi; impressiones musculares duæ orbiculares,





A. Adams, W. Wing del. W. Wing sculp.

Fig 1. *Myochama transversa*.

Fig 6. *Cumingia sinuata*.

Fig 17. *Gena ornata*.

2. *M. Strangeli*

7. *C. fragilis*

18. 19. 20. *Lichia Perona*

3. *Cumingia Cleryi*.

8. 9. 10. 11. 12. *Micronis tuberculata*.

21. *L. pulcherrima*

4. *C. similis*

13. 14. 15. *Stomaria duplicata*.

22. *Cyclostrema spirula*

5. *C. striata*.

16. *Stomaria notata*

distantes, laterales; impressio muscularis pallii sinu brevi lato; ligamentum tenue externum.

Shell inequivalve, adhering; the attached valve with two unequal diverging marginal teeth, separated at the umbo by a triangular pit in which one end of a testaceous appendage is inserted and connected by a horny cartilage; the free valve with two unequal, small, diverging teeth, close under the umbo, in which is inserted the other end of the testaceous appendage; the umbo of the free valve is curved inwards, that of the fixed valve outwards; muscular impressions two, nearly orbicular, distant, lateral; palleal impression with a short broad sinus.

MYOCHAMA ANOMIOIDES, Stutchbury. *M. testá rosed, tenui, fragili, costis prominentibus radiantibus dichotomis; valvâ liberâ valdè convexâ; umbone extra apicem valvæ alterius producto; epidermide tenui pellucidâ.*

Long. $\frac{1}{12}$; lat. $\frac{5}{12}$; alt. $\frac{9}{12}$.

Hab.

Shell rose-coloured, thin, fragile, ornamented by prominent radiating dichotomous ribs; free valve extremely convex, the umbo projecting beyond the apex of the other; epidermis thin and transparent.

Hab.

This species is always regularly radiately ribbed, but when found attached to smooth shells the ribs are smooth, but if fixed to *Trigonia pectinata* they are crossed by tubercles.

MYOCHAMA TRANSVERSA, A. Adams. *M. testâ inæquilaterali transversâ fuscâ, subquadrâtâ, anticè longiore posticè breviorè subtruncatâ, radiatim costatâ, costis subnodosis interdum dichotomis, concentricè minutissimè striatâ, valvâ liberâ subconvexâ, umbone extra apicem valvæ alterius producto.*

(Mollusca, Pl. VIII. fig. 1.)

Shell inequivalve, transverse, light brown, subquadrate, anteriorly longer, posteriorly shorter and rather truncated, radiately ribbed, ribs rather nodulous, sometimes divided in two, very minutely concentrically striated, the free valve rather convex, with the umbo produced beyond the apex of the other valve.

Hab. Cape Upstart, 8 fathoms; *Mr. Jukes.* (Mus. Cuming.)

MYOCHAMA STRANGEI, A. Adams. *M. testâ luteâ, tenui, fragili, corrugatâ, costis nodosis, non distinctis, concentricè striatâ, lineis radiantibus asperis ad marginem ventralem distinctioribus; valvâ liberâ depressâ umbone plano cinerascente non extra apicem valvæ alterius producto.*

Hab. in Australasiâ. (Mollusca, Pl. VIII. fig. 2.)

Shell yellow, thin, fragile, corrugated, ribs nodulous, not distinct, concentrically striated, with rough radiating lines more distinct towards the ventral margin; the free valve depressed, ash-coloured, flattened, not projecting beyond the apex of the other valve.

Hab. Port Jackson; *Mr. Strange.* (Mus. Cuming.)

4. DESCRIPTION OF NEW SPECIES OF THE GENUS CUMINGIA,
WITH SOME ADDITIONAL GENERIC CHARACTERS.

By ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. VIII.)

CUMINGIA, G. B. Sowerby.

Testa bivalvis, inæquilateralis, æquivalvis, latere antico rotundato, postico hiante subacuminato; dentibus, cardinali, in utrdque valvâ unico, parvo antico, lateralibus in alterâ valvâ ad utrumque latus uno, valido, in alterâ nullo; ligamento interno foveolæ subcochleariformi affixo; impressionibus muscularibus dualibus lateralibus distantibus, anticâ irregulari oblongâ, posticâ subrotundatâ; impressione musculari pallii sinu maximo.

Shell ovate, inequilateral, equivalve; a shallow spoon-shaped cardinal tooth and a single small tooth by its side in each valve, a strong lateral tooth on both sides in one valve only; palléal impression with a large sinus, posteriorly gaping.

All the species of this genus gape more or less posteriorly, are more or less lamellose, and the cavity for the cartilage is spoon-shaped and projects into the cavity of the valves, differing in this respect from *Amphidesma* or *Semele*.

CUMINGIA SIMILIS, A. Adams. *C. testâ subtrigonaliovatâ decussatè striatâ, lineis transversis concentricis, lamellâ unicâ prope marginem ventralem anticè latiore rotundato supra angulato postice angustiore subrostratâ, areâ posticâ clausâ, lunulâ lanceolato-ovatâ, margine ventrali posticè coarctatâ.*

Hab. in Borea-Occidentali Ora Americæ. (Mollusca, Pl. VIII. fig. 4.)

Shell triangularly ovate, decussately striated, lines of growth transverse and concentric, rather strongly marked, a single lamella near the ventral margin, anterior side the widest, rounded in front and angulated above, posterior side narrower, somewhat beaked posteriorly, area closed, lunule lanceolately oval, ventral margin posteriorly contracted.

Hab. N.W. coast of America. (Mus. Cuming.)

CUMINGIA CLERII, A. Adams. *C. testâ ovatâ compressâ subæquilaterali, albâ, opacâ, sublevi, nitidâ, striis transversis concentricis alveolisque irregularibus, latere antico angustiore rotundato, postico latiore, margine ventrali integro arcuato.*

Hab. ad Talcahuano, Chili. (Mollusca, Pl. VIII. fig. 3.)

Shell ovate, compressed, subequilateral, white, opaque, rather smooth and shining, marked with faint transverse concentric striæ, and numerous pits irregularly disposed, anterior side narrower and rounded, posterior side wider; ventral margin entire, arcuated.

Hab. Found at Talcahuano, Chili, by Capt. Clery, French Marine, attached to fuci in shallow water. (Mus. Cum.)

CUMINGIA ANTILLARUM, A. Adams. *C. testâ ovato-trigonalî, concentricè lamellosâ; lamellis subdistantibus, interstitiis valdè*

longitudinaliter striatis, latere antico breviorè latiorè rotundato, postico longiorè, angustiorè subrostrato, valde hiantè, margine ventrali postice subsinuato.

Hab. In Indiâ Occidentali.

Shell ovately triangular, concentrically lamellose, lamellæ rather wide apart, the interstices with distinct longitudinal striæ, anterior side shorter, wider, and rounded, posterior side longer, narrower and somewhat beaked, widely gaping, ventral margin posteriorly rather sinuated.

Hab. West Indies. (Mus. Cuming.)

CUMINGIA FRAGILIS, A. Adams. *C. testâ transversâ ovali albâ fragili subpellucidâ concentricè lamellosâ; lamellis elevatiusculis, subdistantibus, interstitiis tenuissimè longitudinaliter striatis, latere antico latiorè margine sinuato, postico angustiorè rotundato subflexuoso, margine ventrali integro arcuato.*

Hab. in Guadaloupiâ. (Mollusca, Pl. VIII. fig. 7.)

Shell transverse, oval, white, fragile, semipellucid, concentrically lamellose, lamellæ rather elevated and wide apart, interstices very finely longitudinally striated, anterior side wider, the margin sinuated, posterior side narrower, rounded, subflexuous, ventral margin entire and arcuated.

Hab. Guadaloupe; Governor Admiral Tourbeyre. (Mus. Cuming.)

CUMINGIA STRIATA, A. Adams. *C. testâ ovato-trigonalis subventricosâ albâ tenui fragili; striis transversis concentricis elevatis confertis, interstitiis longitudinaliter striatis, latere antico latiorè rotundato, postico subacuminato, margine ventrali posticè coarctato.*

(Mollusca, Pl. VIII. fig. 5.)

Shell ovately trigonal, somewhat ventricose, white, thin, fragile, with transverse concentric crowded elevated striæ, the interstices longitudinally very finely striated, anterior side wider and rounded, posterior side rather acuminate, ventral margin posteriorly contracted.

Hab. Conception; seven fathoms, sandy mud; *H. C.* (Mus. Cuming.)

CUMINGIA SINUOSA, A. Adams. *C. testâ subtrigonalis albâ semipellucidâ subæquilaterali concentricè lamellosâ, interstitiis longitudinaliter substriatis, latere antico sublatoiorè rotundato, postico angustiorè, margine ventrali posticè valdè sinuato.*

Hab. in Indiâ Occidentali. (Mollusca, Pl. VIII. fig. 6.)

Shell subtrigonal, white, semipellucid, subequilateral, concentrically lamellose, interstices longitudinally substriated, anterior side rather wider and rounded, posterior side narrower, ventral margin posteriorly deeply sinuated.

Hab. West Indies. (Mus. Cuming.)

February 12, 1850.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read :—

1. ON THE TRICHOGLOSSINE GENUS OF PARROTS, EOS, WITH THE DESCRIPTION OF TWO NEW SPECIES. BY CHARLES LUCIAN, PRINCE BONAPARTE, MEMBER OF THE PRINCIPAL ACADEMIES OF EUROPE AND AMERICA.

The genus *Eos* is, like *Eclectus*, a new instance of the impropriety of that *middling course* (as disgusting in science as it is in politics), of uniting together by two and two, four and four, &c., small groups (or *States*), which, natural by themselves, have no stronger relation to each other than to any other member of their family. Take for example (comparing them to Naples and Sicily!) *Spiza* and *Paroaria*, Bon., united by G. R. Gray under his *Spiza*! amongst the *Fringillidæ*, and amongst the Parrots *Psittacodis** and *Eclectus* confounded together by the same process!

The genus *Eos* is intermediate between the two subfamilies *Trichoglossinæ* and *Lorinæ*. Although it may astonish some naturalists that I do not consider it as one of the latter, still, on account of its tail, its anatomy and its habits, I keep it within the boundaries of the former, in close relation with my new genus *Chalcopsitta* †,

* Since I speak of *Psittacodis* (the only *green* Genus of Lorine Parrots, which forms the same beautiful passage from *Lorinæ* to *Psittacinæ* that *Eos* does from *Trichoglossinæ* to *Lorinæ*), let me submit to the Society the phrases of two new species that make the whole number hitherto known five: they come as near *Psittacodis magnus* or *sinensis* (with which I for that reason compare them) as the three *Eclecti* do to each other:—

1. PSITTACODIS MAGNUS ET SINENSIS, Gm. (*viridis*, Lath.; *lateralis*, Shaw; *Mascarinus prasinus*, Less.; *Psittacodis magnus*, Wagl.; *Eclectus!* *polychloros!* Gr. ex Scopoli) Pl. Enl. 514; Edw. B. t. 231; Lev. Perr. t. 132.

Major: *iliis rubris*: *marginæ alarum cyaneo*: *cauda apice subconcolori*.

2. PSITTACODIS INTERMEDIUS, Bp. Mus. Lugd.

Minor: *iliis rubris*: *marginæ alarum rubro*: *cauda apice subconcolori*.

3. PSITTACODIS WESTERMANNI, Bp. Zool. Soc. Amst.

Minor: *iliis concoloribus*: *marginæ alarum cæruleo*: *cauda apice subconcolori*.

Dedicated to the able and modest Director of the Zoological Society of Amsterdam, where this new Parrot is living.

† This new genus of mine, though composed of decided *Trichoglossine* Parrots, shows a strong affinity, not only to the *Lorine* but also to the *Platyercine*. It is composed in fact of

1. PLATYCERCUS ATER, Gr. (*Psittacus novæ guineæ*, Gm.; *Ch. novæ guineæ*, Bp.); and of

2. EOS SCINTILLATA, Gr. (*Psittacus scintillatus*, Temm.; *Ch. scintillans*, Bp.); to which I have added a third new species, also from the Moluccas:—

3. CHALCOPSITTA RUBIGINOSA, Bp. Mus. Lugd. ex Ins. Barabay et Guebe.

(Aves, Pl. XVI.)

E. purpureo-badia, *capite obscuriore*; *subtus fasciolata*, *plumis singulis lunulâ medianâ et apicali nigricante*: *remigibus rectricibusque virescentibus caudâ*; *apicem versus gradatim lutescente*.

Rostrum rubrum: *pedes nigri*: *irides albæ*. *Magnitud. Turdi*.

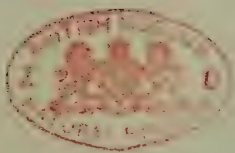


Walden

Printed by Hullmandel & Walton

CYANOPSITTA CYANIROSTRIS Bonap







Painted by J. G. Keenan from a specimen in the collection of the British Museum.





which connects it with *Trichoglossus*, the type and centre of the subfamily; as on the other side *Lathamus* and *Charmosina* connect the same *Trichoglossus* through *Coriphilus* (and especially by means of *Lathamus*) with the subfamily *Platycercinæ*.

It may be characterized by its elegant form, small stature, compact, red plumage with more or less blue; compressed, moderate, red bill, with the cere apparent (not concealed as in *Eclectus*); short feet, with robust toes and powerful, arched, very acute nails; and longish, not very broad, wedged tail.

It is composed, to my knowledge, of only seven species;—five already described (and some of them too many times) in the systems, and two new ones, which form the subject of the present paper, and of which I subjoin the faithful portraits drawn by an anonymous hand, which has no merit in keeping the transparent veil upon an additional claim to our admiration and gratitude, since it is so far beneath its others! And when I say that only five are the hitherto known species of *Eos*, it is because I do not count *Eos variegata* and *Eos Isidorii* of Wagler, since, the first is evidently nothing but a *variegated* or *pieb* bird, and the other, named, described and figured by Swainson, appears identical with *Eos riciniata*, for which the false name of *cochinchinensis* cannot be retained. Of the other three (out of the ten admitted by our friend G. R. Gray, in his 'Genera of Birds'), *E. scintillata* is a *Chalcopsitta*, and *E. cervicalis* and *ornata* are *Trichoglossi*!

1. *EOS* CYANOGENIA, Bp. (Aves, Pl. XIV.)

E. rubra; maculâ magnâ periophthalmicâ cyaned: humeris ex toto, remigibus elongatis reetricibusque magnâ ex parte nigris.

Long. 9 poll.; alæ, 6½ poll.; caudæ, 4 poll.

Close to *Eos indica* or *coccinea*, but having no blue on the head, back or breast; and instead, a large blue patch, including the eye and covering the cheek, which *Eos indica* has red; the black also is more predominant on the wings, and the red tinge duller. The phrase in English may be:

“Brownish red; the whole of the shoulder and great part of the wing- and tail-feathers black; a large azure patch on each side of the head.”

I found the specimen upon which I did not hesitate to establish my species among the endless treasures of the Leyden Museum.

2. *EOS* SEMILARVATA, Bp. (Aves, Pl. XV.)

E. coccinea; vittâ a gulâ ultrâ oculos, maculâ utrinque scapulari, crissoque, cyaneis: remigibus brevibus reetricibusque apice tantum nigris.

Long. 9 poll.; alæ, 5¾ poll.; cauda, 4 poll.

Resembling *Eos rubra*, but much smaller and *half-masked*!

“Entirely red, even on the shoulders; the tips only of the quills and tail-feathers black; two symmetrical spots on the scapularies, under tail-coverts and *semi-mask* extending from the throat behind the eyes, rich blue.”

I picked up this beautiful species in the rising Museum annexed to the Zoological Gardens of Amsterdam; and as soon as he became aware of the value of his bird, Mr. Westermann, as a compliment to Dr. Schlegel and myself, with a liberality of which few men even of science are capable, made a present of it to the Leyden Museum; where, duly greeted by Mr. Temminck, the typical specimen is safely deposited.

To complete the monography of the genus, I add the comparative phrases of the five other species, all of which have several beautiful representatives in the Leyden Museum.

1. EOS INDICA, Wagl.

E. coccinea; fasciâ verticis latissimâ, cervice, dorso, pectore, tibisque, cyaneis: tectricibus alarum internis et remigibus apice nigris.

Synonyms.

Psittacus indicus, Gm.

Psittacus variegatus, Gm., Lath. ex Buff. Pl. Enl. 143.

Psittacus coccineus, Lath.

Eos indica, Gr.

Eos variegata, Gr.

Perruche des Indes orientales, Buff. Pl. Enl. 143, accidental var.!

Le Lori-Perruche violet et rouge, Levaill. Perr. t. 53.

Hab. In Insulis Moluccis.

2. EOS RUBRA, Wagl.

E. rubra; crisso, scapularibusque cyaneis; tectricum majorum margine apicali, remigibusque primariis externè nigris.

Synonyms.

Psittacus ruber, Gm.

Psittacus borneus? Gm., Lath. jun.

Psittacus cæruleatus, Shaw.

Psittacus cyanonotus, Vieill.

Eos rubra, Gr.

Lory de la Chine, Buff. Pl. Enl. 519.

Le Perroquet Lori à franges bleues, Levaill. Perr. t. 93.

La Perruche écarlate, Lev. Perr. t. 44.

Hab. In Insulis Moluccis; Amboina.

3. EOS GUEBIENSIS, Wagl.

E. coccinea, scapius tanquam squamata; plumis pilei, colli, pectoris et laterum margine nigro-virescentibus: alarum fasciâ duplici remigibusque apice nigris.

Synonyms.

Psittacus guebiensis, Auct.

Psittacus squameus, Shaw.

Eos squamata, Gr. ex Scopoli.

Lory de Gueby, Buff. Pl. Enl. 684.

Le Lori écaillé, Levaill. Perr. t. 51.

Hab. In Insulis Gueby, Buron et Ceram.

4. EOS RICINIATA, Bp.

E. rubra; vertice, collo et maculâ abdominali magnâ, cyaneis : tetricibus alarum remigibusque ad apicem latè nigris.

Synonyms.

Psittacus cochinchinensis, Lath.

Psittacus riciniatus, Bechst.

Psittacus cucullatus, Shaw.

Lorius Isidorii, Sw. Zool. Ill. n. s. t.

Lorius riciniatus, Müll.

Eos cochinchinensis, Wagl., Gr.

Perruche à chaperon bleu, *Levaill. Perr.* t. 54.

Hab. In Insulis Moluccis. Gilolo et Ternate, *Forsten, Müller* ; nec in Cochinchina!

5. EOS CYANOSTRIATA, Gr.

E. rubra, alis caudâque, nigro variis ; maculâ postoculari nigro-cæruleâ : dorso striis cæruleis.

Synonyms.

Lorius borneus ! *Less. Traité d'Orn.* p. 192, nec Lath.

Eos cyanostriata, *Gray and Mitchell, Gen. of Birds*, t. 103.

Hab. In Insulis Moluccis, minimè in Borneo!

2. AN ARRANGEMENT OF STOMATELLIDÆ, INCLUDING THE CHARACTERS OF A NEW GENUS, AND OF SEVERAL NEW SPECIES.
BY ARTHUR ADAMS, R.N., F.L.S. ETC.

STOMATELLIDÆ.

Head broad, probosciform ; tentacles subulate, with a fimbriated lobe at their inner bases ; eyes on peduncles at their outer bases ; mantle with the front edge entire ; muscle of attachment crescentic, open in front ; foot with a lateral membrane. Operculum rudimentary or none. Shell imperforate, with a crescentic muscular impression, open in front.

The family *Stomatellidæ* differs from that of *Haliotidæ* in the mantle not being fissured anteriorly, in the muscle of attachment being in the form of a horseshoe round the sides and posterior part of the mantle, instead of being oval and central, and in the shell not being perforated. In their habits they are littoral, living on coral reefs and attached to stones near the shore. Some of the genera, as *Gena*, *Stomatella* and *Stomatia*, have considerable locomotive powers, and glide, especially *Gena*, with some degree of celerity. The latter genus and *Stomatia* possess the faculty, common to some other kinds of mollusca, of spontaneously detaching a considerable portion of the hind part of the foot when disturbed or irritated.

STOMATELLA, Lamarck.

Animal spiral, retractile within the shell ; tentacular lobes triangular, with the front edge fringed ; foot small, not tubercular, not

produced posteriorly, operculigerous, lateral membrane very wide, the circumference regularly fimbriated. Operculum orbicular, thin, horny, multispiral. Shell spiral, suborbicular, depressed, transversely ribbed or sulciferous; spire more or less elevated, whorls rounded; aperture large, wider than long, pearly within.

STOMATELLA IMBRICATA, Lamarck.

Hab. Torres Straits; *Jukes*. (Mus. Cuming.)

Stomatella imbricata, *Lamk. Ency. Méth.* p. 450. f. 2; *Hist. Nat. An. s. Vert.* vol. vi. p. 209.

STOMATELLA CANCELLATA, Krauss.

Hab. Table Bay, Cape of Good Hope. (Mus. Cuming.)

Stomatella cancellata, *Krauss, Sudafrican Moll.* tab. 5. fig. 26.

STOMATELLA COSTELLATA, Adams. *S. testá suborbiculatá, convexo-depressá, albidá, imperforatá, costellis transversis obtusis striisque elevatis longitudinalibus decussatá; spirá subprominulá; aperturá magná, obliquá, oblongá.*

Hab. —?

Shell suborbicular, convexly depressed, whitish, imperforate, with obtuse transverse ribs and decussating longitudinal elevated striæ; spire rather prominent; aperture large, oblique, oblong.

Hab. —? (Mus. Metcalf.)

STOMATELLA ARTICULATA, Adams. *S. testá suborbiculari, imperforatá, convexá, tenui, griseá, costulis transversis nigro-articulatis, interstitiis lineis longitudinalibus elevatis ornatá; spirá prominulá, anfractibus rotundatis; aperturá oblongo-ovali, longiore quam latiore.*

Hab. In insulis Pacificis.

Shell suborbicular, imperforate, convex, thin, grey, ornamented with transverse ribs articulated with black, the interstices with longitudinal elevated lines; spire rather prominent, whorls rounded; aperture oblong-oval.

Hab. Australia; Lord Hood's Island, South Seas, on the pearl oyster; *H. C.* (Mus. Cuming.)

STOMATELLA SULCIFERA, Lamarck.

Hab. Philippines, Catbalonga; island of Samar, under stones; isle of Ticao, on the reefs, low water; *H. C.* (Mus. Cuming.)

Stomatella sulcifera, *Lamk. Hist. Nat. An. s. Vert.* p. 210.

STOMATELLA MACULATA, Quoy and Gaimard.

Hab. Catanuan, province of Tayabas, island of Luzon, under stones, low water; *H. C.* (Mus. Cuming.)

STOMATELLA MONILIFERA, Adams. *S. testá suborbiculari, convexo-depressá, imperforatá, albidá, rufo-punctatá, costellis moniliferis confertis transversis ornatá; aperturá obliquá, subcirculari.*

Hab. —?

Shell suborbicular, convexly depressed, imperforate, whitish, with rufous spots, ornamented with small, close-set, beaded, transverse ribs; aperture oblique, subcircular.

Hab. — ? (Mus. Metcalf.)

STOMATELLA DECOLORATA, Gould.

Hab. Mangsi Island; Gould.

Species unknown to me. "Allied to *S. maculata*, Quoy, but the spire is less elevated, aperture more round, and a plain white lunate area adjacent to the columella."

Stomatella decolorata, Gould, *Expedition, Shells*, p. 51.

STOMATELLA PAPYRACEA, Chemnitz.

Hab. China Sea and Sooloo Archipelago. (Mus. Cuming.)

Turbo papyraceus, Chemnitz. *Stomatella tumida*, Gould, *Expedition, Shells*, p. 51.

STOMATELLA MALUKANA, Adams. *S. testá suborbiculatá, convexá, imperforatá, transversim sulcatá, longitudinaliter striatá, costulis transversis striatis cinctá, musteliná rufo-fusco variegatá, subtus costis albo rufoque articulatis; spirá prominulá; aperturá ovali, longiore quam latiore.*

Hab. in insulis Moluccis.

Shell suborbicular, convex, imperforate, transversely sulcated, longitudinally striated, encircled with transversely striated ribs, yellowish brown variegated with red brown, inferiorly the ribs articulated with white and fuscous; spire rather prominent; aperture oval, longer than wide.

Hab. Molluccas. *M.C.*

STOMATELLA ORBICULATA, Adams. *S. testá suborbiculari, convexá, virescenti, castaneo variegatá, transversim sulcatá, longitudinaliter striatá, costis confertis rotundatis; spirá prominulá, anfractibus rotundatis; aperturá subcirculari, intus viridescenti.*

Hab. in freto Mosambico.

Shell suborbicular, convex, greenish, variegated with chestnut, transversely sulcated, longitudinally striated, with numerous round, close-set, transverse ribs; spire prominent, whorls rounded; aperture nearly circular, pearly and green internally.

Hab. Mosambique, under stones, low water; *Rev. W. V. Henner.* (Mus. Cuming.)

STOMATELLA JAPONICA, Adams. *S. testá suborbiculari, imperforatá, convexá, fuscá, transversim costulatá, costulis confertis nodulosis, interstitiis tenuissimè longitudinaliter striatis; spirá prominulá, anfractibus costatis rotundatis; aperturá subcirculari, intus margaritaced.*

Hab. in insulis Japonicis.

Shell suborbicular, imperforate, convex, fuscous, transversely ribbed; ribs small, nodulous, close together; interstices with smaller

ribs, and very finely longitudinally striated; spire somewhat prominent; whorls ribbed and rounded; aperture subcircular, pearly and green within.

Hab. Japan. (Mus. Cuming.)

STOMATELLA HALIOTIDEA, Sowerby.

Hab. Philippines, Oalaguete; Loon, isle of Bohol, under stones, low water; San Estevan, prov. South Ilocos; *H. C.* (Mus. Cuming.)

Stomatella haliotidea, *Sowerby, Genera.*

STOMATELLA FULGURANS, Adams. *S. testá suborbiculari, subperforatá, convexá; spirá acuminatá, apice acuto roséá, transversim sulcatá, carinulis transversis albo maculatis, longitudinaliter striatis, striis subtus obsoletis, albidd lineis fuscis undulatis variegatá; aperturá ovali, obliquá, intus margaritaceá, valdè sulcosá.*

Hab. in insulis Philippinis.

Shell suborbicular, subperforate, convex; spire acuminated, apex acute, rosy, transversely sulcated, with small transverse keels marked with white, longitudinally striated, striæ obsolete inferiorly, whitish variegated with brown undulating lines; aperture oval, oblique, pearly within and strongly sulcated.

Hab. Bais, island of Negros, under stones, low water; *H. C.* (Mus. Cuming.)

STOMATELLA SANGUINEA, Adams. *S. testá orbiculatá, depressá; spirá prominulá, acutá, coccinea, transversim tenuissimè sulcatá, longitudinaliter obliquè striatá, carinulis transversis subdistantibus nodulosis; aperturá ovali, obliquá; columellá subcallosá, areá umbilicali albá, intus margaritaceá sulcosá.*

Hab. in insulis Philippinis.

Shell orbicular, depressed; spire rather prominent, acute, blood-red, transversely very finely sulcated, longitudinally obliquely striated, with nodulous, transverse, rather distant carinæ; aperture oval, oblique; columella somewhat callous, with a white umbilical area, pearly and sulcated internally.

Hab. Island of Ticao, under stones, low water; *H. C.* (Mus. Cuming.)

STOMATELLA SPECIOSA, Adams. *S. testá orbiculato-conicá, albá sanguineo maculatá, transversim carinatá, longitudinaliter valdè striatá, carinis obtusis prominentibus carinulis intermediis; spirá prominulá, anfractibus tricarinatis; aperturá ovali, intus margaritaced.*

Hab. ad insulam Grimwoodianam.

Shell orbiculately conical, white marked with crimson blotches, transversely carinated, longitudinally strongly striated, keels obtuse, rather prominent, with small intermediate keels; spire rather prominent, whorls tricarinated; aperture oval, pearly within.

Hab. Grimwood's Island; *H. C.* (Mus. Cuming.)

STOMATELLA COCCINEA, Adams. *S. testá orbiculato-conicá, subperforatá, coccineá, maculis albis seriatim dispositis in anfractu ultimo ornatá, transversim tenuiter sulcatá, anfractu ultimo subangulato; spirá prominente, anfractibus bicarinatis; aperturá subcirculari, labio posticè reflexo, calloso.*

Hab. in insulis Occidentalibus.

Shell orbiculate conic, subperforate, scarlet, adorned with white spots arranged in a row on the last whorl, transversely very finely sulcated, last whorl somewhat angulated; spire prominent, whorls bicarinated; aperture subcircular, inner lip posteriorly reflexed and callous.

Hab. St. John's; Mr. Hartweg.

STOMATELLA TIGRINA, Adams. *S. testá orbiculato-conicá, perforatá, albidá, fasciis rufis radiatim dispositis ornatá, bicarinatá, carinis elevatiusculis, obtusis, transversim striatá, striis regularibus; spirá prominente, anfractibus angulatis; aperturá subcirculari, labio subreflexo, calloso; umbilico distincto, subobtecto.*

Hab. — ?

Shell orbiculate conical, umbilicated, whitish adorned with red bands radiately disposed, bicarinated, keels rather elevated, obtuse, transversely striated, striæ regular; spire prominent, whorls angulated; aperture subcircular, inner lip somewhat reflexed and callous; umbilicus distinct, partly covered.

Hab. — ?

STOMATELLA MARGARITANA, Adams. *S. testá turbinatá, spirá elevatá, anfractibus rotundatis, rubrá longitudinaliter substriatá, transversim costulatá, costulis subnodulosis inequalibus; aperturá suborbiculari, intus margaritaceá, labro semicirculari; umbilico callo, obtecto.*

Hab. in littoribus Australiæ. (Mus. Cuming.)

A small, red, transversely ribbed species, having very much the appearance of a *Margarita*.

STOMATELLA BIPORCATA, Adams. *S. testá turbinatá, subdepressá, rubrá, albo obscurè variegatá, transversim sulcatá; spirá acuminatá, anfractibus quatuor, anfractu ultimo porcis duabus prominentibus instructá; aperturá subquadratá, intus margaritaceá, labio subrecto, labro in medio biangulato, umbilico callo, obtecto.*

Hab. in littoribus Australiæ. (Mus. Cuming.)

A small red species with two rounded ridges on the last whorl and a subquadrate aperture.

STOMATIA, Helbling.

Animal spiral, too large to entirely enter the shell, tentacular lobes digitated. Foot large, tubercular, greatly produced behind; lateral membrane fringed, ending anteriorly on the left side in a fimbriated

crest under the eye-peduncle, and on the right in a slightly projecting fold or gutter leading to the respiratory cavity. Operculum none. Shell subspiral, oblong, or suborbicular, carinated or tuberculated; spire prominent; aperture wider than long, pearlaceous within.

STOMATIA PHYMOTIS, Lamarck.

Hab. Philippine Islands, Matnag, province of Albay, Luzon, on the reefs; *H. C.* (Mus. Cuming.)

STOMATIA AUSTRALIS, Adams. *S. testá haliotideá, ovato-oblongá, sublatá, olivaceá, dorso lævigatá, transversim tenuè striatá, carinis duabus rotundatis, inferiori tuberculatá; aperturá anticè dilatatá, labro supra ultimum anfractum ascendente.*

Hab. in littoribus Australiæ.

Shell rather broad, olivaceous, back nearly plain, transversely finely striated, with two rounded keels, the lower one tuberculated; aperture dilated anteriorly, outer lip ascending on the body whorl.

Hab. Darnley's Island, Torres Straits, under stones; *Jukes.* (Mus. Cuming.)

STOMATIA DUPLICATA, Sowerby.

(*P. Z. S. Mollusca*, Pl. VIII. fig. 13, 14, 15.)

Hab. Cagayan, province of Misamis, island of Mindanao, under stones, low water; *H. C.* (Mus. Cuming.)

STOMATIA ANGULATA, Adams. *S. testá orbiculato-convexá, subdepressá, viridulá, transversim valdè costulatá, interstitiis longitudinaliter striatis, carinis duabus elevatis simplicibus angulatis; aperturá transversá, subcirculari, labro in medio biangulato.*

Hab. in insulis Philippinis.

Shell orbicular, rather depressed, olive-green, transversely coarsely costulated, interstices longitudinally striated, with two elevated, simple, angulated ridges; aperture transverse, suborbicular, outer lip biangulated in the middle.

Hab. San Estevan, province of South Ilocos, island of Luzon and island of Ticao, under stones, low water; *H. C.* (Mus. Cuming.)

STOMATIA DECUSSATA, Adams. *S. testá ovato-oblongá, longitudinaliter et transversim decussatè striatá, carinis duabus simplicibus aut subtuberculatis angulatis prominentibus, pallidá maculis fuscis variegatá; spirá elevatá; aperturá obliquá, ferè orbiculari, labro biangulato in medió.*

Hab. in insulis Philippinis.

Shell decussately transversely and longitudinally striated with two acute simple or subtuberculated prominent keels, pale marked with light brown blotches and fine puncta; spire elevated; aperture oblique, nearly orbicular, outer lip biangulated in the middle.

Hab. Sorsogon, province of Albay, island of Luzon, on smooth stones, 6 fathoms; *H. C.* (Mus. Cuming.)

STOMATIA ACUMINATA, Adams. *S. testá haliotideá, suborbiculatá, subfuscá, cancellatá, transversim costatá, costis tribus prominentibus, mediá valdè prominulá tuberculatá, valdè plicatá prope suturam, longitudinaliter elevatè striatá; spirá prominulá, acuminatá, anfractibus quatuor angulatis, labro in medio triangulato.*

Hab. in insulis Philippinis.

Shell reddish brown, cancellated, transversely ribbed, three ribs very prominent, the middle one more so than the others and strongly tuberculated, strongly plicated near the suture, longitudinally elevately striated; spire prominent, acuminated, whorls four, angled; aperture suborbicular, obliquely transverse, outer lip triangulated in the middle.

Hab. Philippine Islands. (Mus. Cuming.)

STOMATIA LIRATA, Adams. *S. testá orbiculato-convexá, liris transversis subæqualibus elevatis vix nodulosis, interstitiis valdè longitudinaliter striatis, prope suturam subplicatá, pallidá, fusco radiatim marmoratá; spirá subprominulá, anfractibus rotundatis; aperturá obliquá, oblongo-ovali, labro convexo, rotundato.*

Hab. —?

Shell orbicular, convex, with nearly equal transverse raised ridges, ridges slightly nodulous, interstices strongly longitudinally striated, plicated near the spire, pallid, radiately marbled with brown; spire rather elevated, whorls rounded; aperture oblique, oblong-oval, outer lip convex, rounded.

Hab. —? (Mus. Cuming.)

STOMATIA RUBRA, Lamarck.

Hab. Philippine and Corean Archipelago. (Mus. Cuming.)

STOMATIA NOTATA, Adams. *S. testá suborbiculari, depressá, pallide roséá, maculis purpureis valdè distinctis ornatá, transversim carinatá, carinis acutis prominentibus subdistantioribus, longitudinaliter valdè obliquè striatá; spirá subprominulá, anfractibus carinatis, apice acuto; aperturá subcirculari, intus margaritacéá et transversim sulcatá.*

Hab. —? (Mollusca, Pl. VIII. fig. 16.)

Shell suborbicular, depressed, pale rose-colour, adorned with very defined dark purple spots, transversely keeled; keels acute, rather prominent, somewhat wide apart, longitudinally strongly obliquely striated; spire rather prominent, whorls carinated, apex acute; aperture subcircular, transversely sulcated and pearly within.

Hab. —? (Mus. Cuming.)

STOMATIA CANDIDA, Adams. *S. testá suborbiculatá, depressá, candidá, transversim totá carinatá, carinulis parvis confertis permultis elevatiusculis subnodulosis, interstitiis longitudinaliter tenuissimè striatá; spirá depressiusculá, anfractibus rotundatis; aperturá obliquá, subcirculari, longiore quam latiore.*

Hab. in insulis Koreanicis.

Shell orbicular, depressed, white, transversely entirely carinated; keels very small, close together and very numerous, subnodulous and slightly elevated; interstices longitudinally very finely striated; spire somewhat depressed, whorls rounded; aperture oblique, sub-circular, longer than wide.

Hab. Korean Archipelago, coral reefs; *A. H.* (Mus. Cuming.)

STOMATIA PALLIDA, Adams. *S. testá suborbiculari; spirá acuminatá, albá, radiis pallidis longitudinalibus pictá, transversim liratá, interstitiis decussatè striatis; aperturá transversá, sub-ovali, intus porcellaná, labio subrecto, calloso.*

Hab. ad Insulam Lord Hood, dedicav. (Mus. Cuming.)

A species somewhat resembling in colouring the striped variety of *S. notata*, but which differs materially in form and sculpture.

MICROTIS, new genus.

Animal as in *Stomatia*, but the foot with a deep anterior fissure for the head, and the front edge bilobed. Operculum none. Shell spiral, suborbicular, depressed, with two tuberculated ridges; spire slightly prominent; aperture very large, wider than long, pearly within, columellar margin spiral, visible as far as the apex of the spire.

MICROTIS TUBERCULATA, Adams. *M. testá suborbiculari, halio-tided, valdè depressá, viride variegatá, transversim striatá, bicarinatá, carinis tuberculatis, prope suturam nodulosim plicatá; spirá vix elevatá, anfractibus carinatis; aperturá magná, ovali, intus bisulcatá margaritacéa.*

Hab. in insulis Philippinis. (Mollusca, Pl. VIII. fig. 8-12.)

Shell suborbicular, ear-shaped, greatly depressed, variegated with green, transversely striated, bicarinated; keels tuberculated, nodosely plicated near the suture; spire scarcely elevated, whorls carinated; aperture large, oval, pearly within, with two concentric parallel grooves.

Hab. Island of Capul, on the sands, high water; *H. C.* (Mus. Cuming.)

GENA, Gray.

Animal subspiral, oval, depressed, too large to enter the shell; tentacular lobes plumose. Foot very large, tubercular, posteriorly produced; lateral membrane not fimbriated, more or less extended, and covering the shell. Operculum none. Shell subspiral, oblong, ear-shaped, depressed, smooth or striated; spire flattened, nearly obsolete; aperture large, pearly within.

GENA PLANULATA, Lamarck.

Hab. Isle of Camaguin, under smooth stones, low water; Gindulman, isle of Bohol, under stones; *H. C.* (Mus. Cuming.)

Stomatella planulata, Lamarck, *Hist. An. s. Vert.* vol. vi. p. 210; *Encyclop. Méth.* pl. 40. f. 4 a, b.

GENA AURICULA, Lamarck.

Hab. Eastern Seas; Red Sea; Celebes. (Mus. Cuming.)
Stomatella auricula, Lamk. *Hist. An. s. Vert.* vi. p. 210. *Patella*
lutea, Linn.

GENA NIGRA, Quoy and Gaimard.

Hab. Eastern Seas. (Mus. Cuming.)
Stomatella nigra, Quoy & Gaimard, *Voy. de l'Astr.* v. 3. pl. 66 bis,
 fig. 10-12.

GENA PLUMBEA, Adams. *G. testá haliotided, ovato-oblongá, dorso latere dextro gibbosá, sinistro planulatá, plumbeá, decussatè totá striatá; spirá prominulá, anfractibus rotundatis, anfractu ultimo ad suturam gibboso; aperturá posticè subcanaliculatá, labro in medio flexuoso.*

Hab. Java.

Shell gibbous on the right side, flattened on the left, lead-coloured, decussately striated over the back; spire rather prominent, the whorls rounded, last whorl gibbous at the suture; aperture slightly channeled posteriorly, outer lip flexuous in the middle.

Hab. Java. (Mus. Cuming.)

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 GENA STRIGOSA, Adams. *G. testá haliotided, ovato-oblongá, dorso subplanatá, totá striatá, striis irregularibus subconfertis, olivaceá lilaceo alboque variá, fasciis subfuscis, pallidis alternantibus longitudinaliter ornatá, labro haud sinuoso.*

Hab. —?

Shell rather depressed, the back equally convex, striated all over, olivaceous varied with white and lilac, marked with alternate light and dark bands, the light bands sometimes articulated; spire depressed, outer lip slightly sinuous.

Hab. —? (Mus. Cuming.)

GENA STRIATULA, Adams. *G. testá haliotided, ovato-oblongá, dorso planiusculá, totá striatá, striis profundis subdistantibus, rubrá, flaveolo aurantiaco fuscoque variè pictá; spirá prominulá, nunquam subdistortá; labro valdè flexuoso.*

Hab. Australia; et in insulis Philippinis.

Shell very elongated, slightly convex, strongly striated all over the back, red varied with orange, light yellow and brown; spire elevated, often distorted; outer lip very flexuous.

Hab. Calapan, island of Mindoro, on small stones, 9 fathoms; *H. C.* Swan River, *Lieut. Preston*; Australia. (Mus. Cuming.)

GENA VARIA, Adams. *G. testá haliotided, ovato-oblongá, politá, dorso æqualiter convexá, latere sinistro striatá; luteo, rubro alboque variegatá; spirá prominulá, erectá, acuminatá.*

Hab. Australia; et in insulis Philippinis.

Shell smooth, polished, back equally rounded, striated on the left side, varied with yellow, red and white; spire rather elevated, lateral, upright and pointed.

Hab. Calapan, island of Mindoro, on small stones, 9 fathoms; *H. C.*

Acapulco, on the sands, *Col. Moffat*; Australia. A pretty little species usually confounded with *G. auricula*. (Mus. Cuming.)

GENA CONCINNA, Gould.

Hab. Sandy Island.

GENA MINIMA, Dufo.

Hab. Seychelles, dredged from 6 fathoms; *Dufo*.

Stomatella minima, *Dufo*, *Ann. Sc. Nat.* Oct. 1840, p. 202. Species unknown to me.

GENA IRASATA, Dufo.

Hab. Seychelles.

Stomatella irasata, *Dufo*, *Ann. Sc. Nat.* Oct. 1840. Species unknown to me.

GENA PULCHELLA, Adams. *G. testá convexo-depressá, ovali, albá, rufo maculatá, dorso convexá, totá striatá; spirá prominulá, anfractibus rotundatis; aperturá magná, ovali, intus margaritacé, iridescente.*

Hab. —?

Shell convexly depressed, oval, white, with large rufous spots; back convex, striated all over; spire rather prominent, whorls rounded; aperture large, oval, pearly within.

Hab. —? (Mus. Metcalf.)

GENA LINTRICULA, Adams. *G. testá haliotidéá, oblongá, dorso convexá, totá tenuissimé striatá, tenui, fragili, carneolá, rubro maculatá; spirá subterminali, minimá, ad latus decumbente; aperturá apertá, valdè elongatá.*

Hab. in insulis Philippinis.

Shell elongated, regularly convex, entirely striated, thin, fragile, pink, with darker spotted and articulated lines; spire nearly posterior, slightly elevated; aperture elongated anteriorly, dilated.

Hab. Calapan, island of Mindoro, on smooth stones, 9 fathoms; *H. C.* (Mus. Cuming.)

GENA ASPERULATA, Adams. *G. testá haliotidéá, dorso convexá, rufo-fuscá cingulá albá latá longitudinali ornatá, lineis elevatis subconfertis, striisque longitudinalibus obliquis decussatá; spirá posticá, subprominulá, albá; aperturá elongatá, ovali.*

Hab. —?

Shell ear-shaped, back convex, red-brown with a broad white longitudinal band, decussated with transverse raised lines and oblique longitudinal elevated striae; spire posterior, slightly prominent; aperture elongated, oval.

Hab. —? (Mus. Metcalf.)

GENA NEBULOSA, Adams. *G. testá haliotidéá, ovato-oblongá, dorso totá striatá, albá rufo-fusco nebulosá; spirá prominulá, anfractibus angulatis; aperturá elongatá, ovali; columellá callo crasso rimam umbilicalem obtegente.*

Hab. Australia.

Shell flat, depressed, entirely striated, white clouded with red-brown; spire rather prominent, the whorls angulated; aperture elongated, oval; columella with a thickened callus covering the umbilical fissure.

Hab. Australia. (Mus. Cuming.)

GENA ORNATA, Adams. *G. testá subturbinacéa, ovali, lævi, politá, dorso convexá, fusco-rubrá, lineis nigris albo-articulatis longitudinalibus; spirá prominulá, roséa; aperturá ovali; columellá curvatá, simplici; labro reflexo, posticè subflexuoso.*

Hab. in insulis Philippinis. (Mollusca, Pl. VIII. fig. 17.)

Shell oval, smooth, polished, convex, red-brown, with regular distinct black longitudinal lines articulated with white; spire rosy, rather prominent; aperture oval; columella curved, simple; outer lip convex, slightly inflexed posteriorly.

Hab. Island of Ticao, Philippines, on the reefs, low water; *H. C.* (Mus. Cuming.)

GENA LINEATA, Adams. *G. testá subturbinacéa, solidá, lævi, politá, convexá, ovali, carneolá lineis rubris longitudinalibus ornata; spirá prominulá, anfractibus rotundatis; aperturá subrotundatá; columellá planulatá, callosá, labro simplice.*

Hab. —?

Shell thick, smooth, polished, convex, oval, light pink, with regular parallel continuous red lines arranged longitudinally; spire prominent, whorls rounded; aperture nearly circular; columella flattened, with a callous deposit, outer lip simple.

Hab. —? (Mus. Cuming.)

BRODERIPIA, Gray.

Animal unknown. Operculum? Shell ancyliform, nonspiral, oblong-ovate, flattened, apex posterior, involute; aperture very large, ovate, pearly internally.

Scutella, *Broderip* (pars).

BRODERIPIA IRIDESCENS, Broderip, sp.

Hab. Pacific Ocean, Grimwood's Island. (Mus. Cuming.)
Scutella iridescens, *Broderip*, *Proc. Zool. Soc.* June 1834.

BRODERIPIA ROSEA, Broderip, sp.

Hab. Pacific Ocean, Grimwood's Island. (Mus. Cuming.)
Scutella rosea, *Broderip*, *Proc. Zool. Soc.* June 1834.

BRODERIPIA CUMINGII, A. Adams. *B. testá ovatá, depressoconvexá, subpellucidá, pallidá, radiis rubris pictá, concentricè corrugato-striatá, strüs granulosis, vertice postico excentrico-submarginali; aperturá patulá, intus margaritacéa, margine albo limbo maculis rufis picto; margine columellari acutè angulato prominente, posticè subrecto.*

Hab. in insulis Philippinis (Capul). (Mus. Cuming.)

Distinguished from *B. iridescens* by its prominent angulated columellar margin and granulato-corrugose surface.

SCISSURELLA, D'Orbigny.

Animal unknown. Operculum none. Shell very small or minute heliciform; spire depressed; aperture suborbicular, effuse; outer lip with a narrow fissure or slit; umbilicus open.

? *Anatomus*, *Montfort*.

SCISSURELLA ANGULATA, *Lovèn*.

Hab. Scandinavia.

Scissurella angulata, *Lovèn*, *Index Moll. Scand.* p. 20.

SCISSURELLA PPLICATA, *Philippi*.

Hab. Shores of the Peninsula of Thapsi.

Scissurella plicata, *Phil. En. Moll. Sicil.* vol. i. p. 187, vol. ii. tab. 25. fig. 18.

Scissurella d'Orbigny, *Scacchi*.

SCISSURELLA STRIATULA, *Philippi*.

Hab. Peninsula of Magnisi.

Scissurella striatula, *Phil. En. Moll. Sicil.* vol. ii. p. 160.

SCISSURELLA DECUSSATA, D'Orbigny.

Scissurella decussata, *D'Orbigny*, *Mém. Soc. d'Hist. Nat. de Par.* i. p. 340.

SCISSURELLA CRISPATA, *Fleming*.

Scissurella crispata, *Fleming*, *Brit. An.* p. 361-366.

3. MONOGRAPH OF THE GENUS ANATINELLA.

By ARTHUR ADAMS, R.N., F.L.S. ETC.

ANATINELLA, *Sowerby*.

Testa ovata æquivalvis, subæquilateralis, latere antico rotundato, postico subrostrato, subtruncato; ligamento interno, processui cochleariformi affixo, dentibus duobus cardinalibus in utraqve valvâ ante processum positis; impressionibus muscularibus duabus, anticâ oblongâ, irregulari, posticâ subcirculari; impressione musculari pallii integrâ; appendice cardinali internâ nullâ.

Shell ovate equivalve, nearly equilateral, anterior side rounded, posterior slightly beaked and subtruncated. Ligament internal, fixed to a spoonshaped process in each valve, on the anterior side of which are placed two rather elongated cardinal teeth. Muscular impressions two, lateral, distant, the anterior oblong and irregular, the posterior nearly circular. Pallial impression entire, without any sinus. No testaceous appendage within the hinge.

ANATINELLA SIBBALDII, *Sowerby*. *A. testâ solidiori, subopacâ, lævi, valdè concentricè corrugatâ, longitudinaliter obsolete substriatâ; latere postico, acuminato, subtruncato; margine dorsali posticè declivi; processu cochleariformi crasso lato; margine ventrali valdè arcuato.*

Hab. — ?

Shell rather solid, subopaque, smooth, strongly concentrically wrinkled, longitudinally obsoletely striated; posterior side acuminate, subtruncated; dorsal margin posteriorly sloping; spoon-shaped process thick and wide; ventral margin strongly arcuated.

Hab. Ceylon, on the sands. (Mus. Cuming.)

ANATINELLA DILATATA, Adams. *A. testá tenui, fragili, concentricè corrugatá, longitudinaliter striatá, latere postico dilatato, obliquè valdè truncato, margine dorsali posticè horizontali recto, processu cochleariformi parvo tenui, dentibus cardinalibus valdè divergentibus; margine ventrali arcuato.*

Hab. — ?

Shell thin, fragile, concentrically wrinkled, longitudinally striated; posterior side dilated, obliquely strongly truncated; dorsal margin posteriorly horizontal and straight; spoonshaped process small, thin; cardinal teeth greatly diverging, ventral margin arcuated.

Hab. Puteao, Philippines, on sand-banks, at low water; *H. C.* (Mus. Cuming.)

ANATINELLA VENTRICOSA, Adams. *A. testá tenui, ventricosá, semipellucidá, concentricè corrugatá, longitudinaliter conspicuè striatá, striis elevatiusculis, latere postico rotundato; margine dorsali posticè declivi; processu cochleariformi tenui, angusto; margine ventrali leviter arcuato.*

Hab. — ?

Shell thin, ventricose, semipellucid, concentrically wrinkled, longitudinally conspicuously striated, striæ rather elevated, posterior side rounded, dorsal margin posteriorly sloping; spoonshaped process thin, narrow, ventral margin slightly arcuated.

Hab. Puteao, Philippines, on sand-banks, at low water; *H. C.* (Mus. Cuming.)

February 26, 1850.

W. Spence, Esq., F.R.S., in the Chair.

The following paper was read:—

1. MONOGRAPHS OF CYCLOSTREMA, MARRYAT, AND SEPARATISTA, GRAY; TWO GENERA OF GASTEROPODOUS MOLLUSKS. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

CYCLOSTREMA, Marryat.

Animal ignotum. Operculum — ? *Testa depressa, perspective-umbilicata; apertura circularis.*

Shell depressed; aperture circular; umbilicus very large, with the volutions of the whorls visible within it.

CYCLOSTREMA CANCELLATA, Marryat. *C. testá albá, lineis longitudinalibus et transversis elevatis decussantibus inde cancel-*

latd; aperturd labiis cancellatis; cancellis transversim striatis.

Hab. in insulis Philippinis.

Shell white, cancellated, with elevated, decussating transverse and longitudinal lines; aperture with the lips cancellated; cancelli transversely striated.

Hab. Baszay, island of Samar, 6 fathoms, coral sand; *H. C.* (Mus. Cuming.)

Cyclostrema cancellata, *Marryat*, *Trans. Linn. Soc.* 1818, vol. xii. p. 338.

CYCLOSTREMA NIVEA, Chemnitz. *C. testá orbiculari, niveá, pelliculd; spirá depressá, anfractibus transversim costellatis, costellis regularibus, superis distantioribus; interstitiis leviter concavis; suturis profundis subcanaliculatis; labro simplici; umbilico peramplo.*

Hab. in maribus Occidentalibus.

Shell orbicular, snowy white, transparent; spire depressed, whorls transversely ribbed, ribs regular, the upper fewer and wider apart; interstices slightly concave; sutures deep, slightly channeled; lip simple; umbilicus very large.

Hab. Seas of India. (Mus. Cuming.)

Turbo niveus, *Chemnitz*, *Conch. Cab.* vol. x. pl. 165. f. 1587 and 1588. *Delphinula nivea*, *Reeve*. *Delphinula lævis*, *Kiener*.

CYCLOSTREMA REEVIANA, Hinds. *C. testá orbiculari, subdiscoideá, muticá; spirá depressiusculá, anfractibus convexis, longitudinaliter carinulatis, carinulis numerosis, superis distantioribus; interstitiis liris obliquis corrugato-clathratis; labro simplici; umbilico peramplo.*

Hab. — ?

Shell orbicular, somewhat discoid; spire rather depressed, longitudinally keeled, keels numerous, upper ones wider apart; interstices latticed in a wrinkled manner, with oblique ridges; inner lip simple; umbilicus very large.

Hab. Straits of Malacca, 17 fathoms. (Mus. Cuming.)

Delphinula Reeviana, *Hinds*, *Proc. Zool. Soc.* 1843.

CYCLOSTREMA COBIJENSIS, *Reeve*. *C. testá turbinatá, minutá, anfractibus convexis, carinulis transversis et longitudinalibus æquidistantibus regulariter clathratis; umbilico mediocri; labro simplici.*

Hab. Cobija, Peru.

Shell turbinated, very small; whorls convex, regularly latticed, with equidistant, transverse and longitudinal ribs; umbilicus moderate; lips simple.

Hab. Port of Cobija, Peru, under stones in rocky places, low water; *H. C.* (Mus. Cuming.)

Delphinula Cobijensis, *Reeve*, *Proc. Zool. Soc.* 1843.

CYCLOSTREMA SPIRULA, *Adams*. *C. testá orbiculari, discoideá, evolutá; spirá depresso-concavá, anfractibus rotundatis, primis*

contiguus, ultimá distinctá, transversim costulatis, costellis subconfertis, æquidistantibus; interstitiis tenuissimè longitudinaliter striatá; aperturá circulari; peritremate continuo.

Hab. in insulis Philippinis. (Mollusca, Pl. VIII. fig. 22.)

Shell orbicular, discoid, evolute; spire depressly concave; whorls rounded, the first contiguous, the last separate, transversely ribbed, ribs equidistant, close together; interstices very finely longitudinally striated; aperture circular; peritreme continuous.

Hab. Philippine Islands. (Mus. Cuming.)

CYCLOSTREMA CINGULIFERA, Adams. *C. testá orbiculari, nitidá; spirá depressá, anfractibus rotundatis, carinulis transversis, acutis, æquidistantibus; interstitiis (sub lente) tenuissimè longitudinaliter striatis; aperturá subcirculari, supra subangulatá; umbilico mediocri.*

Hab. in insulis Philippinis.

Shell orbicular, shining; spire depressed; whorls rounded, with equidistant, small, acute, transverse keels; interstices (under the lens) very finely longitudinally striated; aperture subcircular, angulated above; umbilicus moderate.

Hab. Dumaguete, island of Zebu, 4 fathoms; *H. C.* (Mus. Cuming.)

CYCLOSTREMA NITIDA, Adams. *C. testá orbiculari, lævi, tenui, nitidá; spirá elevatiusculá, anfractibus prope suturam subangulatis; suturis profundis, subcanaliculatis; aperturá subcirculari, supra angulatá; umbilico magno, peromphalo angulato, acuto.*

Hab. in insulis Philippinis.

Shell orbicular, smooth, shining; spire rather elevated; whorls somewhat angulated near the suture; suture deep, subcanaliculated; aperture subcircular, angulated above; umbilicus large, peromphalus acutely angulated.

Hab. Catanuan and Sual, island of Luzon, 10 fathoms, sandy mud; *H. C.* (Mus. Cuming.)

CYCLOSTREMA PLANORBULA, Adams. *C. testá orbiculari, planorbulá; spirá depressá, anfractibus lævibus, rotundatis, suturis distinctis; aperturá subcirculari, supra angulatá; umbilico permagno, patulo.*

Hab. in insulis Philippinis.

Shell orbicular, planorbular; spire depressed, whorls smooth, rounded, suture distinct; aperture subcircular, angulated above; umbilicus very large and open.

Hab. Sual, island of Luzon, 10 fathoms, sandy mud; *H. C.* (Mus. Cuming.)

CYCLOSTREMA PLANA, Adams. *C. testá orbiculari, dorso planoconvexá; spirá depressá, anfractibus planis, supra transversim striatis, infra lævibus; aperturá subcirculari, supra angulatá; umbilico peramplo, anfractibus intus conspicuis.*

Hab. in insulis Philippinis.

Shell orbicular, back plano-convex; spire depressed, whorls flat-

tened, above transversely striated, below smooth; aperture subcircular, angulated above; umbilicus very wide, the whorls visible within it.

Hab. Dumaguete, island of Negros; *H. C.* (Mus. Cuming.)

CYCLOSTREMA MICANS, Adams. *C. testá turbinatá, minutá, albá, nitidá, anfractibus convexis, longitudinaliter obliquè costellatis, transversim carinulatis, carinulis nodulosis; umbilico mediocri; aperturá circulari; peristomate continuo, incrassato.*

Hab. Australia.

Shell turbinated, small, white, shining, whorls convex, longitudinally obliquely ribbed, transversely carinated, keels nodulous; umbilicus moderate; aperture circular; peristome continuous, thickened.

Hab. Port Lincoln; *Metcalf.* (Mus. Cuming & Metcalf.)

CYCLOSTREMA ELEGANS, Adams. *C. testá orbiculari, discoided, tenui, semipellucidá; spirá depressá, anfractibus rotundatis, transversim omnino striatis; suturis distinctis; aperturá subcirculari, supra angulatá; umbilico peramplo.*

Hab. in insulis Philippinis.

Shell orbicular, discoid, thin, semipellucid; spire depressed, whorls rounded, entirely transversely striated; suture distinct; aperture subcircular, angulated above; umbilicus very wide and open.

Hab. Sibonga, island of Zebu, 10 fathoms, sandy mud; *H. C.* (Mus. Cuming.)

CYCLOSTREMA SULCATA, Adams. *C. testá orbiculari, discoided; spirá planiusculá, anfractibus convexis, costellis transversis confertis regularibus, interstitiis profundè sulcosis; suturis profundis canaliculatis; umbilico patulo; peromphalo lævi.*

Hab. in insulis Philippinis.

Shell orbicular, discoid; spire rather flattened, whorls convex, with regular, transverse, small ribs, numerous and close together, interstices deeply grooved; suture canaliculated; umbilicus open; umbilical area smooth.

Hab. Tambay, island of Negros, coarse sand, 6 fathoms; *H. C.* (Mus. Cuming.)

CYCLOSTREMA ANGULATA, Adams. *C. testá orbiculari, discoided; spirá depressá, anfractibus transversim costellatis, costellis regularibus, æquidistantibus, interstitiis tenuissimè striatis; anfractu ultimo biangulato, supra costellato, in mediá plano, infra costellato; aperturá subangulatá; peritremate interrupto; umbilico permagno.*

Hab. in insulis Philippinis.

Shell orbicular, discoid; spire depressed, whorls transversely costellated; ribs small, equal, equidistant, interstices very finely striated; last whorl biangulated, costellated above, smooth in the middle, and ribbed beneath; aperture somewhat angulated; peritreme not continuous; umbilicus very large.

Hab. Sibonga, island of Zebu, 10 fathoms, sandy mud; *H. C.* (Mus. Cuming.)

SEPARATISTA, Gray.

Animal ignotum. Operculum — ? *Testa orbicularis, subdiscoidea, anfractibus primis contiguis, ultimo distincto; apertura patulâ, effusâ, angulis subcanaliculatis; umbilicus magnus, infundibuliformis, usque ad apicem.*

Shell orbicular, somewhat discoid, the first whorls contiguous, the last disunited; aperture wide-spreading, angulated; umbilicus large, infundibuliform, the whorls visible within as far as the apex.

The *Cornu* of Schumacher and the *Lippistes* of Montfort, founded upon the *Argonauta cornu* of Fichtel, appear to belong to *Carinaria* of Lamarck. *Steira* of Eschscholtz would seem by the figure given in Oken's 'Isis' to be an *Atlanta* badly drawn in an inverted position, and indeed is founded upon the "Corne d'Ammon vivant" of Lesueur, *Atlanta Peronii*.

Separatista, Gray (not described).

SEPARATISTA GRAYII, Adams. *S. testâ spirâ depressâ, anfractibus carinulis quinque transversis; apertura oblongo-transversâ; labio reflexo, anticè rotundato.* = *Cornu*

Hab. apud Promontorium Bonæ Spei.

Shell with the spire depressed, whorls with five transverse keels; aperture transversely oblong; inner lip reflexed, anteriorly rounded.

Hab. Cape of Good Hope. (Mus. Cuming.)

SEPARATISTA CHEMNITZII, Adams. *S. testâ spirâ elevatâ, anfractibus carinulis tribus transversis; apertura subcirculârî; labio subreflexo, anticè producto, angulato.* = *Chemnitz*

Hab. in insulis Philippinis.

Shell with the spire elevated, whorls with three transverse keels; aperture subcircular; inner lip somewhat reflexed, anteriorly produced and angulated.

Hab. Island of Bureas, Philippines; *H. C.* (Mus. Cuming.)
Turbo separatista, *Chemnitz*.

PROFESSOR OWEN communicated a Memoir*, in continuation of his previous papers published in the Transactions (vol. iii. pp. 243, 307, 345), on the Gigantic Wingless Birds of New Zealand.

Having in the previous Memoirs determined and referred to their genera and species the different bones of the leg, he made those of the foot the subject of the present communication, which was illustrated by the exhibition of an extensive series of remains from both the North and South (or Middle) islands of New Zealand; comprising the entire series of phalanges of one and the same foot of the *Palapteryx robustus*, a gigantic species from Waikawaite; a similarly complete series of the *Dinornis rheides*; and series more or less incomplete of the phalanges of the *Dinornis giganteus*, *Palapteryx ingens*, and other genera and species of the singular extinct wingless birds of New Zealand. The characteristics of the different phalanges

* This paper will be printed in the Transactions, vol. iv. Part 1.

were minutely detailed, and the different proportions of the toes characteristic of different species, especially of the two most gigantic, viz. the *Dinornis giganteus* of the North island, and the *Palapteryx robustus* of the turbary deposits of the Middle island. The adaptation of the claw-bones for scratching up the soil was obvious from their shape and strength. The generic distinction of *Palapteryx* had previously been indicated by a slight depression on the metatarsus, supposed by the author to be for the articulation of a small back-toe, as in the *Apteryx*; and he had since received a specimen of the principal bone of that toe, which was exhibited and described. A nearly entire sternum, a portion of a minute humerus, and a cranium of one of the smaller species of *Dinornis*, were also exhibited and described.

This magnificent series of remains of great New Zealand birds had been collected chiefly by the late Colonel Wakefield, and had been transmitted to the author through the kind interest of J. R. Gowen, Esq., a Director of the New Zealand Company.

March 12, 1850.

W. Spence, Esq., F.R.S., in the Chair.

The following papers were read:—

1. FIRST THOUGHTS ON A PHYSIOLOGICAL ARRANGEMENT OF BIRDS. BY EDWARD NEWMAN, F.L.S., F.Z.S. ETC.

The systematic arrangement of the Class Aves is more unsettled than that of any other portion of the animal kingdom, a circumstance that may fairly be attributed to our attaching too high a value to characters purely structural or admensural, while we neglect others more intimately connected with reproduction; in a word, to the substitution of physical for physiological characters. In mammals, reptiles and fishes, we have a primary division based entirely on physiology: thus mammals are placental or marsupial; reptiles are oviparous or spawning; fishes are viviparous or spawning; and this primary division of these classes is admitted by all physiologists to be strictly natural. Notwithstanding, however, the purely physiological character, on which these primary divisions depend, it is found that physical characters harmonise with physiological, and that intimate structure in each instance bears out physiological difference. It were not wise altogether to discard structural differences even in the outset of an inquiry into system, but it is necessary to use them rather as corroborative than as indicative; and above all to draw a distinct and permanent line between such as are truly intimate and such as are purely adaptive. It has always appeared to me that one of the chief advantages of an extensive Vivarium like that possessed by our Society is the opportunity it affords for studying animated nature in an ani-

mated state, for ascertaining physiological as well as physical characters. If then we avail ourselves of the opportunities which are or ought to be thus afforded us, we shall find that in the very outset of life a physiological character of the most obvious kind will divide birds into groups as distinct as are the placental and marsupial mammals, or the cartilaginous and bony fishes. Prior to the extrusion of the egg, observed facts bearing on this subject are so few and so unconnected that they cannot be rendered available as affording evidence on the question to be considered; it is therefore compulsory that our comparisons begin at that moment when the condition of the young becomes patent by the breaking of the shell. Commencing the inquiry at this point, which may safely be regarded as analogous to the birth of a placental animal, we have this obvious grand division of the class:—

1. *Hesthogenous Birds*.—In these, immediately the shell is broken the chick makes its appearance in a state of adolescence rather than infancy: it is completely clothed, not with such feathers as it afterwards wears, but still with a close, compact, and warm covering: it possesses the senses of sight, hearing, smelling, &c. in perfection: it runs with ease and activity, moving from place to place at will: it perfectly understands the signals or sounds uttered by its parent, approaching her with alacrity when invited to partake of food she has discovered, or hiding itself under bushes, grass, or stones, when warned of danger; in either case exhibiting a perfect and immediate appreciation of its parent's meaning: it feeds itself, pecking its food from the surface of the earth or water, and not receiving it from the beak of its parent: although entering on life in this advanced state, it grows very slowly, and is long in arriving at maturity. When full-grown it uses its feet rather than its wings: it trusts much to its legs for means of escape: when it flies, it moves through the air by a series of rapid, powerful, laboured strokes of the wing, and invariably takes the earliest opportunity of settling on the land or water, not on trees; it never takes wing for recreation or food, but simply as a means of moving from place to place: it is polygamous in its habits; the number of females predominating over the males: the males are pugnacious, they accompany the females only until incubation has commenced, and abandon the duties of incubation and the care of the young solely to the females: the females make little or no nest, a depression scratched on the surface of the soil generally sufficing: the eggs are large in comparison to the size of the bird: neither sex sings, or attempts to imitate the voice of men or animals. Birds included in this division approach more nearly to mammals than do those which it excludes: for instance, the habitual use of land or water for progression, the swiftness of foot, the strength and muscular development of the legs, the polygamous habits, the want of the extraordinary instinct of nest-making, are characters which, while they seem to degrade these birds as birds, certainly raise them in the list of animals, because they are thus brought nearer those animals which suckle their young, and which are always placed at the head of the animal kingdom. In an econo-

mical point of view, and considered in reference to man, the flesh of these birds is wholesome, nutritious, and is generally considered highly palatable. The division comprises the following orders, in each of which partial exceptions to one or other of these general characters occur :—

1. Gallinæ, or the Poultry order.
2. Brevipennes (*Cuvier*), or the Ostriches.
3. Pressirostres (*Cuvier*), or the Plovers.
4. Longirostres (*Cuvier*), or the Snipes.
5. Macroductyli (*Cuvier*), or the Rails.
6. Plongeurs (*Cuvier*), or the Divers.
7. Lamellirostres (*Cuvier*), or the Ducks.

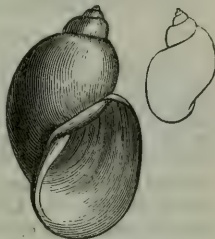
2. *Gymnogenous Birds*.—In these, when the shell is broken, the chick makes its appearance in a state of helpless infancy : it is naked, blind, and incapable of locomotion : it cannot distinguish its parent by means of its senses : it gapes for food, but does not distinguish between proper food offered by its parent, and a stick or a finger held over it : it cannot feed itself, and would die were not food placed in its mouth : it rapidly attains its full size, often before leaving the nest. When full-grown it uses its wings rather than its feet : it flies with a succession of deliberate and easy strokes : it takes wing for recreation and for food, and not merely for the purpose of moving from place to place : it is strictly monogamous ; the sexes being equal in number : males share with females the cares of incubation and feeding the young until these are able to shift for themselves. Birds possessing these characters build elaborate nests in trees, and perch in trees rather than on the ground : many of them sing melodiously ; others imitate, with wonderful facility, the voice of man or of animals. As an economical character in connexion with man, their flesh is bitter and unpalatable, often offensive and disgusting ; hence man has never domesticated them for purposes of food. These are birds *par excellence* : they possess in perfection the essential characters of birds : in the habitual use of air for progression and of trees for resting, in the want of abilities for terrestrial progression, in strength and bulk of pectoral muscle, in monogamous habits, in the fabrication of nests, in power of song, they are raised as birds, but degraded as animals, since in all these characters they recede from those animals which suckle their young. The division comprises the following groups, in each of which exceptions to one or other of the general characters occur :—

1. Totipalmes (*Cuvier*), or the Pelicans.
2. Longipennes (*Cuvier*), or the Gulls.
3. Accipitres, or the Birds of Prey.
4. Cultrirostres (*Cuvier*), or the Herons.
5. Passeres, or the Sparrow order.
6. Grimpeurs (*Cuvier*), or the Climbing birds ; and
7. Columbæ, or the Pigeons.

2. ON A NEW SPECIES OF LYMNÆA FROM THIBET.

BY LOVELL REEVE, F.L.S., F.Z.S. ETC.

LYMNÆA HOOKERI. *Lymn. testâ ovatâ, tenuiculâ, conspicuè umbilicatâ, anfractibus quatuor ad quinque, convexis, supernè depresso-rotundatis, suturis subimpressis, aperturâ orbiculari-ovatâ, marginibus laminae latiusculâ subverticali conjunctis; sordidè olivaceo-fusca.*



The above-described freshwater mollusk, collected by Dr. Hooker on the Thibetian or north side of Sikkim Himalaya, at 18,000 feet elevation, belongs to the same type as our well-known *Lymnæa peregra*, and affords an interesting addition to the evidence which has been in part collected touching the wide geographical distribution of corresponding forms of plants and animals over those parts of Europe and Asia where there are no extensive mountain-barriers. The European *Lymnæa stagnalis* has been collected as far east as Affghanistan, and the typical form of *Lymnæa peregra* is very characteristic in this species from Thibet. A depression of the whorls next the sutures, which gives a more orbicular form to the aperture, and a conspicuous umbilicus, which is not in any degree covered by the columellar lamina, prove it to be specifically distinct from *L. peregra*; and these characters do not appear in the various modifications of that species arising out of its more or less ventricose growth, or more or less attenuated convolution. South of the Himalaya range, where Dr. Hooker reckons the snow-line to be 5000 feet lower than on the north side, and 3000 feet lower than the locality inhabited by this species, the *Lymnææ* are of quite a different type, more especially in the plains of Bengal, where the shell, owing to its being formed in so much warmer a temperature, is of stouter growth, and characterized by some design of colouring. The European types of *Lymnæa*, ranging over Russia and Siberia, appear abundantly in the stagnant waters of North America; and some are identical in species. *L. elodes* of Say, inhabiting Pennsylvania, is doubtless the same species as the European *L. palustris*; *L. truncatula* of the same author appears to be identical with *L. desidiosa*; and the *L. peregra*, represented by *L. Hookeri* in Thibet, is represented in Pennsylvania by Say's *L. catascopium*. The *Lymnææ* of Australia are of a remarkable and very distinct type from either of those mentioned above.

I have much pleasure in naming this Thibetian *Lymnæa* after the indefatigable traveller, whose researches into the natural and physical history of that remote country into which few have penetrated, are likely to be attended with such important results. I have placed the specimens in the British Museum.

The figure in outline is of the natural size.

No. CCIV.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

3. ON THE ANIMAL OF LIOTIA; WITH DESCRIPTIONS OF NEW SPECIES OF DELPHINULA AND LIOTIA, FROM THE CUMINGIAN COLLECTION. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. VIII. fig. 18, 19, 20.)

An examination of the animal of *Liotia Peronii* tends to confirm the generic importance of a small group hitherto confounded with *Cyclostrema* and *Delphinula*, but which had been justly recognised by Mr. Gray under the name of *Liotia*. The shell is known by its thickened peritreme; the operculum is peculiar, and the habits are peculiar in living at considerable depths, while *Delphinula* proper are chiefly littoral. In *Liotia* the head is probosciform, the tentacles subulate, the eyes on conspicuous peduncles at their outer bases; there are no intertentacular lobes, but a conical lobe on each side of the head external to the eye-peduncles; the lateral membrane of the foot is undulated, and furnished posteriorly with three cirrhi.

The operculum is arctispiral, the volutions being very narrow, numerous, and covered with a calcareous deposit, which is articulated at regular intervals, giving the upper surface of the operculum a tessellated appearance; the periphery is ornamented with radiating, horny fibres.

LIOTIA PULCHERRIMA, Adams. *L. testâ subdiscoïdè; spirâ elevatiusculâ, anfractibus rotundatis, liris transversis et longitudinalibus elegantissimè cancellatâ, liris transversis muricatis; labro expanso, duplicati, radiatim fimbriato; umbilico peramplo, crenulato.*

Hab. apud Promontorium Bonæ Spei. (Mollusca, Pl. VIII. fig. 21.)

Shell subdiscoïd; spire slightly elevated, whorls rounded, very elegantly cancellated with transverse and longitudinal raised ridges, the transverse being muricated; outer lip expanded, with a double peritreme, each being radiately fimbriated; umbilicus very large, the margins crenulated.

Hab. Cape of Good Hope. (Mus. Cuming.)

LIOTIA AFFINIS, Adams. *L. testâ globosâ; spirâ subprominulâ, anfractibus rotundatis, transversim elevato-striatis, costis variciformibus longitudinalibus, distantibus, angulatis, mucronatis; anfractuum parte inferiori serie unice foraminum; labro expanso; umbilico patulo, crenulato.*

Hab. in littoribus Australiæ.

Shell globose; spire rather prominent, whorls rounded, transversely elevately striated, with variciform longitudinal ribs, wide apart, angulated, and with the angles furnished with sharp points; lower part of the whorls with a single row of holes; outer lip expanded; umbilicus wide, crenulated.

Hab. Australia. (Mus. Cuming.)

A species partaking of the characters of *L. scalarioïdes* and *L. varicosa* of Reeve, but which can be referred to neither.

LIOTIA DUPLICATA, Adams. *L. testá orbiculari; spirá depressá, anfractibus transversim et longitudinaliter costatis; costis transversis duabus, tuberculatis; anfractuum parte inferiori planá; umbilico amplo, perspectivo, crenulato.*

Hab. in insulis Philippinis.

Shell orbicular; spire depressed, whorls transversely and longitudinally ribbed; transverse ribs two, tuberculated; the lower part of the whorls smooth; umbilicus very large, the other whorls visible within, margin crenulated.

Hab. Cagayan, province of Misamis, Isle of Mindanao, Philippines. (Mus. Cuming.)

LIOTIA NODULOSA, A. Adams. *L. testá orbiculato-depressá; spirá complanatá, transversim striatá, ultimo anfractu costis transversis duabus in medio puncto sulcatis et nodulis magnis subdistantibus instructis, infra serie punctorum circa regionem umbilicalem; aperturá orbiculari, peristomate reflexo puncto fimbriato, umbilico patulo margine crenulato.*

Hab. in insulis Philippinis. (Mus. Cuming.)

DELPHINULA CORONATA, Adams. *D. testá subdiscoideá, albá, nigro lineatá; anfractibus rotundatis, supra, spinis squamæformibus subramosis nigricantibus sursum curvatis coronatá; anfractuum parte alterá spinis brevioribus nigris in seriebus dispositis; spirá plano-convexá.*

Hab. in littoribus Australiæ.

Shell subdiscoid, white, with black lines; whorls rounded, coronated above with blackish subramose scale-like spines curved upwards, the other part of the whorls with shorter black spines arranged in parallel rows; spire plano-convex.

Hab. Cape Upstart, North Australia, in crevices of rocks at low water; *Jukes*. (Mus. Cuming.)

DELPHINULA EURACANTHA, Adams. *D. testá subdiscoideá, albidá fusco rubroque variegatá, anfractibus supra lævigatis, superne angulatis, angulo spinis squamæformibus grandibus latis decurvatis ornato; anfractuum parte inferiori serie unicá spinarum et squamarum in seriebus parallelis dispositis ornato; umbilico amplo, squamis muricatis armato, peromphalo nodoso.*

Hab. in insulis Philippinis.

Shell subdiscoid, whitish varied with red and brown; whorls smooth above, angulated superiorly, the angle ornamented with large wide decurved scale-like spines; lower part of the whorl with a single series of spines and numerous parallel rows of scales; umbilicus wide, armed with muricated spines, margin nodose.

Hab. Isle of Mindora, Philippine Islands; *H. C.* (Mus. Cum.)

Like *D. aculeata*, Reeve; but the spinose processes are broad and deflexed, and there is a single row of large spines on the under part.

DELPHINULA CALCAR, Adams. *D. testá orbiculari, discoideá; spirá depressá, albá, anfractibus angulatis acutis, peripheriá serie unicá spinarum radiatim stellatá, spinis triangularibus*

compressis prominentibus ; anfractuum parte inferiore pland ; umbilico patulo, crenulato.

Hab. in insulis Philippinis.

Shell orbicular, discoid ; spire depressed, white, whorls sharply angulated, periphery with a single series of prominent broad triangular compressed spines radiately disposed ; lower part of whorls smooth ; umbilicus wide, crenulated.

Hab. Catanuan, province of Tayabas, island of Luzon, sandy mud, 10 fathoms ; *H. C.* (Mus. Cuming.)

A small species, partaking somewhat of the characters of *D. stellaris*, Adams and Reeve, but much more depressed, and the lower part of the whorls simple.

March 26, 1850.

W. Yarrell, Esq., V.P., in the Chair.

The following papers were read :—

1. ON A LEECH NEW TO THE BRITISH FAUNA.
BY J. E. GRAY, ESQ., F.R.S.

Mr. Hoffmann lately sent to the Zoological Gardens a living specimen of a very large leech which he had found near his house in the Regent's Park. It has been preserved in fluid, and now forms part of the Collection of British Animals in the British Museum.

It proved to be an adult specimen of *Trochetia subviridis*, Dutrochet (*Lamk. Hist. A. s. F.* v. 523), well-figured in the 2nd edition of Moquin-Tandon's 'Monograph of Hirudines,' t. 4. It is a very interesting addition to the fauna. It is the giant of the family, this specimen being more than 7 inches long.

2. ON THE OCCURRENCE OF REGALECUS GLESNE AT REDCAR,
YORKSHIRE, IN 1850. BY J. E. GRAY, ESQ., F.R.S.

A specimen of this fish was cast ashore on Redcar Sands, Yorkshire, on Thursday, the 3rd of January 1850. "The fish was alive when found. Length without the tail-fin, which is wanting, about 11 feet ; width at the broadest part, 12 inches ; weight, 4 stone 10 lbs."

It was salted and exhibited at Redcar. During the exhibition the rays of the dorsal and ventral fins were almost entirely destroyed, and it broke transversely into three nearly equal lengths on being moved from the sand.

It was eventually sent to London, and now forms part of the Collection of British Animals in the British Museum. The specimen, when it arrived in London, agreed in general appearance and in all essential characters with the specimen from Cullercoats which was exhibited in London last year. Mr. Wrightson, who had the care of it at Redcar, considered, because it had no expanded forked tail, that the tail was wanting.





V. H. Baby.

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Fig. 1. a. b. c. *Helix vellicata* Forbes.

- 2. a. b. *H. Kelletii*.
- 3. a. b. *H. Pandora*.
- 4. a. b. *H. labyrinthus*, var.
- 5. a. b. *Bulimus achatinellina*, Forbes.

Fig. 6. a. b. *Bulimus chemnitzoides* Forbes

- 7. a. b. *fimbriatus*.
- 8. a. b. *Succinea cingulata*.
- 9. a. b. *Cyclostoma purum*.
- 10. *Fusus Kelletii*.

3. NOTE ON CALLICHTHYS AND ANABLEPS. BY J. P. G. SMITH, ESQ.

The flesh of *Callichthys*, when cooked, is of a fine deep yellow colour, and in substance is somewhat cheesy or buttery on the tongue; it is very rich in flavour: no cleaning of the intestines appears to be necessary before preparation for the table.

In the creeks by which the island of Mexianna is intersected, these fish literally swarm and keep the waters alive and in a state of constant disturbance. I have witnessed them crossing a log of wood, which was lying in the water and intercepted the passage, in such numbers that they quite concealed it from view; and the people, when they wanted a dish, were in the habit of going down to a favourable spot and picking them out with their hands, without going into the water.

Anableps swims in small shoals with the eyes above the surface of the water, generally close to the shore, and so near together that I have shot twenty to thirty at a time by firing a gun among them; their flesh is very sweet, and not unlike a smelt in taste.

4. ON THE SPECIES OF MOLLUSCA COLLECTED DURING THE SURVEYING VOYAGES OF THE HERALD AND PANDORA, BY CAPT. KELLETT, R.N., C.B., AND LIEUT. WOOD, R.N. BY PROFESSOR EDWARD FORBES, F.R.S.

1. On the Land-Shells collected during the Expedition. (Mollusca, Pl. IX.)

Officers employed on a hydrographical survey have seldom time or opportunity for making an extensive collection of land-shells. In the assemblage of mollusks collected by Capt. Kellett and Lieut. Wood, there are twenty-eight species, of which eight are undescribed forms. These have been collected at various points between the coast of the Equador to the south and Vancouver Island to the north, the Gelepagos Islands, Pitcairn's Island, and the Sandwich Isles. Unfortunately, in consequence of the mixing of unlabeled specimens, the precise locality of several of the species cannot now be determined.

Of the genus *Helix* there are nine species. Of these, *H. Townsendiana*, *Nuttalliana* and *Columbiana* are certainly from the neighbourhood of the Columbia river. *Helix Kellettii* and *Pandora*, both new, are probably from the same country, though the box in which they were contained was marked "Santa Barbara." *Helix areolata* bears no indication of its locality. *Helix labyrinthus*, variety *sipunculata*, is a very curious modification of *H. labyrinthus*, and, like its known near relations, comes from Panama. *Helix ornatella* (known also as *H. Adamsi*) was collected in Pitcairn's Island, where it had originally been observed. A single specimen of the common European *Helix aspersa* is marked "Santa Barbara," and probably owed its presence, wherever it was found, to transport by Europeans.

Of the genus *Bulimus* fourteen species were collected. Among the most interesting of these are seven species, two of them new, from

Chatham Island, one of the Gelepagos group. Five, viz. *nux*, *calvus*, *eschariferus*, *unifasciatus*, and *rugulosus*, are described forms; two, to which I have applied the names *chemnitzoides* and *achattellinus*, are new, and very curious. Of these latter, the first is singularly isolated in many of its features, though bearing a resemblance sufficient to indicate an affinity with certain elongated and turreted *Bulimi*, natives of South America. The other is equally distinct from any known members of this genus; but, moreover, instead of linking, as the majority of the Gelepagos land-shells do, the fauna of those singular islands with the American continent, rather points, as it were, in the opposite direction, and distantly indicates affinity with the fauna of the Sandwich Isles.

Unfortunately less certain as to exact locality, though contained in a box labeled "Panama," is a curious small elongated *Bulimus*, to which I have given the name *finbriatus*. A form such as this, suggests, when we bear in mind the varied characters of its congeners, considerable doubts as to the value of the generic sections at present generally received among the Pulmoniferous Mollusca. We speak of *Bulimus*, *Helix*, *Pupa*, *Achatina*, and *Balea*, as if they were so many marked groups, the species in each assimilating to ideal generic types, whereas the difference between certain forms of so-called *Bulimi* and others placed under the same generic name is greater than between many *Bulimi* and *Helices* or *Pupæ*. Without assenting to the views of Férussac, which would have amalgamated the genera into one, on account of the similarity in external characters of the soft parts of the animal, and fully admitting that in certain tribes the shell alone may become a most important source of generic character—in other words, granting that in certain groups the sources of generic distinction may lie in the pneumo-skeleton—I do think that we have not yet attained a natural arrangement of the Pulmoniferous Mollusks, and until we have solved that problem, we shall be seriously impeded in the study of the laws of their distribution as well as of their organization.

Besides the *Bulimi* already named, there are specimens of *Bulimus iostomus*, *B. Hartwegii*, and a beautiful new species lately described and figured by Mr. Reeve under the name of *Bulimus Kelletii*, all probably from the Equador; *Bulimus alternatus*, from Panama; and *Bulimus miltecheilus*, marked from the Sandwich Islands, though this curious and beautiful shell is not known to inhabit that locality; nor have we evidence sufficient that the specimen brought home by Lieut. Wood was gathered there. Hitherto it is only known from "San Christoval, south-eastern island of Solomon's Group, north-east coast of New Holland" (Reeve), from which locality the specimens in Mr. Cuming's collection were obtained, and the single example now referred to may have possibly been brought away from the same place.

Of the curious genus *Achatinella*, two species, *livida* and *alba*, are in the collection, both procured at the Sandwich Islands.

Of *Succinea* there is a new species, marked from Mazatlan; I have named it *Succinea cingulata*.

There are two species of *Cyclostoma*, the fine *C. grande* (no locality is attached to it), and an equally beautiful one which I have named *C. purum*.

The following diagnoses of the new species in the collection have been modeled on those of Dr. L. Pfeiffer, whose admirable 'Monographia Heliceorum Viventium' is one of the most valuable contributions to Malacology that have been published for many years.

HELIX PANDORÆ. *H. testâ obtectè perforatâ, depresso-globosâ, tenui, rugulosâ, concentricè minutissimè striatâ, anfractibus supra peripheriam fuscis, infra et prope peripheriam albidis fusco cingulatâ, basi albidis; aperturâ rotundatâ intus fuscâ albido-fasciatâ, margine interno incrassato albo; peristomate reflexiusculo, extus albo-labiato, margine columellari dilatato, reflexo, umbilicum occultante.*

Diam. max. 17, min. 16, alt. 14 mill. (Pl. IX. fig. 3 a, b.)

Collected near the Straits of Juan del Fuaco; allied to the last species, but very distinct.

HELIX KELLETTII. *H. testâ angustè umbilicatâ, depresso-globosâ, tenui, rugulosâ, granulatâ, fulvâ, spirâ subturbinatâ, sordidè flavo conspersâ, rufo-unifasciatâ, anfractibus 6, convexiusculis, ultimo ad peripheriam fasciâ pallidâ cincto, basi subinflato; aperturâ lunato-rotundatâ, intus pallidè fuscâ, unifasciatâ; peristomate reflexiusculo, margine columellari dilatato, reflexo, umbilicum occultante.*

Diam. max. 22, min. 19, alt. 19 mill. (Pl. IX. fig. 2 a, b.)

This species is nearly allied to *Helix Californiensis*, Lea. It differs in the more pyramidal contour of the spire, in the less tumid body-whorl, and consequently differently shaped, more lunate, slightly elongated mouth. The margin of the mouth is more reflected.

HELIX VELLICATA. *H. testâ aperte umbilicatâ, tenui, convexo-depressâ, subnitidâ, sulcato-striatâ, striis minutissimis spiralibus decussatâ, late viridibus; spirâ convexiusculâ, anfractibus 6, ultimo rotundato magno, anticè dilatato, subdescendente; aperturâ perobliquâ, lunato-oblongâ; faux alba, peristomate margine sub-reflexo, superne deflexo-sinuato.*

Diam. max. 22, min. 18, alt. 8 mill.

From Panama? (Pl. IX. fig. 1 a, b, c.)

Distinguished from its near allies by the peculiar deflexion of the upper portion of the lip-margin.

BULIMUS CHEMNITZIOIDES. *Bul. testâ subperforatâ, turrito-subulatâ, regulariter costatâ, costis numerosis, nitidulis, flavidulâ, fasciâ spirali fusco-purpureâ cinctâ; anfractibus 14, ultimo $\frac{1}{2}$ longitudinis subæquante, basi fusco-purpureo; columellâ subrectâ, albidâ; peristoma simplex, acutum; margine externo superne arcuato; aperturâ ovali-oblongâ.*

Long. 19, diam. 4 mill.; apert. 3 mill. longa, 2 lata.

Chatham Island, Gelepagos. (Pl. IX. fig. 6 a, b.)

This beautiful species strikingly resembles a marine *Chemnitzia*.

It is very distinct from any known *Bulimus*, but has affinities with *B. terebralis*, *B. columellaris*, and *B. clausilioides*.

BULIMUS FIMBRIATUS. *Bul. testâ imperforatâ, subuliformi, tenui, costis longitudinalibus subarcuatis, lineis confertis parallelis in interstitiis costarum sculptâ, rufo-fuscâ, suturâ impressâ; anfractus 7-8, tumidi, ultimus $\frac{1}{3}$ longitudinis vix superans, infra medium obsolete carinatus; columella subsimplex, ad basim apertura angulum formans; apertura subovalis; peristoma simplex.*
Long. 9, diam. 2 mill.; apert. 2 mill. longa, 1 lata.

(Pl. IX. fig. 7 a, b.)

In a box of shells labeled "Panama." The nearest ally of this very curious shell is the *Bulimus gracillimus* of Pfeiffer, from Cuba.

BULIMUS ACHATELLINUS. *Bul. testâ perforatâ, umbilico parvo, conicâ, obsolete striatâ, nitidâ, flavâ, fusco-fasciatâ; suturâ cingulatâ, crenulatâ, albâ; anfractibus 7-8 convexiusculis, ultimo vix $\frac{1}{2}$ longitudinis æquante; apertura semiovalis, peristoma rectum, simplex, acutum; columella obsolete contorta, margine columellari reflexo, perforationem semitegente.*

Long. 19, diam. 10 mill.; apert. 5 mill. longa, 4 lata.

(Pl. IX. fig. 5 a, b.)

This shell is from Chatham Island, Gelepagos; it is unlike any other known *Bulimus*, and its characters distinctly indicate affinity with the *Achatinellæ*.

B. 4 **SUCCINEA CINGULATA.** *S. testâ oblongo-ovatâ, vix obliquâ, solidâ, striatâ, nitidâ, fulvo-succineâ, sæpe spiraliter albo-lineatâ; spirâ exsertâ, obtusâ; anfractus 4, convexiusculi, ultimus $\frac{2}{3}$ longitudinis æquans; apertura elongato-ovatâ, superne acutâ, basi obliquè pone axin recedente; columellâ arcuatâ.*

Long. 12, lat. 6 mill.; apert. 7 mill. longa, medio 3 lata.

(Pl. IX. fig. 8 a, b.)

This *Succinea* is distinct from any recorded by Pfeiffer. It is said to come from Mazatlan. The very fine white spiral lines are not always clearly marked in colour; they correspond with lines of deeper depression at intervals of the striæ of growth.

CYCLOSTOMA PURUM. *C. testâ orbiculari, depressâ, albâ, nitidâ, spirâ elevatiusculâ, luteâ; anfractibus sex, rotundatis, spiraliter sulcatis, sulcis numerosis, transversè striatis; apertura subcirculari, obliquâ, peritremate simplici; umbilico maximo; operculo — ?*

Diam. 48, alt. 17 mill. (Pl. IX. fig. 9 a, b.)

Very near *C. Cumingii*, a species described by Mr. G. Sowerby from the island of Tumaco.

5. ON THE CHARACTERS OF THE GENERA PUSIONELLA AND CLAVATULA. BY J. E. GRAY, F.R.S. ETC.

7] In the List of Genera of Mollusca published in the Proceedings for 1848, I gave the name of *Pusionella* to a genus of shell, referring to the *Nefal* of Adanson and the *Murex pusion* of Born as the type.

This genus is easily characterized by the smooth thin periostraca, and the sharp-edged oblique plait which crosses the lower part of the canal. At the time I formed the genus, which contains several species in my collection, all coming from Africa, I was convinced that it was separate from the other zoophagous mollusca, from the characters assigned to it above, though I am aware that several zoologists were inclined to consider that they were scarcely sufficient for the formation of a generic group.

The examination of the operculum of the shells arranged in this group has shown that it affords a most excellent character, which separates it at once from all the other genera of the family. The operculum is formed of concentric laminæ, with the nucleus or first-formed lamina placed on the straight front or inner side of the operculum, which is situated next to the pillar of the shell. With this peculiarity the genus must now be regarded as firmly established. This form of operculum had only before been observed in the genus *Bezoardica*.

The discovery of this character in shells which had been regarded by most authors as *Fusi*, induced me to examine the opercula of some other allied genera, and I was rewarded by the discovery that *Pleurotoma bicarinata*, which is very nearly allied in form to *P. coronata*, the type of the genus *Clavatula* of Lamarck's 'System,' has the operculum of the same shape and formed nearly in the same manner as that of the genus *Pusionella*; while *Pleurotoma Babylonica*, *P. Virgo*, and *P. oxytrophis*, which may be regarded as the typical *Pleurotomæ*, have the ovate lanceolate operculum with the nucleus on the acute apex, like the typical *Fusi*.

This being the case, it appears to me desirable that the genus *Clavatula* should be re-established, and restored to the species which has the operculum of this kind. Should it be considered necessary to separate from *Pleurotoma* the species which have a very short anterior canal, which have hitherto been regarded as *Clavatula*, they may be called *Drillia*, as that was the name which was first applied to them before they were confounded with the true *Clavatula*.

These observations show the importance of studying the opercula of the different genera; and I may add, that the attention which I have been able to bestow on the subject has convinced me that they form quite as important a character for the distinction of the genera, and the arrangement of the genera into natural groups, as the structure and form of the shelly valve, or of the external form of the animals themselves; and this may well be believed, when we consider them, as I am inclined to do, as an imperfectly developed valve, and as homologous to the second valve of the bivalve shell.

April 9, 1850.

Prof. Owen, V.P., F.R.S., in the Chair.

The following papers were read :—

1. NOTICES OF AUSTRALIAN FISH. BY SIR JOHN RICHARDSON, M.D., F.R.S. ETC.

(Pisces, Pl. I. II. III.)

In the third volume of the 'Zoological Transactions;' the 'Magazine and Annals of Natural History,' vol. ix.; a report on the "Fish of New Zealand," made to the British Association in 1842; the Ichthyology of the Voyage of the Sulphur, and especially in the Ichthyology of the Antarctic Voyage of the Erebus and Terror, completed in February 1848, I have described various species of Australian fish. Among other sources of information to which I had recourse, a collection of drawings, made by Deputy Assistant Commissary General Neill, in 1841, at King George's Sound, is particularly valuable on account of the notices it contains of the habits and qualities of the fish. The drawings are so characteristic, that most of the species are easily recognised, but some novel forms could not be systematically described without specimens, and the opportunity now afforded me by Mr. Gray of inspecting a number of dried skins prepared on the spot by Mr. Neill, has given occasion to the present paper.

APISTES PANDURATUS, Richardson.

Radii.—B. 7; D. 17|7; A. 3|6; C. 12 $\frac{2}{7}$; P. 14; V. 1|5, spec.

(Pisces, Pl. I. fig. 3, 4.)

Among the various forms that the genus *Apistes* presents, the present one is remarkable for the elevation of the orbit, which rises in a semicircular protuberance, so high above the occiput as to give the hinder part of the head a relative depression like a Turkish saddle, and to render the snout and forehead almost vertical.

The mouth is terminal and small, and both jaws, with the chevron of the vomer and a round patch on each palatine bone, are furnished with minute, short villiform teeth. The intermaxillaries are moderately protractile, and the maxillary, whose dilated lower end drops below the corner of the mouth, has its posterior edge turned outwards producing a ridge. The nasal spines are thick, but acute, and are bent to the curve of the forehead. There is a narrow deep groove between them. This groove widens on the top of the head, where it is bounded by smooth ridges continued from the nasal spines, and in conjunction with them the raised edges of the orbits form an exterior furrow on each side. These four furrows and ridges end in obtuse eminences which cross from the superior-posterior angle of one orbit to the other. Behind them the skull sinks perpendicularly to the level of the nearly flat, depressed occiput, on which however the middle ridges are still visible. The preorbitar is small, very uneven, and emits a

strong spine whose acute point reaches back to the middle of the orbit. The second suborbital in crossing the cheek to the hollow of the preoperculum forms a stout ridge of oblique, somewhat twisted and striated eminences, none of them spinous. The preoperculum has a smooth vertical upper limb, which shows as a narrow, slightly elevated ridge. At its curve or angle there is a strong spine, longer than the preorbital one, but not reaching quite to the gill-opening. A short thick spine is adnate to its base above, and a little way below it there is an acute spine half as long, which is followed by three other angular or spinous points on the lower limb of the bone*. Two prominent but smooth ridges exist on the gill-plate without any spinous points. On the suprascapular region there are two ridges, the upper one having three thick, striated eminences with acute points, and the lower one has two such eminences, with two small points more posteriorly.

There are no scales on any part of the head, and there is a smooth space along the base of the dorsal, which is widest towards the shoulder; the space between the ventrals and the breast anterior to them, with the base of the pectorals and their axils, are scaleless; the rest of the body, including the belly and integuments adjoining the anal, is densely covered with small scales. The lateral line is marked by a series of small eminences and is straight.

Judging from the numbers given in the 'Histoire des Poissons,' and also from the examination of several species not described in that work, the branchiostegous rays seem to vary in the *Apistes* from five to seven. In the species now under consideration there are seven rays, but the lowest one is very slender, and so closely applied to the following one that it can be detected only by dissection.

The dorsal commences between the second points of the suprascapular ridges and extends to near the caudal. Its spinous portion is much arched; the spines are strong and acute, and the seventh one is the tallest, being equal to two-thirds of the greatest height of the body; the other spines are slightly graduated, but the foremost three diminish more abruptly. The last spine is rather more than one-half as long as the soft rays or than the tallest spine. The last soft ray is bound at its base to the back by membrane, but this membrane does not reach to the base of the caudal. The anal terminates rather further from the latter fin, and has three strong spines, the second being the stoutest and as long as the third one; the soft rays surpass them by about a fourth part. The pectorals are large and obliquely semi-oval, the lower rays being the shortest. Their rays are forked, which is a characteristic mark of the genus, and is not common in the Cottoid family. The ventrals are also rather large, exceeding the anal a little in length and in spread. Their spine stands behind the pectoral axil and under the fourth dorsal spine.

The length of the head exceeds the height of the body, and is contained thrice and one-half in the whole length of the fish, caudal included. Length of specimen $5\frac{1}{2}$ inches.

* In the figure, the angle of the mandible being strongly represented, looks like a fourth angular point.

APLOACTIS MILESII, Richardson.

Radii.—Br. 5; D. 14|14; A. 12; C. 13; P. 11; V. 1|2, spec.

(Pisces, Pl. I. fig. 1, 2.)

This fish has the fins of a *Synanceia* with the lateral eyes and head of a *Scorpena*, but instead of the ridges of the cranium, face and gill-covers ending in spinous points, they produce only obtuse knobs. Its teeth in character and position resemble those of *Pteröis*, and its dermal spine-like scales are similar to those of *Centridermichthys* (Zool. of Voy. of Sulphur, p. 73). I am not quite sure that it corresponds in all its general characters with the *Aploactis aspera* of the 'Fauna Japonica' (pl. 22), but it comes sufficiently near to be included in the same generic group.

The form of the fish is rather elongated, the height of the body, which is a little less than the length of the head, being nearly one-fourth of the total length of the fish, caudal included. The compression of the head is moderate, its thickness being only one-third less than its height, and equal to about half its length. The mouth is terminal, cleft only a very short way backwards, but having a moderately large gape. The intermaxillaries are slightly protractile, and their edges and those of the mandible are covered with very short and minute, densely crowded teeth. The chevron of the vomer is similarly armed, but there are no teeth on the very narrow edges of the palate-bones, and the tongue, which is not in the least free at the tip, appears to be quite smooth. The premaxillaries are but slightly protractile, the tips of their pedicles when retracted not reaching half-way to the eye. The maxillaries have a protuberance in the centre of their lower dilated ends, and only their more slender upper halves glide under the preorbital. When the head is viewed in front, two short parallel ridges are seen covering the pedicles of the premaxillaries, above which, on the forehead, there is a deep oblong depression bounded by an elevated bony ridge, from which a side ridge formed by the prefrontals proceeds to each orbit. The margins of the orbits themselves are elevated and uneven, and there is a prominent bend upwards on the edge of each postfrontal bone; the rest of the top of the head is occupied by the front rays of the dorsal fin. The preorbital sends one obtuse ridge forwards over the middle of the maxillary, and another and a larger one backwards in the situation of the spine of an *Apistes*; this one is knobbed at the end and curved upwards. The suborbital chain is elevated and very uneven throughout, particularly the ridge which traverses the cheek to the hollow of the preoperculum. There is a blunt process from the angle of the latter bone, representing the spine common in this family, and three smaller knobs below it, the edge of the bone being also raised in a slighter degree. Two slightly diverging ridges, ending bluntly, cross the operculum; there is a small blunt point on the interoperculum, and four obtuse eminences between the eye and shoulder, representing the two ridges shown in that part in the *Scorpenæ*. The parts between the bony eminences on the head are covered with small spines like those of the body, and the whole, in the recent state, seems to have



1. 2. APLOACTIS MILESII. 3. 4. APISTES PANDURATUS



been enveloped in soft skin, which in the dried specimen has left traces of a short skinny fringe on the lower jaw and of filamentous points elsewhere. There are several open pores on the limbs of the mandible. The gill-membrane is smooth and is sustained by five curved rays. The gill-openings are closed above the gill-plate, but extend from the point of the operculum downwards and forwards to opposite the articulation of the mandible, being sufficiently ample.

The whole skin of the body and the lower parts of all the fins are studded with straight acute spines, each enveloped in a skinny sheath. The lateral line is nearly straight, having merely a slight rise over the pectoral. It is marked by a smooth furrow and a series of ten or twelve skinny processes.

The dorsal extends from between the eyes the whole length of the back, but is not actually connected to the caudal fin. It is highest anteriorly, lowest over the pectoral, and of medium height and nearly even posteriorly, its end being rounded off. The second spine, which stands over the middle of the orbit, is the tallest, its height being but a little less than that of the head; the first and third rays are only a little shorter, while the fifth and sixth are much lower, producing a deep notch in the fin. The eighth and following spines are very slightly graduated, and from thence to its rounded extremity the outline of the fin is even. The membrane is notched between the rays, and the tips of the jointed rays curve backwards. The first seven or eight spines are pungent, but the six following ones are less so, and are not easily distinguishable in the dried specimen from articulated rays in which the joints have become obsolete. The fore-part of the dorsal shows some small membranous points on the spines. The anal is similar to the soft dorsal, but terminates further from the caudal, and if it be furnished with a spine it is concealed at the base of the first soft ray, there being no appearance of one externally. The caudal when fully spread is almost circular in outline. Its rays are simple, with the tips projecting beyond the membrane, especially those of the extreme pairs above and below. The pectoral has the oblique semi-oval form of that fin in *Synanceia*, but is less adnate to the side. Its rays are simple, with projecting tips. The ventrals, formed of one spine and two unbranched rays, stand exactly under the base of the lowest pectoral rays, and are small.

The only vestiges of colour remaining in the dried specimen are brown and purple bands and blotches on the dorsal, caudal and pectorals, with one or two rows of white spots on the two latter fins.

CHEILODACTYLUS CARPONEMUS, Cuv. et Val. v. p. 362. pl. 128.

Radii.—Br. 6; D. 17|31; A. 3|19; C. 14 $\frac{6}{8}$; P. 8 et VII.; V. 1|5, spec.

This fish is the "Chettong," No. 39, of Neill's drawings, and the "Jew-fish" of the sealers who frequent King George's Sound. Mr. Neill informs us that it is an inhabitant of rocky shores, and that individuals are often taken which weigh more than 16 lbs. It is readily captured by the hook.

The specimen described and figured in the 'Histoire des Poissons'

was obtained by Messrs. Quoy and Gaimard in the same locality with Mr. Neill's, and the latter accords perfectly with it; but I am persuaded that the references in that work referring to Solander and Forster's accounts of a New Zealand species ought to be struck out. Some notices of the discrepancies between the memoranda of these authors and the history of *Ch. carponemus* in the 'Histoire des Poissons' have been given in the 'Zoological Transactions,' vol. ii. p. 101, and since the date of that publication the examination of various Australian specimens has strengthened the reasons I had for coming to that conclusion.

The *Cheilodactyli* do not accord well with the typical *Sciænida*, and the evidences of the ptenoid structure of their scales are often deficient, the teeth on the disks becoming perfectly obsolete, and none existing on the margins of the scales of any species we have examined. In Mr. Neill's specimen the length of the head is contained four and a half times in the total length of the fish, in which the caudal is included. The height of the preorbital equals the diameter of the orbit; and its length is considerably greater, being about equal to one-third of the length of the head. The teeth on the jaws are needle-shaped, small, and arranged in a narrow, not crowded band. The vomer is smooth. The dorsal fin is low, the sixth and tallest spine being only equal to a quarter of the height of the body, and the fifth and seventh spines are scarcely shorter. The spines lower a little towards the soft rays, but there is no decided notch. None of the spines are stout. The second anal spine is as long as the third one and is thicker. The tenth or long pectoral ray reaches beyond the first third of the anal; the caudal is deeply forked. The transverse diameter of the scales generally exceeds the longitudinal one.

Mr. Neill's drawing represents five yellowish lines on each side of the face, reaching backwards to the occiput, the three lower ones crossing the upper part of the preorbital and being interrupted by the eye. The under and fore edge of the preorbital is marked by a blue line, which is prolonged to the temples, and there is also a short blue streak immediately under the orbit, the iris itself being likewise of that colour. Two blue lines traverse the summit of the back close to the dorsal, disappearing under the middle of the soft portion of that fin. The same colour exists on the membrane joining the first three dorsal spines, on the spines of the anal, the ventrals, the long pectoral ray, and the upper and under edges of the caudal, the tint in all these cases being a pure indigo. The rest of the fins are of a paler colour, approaching to mountain-blue.

CHEILODACTYLUS MACROPTERUS, Forster.

Sciænoides abdominalis, Solander MSS. *Pisces Australiae*, p. 11.

Sciæna abdominalis, *Idem*, *op. citat.* p. 29; *fig. pict. Parkins.* 2-40.

Sciæna macroptera, Forster, *Descrip. Anim.* p. 136. *fig. 206. Georgio Forst. picta.*

Radii.—Br. 6; D. 17|26; A. 3|14; C. 17; P. 15; V. 1|5, Soland.

Br. 6; D. 17|26; A. 3|14; C. 30; P. 9 et VI.; V. 1|5, Forst.

Of this species I have seen no example, and it is known to me only by the descriptions and figures above referred to. It inhabits the bays of the middle island of New Zealand, and was taken on Cook's first and second voyage in Queen Charlotte's Sound and Dusky Bay. At the latter place its native appellation was ascertained to be "Taraghee," but the seamen called it "Cole-fish." That it is different from the *Ch. carponemus* of the 'Histoire des Poissons' I am inclined to believe, from the dissimilarity of the figure in the latter work with those drawn by Parkinson and George Forster, and from the more notched dorsal and stouter dorsal and anal spines than we find in authentic specimens of *Ch. carponemus* from King George's Sound. These discrepancies, and the smaller number of dorsal and anal rays, authorise us to keep it distinct until an opportunity occurs of examining the New Zealand fish. The broad black band which descends from the shoulder not quite as far as the pectoral is a good distinctive mark. The reader is referred to the 'Zoological Transactions,' vol. iii. p. 101, for extracts from Solander's notes, which may be compared with Forster's description in the 'Historia Animalium,' &c. p. 136.

Some specimens of *Cheilodactyli* from Sydney which I have seen point at a species nearly allied to the two preceding ones as existing in that part of Australia, but the materials I possess are not sufficient for the elaboration of its distinctive characters.

CHEILODACTYLUS NIGRICANS, Richardson.

Radii.—Br. —; D. 15|26; A. 3|10; C. 15 $\frac{2}{3}$; P. 9 et V.; V. 1|5, spec.

Toorjenung, *Neill's drawings*, No. 42.

This fish is the "Toorjenung" of the natives of King George's Sound, and the "Black Jew-fish" of the sealers. Mr. Neill says that it grows to a large size, feeds grossly, and that its flesh is dry and dark-coloured. It is much prized by the aborigines, and forms a principal article of food among the native families, who are expert in spearing fish. The head of a large fish is said to make good soup. It is an inhabitant of rocky points that project from sandy bays, and moves sluggishly along the bottom, ploughing the sand with its soft fleshy lips; hence it falls a ready sacrifice to the native spear.

In shape this fish approaches to *carponemus*, but is rather more elongated in the body, and has a more arched spinous dorsal. Its eye is more remote from the gill-opening, being nearer to the middle of the head, and the preorbital is shorter, its length not exceeding the diameter of the orbit. The most striking dissimilarity to the preceding species is in the longest pectoral ray, which projects only about one-sixth of its length beyond the membrane. It is the uppermost of the simple rays, and the four others are graduated and also project beyond the membrane as far in proportion. The disk of the preoperculum is broad, that of the interoperculum fully equal to it, and both these bones and the cheek are scaleless in the specimen, which has sustained some damage in the head, but not apparently in these places. *Ch. carponemus* and *aspersus* have interopercular bones rather narrower than the disk of the preorbital, and both these

bones, with the cheek, are covered with small scales which do not extend to the preorbital. In *aspersus* a small part of the cheek next the preorbital is scaleless. In all these species the operculum and suboperculum are densely scaly. The integuments of the cheek of *nigricans* are full of pores, and the lips are large and fleshy. About forty-eight scales occur in a row between the gill-opening and caudal, with three or four rows in addition on the base of that fin. About seventeen compose a vertical row at the shoulder. The scales of the lateral line are, as in the other species, smaller than those above and below, which also overlap them. The exposed disk of a scale is rough, with minute points, but the exterior margin is thin and membranous. The base is faintly marked by a dozen or more slightly divergent furrows, which do not produce marginal crenatures. The sixth and tallest dorsal spine equals one-third of the height of the body and is higher than the soft rays, which rise considerably above the posterior spines. The third anal spine is more slender and considerably longer than the second one. None of them are strong. The caudal is forked to half its depth, and has acute lobes.

In Mr. Neill's drawing this fish is represented as having a dark greyish-black colour on the back, head and fins, and as being pale on the belly. The lips are flesh-coloured. Length of the specimen 21 inches. The drawing is two feet long.

CHEILODACTYLUS ASPERSUS, Richardson.

Cheilodactylus carponemus, Richardson, *Zool. Trans.* vol. iii. p. 99, *exclus. synon.*

Radii.—Br. 6; D. 17|27; A. 3|11; C. 13 $\frac{6}{8}$; P. 8 et VII.; A. 1|5, specimens.

This fish frequents Port Arthur in Van Diemen's Land, and Dr. Lhotzky says that it is never taken at Sydney. In the 'Zoological Transactions' for 1841 (vol. iii. p. 99) there is a notice of it, to which the reader is referred; but it is necessary to state that the number of fin rays there given are those of *Ch. carponemus*, as expressed in the 'Histoire des Poissons.' I there pointed out some of the discrepancies between the examples of this fish I had then before me and the description and figure of *carponemus* in the work just referred to; but being at that time very imperfectly aware of the number and variety of the *Cheilodactyli* existing in the Australian seas, I did not venture to indicate it as a proper species. This I am now enabled to do, after a careful comparison of the specimens then commented upon with Mr. Neill's example of *carponemus* from King George's Sound, the exact locality of the specimen of the latter described by Cuvier and Valenciennes.

Ch. aspersus is a higher fish than *carponemus*, the greatest height of the body being contained only three times and one-third in the total length, caudal included. It is much compressed, with an acute back and a deeply-forked caudal. The more arched form of the spinous part of the dorsal fin, and the much stouter dorsal and anal spines, afford a ready means of distinguishing the dried specimens. The different colours and markings of the recent fish are very appa-

rent. The first and last dorsal spines are much shorter than the corresponding ones of *carponemus*, and the notch of the fin is conspicuous from the greater height of the soft rays. The second anal spine is very stout, and it rather exceeds the third one in length. The preorbital is smaller than in that species, and its length does not exceed the diameter of the orbit. The face is therefore shorter, and the profile rises more steeply to the dorsal, owing to the greater height of the fish. The elongated pectoral ray, which is the tenth, reaches no farther back than the beginning of the anal. The scales are rather large and much tiled. About fifty-two exist on the lateral line, besides six or seven rows on the base of the caudal, and there are twenty-two rows in the height of the fish.

Mr. Lempriere, from whom we had the specimens, says that the fish is known at Port Arthur under the name of "the Perch," and has a bright silvery hue with dark spots. The specimens still exhibit many dark brown spots scattered thickly on the back and more sparingly on the sides, most of them being rather smaller than the exposed disk of a scale. The vertical fins, particularly the caudal, are more minutely spotted. The top of the gill-cover is blackish, and there is a dark mark on the humeral bone. As is usual in the genus, the inside of the mouth and lining of the gill-opening are purplish-black. Length $12\frac{1}{4}$ inches. Greatest height $3\frac{2}{3}$ inches.

The *Cheilodactylus carmichaelis* (Hist. des Poiss. v. 360) (*Chatodon monodactylus*, Carmichael, Linn. Trans. vol. xii. p. 500. pl. 24) approaches *aspersus* in shape, in the length of its long pectoral rays, and in the number of fin rays generally, but it is distinguished by six short, broad dark bars on the back. The formula of its rays is as follows:—*Radii*.—Br. 6; D. $17|24$; A. $3|12$; P. 9 et VI.; V. $1|5$, Carmichael.

The *Cheilodactylus fasciatus* (Cuv. et Val. v. 357) of the Cape is distinguished by four or five vertical dark bands and five transverse lines on each lobe of the caudal. Its rays are stated to be:—

Radii.—Br. 5; D. $19|23$; A. $3|11$; C. 17; P. 10 et V.; V. $1|5$. Hist. des Poiss.

CHEILODACTYLUS GIBBOSUS, Solander. (*Chatodon*.)

Chatodon gibbosus, Banks, *Icon. Parkins. ined.* t. 23.

Cheilodactylus gibbosus, Richardson, *Zool. Trans.* vol. iii. p. 102.

Radii.—D. $17|36$; A. $3|8$; C. $14\frac{1}{4}$; P. 8 et VI.; V. $1|5$, spec.

(Pisces, Pl. II. fig. 3, 4.)

This fish inhabits the seas of Van Diemen's Land and the east coast of New Holland, as well as King George's Sound. A full description of it is contained in the 'Zoological Transactions' quoted above. It has the highest spinous dorsal of any described species of *Cheilodactylus*, and in the distribution of its black bands it bears a considerable resemblance to *Eques americanus*.

Mr. Neill gives a drawing of it (No. 24), and states that it is known to the aborigines of King George's Sound by the name of No. CCV.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

“Knelvek.” The natives spear it on sandy banks, but say that it is rare. Its scales are smooth, and the second and third anal spines are moderately long and equal to each other. The suboperculum is narrow, and together with the other opercular bones and cheek is scaly.

The figure is one-third of the size of the specimen. The scale is magnified. A considerable part of its disk retains the small asperities or ptenoid teeth, which do not however extend to the margin of the scale, that being, as is usual in the genus, thin and membranous.

CHEILODACTYLUS NIGRIPES, Richardson.

Radii.—Br. 6; D. 18|26; A. 3|10; C. 13 $\frac{5}{8}$; P. 7 et V.; V. 1|5, spec.

The aborigines of King George's Sound had no name for this species, and no drawing of it was made by Mr. Neill. The only specimen of it obtained was speared by a native named Murrienne, and measures 13 inches in length. It has a conical eminence on the pre-frontal bone, like that existing in *Ch. gibbosus*; its face is short, with the profile ascending almost as much as in the species just named. The length of the preorbital is rather less than the diameter of the orbit, the eye is placed midway between the gill-opening and mouth, and the interoperculum is only about half as wide as the disk of the preoperculum. The cheek and all the pieces of the gill-cover are densely scaly. The second of the simple pectoral rays is the longest and it falls short of the anus, while only about one-third of its length projects beyond the membrane. The spinous part of the dorsal is arched anteriorly. Its fifth and longest spine rather exceeds one-third of the height of the body. The preceding ones are graduated to the first, whose height is only a fifth part of the fifth one, but the decrease of the posterior spines is much less rapid, the last one having half the length of the fifth. The soft rays rise to nearly twice the height of the posterior spines, rendering the fin notched. The third anal spine is somewhat longer than the second one, which is stouter, but the spines generally are of moderate thickness, and are compressed. The caudal is forked to half its depth. The ventral spine is long and slender. The scales are without asperities, and the exposed part of their disk exhibits the concentric rings of structure distinctly. About sixty-one exist in a row between the gill-opening and caudal, exclusive of three or four on that fin. The teeth on the jaws are slender and closely set.

In the dried specimen the ventrals are pitch-black, and the other fins are nearly equally dark. The body is also dark, but in the absence of drawings or descriptions of the recent fish we cannot state its proper tints.

CHEILODACTYLUS ZONATUS, Cuv. et Val.

Cheilodactylus zonatus, *Cuv. et Val.* vol. v. p. 365; *Rich. Rep. Brit. Assoc.* 1845, p. 239.

Radii.—D. 17|31; A. 3|8; C. 14 $\frac{5}{8}$; P. 8 et VI. spec.

This fish, which is common to the China and Australian seas, appears to be called the “Zebra-fish” by the sealers who frequent

King George's Sound, though that name is most generally appropriated by them to the *Crenidens zebra*. Its prefrontal bone projects behind the nostril, but not so acutely as in *Ch. nigripes* or *gibbosus*. There is however a difference in this respect in different individuals. The width of the interoperculum is about half that of the preopercular disk, and these bones and the cheek are densely scaly. The scales of the cheek however are imbedded in spongy porous skin. The length of the preorbital equals the diameter of the orbit. In the relative sizes of the opercular bones and preorbital, and in the form of the dorsal, *zonatus* and *nigripes* closely resemble each other, but there is a difference in the anal spines, in the rays of the pectoral, in the shape of the caudals, that of *zonatus* being only sparingly excavated, and a striking one in the colours.

The dried specimen of *zonatus* shows very distinctly eight dark oblique bars on the body, the first crossing the nape and the last the base of the caudal, the intermediate pale spaces being equal to the bars in breadth. The entire head, including the preorbital, is thickly marked by round dark spots of the size of duck shot. There are large spots on the caudal, which are so crowded on the margin of the fin as almost to form a continuous bar. Two or in some parts more rows traverse the dorsal, and there are dark marks on the tips of the anal and ventrals. The simple rays of the pectoral are orange. Mr. Reeves's drawing of the Chinese fish represents it as dressed in very lively colours during the breeding season.

The dorsal is highest at the fifth spine, as in *zonatus*, and is in other respects similar in form; but the anal spines are shorter, especially the second, which is also stouter in proportion. Rather less than one-third of the longest pectoral ray projects beyond the membrane, and the membrane is less deeply notched between the other simple rays than in *nigripes*. The scales differ from those of the last-named species, being finely granulated on the disk, as in *nigricans*.

The rays are somewhat differently enumerated in the 'Histoire des Poissons,' from a Japanese specimen. *Radii*.—Br. 6; D. 17|29; A. 3|8; P. 9 et V.; V. 1|5, Cuv. et Valenc.

The *Cheilodactylus brachydactylus* (Hist. des Poiss. p. 361) of the Cape approaches more nearly to our examples of *zonatus* in the numbers of the rays, but it does not appear to possess the prefrontal prominence, and has no other markings than a triangular black mark behind the eye. *Radii*.—Br. 5; D. 17|31; A. 3|9; C. 17; P. 8 et V.; V. 1|5, Cuv. et Valenc.

Cheilodactylus ciliaris, Richardson, Zool. of the Voy. of the Erebus and Terror, p. 37. pl. 26. fig. 6, 7 (*Latris*; *Sciæna ciliaris*, Forster, &c.), is a species which is allied to the following ones, in the shortness of its simple pectoral rays.

CHEILODACTYLUS HECATEIUS, Richardson.

Latris hecateia, Richardson, Zool. Trans. p. 106. tab. 6. f. 1.

Radii.—Br. 6; D. 18|36; A. 3|27; C. 16 $\frac{2}{3}$; P. 9 et IX.; V. 1|5, spec.

In the account of this species quoted above, I expressed doubts of the rank of *Latris* as a subdivision of the *Cheilodactyli*; but now that I have had an opportunity of examining a more complete gradation of specific forms, I am not disposed to think that it merits to be considered even a subgenus, though the non-prolongation of one of the pectoral rays (usually the tenth) makes it a convenient division of the *Cheilodactyli*, now known to be numerous.

This species inhabits the seas of Van Diemen's Land.

CHEILODACTYLUS LINEATUS, Forster (*Sciæna*).

Cichla lineata, *Schneider*.

Sciæna lineata, *T. R. Forsteri Descr. Anim.* p. 134. An. 1844;
Fig. pict. Georg. Forsteri in Bibl. Banks. servata.

Radii.—Br. 6; D. 18|36; A. 1|26; C. 30; P. 17; V. 1|5, Forst. *l.c.*

This species agrees nearly with the preceding in the numbers of its fin rays, except that Forster says expressly that it has only one anal spine. It has also four dark dorsal stripes, with three intervening silvery ones; but it differs from *hecateius* in the yellowish colour of its fins, and particularly of its caudal, which obtained for it the appellation of "Yellow-tail" from the sailors. It frequents, like the other *Cheilodactyli*, rocky places, was captured by Cook's sailors with the hook, and was much approved as an article of food. It is a native of the seas washing the southern island of New Zealand. Length of specimen described by Forster, 24 inches.

Having seen no specimens we cannot institute a correct comparison with *hecateius*.

THREPTERIUS, Richardson.

(Θρεπτήριος, *ad alendum idoneus*.)

Genus piscium acanthopterygiorum *Cheilodactylis* affine. Corpus catheto-plateum, ovato-oblongum, squamosum. Caput aliquantulum parvum, cute porosâ tectum, absque spinis, angulis vel aciebus serratis osseis. Os ut in *Cheilodactylis* extensibile. Dentes in premaxillaribus, mandibulâ trigonioque vomeris unâ serie instructi, brevissimi, parvi, subconici. Ossa palatis lævia. Genæ craniumque esquamosæ. Os preorbitale angustum. Operculum subtriangulare squamis tectum. Membrana branchiostega radiis sex curvis, satis validis sustentata. Squamæ læves nec dentatæ; linea lateralis recta. Radii pinnarum pectoralium inferiores simplices. Pinna dorsi e nuchâ ferè usque ad caudæ pinnam regnans, squamulis apud radios instructa, membranâ inter spinas profundè emarginatâ; lobulo tamen membranaceo e summis spinis pendente. Pinnæ ventrales thoracicæ sed a gulâ paulo remotæ.

The characters are deduced from dried specimens, and the pharyngeal teeth and structure of the intestinal canal are unknown. The jaw teeth are not strictly disposed in a single row, since a few minute ones form a row behind the others in front of the premaxillaries; but these can scarcely be visible in the recent fish. The chevron of

the vomer is acute and projects a little. The orifice of the mouth is rather larger than in the *Cheilodactyli*, but the jaws are extensible in about the same degree. The maxillary bone wants the flat thin plate near its head which exists in the *Cheilodactyli* and glides beneath the preorbitar. The latter bone is narrow, its width not being equal to one-third of the diameter of the orbit. The eye is comparatively large, three diameters and a half of the orbit being equal to the entire length of the head, and two of these diameters measure the distance between the hinder edge of the orbit and the tip of the gill-cover. The position of the eye is high enough to encroach upon the profile. The cheek equals the diameter of the orbit in breadth; the disk of the preoperculum is also wide, and the interoperculum moderately so. The operculum and suboperculum conjointly have a triangular form; the former is notched, and the latter is prolonged by a membranous tip, which forms the apex of the gill-cover. Both these bones are densely scaly; there is also a row of scales on the interoperculum, partially overlaid by the thin edge of the preoperculum, and the temples are also scaly. The rest of the head is without scales, but the mucous skin, full of canals and pores, which envelops the head, prevents us from ascertaining the exact extent of the scales, at least in the dried specimens. The top of the head is destitute of scales to the occiput, but in the *Cheilodactyli*, dense, small scales extend forward on the skull to before the eyes. In the absence of thick fleshy lips, the genus differs from *Cheilodactylus*. The preorbitar is neither wide enough nor long enough to conceal the maxillary, which however enters partially beneath its edge. The thin crescentic border of the preoperculum is striated, but not crenated. The same kind of streaks or furrows may be discerned, though not so readily, in some *Cheilodactyli*. The head forms a fourth of the total length. The height of the body is also equal to a fourth of the length of the fish, caudal included. The belly is prominent, and the tail, posterior to the vertical fins, is slender. The lateral line is straight, and each of its scales is marked by a short straight tube, which is placed somewhat obliquely to the general direction of the line. About fifty-two scales compose a row between the gill-opening and caudal, the base of whose rays are also scaly, and the lateral line is prolonged as far as the scales extend on that fin.

The dorsal commences over the upper angle of the gill-opening and reaches to within an inch of the caudal. Its seventh spine, which is the tallest, is nearly equal to half the height of the body; the others are graduated very slightly posteriorly and more rapidly anteriorly. None of them are stout, and all of them are traversed on each side by a deep furrow. The membrane between them is deeply notched, as in the genus *Pelors*, and a slender process running up the back of each spine surmounts it in form of a small free lobe. The soft rays surpass the tallest spine a little, and are more than twice the height of the last one. The anal commences opposite to the beginning of the soft portion of the dorsal and ends beneath its tenth branched ray, or, in the specimens before us, about two inches and a half from the caudal. The spines are like the dorsal ones, grooved and slender,

and the second one, which is scarcely shorter than the third, is not quite twice as long as the first one. The seven inferior simple rays of the pectoral have free tips, their membrane being deeply notched as in the dorsal. The ventrals are attached under the middle of the pectorals, or opposite to the sixth dorsal spine. Their spine is slender, and about two-thirds of the length of the soft rays. The caudal is rounded, with the tips of the rays projecting beyond the membrane.

THREPTERIUS MACULOSUS, Richardson.

(Pisces, Pl. II. fig. 1, 2.)

This fish approaches the division *Lutris* of the *Cheilodactyli* in the form of its pectoral fin and other characters, but differs so much in its general aspect, which reminds one of a cottoid fish, that it is well that we can find a structural difference which enables us to place it in a separate genus. This exists in the vomerine teeth, the vomer being smooth in the *Cheilodactyli*, but in this fish it is armed like the jaws by a single row of teeth, which, instead of being setiform and crowded, as in the *Cheilodactyli*, are short, somewhat conical, and confined nearly to a single row on the jaws as well as on the vomer.

The native name of the fish at King George's Sound is "Cūm-beük," and it frequents rocky places, having apparently the same habits with the *Cheilodactyli*. The simple projecting rays of the pectoral would appear to perform the functions of an organ of touch, and are furnished to many fish that, like the *Trigla*, swim close to the sandy bottom, which they touch with these simple rays, whether they are wholly or partially free. The Cūmbeük is prized as an article of food, whence the generic name.

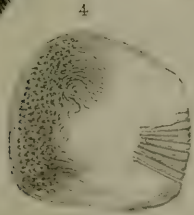
Mr. Neill's figure represents the fish as having a pale brown colour, much lighter on the belly, and thickly studded with irregular dark liver-brown spots, most crowded along the back and becoming much smaller and more scattered on the belly. The fins are rather of a redder brown, and the soft dorsal, ventral and caudal are minutely spotted. Length 9 inches.

TAUTOGA PARILA, Richardson.

Paril and "Common Rock-fish," *Neill's drawings*, No. 9; *Richardson, Ichth. Erebus and Terror*, p. 127, sub *Labro fucicolâ*.

Radii.—Br. 6; D. 9|11; A. 3|10; C. 13 $\frac{1}{4}$; P. 13; V. 1|5, specimens.

This species of *Labrus* or *Tautoga* approaches *Labrus tetricus* (*Ichth. of Erebus and Terror*, pl. 55. f. 1) in general form, but there is only a single row of scales on the temples, and they do not descend lower than the middle of the upper limb of the preoperculum. The scales covering the operculum and suboperculum are, as in the allied species, large. The cheek, preoperculum and the broad thin interoperculum show no scales, but, in common with the top of the head, are covered with a thick skin full of mucous canals and open pores. The diameter of the orbit is less than the length of the preorbital,



W. Mitchell del. ex. lit.

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1. *Therapontes maculosus*.
 2. *Therapontes maculosus*.
 3. *Therapontes maculosus*.
 4. *Therapontes maculosus*.



and is contained five times and a half in the length of the head when the jaws are retracted. The preorbital lips are only slightly developed, but the intermaxillary and mandibular ones are thick and plaited. Teeth arranged in each jaw in a series gradually decreasing towards the angle of the mouth, the anterior pair above and below being considerably larger and more curved. In the upper jaw there is a complete interior series of small rounded teeth which are on a level with the soft parts. On the mandible the interior row is confined to the fore-part of the jaw, and is less regular. The tubular ramifications on the scales of the lateral line are more numerous and crowded than in *L. tetricus*, or any of the other Australian species figured in the 'Ichthyology of the Erebus and Terror.' There are twenty-four scales on the lateral line having these clusters of tubes, and the clusters do not diminish in size towards the tail, though one or two less bushy occur under the soft dorsal. The line is as usual suddenly bent downwards under the end of that fin.

In the dried skins dark brown lines radiate from the orbit over the temples, cheek, and preorbital, and there are dark spots on the jaws, top of the head and gill-plates. There are also some white blotches and bars on the cheek, preoperculum, interoperculum and lower jaw. The body is variegated with brown spots, crowded along the back, more scattered on the sides, and mixed with small round dots of the same tint. The dark marks extend to all the vertical fins. These spots have an umber-brown colour in Mr. Neill's drawing.

No. 37 of the same drawings represents the "Black-fish of the sealers" and the "Paril" or "Kuhoul" of the natives, which is considered to be a variety of the preceding. There is no specimen of it in the collection, but it has the back and upper part of the sides thickly sprinkled with reddish-brown dots without any larger spots. This variety or species is said to grow to the size of 15 or 20 lbs.

COSSYPHUS VULPINUS, Richardson.

Radii.—Br. 4; D. 12|11; A. 3|12; C. 14½; P. 16; V. 1|5, spec.

The height of the body is one-fourth of the total length of the fish, caudal included, and is about equal to the length of the head.

The profile rises in a slightly concave line from the acute snout to opposite the back part of the orbit at an angle of 30°. From thence to the beginning of the dorsal, which stands as far back as the axil of the ventrals, the line is almost horizontal, and judging from the dried specimen the dorsal ridge there is acute. When the jaws are retracted the face has a hollow profile, and the strong series of teeth give it a sinister look. There are two pairs of canines at the extremities of the upper and under jaws, the upper ones being inclined forwards, and also a canine at the corner of the mouth, which is bent outwards. The smaller teeth are rather widely set, and there are six of them on each maxillary and fourteen on each limb of the lower jaw; and of the latter the middle ones are somewhat longer than those towards each end of the jaw. Within the front teeth on both jaws there is a flat naked surface of bone fitted for grinding or crushing, and more interiorly a few minute granular teeth scarcely protruding

from the bone. The cleft of the mouth extends backwards to the front of the preorbital bone, and is equal to the distance between the corner of the mouth and the eye.

The preorbital is covered with smooth skin, presenting an even surface in the recent fish, but in the skeleton it presents three deep notches anteriorly, separated by linear processes. The rest of the suborbital chain is narrow. The upper limb of the preoperculum is finely serrated, the serratures disappearing on the rounded angle. The disk of that bone, the other opercular pieces, the cheeks, temples and suprascapulars are scaly, but there are no scales on the limbs of the lower jaw, in which respect the species differs from the *Cossyphus maldat* of the 'Histoire des Poissons,' to which it has some resemblance in general form. There are six rows of scales on the cheek and as many on the interoperculum; the scales on the disk of the preoperculum are smaller than these, and those covering the operculum and suboperculum are considerably larger. The naked part of the scales exhibits little pits rather than granulations. There are thirty scales on the lateral line, each carrying a simple tube with its point turned upwards. The tube is more branched in *C. maldat*. There is no sudden bend in the lateral line, but it descends gradually under the soft dorsal rays to the middle height of the tail, on which there are eight rows of scales.

The anal and dorsal fins move in scaly sheaths, which are broadest on the soft rays. The spinous rays are strong, tapering, and acute. The first dorsal spine stands over the axil of the ventrals; and the ventral spine, which is as tall as the last and longest dorsal one, stands beneath the base of the lowest pectoral ray. The soft parts of the anal and dorsal are somewhat peaked, and rise above the spines. These two fins end exactly opposite to each other, and leave a considerable space of naked tail behind them. The angles of the caudal project a little beyond the straight intermediate border. The colours of the specimen have faded. Length 16 inches.

COSSYPHUS GOULDII, Richardson.

Labrus gouldii, *Rich. Ann. & Mag. Nat. Hist.* xi. p. 353.

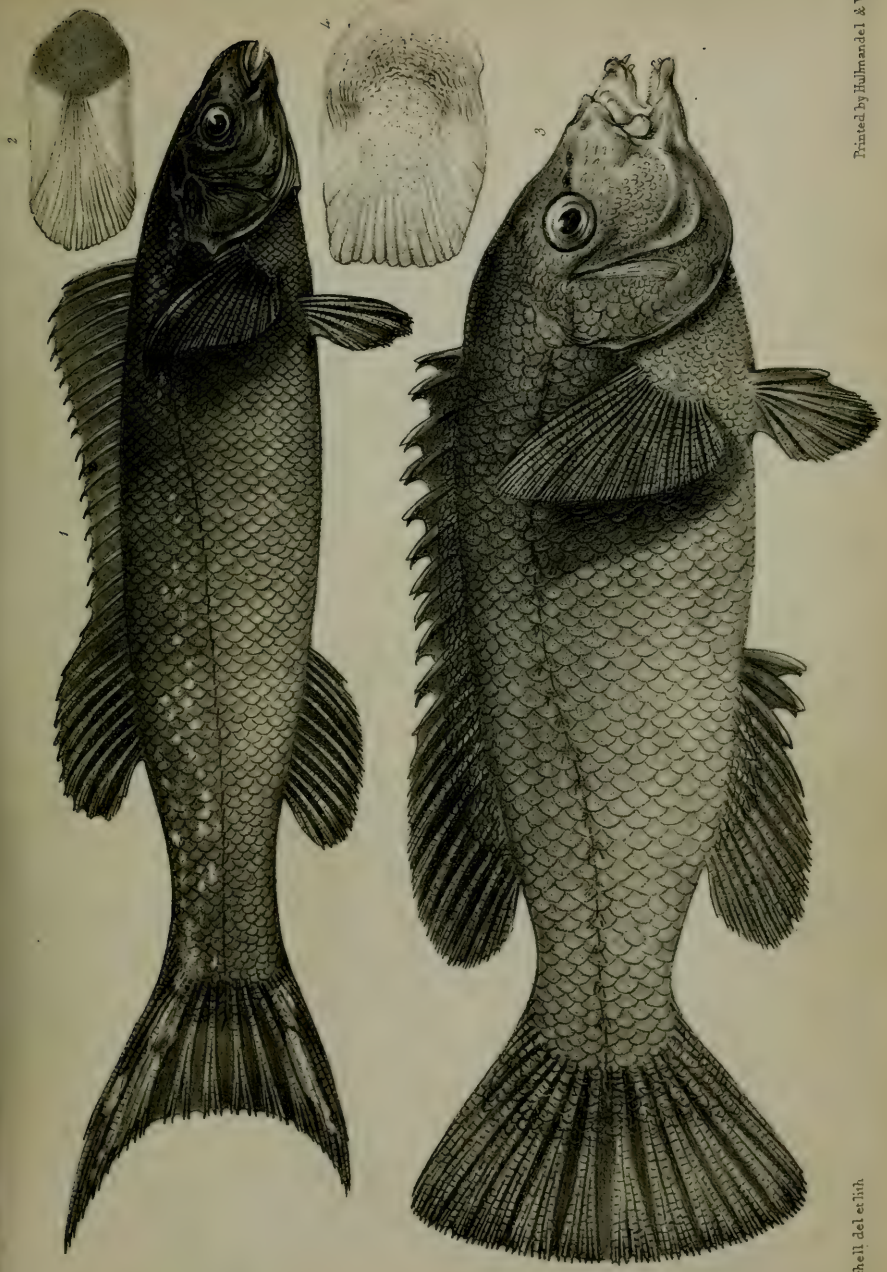
Cossyphus, vel *Lachnolaimus gouldii*, *Idem, Ichth. of Voy. of Erebus and Terror*, p. 132.

Radii.—D. 11|10 vel 11; A. 3|10 vel 11; C. 14 $\frac{3}{5}$; P. 17 vel 16; V. 1|5, spec.

(Pisces, Pl. III. fig. 3, 4.)

Mr. Neill's collection contains a young specimen of this fish, which was previously known to me only by an example of considerably greater size, brought from Western Australia by Mr. Gould. Neither specimen retained the pharyngeal bones, and I still remain in doubt as to which of the dismemberments of the Linnæan genus *Labrus* it ought to be referred.

It has the general form of *Labrus*, with the scaly dorsal and anal sheaths of *Cossyphus*, and a peculiarity in the very compressed form of the spinous rays which I have not as yet seen in any other Labroid. It has the four anterior canines in each jaw which exist in



1. 2. OLISTHCPUS CYANOMELAS. 3. 4. COSSYPHUS GOULDII.



some *Cossyphi*, and on the mandibles these canines are inclined forward like the corresponding teeth in *Anampses*. There are no canines at the angle of the mouth. The lateral teeth are incorporated with the bone, and are small and uniform, not decreasing in succession, as in the *Labri*. In the young specimen the bone of both jaws is thin, and the forms of the lateral teeth are distinctly seen, cemented laterally to each other, with a few very minute granular teeth scattered on the interior surface of the bones; but in the older specimen the premaxillaries have swollen behind the canines and acquired a smooth surface by friction, and the edges of the jaws having worn down the forms of the teeth composing them, are obscured—their rounded points alone being visible. On the other hand the granular teeth on the sides of the jaws have become more conspicuous in consequence of their growth.

The cleft of the mouth is small, not exceeding the diameter of the eye. The length of the preorbital is greater. The latter bone and the suborbital chain, with the lower jaw and top of the head, are scaleless. The edge of the preoperculum is quite smooth, and its disk appears to be scaleless, but there are nine rows of small scales on the cheek, and the other gill-pieces are scaly, those on the operculum and suboperculum being larger than the rest. The uncovered disks of the scales of the body are rough, with small round points, the edges being thin, membranous, and striated or wrinkled. The descending curve of the lateral line under the soft dorsal is the gradual one of a *Cossyphus*, not the more sudden deflection of a *Labrus*. Each of the scales composing it has a loose arbuscle of sparingly branched tubes.

The dorsal spines are strong and comparatively short, and the anterior ones are compressed so as to render their front edges acute. The compression diminishes in the posterior spines, and the last and tallest one is subulate, grooved and pointed. The foremost two anal spines are even more conspicuously compressed, and the third one is subulate. The ventrals are rounded, and have a compressed spine which stands under the second and third dorsal spines and base of the pectoral—being farther forward than in *Cossyphus vulpinus*.

This fish is represented as having a dark purplish colour, and is said by Mr. Neill to bear the names of "Koojenuck," "Quejuinuck," or "Knowl," among the aborigines of King George's Sound. It attains the weight of 28 or 30 lbs. It is described more at length in the 'Ichthyology of the Voyage of the Erebus and Terror,' quoted above.

JULIS CYANOGRAMMA, Richardson.

Radii.—D. 9|13; A. 3|13; C. $12\frac{3}{4}$; P. 13; V. 1|5, spec.

This species is the "Knelmick" or "Kielmick" of the aborigines frequenting King George's Sound, and the "Common Rock-Cod" of the sealers. It is also an inhabitant of New South Wales, specimens of it having been sent to the Museum at Haslar by Mr. Miles. Its flesh is little prized.

In the numbers of its fin rays it comes near *Julis dussumieri*, but

differs from it in having smaller scales, in form and in colours; nor have I been able to refer it to any described species. Its body is elongated; its height, which is not equal to the length of the head, being contained five times and a half in the total length of the fish, caudal included. The compression of the head is considerable, its thickness not exceeding half its height, and the occiput and nape are acute. The length of the preorbital is considerably greater than the diameter of the eye, and the cheek and interoperculum are both high. There are no scales on the temples or any other part of the head. There are fifty scales on the lateral line, each marked by six or seven short, simple, diverging tubes. The lateral line is bent downwards under the ninth, tenth and eleventh soft rays of the dorsal; it is otherwise straight, and runs near the back. The dorsal commences far forward, over the top of the gill-cover, and runs back with an even outline; its tip, which is acute, though not prolonged, reaching, when laid back, to the base of the caudal. Its spines, as well as those of the anal and ventrals, are flexible and very slender. The pectorals are not large, and the ventrals have tapering, acute, but not filamentous tips. They stand under the base of the lowest pectoral ray. The caudal is moderately rounded, and it is scaly between the rays for more than one-third of its length.

When the open mouth is viewed in front, its teeth form a rhomb; the front pair of teeth above and below are comparatively large and are curved. There is also a small curved tooth standing forwards from the angle of the mouth.

Mr. Neill's drawing represents this fish as having an aurora-red ground colour on the head, back, dorsal and anal fins, the fins being of the deepest tint. The head is ornamented by deep blue lines, which are distinctly visible on the dried specimen. These all form curves more or less bold, with the convexity forwards. The anterior one begins on the nose, runs forward to the lips, and inclines backwards again on the lower jaw; the next descends from the nostrils over the disk of the maxillary and posterior part of the lower jaw. Two descend from the orbit over the interoperculum, and there are some finer intermediate ones which vanish on the cheek. There are also about six slender lines on the gill-cover, which are thickened on the suprascapular region. The body is traversed by seven or eight rows of short blue lines, which on the tail are superseded in part by dots. The dorsal and anal have about three rows of these short lines, and the caudal, which is reddish-orange, is streaked longitudinally with blue. The pectoral and ventrals are flesh-coloured.

Length of specimen $12\frac{1}{2}$ inches.

OLISTHOPS, Richardson.

(*Olisthops*, ex *ὀλισθηρός*, *lubricus*, et *ὤψ*, *vultus*.)

Genus generis *Odacis* affine. Caput totum cute lubricâ, esquamosâ tectum (squamulæ quatuor tantum inconspicuis regioni suprascapulari utrinque insidentes). Labia simplicia cum cute faciei con-

tinua, labia preorbitalia nulla. Dentés cum ossibus lunatis premaxillaribus mandibulisque, modò *Scarorum* ferruginati. [Ossa pharyngea ab exemplaribus nostris excisa, hinc nobis ignota.] Squamæ cyloideæ. Linea lateralis simplex, e tubulis rectis facta, continua; anticè arcuata, posticè recta. Pinna dorsi unica, prope humerum incipiens, in parte spinosa, modo proprio, emarginata; radiis spinosis apicibus flexilibus. Pinnæ ventrales sub axillis pectoralium positæ. Membrana branchiostega in gutture continua, utrinque radiis quatuor sustentata.

The general form of this fish has been known to me for some years by the accurate drawing of Mr. Neill. It is an inhabitant of King George's Sound in Australia, where it is recognised by the natives under the name of "Toobitoet," or "Toobitooit," and it is said to inhabit rocky places and to be rarely captured. In the construction of its jaws and in general form it approaches most nearly to *Odax*, but it differs from that genus, and still more from *Scarus*, in the want of scales on the head, the single lips, and in the unusual form of the dorsal. The subjoined description is drawn up from a specimen prepared by Mr. Neill, which I have lately had an opportunity of inspecting.

In the shape of the jaws *Olisthops* resembles several species of *Odax* which inhabit the Australian seas, but does not agree altogether with the account of the dentition of that genus as given in the 'Histoire des Poissons' (xiv. p. 299), nor with the drawing of the jaws of *Odax pullus* (*op. cit.* pl. 408. f. 2).

The jaws of *Odax*, says M. Valenciennes, are composed, as in *Scarus*, of an assemblage of small teeth arranged in a quincuncial order and intimately soldered together, forming on each side a single body, whose cutting edge is crenulated; but these jaws are neither so broad nor so convex as in *Scarus*, and are entirely covered by the lips. They differ from those of *Scarus* in that the teeth form two spoon-bowls at the end of the mouth in front of the spinous points which crown the teeth of the jaw. *Olisthops* and several *Odaces* want these posterior marginal toothlets, the spoon-shaped masses constituting the entire dental process of the jaw, and showing their origin merely by the reflections of the incorporated, minute pearly quincuncial teeth, so densely crowded as to form nearly the whole of their smooth exterior surfaces.

OLISTHOPS CYANOMELAS, Richardson.

Radii.—Br. 4; D. 18|10; A. 3|10; C. 12 $\frac{2}{3}$; V. 1|5; P. 12.

(Pl. III. fig. 1, 2.)

Form elongated, the greatest height of the body, which occurs just behind the ventrals, being contained five times and a half in the total length of the fish, caudal included. The bluffness of the head, produced by the form of the jaws, is intermediate between that of *Scarus* and *Odax*, and the profile, from the nostrils to the dorsal, is moderately ascending and but slightly convex. The jaws have the usual

structure of those of *Scarus*, being composed of a multitude of minute teeth, arranged in a quincuncial order in many rows, and so incorporated with the bone that they produce no inequality of surface, but reflect the light in certain positions so as to reveal their structure. The two premaxillaries conjointly, and the two halves of the mandible, resemble half the bowl of a spoon with straight cutting edges, which under a lens appear to be striated and minutely crenulated. At the symphysis of the mandible, the cutting edge rises slightly, so as to seem very slightly peaked. The orifice of the mouth is comparatively small, and the small maxillaries are concealed under the skin at its corners. Interiorly there is a conspicuous velum in both jaws. The small nostrils lie in a membranous space above the pre-orbital.

The entire head is covered with smooth integument, which has no inflexed folds at the edges of the opercular pieces or preorbital, but is continuous with single lips, that are capable of covering the jaws. The gill-membrane is continuous with the edges of the interopercula, and passes over the isthmus to which it is partially adherent, leaving a small flap posteriorly. It is sustained by four flat thin rays on each side. In length the head is equal to five diameters and a half of the circular orbit, and the space between the eye and the tip of the gill-flap equals three of these diameters. The eye is near, but does not touch the upper profile of the head. A triangular preorbital, having a length equal to the diameter of the orbit, is so concealed by the integument that it is scarcely discernible in the recent fish, but in the dried specimen it shows a slightly raised disk bounded in a somewhat radiated manner by slightly prominent mucous canals. The rest of the suborbital chain goes round more than half the orbit in form of a slender line of simple mucous tubes. The two limbs of the preoperculum, equal to each other in length, meet at a right angle and inclose a broad and perfectly smooth cheek. In the dried fish the disk of the bone appears raised, and is edged irregularly with mucous prominences, but the under border of the bone is thin, and is scarcely distinguishable from the very thin, flexible interoperculum. At the temporal angle of the gill-plate there originates a bushy cluster of prominent ramifications, which disappear about the middle of the disk, and are most probably not visible at all in the recent fish. The rather narrow, very thin suboperculum is lengthened into the tip of the gill-cover, in which the flexible bone is scarcely to be distinguished from the membrane. The gill-opening is restricted above, the whole upper edge of the operculum being attached to the side of the head by membrane. Posteriorly and above the pectoral the gill-membrane is vertically truncated, and the gill-opening slopes from the level of the upper ray of that fin downwards and forwards till it terminates opposite to the angle of the preoperculum. A row of small scales exists on the suprascapular region, but there are no other scales, nor any bony or spinous points on the head.

The scales are cycloid and of smaller size than those of *Scarus*, there being forty-eight in a longitudinal row between the gill-opening





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PRESBYTES ALBIGENA Gray

and caudal ; seven rows above the lateral line anteriorly, and fourteen below it.

The scales are oblong, with parallel or converging sides, a truncated or rounded base and a rounded or conical free end. Fine striæ, from twelve to twenty in number, diverge from the centre towards the base, but do not produce lobes or crenatures on the margin ; there are some fainter diverging striæ anteriorly. The lateral line is arched over the pectoral, and afterwards descends gradually, till opposite the three last dorsal spines, from whence it holds a straight course down the middle of the tail and runs out to the middle of the caudal membrane. It is formed of a series of single straight tubes, and is nearly perfectly continuous, especially posteriorly.

The dorsal spines are slender, and end in soft flexible tips. The first spine stands over the base of the lowest pectoral ray, and is the tallest* ; the others gradually diminish in height to the penultimate one, which is a little shorter than the last one ; the soft rays are forked, and rise abruptly to nearly twice the height of the posterior spines. The anal, of similar height and shape to the soft dorsal, has its commencement and end a little posterior to those of the latter. The rather small ventrals are attached opposite to the third dorsal spine. The caudal is rather large, and is crescentic at the end with projecting points, of which the upper one is the longest.

In general colour the fish appears from Mr. Neill's figure to be blackish-green, deepening nearly to black on the back and dorsal fin. A deep prussian-blue streak covers the second pectoral ray, and there are two broader, interrupted ones on the caudal, viz. between the longest rays of the caudal above and below and the ray immediately interior to them. The iris is likewise blue, and there is a blue spot on the nostrils. These streaks are to be traced on the specimen, but have changed to green. The female differs in being much paler (a dull leek-green in the dried specimen), and in wanting the blue streaks. The lobes of its caudal also are less prolonged.

2. DESCRIPTION OF A NEW SPECIES OF MONKEY, RECENTLY LIVING IN THE SOCIETY'S MENAGERIE. BY JOHN EDWARD GRAY, ESQ., F.R.S. ETC.

(Mammalia, Pl. XVI.)

PRESBYTIS ALBIGENA. Grey-checked Presbytis.

Black ; throat, sides of the neck and front of the chest greyish ; face black, nearly bald, with a few short, rigid, black hairs on the lips ; a tuft of elongated rigid hairs over each eye ; the cheeks are covered with short, adpressed, greyish hairs. The hairs of the body are uniform black to the base, rather elongated and flaccid, forming a fringe along each side, and a compressed crest on the crown and

* The artist has inadvertently drawn the first dorsal ray a little shorter than the second one, not having noticed that its tip was bent backwards in the specimen put into his hands.

nape. The hands and feet are short; the fore-thumb is small, the hinder one rather large and broad.

Hab. West Africa?

This species is very like *Presbytis obscurus*, but it is blacker, and has no pale spot on the nape, and the hair of the body is much longer, more silky, and forms a compressed crest on the nape, which is quite wanting in *P. obscurus*.

It is more like *P. melalophus*, but differs from it in being black, and can scarcely be a black variety of that species.

SIR RODERICK MURCHISON exhibited the head of a fish belonging to the genus *Clarias*, from the river Limpopo, and a portion of the skull of *Phacochærus æthiopicus*, which had been collected by Capt. Vardon, during his recent travels in South Africa. The *Clarias* had been seen by Mr. Oswell, and identified by him as being a species also found in the river Zonga, which flows out of the newly discovered Lake. In directing the attention of the meeting to what may be regarded as the first indication which has reached us of the zoology of that most interesting region, Sir Roderick Murchison gave a summary of the knowledge already obtained by African explorers of the character of the country surrounding the Lake, and of the speculations in physical geography to which their discoveries have given rise.

Mr. R. C. Griffith exhibited some specimens of the "Tsetze," which had been entrusted to him for that purpose by Capt. Vardon. Sir Roderick Murchison having given some account of the supposed effects of the sting of this fly, Mr. Westwood undertook to describe the insect more particularly, as it appeared to be new to science, at a future meeting of the Society.

The Secretary exhibited some cocoons of a species of *Saturnia*, "the famous wild silk-worm from Leotang in Mantchouria," which had been transmitted to this country by Mr. Rutherford Alcock, Her Majesty's Vice-Consul at Shanghai, and obligingly presented to the Society by Dr. Lindley.

April 23, 1850.

R. H. Solly, Esq., F.R.S., in the Chair.

The Secretary reported that he had received a letter from Lord Harris, Governor of Trinidad, announcing his Excellency's intention of presenting some living animals from that island, and from Venezuela, to the Society.

The Secretary also stated that he had succeeded in purchasing for the Menagerie two healthy young specimens of *Phacochærus æthiopicus*, the Vlack Vark, from Port Natal. They are stated by the importer to be about fifteen months old. (Mammalia, Pl. XVII.)



Printed by Hollmanck & Walter

PHACOSCHYLUS PITHIÆCUS, JUV.

W. G. G. G. G. G.







M & N Haubart. Imp.

CERILLUS LITHI Bosc.

1850

The following papers were read:—

1. ON THE GARRULINE BIRDS, OR JAYS; WITH DESCRIPTIONS OF NEW SPECIES. BY CHARLES LUCIEN, PRINCE BONAPARTE.

(Aves, Pl. XVII.)

Having elevated the *Garruline Crows* to the rank of a full family, the forty-eighth of my Natural Classification of Birds, I now consider the family *Garrulidæ*, (including, besides the *Glaucopinæ*, *Baritinæ*, and the *Jays*, also the *Hopping Magpies*, notwithstanding their stronger bill and closer relation to the *Corvidæ*,) as formed of four different groups (subfamilies or great genera as you may call them, according to your notions, and you admit or not subgenera). And I say four, although I do not separate the Magpies from the Jays, but consider them as *Garruline*, because to the three old subfamilies, *Baritinæ*, *Glaucopinæ* and *Garrulinæ*, I now add a fourth, for the reception of a good many birds hitherto scattered in different families, whose affinity to the Jays, taken for mere analogy, is now clear and manifest to my eye. *Garrulax*, *Actinodura*, *Oriolia*, *Turnagra*, or rather *Otagon*, distinct from the much more *Garruline Keropia*, with those *Kittæ* which are not *Coraciinæ*, are all members of this my new group, to which (however enlarged) I give or rather preserve the name *Ptilorhynchinæ*, as it includes also *Chlamydera* and *Ptilorhynchus*, which in *Sturnidæ* were out of their place. But the object of the present paper is merely the enumeration of the genera and species of my *Garruline* subfamily.

The first that we meet, ending the *Ptilorhynchinæ* with *Keropia*, which may as well be the first of *Garrulinæ*, is the genus *Platylophus*, Sw., judiciously changed by G. R. Gray, 1840, into *Lophocitta*, hitherto composed of but one species from Java, to which I now add a second from Sumatra, introducing to you the bird called *Garrulus histrionicus* by Solomon Müller, struck in the native woods where he discovered it by its mimic gestures, whilst the skins he sent to the Leyden Museum suggested the name of *Garrulus rufulus*, Temminck, than which there can be no better for closet-naturalists. I introduce it thus in the Systema Naturæ.

LOPHOCITTA HISTRIONICA, Bp. *Minor: fusco-ferruginea; collaris nigro; maculâ utrinque colli magnâ, supraoculari parvâ, albâ.*

Synonyms.

Garrulus histrionicus, Müll.

Garrula rufula, Temm. Fig. nulla.

Hab. Sumatra; Borneo.

The old species will stand as follows:

LOPHOCITTA GALERICULATA, Gr. *Major: nigra; collaris nullo; maculâ utrinque colli magnâ, supraoculari parvâ, albâ.*

Synonyms.

Corvus galericulatus, Cuv.

Lanius scapulatus, Licht.

Lanius coronatus, *Raffles*; *Levaill. Hist. Nat. Parad.* t. 42.

Hab. Java.

The second genus of the family will be my *Perisoreus* or the *Dysornithia* of Swainson, a northern group composed also of two species only, both well known, the European and Asiatic *Perisoreus infaustus* and the American *Per. canadensis*; for *brachyrhynchus*, Sw., is the young of the latter; and as to *Garrulus ferrugineus*, Bechstein, we cannot think of admitting it as distinct, although sustained by Wagler; plate 48 of *Levaillant*, on which alone it is based, being much more like *Perisoreus infaustus* than the very plate 47 constantly quoted under that name.

Third comes the true *Garrulus*, peculiar to the Old World, composed of our common Jay with its five closely-allied (or mere races), and two other more distinct, though hardly less typical, species; one of which, the chief object of the present paper, is certainly by far the handsomest, if not at the same time the largest, resembling most, especially by the small, lanceolate, white-shafted feathers of its throat, with barbs still more disjuncted, *Garrulus lanceolatus* of Central Asia, so well figured by Gould in his 'Century of Himalayan Birds'; which may be appreciated also in its adult state under the name of *Garrulus gularis*, and in immature plumage under that of *Garrulus Vigorsi* among the 'Illustrations of Indian Zoology.' Our new species, notwithstanding its stouter and longer feet, its higher and much more compressed bill, and elongated square tail, can by no means be called aberrant.

(Aves, Pl. XVII.)

GARRULUS LIDTHI, Bp. *Rufo-vinaceus; capite colloque ex totis, alis, caudaque, saturatè azureis; fronte lorisque nigricantibus; plumis gulæ lanceolatis, barbulis disjunctis, rachidibus albis; tetricibus alarum nigro-fasciolatis: remigibus, rectricibusque apicem versus nigricantibus, apice ipso albo.*

Long. 13 poll.; rostr. $1\frac{1}{2}$ poll.; alæ 7 poll.; caudæ $5\frac{1}{2}$; tars. $1'' 8'''$.

Typicus; quamvis ad ACTINODURAM accedens simul et ad CYANOPICAS!

Rostrum albidum, altum, valde compressum: cauda elongata, æqualis.

Color azureus capitis et colli sensim in rufo-vinaceum dorsi et abdominis transiens.

Hab. The precise country of this Jay is not known; but Asiatic as it shows, and all circumstances induce us to believe, it must live in some very remote and unexplored occidental spot of China or Indo-China. The specimen described formed part of Baron van der Capellen's collection, purchased after the death of that Dutch governor of Malasia by Prof. van Lidth de Jeude of Utrecht. I detected it last week during a visit I paid to that most splendid perhaps of private collections with my learned friend Schlegel*.

* We had a double object in view in visiting Utrecht and the munificent Professor, to whom it is more justice than compliment to dedicate his new Jay: 1. Of admiring the only adult bird in collections of the Japanese Sea-Eagle (*Haliae-*

The tail alone, strongly rounded, would be sufficient to distinguish from our new species, and indeed from all others,

GARRULUS LANCEOLATUS, Vig. *Cano-vinaceus*: pileo genisque nigris: gula juguloque nigricantibus plumis lanceolatis, rachidibus albis: tectricum alarum minorum exterioribus candidis, corpori proximioribus nigerrimis absque fasciis: remigibus reatricibusque cæruleis nigro fasciolatis: cauda valde rotundata, apice alba.

Synonyms.

Garrulus gularis, J. Gr. *adult.*

Garrulus Vigorsi, J. Gr. *juv.*

Ill. Ind. Zool. i. t. 10 & t. 9.

Hab. in Asia centrali, Himalaja.

N.B. The small coverts which in all other Jays are blue banded, in this are plain black and white (bipartite); which latter colour on the contrary is wanting on the quills, beautifully striated blue and black as are the small coverts of the others.

The comparison with this last species was the only one necessary to establish; but, considering that no little difficulty is met with in discriminating the different European and Asiatic Jays, and what a confusion prevails among the synonyms of the remaining, which may be considered as six races of the same great species, I shall try to take advantage of my long experience, peculiar fancy for the group, and especially of the rich collection I now have at my command, in order to point out their discrepancies.

1. **GARRULUS GLANDARIUS**, Vieill. *Cinereo-vinaceus*, dorso orbitisque concoloribus: pileo albo-cinereo, plumis elongatis medio nigris: genis rufescentibus: gula juguloque albis: remigibus primariis extus basi albis; secundariis obsolete cæruleo-fasciolatis: reatricibus nigris subfasciolatis. Major: rostrum validum.

Synonym.

Corvus glandarius, L. &c.

Pl. Enl. 481; *Levaill. Parad.* t. 40, 41; *Gould, Eur.* t. 214.

Hab. Europ. s. occ. et m. ab Hispaniâ ad Græciam.

tus pelagicus, leucopterus aut *imperator*), whose monstrously powerful bill must really be *thunderstriking*! 2. Of ascertaining the supposed new species of *Microglossus*, of which you may have read in the 'Comptes Rendus' of the French Academy, and which I am delighted to say proves to be a specimen of the oldest known, more likely to get the second abolished than a third established. Schlegel (whose observations I shall always be happy to collect and profit by) declared that the two species of *Microglossi* will henceforth stand in precisely the same relation as the two *Coracopsis* (which he of course called *Vasa*) to each other. But even not considering that result of our investigation, our chief object would have become the least important, from the great variety of valuable and new animals we saw on all sides in the newly-built galleries and well-kept museum, especially among reptiles! And what can I say of the unique collection of fetuses? Even Englishmen could not help being amazed at seeing in the midst of other wonders, the ELEPHANT and HIPPOPOTAMUS bottled up in spirits!

NO. CCVI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

2. GARRULUS JAPONICUS, Schlegel. *Fusco-vinaceus, dorso concolore: pileo albo-cinereo, plumis elongatis maculis nigris expansis: orbitis, loris, remigibusque primariis basi externe nigris: secundariis cæruleo nigroque distincte fasciatis: rectricibus subunicoloribus.*

Synonym.

Garrulus glandarius, var. an nov. sp.? Patriæ ignotæ, *De Filippi, Cat. Mus. Mediolanens.* 1847, sp. 18; *Faun. Japonic. Av.* t. 43.

Hab. in Japan.

3. GARRULUS KRYNICKII, Kaleniczenko. *Cinereo-vinaceus, dorso orbitisque concoloribus: pileo nigro, plumis elongatis: cervice rufa: gula, genis, juguloque rufo-cinereis: remigibus secundariis unicoloribus: rectricibus mediis tantum fasciatis cærulescentibus ad basim. Major: rostrum robustum.*

Synonyms.

Corvus glandarius, var. pileo nigro, *Hohenacker, Enumeratio Anim. Schirwan, in Bullet. Soc. Nat. Mosc.* 1837, p. 141.

Garrulus Krynickii, *Kalenicz. Bull. Soc. Nat. Mosc.* 1839, p. 319. t. 14.

Garrulus iliceti, *Mus. Lugdun.*

Garrulus glandarius melanocephalus, *Schleg. Rev. Critiq. Ois. Eur. et Faun. Japon., et G. melanocephalus, Auct. quoad Av. Europ.! nec Bonelli; Susemihl, Eur. Vog.* 11. t. 6.

Hab. in Europa magis orientali et Asia occid. in Regionibus Caucasica et transcausica, Persia boreali, Crimea, Ukraina, Daouria.

4. GARRULUS MELANOCEPHALUS, Bonelli. *Cano-vinaceus, dorso orbitisque concoloribus; pileo nigro, plumis vix elongatis: cervice rufo-castanea: gula, genisque albis: subtus albido-cinereus: cæruleo alarum dilutiore, minus extenso: remigibus secundariis unicoloribus: rectricibus mediis omnino cæruleo-fasciatis. Minor: rostrum gracilius.*

Synonyms.

Garrulus atricapillus, *Geoffr.* 1832.

Garrulus iliceti, *Mus. Berolin.*

Pica stridens, Ehrenb.; Géné, Mem. Acad. Taur. xxxvii. t. 1; *Levaill. jun. Exp. Alger. Av.* t. 6.

Hab. in Africa s. Syria, Arabia.

5. GARRULUS BRANDTI, Eversm. *Vinaceo-rufus, dorso cano; orbitis nigris: abdomine cinnamomeo canescente: pileo rufo-cinnamomeo, plumis elongatis, vix maculato: remigibus secundariis externe candidis: rectricibus ad basin tantum obsolete fasciatis.*

Synonym.

Garrulus Brandti, *Hartl. Rev. Zool.* 1845; *Schleg. in Faun. Japon.* p. 83; *Brandt, Enum. Anim. Vert. Sib. Occ.* p. 25. sp. 104.

Hab. in Sibiria occid. et centr. Mont. Altai.

6. GARRULUS BISPECULARIS, Vig. *Cinereo-cinnamomeus, dorso*

orbitisque concoloribus : pileo immaculato, plumis vix elongatis : remigibus secundariis (uti tectrices minores) nigro caruleoque fasciolatis.

Synonyms.

Garrulus ornatus, *J. Gr. Ill. Ind. Zool.* t. 10.

Garrulus bispecularis, *Gould, Cent. Himal. B.* t. 38.

Hab. in Asia Centrali, Nepal. Mont. Himalay.

N.B.—I do not know *Garrulus albifrons*, figured by J. Gray on plate 12 of the second volume of Hardwicke, *Ind. Zool. Ill.*, but notwithstanding the authority of Hartlaub, judging as he does from the figure, I have no hesitation in declaring it is not a Jay.

The fourth genus of my *Garruline* subfamily is *Cyanogarrulus*, Bp., a North American group, dismembered from *Cyanocorax*, Boie, for the distinction of the Blue true Jays with shorter bills, short-tailed and crested, much more allied to the European *Garruli* than to the South American *Cyanocoraces*. Three species are known: *cristatus*, L., *Stelleri*, Pall., and *coronatus*, Sw.

Not professing Mr. Strickland's principles as to the appropriation of names, we borrow from him the classical one *Cyanocitta* for a fifth group, still composed of a dozen species of both Americas, such as *flavidanus*, *ultramarinus*, &c., of which genus we shall say no more on this occasion, in hopes that such elegant birds tinged with blue will shortly make their appearance in a peculiar monograph published in the same style and with the same joint authorship as the monograph of those birds tinged with red, the *Loxiinæ*, just ready to appear by the exertions of Dr. Schlegel and myself.

A sixth genus will necessarily be the one to which I restrict Boie's name of *Cyanocorax*, because even by their size and less brilliant colours they are really Blue Crows, such as *C. azureus* and *violaceus*, which latter, even by its nuchal ornament (beautiful ornamental spot), shows a passage on one side to *C. ornatus*, (which with the other smaller elegant species, such as *armillatus*, have again a tendency to the Jays;) and on the other, by *C. cayanus*, to the white-tailed species, much more crow-like, and which five, as they are, might constitute the group *Uroleuca*.

Then comes seventh, with its yellow tail, my new genus *Xanthura*, composed of three South American birds formed and coloured as *Corvus peruvianus*, one of which exhibits also the elegant nuchal spot which so much contributes to show the South American birds connected. The last of *Cyanocorax* must be the *Sanblasiana*, so abnormal as to deserve perhaps the generic appellation of *Cissilopha*. More than ever convinced of the propriety of using old names for modified groups, I persist of course in retaining that of *Cyanurus*, Swainsonian synonym of *Cyanocorax*, but recalling attention to the tail, for the Long-tailed Blue Jays with black bills: of these, two undescribed species appear to live in the far east of Asia, quite as beautiful as the two celebrated ones of occidental America, upon which so many names have been lavished:

1. **CYANURUS BULLOCKI**, Bp. *Cyaneus, subtus albus : gula, genis, pectoreque nigris : crista frontali parva : reatricibus duabus mediis mirifice elongatis, lateralibus apice latissime albis.*

Synonyms.

Pica Bullocki, *Wagl.* 1827.
Pica miles, *Licht.*
Pica formosa, *Sw.*
Garrula gubernatrix, *Temm. Pl. Col.* 436.
Psilorhinus gubernatrix, *Gr.*
Hab. in Mexico.

2. **CYANURUS COLLIEI**, Bp. *Cyaneus, subtus cum genis albus ; torque jugulari nigro : crista sincipitali magna : reatricibus mediis modice elongatis ; lateralibus apice latissimis albis.*

Synonyms.

Garrulus bullocki, *Aud. nec Wagl.*
Psilorhinus bullocki, *Gr.*
Pica Collieri, *Vig. Zool. Beechey's Voy.* f. 7.
Garrulus Burneti (err. *bernetti*, *berneti* and *bennetti*), *J. Gr.*
Garrulus ultramarinus, *Aud. nec Bp. Am. B.* t. 96.
Hab. in California.

3. **CYANURUS DAIRI**, Bp. *Cyaneus, subtus omnino albus : crista occipitali longa ; reatricibus mediis valde elongatis ; omnibus apice nigris.*

Hab. in Asia magis orientali, *Corea.*

4. **CYANURUS CUBO**, Bp. *Cyaneus, subtus antice niger : crista nulla : reatricibus mediis valde elongatis ; omnibus apice albis.*

Synonym.

San-zjak, *Japonens.* (which name applies also to the red-billed *Calocitta sinensis*).

Hab. in Asia magis orientali, *Corea.*

Naturalists acquainted with the two American species will see, independently of these phrases, how much more strongly the characters contrast between my two new Asiatic species than between the old American ones, although in some aspects they may be considered to bear to each other the same relations. At all events that I should be excused, if not justified, my Chinese *Black-billed Cyanuri* must on every account be followed and supported by Schlegel's own genus *Biophorus* and by its only species *Biophorus paradisiacus* of the Fauna Japonica, Av. Suppl. tab. B. Of this splendid bird also the portrait only has yet reached Europe, taken by a Japanese artist from the living bird under the eye of the celebrated Siebold, who is warrant of its correctness.

The next genus will be that of the *red-billed, long-tailed, Blue Magpies*, to which I give the name of *Calocitta*, not being able to apply to the group any older than that given to it by my friend Gray

in 1840, though since withdrawn when he had the untoward idea of making the most unnatural amalgamation of *Garrulinae* under his arrangement of *Psilorhinus*! Those who call it *Cissa* are evidently wrong. I know three Indian species, nor do I believe in many more, at least among the described. *Psilorhinus morio*, *fuliginosus* or *mexicanus*, therefore, would have to stand alone, as Rüppel probably intended it when he instituted the genus (excellent if not adulterated), if we had not from Chili a smaller new species as typical as the old one (*Psilorhinus chilensis*, Bp.).

Still less than the other intruders can *Gymnorhinus cyanocephalus*, Wied, be forced into it, as the name alone ought to have taught. That name, however, was preoccupied, when, in 1840, the Prince of Neuwied proposed it for his new genus: and it was very reluctantly, and after requesting in vain the author to change it himself, that I was compelled in 1842 to make it *Cyanocephalus*, calling the bird *Cyanocephalus Wiedi*, as a small compensation and a testimony of personal regard to the author, with whom I have long corresponded and prosecuted all kinds of satisfactory scientific affairs. Now, in 1850, he requests me to take his new name of *Gymnokitta*, and I most willingly adopt it, hoping that all ornithologists will make an exception to the rule of priority in this very peculiar case, in which, after all, the Prince of Wied claims his own genus with a better name.

Intermediate between *Garrulus* and *Pica*, we come now to my *Cyanopica*, a genus of *Blue Magpies* about which some English journalists have *chattered* like *pie* (or rather *paid*) Magpies! I subjoin here the phrases of its three species, that of Vaillant, Pallas, and Capt. Cook, now Widdrington (so closely allied as to be taken for three races of but one species), to show they are really distinct, although the characters hitherto assigned to them by the most clever and accurate naturalists may have proved inconstant and fallacious.

1. CYANOPICA MELANOCEPHALA, Bp. *Capite subcristato, ex toto cum gula nigro: dorso cærulescenti: reatricibus omnibus albo terminatis.*

Synonyms.

Corvus cyaneus, Lath., Vieill.

Pica melanocephalus, Wagl.

Cyanopica Vaillanti, Bp. in litt.; *Levaillant*, Ois. Afr. t. 58.

Hab. in China.

2. CYANOPICA CYANEA, Bp. *Capite lævi, supra tantum nigro-chalybæo: dorso cinereo-vinaceo, nucha vix canescente: reatricibus lateralibus apice tantum albis, mediis valde elongatis late albo terminatis.*

Synonyms.

Corvus cyaneus, Pall.

Pica cyanea, Wagl., Schleg.

Cyanopica Pallasi, Bp. in litt.; *Faun. Japon.* t. 42.

Hab. in Asia orientali, Daouria, Japan.

3. *CYANOPICA COOKI*, Bp. *Capite lævi, supra tantum nigro-chalybæo: dorso cano-rubello, nucha albicante: rectricibus lateralibus late albo terminatis, mediis modice elongatis vix apice albis.*

Synonyms.

Pica cyanea, Cook.

Pie bleue d'Europe, Schlegel (*Cyanopica europæa*).

Cyanopolus Cooki, Bp. *Brit. Assoc. Birmingham*. 1849; Gould, *Eur.* t. 217; Susemihl, *Eur. Vog. t.*

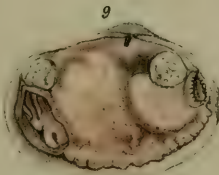
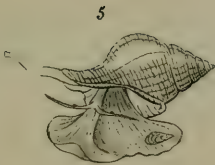
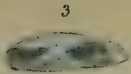
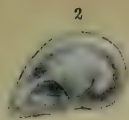
Hab. in Eur. mer. Hispania.

We are thus arrived to the genus *Pica*, Br., or true Magpie (*the pied long-tailed*), which, as we observed from the beginning, must close the *Garruline* series, which it connects with the *Corvidæ*, showing as much affinity to those larger Crows as the first of the Jays do to the smaller Shrikes or *Laniidæ*. Of such Magpies we know eight species perfectly typical and quite close to each other, whilst two birds still allowed to remain in it are abnormal, each deserving of a genus by itself: to both these birds, however different in form and colour, the name of *Corvus caledonicus* has been applied, one of which is the slender-billed, more jay-like *Pica albicollis*, Vieill., *Garrula torquata* of the 'Pl. Col.' of Temminck, to which the generic name of *Streptocitta* might be applied; whilst I propose that the name of *Gazola* (so congenial in this our family), applied to the legitimate *Corvus caledonicus*, should honour the person and perpetuate the martyrdom of a highly refined and scientific ecclesiastical friend of humanity, the lost victim of clerical machinations!

2. MONOGRAPH OF SPHENIA, A GENUS OF LAMELLIBRANCHIATE MOLLUSCA. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. X.)

In the unrivalled Collection of Mr. Cuming is a group of Bivalve shells, which appear to be neither *Mya* nor *Corbula*, but partaking of the characters of each. The animal, which is also preserved in spirits, resembles that of *Corbula* in having short united siphons, a small compressed foot, and in the mantle being closed, with the exception of an anterior elliptic opening; the shells, however, have the hinge of *Mya*, but do not gape at both extremities. The only genus, therefore, into which they resolve themselves is *Sphenia* of Turton, which, with the hinge of *Mya*, gapes only at one end, and which moreover is deprived of a long coriaceous siphon. Mr. Hanley has published one species in the 'Zoological Proceedings,' under the name of *Mya semistriata*, and M. Deshayes another, under that of *Corbula decussata*, in the 'Magazin de Zoologie,' 1844, and I had described a third, under the name of *Sphenia Mindorensis*, in the 'Zoology of the Voyage of H.M.S. Samarang;' and to these I now add several other large exotic species collected by Mr. Cuming.





SPHÆNIA, Turton.

Animal ovatum; pallium anticè clausum, præter aperturam pro pede parvo digitiformi sulco byssali instructo; siphones con-nati usque ad extremitates, orificia cirrata; siphon analis val-vulâ tubulari membranacè extra orificium productâ.

Testa oblonga, inæquivalva, inæquilateralis, magis minusve posticè hians; lævis, vel rugosa, epidermide tecta; umbones incurvati; cardo dente laminari dilatato erecto in valvulâ sinistrâ, alveo convenienti in valvulâ dextrâ; ligamentum internum; impres-siones pallii sinu parvo.

Animal ovate; mantle closed in front, except an opening for the passage of a small digitiform foot furnished with a byssal groove; siphons united to their extremities, their orifices cirrated; anal siphon with a tubular membranous valve projecting beyond the orifice.

Shell oblong, inequivalve, inequilateral, more or less gaping poste-riorly; surface of the valves smooth or rugose, covered with an epi-dermis; beaks incurved; hinge composed of an erect, dilated, laminar tooth in one valve, with a corresponding pit in the other; ligament internal; pallial impression with a slight sinuation.

SPHÆNIA BINGHAMI, Turton. *S. testâ inæquivalvâ, inæquila-terali, ovato-trigonalì, transversim concentricè sulcatâ, epider-mide olivaceo tectâ; latere antico breviorè, rotundato, postico longiorè, hiantè, subtruncato; impressione pallii sinu subpro-fundo, rotundato; dente cardinis valvulæ sinistræ posticè sub-sinuato.*

Hab. in littoribus Britannicis.

Shell inequivalve, inequilateral, ovately trigonal, transversely con-centrically sulcated, covered with an olivaceous epidermis; anterior side shortest, rounded, posterior side longest, gaping, subtruncate; sinus of pallial impression rather deep and rounded; tooth of left valve posteriorly sinuated.

Hab. British islands.

SPHÆNIA DECUSSATA, Deshayes, sp. *S. testâ ovato-oblongâ, sub-æquilaterali, posticè truncatâ, subrostratâ, rostro basique ob-liquè carinatâ, albâ, striis longitudinalibus, transversisque tenuissimè decussatâ; umbonibus magnis, oppositis; dente car-dinali magno, obliquo, compresso in valvâ sinistrâ, in valvâ dextrâ foveolâ profundâ, marginatâ.*

Hab. in Sumatræ maribus.

Shell ovately-oblong, subequilateral, posteriorly truncated, sub-rostrate, beak and base obliquely carinated, white, very finely decus-sated with longitudinal and transverse striæ; umbones large, oppo-site; cardinal tooth large, oblique, compressed in the left valve, in the right valve a deep marginated pit.

Hab. Seas of Sumatra.

SPHÆNIA SEMISTRATA, Hanley, sp. *S. testâ albâ, transversâ, ovali, inæquilaterali, concentricè striatâ; latere antico breviorè,*

valdè convexo, lævi; postico longiore, angustiore, truncato, radiatim striato; margine ventrali in medio sinuoso, posticè angulato, anticè rotundato.

Hab. —?

Shell white, transverse, oval, inequilateral, concentrically striated; anterior side shortest, very convex, smooth; posterior side the longest, narrower, truncated and radiately striated; ventral margin sinuated in the middle, angulated posteriorly, rounded anteriorly.

Hab. —?

This species have sculpture similar to *Sp. princeps*, but the valves are more gibbous, especially at the anterior part; the shell is much thinner, and the general outline different.

Mya semistriata, Hanley, *Zool. Proc.* 1843.

SPHENIA PRINCEPS, Adams. *S. testá magná, albá, transversá, ovali, inequilaterali, concentricè striatá; latere antico, longiore, rotundato, lævi; postico breviorè, angustato, subtruncato, radiatim sulcatá; margine ventrali arcuato, integro; impressione palliali vix sinuatá; dente cardinis emarginato.*

Hab. in insulis Philippinis.

Shell large, white, transverse, oval, inequilateral, concentrically transversely striated; anterior side longest, rounded and smooth; posterior side shortest, narrow, subtruncated and radiately sulcated; ventral margin arcuated and entire; pallial impression with a slight sinus; hinge with the edge of the cardinal tooth of the left valve emarginate.

Hab. Philippine Islands; *H. C.* (Mus. Cuming.)

SPHENIA ELLIPTICA, Adams. *S. testá transversá, ovali, subæquilaterali, albá, fragili, utrinque rotundatá, epidermide tenui partim obtectá, concentricè striatá; latere antico lævi, postico radiatim striato; impressione pallii vix sinuatá; dente cardinis sæpe valdè anticè fisso.*

Hab. in Australasiâ.

Shell transverse, oval, subequilateral, white, fragile, rounded at both ends, partially covered with a slight epidermis, concentrically striated; anterior side smooth, posterior side radiately sulcated; sinus of pallial impression very shallow; hinge with the tooth of the left valve often deeply fissured anteriorly so as to exhibit an apparent distinct anterior tooth.

Hab. Sydney, 4 fathoms, mud; *Mr. F. Strange.* (Mus. Cuming.)
Mus. Hanley.

SPHENIA DECURTATA, Adams. *S. testá transversá, ovali, subæquilaterali, albá, concentricè transversim sulcatá; longitudinalliter tenuissimè radiatim striatá; anticè latiorè, rotundatá, posticè angustatá, angulatá, abruptè truncatá; margine ventrali arcuato, integro; impressione pallii sinu parvo; dente cardinis anticè valdè fisso.*

Hab. in insulis Philippinis.

Shell transverse, oval, subequilateral, white, transversely concentri-





Wolff'sel. lith.

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THYLACINUS CYNOCEPHALUS. JUV.

cally sulcated; longitudinally very finely radiately striated; anteriorly rounded and wider, posteriorly narrower, angulated and abruptly truncated; ventral margin arched, entire; pallial impression with a small sinus; hinge with the tooth of the left valve deeply fissured anteriorly.

Hab. Catanuan, province of Tayabas, island of Luzon, in sand at low water; *H. C.* (Mus. Cuming.)

SPHÆNIA PHILIPPINARUM, Adams. *S. testâ ovali, transversâ, subinæquivalvâ, albâ, tenui, ventricosâ, inæquilaterali; latere antico longiore, rotundato, lævi; postico breviorè, radiatim striato, vix truncato; epidermide fusco tenui tectâ; margine ventrali interdum subsinuato; impressione palliali sinu parvo; dente carinis valvulæ sinistræ trilobato.*

Hab. in insulis Philippinis.

Shell oval, transverse, slightly inequivalve, thin, white, ventricose, inequilateral; anterior side longest, rounded, smooth; posterior side shortest, radiately striated, slightly truncated and covered with a very thin brown epidermis; ventral margin sometimes slightly sinuated; pallial impression with a small sinus; hinge with the cardinal tooth of the left valve trilobate. (Mollusca, Pl. X. fig. 7—9.)

Hab. Sibunga, island of Zebu, fine sand, 30 fathoms; *H. C.* Bay of Manila, clayey sand, 6 fathoms; *H. C.* (Mus. Cuming.)

SPHÆNIA RÜPPELLII, Adams. *S. testâ transverso-elongatâ, transversè striatâ, epidermide fusco tectâ; latere antico breviorè, rotundato, gibboso, obsoletè radiatim striato; postico longiorè, angustiorè, subrostrato, truncato; dente carinis valvulæ sinistræ subsinuato.*

Hab. in Mari Rubro.

Shell transversely elongated, covered with a reddish-brown epidermis, transversely striated; anterior side the shortest, rounded, gibbose, obsoletely radiately striated; posterior side narrower, rather beaked, widely gaping and truncate; tooth of left valve slightly sinuated.

Hab. Red Sea; *Dr. Rüppell.*

SPHÆNIA MINDORENSIS, Adams and Reeve.
Voy. Zool. Samarang, t. 23. f. 13. (as mya)

May 14, 1850.

William Yarrell, Esq., V.P., in the Chair.

The Secretary stated that, through the liberality of Ronald Gunn, Esq., and Dr. Grant, of Launceston, the Menagerie had been enriched by the safe arrival of two living specimens of *Thylacinus cynocephalus* (Mammalia, Pl. XVIII.): and he read the following letter in reference to this most valuable and interesting gift, which has

added one of the rarest and most difficult forms to the series of Marsupials which have hitherto been exhibited in the Gardens:—

“Launceston, Van Diemen’s Land, 29th December, 1849.

“SIR,—I have shipped on board the barque *Stirlingshire*, Chris^t. Gwatkin, master, two living Thylacines (male and female) for the Zoological Society of London, and which I trust will reach you alive and well. Captain Gwatkin, whom I have known for some years, has promised his utmost personal care and attention to them during the passage home. I have put on board twelve fat sheep (together with hay for their sustenance) as sea-stores for the Thylacines, and have made every arrangement I could think of to ensure their safe arrival in London.

“I have had the female in confinement for upwards of six months, and it has become sufficiently tame to permit its head to be scratched, or to be otherwise touched through the bars of its prison, without showing any anger or irritation. The male, for which the Society is indebted to my friend Dr. James Grant of Launceston, was only caught a month ago. We placed it at once with the female, with which it seems upon the best of terms, but it is not yet so familiar with the presence of man. I have purposely kept their cage close to the side of a path where many of my servants pass daily, and where my children are in the habit of playing, and I find that beyond a hissing noise made by the *male*, they do not seem at all disturbed by any one going close to them.

“I have fed them exclusively upon mutton. They prefer the parts containing bones, and do not seem to relish the liver, heart, lights, &c.

“Both these animals have been caught in snares upon the upper part of the St. Patrick’s River, about thirty miles N.E. of Launceston.

“The female, which was first caught, was placed for some time in a small unfinished house at the St. Patrick’s until I could devise means of getting her down here; and when I sent a trustworthy person up for her, he assured me that she was excessively agile—springing from the floor to the top of the walls, 6 to 8 feet, and from joist to joist near the roof with the activity of a cat. He also informed me that the Thylacine will not eat the *Wombat*, an animal exceedingly abundant on the St. Patrick’s River, and with which they attempted to feed it during the month it was there, previous to my having it brought down to my residence. Otherwise I have not had any great opportunity of observing any peculiar habits.

“Both Dr. Grant and I continue to offer high rewards for living specimens, and you shall have all the benefit of our success, whatever it may be. The great increase of sheep in all directions obliges the shepherds to destroy them by every possible means, and they are rarely caught alive, or if so caught, are killed whilst in the snares. I am therefore more than usually anxious that these should reach you safely, and I have offered the Captain a proportionate reward for their delivery alive.



“ An observation of mine, contained in a letter to Sir W. Hooker, and which was not meant for publication, has been misunderstood, and has led to the propagation of error—for which I am very sorry. In it I said the Thylacine’s tail was *not compressed*—in reference to an observation of Mr. Swainson’s in the ‘Encyclopædia of Geography’ (then recently published), that the tail of the Thylacine was compressed, *which suggested the supposition that it was used in swimming*, &c. It was to the latter part of this observation that my remarks were particularly applied (vide Annals of Nat. Hist. vol. i. p. 101–2), and I meant that the tail was not compressed to such an extent as to have justified the inference that it was useful in swimming; and thus that the animal obtained its food principally from the sea, which the paragraph in the ‘Encyclopædia of Geography’ implied. The tail is obviously slightly compressed, but not, I think, more so than the tails of the Dasyures, to which aquatic habits are not attributed. In writing hurriedly—and not for publication—I did not express myself with the precision I ought to have done. I mainly wished to point out that the tail would not justify the inference of Mr. Swainson (which I thought very far strained), that the animal was aquatic in its habits and piscivorous. Pray set me right whenever you have an opportunity.

“ I beg to remain, Sir, yours very faithfully,

“ RONALD C. GUNN.”

“ *D. W. Mitchell, Esq., Secretary Zoological Society.*”

The Secretary then called the attention of the meeting to three eggs of the Wedge-tailed Eagle of Australia, *Aquila audax*, Lath., which had been recently laid in the Menagerie (Aves, Pl. XIX.), and which were probably the only perfect specimens yet known. The same female had produced two eggs in the spring of 1849, but they were immediately destroyed either by herself or the male, as fragments only were discovered by the keeper.

The following papers were read:—

1. DESCRIPTIONS OF NEW BIRDS. BY J. GOULD, F.R.S. &c. &c.
(Aves, Pl. XX.)

It is no less interesting than true, that during the past two years we have had accessions in ornithology of no ordinary value; comprising as they do additional species of several anomalous forms, of each of which only one was previously known; for instance, we have a second species of the genera *Apteryx*, *Menura*, and *Ptiloris*. On the present occasion I have the good fortune to offer to the notice of this Meeting new species of two forms, equal in interest to those above referred to, viz. that of *Cephalopterus*, a form known to all as being American, and of which the type is the remarkable species *Cephalopterus ornatus*, commonly called the Umbrella Bird. The discovery of a second species of this form is due to the researches of M. Warzewickz, a gentleman who has just returned from Central America, after trav-

sing parts of that country hitherto untrodden by Europeans: it was in the high Cordillera of Chiriqué in Veragua, at an elevation of 8000 feet, that this bird was found, and of which the individual now exhibited was the only one procured.

CEPHALOPTERUS GLABRICOLLIS. (Aves, Pl. XX.)

This new species differs in many particulars from its congener, particularly in its smaller size, in the lesser development of its umbrella-like hood, and in its denuded fore-neck and chest, and in the absence of feathers on the base of the tab or appendage at the basal part of the neck. M. Warzewickz describes the bare part of the neck to be reddish orange, and the bare base of the tab as bright red. This fine bird forms part of the collection of T. B. Wilson, Esq., of Philadelphia.

Independently of the novelty just described, M. Warzewickz brought me six species of Humming Birds entirely new to science; these, with some other new species of the same group, I propose to characterize at a future meeting.

By Lord Gifford, who has recently returned from a journey in Thibet, ornithology has been enriched by the discovery of a new species of *Syrnhaptēs*, a form as extraordinary in its way as that of any of those above noticed; the new species is finer both in size and colouring than the *Syrnhaptēs paradoxus*; it was shot on the banks of the Stumererri Lake, where two examples were seen, but unfortunately only one was procured; it appears to be an adult male, for which I propose the name of

SYRRHAPTES TIBETANUS.

Face hoary; front and sides of the neck ochreous yellow; feathers of the head and nape brown at the base, and alternately barred at the tip with black and white; upper part of the back, front and sides of the breast buffy white, crossed by narrow irregular bars of blackish brown; all the upper surface and wings buff, pencilled all over with dark brown, the pencillings being conspicuous on the back, and so minute on the wings as to be almost imperceptible; scapularies largely blotched on their inner webs with black; primaries and secondaries slaty black, the fourth, fifth, sixth, seventh and eighth primaries with an oblique mark of brownish white at the tip; basal half of the two centre tail-feathers buff, pencilled with brown, their apical half narrow, filamentous and black; lateral tail-feathers sandy red, crossed by three widely placed irregular bands of black, and tipped with buffy white; under surface buffy white, minutely pencilled on the breast with brown; legs of the same hue, but the feathers banded with faint bars of brown; bill and nails black.

Total length, $15\frac{1}{2}$ inches; bill, $\frac{5}{8}$; wing, 10; tail, $7\frac{1}{2}$; tarsi, 1.

Hab. Ladakh in Thibet.

Remark. Distinguished from the *S. paradoxus* by its much larger size, by the primaries not being extended into the filamentous form so remarkable in that species, and by the absence of any black colouring on the breast.



Del. J. S. Silliman

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CEPHALOPTERUS GLABRICOLLIS Gould.

The only example which has come under my notice is in the possession of the Rt. Hon. the Lord Gifford, to whom I am indebted for permission to include a figure of it in my work on the 'Birds of Asia.'

Extraordinary as have been the new species discovered during the last few years, of that remarkable group the *Ramphastidæ*, no one is more singular than the bird which I now submit to the notice of the Meeting; it may be regarded as an evidence that all the members of the group are not yet known to us, and that the productions of the rich forests of the Cordillerian Andes appear to be inexhaustible. It had long been my intention to propose a generic name for the Andean group of Toucans, characterized by the dense villose clothing of the under surface, the colouring of which is of a uniform tint, instead of being crossed by bars of black, red and yellow as in the typical *Pteroglossi*; and at no moment could such a step be more appropriately taken than at the present, when characterizing a new species of this section, for which, indicative of the country in which the members are found, I propose the generic term of *Andigena*, and for the new species, *A. laminirostris*; the other species pertaining to this genus are *A. hypoglaucus*, *A. nigrirostris*, *A. cucullatus*, and *A. Bailloni*. The new species *A. laminirostris*, which is distinguished by the yellow laminae near the base of the upper mandible, is the property of Dr. T. B. Wilson of Philadelphia, to whom and to his brother, E. Wilson, Esq., I am indebted for permission to describe this fine bird; the native habitat of which is the forests at the base of Pichincha, a high mountain of Ecuador.

GENUS ANDIGENA.

Gen. Char.—Bill stout, swollen, and moderately large when compared with the bill of the true *Pteroglossi*; wings and tail very similar to those of *Aulacorhynchus*. General plumage long, loose, and hair-like.

The species belonging to this genus are—

Andigena hypoglaucus (*Pteroglossus hypoglaucus*, Gould).

— *cucullatus* (*Pteroglossus cucullatus*, Gould).

— *nigrirostris* (*Pteroglossus nigrirostris*, Waterh.).

— *laminirostris*, Gould.

— *Bailloni* (*Pteroglossus Bailloni*, Wagl.).

All are characterized by a uniform wash of colour on the under surface, in lieu of the bars of rich red and black so conspicuous in the true *Pteroglossi*.

ANDIGENA LAMINIROSTRIS.

Crown of the head and back of the neck deep black; upper surface golden brown; primaries black; rump pale sulphur-yellow; upper tail-coverts very dark green; tail dark slaty grey, four central feathers largely tipped with chestnut-red; under surface ashy blue; on either flank a large patch of rich yellow; thighs deep chestnut; under tail-coverts blood-red; orbits apparently orange; culmen and apical half of both mandibles black; a broad band on the base of

the upper mandible and the basal half of the lower mandible deep blood-red; on either side of the upper mandible, immediately in front of the blood-red basal band, is a large buff-coloured plate or lamina, continuous with the structure of the bill at its base, but separate and detached in front, thin on its upper edge, but thicker and projecting beyond the edge of the mandible below; feet slaty blue.

Total length, 18 inches; bill, $3\frac{3}{8}$; wing, $6\frac{3}{4}$; tail, $6\frac{3}{4}$; tarsi, $1\frac{1}{2}$.

Hab. Neighbourhood of Quito.

Remark. The only example I have seen belongs to the collection of T. B. Wilson, Esq., of Philadelphia, and which has been kindly lent to me by his brother Edward Wilson, Esq., to enrich my Monograph of the *Ramphastidæ*.

Equally inexhaustible appear to be the Odontophorinæ or Partridges of America, for in the rich Museum of Leyden, I lately found a species which was previously unknown to me; it pertains to the genus *Odontophorus*, and I propose for it the name of *Odontophorus Columbianus*.

ODONTOPHORUS COLUMBIANUS.

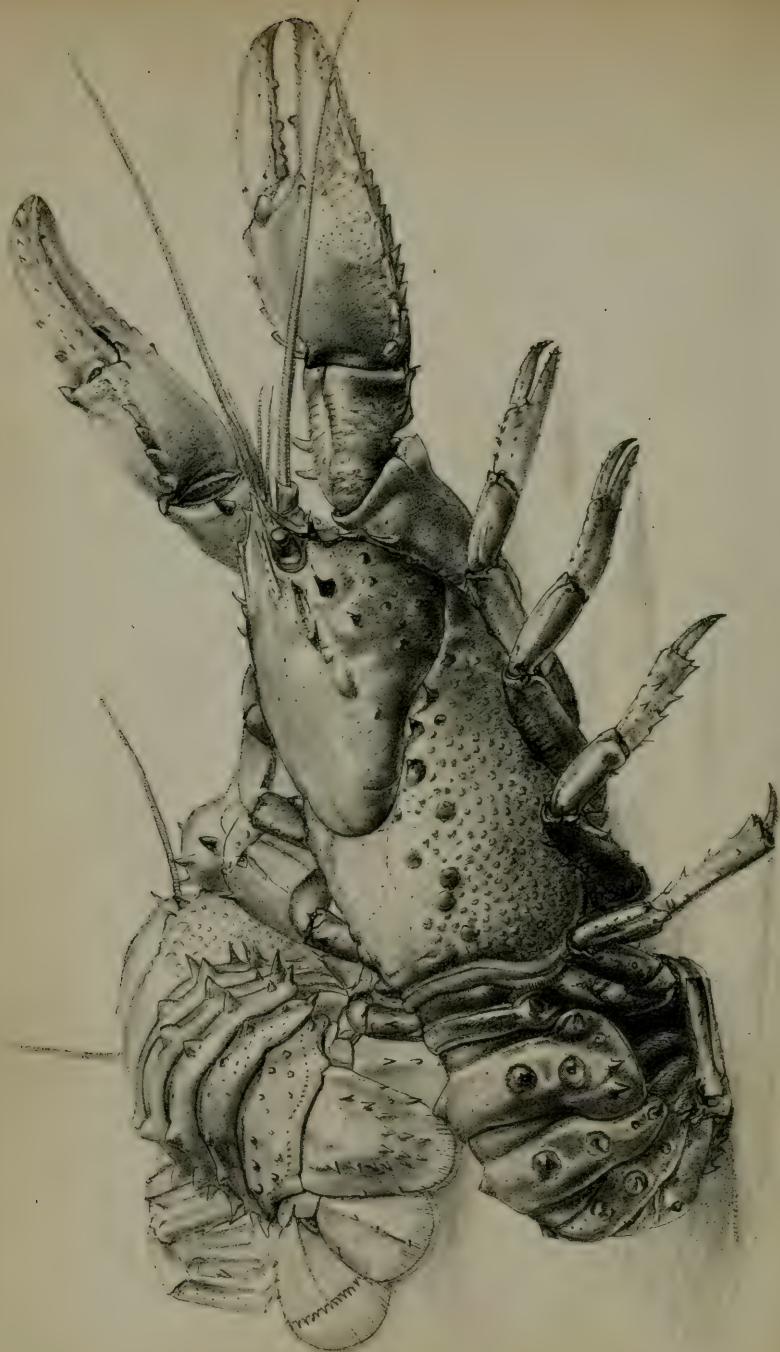
Crown of the head brown, minutely freckled with black; back of the neck washed with rufous; over each eye an indistinct mottled stripe; throat white, irregularly spotted, especially on the sides, with black; upper surface brown, washed with grey on the centre of the feathers, each of which is delicately pencilled with black, and has a narrow stripe of buff, bounded on each side by a narrower one of black, down the centre; those of the scapularies and wing-coverts have moreover a large patch of rich dark brown on the inner web near the tip, bounded above by two narrow lines, one of buff, the other of dark brown; primaries brown; secondaries brown, freckled and barred with dark brown, and washed with rufous; tertiaries brown, washed with grey and rufous, freckled with black, having a broad V-shaped mark of black near the tip, and broadly margined and tipped internally with deep buff; under surface reddish brown, each feather with a large irregularly-shaped mark of white margined with black near the tip; under tail-coverts, and vent mottled reddish brown and sandy buff; bill black; feet lead-colour.

Total length, 11 inches; bill, 1; wing, $5\frac{3}{4}$; tail, $2\frac{3}{4}$; tarsi, 2; middle toe and nail, $2\frac{1}{4}$.

Hab. Caraccas.

Remark.—The fine specimen gracing the Museum at Leyden was transmitted by M. Landsberger, Netherlands Consul at Caraccas. There is also another specimen, from, I believe, the same locality, which differs in having the under surface of a nearly uniform greyish brown, with here and there a few of the white marks so conspicuous in the bird above described; it is also of a somewhat smaller size, but notwithstanding these differences, the two birds appear to be one and the same species.

The *O. Columbianus* has a stouter bill, and is of a larger size than *O. dentatus*, but is smaller than *O. Balliviani*, to which it is most nearly allied.



POTAMOBIVS SERRATUS.

Leaving America and India, and proceeding to Australia, I return to a country which has so long engaged my attention, to characterize a new genus of small creeping Insectorial Birds, nearly allied to the genera *Hylacola* and *Dasyornis*, under the name of *Pycnoptilus*, of which at present only a single specimen is known, and to which I beg to assign the specific name of *floccosa*; it is from New South Wales and the country towards the river Darling.

Genus PYCNOPTILUS.

Gen. Char.—Bill much shorter than the head; gonyes and culmen gradually descending; upper mandible notched at the tip; *nostrils* covered with a distinct operculum; base of the bill beset with very fine feeble hairs; *wings* very short, round and concave, the sixth primary the longest; *tail* short, rounded, feathers very broad and of a soft texture; *tarsi* strong, and somewhat lengthened compared with the size of the bird; hind-toe strong, and armed with a rather long claw; fore toes and nails rather feeble, the outer and inner toes of equal length; plumage dense, lengthened and silky, especially on the flanks.

PYCNOPTILUS FLOCCOSUS.

All the upper surface, wings and tail rich brown; throat and breast sandy buff, the feathers of the latter with a crescent of brown near the tip; remainder of the under surface brown, approaching to white on the centre of the abdomen; under tail-coverts rusty red; bill and feet dark brown.

Total length, $6\frac{3}{4}$ inches; bill, $\frac{5}{8}$; wing, $2\frac{3}{4}$; tail, $2\frac{3}{4}$; tarsi, $1\frac{1}{4}$.

Hab. New South Wales.

Remark.—Received in a collection made on the upper part of the river Morumbidgee.

This form is somewhat allied to *Atrichia*, *Hylacola* and *Dasyornis*, but differs from all those genera in several particulars.

I cannot conclude this paper descriptive of several new and important birds, without congratulating the Society upon the means they possess of making known to the scientific world through their Proceedings and Transactions, spread far and wide as they are, not only over our own country, but I may say over the world, the many interesting objects which from time to time are brought before their Meetings; neither must I omit to bear testimony to the high estimation in which they are held by all the continental naturalists and every true lover of scientific research.

2. DESCRIPTIONS OF TWO SPECIES OF CRUSTACEA IN THE BRITISH MUSEUM. BY ADAM WHITE, ASSISTANT ZOOLOGICAL DEPARTMENT, BRITISH MUSEUM.

POTAMOBIVS SERRATUS. (Annulosa, Pl. XV.)

Cancer serratus, Shaw, *Zoology of New Holland*, t. 8.

Beak shorter than the peduncle of the outer antennæ, with three teeth on the outside, above hollowed and slightly grooved down the

middle, edges over the eyes considerably thickened. Hands, outside with a double row of serratures extending to near the end of the fixed claw; inside edge serrated with four teeth and one tooth at the end; moveable claw with six or seven teeth placed irregularly but chiefly on the ridge; claws elongated, inner edge with a few bluntish teeth, the end somewhat hooked. Wrist with each of the lateral edges furnished with two strong teeth or spines. Carapace smooth along the back; the sides of the front portion with a few spines, which on the lower part are almost reduced to tubercles; hinder part of the carapace separated from the front portion by a very deep groove, each of the sides in front with two spines; the sides of this portion are thickly covered with tubercles, which increase in size as they approach the back. Abdomen smooth on the dorsal line, the sides spined; the first segment with a large prominent spine on each side of the first segment; second segment with twelve or thirteen spines, four or five on each edge of the dilated part, the other two larger and situated on the sides; the spines are more or less conical and sharp, the one on each side nearest the back blunt; the third, fourth and fifth segments with eight spines each, placed transversely, the two inner bluntest; the sixth segment with ten or eleven small spines or tubercles; the seventh or terminal segment with seventeen or eighteen small sharp spines arranged in a crescent-like figure, the convexity being outwards. The two posterior pairs of legs with the penultimate joint on the outside furnished with two rows of serratures.

Carapace and legs in the dead specimen of a dirty yellowish brown hue, tinged on the carapace with red. In Dr. Shaw's figure, which slightly differs from Pl. XV., this crayfish is coloured of a bright red, the sides of the claws, carapace and abdomen, are tinged with blue; the specimens, however, were preserved in spirits. Dr. Shaw does not mention from what part of New Holland the specimens described by him were received; I cannot find any trace of them, neither does any author that I am aware of refer to his figure or description.

The species comes closest to the *Potamobius (Astacus) Franklinii*, described with three other Australian species of the same genus by Mr. Gray, in the Appendix to Eyre's Discoveries in Central Australia, vol. i. p. 409, t. 3. f. 1.

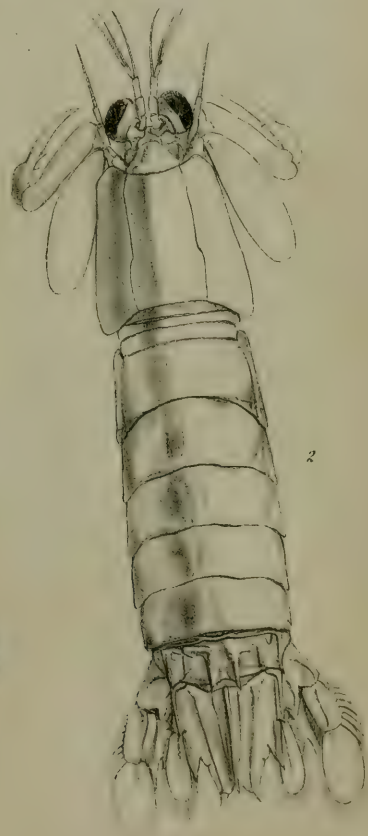
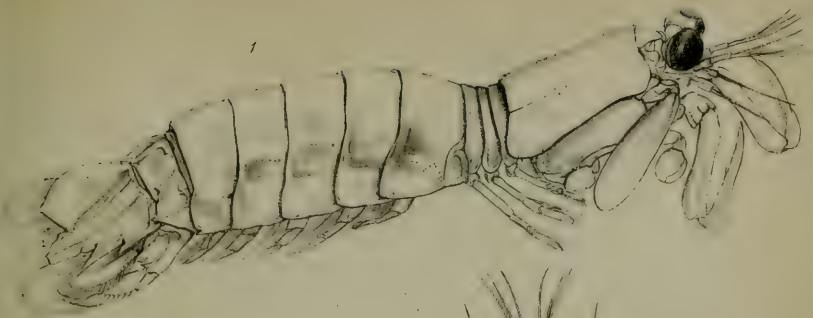
The specimen in the British Museum was found by Mr. Strange in freshwater creeks, Brisbane Water. Mr. Leicester informs me that the species is not uncommon also in the Richmond River.

GONODACTYLUS CULTRIFER, n. sp.

(Annulosa, Pl. XVI. fig. 1, 2.)

In a Chinese collection, part of which was acquired by the British Museum, there occurs a *Gonodactylus* quite distinct from any of the species of this genus which have been described. This species enters into the second section of Prof. Milne-Edwards, in which the rostral plate is rounded, or scarcely pointed, in front. From the elevated compressed process on the seventh abdominal ring, this species may be called *G. cultrifer*.

The sides of the carapace are very thin and membranaceous. The rostral plate is wider than long, but not so wide as in the *G. scyl-*



1-2. GONODACTYLUS CULTRIFER.
3-5. ACANTHONOTUS TESTUDO

larus, neither is the tip so much deflexed as in that species. The raptorial legs are rather slender, and are considerably compressed, the base of the terminal joint is very slightly thickened, the terminal part elongated and knife-shaped, the inner edge with two teeth; tarsi of the three last pair of legs styliform; abdomen with the lateral margins of the first five segments thin and membranaceous, the fifth with a notch at the hind angle; the sixth segment with six slight crests terminating in short spines, the two middle approximating; the seventh segment with a sharp crest which rises nearly as high above its dorsal surface, as the space between its base and the edge of the segment; the end of this crest is pointed; the marginal teeth of the seventh segment are long and sharp, and have a slight ridge behind; the penultimate joint of the outer branch of the appendages to the sixth ring long, and furnished on the outer edge with a series of nine spines, which are depressed, and cover each other at the base. In the *G. scyllarus* there are twelve of these spines.

This species is about four inches long; in its dry state the greater part of the upper surface is tinged with a reddish hue, and along the middle of the back there is a pale line.

The species of the genus *GONODACTYLUS* are,—1. *G. chiragra*; 2. *G. scyllarus*; 3. *G. Edwardsii*, Berthold, Act. Göttingen. 1845, t. 3. f. 6; 4. *G. cultrifer*; 5. *G. styliferus*; 6. *G. graphurus*; 7. *G. trispinosus*. The *G. Edwardsii* is the species met with in nearly every box of insects and fish imported from China.

On the same plate with the *G. cultrifer* is figured an Amphipod, which *may be* the species figured by Colonel Montagu in the ninth volume of the 'Linnean Transactions,' t. 5. f. 5, under the name of *Oniscus Testudo*. I have named this on the plate *Acanthonotus Testudo*: it belongs to Prof. Owen's genus *Acanthonotus*: in the British Museum it bears Dr. Leach's manuscript name, *Vertumnus Cranchii*. The head is produced and pointed between the antennæ, and instead of the small number of segments assigned by Colonel Montagu to his *Oniscus*, there is the normal number of the various genera of Amphipoda.

3. DESCRIPTION OF A NEW PUPINA AND TWO NEW HELICINAS, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. PUPINA BILINGUIS, Pfr. *P. testá oblongo-ovatá, tenui, pellucidá, nitidá, cornéá; spirá sensim attenuatá, obtusiusculá; suturá impressá, vix callosá; anfractibus 6, supremis 3 convexis, confertim striatis, sequentibus subplanis, lævigatis, ultimo $\frac{1}{2}$ longitudinis paulo superante; aperturá verticali, subcirculari, bicaniculatá, canali utroque aperto, ascendente, supero lamini validá, linguiformi, triangulari formato; peristomate subincrassato, breviter expanso, margine columellari plano, linguiformi, acuto.*

Long. 10, diam. 5 millim.

Hab. in Australiá orientali.

2. *HELICINA INTUSPLICATA*, Pfr. *H. testá depresso-globosá, tenuiusculá, lævigatá, nitidá, carné; spirá breviter conoideá, vix acuminatá; anfractibus fere 5 convexiusculis, celeriter accrescentibus, ultimo rotundato, basi planiusculo; columellá recedente, planá, retrorsum in callum tenuem dilatatá; aperturá parum obliquá, semiovali-subtriangulari, altiore quam latá, ad columellam angulatá et plicá intus fere ad marginem decurrente munitá; peristomate simplice, breviter expanso, margine basali ad columellam subangulato.*

Diam. 10, alt. $7\frac{1}{2}$ millim.

Locality unknown.

3. *HELICINA DIAPHANA*, Pfr. *H. testá subconoideo-depressá, tenui, obliquè striatulá, diaphaná, nitidulá, fulvo-lutescente; spirá subelevatá, apice obtusá; anfractibus 4 planiusculis, ultimo obsolete subangulato; columellá brevissimá, basi subnodosá, in callum circumscriptum, sub lente granulum retrorsum dilatatá; aperturá subobliquá, semilunari; peristomate simplice, breviter expanso, margine basali leviter arcuato, in nodulum columellarem sensim transiente.*

Diam. 5, altit. $3\frac{1}{3}$ mill.

Hab. Honduras; *Mr. Dyson.*

May 28, 1850.

William Yarrell, Esq., Vice-President, in the Chair.

The Secretary reported, that on the morning of the 25th of May he had the gratification of finding, on the arrival of the Peninsular and Oriental Company's steamer "Ripon" at Southampton, that the preparations which had been made in that vessel, and the precautions which had been taken by the Hon. C. A. Murray, for the safe transport of the Hippopotamus, had been eminently successful.

The animal had been assiduously attended during the voyage by Hamet Saafi Canana, to whom he had been entrusted since his arrival in Cairo on the 14th of November 1849, and towards whom he exhibits a very marked attachment. Mr. Murray, having returned to England in the "Ripon," had continued to direct this interesting undertaking to its final success. Captain Moresby and the officers of the "Ripon" had given every facility and assistance in their power throughout the voyage; and, owing to the liberal provision which had been made both in Egypt and at Malta, the supply of fresh water required for the animal's bath had been constant and abundant.

The Hippopotamus was shut into his house with Hamet about 10 o'clock A.M. The house was then hoisted by a tackle from the main deck, and safely lowered to a railway truck on the quay at the New Dock. As soon as the other animals were landed, and arranged for the journey to London, they were conveyed by special train to Nine Elms, and ultimately reached the Garden at 10 P.M.

The house in which the Hippopotamus and Hamet were inclosed having been taken from the waggon, the animal readily followed Hamet, on the door being opened, to the building which had been prepared for him. He had now been twelve hours out of the water; and as soon as he discovered the bath, which had been filled in anticipation of his arrival, he plunged into it with the most evident enjoyment. (Mammalia, Pl. XIX.) After this he fed freely on warm milk and meal, without exhibiting the slightest symptoms of fatigue, or of discomposure at the new situation in which he was placed.

The remainder of the collection, which had been gathered together by the unceasing energy of Mr. Murray, included—

Felis leo, ♀.
 „ *jubatus*, ♂.
 „ *chaus*.
Genetta pallida, Gray.
Viverra civetta.
Herpestes ichneumon.
Canis niloticus.
Capra nubiana.
Gazella dorcas.
Sus aper, ♀.
Dipus ægyptius.
Gerbillus melanura.
 „ *tenuis*.
Gyps fulvus.
Otogyps auricularis.
Casarca rutila.
Pelecanus crispus.
 „ *onocrotalus*.
Psanmosaurus griseus.
Gongylus ocellatus.
Scincus vulgaris.
Cerastes Hasselquistii.
Naia haje.
Coluber Cliffordii.
Eryx jaculus.

Of these, the Lioness, the Chetah, the Ibex and the Wild Hog were gifts to the Society from H.H. the Viceroy, in addition to the Hippopotamus.

As if to make the 25th a still more memorable day in the annals of the Menagerie, another collection arrived within an hour of that which has been thus briefly mentioned. Lord Harris, Governor of Trinidad, desirous of making the opportunities of his important station available for the advancement of science at home, transmitted under the care of a trustworthy agent, and as a gift to the Society, a box of skins, which will be exhibited at a future meeting, and some beautiful living animals, among which there have arrived remarkable examples of the following species:—

*Lagothrix Humboldtii.**Chiropotes satanas.**Penelope pipile.*" *cristata.**Boa constrictor.*

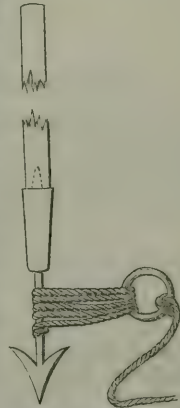
The imperfect knowledge which we possess of the zoology of Trinidad, and the proximity of that island to the Spanish Main, where so many interesting forms abound, render the support of Lord Harris a most valuable addition to the strength of the Society; and it is to be earnestly hoped that the liberal and unhesitating manner in which his Lordship, as well as the Governor of Singapore, have acceded to the applications which were made to them for assistance in promoting scientific objects, will be rivalled by the governors of our other colonies, who have necessarily effectual means of conferring the most important aid towards the progress of zoological inquiry.

The following papers were read :—

1. ON SHARK FISHING AT KURRACHEE. IN A LETTER FROM DR. BUIST, LL.D., F.R.S. ETC., OF BOMBAY, TO COLONEL SYKES. (COMMUNICATED BY COLONEL SYKES*.)

There are thirteen large boats, with crews of twelve men each, constantly employed in the shark fishery at Kurrachee; the value of the fins sent to market varying from 15,000 to 18,000 rupees, or 1000 to 1200 rupees for each boat, after allowing the Banian or factor his profit. One boat will sometimes capture at a draught as many as one hundred sharks of different sizes. The fishermen are very averse to revealing the amount of their captures. Inquiries of this sort are supposed by them to be made exclusively for the purpose of taxation. The average capture of each boat probably amounts to about 3000, so as to give the whole sharks captured at not less than 40,000 a year. The Great Basking Shark, or Mhor, is always harpooned: it is found floating or asleep near the surface of the water; it is then stuck with a harpoon of the size and form indicated in the annexed woodcut.

The fish, once struck, is allowed to run till tired; it is then pulled in, and beaten with clubs till stunned. A large hook is now hooked into its eyes or nostrils, or wherever it



Line, 600 fathoms.
Cane shaft, 8 feet.
Iron shaft, 1 foot 6 inches.
Barb, 5 inches.

* Dr. Buist's informant wrote from Kurrachee, in Scinde, to Dr. Buist in Bombay; who sent the analysis of the letter to Colonel Sykes; and Dr. Buist added the export of sharks' fins from Bombay.—W. H. S.

can be got most easily attached, and by this the shark is towed on shore; several boats are requisite for towing. The Mhor is often 40, sometimes 60 feet in length; the mouth is occasionally 4 feet wide.

All other varieties of shark are caught in nets, in somewhat like the way in which herrings are caught at home. The net is made of strong English whip-cord; the meshes about six inches; they are generally 6 feet wide, and from 600 to 800 fathoms, or from three-quarters to nearly a mile, in length. On the one side are floats of wood about 4 feet in length, at intervals of 6 feet; on the other, pieces of stone. The nets are sunk in deep water, from 80 to 150 feet, well out at sea. They are put in one day and taken out the next; so that they are down two or three times a week, according to the state of the weather and success of the fishing. The lesser sharks are commonly found dead, the larger ones much exhausted. On being taken home, the back fins, the only ones used, are cut off, and dried on the sands in the sun; the flesh is cut off in long strips, and salted for food; the liver is taken out, and boiled down for oil; the head, bones and intestines left on the shore to rot, or thrown into the sea, where numberless little sharks are generally on the watch to eat up the remains of their kindred.

The fishermen themselves are only concerned in the capture of the Sharks. So soon as they are landed, they are purchased up by Banians, on whose account all the other operations are performed. The Banians collect them in quantities, and transmit them to agents in Bombay, by whom they are sold for shipment to China.

Not only are the fins of all the ordinary varieties of Shark prepared for the market, but those of the Saw-fish, of the Cat-fish, and of some varieties of Ray or Skate: the latter indeed acquires almost the size, aspect, and the form of the shark. The Cat-fish, known here by the same name as at home, has a head very like that of its European congener, from which it differs in all other respects most remarkably. The skin is of a tawny yellowish-brown, shading from dark brown on the back to dirty yellow on the belly. It is beautifully covered all over with spots of the shape and size of those of the leopard, similarly arranged.

The fishermen along these coasts are divided into four great castes, over each of which a head man or Jemadar presides: 1. Koolies; 2. Bundarries; 3. Sarras; 4. —. One great Jemadar, or chief, rules supreme in the craft over all these fisher castes. Our informers at Kurrachee were a chief of one of the castes and his brother, two of the finest men I ever saw. They were 6 feet 3 inches each, properly made, and muscular in proportion, but not overgrown. They had brown beards, long black hair and bushy eyebrows, with fine white teeth, a singular openness of countenance and pleasingness of expression. They seemed greatly flattered by our inquiries, and most willing to give information on every point but one, that of the amount of sharks caught. They were quite delighted with the sketches I made of their boats and implements.

Sharks' Fins exported from Bombay, chiefly to China, 1845-46.

Weight, 8771 cwt. 50 lbs. Value, 182,316 rupees.

The following are some of the entries of imports of sharks' fins into Bombay in 1845-46 :—

	Weight.		Value.
	cwts.	lbs.	rupees.
African Coast	104	28	2,118
Arabian Gulf.....	1493	98	30,786
Malabar	554	76	10,757
Cutch and Scinde.....	1149	98	25,076
Kurrachee.....	589	81	13,096
Konkan.....	692	44	14,118

2. DESCRIPTION OF A NEW CRUSTACEAN.

By W. BAIRD, M.D., F.L.S. ETC.

CYPRIDINA ZEALANDICA. (Annulosa, Pl. XVII.)

The valves of the carapace are of an oval form, somewhat flattened, but convex in the centre, and concentrically striated. The striæ are numerous, close-set, and of a waved appearance. The surface of the valves is covered with minute punctations, which probably give origin in the fresh state to short hairs, though they are not visible in the dried specimens. The anterior extremity is slightly narrower than the posterior. The whole carapace is of a uniform white colour. The natural size is about one-fourth of an inch in length and one-fifth of an inch in breadth.

Two specimens were sent to the British Museum by the Rev. R. Taylor of Waimati, New Zealand, along with a collection of marine and freshwater shells, but without any history attached to them.

3. CONTRIBUTIONS TO THE ANATOMY OF THE TAPIR.

By H. N. TURNER, JUN.

A young American Tapir having unfortunately died in the Society's establishment, I have been enabled, through the kindness of Mr. Mitchell, to make some interesting observations on the structure of that animal; and I now propose to notice a few points, which I believe to be hitherto unrecorded, calling attention at the same time to certain interesting resemblances, both external and internal, existing between this form and those to which the more philosophic principles of modern zoology have proved that it is most nearly allied. Perhaps I may be permitted to recall the fact, that it was through the preference formerly given to those accounts which assigned to the Tapir a complex stomach, that Cuvier was led to abandon that method of subdividing the Ungulata, which Professor Owen has since shown to be the true one, and which, in the paper that I last had the honour to communicate, I have endeavoured still further to support. It is very possible that Cuvier, had *no* accounts of the anatomy of the Tapir been extant, might have followed up and established his original idea; for on external examination alone, characters fully suf-

ficient are presented to indicate the group to which it should be referred. The fore-foot, although from its having four toes it is apparently an exception to the Perissodactyle type, yet shows at a glance that the medius is the digit on which the body most immediately rests, instead of its being supported equally upon that and the annularis, which is the constantly prevailing character in the even-toed division. In the Tapir the annularis shares with the index a secondary part in the function of support; and the little finger seems quite pushed aside, so that its presence is no more a true exception than is the absence of the corresponding toe in the hind-foot of the Peccary, where the even number is destroyed by being reduced to three. As in the other Perissodactyla, the Tapir has the prepuce short and wide, not reaching, as in the Artiodactyla, to the middle of the abdomen; and the penis (which is described by Professor Owen) resembles that of the Horse in being short, thick, and truncated. Another interesting external resemblance to the Horse is the elevated crest upon the neck, remarked upon by naturalists for its greater development in this, the common species, as a point of distinction from that discovered by M. Roulin in the mountainous districts of their habitat. This appendage, which adds greatly, in our domestic animal, to his characteristic majesty of form, has precisely the same structure in the Tapir, presenting, when cut into, the same hard fibrous substance well interspersed with fat.

With regard to the organs of digestion, I have scarcely anything to add to the observations already published. The small intestines in this specimen were about 12 yards long; and the fine villi, which clothe their internal surface, were, in the duodenal portion, tipped with a dark pigment. The cæcum was more than a foot long, and the fold of the colon 2 feet; the cæcum contained, like the stomach, large quantities of undigested food, while in the small intestines was little else but fluid chyle. The salivary organs, as usual in the Ungulata, are very largely developed; the parotids being of great extent, joining each other beneath, in front of the neck, and reaching up on each side to surround the base of the auricle. The molar glands, situated between the buccinator muscle and the mucous lining of the mouth, form a conglomerate mass, opening between two elevated ridges by a series of pores.

The generative organs, internally as well as externally, present a general conformity to the type usual in the Perissodactyla; but as the individual was young, it is perhaps as well to defer the publication of any details until they can be confirmed by the dissection of a fully-developed specimen.

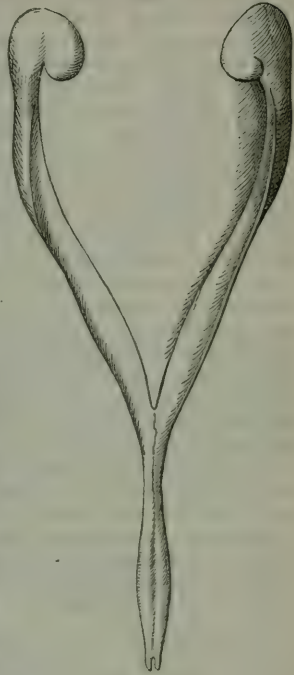
A remarkable anatomical character, which I find the Tapir to possess in common with the Horse, is the singular membranous sac communicating with the Eustachian tube*. It is placed beneath the ear, between the stylohyal bone and the base of the sphenoid, and is of an irregular form, being accommodated to the parts adjacent; the tube itself runs as a groove along part of the upper surface of the sac, and opens into the posterior nares.

* They are called "guttural pouches" by veterinary anatomists.

Nasal bones and cartilages of the American Tapir.

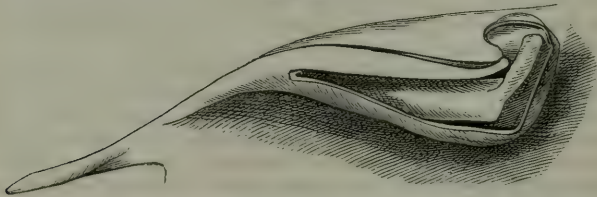
The dissection of the proboscis has afforded some points of interest. A brief description of its general structure, derived only from the dissection of a fœtus, is given by Cuvier in the '*Leçons d'Anatomie Comparée,*' but some remarkable details seem not as yet to have been noticed. The deep notch on each side of the base of the projecting nasal bones, which forms so striking a characteristic in the skull, may be very readily, and probably always has been, presumed to be intended for muscular attachment; but its real office is to lodge the posterior termination of the lateral cartilage of the nose. These lateral cartilages, arising from that of the septum immediately beneath the *ossa nasi*, proceed outwards as usual, but the edge curls inwards, forming one entire convolution, of which the outer part forms posteriorly a flattened tube with a blind extremity, curved upwards, and its termination lodged in the notch alluded to. From the edge, which is of course concealed, a thickened linear prominence is continued upwards within the commencement of the blind tube, but, instead of following its curve, terminates in a rounded extremity. There is no trace whatever of the alar cartilages, the remainder of the proboscis being entirely of a soft substance. With the addition of the pair of

Fig. 1.



Superior aspect.

Fig. 2.



Lateral aspect.—A portion of the outer wall of the cartilage cut away to show the internal convolution.

special levator muscles, noticed both by Cuvier and by Professor Owen, in the possession of which the Tapir again resembles the Horse, the muscles of this organ are arranged upon the usual type. Their fibres radiate from a point just before the eye, some running backwards to form the orbicularis palpebrarum; others spreading upwards to the top of the proboscis, forming the compressor nasi; others proceeding downwards and forwards, to constitute the levator labii superioris aëque nasi. The depressor of the proboscis, and the orbicularis oris, are well developed, the latter muscle being very thick, especially in the under lip.

I have yet seen nothing to shake my opinion, that the structure of the larynx will one day become of great importance to the zoologist, although at present my opportunities have been far from sufficient to enable me to point out which peculiarities in its formation are truly characteristic of certain groups. In this case, therefore, I limit myself to the comparison of it with such as my collection possesses, namely with that of the Horse, as a near ally, and with those of the Peccary and the Sheep, as members of the other great Ungulate division. The os hyoides has the characters usual in the order; its stylohyal pieces agree with those of the Horse in being very narrow at their junction with the lesser cornua, and gradually widening, the reverse being the case in the Peccary and the Sheep. The latter animal, however, like most ruminants, has an intermediate piece at the junction of the stylohyal and the lesser cornu. The Tapir wants the sudden expansion of the upper end of the stylohyal, which is common in the Ungulata, and differs remarkably from the Horse in the small development of the true basihyal, and in the total absence of the strong epihyal process. The thyroid cartilage, however, agrees precisely with that of the Horse in the great obliquity of its alæ, in its median portion being much thickened above, and very deeply emarginated below; the Peccary and the Sheep presenting the reverse of each of these characters. The cricoid and arytenoid cartilages do not present any essential points of difference; but in the Peccary the cricoid is very peculiar in having its anterior part drawn down, so as to encroach upon four of the tracheal rings, and deeply emarginated above. In the interior of the larynx the Tapir has the superior and inferior ligaments well-marked, though not very prominent; the latter, or chordæ vocales, are slight, but sharp, folds in the mucous membrane; the former are thickened anteriorly. Just at the base of the epiglottis is a pair of arched openings, each leading into a small sinus, which extends upwards beneath the base of the epiglottis and inward thickening of the thyroid cartilage, and downwards in front of the anterior attachments of the superior ligaments. The Horse has, like the Tapir, a fossa excavated in the thickened upper part of the thyroid cartilage; and it would appear from Cuvier's remarks (who, however, had but a drawing to inspect), that the Rhinoceros has something similar. The Tapir entirely wants the lateral sacs observable in the Horse.

The muscles of this organ are arranged as usual. The homologues of the sternohyoid and sternothyroid muscles arise, as in some other

animals, from the first pair of ribs and their cartilages; the latter muscles are but narrow. There is no separate stylohyoideus, the digastricus giving some fibres to the os hyoides. The Tapir also possesses the muscle whose fibres (to use the words of Cuvier) fill a portion of the interval of the two cornua of the same side. There is a double pair of thyro-arytenoid muscles, the upper being partly continuous with the transverse arytenoid muscle, and forming a powerful constrictor of the glottis.

The muscles of the limbs formed also a portion of my investigations; but to point out all their peculiarities would involve the repetition of many that are known to be common to the Ungulata. A peculiar muscle arises near the top of the scapula, and covering the supraspinatus, joins the complex muscle formed by the union of the cleidomastoideus with portions of the trapezius and deltoid, called by the French anatomists "muscle commun de la tête, de l'encolure, et du bras." The levator scapulæ and pectoralis minor are wanting, as in the Horse. The coracobrachialis is a long slender muscle, reaching nearly to the inner condyle of the humerus. The brachialis anticus arises from the whole of the rounded posterior side of the humerus, immediately below its head; it consequently embraces and twists round this bone, to proceed to its usual insertion. The anconeus seems to be wanting, or confounded with the triceps. In the forearm, we find the pronator teres represented by a small bundle of fibres closely adherent to a tendinous ligament, which extends from the inner condyle of the humerus all down the sharp edge of the radius. In the hand, the special muscles of the outer toe are all well-developed. In the posterior extremity, the soleus is wanting, and the tibialis posticus is wanting also. The flexor longus pollicis is here, as in all the lower animals, the principal flexor of the toes, arising principally from the fibula, which is here well-developed, and receiving the small tendon of the flexor longus digitorum, after both have passed the ankle in their usual places.

All the organs were perfectly healthy, but the large veins were full of very dark blood, and considerable clots of fibrine were found, not only in the veins and heart, but even in the aorta. Numerous bruises, received in its journey from Liverpool, disfigured the exterior of the animal, and probably assisted, with the unusual coldness of the weather, in causing its premature demise.

4. ON THE IGUANA OF S^{TA} LUCIA, METOPOCEROS CORNUTUS OF WAGLER. BY LIEUT. TYLER, R.E.

(Reptilia, Pl. III.)

This species attains a length of five, and sometimes even of six feet, the tail being about twice and three-quarters the length of the body. When first hatched it measures four inches. The tail is thick at its commencement, and is so connected with the body that it becomes difficult to define precisely their respective limits. The fore and hind legs are thick and muscular, with five toes on each, armed with strong hooked talons, by any one of which the animal can support



IGUANA RHINOLOPHUS



itself. Of the fore-legs the third and fourth toes are the longest; and of the hind-legs the fourth toe is of an enormous length, and has five joints. Under the toes the scales form a double row of denticulations. The nostrils are large, oval, and not mobile, and above them are two horns, with five or six tuberculous excrescences between them and the nostrils, and surrounding the horns. The mouth is large, and armed with two rows of maxillary and two of palatal teeth, which appear simply to be intended to crop leaves and to provide the stomach with vegetable food. Each maxillary tooth is a little double-edged saw, and they are so lapped over each other that the reptile, in closing its mouth upon a leaf, cuts through it completely. The tongue is divided at the point, is very wide, and can be extended out of the mouth, although it is fastened to the interior of the lower jaw near its extremity. The tongue is curiously used by the animal to draw food into the mouth, and to forward it down the gullet, or to repel it at will, and the only use of the palatal teeth appears to be to secure the food while the tongue moves forward to afford fresh assistance in its journey down the throat*. Between the lower jaw and the chest is a pouch, which the animal draws in or extends simultaneously with the compression or swelling out of the body when enraged or excited. The portion of the gular pouch attached to the jaw is inflatable, and food is sometimes retained in it for a considerable period, but the lower part is merely extensible. On the anterior part of this pouch or dewlap, and immediately below the jaw, are from five to seven denticulations similar in substance and colour to the dorsal crest, but not so long.

This crest or mane commences behind the head, with three or four excrescences of different sizes, then suddenly becomes, in larger Iguanas, an inch and a half or two inches in length, and runs uninterruptedly down the back and tail, gradually diminishing, excepting above the commencement of the tail, where a slight increase again takes place, until, at the extremity of the tail, it is undistinguishable. The dorsal crest consists of about fifty protuberances, and the caudal crest of about 218, each of the latter becoming gradually harder as they decrease in height, and so altering their shape as to resemble, down the greater part of the tail, the edge of a saw.

The ear is covered by a thin scale, which gives to the touch, but does not seem sensitive. There is no external opening, nor does the sense of hearing appear to be very acute or much used by the animal, who trusts more to the eye to discover both his food and his enemies.

The eye is bright and prominent, and is protected by an inner cuticle as well as the lower eyelid; the upper lid not moving to aid in covering it, but only when the direction of sight is altered in a perpendicular direction. There are soft brows over the eyes of a spherical shape, and projecting above the remainder of the upper part of the head.

The general colour is bright green in the young and dirty grey in the old Iguanas, with about six black streaks across the body and

* The tongue is always covered by a glutinous secretion, which is perceptibly appended to the jaws when the mouth is open.

fifteen across the tail, each streak being darker towards the head, and gradually shaded off towards the tail. These streaks extend over the dorsal and caudal crests, which partake entirely of the variegations of the body in the younger, but, in the older individuals, are tipped with red and yellowish brown at their bases and extremities. These black streaks do not unite under the belly or under the anterior part of the tail, but towards the extremity of the tail they gradually elongate and become more dull, encircling the tail, and at last becoming hardly discernible, mixing with the green or grey into one dull tint.

The dewlap, as well as the folding skin in front of the shoulder, connected with it, is interspersed with black and yellowish brown, of which colours the denticulations of the dewlap also partake. The upper part of the head is of a darker and richer green in the young, fading as the animal advances in years, and becomes weather-beaten, as is the case with the human species, and with all animal and vegetable life. The whole of the under part of the body is of a lighter colour in both old and young. The female has a more delicate colour and general appearance than the male.

Whilst always retaining the same colours, this Iguana has the power of considerably changing his hues, but these changes are gradually performed. The colours become more dull as the period of the change of skin approaches, which is not, however, frequent. Each scale has its own tint, and the colours being thus irregularly blended, an appearance is given, particularly to the younger reptiles, very much like that of worsted-work. The colour of the eye is dark brown, the pupil being surrounded by a golden rim.

Every part of this curious reptile is covered with scales, and these are of every variety of shape and size. Those on the top of the head are large, smooth, and unequal; between them and the mouth runs a row of smaller scales, while the mouth itself is surrounded, both in the upper and lower jaw, by large scales terminated at the extremity between the nostrils, by one large brownish and softer scale in the upper jaw, and a similar though smaller scale meeting it in the lower jaw. From this latter, and below those immediately surrounding the mouth, is a range of scales or rather plates, each larger than its predecessor, terminated on either side by a very large plate under the auricle. Below this row of scales is the gular pouch (Fanon) covered by small, smooth scales. The eye is protected above by small, smooth, unequal scales, which also form part of the covering of the top of the head. The scales of the lower eyelid are peculiarly small and delicate; and a row of semispherical scales, resembling somewhat a string of small pearls on each lid, surrounds the eye. At the back of the head the scales become tuberculous, and a few on each side of the neck assume a pyramidal or rather a conical form. The scales of the neck and back are almost circular, but nearer the tail they become rhomboidal and carinated, their posterior points elongating, and their centres projecting more and more, both above and below, as they reach the extremity of the tail, so as to give it the form of a many-edged saw, the most severe edge being that presented by the caudal crest. The scales above the fore-legs are equal, carinated, and imbricated,

assuming, at the foot and along the toes, a convex and smooth appearance. Under the fore-legs they are smaller, and peculiarly so at the joints and under the feet; the most delicate, however, are those under the leg, and connecting it with the body. The hind-legs are similarly clothed to the fore-legs, excepting that they are provided with a single row of femoral pores, fourteen or fifteen in number, and which increase in size with the growth of the reptile. These pores are large and fully developed in the male, but small and sometimes even hardly perceptible in the female.

The scales of the belly are very different from those of the back, being larger, equal, and carinated, although generally worn almost smooth in the old individuals. They are divided by a distinct line from the termination of the dewlap to the vent.

The Iguanas live principally in trees, and near the windward coast of the island. They are not much seen excepting in the months of February, March, and April, when they quit their hiding-places, and repair to the sea-shore or other sandy places to lay their eggs in the sand. The older females lay a great number of eggs; I have known an instance of one in confinement laying five in one day; and thirty-two, within the space of ten minutes, five days afterwards, making thirty-seven in all. I have taken the eggs from the bellies of small females in less numbers, such as eight, fourteen, and seventeen. They are not found in successive stages of advancement as in the hen, the tortoise, and many other animals, but all of the same size, and arrived at the same degree of maturity. Nor are the eggs always disposed, as I have seen it stated, in two rows, one on each side of the belly of the female. When very small, they are arranged in a long irregular cluster, closely packed together, and they seem to retain the same relative position as they increase in size. The eggs are very liable to destruction from ants, which fact probably accounts for their being usually deposited in sea sand. They are also hunted for and eaten by the *Pilori* (*Mus pilorides*), or "Rat Musqué," and by a bird called the "Trembler." They are soft and without any white, and their shell resembles the most beautiful kid used for French gloves, of a very light straw-colour. They are about the size of those of a pigeon, but rather longer; they vary however in dimensions, according to the age and size of the Iguana.

This Iguana is not averse to water, when not too cold, taking to it only when the sun is shining; in fact, not moving about much at any other time. Its mode of swimming differs from that of other lizards, inasmuch as it places its four legs close by the side of its body, and swims entirely with its tail. It dives with great facility, and remains sometimes for a considerable time under water. I believe that the Iguana never ventures into the sea. The tail is a very valuable limb; for besides being the sole means of swimming possessed by the animal, it is of great use in climbing trees, although not prehensile; and it is a most important weapon of defence, a blow from it being frequently sufficient to inflict a severe wound. In fact, this reptile is rather formidable when brought to bay in the woods. It is hunted

by the natives with dogs trained for the purpose. The dog immediately upon scenting it gives tongue, and if on the ground, the dog seizes it by the back, and either kills it or maims it, which makes its capture easy; if in a tree, the Iguana is either shaken down, a matter ordinarily of no small difficulty, or the branch is cut off. It is almost useless to attempt to find these reptiles without dogs, as the resemblance of their colour to that of the trees they inhabit prevents them from being easily seen. Few dogs but those accustomed to the sport will touch them, as, in addition to the blows which they inflict with their tails, they bite and scratch furiously; and when once they lay hold of anything with their teeth, they can only be made to let go by an inducement to bite, some other attractive object being offered to them. They run into holes when chased, if an opportunity offers, and when their eyes are hidden from view, they fancy that their whole body is safely covered. The flesh, particularly of the female, is a great delicacy; it is cooked in various ways, sometimes in a fricassee, with the eggs whole, sometimes roasted or stewed. The eggs have a very glutinous taste. The flesh is said to disagree with some constitutions, although it does not, I believe, as has been asserted, disagree peculiarly with those persons who have been affected with venereal diseases.

This Iguana is said by some of the natives to eat lizards and insects, but I have opened several, and I have never succeeded in finding any but vegetable matter in the stomach, sometimes, however, covered with innumerable small worms, the eggs of which must doubtless have been swallowed with the leaves, fruit, or bark of trees, upon which, I conceive, it feeds entirely.

Unless caught young, it is very difficult to induce these reptiles to feed in confinement, and particularly when watched. Their disposition is sulky and savage, and I have known some of them die in confinement from starvation rather than feed. This has caused me to try the following plan, which I find very successful, of affording them nourishment. I hold them by the lower part of the body with one hand, and with the other I irritate them, until they open their mouths and attempt to bite, when I insert food; and by annoying them in this way, I have not only made them eat their natural food, but I have killed some of them by forcing them to eat corn, and leaves which appear to have disagreed with them.

This Iguana has a small rounded heart, reddish lungs, an oblong gall-bladder, a large dark-coloured flat liver, and a white, and very extensible oblong stomach.

June 11, 1850.

W. Spence, Esq., F.R.S., in the Chair.

The following papers were read:—

1. SYNOPSIS OF THE SPECIES OF ANTELOPES AND STREPSICERES, WITH DESCRIPTIONS OF SOME NEW SPECIES. By J. E. GRAY, ESQ., F.R.S., P.B.S. ETC.

(Mammalia, Pl. XX.)

The genera in this Synopsis are arranged after the plan, first suggested in a paper on the genera of the Hollow-horned Ruminants (*Bovidæ*) in the 'Annals and Mag. of Nat. Hist.' xviii. 227.

ANTELOPES.

The Antelopes contain a large number of species separated into several genera, which may be arranged in the following sections:—

I. The ANTELOPES OF THE FIELDS have a tapering nose, with the nostrils bald within.

1. The *True Antelopes* are light-bodied and limbed, and small-hoofed, with a short or moderate tail covered with elongated hair to the base; horns lyrate or conical.

2. The *Cervine Antelopes* are large-sized, rather heavy-bodied and large-hoofed, and have an elongated tail with short hair at the base and tufted at the end; horns lyrate or conical. (See p. 128.)

3. The *Caprine Antelopes* are heavy-bodied and limbed, and large-hoofed, with a very short, depressed tail covered with hair to the base; horns conical. (See p. 135.)

II. The ANTELOPES OF THE SANDY DESERTS have a broad nose, and the nostrils lined with bristles within.

4. The *Equine Antelopes* have the nose very broad, soft, spongy, and bristly. (See p. 138.)

5. The *Bovine Antelopes* have the nose moderately broad, with a black, moist muffle. (See p. 139.)

I. The ANTELOPES OF THE FIELDS. Nose tapering, the nostrils bald within, close together in front and diverging behind.

1. The TRUE ANTELOPES. Body moderate-sized, elegant; legs slender; tail moderately elongate, hairy; horns placed over the eyebrows.

A. *Horns lyrate (or rarely cylindrical, subspiral), strongly ringed at the base; nose ovine, without any naked muffle; deep inguinal pouches; and tear-bag generally well-developed.*

1. SAIGA.

Horns short, strong, annulated, lyrate, white; nose very high, compressed, rounded; nostrils very close together; tear-bag distinct; fur soft.

1. SAIGA TATARICA. The COLUS or SAIGA.

Pale yellowish, crown and back greyish washed; belly and anal region beneath the tail white; young, crown greyer.

Capra Tatarica, Linn. S. N. 97.—*Antilope Saiga*, Pallas.—*Ibex imberbis*, Gmelin.—*Antilope Colus*, H. Smith.—*Colus Strabonis*, Gesner.—*Colus Tartarica*, Wagner.—*Cervicapra*, sp. Blainv.—*Saiga tatarica*, Gray, Knowsley Menag. 3.

Inhabits Siberia. Cab. Brit. Mus.

2. KEMAS.

Horns elongated, rather lyrate; nose with a dilated pouch on each side; tear-bag distinct? hair close, erect, spreading; nose-hole of skull very large; females hornless.

1. KEMAS HODGSONII. The CHIRU.

Pale brown; chest, belly and inside of the limbs white; front of face and front of legs blackish.

Antilope Hodgsonii, Abel.—*A. Kemas*, H. Smith (not horns, t. 181. f. 6).—*A. Chiru*, Lesson.—*Kemas Hodgsonii*, Gray, Knowsley Menag. 3.

Inhabits Thibet. Cab. Brit. Mus.

3. GAZELLA, H. Smith.

Horns strong, lyrate, black; face tapering; nose simple; tear-bag distinct; fur short, close-pressed. Females with smaller horns; teats four.

* *Knees with tufts; back and rump brown, vent white.*

† *Lower part of side with a dark oblique streak; feet with a tuft of black hair beneath.*

1. GAZELLA DORCAS. The GAZELLE.

Fur rather elongate and harsh, grey brown; outside of fore legs, broad oblique streak along the side, edge of anal disc, front of face and face-streak, dark brown; face-streak, throat, chest, belly, inside of thigh and anal disc, white; tuft at under side of feet and end of tail black; knee-tufts blackish; young, back and side-streak rather paler.

Capra Dorcas, Linn.—*Antilope Dorcas*, Pallas; Licht. 3. t. 5.—*A. Gazella*, Pallas.—*Gazella Kevella*, H. Smith, ♀.—*G. Corinna*, H. Smith, ♀.—*Gazelle*, Buffon, H. N. xii. t. 22–25. ♂.—*Kevel*, Buffon, H. N. xii. t. 26. ♂. not F. Cuvier.—*Corinne*, Buffon, H. N. xii. t. 27. ♀. t. 30 (not F. Cuvier); Cuvier, Menag. Mus. t. .—*Kevel gris*, F. Cuvier, Mam. Lithog. t. 3.—*Antilope Cora*, H. Smith.—

A. Arabica, Hemprich and Ehrenb. Symb. Phys. t. 5 ; Licht. Saugth. t. 6.—*A. Cuvieri*, Ogilby, Proc. Zool. Soc. 1840, 35 ; Frazer, Zool. Typica, t.

Var. Nose with a dark spot or streak.

Var. Larger, legs thicker.

Gazella Dorcas, var. Gray, Knowsley Menag. t. 3.

Inhabits N. Africa ; shore of Red Sea ; Mogador (*Willshire*).

The Earl of Derby has specimens which he calls *Gazella vera*, figured *Knowsley Menag.* t. 3 ; they are rather larger, greyer, and the legs are much thicker and heavier than the specimens from the shore of the Red Sea. The fur is similar, but not quite so long on the under side of the neck. The *Kevel gris* (F. Cuvier, Mam. Lith.) well represents this variety.

The *A. Cuvieri* of Ogilby, from Morocco, is a much larger animal than the common *G. Dorcas*, but agrees with it in other characters, except, it is said, in having longer ears.

M. F. Cuvier (Mam. Lithog. vii. t. 8. ♀.) has figured and described an Antelope from Sennaar under the name *A. leptoceros*, which he says is very like *A. Dorcas*, but has larger horns, those of the males being twice and of the females half as long again as the head. The horns vary greatly in length in our specimens.

†† *Upper part of sides with a pale streak.*

2. GAZELLA ISABELLA. The ISABELLA GAZELLE.

Fur short, very soft ; pale yellowish brown, with a broad, rather paler oblique streak on the upper part of the side ; knee-tufts, front of face and lower face-streak, darker yellow brown ; upper face-streak, chest, back edge of tarsus, under side of feet, inside of limbs, belly and vent, white ; tail black. Female, horns very slender, longer than the head. Young, paler, the lower part of the sides rather darker.

Gazella Isabella, Gray, Ann. and Mag. Nat. Hist. 1846.—*Antilope Iridis* (*Die Iris Antelope*), Licht.—*A. Dorcas*, Licht. Darstell. t. 5.—*A. Dorcas*, var. *a.* Sundevall.

Inhabits N. Africa ; Egypt (*J. Burton, Esq.*), Kordofan (*Sundev.*).

This species is easily known from the foregoing by the softness and fineness of the fur, and the lower side-streak being of the same colour as the back, and from it and the following by having no dark edge to the anal disc.

3. GAZELLA SUBGUTTUROSA. The JAIRON.

Pale brown ; upper part of sides with a broad, rather paler streak ; crown and knee-tufts greyer ; face-streak indistinct ; nose, lower part of sides, belly, hinder side of fore and front side of hinder limbs and anal disc white ; streak on haunches dark brown ; end of tail blackish.

Antilope subgutturosa, Guldenst. ; Pallas ; H. Smith, Griff. A. K. t. 183. f. 5, horns.—*Capra Abu*, Kœmp.—*A. Dorcas*, var. *persica*, Rüppell.—*Gazella subgutturosa*, Gray, K. Men. 4.

Inhabits Tartary, Armenia and North Persia. Cab. Brit. Mus.

Larger than the Chikara.

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*** *Knees with tufts; rump mark and throat-spots white: no dark side-streak; tail slender, compressed, only hairy above (Dama, Bennett).*

4. GAZELLA SOEMMERINGII. The ABYSSINIAN MOHR.

Pale brown; nose, forehead and lower edge of face-streak and end of tail blackish; chest and belly, angular mark on rump above the tail, face-streak and spot on the throat white; limbs pale. Female, forehead paler in the centre.

Antilope Soemmeringii, Cretzschm. in Rüppell, Zool. Atlas, t. 19 ♂.

—*Gazella Soemmeringii*, Gray, K. M. 5.

Inhabits Lower Abyssinia; Sennaar. Brit. Mus.

5. GAZELLA MOHR. The MOHR.

Bay; chin, spot on throat, chest, belly, edge and inside of limbs and angular spot on rump above the tail white; spot on side of face and end of tail black.

Antilope Mohr, Bennett, Trans. Zool. Soc. i. t. 8; Knight, M. A. N. f. —*A. Dama*, var. *occidentalis*, Sundevall.—*Gazella Mohr*, Gray, K. M. 5.

Inhabits Morocco. Mus. Zool. Soc. Portendic. There called *Seni-ci* (*Mr. Whitfield*). Mus. Brit.

The specimen in the Frankfort Museum, which was received from the Zoological Society, is one-third smaller than the *Andra*. It is brown, rump mark, lower part of the sides, belly, inside and edge of legs white, face iron-grey with longer hair at the base of the horns; horns large, thick, the face-streak indistinct from the pale colour of the head.

There is a fine specimen of this species living at Knowsley, and a female which died on the passage in the British Museum.

6. GAZELLA DAMA. The NANGEUR.

Bay; chin, spot on throat, belly, lower part of sides and hinder part of the back, inside of the limbs white; no spot on side of the face.

Antilope Dama, Pallas.—*Gazella Dama*, Gray, K. M. 5.—*A. rubra*, Afzelius.—*Nangeur*, Buffon, H. N. xii. t. 32. f. 3. t. 34.

Inhabits W. Africa; Senegal.

Not seen since Buffon's time; may be a bad figure of the former.

7. GAZELLA RUFICOLLIS. The ANDRA.

Whitish; neck and front part of the middle of the back reddish; no face-streak.

Antilope ruficollis, H. Smith, G. A. K. v. 205.—*A. Andra*, Bennett.—*A. Dama*, Licht. Saugh. t. 3, 4; Rüppell, Zool. Atlas, t. 14, 16; Ehrenberg, Symb. Phys. t. 6.—*A. Dama*, var. *orientalis*, Sundevall.—*Gazella ruficollis*, Gray, K. M. 5.

Var. Young? with an indistinct narrow brown streak across the outside of the thighs, and the forehead iron-grey, with longer hair at the base of the horns; horns small. Mus. Frankfort.

Inhabits North Africa; Kordofan. Brit. Mus. ♀.

These species differ in size as well as markings. The *Mohr* and *Andra* differ from *G. Soemmeringii* in being of much larger size, and in wanting the black face and streaks. Bennett's *Mohr* has only an angular white spot on the rump, like *G. Soemmeringii*; Buffon's *Nangeur* is smaller, and has more white on the rump, thighs and sides; and the *Andra*, which agrees with the figures cited, is almost all white, with a reddish neck and withers.

*** *Knees without tufts (but with rather longer hair, forming a linear keel in front); back and rump brown; sides with dark streak.*

8. GAZELLA RUFIFRONS. The KORIN.

Bay brown; sides above paler, with broad dark streak below; tail black; chest, belly, inside of legs, back edge of tarsus, and under side of feet and anal disc white; face bright bay, side-streak broad white.

Gazella rufifrons, Gray, Ann. and Mag. Nat. Hist.—*Kevel*, male, F. Cuvier, Mam. Lithog. t. 3.—*Corine*, F. Cuvier, Mam. Lithog. t. . young ♀.—*A. lævipes*, Sundevall.—*Gazella rufifrons*, Gray, K. M. 5. t. 4.

Var. Nose blackish above (adult ♀).

Young; pale yellowish, side-streak brownish.

Inhabits W. Africa; Senegal. Mus. Paris. Gambia (*Mr. Whitfield*), called *Seni*. Brit. Mus. Sennaar (*Sundevall*).

Buffon mentions a *Corine* as coming from Senegal, but he says it is smaller than the *Kevel*, and Daubenton says that it has knee-tufts, so that it cannot be this species. Indeed the *Gazelle*, *Corine* and *Kevel* of Buffon are clearly all *A. Dorcas* of this memoir.

The *Kevel* figured by M. F. Cuvier well represents this species. He says it was sent from Senegal, and probably it has not knee-tufts, for they are not indicated in the figure or mentioned in the text; for, like other descriptions of this author, though it occupies more than two pages, all the peculiarities of the species are left out. The *Corine* of the same author, also from Senegal, well represents the young. M. F. Cuvier says the *Kevel* and *Corine* and *A. Dorcas* form one species, but afterwards, under *Kevel gris*, he thinks they may be two.

4. PROCAPRA, Hodgson.

Horns strong, elongate, lyrate, black; face tapering, nose simple; tear-bag none; knee-tufts none; tail very short: female hornless; teats two. Asia; not gregarious.

1. PROCAPRA GUTTUROSA. The DSEREN.

Pale yellowish; hair long, soft, of anal region short, white; tail black.

Antilope gutturosa, Pallas, Spic. xii. 45. t. 2; H. Smith.—*Gazella gutturosa*, Gray, Knows. Menag. 3.

Inhabits Mongolia, Siberia. Cab. Brit. Mus., male and female. Thibet. Mus. Ind. Comp.

2. *PROCAPRA PICTICAUDA*. The RAGO A OF GOA.

Hair sordid, brown with pale rufous tips; under side, inside of ears, limbs and anal disc, reddish white; tail black.

Procapra picticauda, Hodgson, J. A. S. Bengal, 1846, 173. 334. t.

Inhabits Thibet; in the plains. Brit. Mus., skulls. Perhaps same as former in summer fur.

5. TRAGOPS, Hodgson.

Horns lyrate, short, black; face tapering, nose simple; "tear-bag none;" teats two: females with small horns. India; not gregarious.

1. TRAGOPS BENNETTII. The CHIKARA.

Bay brown; sides uniformly coloured; knee-tufts, end of nose and tail black; streak on haunches blackish; face-streak, chest, belly and inside of limbs white.

Antilope Bennettii, Sykes.—*A. Christii*, Gray.—*A. Bharatensis*, Hodgson.—*A. Hazenna*, I. Geoff., Voy. Jacq. Mam. t. 6, bad?—*A. Dorcas*, var. E., Sundevall.—*Tragops Bennettii*, Hodgson, 1847.

Inhabits India. Cab. Brit. Mus.

The feet are generally blackish, but sometimes brown like the back.

6. ANTIDORCAS, Sundevall.

Horns lyrate, short, black; face tapering, nose simple; tear-bag not remarkably distinct; back with an expansile white streak or fold; hair close-pressed; knees not tufted: females with small horns.

1. ANTIDORCAS EUCHORE. The SPRINGBOC OR TSEBE.

Pale brown; face, throat, chest, belly, broad expansile streak on back to base of tail, edge and inner side of limbs white; face-streak and middle part of forehead pale brown, side-streak oblique, dark brown: young paler; side-streak paler, back-streak distinct.

Antilope Euchore, Forster, Licht. t. 7; H. Smith; Harris, W. A. A. t. 3.—*A. saltatrix*, Link.—*A. marsupialis*, Zimm.—*A. Pygarga*, Blumenb.—*A. dorsata* and *A. saliens*, Lacep.—*A. Ibez*, Afzelius, 1810.—*Gazella Euchore*, Gray, Know. Men. 6.

Inhabits S. Africa. Brit. Mus.

7. ÆPYCEROS, Sundev. MSS.; *Antilope*, Gray.

Horns elongate, wide-spreading, lyrate, black; face tapering, nose simple; knees not tufted, feet with tuft of (black) hair near pastern; teats two; no trace of suborbital sinus (*Harris*).

1. ÆPYCEROS MELAMPUS. The PALLAH OR ROOYE BOC.

Bay, sides paler beneath; belly, anal disc and lower side of tail white; crown, anal streak and tip of tail blackish; tuft above feet and back of feet black.

Antilope Melampus, Licht.; H. Smith, t. 181. f. 7; Harris, W. A. Africa, t. 15.

Inhabits S. Africa. Brit. Mus.

8. ANTILOPE, H. Smith; *Cervicapra*, Gray.

Horns elongate, subspiral, erect, diverging; face tapering, nose simple; tear-bag large. India; gregarious.

1. ANTILOPE BEZOARTICA. The ANTELOPE.

Grey brown; lips, orbits, chest, lower part of sides and belly, edge and inside of limbs white; nose, front of shoulder and outside of thigh, end of tail and front of feet blackish; neck redder.

Capra bezoartica, Aldrov.—*C. Cervicapra*, Linn., ? H. Smith.—*A. Cervicapra*, Pallas, Gray, Illust. Ind. Zool. t. .—*Antilope*, F. Cuv. Mam. Lith. t. . ♀.—*Cervicapra bezoartica*, Gray, Knowsley Men. 6.

Var. and young. A narrow pale streak on the upper part of each side.

Antilope bilineata, Temm., Gray, Illust. Ind. Zool. t. .
Inhabits India. Brit. Mus.

- B. *Horns small, slender, straight, conical, tapering, more or less diverging and often bent forward at the tip; the muffle is generally large and moist.*

† *Tear-bag large; muffle generally large.*

9. TETRACERUS, Leach.

Muffle large; tear-bag large, longitudinal; horns, two pair very short, conical, straight; knee-tufts none: female hornless.

1. TETRACERUS QUADRICORNIS. The CHOUKA.

Front pair of horns conical, distinct.

T. quadricornis, H. Smith, G. A. K. t. 181. f. 3. t. 186.—*Antilope quadricornis*, Blainv.—*A. striaticornis*, Leach.—*A. tetracornis*, Hodgson.—*A. Chickara*, Hardw.; H. Smith.—*T. Chicara*, F. Cuv. Mam. t. . ♂.—*Cervus albipes*, F. Cuv. Mam. Lith. t. . female.

Inhabits India, Himalaya. Brit. Mus. Thibet. Mus. Ind. Comp.

M. De Blainville in describing this animal has read *Moorshadabad*, the habitat, for *Hoornadabad*, and thought it the name of the animal.

2. TETRACERUS SUBQUADRICORNUTUS. The JUNGLIBUKRA.

Front pair of horns rudimentary, tubercular; hinder horns conical, subcylindrical; pale brown; side rather paler; chest, belly, inside and front of legs whitish; feet paler, varied.

Var. Female, front of legs blackish.

Antilope subquadricornutus, Elliot, Madras Journ. 35. t. 4. f. 2.—*Brown Antelope*, Sykes.

Inhabits Madras. Brit. Mus. Larger than the former.

Mr. Hodgson, in MacClelland's Calcutta Journ. Nat. Hist. 1847, notices and figures five species of this genus: 1. *T. Iodes* (rusty-red), t. 4. f. 3, and 2. *T. paccerois* (full-horned), t. 4. f. 1, 2, from skull.

10. CALOTRAGUS, (part) Sundevall; *Oreotragus*, (part) Gray; *Redunca*, (part) H. Smith; *Tragulus*, H. Smith; *Cervicapra*, sp. Blainv.

Muffle large; tear-bag arched, transverse; horns subulate, elongate, erect; hoofs triangular, flattish beneath, acute in front; crown smooth; tail very short; groin and orbit nakedish: females hornless; teats four; the knees not tufted; inguinal pore none; ear elongate; false hoof small or none.

* *False hoofs none.*

1. CALOTRAGUS TRAGULUS. The STEINBOC.

Fulvous, ashy; hair uniform; small spot on nose, and two diverging streaks on crown to nape blacker; upper part of throat, chest and abdomen white; ears three-fourths the length of the head; false hoofs none.

Antilope Tragulus, Forster, Licht. t. 14.—*A. rupestris*, H. Smith; Harris, W. A. A. t. 25. f. 2.—*A. campestris*, Thunb. 1811; Afzelius, 1815.—*A. pallida*, H. Smith.—*A. Pediotragus*, Afzelius.—*A. fulvorumbrubescens*, Desmoul.—*A. rufescens*, H. Smith, G. A. K. t. 188.—*Calotragus tragulus*, Gray, Knowsley Menag. 7.

Var. Without the black crown-streaks, throat whiter.

Inhabits S. Africa. Brit. Mus.

This species varies much in colour, perhaps according to the season: sometimes the hairs are whitish at the tip, giving the fur a glaucous appearance; the black streaks are as distinct in the young as in the adult.

** *False hoofs small.*

2. CALOTRAGUS MELANOTIS. The GRAYS BOG.

Red bay, with intermixed white hairs, crown with two dark streaks; ears two-thirds the length of head; false hoofs small.

Antilope Melanotis, Thunb. 1811; Afzelius; Licht. S. t. 12; Harris, W. A. A. t. 26.—*A. grisea*, Cuvier, D. S. N. ii. 244, 1816; H. Smith.—*A. rubro-albescens*, Desmoul.—*Calotragus melanotis*, Gray, Knowsley Menag. 7.

Var. *pallida*. Pale ashy white, hairs some white, others lead-coloured with grey tips. Brit. Mus.

Inhabits S. Africa. Brit. Mus.

11. SCOPOPHORUS, Gray; *Calotragus*, part Sundevall.

Muffle small, bald; tear-bag transverse; horns subulate, elongate, acute, slightly recurved at the tip; knees largely tufted; inguinal pores distinct and bearded; ears moderate, with a naked spot on the outside of their base; hoofs triangular, false hoof distinct.

1. SCOPOPHORUS OUREBI. The OUREBI.

Temple-spot small, indistinct; fur red-brown; cheeks paler; crown darker red brown; orbits, chest, belly, and middle of upper

part of inner side of legs white; end of tail, arched line before the eye and spot between the ears black.

Var. End of nose blackish.

Antilope Scoparius, Schreb. Licht. S. t. 13.—*A. Ourebi*, Shaw; Lesson.—*Ourebi*, Buffon, not F. Cuvier.—*A. melanura*, Bechst.

Inhabits S. Africa, Cape of Good Hope. Brit. Mus.

2. SCOPOPHORUS MONTANUS. The GIBARI.

Temple-spot large, deep (more than half an inch over), naked; fur greyish brown; cheeks paler; crown red brown; orbits, chest, belly, under side of tail and middle of the inner side of the upper parts of the legs white; end of tail and arched line before the eye black.

Antilope montanus, Rüppell, Zool. t. .—*Scopophorus montanus*, Gray, Knowsley Menag. t. 5.

Inhabits W. and E. Africa; Abyssinia (*Rüppell*); Gambia. Called Gebari, or Mahomet's Antelope (*Earl of Derby*). Brit. Mus.

Very like the former, but grey brown, and the temporal spot much larger, deeper, more distinct and bald, both when alive and in the skin, so that it does not depend on the stuffing.

12. OREOTRAGUS, Gray, Sundevall; *Tragulus*, H. Smith, not Pallas.

Muffle large; tear-bag arched, transverse; horns subulate, elongate; hoofs squareish, high, compressed, much-contracted, concave beneath; false hoofs large, blunt; crown smooth; tail very short; hair thick, quill-like, spread out: female hornless; teats two.

1. OREOTRAGUS SALTATRIX. The KIANSI or KLIPPSPRINGER.

Dark brown, yellow grised; hair grey, brown at the end, with a short yellow tip; beneath whitish; edge of ears and feet above the hoofs black.

Antilope Oreotragus, Forster; H. Smith; Licht. Saugth. t. 15.—*A. saltatrix*, Bodd.; Harris, W. A. A. t. 24.—*Oreotragus saltatrix*, Sundev.; Gray, Knowsley Men. 8.

Inhabits S. Africa; Abyssinia (*Rüppell*). Brit. Mus.

Varies in brightness and depth of colour according to the season.

13. NESOTRAGUS, Von Duben, Sundev. MSS.

“Muffle large, bald; lachrymal sinus deep, large; face and forehead not crested; ears large; horns in males large; false hoofs none; tail very short.

Very like *Neotragus* in form and character.

1. NESOTRAGUS MOSCHATUS. The NESOTRAGUS.

Reddish grey; belly white; feet pale red; hair of back brown, with a pale subterminal band and black tip.

Nesotragus moschatus, Von Duben; Sundev. Vet. Ac. Oefversigt, 1846, 221; Pecora, 134; Gray, Knowsley Menag. 8.

Inhabits Zanzebar, east coast of Africa. Male and female in the Stockholm Museum.”

14. NEOTRAGUS, H. Smith; *Madoqua*, Ogilby.

Muffle none; nose ovine; nostrils close together; false hoofs very small; tear-bag roundish; tail very short; crown crested.

1. NEOTRAGUS SALTIANA. The MADOQUA.

Antelope Saltiana, Blainv.—*A. Hemprichianus*, Ehrenb. S. P. t. 7; Licht. Saugth. t. 16.—*Neotragus madoka*, H. Smith.—*A. Grimmia*, Rüppell.—*A. Hemprichii*, Rüppell, Abyss. 25.—*N. Saltiana*, Gray, Knowsley Menag. 8.—*N. Hemprichianus*, Sundev.

Inhabits Abyssinia. Brit. Mus.

†† *A glandular line on the side of the face, in the place of the tear-bag; and the muffle large and bald.*

15. CEPHALOPHUS, H. Smith; *Sylvicapra*, Ogilby, Sundev.

Muffle large; tear-bag none, but a naked, glandular line, formed of two series of pores, on the side of the cheek; crown crested, ending in a tuft between the horns.

* “*Knees and hind legs tufted; ears and horns elongate; tear-bag small, under the eye, and a narrow naked streak on cheek.*”

1. CEPHALOPHUS? QUADRISCOPE. The FOUR-TUFTED ANTELOPE.

“Buff, paler on the sides; tail, knee-tufts, front of nose, narrow inferior lateral and anal streak and streaks across legs blackish; lips, breast, belly, inside of limbs, vent and houghs white.”

Antelope quadriscopa, H. Smith, G. A. K. iv. 261. t. 188.—*Cephalophus? quadriscopa*, Gray, Knowsley Menag. 8.

“Inhabits Senegal.”

This species is only known from Colonel H. Smith’s description and figure.

** *Knees not tufted; ears elongate acute; horns slender, elongated.*

2. CEPHALOPHUS GRIMMIA. The IMPOON or DUYKER or DUYKER BOG.

Yellowish brown, greyish in winter; hair yellowish, with blackish tip; forehead yellowish bay; inside of ears, chin, throat, abdomen and under side of tail white; feet, streak on the nose, up the legs, and upper part of tail black; ears elongate, nearly as long as head, acute; horns black, elongate, slender, base rugose and subangular in front.

Capra Grimmia, Linn. S. N. (ed. 10) 70.—*Moschus Grimmia*, Linn. S. N. (ed. 12).—*Antelope mergens*, Blainv. Bull. Soc. Phil. 1817; H. Smith, G. A. K. v. 264; Licht. Saugth. t. 11; Harris, W. A. A. t. 15.—*A. nictitans*, Thunb. Mem. Petersb. 1811, iii. 312.—*A. Burchellii*, H. Smith, G. A. K. v. 262. adult in summer?—*A. Ptoox*, H. Smith, G. A. K. v. 265? jun.?—*A. Platous*, H. Smith, G. A. K. v. 266.—*Ceph. Grimmia*, Gray, Knowsley Menag. t. 1. f. 1, t. 2. f. 1, 2. Inhabits S. Africa. Brit. Mus.

This species varies greatly in the intensity of the colours and in the extent of the black on the feet and nose. In one young specimen in the British Museum the black on the nose is quite deficient; though it has the bright colouring of the breeding-season, and is bright bay on the crown.

The specimen in the Museum of the London Missionary Society (No. 8 Blomfield Street, Moorfields, formerly in Austin Friars), Case 5, described by Colonel H. Smith under the name of *A. Platous*, is the size and has the horns and ears of an adult *C. Grimmia*, but differs in being paler, and having no dark colour on the nose or feet; but it is evidently much bleached. It has certainly no relation to the *C. sylvicultrix*, with which Colonel Smith was afterwards inclined to place it as a variety (Griff. A. K. Syn. v. 344).

There are three species which have been called *Antilope Grimmia*:—

1. The *Capra sylvestris africana* of N. Grimm, Misc. Cur. No. rimb. 1705, 131. t. 13, the authority for *Capra Grimmii*, Ray, Syn. 80, and Linn. S. N. (ed. 10) 70. *Moschus Grimmia*, Linn. S. N. ed. 12, from the Cape, of a dull grey colour. Probably the Duyker.

2. *Le Grimme* of Buffon, H. N. xii. 307. 329. t. 41. f. 2, 3, from a head sent from Senegal by Adanson; the *Antilope Grimmia* of Desmarest, F. Cuvier, and H. Smith, &c.; the *Cephalophus rufilatus*.

3. The *A. Grimmia* of Pallas, with large ears and a black streak to the horns, like *C. Campbelliæ*, but is from Guinea. I know of no species common to the W. and S. coast of Africa, so that it is probably yet to be distinguished.

The "*Fitomba*" or "*Philantomba*" appears to be the generic name of all the W. African *Cephalophi* or Bush Antelopes.

3. CEPHALOPHUS CAMPBELLIÆ. THE BLACK-FACED PHILANTOMBA.

Grey and black grised, beneath white; cheeks, neck and chest yellowish; forehead yellow, with a black streak on the nose widening on the forehead and ending in a tuft behind the horns; feet and front of fore-legs reddish black; fur soft; hair grey, with black ring and tip; ears elongate acute.

Antilope Grimmia, Pallas, Spic. Zool. xii. 18. t. 1?—*C. Burchellii*, var. (*C. Campbelliæ*), Gray, Cat. B. M. 162.—*C. Campbelliæ*, Gray, Ann. and Mag. Nat. Hist. 1846, 164; Knowsley Menag. 9. t. 2. f. 3.

Inhabits S. Africa. Brit. Mus.

This species is at once known from the Duyker by being much darker and distinctly grised or dotted, and the under side being much whiter.

We have an adult female of this species sent us as *A. mergens*, var. *Burchellii*, by M. Sundevall (the other specimen of the same name being a true Duyker), and a young specimen which has been in the British Museum for several years, sent from Africa, under the generic name of *Philantomba*, by Mrs. Campbell.

The *A. Grimmia* of Pallas, Spic. Zool. i. 18. t. 3, which he describes as grey grised, becoming brownish ash on the buttocks; throat, chest and beneath the body white; head and neck yellowish

grey; a black streak between the horns, forming a fascia on the forehead and broader on the nose; fur softer than the Deer, but rough, of lower part of the neck rougher and more lax; feet and line on fore-legs blackish; tail black above; ears rather acute: inhabits Guinea; agrees in most respects with this species, but most probably is yet to be procured from W. Africa.

*** *Knees not tufted; ears moderate, acute; horns short, conical, thick.*

4. CEPHALOPHUS MADOQUA. THE ABYSSINIAN BUSH BUCK.

Yellowish brown, slightly punctulated with black; neck yellowish; limbs blacker; face-streak and feet black; hair rather rigid, close-pressed, reddish grey at the base, end polished yellow brown, with dark tips; forehead reddish.

Antilope Madoqua, Rüpp. Abyss. t. 7. f. 2; Sundev.—*Madoqua*, Bruce's Travels, vii. 360. t. 56.—*C. Madoqua*, Gray, Knows. Men. 9. Inhabits Abyssinia. Mus. Frankfort.

This species is very distinct from *C. coronatus*, being darker, and the fur more rigid and close-pressed.

5. CEPHALOPHUS CORONATUS. THE RED-CROWNED BUSH BUCK.

Pale yellowish brown; middle of back and front of fore-legs varied with a few scattered black hairs; crown bright bay; crest blackish brown, bay in front; feet and streak up the nose blackish; inside of ears, chin, throat, chest, belly and inner side of legs whitish; horns short, conical; ears about half as long as the head, acute.

Cephalophus coronatus, Gray, Ann. and Mag. Nat. Hist. x. 1842, 266. 1846, 164; Knowsley Menag. 9. t. 6. f. 1, 2.

Inhabits W. Africa; Gambia, Macarthy's Island. Mr. Whitfield called it *The Coquetoon*. Brit. Mus.

**** *Knees not tufted; ears moderate, rounded; horns conical, thick; without any streak over the eyes.*

6. CEPHALOPHUS SYLVICULTRIX. THE WHITE-BACKED BUSH BUCK.

Blackish brown, minutely grised; hair brown, with whitish tips; back with a large yellowish white spot, narrow in front; throat, chest and belly redder; crown, nape and legs darker; horns — ?

Antilope sylvicultrix, Afzelius, N. Act. Upsal. vii. 1238; H. Smith, G. A. K. t. 187.—*C. sylvicultrix*, Gray, Knowsley Menag. 10. t. 8. f. 1. Inhabits Sierra Leone, in swampy places. Brit. Mus.

Varies in the size of the dorsal spot.

In the British Museum is a young male: length 29 inches; height 18; tarsus 6·9.

7. CEPHALOPHUS OGILBII. THE BLACK-STRIPED BUSH BUCK.

Pale bay brown, with a deep black dorsal streak; beneath pale; crown and haunches brighter bay; neck and withers, and sides of the

dorsal line varied with deep brown hairs; streak up the fore-leg, upper part of hock, feet (above the hoof) and end of tail blackish; horns short, thick, conical, very rugose on the inner front edges of the base.

Cephalophus Ogilbii, Gray, Ann. and Mag. Nat. Hist. 1842; Knowsley Menag. 10. t. 8. f. 2; Frazer, Zool. Typ. t. — *Antilope Ogilbii*, Waterh. P. Z. S. 1838, 60. 1842, 129.

Inhabits Fernando Po (*J. Thompson, Esq.*). Brit. Mus. Not half the size of the preceding.

8. CEPHALOPHUS DORSALIS. The BAY BUSH GOAT.

Dark bay; shoulders and legs darker; hair brown, a few on the haunches white-tipped; crown and nape, broad streak along the back to end of tail black; spot over each eye; lips, sides of chin, front of chest, under side of tail and inside of thighs pale brown.

Cephalophus dorsalis, Gray, Ann. and Mag. Nat. Hist. 1846, 165; Knowsley Menag. 10. t. 7. f. 1.

Inhabits Sierra Leone: called *Bush Goat*. Brit. Mus. The head is very large, the skull short, broad, forehead rounded.

9. CEPHALOPHUS NIGER. The BLACK BUSH BUCK.

Sooty black, greyer in the front half of the body; chin, throat, abdomen and inside of thighs grey; forehead and crown dark bay and black mixed: cheeks pale brown and black varied; tail, end whitish.

Antilope niger, Mus. Leyden.—*Cephalophus niger*, Gray, Ann. and Mag. Nat. Hist. 1846, 165; Knowsley Menag. 10. t. 7. f. 2.

Inhabits Guinea. British Museum. Sierra Leone (*Mr. Whitfield*). Knowsley Museum.

In the British Museum there is a male from the Leyden Museum, nearly as large as the former.

10. CEPHALOPHUS NATALENSIS. The NATAL BUSH BUCK.

Bright red bay; nape, withers and feet varied with dark grey hairs; nose-streak short, blackish; lips, chin, upper part of throat and end of tail white; lower part of cheeks, throat and abdomen pale yellowish; crown and tuft bright red; horns short, conical.

Antilope natalensis, A. Smith, S. Afr. Quart. Journ. 217; Illust. Z. S. A. t. 32.—*Cephalophus natalensis*, Gray, Knowsley Menag. 10.

Inhabits S. Africa. Port Natal. Brit. Mus. Five specimens of different ages. Resembles *C. Ogilbii* in size and colouring, but wants the dorsal streak. The females are horned.

11. CEPHALOPHUS RUFILATUS. The COQUETOON.

Deep reddish bay; legs, nape, streak on the nose to the crown and broad streak on the back blackish grey; ears blackish; crest and upper part of tail black; cheeks rather paler; chin and abdomen pale yellowish; inside of ears whitish, with a brown spot on the outer side; horns conical, rather elongate, obscurely annulated, slightly recurved.

Cephalophus rufilatus, Gray, Ann. and Mag. Nat. Hist. 1846, 166; Knowsley Menag. 10. t. 9.—*Antilope Grimmeria*, H. Smith, G. A. K. v. 266.—*Le Grimme*, Buffon, H. N. xii. t. 41. f. 2, 3?

Var. 1. Sides paler, greyish red; forehead rough.

Le Grimme, F. Cuv. Mamm. Lithog. t. . not good.

Inhabits Sierra Leone, called *Coquatoon*. Brit. Mus.

The hair is rather paler at the base, of the dorsal streak grey, with a blackish tip.

M. F. Cuvier's (Mamm. Lithog. t. .) figure is the pale variety, which Mr. Whitfield regards as distinct; he says it is called *Grimme* by the natives: the separate head of Cuvier's plate appears to have been taken from the *Guevei*.

**** *Knees not tufted; ears moderate, rounded; horns short, thick, conical; head with a pale streak on each side over the eyes to the base of the horns.*

12. CEPHALOPHUS MAXWELLII. The GUEVEI.

Grey brown or sooty brown; sides of head and body greyer; chin, throat, chest and belly whitish grey; abdomen and front of thigh white; broad streak over each eye to the base of the horns yellowish white; feet and end of nose rather darker; fur rather rigid; hair uniform.

Antilope Maxwellii, H. Smith, G. A. K. iv. 267.—*A. pygmea*, Pal-las, Spic. xii. 18?—*The Guevei*, Buffon, H. N.—*A. pygmea (Guevei)*, F. Cuv. Mamm. Lithog. t. . good.—*A. Federici*, Laur.; Sundev.—*A. Philantomba*, Ogilby, P. Z. S. 1836, 121; 1839, 27.—*Cephalophus Maxwellii*, Gray, Knowsley Menag. 11. t. 12.

Inhabits W. Africa. Brit. Mus.

The adult male in the British Museum is bright sooty brown, darker near the rump; the female is nearly uniform pale grey brown. It is well figured by M. F. Cuvier. It is known from *C. monticola* by being larger, by the whiteness of the eye-streak, and of the front of the thigh and chest.

13. CEPHALOPHUS MONTICOLA. The NOUMETGE or CAPE GUEVEI.

Grey brown; streak over the eyes, legs and outer part of thighs rufous; feet grey brown; chin, chest, abdomen, and under side of tail and inside of ears white; fur soft, grey, with intermixed rather rigid black hairs.

Antilope monticola, Thunb. Stockh. N. H. xxxii. t. 5.—*A. cærulea*, H. Smith, G. A. K. v. 855; Daniell's Afr. Scen. t. ; Harris, W. A. A. t. 26.—*A. perpusilla*, H. Smith, G. A. K. v. 854.—*A. pygmea*, Licht. Saugth. t. 16; Sundevall.—*Cephalophus monticola*, Gray, Knowsley Menag. 11.

Inhabits S. Africa. Brit. Mus.

The colours vary in intensity; in a female in the British Museum, the rufous colour of the thighs and the white of the chest are more distinct than in the male, but this may depend on the season when

they were killed. A very young fawn (perhaps hardly born), which was brought home from the Cape by M. Verreaux, is darker, and the reddish tint extends over nearly the whole body.

Thunberg described the South African species, but says that there is a specimen in the Stockholm Museum, brought by Afzelius from Sierra Leone, which agrees with his animal; so he evidently did not observe the difference between the two species.

14. CEPHALOPHUS MELANORHEUS. The BLACK-RUMPED GUEVEI.

Grey brown; throat and sides paler; rump and upper part of tail black; chin, chest, abdomen, back and front edge of thighs and under part of tail white; narrow streak over the eyes whitish; feet like the back; fur soft, pale grey, with intermixed rather rigid black hairs.

Cephalophus melanorheus, Gray, Ann. and Mag. Nat. Hist. 1846; Knowsley Menag. 11. t. 10.—*C. Philantomba*, Gray, Cat. Mamm. B. M. 163 (not H. Smith).

Inhabits Fernando Po (*J. Thompson, Esq.*). Brit. Mus.

This species is coloured like the *Guevei* from W. Africa, but smaller, and have the soft fur and interspersed black hair of the *Cape Guevei*, *C. monticola*, but they are easily known by the black mark on the rump.

15. CEPHALOPHUS PUNCTULATUS. The GRISLED GUEVEI.

Dark fulvous brown; sides and legs rather paler; narrow streak over the eyes and inside of ears pale brown; chin, throat, chest, belly and front of thighs and under part of tail white; hair grey at the base, with brown ends and yellow subterminal rings; crown and upper part of tail darker; feet pale, varied.

Cephalophus punctulatus, Gray, Ann. and Mag. Nat. Hist. 1846; Knowsley Menag. 11. t. 11. f. 1.

Inhabits Sierra Leone. Brit. Mus. A young specimen presented by Colonel Sabine, R.E.

It is at once known from the other *Gueveis* by the fulvous colour which is produced by the yellow subterminal rings of the hairs.

Colonel H. Smith indicates a species under the name of *C. Philantomba*, but so indistinctly, that it is impossible to know for what it is intended.

16. CEPHALOPHUS WHITFIELDII. The WHITE-FOOTED GUEVEI.

Yellowish ash; shoulders, outside of limbs and hinder parts of back rather darker; ears and crown pale yellowish brown; streak over the eyes, cheeks, throat, belly, inside of the limbs and ring round the feet above the hoof ashy white; hair ashy grey; of the back brown at the end, with a yellow tip.

Cephalophus Whitfieldii, Gray, Knowsley Menag. 12. t. 11. f. 2.

Inhabits Gambia (*Mr. Whitfield*). Mus. Brit. Young.

Smaller than the *Grisled Guevei*, and much paler and yellower.

***** *No tear-bag nor glandular streak on the face, and the muffle large and moist; crown smooth.*

16. NANOTRAGUS, Sundev.; *Neotragus*, part H. Smith.

Horns very short, conical; legs slender; tail subpectinate; hoofs small, triangular, false hoofs none; crown not crested; ears small, rounded.

1. NANOTRAGUS PERPUSILLUS. The ROYAL ANTELOPE.

Fulvous; throat, belly and edge of thighs and tip of tail white.

Capra perpusilla, Linn. Mus. Ad. Fred. i. 12.—*Moschus pygmeus*, Linn. S. N. (ed. 12) 92.—*Antilope pygmea*, Pallas, Spic. Zool. xii. 18; Cuv. D. S. N. ii. 241; H. Smith.—*A. regia*, Erxleben, 278.—*A. spiniger*, Temm. Monog.—*Nanotragus regius*, Gray, Knowsley Menag. 12.—*Royal Antelope*, Penn.

Inhabits W. Africa; Guinea. Brit. Mus.

The smallest-hoofed animal. The feet were formerly often used as tobacco-stoppers, and are figured mounted by Seba, t. 43. f. a, b; Buffon, H. N. xii. t. 42, 43.

17. ELEOTRAGUS, Gray; *Redunca*, H. Smith; *Cerricapra*, Blainv., Sundev.; *Nagor*, Laur.; *Sylvicapra*, Ogilby.

Horns conical, bent back and then forward at the top; hoofs and false hoofs rather large; tear-bag none; teats four; inguinal pores distinct.

† *Horns erect, slender, and face narrow; nose swollen; muffle large, extended far behind the nostrils; fur woolly hair.* PELEA. S. Africa.

1. ELEOTRAGUS CAPREOLUS. The REHBOCK or PEELE.

Temple-spot none; head slender, compressed; horns erect, scarcely diverging, very slender; fur short, woolly, grey brown; back redder; throat and beneath white; end of nose and chin blackish; feet darker.

Antilope Capreolus, Thunb.; Afzelius, N. Act. Upsal. vii. 251. 1818; Licht. Saugth. t. 8; Harris, W. A. A. t. 25. f. 1.—*A. villosa*, Burchell, 1822; H. Smith.—*A. lanata*, Desmoul.—*Eleotragus Capreolus*, Gray, Knowsley Menag. t. 12. from life.

Inhabits S. Africa. Brit. Mus. Knowsley, living.

†† *Horns diverging, thick, conical; head broad; nose not swollen.*

* *Muffle large, extended far behind nostrils; fur grised, harsh, straight, with a subterminal pale band, and often whorled; a naked spot on the temple.* South Africa.

2. ELEOTRAGUS ARUNDINACEUS. The INGHALLA or REIT BOCK.

Head broad; temple-spot naked; horns diverging, conical, tapering. Brown, yellow grised; hair pale brown, with a subterminal yellow band; cheeks and neck yellower; base of ears, chest, belly and insides of the legs and under side of bushy tail white; front of legs black.

Antilope arundinacea, Shaw, Zool.—*A. Eleotragus*, Schreb. Licht. t. 9; H. Smith; Harris, W. A. A. t. 26.—*A. redunca*, H. Smith; Gray, Cat. B. M.—*A. cinerea*, Afzelius, 1815.—*A. Lalandii*, Desm.; Fischer.—*A. Lalandiana*, Desm.—*Eleotragus arundinaceus*, Gray, Knowsley Menag. 12.

Var. Larger.

A. Isabellina, Afzelius, N. Act. Upsal. 1815, vii. 244; Licht. t. 10; H. Smith; Sundev.

Var. With a large black rhombic spot on the back of the head behind the ears. Female in Brit. Mus.

Inhabits S. Africa, in marshy places. Brit. Mus.

Afzelius, Lichtenstein, H. Smith and Sundevall have described two species of this genus as coming from South Africa; the smaller they call *A. Eleotragus*, and the larger *A. Isabellina*. The latter author has given a comparative character between the two kinds, but he has only seen two specimens of the former (a male at Berlin and a female at Stockholm), and several specimens of the larger kind. I have examined with care a series consisting of four males and five females from different parts of South Africa, and can find no distinction between them, except a slight difference in the length of the fur and in its colour. Two specimens in the British Museum are larger than the rest, and have the tarsus one-fourth longer than the others; they have a shorter fur and are of a rather brighter colour, and the front of the leg is blacker; but the fur and colour probably depend on the season when they were killed. In these respects they agree with Sundevall's description of *A. Isabellina*, but they both have the temporal spot large and quite naked, while Prof. Sundevall described the spot on this species as pubescent. The female of the larger specimen that has the black spot on the back of the head; some of the smaller ones have the temple-spot much smaller and less naked than the others. The two larger specimens have a single whorl of hair in the middle of the back; the others, with longer hair, show the whorls more distinctly, and have the hair from the central whorls to the shoulders forming a more or less diverging line. After examining these specimens and those in other collections, I conclude that they form only a single species. M. Sundevall, in a note just received, observes, "Mr. Wahlberg considers *A. Isabellina* and *A. Eleotragus* as very distinct, and our specimens seem to show a difference, though not very well expressed. Also I have committed a mistake, for the young female described in my Synopsis as γ . under *A. Isabellina*, is really *A. Eleotragus*."

** *The muffle smaller, scarcely extending beyond the nostrils; fur fulvous, not grised; hair grey, with yellow tips; tail less bushy.*
W. and E. Africa.

3. ELEOTRAGUS REDUNCUS. THE WONTO OR NAGOR, OR RED ANTELOPE.

Head broad; horns conical, thick at the base, diverging; fulvous brown, rather pale on the sides; hair soft, yellow tipped, all in regu-

lar order; chin, throat, spot under ears and over eyes, inside of limbs, under side of tail and lower side of body white; front of leg sometimes blackish.

Antilope redunca, Pallas?; Rüppell, Abyss. t. 7, good.—*A. rufa*, Afzelius, 250, from Buffon.—*A. reversa*, Pallas?—*Nagor*, Buffon, xii. t. 46?—*Oureby*, F. Cuv. Mamm. Lithog. t. ♀.—*A. Isabellina*, Gray, Cat. Mamm. Brit. Mus.—*Eleotragus reduncus*, Gray, Knowsley Menag. 13. t. 13.

Inhabits "Senegal." Mus. Frankfort and Mus. Leyden. Gambia (*Whitfield*), where it is called *Wonto*. Male and fawn, British Museum, and a young male living at Knowsley, from the Gambia.

Var. Larger, colour brighter.

A. Bohor, Rüppell, Abyss. t. 7; Sundev.

Inhabits Abyssinia. Mus. Frankfort.

Pallas and Afzelius's account of this species is derived from Buffon's description; both he and Adanson (Hist. Nat. xii. 326) say that it is "all pale red," and Buffon further observes that it has not the white on the belly of the Gazelles. This does not agree with our animal, which is white in several parts, but certainly not so white as the Gazelle, and has black on the legs; but as yet no other animal has been brought from West Africa, which better agrees with their account or figure.

M. Sundevall considers specimens of the *Nagor* of Senegal and the *Bohor* of Abyssinia, in the Frankfort Museum, as distinct, the former having the hair of the back whorled, the fore-leg with a dark stripe, and the latter having the hair not whorled and the legs pale. Our specimens, from Gambia, have the hair not whorled, and more or less distinct streaks on the fore-legs; hence I am inclined to believe the *Nagor* and the *Bohor* to be alike. Sundevall's animal may be the *Kob*, but that has only one whorl on each end of the back, a nearly cervine muffle, and the end of the tail black.

When in Frankfort, I observed that the male *Antilope Bohor*, from Abyssinia, was rather larger than the male of "*A. redunca*," from Senegal, in the same collection, and much brighter, and the horns more slender; the female was darker and browner than the male; both sexes have more black on the carpus and tarsus than in the specimen of *A. redunca* in the same museum.

Colonel Hamilton Smith formed a genus for two pairs of horns on part of the frontal bones in the College of Surgeons belonging to this group of Antelopes, which he called *Raphicerus acuticornis* and *R. subulata* (Griffith, A. K. t. 181. f. 2, 1). The figures are not sufficient to identify the species, and we now know that the horns of the same species differ greatly in individuals of the same species, and during the growth of the same specimen. *R. acuticornis* may be the horns of the *Duyker Boc*, *Ceph. Grimmia*?

2. The CERVINE ANTELOPES have an elongated tail, cylindrical at the base, and with long hair at the end, often forming a compressed ridge; the body heavy and the limbs strong. They are of a large size.

A. Neck not maned.

18. ADENOTA.

Muffle cordate, moderate, cervine; nose hairy between the back of the nostrils; horns sublyrate, ringed, when young rather recurved; place of tear-bag covered with a tuft of hair; hair of the back whorled, of dorsal line and back of head reversed; tail elongate, hairy.

This genus is very like *Eleotragus*, but has a smaller, more cervine muzzle and lyrated horns; it differs from *Cobus* in the form of the tail, and wanting the mane, and from both in having a tuft of hair in the front of the orbit.

* *Horns sublyrate; tail hairy.*

1. ADENOTA KOB. The ÆQUITOON.

Pale brown; end of nose, inside of ears, chest, belly, inside of legs and thighs, tip of tail, and band above hoofs white; front of fore and hind legs, and end of ears and tail black; hair of the dorsal line reversed, with a whorl on the shoulders and loins.

Antilope Kob, Erxl. from *Kob*, Buffon, H. N. xii. t. 32. f. 1? —*Kobus Adansonii*, A. Smith, from Buffon.—*Gambian Antelope*, Penn. Syn. 39, from Buffon.—*A. adenota*, H. Smith, G. A. K. iv. 224. t. 184. and t. 183. f. 3, 4. horns?

A. Kob, Ogilby, P. Z. S. 1836.—*A. annulipes*, Gray, Ann. and Mag. Nat. Hist. 1843.—*Adenota Kob*, Gray, Knows. Menag. 14. t. 14, 15.

Var. Female, hair longer, sides of face whitish.

A. sing-sing, Gray, Cat. Mamm. Brit. Mus. 159, not Bennett.

Inhabits W. Africa; Gambia. Called *Æquitoon* by the Joliffs, and *Kob* by the Mandingoes.

A fine pair has been at Knowsley some years. Thinking them new, I described them as *A. annulipes*. Mr. Ogilby has called it the *Nagor*, but it is scarcely the *Nagor* of Buffon. An adult male noticed by Mr. Ogilby as the *Kob* is now in the Museum of the Zoological Society; its horns, like the male at Knowsley, are much worn down. They whistle like a stag.

Buffon (H. N. xii. 219. t. 32. f. 1) figures a skull with horns, brought from Senegal by Adanson, under the name of *Kob*, which is also called the *Petit vache brune*. Erxleben gave this figure the name of *A. kob*, and Pennant called it the *Gambian Antelope*, Syn. i. 39. The figures somewhat resemble the head of a half-grown male of this species, but the horns are longer, and have more rings than the specimen in the British Museum; but I am inclined to agree with Mr. Ogilby in believing that it was intended for this species. In the Jardin des Plantes they called the Sing-Sing the *Kob* of Senegal; this may be a mistake for the *Koba*. I may remark that the horns of the *Koba* in the same plate of Buffon are represented with more rings than are mentioned in the description.

Colonel Hamilton Smith describes and figures a male and female specimen which were alive in Exeter Change, and figures the male and its skull and horns under the name of *A. adenota*, which well

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agrees with this species, and has the peculiar distribution of its hair ; hence its name : but he says, it has "a long open suborbital slit, and small black brushes on the knees;" but this I suspect must be a mistake, as he himself observes no lachrymal cavity was found in the skull. He might have mistaken the tuft of hair for the gland at the distance at which he saw the specimens. He also (G. A. K. iv. 221) described a specimen which was in Exeter Change, which he regarded as the *Gambian Antelope* of Pennant, and calls *A. forfex*. His characters agree in most particulars with this species, but he says it had "a long lachrymal sinus, and had small brushes on the knees." If there was not some mistake in transcribing these descriptions, both these animals should be *Gazellas*, but I have never seen any which agreed with them.

The young male in the British Museum shows the development of the horns of these animals. The upper rings of the growing horn fall off in large thick flakes as the horn increases in size beneath : this explains how the extent of the smooth tapering part of the horns increases in length as the horn grows, and how the number of rings are found to be nearly the same in the various ages, and different individuals of the various species. Mr. Whitfield informs me that the scrotum is rarely developed or dependent externally in different kinds of Antelopes before they have completed their first year.

** *Horns elongate, recurved at the tip ; tail slender, end tufted.*

2. ADENOTA LECHÈ. The LECHÈ. (Mammalia, Pl. XX.)

Pale brown ; orbits, chest and beneath white ; front of legs dark brown ; fur short, adpressed, upper part of nape and withers with a small whorl of hair ; tail slender at the base.

Léchee, *Oswell*, *Journ. Roy. Geog. Soc.* xx. 150, 1850.—*Kobus Lechè*, *Gray*, *Knowsley Menag.* 23.

Inhabits S. Africa ; bank of river Zouga, lat. 22° S. (*Capt. Frank Vardon*). *Oswell*, l. c. 150, *Brit. Mus.*

This animal is nearly as large as the *Water Buck*. The horns are very like those of that animal ; the neck is covered with short adpressed hair, and has no appearance of a mane.

B. Neck maned on the sides.

19. KOBUS, H. Smith ; *Cervicapra*, § *Sundev.* ; *Ægocerus*, *Harris* ; *Kolus*, *Gesner*, *Gray*.

Horns elongate, sublyrate, bent back and then forward at the top ; muzzle cervine ; tear-bag none ; inguinal pores none ; hair rough, elongate ; neck covered with longer, diverging and drooping hair ; tail rather elongated, depressed, hairy on the sides and below : females hornless ; teats four ; animal very large.

1. KOBUS ELLIPSIPRYMNUS. The PHOTOMOK or WATERBUCK.

Rump with a whitish elliptical ring near the base of the tail, brownish ; horns converging at the tip.



Wolf del. et. lit.

LECHÉ Gray

Painted by Hammer, & Co.

Antelope Ellipsiprymna, Ogilby, P. Z. S. 1833, 47; Harris, W. A. Africa, t. 14.—*Kobus Ellipsiprymnus*, A. Smith, Illus. Z. S. A. t. 28, 29.—Gray, Knows. Menag. 15.

Inhabits S. Africa. Brit. Mus.

The horns figured as *A. Kemas?* (H. Smith, G. A. K. t. 181. f. 6) appear to belong to this species.

2. KOBUS SING-SING. The SING-SING.

Anal ring none. Reddish or yellowish grey brown, rather greyer on the shoulders; nose, lips and hinder part of the thighs, under the neck, from the ears to the gullet, a streak over each eye, and ring above the hoofs and false hoofs white; belly and legs blacker; end of tail, and legs from shoulder to hough black. Female greyer; belly and upper part of legs paler.

Antelope Sing-Sing, Bennett, Waterhouse, Cat. Zool. Soc. Mus. 41. n. 378.—*A. defassa*, Rüppell, Abyss. t. 3.—*A. unctuosa*, Laur., D'Orbig. Dict. Univ. H. N. i. t. 622. ♂. good.—*A. Koba*, Ogilby, Penny Cyclop. ii. 79. fig. ♀; P. Z. S. 1836, not Erxleben.—*Koba*, Buffon, H. N. xii. 210, 267. t. 32. f. 2, horns?—*Senegal Antelope*, Pennant, Syn. 38 (part from Buffon only).—*Kobus Sing-Sing*, Gray, Knows. Menag. 15.

Inhabits N. and W. Africa; Senegal; Gambia, where it is called *Kassimause* and *Kob* (*Whitfield*). Brit. Mus. Abyssinia (*Rüppell*). Mus. Frankfort.

This species varies much in the tint of the colouring, and in the length of the hair in the different seasons. In summer they are covered with very short, closely pressed fur, letting the skin be seen between the hairs. In the cold weather, and in England, the fur is longer and more abundant. The hair of the chin and neck is long and rigid in all seasons, and even in the young animals. The tail of the adult specimen is cylindrical and nearly bald, ending in a tuft of black hair; in the young specimens, especially in the winter fur, the base of the tail is fringed with hair on each side. The male is much brighter coloured, and the chest and belly are nearly black like the legs. The hinder parts of the rump of the young animals are greyish white; in the older specimens it becomes pure white and broader in extent.

This animal is called *Sing-Sing* by all the negroes. They do not think their flocks of cattle will be healthy or fruitful unless they have one of the Sing-Sings accompanying them, as some persons think a Goat necessary to be in a stable in England. The English on the Gambia call it the *Jackass Deer* from its appearance, and it is called *Koba* and *Kassimause* by the negroes at Macarthy's Island. Its flesh is very strong, unpleasant, and scarcely palatable.

As far as I could judge by my recollection and description, the adult specimen at Knowsley, the young male and adult female in the British Museum, the male and female at Frankfort, and the adult male in the Paris menageries, are the same species.

Buffon figured (Hist. Nat. 210, 267. xii. t. 32. f. 2) under the name of *Koba* a pair of horns which were in the library of St. Victor

at Paris. He described them as larger and more curved above than those of the *Kob*, eighteen inches long and five inches in circumference at the base, and he refers them to an animal which Adanson says is called *Koba* in Senegal, and the *Great Brown Cow* by the French colonists. Pallas refers these horns to *A. Pygargus*, and the figures and description agree in many particulars with the horns of that species; but they are rather longer, and have more rings. Pennant (Syn. Mam. 38) has given the name of *Senegal Antelope* to Buffon's short account and figure, but has added to it the description and the figure of the head of a skin which came from Amsterdam, and appears to be *A. Caama* of South Africa. Cuvier (Diet. Sci. Nat. ii. 235) has translated Pennant's name to *A. Senegalensis*. Erxleben (Syn. 293) and Zimmerman (Zool. 345) have translated Pennant's description of his skin of *A. Caama*, and called it *A. Koba*, referring to Buffon's description and Daubenton's figure. Fischer, Hamilton Smith and M. Sundevall regard the *Koba* of Buffon the same as the *Korrigum* of Denham and Clapperton, but the horns of that species are considerably longer and much thicker at the base than those described by Daubenton, and the annulations of the horns are higher and more regular: but it may be remarked that Buffon describes his horns as having eleven or twelve rings, but figures them as having seventeen or eighteen. Mr. Ogilby (Penny Cyclopædia and the Proceedings of the Zoological Society) considers Buffon's *Koba* to be the *Sing-Sing*; and in the length of the horns, and in the number, disposition and form of the rings, his figure more nearly agrees with the horns of that species than of that of the *A. Pygarga*, to which Pallas first referred it; but the horns are represented much more lyrated than any horns of the *Sing-Sing* I have seen; indeed, not one of the specimens which have come under my observation have had any inclination to assume that form: but as this is the only Western-African species which in any way agrees with Buffon's figure, perhaps it is best to adopt Mr. Ogilby's suggestion. The name of *Koba* or *Kob* appears to be common to many species. Schinz erroneously considers *Damalis Senegalensis*, *Antilope adenota* and *A. forfex* (H. Smith) as synonyms of this species.

c. *Nape with a linear, central, compressed, recurved mane.*

20. AIGOCERUS, H. Smith; *Egocerus*, Desm.;
Hippotragus, Sundev.

Horns conical, elongate, rather compressed, ringed, recurved; back of the neck with a linear reversed mane; tear-gland covered with a tuft of hair; teats two.

1. AIGOCERUS EQUINUS. The ETAAK or EQUINE ANTELOPE.

Spot above the eyes and pencil before the eyes fulvous grey; nose whitish; face black; nuchal mane distinct.

Aigoceros Equina, H. Smith; Harris, W. A. A. t. 21.—*A. glauca*, Forster.—*A. Osanne*, Geoff.—*A. barbata*, H. Smith.—*A. Truteri*, Fischer.—*A. aurita*, Burch. MSS.—*Capra Æthiopica*, Schinz.—

Tzeiran, Buffon, H. N. xii. t. 31. f. 6, horn.—*Aigocerus Equinus* and *A. leucophæus*, Gray, Knows. Men. 16.

Inhabits S. Africa. Brit. Mus. W. Africa; Gambia (*Whitfield*). Horns. Brit. Mus.

Var.? Smaller. "Fur glaucous grey; tuft before the eye short, brown; nuchal crest none; hoofs small."—*Sundevall*.

Antelope leucophæus, Pallas; H. Smith, G. A. K. v. t. 179.—*Aigocerus leucophæus*, Gray, Knows. Menag. 16.

Inhabits the Cape of Good Hope; now extinct. Mus. Stockholm, Mus. Upsal and Mus. Paris.

The head of the female covered with the skin from Macarthy's Island, on the coast of Gambia, which Mr. Whitfield brought home, did not appear to differ from the specimen from the Cape in the British Museum. The species does not appear to be uncommon in the locality, for Mr. Whitfield brought over several pairs of horns. He states the flesh is very good venison. "It is called *Dacoi* or *White Mouth* by the Mandingoes, *Kob* and *Koba* by the Joliffs, and *Vache brune* by the French at Senegal." This is certainly not the *Kob* of Buffon (xii. t. 32. f. 1, 2). The negroes at the Gambia declare that this animal never bears more than one fawn; for after that period, the horns increase in length, and enter the loins and destroy the animals!

Buffon (xii. 271. t. 31. f. 6) figures the horn of this species, which had been made into a powder-flask, under the name of *Tzeiran*.

A. barbata of Daniels appears to be only a bad drawing of this species.

The variety is the size of the Common Stag, *Cervus Elaphus*. M. Sundevall observes that it is as different from *A. Equina*, as the species of *Eleotragi* and *Tragelaphi* are from one another; and he observes, in a letter I have just received, "I must tell you, that after the inspection of a whole series of *A. Equina*, which Wahlberg brought home, I am convinced that the *A. leucophæa* of Pallas is a very distinct race. Our stuffed specimen, that must have been adult, has much smaller hoofs than the very young *A. Equina*, male as well as female, amongst Wahlberg's, and in the tuft over the lachrymal sinus, as I have shortly expressed in the printed survey."

When I examined the specimen at Paris I regarded it as a young or rather dwarf specimen of *A. Equina*, and the absence of the nuchal crest led to this belief; and I am not satisfied that the number of rings on the horns are a sufficient proof of its being adult.

2. AIGOCERUS NIGER. The BLACK BOK.

Black; female and young brown; face white, with a dark streak.

Antelope niger and *A. Harrisii*, Harris, Wild African Anim. t. 23.—*Aigocerus niger*, Gray, Knows. Menag. 17.

Inhabits S. Africa. Brit. Mus. Males and female and young.

21. ORYX, Blainv., H. Smith.

Horns elongate, subulate, ringed at the base, straight, or slightly arched, placed in a line with the face; neck maned above and below;

tear-bag none; nose subcervine, with a marginal muffle; hoofs narrowed in front, false hoofs large; teats four (two, *Harris*). In the skull there is a slight suborbital fissure, but no pit, and the grinders have supplementary lobes.

* *Horns straight.*

1. ORYX GAZELLA. The KOOKAAM or GEMSOB.

Horns straight, shelving backwards; throat with a bunch of black hairs; black streak on the face, conjoined under the chin; rump, face, spinal line, lateral streak, and very broad band on the thigh and cubitus black in summer. Young pale brown; hairs blackish at the base.

Capra Gazella, Linn.—*Antilope Oryx*, Pallas; H. Smith.—*A. bezoartica*, Pallas.—*A. reticornis*, Erxl.; Pallas, Nov. Comm. Petrop. xiii. t. 10. f. 6.—*Oryx Capensis*, Ogilby; Harris, W. A. A. t. 9.—*O. Gazella*, Gray, Knows. Menag. 17. t. 16. f. 2, young.

Inhabits S. Africa; Cape of Good Hope. Brit. Mus. Adult and young.

2. ORYX BEISA. The BĒISA.

Horns straight; throat without any bunch of hairs; black face-streaks separate. "Pale; face, belly and limbs white; front of face, two streaks on cheek, narrow line along throat, dorsal streak, streak on each side of abdomen, band round upper part, and streak in front of lower part of fore-leg and end of tail black."

Antilope Beisa, Rüppell, Atlas, t. 5.—*Oryx Beisa*, Sundevall.—*A. Dammah*, Rüppell.

Inhabits Abyssinia. Mus. Frankfort.

There is a male and female in the Frankfort Museum; they are smaller than *A. Gazella* of the Cape, and both have the face-streaks separate: there is a black streak on the throat, as in *A. Gazella*, but no bunch, nor is there any in the Frankfort specimen of *A. Gazella*: the mane of the nape of the male is small, indistinct, continued behind in a broader dark streak to the middle of the loins. In the male the mane is blackish, in the female like the back. They have no dark mark on the rump, found in *A. Gazella*.

** *Horns arched, recurved.*

3. ORYX LEUCORYX. The ORYX.

Horns slender, slightly arched: white, reddish varied; in winter greyish.

Antilope leucoryx, Pallas; Ehrenb. S. P. t. 3; Licht. Saugth. t. 1.—*A. ensicornis*, Ehrenb.—*A. Algazella*, Rüpp. t. .—*A. Gazella*, Pallas.—*A. bezoartica*, Erxl.; H. Smith.—*Algazelle*, F. Cuv. Mam. Lith. t. .—*A. Eleotragus*, Schreb. t. . (not descrip.)—*Oryx leucoryx*, Gray, Knows. Menag. 17. t. 16. f. 1, young; t. 17, adult.

Inhabits N. and W. Africa; Nubia; Sennaar; Senegal. Brit. Mus. I have compared the Nubian and Senegal specimens, and cannot discover any difference between them.

D. *Throat slightly maned, neck simple.*22. ADDAX; *Oryx*, part Blainv. and others; *Gazella*, part H. Smith.

Horns slender, elongate, ringed, slightly spirally twisted, nearly on a line with the face; neck with a slight gular, but no nuchal mane; nose ovine, hairy; hoofs semicircular, edged; tear-bag marked by a tuft of hair; forehead longly hairy.

1. ADDAX NASOMACULATUS. The ADDAX.

White; forehead and front of face darker; grey in winter.

Antilope nasomaculatus, Blainv. Bull. Soc. Phil. 1816, 78; H. Smith.—*A. Addax*, Licht. Saugth. t. 2; Rüpp. Atlas, t. 7; Mam. Lith. t. .—*A. suturosa*, Otto, N. A. Nat. Cur. xii. t. 48; Griffith, A. K. t. 180.—*A. gibbosa*, Savi.—*A. Tao*, H. Smith.—*A. Mytilopes*, H. Smith, G. A. K. t. 182, 183. f. 6.—*Strepsiceros*, Cajus.—*Addax*, F. Cuvier, Mam. Lith. t. . (winter and summer); Ehrenberg, S. Phys. t. 4, male and female.—*Capra Cervicapra*, Linn. S. N. ed. 10.—*Ant. Cervicapra*, Children, Denham Trav.—*Addax nasomaculatus*, Gray, Knows. Men. 17. t. 18.

Inhabits N. Africa. Brit. Mus.

3. The GOAT-LIKE ANTELOPES have a very short flat tail, hairy above. They have heavy bodies, covered with rough, rigid or woolly fur, strong legs, large hoofs and false hoofs. The horns are conical and recurved.

A. *Nose cervine, muffle moderate; horns short, inclined, recurved.*

23. CAPRICORNIS, Ogilby; *Nemorhedus*, part H. Smith.

Horns short, strong, conical, ringed, inclined and recurved, arising behind the orbits; nose cervine, muffle moderate, bald; tear-bag and interdigital pores large; skull with a more or less deep rounded pit, and no suborbital fissure; grinders without supplemental lobes. Asia.

1. CAPRICORNIS SUMATRENSIS. The CAMBING OUTAN.

Black; chin and linear nuchal mane yellowish, especially near the withers; inside of the ears white. Young like the adult.

Antilope Sumatrensis, Shaw; H. Smith, G. A. K. t. 189 (cop. from); F. Cuv. Mam. Lith. t. .—*A. interscapularis*, Licht.—*Capricornis Sumatrensis*, Gray, Knows. Menag. 18.

Inhabits Sumatra. Mus. Leyden.

2. CAPRICORNIS BUBALINA. The THAAR OR THAR.

Grey brown, blackish washed; crown and dorsal line black; thighs and outside of legs rufous; nose, chin, inside of ear, lower part of mane and legs below the hocks whitish.

Antilope Bubalina, Hodgson, P. Z. S. 1832, 12.—*A. Thar*, Hodgson.—*Nemorhedus proclivis*, Hodgson.—*Capricornis Bubalina*, Gray, Knows. Menag. 18.

Inhabits India; Nepal. Mus. Brit.

A head was sent to the United Service Museum by Lieut.-Colonel Childers, of the 11th Dragoons, in 1820, under the name of *Serow* or *Imo*. "It is not speedy, as might be inferred from its make. Its flesh is very coarse and bad. It is usually killed with poisoned arrows."—*Hodgson*, l. c. 14.

3. *CAPRICORNIS? CRISPA*. The JAPANESE GOAT ANTELOPE.

Fur very fine, elongate, rather woolly, crisp; brown or brownish; feet and ears darker; throat whitish: female paler; tear-bag a naked spot?

Antilope crispera, Temm. Faun. Japan. t. 18, 19.—*Capricornis crispera*, Gray, Knows. Menag. 18.

Inhabits Japan. Mus. Leyden.

** *Nose ovine, hairy, without any muffle; horns short, conical, recurved, ringed.*

24. *NEMORHEDUS*, part H. Smith; *Kemas*, Hodgson.

Horns short, conical, inclined and recurved, arising from behind the orbits; nose ovine, hairy; muffle none; tear-bag none; interdigital pores large; fur short.

1. *NEMORHEDUS GORAL*. The GORAL.

Grey brown, black punctulated; streak on lower part of back of neck blackish; cheeks, chin and upper part of throat white; front of fore-legs blackish; feet rufous. Young paler; dorsal line rather darker.

Antilope Goral, Hardw. Linn. Trans. xiv. t. 14; Calcutta J. N. H. i. t. 12. f. 2, 3.—*A. Goural*, Hodgson.—*Bouquetin du Nepaul*, F. Cuv. Mam. Lith. t. . (copy from Hardw.)—*A. Duvaucellii*, H. Smith.—*Nemorhedus Goral*, H. Smith; Gray, Knows. Menag. 18.

Inhabits Nepal. Brit. Mus.

A. Duvaucellii (H. Smith) was described from a drawing traced from one of General Hardwicke's figures of this species, and badly coloured, which Duvaucel sent to Paris without any notes. It has no connection with *C. Sumatrensis*, to which many naturalists have referred it. In the Bengal Journal two Antelopes, said to resemble the *Goral*, are mentioned as found in Affghanistan, one called *Suja* and the other *Goomast*.

25. *MAZAMA*, Rafinesque; *Aplocerus*, H. Smith.

Horns small, conical, nearly erect, slightly inclined and recurved at the tip, ringed at the base; nose ovine, hairy; muffle none; tear-bag none; fur short, under fur woolly, outer very long, hairy and dependent.

1. *MAZAMA AMERICANA*. The MAZAMA or SPRINGBUCK.

White; horns, hoof and edge of nostrils black.

Rupicapra Americana, Blainv.—*Antilope Americana*, Desm.—*Capra Americana*, Rich. F. B. A. 268. t. 22.—*Ovis montana*, Ord.—

Capra montana, Harlan.—*A. lanigera*, H. Smith.—*Mazama dorsata* and *M. sericea*, Rafin.—*A. Mazama* and *Apl. Femmamazama*, H. Smith.—*Capra? Columbiana*, Desmoul.—*Rock Mountain Sheep*, Jameson, Mem. Wern. Soc. iii. 306.—*Mazama Americana*, Gray, K. M. 19.

Inhabits N. America; Rocky Mountains. Mus. Linn. Soc. and Zool. Soc.

26. RUPICAPRA, H. Smith; *Capella*, Keys. & Blas.; *Kemas*, Ogilby.

Horns elongate, slender, erect, recurved at the tip; nose ovine, hairy; muffle none; fur soft; skull without any pit, and with a minute suborbital fissure; grinders without supplemental lobes, cutting-teeth equal-sized, erect.

1. RUPICAPRA TRAGUS. The CHAMOISE OF GERUS.

Brown yellowish, with a dark dorsal streak in summer, blackish in winter.

Capra Rupicapra, Linn.—*A. Rupicapra*, Pallas; H. Smith, G.A.K. t. 90.—*Rupicapra Tragus*, Gray, K. M. 19.—*R. Capella*, Bonap.—*R. pyrenaica*, Bonap.—*Tragus Dorcas*, Klein.—*Chamoise*, Buffon, H. N. xii. t. 16; F. Cuv. Mam. Lith. t. .

Inhabits S. Europe; Switzerland, Pyrenees, and Pindarus. Brit. Mus.

I have compared the Swiss, Pyrenean and Greek specimens, and cannot find any character to separate them.

27. ANTILOCAPRA, Ord; *Dicranocerus*, H. Smith;
Oreammos, Rafin.; *Cervus*, Blainv.

Horns erect, the base compressed with a flattened process in front, the end conical, recurved; nose ovine, hairy; muffle none; fur very close; hair stiff, coarse, flattened, wavy; tail very short; false hoofs none; tear-bag none; inguinal pores none; legs rather slenderer than the other *Goat Antelopes*; skull without any sub-orbital depression, but with a lengthened fissure; grinders without supplemental lobes, cutting-teeth equal-sized and shelving.

1. ANTILOCAPRA AMERICANA. The CABRIT OR PRONGHORN.

Pale fulvous; upper part of rump white.

Antilope Americana, Ord, 1815.—*A. furcifer*, *A. palmata*, H. Smith, Linn. Trans. xiv. t. 2, 3; G. A. K. t. 178. t. 199. f. 1-5; Richards. Z. B. A. t. 21.—*Cervus hamatus*, Blainv.—*C. bifurcatus*, Rafin.—*Antilocapra Americana*, Ord; Gray, K. M. 19.

Inhabits N. America; in the plains in summer and in the mountains in winter. Called the *Goat*. Mexico (*Coulter*). Brit. Mus.

Dr. Coulter brought a head from Mexico which had the face dark brown, and the horns large, wide-spreading and much hooked at the tip, like the *A. palmata* of H. Smith (Proc. Zool. Soc. 1826, 121). This is probably only a larger variety in the summer fur.

II. The ANTELOPES OF THE DESERT. Nostrils bearded within beneath, operculated, far apart; horns on the frontal ridge; nose sub-cervine, with a small muffle; legs rather stout; tail elongate; hoofs rather large.

4. The EQUINE ANTELOPES have a very depressed, spongy and bristly muzzle.

28. CATOBLEPAS, Gray; *Connochates*, Licht.; *Bos*, Forster.

Horns bent down on the sides, recurved at the tip; nose very broad, dilated, spongy, bristly; nostrils operculated; tail elongate, bushy, hairy from the base; hoofs compressed in front; teats four.

This genus has been placed with the Oxen by Forster, and in the Bovine group of genera by Sundevall, but it has all the characters of the true Antelopes in the proportion of its leg-bone.

* *Nose with a crest of reversed hair; chest maned.* Catoblepas.

1. CATOBLEPAS GNU. The GNU OR KOKOON.

Nose with a tuft of reversed hair; chest maned. Brown or blackish; the lower part of the mane and tail often paler or white. Young: pale fulvous; nasal, gular, and nuchal mane black.

Antilope Gnu, Sparm.; Zimmerm.—*Bos Connochates*, Forster.—*Antilope taurina*, Burchell.—*C. Gnu*, H. Smith.—*C. taurina*, H. Smith, not A. Smith.—*Gnu*, F. Cuvier, Mam. Lith. t. ; Harris, W. A. A. t. 1.—*Catoblepas Gnu*, Gray, Knows. Menag. 19. t. 19. f. 1, young.

Var. Mane and tail black.

A. taurina, Burchell; A. Smith.

Inhabits S. Africa. Brit. Mus.

The *A. Gnu* of Burchell, H. Smith, F. Cuvier and Harris, "and the *Kokong* of Lichtenstein," has a white tail and mane. Burchell and H. Smith have given the name of *A. taurina* to the specimens, which have those parts black. When young they are fulvous, and become black as they reach maturity. The specimen of the *Kokoon* in the Museum of the London Missionary Society (Blomfield Street, Moorfields), named by Colonel H. Smith *Kokoon* (*Cat. taurina*, Griff. A. K. iv. 369, v. 368), is an adult common *Gnu*, *C. Gnu* (*Var.* mane and tail white; *Kokong*, Licht. Trav. Cape), and his description of Dr. Burchell's specimen in the British Museum agrees with the *Gnu*, in having the ridge of hair on the face. Indeed Dr. Burchell (*Travels*, ii. 278) appears to consider the difference between the *Gnu* and *A. taurina*, that the former has a white and the latter a black tail. Dr. Andrew Smith (*Illust. Zool. S. A.*) has regarded the *C. taurina* and *C. Gorgon* as the same species. Dr. Sundevall, in his *Synopsis*, has, by mistake, given the name of *C. taurina* to the *Gorgon*, or *Brindled Gnu* (*C. Gorgon*, H. Smith).

** *Nose with smooth hair ; chest not maned.* Gorgon.

2. CATOBLEPAS GORGON. The GORGON.

Face convex, smooth, covered with hair, lying towards the nose ; chest not maned ; black grey, varied and striped. Young : dark grey ; face, gular and nuchal mane and end of tail black. Half-grown : blackish ; crown grey.

Antelope Gorgon, H. Smith ; Harris, W. A. A. t. 4.—*Cat. taurina*, Sundev., not Burch. or Smith.—*Catoblepas Gorgon* or *Gorgon fasciatus*, Gray, Knows, Menag. 20. t. 19. f. 2, young.

Inhabits S. Africa. Brit. Mus.

Colonel H. Smith has figured a pair of horns which were in Mr. Brookes's Museum under the name of *C. Brookesii* (t. 201. f. 1). He thinks it is also probable that *Bos Pegaseus* (H. Smith, G. A. K. t. 204, from a drawing of Prince Maurice's) is a species of this genus (H. Smith, Jard. Nat. Lib.).

5. The BOVINE ANTELOPES have the nose moderately broad, with a moderate or small, bald, moist muffle ; the grinders are rather small, without supplemental lobes, the central cutting-teeth enlarged at the end.

29. BOSELAPHUS ; *Bubalis*, Licht., Ogilby ; *Acronotus*, H. Smith ; *Bubalus*, A. Smith ; *Alcelaphus*, Blainv. ; *Buselaphus*, Ray.

Horns lyrate, end suddenly curved at a nearly right angle, thick at base, on the upper edge of the frontal bones ; nose moderately broad, cervine ; muffle moderate, bald, moist ; tear-bag covered with a tuft of hair. Females : teats two.

1. BOSELAPHUS BUBALIS. The BUBALE.

Pale brown in early uniform ; rump like back.

Antelope Bubalis, Pallas.—*Capra Dorcas*, Houttayn, t. 24. f. 3.—*Buselaphus Caji*, Ray.—*Bubalis Mauretunica*, Ogilby ; Sundevall.—*Acronotus Bubalis*, H. Smith.—*Bubale*, F. Cuv. Mam. Lith. t. . . —*Cervine Antelope*, Penn.—*Boselaphus Bubalis*, Gray, K. M. 20. t. 20. f. 1, young.

Inhabits N. Africa. Brit. Mus.

Var. 1. Uniform pale brown ; with a dark brown streak down the outer side of the front of the fore-legs, like the streak on the leg of the *Lecama* or *Harte beast* from South Africa, which is not generally found in this species. This skin, without a head or hoofs, was brought by Mr. Frazer to the British Museum, from Tunis ; it probably indicates a third species, or perhaps this streak is only marked in the very adult or fully-coloured specimens.

2. BOSELAPHUS CAAMA. The LECAMA OR HARTE BEEST.

Grey brown ; dorsal line, streak on face, outer side of limbs black ; large triangular spot on the haunches whitish.

Antelope Caama, Cuv. D. S. N. ii. 242 (1816) ; Harris, W. A. A. t. 7 ; A. Smith, Illust. Z. S. A. t. 31.—*A. Bubalis*, Licht. ; Erxleb.

291.—*Acronotus Caama*, H. Smith, G. A. K. t. 197.—*A. Dorcas*, Thunb.; Sparm. K. V. Hand. 1779, t. 5.—*Bubale*, Buffon, H. N. xii. t. 38. f. 2; Supp. iv. t. 15.—*Caama*, Cuvier, Menag. t. .—*Senegal Antelope*, Penn. Synn. 38.—*A. Senegalensis*, Cuvier, Dict. Sci. Nat., from Pennant.—*A. Koba*, Erxleb. Syn. 293, from Pennant.—*Boselaphus Caama*, Gray, Knows. Menag. 20. t. 20. f. 2, young. Inhabits S. Africa. Brit. Mus.

Pennant figures the head and horns of this species under the name of *Senegal Antelope*, and erroneously refers to Buffon's figures of the horns of the *Koba* as representing the species, which lead to some confusion; for the *A. Senegalensis* (Cuvier, Dict. Sci. Nat. ii. 235) is an abbreviation, and *A. Koba* (Erxleben, Syn. 293) is a translation, of Pennant's description of this species. Pennant's specimen is said to come from Senegal, but he describes the nuchal line and the knees as black, and the figure indicates the dark colour on the face of the Cape species.

30. DAMALIS; *Damalis acronotus*, sp. H. Smith; *Bubalis*, sp. Sundev.

Horns lyrate, diverging, subcylindrical; nose moderately broad, cervine, with a small, bald, moist muffle between and below the nostrils; tear-bag exposed: females, teats two.

* *Horns recurved above, diverging from the base; face dark in front.*

1. DAMALIS LUNATUS. THE SASSAYBY.

Rufous glaucous, outer sides of the limbs dark.

Antelope lunata, Burchell, Trav. ii. 334, 335. fig. .—*Damalis (acronotus) lunatus*, H. Smith, G. A. K. t. 198; A. Smith, Zool. S. Afr. t. 31; Harris, W. A. A. t. 8.—*Bubalis lunata*, Sundev.—*Sassaybi*, Daniel, Afr. Scenery, t. .—*Damalis lunatus*, Gray, Knows. Menag. 21.

Inhabits S. Africa. Brit. Mus.

** *Horns regularly lyrate, nearly parallel at the base, then diverging, and approaching at the tips; face black marked; tear-bag moderate.*

2. DAMALIS SENEGALENSIS. THE KORRIGUM.

Reddish grey; front of face from nose to occiput, a small spot behind the eyes, a small streak above the angle of the mouth, and streak on outside of the limbs above the knees, and tuft of the tail, black. Very young: uniform pale brown, without any dark marks.

Antelope and Damalis (acronotus) Senegalensis, H. Smith, G. A. K. v. t. 199. f. 3.—*Antelope Koba*, Children, in Denham and Clapperton's Travels, not Erxleben.—*Bubalis Koba*, Sundevall.—*B. lunata*, Sundev. Act. Stockh. 1842, 201, 243, not Burchell.—*A. Corrigum*, Ogilby.—*Damalis Senegalensis*, Gray, Knows. Menag. 21. t. 21.

Inhabits W. Africa; Gambia River, Macarthy's Island; called *Yonga* or *Yongah* by the Joliffs, and *Tan Rong* by the Mandingoes, Mr. Whitfield. Brit. Mus. Senegal? Sennaar. Mus. Stockholm.

In Denham and Clapperton's Travels I regarded this species as the *Koba* of Buffon, and H. Smith and Dr. Sundevall are of the same opinion: but on comparing the six pairs of horns of this species which I have been able to examine with Buffon's figure and descriptions, I find them all longer and much thicker at the base than Buffon describes them; the thinner (a female?) being 7 and the others 9 or 9½ inches in circumference, while that which Buffon described is only 5 inches. The rings are also more elevated, and reach nearer to the top than in Buffon's figure. All the characters lead me to believe that the horns figured as those of the *Koba* by Buffon belong to *Damalis Pygarga*. They afford very good venison.

Colonel Hamilton Smith, in 'Griffith's Animal Kingdom,' described and figured the heads brought home by Messrs. Denham and Clapperton as *A. Senegalensis*, but they are different from the one so called by Cuvier. Mr. Ogilby, in the 'Proceedings of the Zoological Society' (1826, 103), proposed to call these heads, *A. Corrigum*.

Under the name of *Antilope Koba*, Schinz (Syn. Mam. ii. 407) combines the *A. defassa*, Rüppell, *Damalis Senegalensis* and *Antilope adenota*, H. Smith, the *Koba* of Buffon, and the *Antilope Koba* or *Caama* of Erxleben.

*** *Horns regularly lyrate, parallel at the base; face of adult white.*

3. DAMALIS PYGARGA. The BONTE BOC.

Purple red, outside of limb dark; rump and face white: *fawn* pale yellowish brown.

Antilope Pygarga, Pallas.—*Bonte Boc* or *Pied Antelope*, *Gazella Pygarga*, Harris, W. A. A. t. 17.—*Bubalis Pygarga*, Sundev.—*A. Dorcas*, Pallas.—*Antilope (Gazella) Pygarga*, H. Smith.—*Damalis Pygarga*, Gray, Knows. Menag. 21. t. 20. f. 3, young; t. 22. f. 2 & 3, adult.

Half-grown, face whitish.

A. personata, Wood, Zool. Journ. ii. t. .

Inhabits S. Africa. Brit. Mus.

Male: bright purple red, face whitish, dark-edged, with a dark-edged white streak to between the horns; legs whitish, upper and lower part brown varied; temple and upper part of the throat whitish; rump to above the tail pure white; tear-bag round, distinct, moist. The female is similar, but the throat and under part of the body are white. These animals are often brought to the Cape market for food.

4. DAMALIS ALBIFRONS. The BLESS BOCK.

Purplish red; face and back of thighs white; rump like back.

Bless bok or *Antilope albifrons*, Burchell, Trav. ii. 335?; Harris, W. A. A. t. 21.—*Bubalis albifrons*, Sundev.—*Damalis albifrons*, Gray, Knows. Menag. 22. t. 22. f. 1, half-grown.

Inhabits S. Africa.

A half-grown specimen was darker, with a pale spot between the horns, separated by a dark spot from the white on the face; the

temple was white, with a white spot; the legs had a brown stripe down the outer side of the front; and the throat and rump brown, the latter without any white spot.

Dr. Burchell, when speaking of the *Bless bock*, proposed to call it *A. albifrons*, as the name *Pygarga* has been used for both the *Springer* and the *Bless bock*; but it is not certain if he intended by *Bless bock* this or the preceding species. Captain Harris's figure shows the distinction of the species.

**** *Horn unknown.*

5. DAMALIS? ZEBRA. The DORIA.

Bright golden brown, with numerous black cross bands narrowing at the sides; outer sides of fore and hind legs dark.

Antelope Zebra, Gray, Ann. Nat. Hist. 1836.—*A. Doria*, Ogilby, P. Z. S. 1836, 121; Frazer, Z. T. t. —*A. Zebrata*, Robert.—*Viverra Zebra*, Whitfield's MSS.—*Cephalophus? zebra*, Gray, Cat. Mam. B. M.—*Damalis? zebra*, Gray, Knows. Menag. 22.

Inhabits W. Africa; Gambia. Brit. Mus.

Skins without head and feet are alone known; they are brought down by the negroes. In the Catalogue of the Mammalia in the British Museum I have referred this species with doubt to *Cephalophus*. Mr. Ogilby (P. Z. S. 1836, 121) thinks it should be referred with the Harness Antelopes to *Calliope*. I am inclined, on account of the dark mark on the outside of the limb, to think it belongs to the genus *Damalis*. Mr. Whitfield believes it to be a species of *Viverra*.

THE STREPSICERES.

The animals of this family are peculiar as being the only hollow-horned or Bovine Ruminants which are marked with white stripes and spots. The bands are not very distinct in the *Impoofa* or *Eland*, but they are easily to be observed in the female, if it is looked at obliquely, which was brought home by Burke, and presented to the British Museum by the Earl of Derby. Their nostrils are near together in front. They have four teats in a small udder. The horns generally incline backwards from their base; the skull, which somewhat resembles that of the Deer, has a rather small nasal opening, no suborbital pit, and only a small suborbital fissure.

Colonel H. Smith forms of the larger species three of his four subgenera of *Damalis*: he places the smaller kinds as a subgenus (*Tragelaphus*) of Antelopes.

Prof. Sundevall placed the genera I have here brought together in two different families; the genus *Portax* with the *Bovina*, and the others in the *Sylvicaprina*, or True Antelopes.

The AFRICAN GENERA have large heavy horns, only the rudiments of a tear-bag, and their limbs are nearly equal; they have no supplementary lobes to the grinders, and the central cutting-teeth are enlarged above.

Λ. *The nose hairy, cervine, with only a small moist naked space between the edges of the nostrils, and a narrow streak on the upper lip; the body is large, heavy; the neck is maned.*

1. STREPSICEROS, H. Smith; *Calliope*, Ogilby; *Tragelaphus*, sp. Blainv.

Horns large, heavy, spirally twisted, keeled in front; tear-bag a naked space; throat with a central, linear mane: female hornless.

1. STREPSICEROS KUDU. The EECHLONGOLE or KOODOO.

The horns diverge from the line of the forehead, and have two twists; the calf is marked like the adult.

Antelope Strepsiceros, Pallas.—*Damalis (Strepsiceros) Strepsiceros*, H. Smith, G. A. K.—*A. Tendal*, Rüppell, Abyss. 22; Fischer, Syn. 475.—*Strepsiceros Kudu*, Gray, Cat. B. M.; Knowsley Menag. 26. t. 24. f. 2, young.—*S. Capensis*, Harris, W. A. A. t. 20.—*S. excelsus*, Sundev.—*Striped Antelope*, Penn.—*Comdoma*, Buffon, H. N. xii. t. 39; Supp. vi. t. 13.

Inhabits S. Africa. Mus. Brit.

Var. Smaller.

Inhab. Abyssinia. Mus. E. India Company, adult. Mus. Frankfurt, adult and young.

2. OREAS, Desm.; *Boselaphus*, sp. Blainv., Gray; *Damalis (Boselaphus)*, sp. H. Smith; *Damalis*, Sundev.

Horns large, erect, slightly curved, with a spiral keel; throat with a longitudinal, crested dewlap; hoofs narrowed in front. Female with smaller, thinner horns.

I formerly adopted the name of *Boselaphus*, which Blainville had used for the genus, but Ray had previously applied this name to the *Bubale*, and Desmarest has formed a subgenus specially for it under the name of *Oreas*.

1. OREAS CANNA. The IMPOOFO or ELAND.

Pale brown; throat and beneath whitish.

Antelope Oreas, Pallas.—*Damalis (Boselaphus) Oreas*, H. Smith, G. A. K. t. 200.—*A. Oryx*, Pallas, Misc. 9.—*D. Boselaphus Canna*, H. Smith, G. A. K. t. 181. f. 5, horn ♂.—*Oreas Canna*, Gray, Knows. Menag. 27. t. 26, 27.—*Coudou*, Buffon, H. N. xii. t. 46 b.—*Canna*, Buffon, Supp. iii. t. 12.—*Eland*, Kolbe, Sparmann, K. Vet. Handl. 1779, t. 8; Harris, W. A. A. t. 6; Daniel, Afr. Scen. t. .

Inhabits S. Africa; Cape of Good Hope (*Sparmann*). Brit. Mus.

This Antelope has much the character of the Oxen, and Dr. Burckell informs me that it is the best food of any of the genus at the Cape, being the only one which is moist and has any fat intermixed with the muscle; the flesh of the others is dry and hard. At Knowsley it breeds with the facility of domestic cattle, but they are ravenous feeders, and appear liable to an epidemic.

It should be remarked that the skin of the specimen shot by Burke

at the Cape (the female especially) shows several pale whitish cross-bands on the hinder half of the body, similar to the streaks on the *Koodoo*, showing the affinity of this animal to that species; but I could not observe these bands in the living specimens at Knowsley Park.

2. OREAS DERBIANUS. The GING-E-JONGA.

Pale reddish brown; front of the face, the neck, the front part of the under side, a spot on the front and hinder side of the upper part of the fore-leg, the dorsal streak, dark black; the belly, the front and back edge of the upper part of the legs and under side of tail whitish; a broad half-collar in front of the shoulder, narrowed above; fourteen or fifteen narrow, waved, perpendicular streaks on each side of the body white; withers with intermixed black hairs: female, throat dark brown; crown reddish brown.

Boselaphus Derbianus, Gray, Ann. and Mag. N. Hist. xx. 286; Silliman's Amer. Journ. v. 279.—*Oreas Derbianus*, Gray, Knowsley Menag. 27. t. 25.

Inhabits W. Africa; river Casaman. Called *Ging-e-jonga*. Mr. Whitfield. Brit. Mus. Imperfect skin of male and female, and horns.

B. *The nose bovine, with a large coriaceous moist muffle, and a narrow bald space on the upper lip. The animals have very slender, elegant legs; small hoofs and false hoofs; conical, subangular horns; with an oblique, indistinct keel.*

3. TRAGELAPHUS; Antilope (*Tragelaphus*), Blainv., H. Smith.

Horns conical, subangular; tear-bag distinct; nape and back with a more or less distinct mane: they are brown; with spots on haunches, crescent on chest, and inside of legs white, and a dark dorsal stripe.

* *Face with a curved band between the eyes; horns large; back cross-banded.* Euryceros.

1. TRAGELAPHUS EURYCEROS. The EURYCEROS.

Head pale brown; broad band before the eyes, and two large spots on cheeks, chin and front of upper lip white; horns elongate, thick, scarcely bent forward at the tip; throat with long black hairs.

Antilope Eurycerus, Ogilby, P. Z. S. 1836, 120.—*A.*, n. sp., Afzelius, N. Act. Upsal. vii. 269. t. 8. f. 3; H. Smith, G. A. K. v. 361.—*Tragelaphus Euryceros*, Gray, Knows. Menag. 27. t. 23. f. 1, horns.

Inhabits W. Africa. Horns in Brit. Mus. and Zool. Soc.

2. TRAGELAPHUS ANGASII. The INYALA.

Black; back with a dorsal streak and four or five bands on each side; head blackish; narrow band before eyes, two small spots on cheeks, front of upper lip and chin white; forehead and feet bay; throat with a mane of long rigid blackish hair; horns rather slender, elongate, rather bent forward at the tip; female bay, with many white bands.

Tragelaphus Angasii, Gray, P. Z. S. 1848, 89. t. 4 & 5, male, female and young; Knows. Menag. 27.

Inhabits S. Africa; Port Natal. Brit. Mus. male, imperfect skin.

** *Face without any frontal streak; horns small.*

† *Back with transverse white stripes.*

3. TRAGELAPHUS SCRIPTUS. The ZALOFES OR HARNESS ANTELOPE.

Pale bay; back with four cross-bands and a central white streak; haunches white spotted; cheek with two white spots; spot on chest, nose, feet, and spots on the legs blackish; dorsal streak and end of tail black. Adult: chest and outside of shoulder and haunches and legs black: the male with a high ridge of long, coarse white hair extending the whole length of the back to the tail.

Antilope scripta, Pallas, Misc. 8.—*Antilope (Tragelaphus) scripta*, H. Smith.—*A. maculata*, Thunb.—*A. (Tragelaphus) Phalerata*, H. Smith.—*Tragelaphus scripta*, Gray, Knows. Menag. 28. t. 28.—*The Harness Antelope*, Pennant, Syn. 27.—*Guib*, Buffon, H. N. xii. 305, 307. t. 40. t. 41. f. 1; F. Cuv. Mamm. Lithog. t. ; Dict. Sci. Nat. t. .

Inhabits W. Africa; Senegal and Gambia. Called *Oualofes* or *Zalofes*.

The dark colour of the chest and outside of the limbs, and the high crest of the male, are not developed until they are four or more years old.

This species varies in some having seven and others nine white cross-bands, and some are spotted and others not; but they breed together, and the produce is often a different variety from the parent.

They breed constantly at Knowsley: in May 1845 they had a small herd of two males and four females, three of which were expected to bear young.

4. TRAGELAPHUS DECULA. The DECULA.

Grey brown; back with three or four indistinct cross-bands; an arched streak on upper part of side, a few spots forming an arch on the haunches; dorsal line, streak on nose, and in front of fore-legs blackish.

Antilope Decula, Rüppell, Abyss. t. 4.—*Tragelaphus Decula*, Gray, Knows. Menag. 28.

Var. Back without the cross-bands.

Inhabits Africa; Abyssinia (*Rüppell*).

†† *Back without any cross-bands or lateral streak.*

5. TRAGELAPHUS SYLVATICUS. The BOSCH BOC.

Blackish brown; head pale brown; back, across forehead, black; small spot on haunches, larger spot on insides of legs and on feet white; dorsal line longly crested, black, white varied in. Female paler brown. Young: pale bay.

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Antelope sylvatica, Sparmann, Act. Holm. iii. t. 7.—*Tragelaphus sylvatica*, Harris, W. A. A. t. 26; Gray, Knowsley Menag. 28.—*Forest Antelope*, Pennant.

Inhabits S. Africa; Cape of Good Hope. Brit. Mus.

Var.? Smaller horns, rather more erect.

Antelopus Ronleyni (the *Serolomoot broque*), Ronaleyn; G. Cumming, Hunter's Life S. A. ii. 178, 179.

Inhabits Limpopo.

The two pairs of horns, named by Colonel H. Smith *Boselaphus canna* (*a*, *b*, in the List of Mamm. Brit. Mus. 155); one, presented by Dr. W. Burchell, is certainly the horns of this species, and the other appear to be those of a young male, *Strepsiceros Kudu*.

THE ASIATIC STREPSICERES have a bovine nose, with a large coriaceous moist muffle extending over the whole front of the upper lip; small, short, angular horns; a deep longitudinal tear-bag; and the hind-legs much shorter than the fore-ones; the skull without any suborbital pit, and only a minute fissure; and with supplementary lobes to the grinders.

4. PORTAX; *Oreas*, sp. Fischer; *Tragelaphus*, Ogilby;
Damalis (*Portax*), H. Smith.

Horns short, conical, angular, with an obscure oblique ridge; tear-bag deep, longitudinal; shoulders higher than the rump.

1. PORTAX TRAGOCAMELUS. The NYLGHAU.

Grey; under surface, rhombic spot on the forehead and above the hoofs black and white ringed; tail, end black. Female browner. Young: dull reddish fawn; lower part of fore-legs brighter; under lip, spot on jaws, and line along belly on inside of legs and fore-part of hock, white; tip of tail, line on back of nose and on front of legs black.

Antelope Trago-camelus, Pallas, Misc. 5.—*A. picta*, Pallas, Spicil. xiii. 54; Gray, Cat. B. M.—*A. albipes*, Erxl. 280.—*A. leucopus*, Zimm. Zool. 541.—*Damalis* (*Portax*) *Risia*, H. Smith.—*Portax picta*, Gray, Cat. B. M.—*P. Tragocamelus*, Gray, Knows. Menag. 28. t. 29.—*Tragelaphus Hippelaphus*, Ogilby.—*P. Tragelaphus*, Sundev.—*Biggel*, Mandelst. Reise (1658), p. 122.—*Tragelaphus Caii*, Raii Syn. 82?; Parsons, Phil. Trans. No. 476. p. 465. t. 3. f. 9.—*Nylghau*, Hunter, Phil. Trans. lxi. 170. t. 5.—*Nilghaut*, Buffon, H. N. Supp. v. t. 10, 11; F. Cuv. Mamm. Lithog. t. —*Indostan Antelope*, Penn. Syn. 29.—*White-footed Antelope*, Penn. Syn. 29. t. 6. f. 1, 2.

Inhabits India. The *Rouu* of the Mahrattas, the *Nylghau* of the Persians.

This species has bred at Knowsley. In December 1845 they had two calves, both females, making a flock of one male and four females; they are in the paddock with the *Eland* in summer. They have also bred in the Gardens of the Zoological Society (See *P. Z. S.* 1831, 37), and in the Menagerie of Sir Robert Heron at Shibton.

2. A MONOGRAPH OF SCARABUS, A GENUS OF AIR-BREATHING GASTEROPODOUS MOLLUSCA; FROM SPECIMENS IN THE CUMINGIAN COLLECTION. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

SCARABUS, Montfort.

Testa ovata, spira subobtusata, infractibus compressis, varice utrinque instructis; apertura ovali intus utrinque dentata; peristomate non continuo, labro simplici, subexpanso.

The *Scarabi* have the eyes sessile on the inner bases of the tentacles, which are short and annulated; they live like most of the other genera of *Auriculidæ*, in the damp woods and mangrove marshes. None have been found in the African or American regions, but all the species at present known are from the East Indies.

SCARABUS IMBRIUM, Montfort, Conch. Syst. vol. i.; Féruillac, Prodrome, p. 101; Chemnitz, Conch. vol. ix. pl. 136. fig. 1249 & 1250.

Helix scarabæus, Linn.—*Helix pythia*, Müller.—*Bulimus scarabæus*, Bruguière.—*Auricula scarabæus*, Lamarck.

S. testâ ovato-pyramidalis, rufo-fusco variegatâ, longitudinaliter valdè striatâ; spirâ acuminatâ; aperturâ subrotundatâ, spiram æquantem; labro posticè inflexo.

Shell ovately pyramidal, variegated with red-brown, longitudinally strongly striated, spire acuminated; aperture subrotundate, as long as the spire; outer lip posteriorly inflexed.

Hab. Island of Bohol, Philippines; in dry woods, under stones, and in earth; *H. C.* (Mus. Cuming.)

The large size, pyramidal form and strongly striated epidermis are peculiar to this species: the upper tooth on the inner lip is more triangular, and the posterior part of the outer lip is more inflexed than in *S. Lessoni*.

SCARABUS LESSONI, Blainville, Dict. Sci. Nat. pl. 48. fig. 32; Lesson, Voy. de la Coquille, vol. ii. p. 334. pl. 10. fig. 4.

Auricula Petiveriana, var. *Deshayesi*.

S. testâ ovatâ, longitudinaliter substriatâ, rufo-castaneo variegatâ; spirâ lateribus concavis; aperturâ oblongâ, spirâ longiore; labio subplano, labro posticè arcuato.

Shell ovate, longitudinally substriated, variegated with chestnut-red; spire with the sides convex; inner lip rather flattened, outer lip posteriorly arcuated.

Hab. New Ireland; *Hinds*. (Mus. Cuming.)

The oval form and oblong mouth render this species easily distinguished from *S. imbrium*: the upper tooth on the inner lip is longer, and two of the five teeth in the outer lip are more prominent than the others.

SCARABUS PETIVERIANUS, Férussac, Prodrôme, p. 101; Petiver, *Gazophylacia Naturæ*, pl. 4. fig. 10.

Cochlea Bengalensis, Petiver.—*Auricula Peteveriana*, Desh.

S. testá ovato-oblongá, læviusculá, longitudinaliter tenuissimè striatá, albidú castaneo variegatá; aperturá spiram æquante; labro arcuato.

Shell ovately oblong, rather smooth, longitudinally very finely striated, whitish, variegated with chestnut-brown; aperture as long as the spire; outer lip arcuated.

Hab. Borneo; Cagayan, province of Misamis; Mindanao; in damp woods, under decayed leaves; *H. C.* (Mus. Cuming.)

This species is characterized by its smaller size, more ovate form, smoother epidermis, the arcuated outer lip, and rotundate aperture.

SCARABUS TRIGONUS, Troschel, Wiegmann's Archiv, 1840.

S. testá triangulari, rufo-fusco marmoratá, anfractu ultimo transverso gibbo angulato, aperturá angustatá, labro valdè reflexo.

Shell triangular, marbled with red-brown, last whorl transverse, gibbous, angulated; aperture narrowed; outer lip greatly reflected.

Hab. Sarsogon; Luzon; dense woods, damp places; *H. C.* (Mus. Cuming.)

The triangular form, approaching that of *Tomogerus*, at once distinguishes this species: the middle tooth on the inner lip is double, the upper tooth prominent: there are five teeth in the outer lip, two being more prominent than the others.

SCARABUS PLICATUS, Férussac, Prodrôme, p. 101; Chemn. Conch. vol. ix. pl. 136. fig. 1252, 1253.

Helix scarabæus, var. Chemn.—*Auricula plicata*, Deshayes.—*Scarabus triangularis*, Benson.

S. testá subtriangulari, obliquá, gibbosá, spirá brevi, acuminatá, lateribus concavis, anfractu ultimo posticè gibboso anticè subangulato distorto, epidermide longitudinaliter obliquè striatá, castaneá, fuscis pallidis confusè ornatá; aperturá angustá, labio anticè flexuoso, labro arcuato, anticè valdè dilatatá, reflexá, rimá umbilicali longá transversá.

Ashy or chestnut-brown, with pale, rather indistinct bands; much larger and more triangular than *S. Borneensis*, with the outer lip regularly arcuated.

Hab. India; Benson. Jaffna, in saline marshes; *Dr. Gardner.* (Mus. Cuming.)

SCARABUS STRIATUS, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 220. fig. 9.

Auricula scarabæus, Quoy, *Foy. de l'Astrolabe*, Zool. vol. ii. p. 162. pl. 13. f. 24.

S. testá ovato-trigonalí, fusco variegatá, longitudinaliter valdè striatá; spirá acuminatá; labio antico subflexuoso.

Shell ovately trigonal, variegated with brown, longitudinally strongly striated; spire acuminate; inner lip anteriorly subflexuose.

Hab. San Nicholas, island of Zebu; *H. C.* (Mus. Cuming.)

The sharp-pointed spire, striated epidermis and flexuous inner lip, distinguish this form: in the outer lip two of the teeth are more prominent than the others, the intermediate ones being more or less divided or bifid.

SCARABUS CECILLII, Philippi, Zeitsch. für Malacol. 1847, August.

S. testá ovato-oblongá, læviusculá, tenuissimè in longum rugatá, corned; anfractu ultimo interdum castaneo, superius corneo bifasciato; epidermide lineis obscuris ziczac-formibus, punctisque, marmoratá.

Shell ovately oblong, rather smooth, longitudinally very finely rugose, horn-coloured, last whorl chestnut-coloured, with two horn-coloured bands superiorly; epidermis ornamented with zigzag reticulated lines and punctures.

Hab. China. (Mus. Cuming.)

The reticulated epidermis, narrow ovoid form, and angulated outer lip are peculiar to this species; the aperture is oblong, equal to the spire; the outer lip below the angle is rectilinear, and but three teeth are visible in the outer lip.

SCARABUS UNDATUS, Lesson, Voy. de la Coquille, Zool. vol. ii. p. 336. pl. 10. f. 6.

Auricula scarabæus, var. Desh.

S. testá ovatá, fuscá, longitudinaliter valdè striatá; striis undulatis subdecussantibus; anfractu ultimo posticè gibboso; labio arcuato, valdè reflexo.

Shell ovate, fuscous, longitudinally strongly striated; striæ undulated, posteriorly decussating; last whorl posteriorly gibbous; outer lip arcuated, greatly reflected.

Hab. —? (Mus. Cuming.)

The waved elevated lines which cross each other irregularly on the back, and the last whorl posteriorly tumid, will characterize this species: the upper tooth is large and elongated on the inner lip, and the lower tooth of the outer lip is rather lamelliform.

SCARABUS PYRAMIDATUS, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 221. fig. 12.

S. testá ovato-pyramidalí, pallidá, aurantio-fusco variegatá, longitudinaliter substriatá; aperturá aureá, labio circulari.

Shell ovately pyramidal, pallid, variegated with orange-brown, longitudinally somewhat striated; aperture golden orange, outer lip circular.

Hab. New Ireland; *Hinds.* Solomon's Islands; *Capt. d'Orville.* (Mus. Cuming.)

The pyramidal form, golden aperture, and light yellow-brown markings distinguish this species, though some specimens are much more ovate than others: the peritreme is double and thickened, the middle

tooth of the inner lip is simple and thickened, and in the outer lip two of the teeth are large and conspicuous.

SCARABUS CUMINGIANUS, Petit.

S. testá ovato-trigóná, fuscá, longitudinaliter substriatá; anfractu ultimo valdè varicoso; aperturá aeratá, labio calloso, labro valdè posticè sinuato.

Shell ovately trigonal, brown, longitudinally substriated; last whorl strongly varicose; aperture copper-coloured; inner lip callous, outer lip posteriorly sinuated.

Hab. Boljoon, island of Zebu, Philippines; in earth, among decayed coral in the woods. (Mus. Cuming.)

The upper tooth on the inner lip is thickened with a calcareous deposit; the middle tooth is prominent, with a callosity at the lower part: on the outer lip three of the teeth are very prominent, the others are obsolete; the varix on the last whorl is very prominent; the umbilical fissure is wide and deep.

SCARABUS LEKITHOSTOMA, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 220. fig. 6.

S. testá ovatá, imperforatá, solidá, fusco variegatá; aperturá aurantiacá, labio incrassato, labro duplicato, posticè subsinuato.

Shell ovate, imperforate, solid, variegated with brown; aperture golden orange; inner lip callous, thickened, outer lip double, posteriorly somewhat sinuated.

Hab. — ? (Mus. Cuming.)

The middle tooth of the inner lip is double; in the outer lip there are three prominent teeth, the two posterior being approximated; there is no umbilicus, and the spire is concave at the sides; the back, moreover, is strongly plicated near the sutures.

SCARABUS CASTANEUS, Lesson, Voy. de la Coquille, Zool. p. 336. pl. 10. fig. 7.

S. testá oblongá, ovato-pyramidalí, læviusculá, longitudinaliter substriatá, castaneá; spirá elevatá, acuminatá; aperturá oblongá, spiram æquante, labro semicirculari.

Shell oblong, ovately pyramidal, rather smooth, longitudinally substriated, chestnut-brown; spire elevated, acuminated; aperture oblong, as long as the spire, outer lip semicircular.

Hab. Sibonga, island of Zebu, in the woods; *H. C.* (Mus. Cuming.)

This is a smooth, oblong shell, with a regularly arched outer lip with four teeth within it, two of which are much larger than the others.

SCARABUS POLLEX, Hinds, Zool. Voy. Sulphur, Moll. p. . pl. 16. fig. 9, 10.

S. testá ovatá, compressá, fusco-castaneá, longitrorsum valdè striatá, anfractu ultimo confusè fasciato.

Shell ovate, compressed, chestnut-brown, longitudinally strongly striated, last whorl indistinctly banded.

Hab. Feejee Islands; *Hinds.* (Mus. Cuming.)

Distinguished from *S. Lessoni* by its coarsely striated surface and different markings; and from *S. castaneus* by its larger size and darker colour, in being more striated, and by two dark yellowish bands on the upper part of the last whorl.

SCARABUS SEMISULCATUS, A. Adams. *S. testá ovato-pyramidali, læviusculá, rufo-castaneá, longitudinaliter vix striatá, anfractibus convexiusculis semisulcatis, fasciá nigricante prope suturam; aperturá subrotundatá; labio crasso, anticè rotundatá, dilatatá; labro semicirculari, posticè subsinuato.*

Shell ovately pyramidal, smooth, reddish dark chestnut colour, longitudinally slightly striated; whorls rather convex, semisulcated, with a blackish band near the sutures; aperture rather round; inner lip thickened, anteriorly rounded and dilated; outer lip semicircular, posteriorly somewhat sinuated.

Hab. — ? (Mus. Cuming.)

A pyramidal, smooth, dark-brown shell, with the whorls strongly sulcated longitudinally near the sutures; two of the teeth in the outer lip are much larger than the others, and the inner lip is rounded and thickened in front; the umbilicus is large and deep.

SCARABUS SINUOSUS, Adams. *S. testá ovato-oblongá, flavescenti nigro-fusco maculatá; epidermide tenuissimè longitudinaliter substriatá; spirá obtusá, lateribus convexis; aperturá oblongá; labio anticè rotundato, reflexo; labro posticè valdè sinuoso, in medio inflexo, peritremate incrassato.*

Shell ovately oblong, yellowish, spotted with blackish brown; epidermis very finely longitudinally substriated; spire obtuse, the sides convex; aperture oblong; inner lip anteriorly rounded, reflexed; outer lip posteriorly strongly sinuated, inflexed in the middle, peritreme thickened.

Hab. Island of Negros, Philippines. (Mus. Cuming.)

The posterior tooth of the inner lip is elongated, the middle tooth double; in the outer lip three of the teeth are prominent, the two posterior being approximated; the umbilicus is partly closed by the reflection of the inner lip.

SCARABUS IMPERFORATUS, A. Adams. *S. testá ovatá, compressá, imperforatá; spirá brevi, acuminatá, lateribus concavis, læviusculá, longitudinaliter tenuissimè substriatá, lutescenti fusco-castaneo variegatá, anfractu ultimo posticè subangulato; aperturá oblongá; labio anticè excavato, reflexo, labro semicirculari.*

Shell ovate, compressed, imperforate; spire short, acute, sides concave, rather smooth, longitudinally very finely substriated, yellowish, variegated with light chestnut, last whorl somewhat angulated posteriorly; aperture oblong; inner lip anteriorly flattened, excavated, reflexed; outer lip semicircular, umbilicus closed.

Hab. Borneo. (Mus. Cuming.)

The last whorl is posteriorly gibbous; the umbilicus is closed by the inner lip; three of the teeth in the outer lip are prominent, the two posterior approximated.

SCARABUS PANTHERINUS, A. Adams. *S. testá ovato-pyramidalí, tenui, læviusculá, longitudinaliter substriatá, lutescenti, maculis rufo-fuscis ornatá; spirá acuminatá, lateribus convexis; aperturá oblongá, labio anticè rotundato, reflexo, labro semicirculari.*

Shell ovately pyramidal, thin, rather smooth, longitudinally substriated, yellowish, ornamented with red-brown spots; spire acuminated, the sides convex; aperture oblong, inner lip anteriorly rounded and dilated, outer lip semicircular.

Hab. Siquejor; Philippines, woods, under stones. (Mus. Cuming.)

The aperture is yellowish white; three of the teeth in the outer lip are more prominent than the others, the intermediate ones being sometimes double; the umbilicus is large and deep.

SCARABUS BORNEENSIS, A. Adams. *S. testá ovato-pyramidalí, luteo-fuscá, castaneo confusè fasciatá, læviusculá; epidermide tenuissimè, longitudinaliter striatá; aperturá oblongá, angustá, spiram subæquante, anfractu ultimo infernè subangulato; foveá umbilicali angustá, transversá.*

Shell ovately pyramidal, yellowish brown, obscurely transversely banded, rather smooth, very finely longitudinally striated; aperture oblong, narrow, nearly as long as the spire, last whorl inferiorly subangulated; umbilical fissure narrow, transverse.

Hab. Borneo; *Lieut. Taylor.* (Mus. Cuming.)

This species is narrower and more ovate than *S. plicatus*, of a much smaller size; the outer lip is reetilinear in the middle; the teeth of the outer lip are connected by an elevated ridge, and three of the teeth are more prominent than the others.

SCARABUS CHALCOSTOMUS, A. Adams. *S. testá ovato-pyramidalí, spirá elevatá, acutá, longitudinaliter substriatá, pallide luteá, rufo-fuscá variegatá; aperturá ovali, æneá; labio anticè subrecto; labro semicirculari; umbilico patulo.*

Shell ovately pyramidal, spire elevated, sharp, longitudinally substriated, pale yellow varied with reddish brown; aperture oval, brassy; inner lip anteriorly rather straight, outer lip semicircular; umbilicus open.

Hab. Solomon's Islands; *Capt. D'Orville.* (Mus. Cuming.)

In general appearance this species resembles *S. pyramidatus*, but it is more oval, larger, lighter, with the middle tooth on the inner lip double, and the lower tooth broad and ascending; two of the teeth in the outer lip are very large and tubercular.

3. A MONOGRAPH OF PHOS, A GENUS OF GASTEROPODOUS MOLLUSCA. BY ARTHUR ADAMS, F.L.S., R.N.

PHOS, Montfort.

Shell ovately fusiform, spire acuminated, whorls longitudinally ribbed and cancellated; columella with a single anterior plait; outer lip notched in front, striated within. The animal has a small head;

the tentacles connate at the base, with the eyes near their distal third; the foot is dilated in front, forming an elevated shield, acutely auriculate on each side, pointed behind, and ending in a single long filament. Operculum small, horny, and unguiform. In three species of this genus in which I have observed the animal, namely *Phos senticosus*, *roseatus*, and *Blainvillii*, the hind part of the foot terminated in a single median filament, and not, as in *Nassa*, in a bifurcate tail.

1. PHOS SENTICOSUS, Linn. sp.; List. Pl. 967. fig. 22.
Buccinum senticosum, Linn.
Phos senticosus, Montfort.
Hab. Philippine Islands; H. C.
2. PHOS BLAINVILLII, Desh. Chemn. pl. 125. f. 1201, 1202.
Kiener, Mon. Buccinum, pl. 11. f. 38.
Buccinum pyrostoma, Reeve.
Hab. Philippine Islands; H. C.
3. PHOS CUMINGII, Reeve, Elements of Conchology, pl. 3. fig. 16.
Hab. — ?
4. PHOS CRASSUS, Hinds, Zool. Voy. Sulphur, Moll. p. 37. pl. 10. f. 1, 2.
Hab. Panama, Gulf of Fonseca.
5. PHOS VIRGATUS, Hinds, l. c. p. 37. pl. 10. fig. 11, 12.
Hab. Ceylon.
6. PHOS RETECOSUS, Hinds, l. c. p. 37. pl. 10. fig. 3, 4.
Hab. Ceylon.
7. PHOS VERAGUENSIS, Hinds, l. c. p. 37. pl. 10. fig. 13, 14.
Hab. Pueblo Nueva, west coast of Veragua.
8. PHOS ARTICULATUS, Hinds, l. c. p. 38. pl. 10. fig. 7, 8.
Hab. Panama.
9. PHOS ROSEATUS, Hinds, l. c. p. 38. pl. 10. fig. 9, 10.
Hab. North coast of Sumatra.
10. PHOS GAUDENS, Hinds, l. c. p. 38. pl. 10. fig. 5, 6.
Hab. Gulf of Tehuantepec, west coast of Mexico.
11. PHOS CANCELLATUS, A. Adams. *P. testá orato-fusifirmi, albidá, obsolete fusco fasciatá; anfractibus subrotundatis, lineis elevatis longitudinalibus et transversis, valdè cancellatis, cancellis ad angulos acutè nodosis; aperturá intus fuscátá, anticè tuberculátá, plicá validá.*
Hab. — ?

This species resembles *P. veraguensis*; but the areas between the cancelli are simple, whereas in *P. veraguensis* there is an intermediate, elevated line, crossing them, a circumstance not mentioned in the description of Mr. Hinds.

12. PHOS TURRITUS, A. Adams. *P. testá ovato-fusiformi, tenui, subpellucidá, spirá turritá, acuminatá, albido-fuscatá; anfractibus rotundatis, costis longitudinalibus angustis numerosis, lineis elevatis, transversis, ad costas nodulosis, ornatis; columellá plicá anticá subevanidá.*
Hab. Panama, coral sand, 6 to 10 fathoms; *H. C.*

13. PHOS TEXTILIS, A. Adams. *P. testá elongatè ovatá, albidá, spirá acutá, costis rotundatis, crassis, infra suturam nodoso-angulatis, lineis transversis, planis, subconfertis, elevatis, interstitiis longitudinaliter subtilissimè striatis; columellá plicá anticá validá.*
Hab. Dumaguete, Philippines; *H. C.*

In general form this species approximates *P. Blainvillii*, but the elaborate and distinct style of sculpture and white aperture at once distinguish it.

14. PHOS RUFOCINCTUS, A. Adams. *P. testá ovato-fusiformi; spirá productá, angustá, albidá, fasciá rufá ornatá; anfractibus rotundatis, costis crassis, infra suturam rotundatis, lineis transversis, elevatis, nodulosis, confertis, ornatis; columellá plicá anticá productá.*
Hab. Dumaguete; *H. C.*
 The nucleus of this species is large and papillary.

15. PHOS SCALARIOIDES, A. Adams. *P. testá ovatá, acuminatá, turritá, albidá, fusco variegatá, obscurè fusco bifasciatá; anfractibus rotundatis, costis longitudinalibus, distantibus, infra suturam rotundatis, lineis elevatis, transversis, ad suturas nodulosis, interstitiis subtilissimè longitudinaliter striatis; columellá supernè callosá, infernè plicá productá; labro intus lirato.*
Hab. — ?

A beautiful species, with regular, strong ribs, giving it the appearance of a *Scalaria*.

16. PHOS SPINICOSTATUS, A. Adams. *P. testá ovatá, spirá acuminatá, albidá, sparsim fusco nebulosá; anfractibus rotundatis, costatis, costis distinctis, subdistantibus, infra suturam angulatis et spinosis, lineis transversis elevatis ornatis; columellá rufo-fusco maculatá, plicá anticá productá; labro intus rufescenti lirato.*
Hab. Batangas, in insulis Philippinis.

17. PHOS NODICOSTATUS, A. Adams. *P. testá ovatá, turritá, acuminatá, albidá, rufo-fusco maculatá; anfractibus rotundatis, costatis, costis distantibus, infra suturam angulatis et nodosis, lineis transversis, elevatis, ad costas nodulosis ornatis; columellá plicis evanidis, plicá anticá validá productá.*
Hab. ad insulam Negros; *H. C.*

The two species, described above, are somewhat similar in form,

but the peculiarity of the ribs and colour of the apertures readily distinguish them.

18. PHOS CYLLENOIDES, A. Adams. *P. testá ovatá, albidofuscá, spirá acutá, longitudinaliter plicato-costatá, costis superne nodosis, ad suturam evanidis, lineis impressis transversis sulcatá; columellá plicá anticá, valdè productá; labro intus fusco lirato.*

Hab. in insulis Philippinis.

19. PHOS CYANOSTOMA, A. Adams. *P. testá elongatè ovatá, acuminatá, albidá, anfractibus rotundatis, costatis, costis crassis, æqualibus, infra suturam plicato-nodosis, cingulis elevatis, transversis, subdistantibus, interstitiis longitudinaliter subtilissimè striatis; aperturá cyaneo tinctá; columellá tuberculatá, plicá anticá validá.*

Hab. in insulis Philippinis.

The interstices between the transverse ridges in this species are very beautifully engraved with fine longitudinal lines, and the aperture is tinged with blue.

20. PHOS LÆVIGATUS, A. Adams. *P. testá elongatè ovatá, lævigatá, pallide fuscá; anfractibus subrotundatis, costatis, costis crassis, distantibus, lævigatis, infra suturam valdè nodosis, lineis tenuibus transversis ornatis; columellá plicá anticá productá; labro extus plicato, plicis numerosis confertis, intus substriato.*

Hab. Promontorium Bonæ Spei.

A large, smooth shell, with thick, simple ribs.

June 25, 1850.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

1. CATALOGUE OF THE MAMMALIA OF CEYLON. COLLECTED AND OBSERVED BY E. F. KELAART, M.D., F.L.S.

Order PRIMATES.

Fam. SIMIADÆ.

1. Presbytes cephalopterus, *Gray*. The Nestor or Purple-faced Monkey.
2. Presbytes Thersites, *Blyth*. The Wanderoo of Ceylon.
3. Presbytes Priamus, *Elliot*. The larger Wanderoo.
4. Simia sinicus, *Desm*. The Rillouwah or Green Monkey.

There is another Monkey found in Newera Ellia and its neighbourhood, resembling the *P. Priamus*. The *Simia Silenus* is not a native of Ceylon; it comes from the Malabar coast.

Fam. LEMURIDÆ.

5. *Loris gracilis*, *Geoff.* The Loris or Ceylon Sloth.

The *Loris tardigradus* is said to be also found in the island, but I have not yet seen it.

Fam. VESPERTILIONIDÆ.

6. *Kerivoula picta*, *Gray.* Painted Kerivoula.
 7. *Pteropus Edwardsii*, *Geoff.* The Flying Fox.
 8. *Cynopterus marginatus*, *F. Cuv.* The Cynoptere (margin-eared).
 9. *Vespertilio pipistrellus*, *Gm. var.* The Pipistrelle.

There are two other Bats in the island which Mr. Edgar Layard has seen and identified.

Order FERÆ.

Fam. FELIDÆ.

10. *Leopardus varius*, *Gray.* The Leopard (Cheetah of Ceylon).
 11. And var. black, *Felis Melas*, *Peron.*
 12. *Leopardus viverrinus*, *Gray.* Var. of the Wagati Cat. The Jungle Cat of Ceylon.
 13. *Felis Chau*? The Lynx-like Cat.
 14. *Felis domestica.* The domestic Cat (several varieties).
 15. *Viverra indica*, *Geoff.* The Indian Genette.
 16. *Herpestes griseus*, *Sykes.* The Grisled-brown Mungous.
 17. *Herpestes vitticollis*, *Elliot.* The Streaked-neck Mungous.
 18. *Paradoxurus zeylanicus.* Two varieties of the Ceylon Paradoxure.
 19. *Canis aureus*, *Linn.* Two varieties of the Jackal.
 20. *Canis familiaris*, var. Pariah. The Pariah Dog.
 21. *Lutra nair*, *Sykes.* The Otter.

I have heard it stated that the Bengal Tiger (*Felis Tigris*) was seen some years ago in Newera Ellia and in the Jaffna district.

I have an imperfect skin of an animal killed at Newera Ellia resembling much that of a *Prionodon*.

Fam. URSIDÆ.

22. *Ursus labiatus*, *Blainv.* The Indian (lipped) Bear.

Fam. TALPIDÆ.

23. *Sorex murinus*, *Linn.* The Musk Shrew.
 24. *Corsira Newera Ellia*, *Nobis.* The Black Shrew.
Corsira nigrescens, var. or new species.
 25, 26. *Erinaceus*, two species. The Hedgehog.

Order CETÆ.

27. *Halicore Dugong*, *F. Cuv.* The Dugong.
 28. *Delphinus*, *Sp.* The Dolphin.

The Porpoise and the Whale are also sometimes seen on the coast of Ceylon.

Order GLIRES.

Fam. MURIDÆ.

29. *Mus bandicota*, *Gray.* The Bandicot or Pig Rat.
 30. *Mus decumanus*, *Pallas.* The Norway Rat.
 31. *Mus niviventer*, *Hodgs.?* The White-bellied Rat.
 32. *Mus musculus*, *Linn. var.* The common Mouse, two varieties.
 33. *Leggada booduga*. The Booduga (Soil Rat).
 34. *Golunda newera*, *Nobis.* The Golunda (Soil Rat).

Fam. HYSTRICIDÆ.

35. *Hystrix leucurus*, *Sykes.* The Indian Porcupine.
 36. *Cavia Cobaya*. The domesticated Guinea Pig.

Fam. LEPORIDÆ.

37. *Lepus macrotus?*, *Hodgson.* The Indian or Ceylon low country Hare.
 38. *Lepus nigricollis*, *F. Cuv.* The highland Black-naped Hare.
 39. *Lepus cuniculus*, *Linn.* The tame Rabbit.

Fam. JERBOIDÆ.

40. *Pteromys nitidus*, *Geoff.* The Flying Squirrel.
 41. *Sciurus macrurus*, *Forster.* The Rokea, two varieties.
 42. *Sciurus palmarum*, *Linn.* The Palm Squirrel.
 43. *Sciurus trilineatus?* The Three-streaked Squirrel.

There are three other species of Squirrels in the island, and another flying Squirrel, the skin of which I possess without its head.

Order UNGULATA.

Fam. BOVIDÆ.

44. *Bos taurus*, var. *Indicus.* The Ox.
 45. *Bubalus Buffelus*, *Gray.* The Buffalo (wild and domesticated).
 46. *Ovis Aries*, var. The Jaffna Sheep.
 47. *Capra hircus*, var. The Ceylon Goat.

The *Bos gaurus* was once seen on the island.

48. *Meminna indica*, *Gray.* The Meminna.
 49. *Muntjacus vaginalis*, *Gray.* The Muntjac.
 50. *Axis maculata*, *Gray.* The Spotted Axis.
 51. *Cervus unicolor*, *H. Smith.* The Ceylon Rusa or Stag.
 52. *Cervus porcinus?*, *Auct.* The Hog Deer.

Fam. EQUIDÆ.

53. *Equus caballus*, *Linn.* The Horse. Introduced.
 54. *Equus asinus*, *Linn.* The Ass. Introduced.
 Mules are also bred in the island.

Fam. EQUIDÆ.

55. *Elephas indicus*, *Linn.* The Asiatic Elephant.
 56. *Sus indicus*, *Gray.* The Indian Wild Boar.
 57. *Sus scrofa*, var. *sinensis.* The domesticated Hog.

Fam. DASYPIDÆ.

58. *Manis pentadactyla*, *Linn.* The Pangolin, or scaly Ant-eater.

REMARKS.—The new species indicated in the foregoing Catalogue may be described as follows:—

34. GOLUNDA NEWERA, *Nobis.*

Fur soft, yellowish brown varied with black; chin and beneath yellowish grey; under-fur dark lead-colour; soft long hairs on the upper parts of the head and body, with longer black-tipped hairs having a subterminal yellowish band; fur of belly dark lead-colour tipped with yellowish grey; ears large, hairy on both sides, of a light rusty or ashy colour; whiskers slender, moderately long, some greyish, others blackish; tail shorter than the body, tapering to a point, scaly; upper surface of a black colour and covered with short semi-adpressed black hair; lower surface yellow or ashy colour, covered with short hair of the same yellow colour; feet having dark brown claws, purplish; four toes to the fore-feet, with a clawless rudimentary thumb; five hind-toes, three middle subequal; soles nearly bald, blackish; palma studded with four small tubercles; planta with six tubercles, the two foremost considerably larger; incisors yellow, superior ones grooved in the centre; molars flat, deeply 3-lobed, tubercles rising in three distinct lines, middle larger than those of the sides, and the front one extending beyond the two other lobes.

Length of body and head, $3\frac{1}{4}$ inches; tail, $2\frac{1}{2}$.

This rat is found in the black soil of Newera Ellia, and is a great destroyer of peas and potatoes. The only two specimens I had, lived for some days in a cage and played like mice.

24. CORSIRA NEWERA ELLIA, *Nobis.* (Or variety of *Corsira nigrescens.*)

Slaty or ashy black, very slightly washed with rufous on the upper parts; no trace of rufous beneath, which is paler slaty; whiskers long, very thin, greyish; legs from half way down the thighs covered with short adpressed hairs; feet fleshy grey; hair on the toes longer, and those of the hind-feet extending over the claws; claws white, those of the front feet elongated, compressed, acute; toes 5-5, all clawed;

ears large, naked, partially hid in the fur; tail black, round, tapering, rather scaly, and thinly covered with short hair intermixed with much longer, glossy, shining, thin, stiff hairs, some of which are also seen in the upper parts and sides of the lower half of the body; teeth white throughout.

Length of body and head, $3\frac{1}{2}$ inches; tail, $2\frac{1}{2}$.

Found in Newera Ellia and even on Pedrotellgala, the highest mountain in Ceylon, which rises from the plains of Newera Ellia, and is 8020 feet above the sea's level. I had one quite docile in a box for some days, which fed ravenously on earth-worms; it used to run about the table and on my arms without attempting to get away; it died one frosty night.

This shrew differs from the *Sorex murinus* chiefly in the absence of all unpleasant smell. I could not trace any glands or lectæ in any part of the body. The elongated fore-claws is another good specific distinction. The *Sorex murinus* is also found here, and I am inclined to think that a very diminutive shrew, of which I have seen only one specimen, is another species, but which for the present I have considered as only the young of the above-described animal. It resembles in every point the *Sorex pygmaeus* of Hodgson (Mag. Nat. Hist. vol. xv.). There are several characters in our *Corsira* which make me consider it not identical with the *C. nigrescens* of Gray, especially the greater length of its tail than in the animal found on the continent of India, which I know only from Mr. Gray's description.

Of the Mammals enumerated in the catalogue, the following are found in Newera Ellia:—*Presbytes priamus*, var.; *Vespertilio pipistrellus*, var.; *Felis varius*; *Felis chaus*?; *Herpestes vitticollis*; *Viverra indica*; *Paradoxurus* (two var. or species); *Canis aureus*; *Mus Bandicota*; *Mus musculus* (variety with white feet); *Mus albiventer*; *Golunda Newera*; *Sorex murinus*; *Corsira Newera Ellia*; *Lepus nigricollis*; *Sciurus macrurus* (very black-coloured variety); *S. trilineatus*? *Elephas indicus*; *Lutra nair* (perhaps another species, for I only saw it taking the water). The *L. nair* is found in abundance in the low country; and a *Prionodon*, the skin resembling one I have.

Of Birds, the following I have here, besides those I have enumerated as new: *Cissa puella*, Blyth; *Caprimulgus indicus*, Latham; *Palaornis Layardii*, Blyth; *Hirundo domicola*; *Acanthylis caudacuta*?; *Collocalia nidifica*?; *Gracula ptilogenys*; *Columba Elphinstonii*, var.; *Parus cinereus*; *Gallus Stanleyii* or *Lafayetii*; *Galloperdix bicalcaratus*; *Picus ceylonicus*; *Dendrophila frontalis*; *Hypsipetes nilgherriensis*; *Hemipus picatus*; *Corydala rufa*; and a few others.

Newera Ellia, Ceylon, 8th May, 1850.

2. ON THE BLOOD-COLOURED EXUDATION FROM THE SKIN OF THE HIPPOPOTAMUS. BY JOHN TOMES, F.R.S., SURGEON-DENTIST TO THE MIDDLESEX HOSPITAL.

(Mammalia, Pl. XXI.)

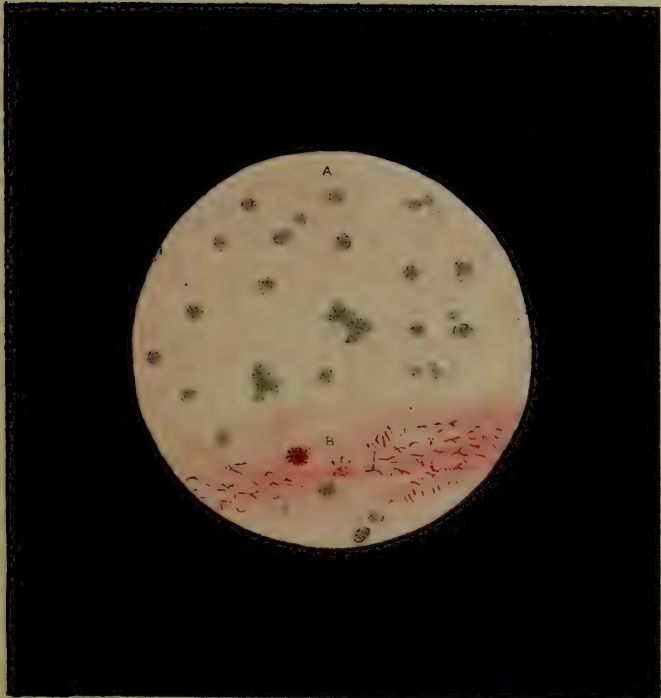
The Honourable C. A. Murray, in a letter which he addressed from his residence at Cairo to Mr. Mitchell, states that the skin of the young Hippopotamus entrusted to his care was at times covered with a blood-coloured exudation, and that it was most abundant immediately after the animal had left his bath. At first this peculiar condition excited considerable alarm, but its constant recurrence, and the otherwise perfectly healthy appearance of the animal, induced the belief that the secretion was normal, or at all events portended no harm. In a letter received at a later date than the one I have referred to, Mr. Murray says that the exudation, though still preserving the same peculiar characters, has diminished both in amount and in intensity of colour.

On the day after the Hippopotamus arrived in the Zoological Gardens, I had a favourable opportunity of examining the general appearance of the skin. The upper surface of the body is dotted over with a number of deep brown spots, disposed on a comparatively faint brownish black ground. The spots are much more apparent when the skin is wet, than when it has become dry from exposure to the air. Immediately after leaving the bath, each of the deep brown spots may be seen to have a slightly raised centre, from which is poured a drop of pink fluid of the consistence of white of egg. This peculiar exudation speedily diffuses itself over the surface of the skin, and dries with a slightly glazed surface.

The Arab keeper who attended the Hippopotamus in his passage to this country, and who still has charge of him, says that he has never seen the red fluid exude, excepting immediately after the animal has left his bath; that it quickly dries up, and does not reappear till the animal again emerges from his bath. The end of the nose is however constantly a little damp, from the presence of a small quantity of a colourless mucous fluid, which escapes from minute pores situated in this part. At the line of junction with the skin and the smooth semi-mucous membrane which covers the extremity of the nose, the fluid has a faint pink colour.

On the second day of the animal's residence in the Gardens, I collected a small portion of the coloured fluid from the middle part of the back, and after securing it between two slips of glass, placed it in the field of my microscope, which I had conveyed there for the purpose of making an examination previous to the fluid undergoing any change, either from decomposition or evaporation, which a slight lapse of time might possibly have affected.

The following particulars were obtained from the examination I then made:—The exudation is composed of a transparent fluid in which float two kinds of corpuscles; one kind is tolerably abundant, and is both transparent and colourless; the other is comparatively rare and of a bright red colour. To the solution of these latter bodies the fluid owes its peculiar colour.



11 Wmf. 62. 1. 100.

Tabl A Yon. Lohstrophora 54. Easton Carlin.

Exudation from the skin of the
HIPPOPOTAMUS

A. Colourless Globules B Coloured Globules



J. Wolf, lith.

M. A. N. Hanhart, imp.

HIPPOPOTAMUS AMPHIBIUS. Linn.



The colourless corpuscles are spherical in shape, and vary in diameter from the 3450th to the 2100th of an inch; the majority however measure about the 3000th of an inch. Their structure is granular, and in about the same degree as the colourless corpuscles of blood, and the ordinary exudation corpuscles, to which they present a strong resemblance.

Many of these bodies preserve their figure for a considerable time, while others become collected into clusters and form irregular broken masses.

The coloured corpuscles are irregular in size and shape, and are composed of an aggregation of minute elongated and sometimes triradiate bodies, many of which appear, from their irregular and obscure outline, as though partially dissolved. In the immediate neighbourhood of these, the fluid has a much deeper colour than elsewhere. From these circumstances I have been led to conclude that the general pink colour of the fluid is due to the solution of the coloured particles, and not simply to their presence. In this particular the fluid under consideration is strikingly different from blood, which owes its colour to the presence of coloured globules and not to their solution.

The colourless corpuscles are represented in the figure at A, and the coloured ones at B, together with the deeper colour of the fluid at the part in which the latter are present.

These observations were made May 28th, 1850. Since that time I have on several occasions sought to obtain a little more of the red exudation, but always without success. The creature on leaving the bath feels slimy, and a small quantity of transparent tenacious fluid issues from the elevations on the skin, but it quickly dries up.

On Sunday last, June 23, the nose was covered with colourless exudation, and near the upper margin of the nostril it had a perceptible pink tinge. On this occasion the animal had been out of the bath for some hours, and the skin of the body was perfectly dry.

Whether the red colour of the exudation is a condition of youth, and of an imperfect condition of the skin, and has ceased in consequence of the increased age of the animal and the consequent more perfect development of the integument, or has ceased in consequence of the change of climate to which the animal has been lately subjected, is a question which, with the facts at present at our disposal, cannot be satisfactorily determined.

We have however sufficient evidence to warrant the conclusion, that the thick tenacious exudation, whether coloured or otherwise, is poured out only during the time the skin is immersed in water, and that it has an especial reference to the aquatic habits of the animal. It appears for the time to convert the surface of the body into a mucous membrane, and then, on the animal leaving the water, to furnish by its inspissation an epidermis.

Should further inquiry show that the thickness of the exudation arises from a solution of the colourless globules, its relation to mucus will be still further established, and a microscopic examination into

the structure of the skin will become a subject of great physiological interest.

3. ON SIX NEW SPECIES OF HUMMING BIRDS. BY JOHN GOULD, F.R.S. ETC.

Although the Trochilidæ have lately received much attention both from our own and the continental naturalists, the subject is far from exhausted, as is shown by the circumstance of my being able to bring before the notice of the Society this evening no less than six species hitherto uncharacterized and unknown. These great accessions to the family are all from a state with which we have as yet had but little intercourse—that of Veragua in Central America; and we are indebted for a knowledge of them to the researches of an enterprising traveller and botanist, M. Warzewicz, who has just returned from that country, where he successfully explored many forests and other districts not previously trodden by the foot of civilized man. Unfortunately, both for myself and for science, he was not able, in consequence of the heavy rains which prevailed at the time, to procure or to preserve the examples in so fine a state as could be wished; although much mutilated and otherwise damaged, they are, however, sufficiently perfect to admit of my furnishing the following descriptions:—

1. TROCHILUS (SELOSPHORUS) SCINTILLA.

Male: upper surface bronzy green; on the throat a gorget of glittering fiery red, the feathers of which are much produced on either side; beneath the gorget a band of buffy white; wings purple-brown; central tail-feathers brownish black, margined with rusty red; lateral tail-feathers brownish black on their outer and rusty red on their inner webs; under surface reddish brown; bill black.

Female: upper surface as in the male, but not so bright; under surface white; throat-feathers less produced, and spotted with brown on a white ground; flanks buff; tail rufous, crossed by a crescentic bar of black near the tip.

Total length of the male, $2\frac{3}{4}$ inches; bill, $\frac{1}{2}$; wing, $1\frac{1}{4}$; tail, 1.

Hab. Volcano of Chiriqui, at an altitude of 9000 feet.

This is an extremely beautiful species, and forms a miniature representative of the *Trochilus rufus*, to which it is somewhat allied.

2. TROCHILUS (THAUMATIUS?) CHIONURA.

Male: upper surface very dark grass-green; wings purplish brown; central tail-feathers bronzy green; lateral tail-feathers white, largely tipped with black; throat pale shining green; flanks greenish; centre of the abdomen and under tail-coverts white; upper mandible black, base of the lower mandible fleshy white.

Female: upper surface as in the male, but paler; lateral tail-feathers white, as in the male, but crossed near the extremity with an oblique band, instead of being tipped with black; throat and under surface generally white.

Total length, $3\frac{1}{2}$ inches; bill, $\frac{5}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. Chiriqui near David, province of Veragua, at an altitude of from 2000 to 3000 feet.

This is a remarkable species, differing, as it does, from all other Humming-Birds with which I am acquainted, in the large amount of white on the tail-feathers, which shows very conspicuously when that organ is spread. In form it is very similar to the *T. brevirostris* and *T. longirostris* of the Brazils.

3. TROCHILUS (THALURANIA) VENUSTA.

The entire crown, back of the neck, and upper part of the back, shoulders, abdomen, and under tail-coverts, beautiful shining ultramarine blue; throat and fore-part of the neck rich metallic green; wings purplish black; tail considerably forked, and of a blackish blue; bill black.

Total length, 4 inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{5}{8}$.

Hab. Volcano of Chiriqui in Veragua.

Remark.—Nearly allied to, and of the same form and size as, the *T. furcatus*, but a far finer bird.

4. TROCHILUS (—?) CÆRULEOGULARIS.

Male: upper surface, shoulders, abdomen and under tail-coverts, shining grass-green; throat, sides of the neck and chest, rich violet-blue; wings purple-brown; tail rather forked; central feathers bronzy green; lateral feathers purplish black; upper mandible and tip of the lower black; basal portion of the latter fleshy white.

Female: upper surface shining grass-green, but of a paler hue than in the male; tail as in the opposite sex, except that the lateral feathers are tipped with white; centre of the throat, abdomen and under tail-coverts white.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{3}{4}$; wing, 2; tail, $1\frac{1}{2}$.

Hab. Near David, on the north side of the Cordillera, Veragua.

I am also indebted to Dr. T. B. Wilson of Philadelphia for the loan of a specimen from Panama. This species is precisely of the same elegant form as the *T. Goudotii*, but is of a larger size, and is at once distinguished from that bird by its blue breast.

5. TROCHILUS (—?) CASTANEOVENTRIS.

Crown of the head metallic green; upper surface green; wings purplish brown; tail dark bronzy green, crossed near the tip by a broad band of black; the lateral feathers tipped with buff, which decreases in extent as the feathers approach the central ones; all the under surface reddish chestnut; bill black.

Total length, 4 inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{4}$; tail, $1\frac{3}{8}$.

Hab. Cordillera of Chiriqui, at an altitude of 6000 feet.

Remark.—This is a moderately sized species, and is not allied to any other member of the family with which I am acquainted; I am therefore unable to assign it a place in any of the sections hitherto proposed; the specimens I possess appear to be immature, and are unfortunately in bad condition.

6. TROCHILUS (—?) NIVEOVENTER.

Crown of the head and back of the neck bronzy green; back rich coppery bronze; wings purple-brown; upper tail-coverts reddish purple; tail purple-black; throat resplendent green; abdomen snow-white; flanks green; under tail-coverts greenish brown, margined with white; bill black, except the basal three-fourths of the lower mandible, which are flesh colour.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. Near David; warm countries of Veragua.

Remark.—Nearly allied to *T. Edwardi* and *T. erythronotus*; from the former, however, it differs in the colour of the tail, and from the latter in the white colouring of the breast.

July 9, 1851.

John Gould, Esq., F.R.S., in the Chair.

The following papers were read:—

1. ON THE GENERIC SUBDIVISION OF THE BOVIDÆ, OR HOLLOW-HORNED RUMINANTS. BY H. N. TURNER, JUN.

In the series of observations upon the Ungulate Mammalia, of which I attempted last winter to lay before the Society the more general results, my attention was also in some measure directed towards the detailed arrangement of those portions of the order which have generally proved subjects of difficulty. Of these, the classification of the *Bovidæ*, or hollow-horned Ruminants, has certainly been the greatest, since they form a well-marked natural group, including a great variety of forms, with but few remarkable differences of structure. I soon found, however, that even setting aside some of the more strikingly-modified genera, the distinctions afforded by the skull were much more decided than any that I could find among the *Cervidæ*, which, from their being less rich in number and variety, were always easier to subdivide correctly. Not having been able at that time to observe the skulls of certain of the more remarkable forms, I set the matter aside for better opportunities; and now that the large and interesting collection of hunters' spoils which Mr. Roualeyn Gordon Cumming has brought together, and is at present exhibiting in London, has given me the opportunity of supplying some of these desiderata, I venture, although there are yet a few points I could wish to ascertain, to lay this portion of my researches before the Society.

There cannot be a doubt that the horns present the best and most readily discernible characters, or that, when the genera are once correctly determined, they may be pretty easily defined by the variations of these parts alone; but it has long since been seen how the con-

sideration only of the horns has led to very unnatural approximations. For example, Cuvier associates the Addax with the Indian Antelope; and Mr. Blyth, his translator, inserts his belief that it is more allied to the Coudou, which I think modern naturalists will allow to be equally wide of the truth. Again, the species forming the genera *Ægocerus* and *Nemorhædus* of Major Smith are placed together in the 'Règne Animal,' and Mr. Blyth hints that the Anoa may be allied to the Oryx.

It is certainly remarkable, that while the teeth have contributed so important a share in the characters by which the mammalia have been arranged by various authors, they should have been so entirely overlooked in the members of the present division; for notwithstanding the great uniformity and strongly-marked character pervading the Ruminant dentition, very decided characters may frequently be found in the form and direction of the incisors, and in the presence or absence of the supplemental lobe in the molars; and it is the more to be wondered at when we consider that the incisors, from their position, may often easily be seen in dried specimens, and that the character alluded to in the molars has been found of considerable value in the interpretation of fossil remains. The remaining characters I shall have to bring forward consist of certain little details of structure in the skull, which are very easy to be perceived, and which, as I have found them constant in those groups which I have characterized by their means, I trust may meet with due consideration from naturalists.

Of late years, while some zoologists have remained content to call all hollow-horned Ruminants that are neither oxen, sheep, nor goats, by the generic name *Antelope*, another class have run into the extreme of the modern fashion by using every trifling external difference visible in dried skins, or recorded in books (sometimes not even excepting size and colour), to divide them so extensively, that the characters of the genera become more difficult to remember than those of the species. Considering the difficulty of observing many of these characters in dry specimens, and of bearing such trivial details in the memory, it is not to be wondered at that many errors of observation have crept in, a few of which I will point out as I proceed, limiting myself in my own diagnoses to the characters of the skull and horns. There is no doubt that the suborbital sinus, improperly called "lacrymal sinus" (translated into "tear-pit" by some authors, "tear-bag" by Mr. Gray), will form a valuable means of distinction when its structure in all the genera has been sufficiently observed upon fresh individuals, or on the parts preserved in fluid, provided that we do not attach too much importance to its relative dimensions; but although its dried appearance may assist discrimination, we cannot venture to describe it. As to inguinal pores and interdigital pits, it must always be difficult, and frequently impossible to determine their presence or absence in specimens that are dried and mounted. Tufts upon the joints of the limbs, and the extent of bare space upon the muzzle, are certainly much too trivial to warrant generic distinction, and never mark out any particular natural group.

The last attempt to arrange this extensive family in subordinate groups is that of Mr. Gray, published in the eighteenth volume of the 'Annals and Magazine of Natural History.' His preliminary remarks, though brief, appear to me quite sufficient to dispose of the arrangements previously set forth, therefore I will content myself with the consideration of his own. The two primary divisions, which are founded only upon the horns, certainly do not indicate any very natural affinities, since, taking the whole structure into consideration, the *Antilopeæ* of Mr. Gray are not more closely allied to the *Bovææ* than they are to the members of the second primary division, nor do the *Strepsicerææ* ally themselves particularly to the Sheep and Goats. With regard to the subdivision of the *Antilopeæ*, he is certainly right in separating the "Antelopes of the Desert" as a group, although there is no doubt that some of the divisions of the "Antelopes of the Fields" are equally as distinct from each other as they are from the former. The division of the latter group into "True Antelopes," "Caprine Antelopes," and "Cervine Antelopes," also possesses some merit; but the genera *Capricornis* and *Nemorhædus* are very distinct from the other Caprine Antelopes, and the genus *Eleotragus* (*Redunca* of Major Smith) is very distinct from the other true Antelopes, and ought, as I am quite convinced, to include the genus *Kolus* of Dr. Andrew Smith, placed by Mr. Gray among his Cervine Antelopes, and consisting of species not known at the time Major Smith was engaged in these researches.

It will be universally admitted, that for the generic division of the Ruminants, zoology is most indebted to Major Smith, and in the course of my observations I have found reason to reject but few of the divisions proposed by him as subgenera, and few, if any, in my opinion, need be added. As I thus propose to curtail the list of genera adopted by Mr. Gray, and to separate certain of them from those with which he has associated them, several will stand alone; and of those which do ally themselves together, no group seems to manifest that particular relationship with other groups which should warrant us in separating the family, as Mr. Gray has done, into divisions of a primary, secondary, tertiary, and in some cases even a fourth and fifth degree of rank.

I will, therefore, while enumerating the characters which I have observed in the genera I propose to adopt, point out which of them appear to constitute groups, and mention those species which, from the inspection of entire specimens, skulls, or at least horns, I feel warranted in referring to the genera under which I place them. As I have seen nothing to guide me to a particular linear arrangement, any naturalist who may be pleased to adopt my divisions is at liberty to place the groups, and the genera contained in each, in whatever order he may think most convenient.

I will first proceed to the "true Antelopes" of Mr. Gray, excluding the genus *Eleotragus*. They all have the horns round, the middle incisors expanded at their summits, the others being bent outwards to make room for them, and the molars without supplemental lobes. The infraorbital depression when existing upon the skull is gene-

rally suddenly pressed in before the orbit. The genera are as follows:—

ANTILOPE.

No suborbital fissure nor fossa*, but a wide opening on the side of the muzzle, between the maxillary and intermaxillary bones; the masseteric ridge rising before the orbit; the auditory bulla large and prominent, with only a small groove on its outer side to receive the attachment of the stylohyal bone; the occiput broad, somewhat produced downwards; its basal portion with the posterior pair of tubercles broad, the anterior ones small. Molars without the supplemental lobe.

Horns annulated, curving outward from the base, then bending backwards and towards the tip upwards.

Hab. South Africa.

A. Melampus.—Of this single species, to which modern zoologists have confined the old generic name, I have only seen skulls of the male, in Mr. Cumming's collection: the lower jaw, as in most of his skulls of Ruminants, being wanting in all of them, I could not ascertain the character of the incisive teeth.

Major Smith assigns a suborbital sinus to this genus, making the principal distinction from the next to consist in the absence of horns in the female, thus associating with it the *gutturosa* and *colus*, belonging properly to the next genus,—the *cervicapra*, which it seems most convenient to separate,—and the *adenota*, which I must now refer to the genus *Eleotragus*. With his *A. forfex* I am at present unacquainted. *Melampus* alone remains, to which Mr. Gray rightly assigns no "tear-bag;" this, together with the horns, must be the external character of the genus, if, indeed, it be essentially distinct from the Gazelles, for the horns might be considered as a distorted modification of the lyrate type, and some species of that genus seem to want the suborbital sinus.

GAZELLA.

A suborbital fissure, and a moderate, or very slight fossa, suddenly pressed in before the orbit; the masseteric ridge rising before the orbit; the auditory bulla large and prominent; the basioccipital bone having its tubercles moderately or but little developed; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns annulated, more or less resembling an inverted lyre; that is, bending a little outwards soon after their origin, and again inwards towards the tip.

Hab. Eastern Europe, Asia and Africa.

* I here use these terms with reference only to the skull, the fissure being that opening existing in most Ruminants, filled up during life by membrane, between the nasal, frontal, lacrymal and maxillary bones; and the fossa, the depression upon the surface of the lacrymal bone immediately before the orbit, generally affording some indication as to the existence and structure of the suborbital sinus.

<i>G. dorcas.</i>	} Of these species I have seen skulls.	<i>G. subgutturosa.</i>
<i>G. Bennettii.</i>		<i>G. Sæmmeringii.</i>
<i>G. euchore.</i>		<i>G. mhorr.</i>
<i>G. gutturosa.</i>		<i>G. colus.</i>
		<i>G. kemas.</i>

Several of the so-called species that are closely allied in size and colour to *G. Dorcas*, appear to me to be merely varieties, as some of them have been considered by the older naturalists.

This genus seems prone to exhibit in certain species inhabiting more temperate regions, enlargements of, or appendages to, the respiratory passages; for example, the enlarged larynx of *G. gutturosa*, the elevated nose of *G. colus*, and the appendages to its sides in the Chiru (*G. kemas*); these seem to be physiological adaptations, in no case marking a group, and therefore insufficient to warrant generic distinction, which has been made in the two latter instances. However, not having as yet seen entire skulls of these species, I retain them provisionally in this genus, judging by the horns. I think few naturalists will set forth, with Mr. Gray, the colour of the horns of the Saiga as a generic character. Even in the *G. Bennettii*, so closely allied to *G. dorcas*, Mr. Hodgson states that the suborbital sinus is wanting, and he places the animal in a distinct genus, *Tragops* (afterwards altered to *Tragomma*), on account of this difference; while Colonel Sykes, the original describer of the species, affirms that it exists, though of very small size. Mr. Hodgson also denies it to the Chiru, which forms his genus *Panthelops*, and to which he assigns only five molars in each series.

CERVICAPRA.

A small suborbital fissure, and a very large fossa; the tubercles and median groove of the basioccipital bone well-developed. The other cranial characters as in *Gazella*.

Horns annulated, spirally twisted.

Hab. India.

C. bezoartica.

The remainder of this group, if we exclude the *Cephalophi* and the four-horned Antelopes of India, consists of a number of small species, apparently nearly allied, forming the subgenera *Tragulus* and *Neotragus* of Major Hamilton Smith. These are very distinguishable by the former having vertical, the latter recumbent horns; to the former, however, must be added the *Ourebi* (*A. scoparia*), from his subgenus *Redunca* (*Eleotragus*). Mr. Gray divides them into several genera, depending upon the presence or absence of inguinal pores and knee-tufts, the shape of the hoofs, the presence or absence and form of the "tear-bag," the condition of the fur; and one genus, founded upon two very young specimens, is characterized by the absence of the lateral rudimental hoofs. Most of these characters I must decidedly reject; and as I do not consider the evidence of dried skins quite satisfactory with regard to certain others, and have as yet

seen skulls of only two species, I will content myself at present with adopting only the two genera of Major Smith; using however, for the first one, Mr. Gray's generic name *Oreotragus*, without at present wishing to enter into the question of its right to supersede that of *Tragulus*, because the latter name has been also used by Mr. Gray for a group of small Musk Deer, needlessly separated from the Meminna.

I do not see sufficient in the small horns contained in the Museum of the College of Surgeons to warrant the adoption, as a genus, of Major Smith's subgenus *Raphicerus*. I will not attempt to conjecture to what species they may belong: they show nothing to prevent their ranking among the *Oreotragi*; and their locality, said to be the East Indies, while all the members of this genus are African, is not known with certainty.

OREOTRAGUS.

A small suborbital fissure, with a large deep fossa suddenly pressed in before the orbit; the masseteric ridge rising a little before the orbit; the auditory bulla rather large and prominent; the basioccipital bone flat and smooth; the median incisors expanded at their summits, and the molars without supplemental lobes.

Horns small, placed forwards, vertical.

Hab. Africa.

O. saltatrix.

O. scoparius. } Of these two species I

O. tragulus. } have seen skulls.

O. melanotis.

NEOTRAGUS.

Horns recumbent.

Hab. Africa.

N. saltianus.—Of this animal I have seen no skull, but adopt for the present Major Smith's division, as the different direction of the horns is well-marked. It has the suborbital sinus, however, although its absence is assigned as a character by Major Smith. Of the other species included in the subgenus, I have seen but the two young specimens upon which Mr. Gray has founded his genus *Nanotragus*; they having no horns, I will not here venture to point out their location. The lateral rudimental hoofs are also wanting in at least one species of the last genus, the *Oreotragus Tragulus*, which Mr. Gray places in his genus *Calotragus*.

The skulls of the species of the two following genera are distinguished from those of the preceding ones by their having no suborbital fissure, and the fossa being large and not so suddenly pressed in in front of the orbit; and by the horns (or at least, in one case, the principal pair) being thrown back quite to the posterior edge of the frontal bone.

CEPHALOPHUS.

No suborbital fissure, a large fossa occupying the whole side of the

cheek; the nasal bones expanded behind, reaching over a little way into the fossa. The other cranial characters as in *Oreotragus*.

Horns placed far back, inclined backwards.

Hab. Africa.

<i>C. mergens.</i>	<i>C. Maxwellii.</i>
<i>C. coronatus.</i>	<i>C. monticola.</i>
<i>C. silvicultrix.</i>	<i>C. punctulatus.</i>
<i>C. Ogilbii.</i>	<i>C. grinnia.</i>
<i>C. Natalensis.</i>	<i>C. Whitfieldii.</i>
<i>C. rufilatus.</i>	

I have taken this list of species from Mr. Gray's paper on the genus, published in the same volume of the 'Annals and Magazine of Natural History,' omitting a few that seem to me likely to prove varieties, and adding two, which I find named in the Museum, and not included in his paper. I have only seen skulls of two or three species, but no one will dispute the limits of this very distinct genus.

TETRACERUS.

The nasal bones not expanded; the other cranial characters the same as in *Cephalophus*, with the addition of a second pair of horns of small size, placed over the orbits.

Hab. India.

<i>T. quadricornis.</i>	<i>T. subquadricornis.</i>
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ELEOTRAGUS.

Nasal opening rather lengthened, the nasal processes of the intermaxillary bones long, yet not always reaching the nasal bones; a large infraorbital fissure, but no fossa; the masseteric ridge ascending rather high; the auditory bulla large and swollen; the basioccipital bone with its median groove and tubercles well-developed; the median incisors expanded at their summits; a well-developed supplemental lobe in the first true molar of each jaw, and usually more or less appearance of it in those behind.

Horns inclining backwards and outwards, transversely wrinkled, gently curving upwards, and a little inwards towards the tip.

Hab. Africa.

<i>E. reduncus.</i>	<i>E. adenota.</i>
<i>E. isabellinus.</i>	<i>E. sing-sing.</i>
<i>E. capreolus.</i>	<i>E. ellipsiprymnus.</i>
<i>E. arundinaceus.</i>	<i>E. leché.</i>

I have seen skulls of the four preceding the last-named.

It is quite evident, both from the structure of the skull and horns, and from the general external appearance and markings, that the *Antelope adenota* of Major Smith, and certain large species forming Dr. Andrew Smith's genus *Kolus*, belong truly to this form, and that in the latter case, at least, naturalists must have been deceived by mere dimensions. The similarity of character between the horns of the *Adenota* and those of the other species is very recognizable, al-

though Major Smith, judging by these parts alone, supposed them to belong to the lyrate type. The species does not appear among those mentioned in Mr. Gray's paper in the 'Annals and Magazine of Natural History,' but from the name and place assigned to the specimen in the British Museum, he appears to have evaded the difficulty by constituting it a genus of itself, which is placed near the genus *Kolus*, the genus *Eleotragus* (as in his paper) being far removed. The skull in the Museum, although the occiput is lost, bears full evidence of its real affinity. Among the interesting additions to South African zoology discovered by those travellers who have visited the great lake recently discovered in that region, an undescribed species of Antelope*, of which a beautiful skin was recently brought before the Society, will perhaps assist the more sceptical in osteological characters in arriving at a just conclusion on this point, since, while it has the stature and lengthened horns of the *ellipsiprymnus*, it has the brilliant colour and the external marks (particularly the dark stripe down the fore-leg) which characterise the smaller species.

This genus does not seem to show any particular affinity for any of the rest, and forms a well-marked group, of which the species are scattered over various parts of Africa, and are mostly noted for their predilection for the vicinity of water.

I here again adopt Mr. Gray's generic name, to avoid the necessity of altering the name of one of the species, the *E. reduncus*.

STREPSICEROS.

The nasal opening of moderate size; a suborbital fissure, but no fossa; the masseteric ridge not extending high; the auditory bulla swollen and prominent; the basioccipital bone with its anterior and posterior pairs of tubercles well-developed, the former separated by a deep median groove; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns inclined backwards from the base, twisted, with one or more longitudinal angular ridges.

Hab. Africa.

S. cudu.

S. euryceros.

S. Angasii.

S. oreas.

S. Derbianus.

S. scriptus.

S. silvaticus.

S. decula.

The general aspect of the skull in this group reminds one a little of that of the Deer. The species all agree very closely, both in structure of the skull, and in the direction, twisting, and ridges of the horns, the Coudou differing only in having the spiral wide and open, and in the horns being confined to the male, while the Eland is only a gigantic representation of the smaller species. *S. euryceros*, *S. Angasii*, and a species most probably distinct from the rest, of which Capt. Allen brought a skull from the Bight of Biafra, show an intermediate condition of the horns; and in *S. Angasii*, at least, they are known to be wanting in the female. Major Smith himself has here

* Since named *Kolus leché* by Mr. Gray.

been deceived by size, and been led to place the subgenus *Tragelaphus* under his genus *Antilope*, and the others under his genus *Damalis*; even availing himself of stature, and in the case of the Cou-dou, of a white streak over the eyes, to help out the meagre distinctions. In associating the Nyl-Ghau with these animals, Mr. Gray has even allowed colour and marking to deceive him, for in this animal the horns are not even spiral; but in another respect the characters assigned to his *Strepsicereæ* agree with the Nyl-Ghau, and not with the others, which certainly have no suborbital sinus, nor have any of them an ovine muzzle, by which Mr. Gray distinguishes the larger genera from the *Tragelaphus*. In these latter points Major Smith is correct.

I will now proceed to the "Antelopes of the Desert" of Mr. Gray, a very well-marked, natural group, consisting of two distinct genera, which have usually been widely separated. Mr. Blyth, however, in the translation of Cuvier's 'Animal Kingdom,' hints at their affinity, and Mr. Waterhouse informs me that he has long held that opinion. Indeed he has placed the species next each other in the Catalogue of the Society's Museum.

ALCELAPHUS.

A large deep impression before the orbit, but no fissure; the masseteric ridge not extending high; the bones of the face lengthened downwards and forwards, and the occiput also prolonged and drawn downwards; the auditory bulla large and prominent, enclosing a large rounded space for the attachment of the stylohyal bone; the basioccipital tubercles high and sharp, the groove between them narrow in front, wide behind, with a flat space between the occipital condyles; the median incisors expanded at their summits; the molars rather small, narrow, and without supplemental lobes, showing, when somewhat worn, a pit in the middle.

Horns placed high, ringed at the base, with double flexures more or less marked.

Hab. Africa.

A. bubalis.

A. lunatus.

A. Senegalensis.

A. pygargus.

A. caama.

I have seen skulls of the three last-named.

Mr. Gray calls a portion of this genus "Boselaphus," doubtless intending *Alcelaphus* of De Blainville, which being antecedent to Major Smith's name *Acronotus*, should certainly be adopted. The genus is a very natural one, and the characters by which Mr. Gray proposes to divide it into two, are by no means sufficient. The last-mentioned species, *A. pygargus*, has usually been placed among the Gazelles, where it was left by Major Smith and by Mr. Blyth, who speaks of it as leading "through *A. Caama*, *Bubalis*, &c. to the Gnus." Mr. Waterhouse, who in the Catalogue of the Society's Museum uses the generic name *Antilope* throughout, places this species

between the Gazelles and the others of its natural genus, to which the Gnu follows. Mr. Gray, who had left it with the Gazelles in the 'List of Mammalia' in the British Museum, has removed it to its true place in his paper in the 'Annals and Magazine.'

CATOBLEPAS.

The general characters of the skull the same as in *Alcelaphus*; but the depression before the orbit less marked; the occiput rather less prolonged, and its base, together with the auditory bulla, broader.

Horns broad at the base, inclining more or less downwards and outwards, and then bent upwards.

Hab. Africa.

C. gnu.

C. taurina.

The next genus is included by Mr. Gray among his "Caprine Antelopes," but differs from them in having a suborbital sinus or gland, of large size in some species, and of peculiar structure, opening externally by a single pore. Their nasal bones resemble those of the domestic Sheep, and their structure being altogether rather heavy, they might be called *Ovine Antelopes*.

NEMORHÆDUS.

No suborbital fissure; the fossa rounded, shallow, very variable in size, sometimes very minute; the nasal bones rather short and broad, joining the maxillaries only by the interposition of some imperfect ossification or separated from them altogether; the masseteric ridge extending high before the orbit; the auditory bulla very small; the basioccipital bone broad, with moderately developed eminences; the middle incisors slightly expanded at their summits; the molars without supplemental lobes.

Horns rising behind the orbits, annulated and wrinkled at the base, inclined and curved backwards.

Hab. India and its islands.

C. bubalina.

C. Sumatrensis.

C. goral.

This genus is too well-marked by nature to admit of subdivision. Although the "tear-bag" is said to be wanting in the *Goral*, there is certainly a slight depression upon the lacrymal bone, and the pore with which the gland opens may be so small in this species as to escape detection in dried specimens; but if it be really absent, the instances of the genera *Gazella* and *Ovis* must warn us against founding a genus solely on the want of this organ, while on the other hand, a difference in its structure seems to be of great zoological importance.

Since the foregoing observations were written, I have perused Mr. B. H. Hodgson's interesting account of the *Budorcas taxicolor*, in the 'Journal of the Asiatic Society of Bengal,' and a glance at the representations of the skull indicates very plainly that it is closely allied to *Nemorhædus*, to which Mr. Hodgson admits certain resemblances, and that it has no relationship with the Gnu, or the Musk Ox. The characters that I assigned to *Nemorhædus* would appear

to serve as well for this new and singular genus, except that there seems to be no suborbital depression, and the masseteric ridge, as may be expected from the general elevation of the skull, does not rise before the orbit. The horns, whose peculiar twist must constitute the diagnosis of the genus *BUDORCAS*, appear, from the rough figures given, to have the wrinkling at the base very similar to that in *Nemorhædus*.

The following genera may be considered as in some degree allied, and deserve the name of Caprine Antelopes. They have no sub-orbital sinus, but have a fissure in the skull, and their incisors are not widened at the summits.

RUPICAPRA.

A minute suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla very small and compressed; the basioccipital bone flat; the incisors equal-sized, vertical; the molars without supplemental lobes.

Horns slender, round, vertical, and hooked backwards at the tip.

Hab. Europe.

R. tragus.

DICRANOCERUS.

No suborbital depression; the fissure lengthened; the nasal bones widest posteriorly; the orbit a little elevated above the line of the face, and the masseteric ridge not rising before it; the auditory bulla moderate, compressed and angular; the incisors equal-sized, sloping; the molars without supplemental lobes.

Horns vertical, compressed, with a process on their anterior side, and hooked backwards at the tip.

Hab. North America.

D. Americanus.

APLOCERUS.

Horns round, vertical, gently curved backwards.

Hab. North America.

A. Americanus.

I have seen no skull of this animal, but leave it for the present in this location.

I must forego all notice of the *Ixalus probaton* of Mr. Ogilby, as there is no skull to be seen, and the horns in the only specimen known are quite in a rudimentary condition.

The genera next to be considered are the "Cervine Antelopes" of Mr. Gray, exclusive of the genus *Kolus*, which I have rejected. With the exception of the Nyl-Ghau and some of the *Eleotragi*, they are the only members of the old genus *Antilope* that have well-developed supplemental lobes in all the true molars; they have always been placed near together.

ÆGOCERUS.

A small suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla moderate; the occipital portion of the skull much prolonged; the basioccipital portion widened, its two pairs of tubercles much developed, with a deep groove between them; the incisors gradually increasing in size to the median pair, which are not expanded at their summits; the molars with largely-developed supplemental lobes.

Horns rising immediately above the orbits, curved backwards, annulated.

Hab. Africa.

Æ. leucophæus.

Æ. niger.

ORYX.

A suborbital fissure, but no fossa, the masseteric ridge not extending high; the auditory bulla large and compressed; the basioccipital bone with its tubercles well-developed; the molars with supplemental lobes.

Horns straight or gently curved, annulated, placed in a line with the face.

Hab. Africa.

O. gazella.

O. leucoryx.

It is only in Mr. Cumming's collection that I have seen entire skulls of the Gemsbok, and the lower jaw being absent, I could not ascertain the character of the incisors. The skull of the *Leucoryx* I have not seen.

ADDAX.

A small suborbital fissure, but no fossa; the masseteric ridge ascending before the orbit; the auditory bulla large, prominent, and compressed; the basioccipital bone with its anterior pair of tubercles slightly, the posterior well, developed; the median incisors expanded at their summits; the molars with supplemental lobes.

Horns nearly in a line with the face, annulated, spirally twisted.

Hab. Africa.

A. naso-maculata. I have seen but one skull of this animal, and that is a young one, in the Society's collection, still retaining the whole of its milk dentition.

Before proceeding to the Sheep and Goats, the Nyl-Ghau requires to be introduced. It seems to stand alone, not having a decided affinity for any other genus.

PORTAX.

The nasal opening rather small, with the nasal bones small and narrow; a minute suborbital fissure; no fossa, but a smooth line upon the lacrymal bone; the masseteric ridge not extending high; the auditory bulla moderate, bulbous, compressed; the basioccipital

bone with the posterior tubercles moderately developed, the anterior ones scarcely at all; the molars with supplemental lobes.

Horns short, round, vertical, slightly bent forwards.

Hab. India.

P. picta.—The only skull that I have seen (that in the British Museum) wants the incisor teeth, so that I could not ascertain their structure. The smooth line upon the lacrymal bone terminates in a small foramen, but on one side is continued for some distance forwards upon the maxillary bone, where it terminates in the same way; and it may even be faintly traced on the other side for some distance beyond the foramen.

CAPRA.

A small suborbital fissure, no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla prominent and compressed; the basioccipital flat, with its processes developed; the middle incisors not expanded; the molars without supplemental lobes.

Horns erect, compressed; curved backwards and a little outwards, or twisted; annulated or nodulous, and furnished with one or more longitudinal ridges.

Hab. The Northern portions of the Old World.

C. hircus.

C. Falconeri.

C. ibex.

C. jemlaica.

I do not see sufficient reason for separating the Jemlah Goat, as has been done, under the names of *Hemicapra* and *Hemitragus*.

OVIS.

A more or less marked, rounded, suborbital depression, but no fissure; the masseteric ridge ascending high before the orbit; the auditory bulla small; the basioccipital flat, more or less expanded anteriorly by the extension of the anterior pair of tubercles, the posterior ones small; the incisors nearly equal-sized, sloping; the molars without supplemental lobes.

Horns broad at the base, transversely wrinkled, bent outwards, with a more or less marked spiral curve in a direction contrary to that occurring among the Antelopes, and a longitudinal ridge or angle.

Hab. The Northern hemisphere.

O. ammon.

O. nahura.

O. Vignei.

O. tragelaphus.

O. aries.

It is a matter of surprise to me that naturalists should almost universally have given *no* suborbital sinus, as characteristic of the genus *Ovis*, since it is very perceptible in the Domestic Sheep; and in some other species, especially the *O. ammon*, judging by the appearance of the stuffed specimens, and by the fossa upon the skull, it must be of very considerable size. I do not perceive it, however, in the *O. tragelaphus*, nor in the *O. nahura*. Although Mr. Gray maintains the long-established error, the observations of Mr. Ogilby and Mr. Hodg-

son agree with my own in this respect; the latter gentleman, who far exceeds Mr. Gray in the number of generic divisions, even separates *O. nahura* and *O. barhel* as a distinct genus under the name *Pseudovis*, on account of the absence of "eye-pits."

OVIPOS.

A small depression in front of the orbit; no fissure; the masseteric ridge ascending before the orbit; the auditory bulla of moderate size; the basioccipital bone broad and flat, with a ridge and a fossa on each side; the anterior part of which is rough; the fossa at the side of the occipital condyle filled up and produced into a blunt process, upon which the articulating surface is continued; the molars without supplemental lobes.

Horns broad at the base, tapering, pressed downwards against the sides of the head, and the points bent upwards.

Hab. The North Polar Regions.

O. moschatus.—This animal, which derives its name from its general aspect being intermediate between that of the Ox and that of the Sheep, has generally been placed among the Bovine forms. Taking the aggregate of its characters, it appears to me to be at least as nearly, if not more, allied to the Sheep, but should most properly stand alone.

The remaining genera constitute the true Bovine type, and agree among themselves in most characters of the skull. I fear that Mr. Gray's distinctions, in the extent of the intermaxillary bones upon the sides of the nasal aperture, will not always hold good. Their general cranial character may be given first;—

No suborbital fissure, nor fossa; the masseteric ridge ascending rather high before the orbit; the auditory bulla moderate, compressed; the basioccipital bone with its tubercles well-developed, and a deep groove between them; the incisors nearly equal-sized, slightly bending outwards, and the molars with well-developed supplemental lobes.

Bos.

Horns placed upon the extremities of the ridge terminating the occipital plane, directed outwards.

Hab. Europe and Asia.

B. taurus.

B. gaurus.

B. frontalis.

B. bantiger.

BISON.

Horns round, situated in a plane anterior to that of the occiput, directed outwards and curved upwards.

Hab. The Northern Temperate regions.

B. urus.

B. grunniens.

B. Americanus.

The last-named species is a true Bison, as the position of the horns,
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and the woolly fur, make apparent; the fur being generally more copious, may reasonably be expected to extend further upon the muzzle; and the generality of instances proves that the extent of naked surface may differ in very nearly allied species, and is not sufficient to warrant generic distinction. Therefore I do not think it advisable to adopt the genus *Poëphagus*.

BUBALUS.

Horns attached in a plane anterior to that of the occiput, flattened or trigonal, inclined outwards and backwards, with the point bending upwards.

Hab. Southern Asia, its islands, and Africa.

B. buffelus.

B. depressicornis.

B. brachycerus.

B. Caffer.

Although Major Smith was deceived as to the affinities of the Anoa, later as well as earlier naturalists have assigned it to its true place, and a glance at the stuffed specimen in the British Museum leaves the matter beyond a doubt. I have examined the skull in the Museum of the College of Surgeons, and cannot see that it has even a title to generic distinction. Naturalists seem at all times to have been prone to assign generic rank to whatever was mysterious or difficult to classify, and I can in no other way account for this species being made a genus.

It will be seen that my endeavour has been rather to ascertain and demonstrate whatever natural degrees of relationship exist among the species of this family, than to compose a system for mere convenience of reference; but so far from that being any hindrance to the practical adoption of my views, I think that in arranging the specimens in a museum, or the materials of a work, it will generally be found more convenient to be able to dispose the members of a natural group in whatever order may suit our immediate object, than to be compelled to place them in accordance with the stringent laws of a purely analytical method; and that for the purpose of referring a new species to its true location, when we have not the means of observing all characters that may be necessary for the determination of a series of natural affinities, the external characters which can be assigned to a group when its limits are well made out, will be found sufficient; while on the other hand, not only the external characters, but sometimes even those of anatomical structure, will, in a group which has not been previously subjected to a full and careful examination, be as the letters of an unknown language, often leading into error and confusion.

With regard to nomenclature, I have used such names as I find most generally adopted by later naturalists who have given attention to this subject, generally taking, where I had a choice, such as appeared to have been of earliest date; and as I only enumerate such species as I have seen, I must not be considered, although I have omitted a few which appear to be varieties, as rejecting all that are left out.

2. DESCRIPTION OF A NEW GENUS OF THE FAMILY MELANIANA, AND OF MANY NEW SPECIES OF THE GENUS MELANIA, CHIEFLY COLLECTED BY HUGH CUMING, ESQ., DURING HIS ZOOLOGICAL VOYAGE IN THE EAST, AND NOW FIRST DESCRIBED. BY ISAAC LEA AND HENRY C. LEA, PHILADELPHIA*.

Genus PACHYCHILUS †.

Testa conica. Apertura ovata, basi integro. Labrum crassum. Columella supernè incrassata. Operculum suborbiculare, corneum.

The genus *Melania* has been found to embrace such a vast number of species in various parts of the globe, that it has become very desirable to separate any definite group with sufficient persistent characteristics. The thickened lip sufficiently distinguishes the proposed genus from *Melanopsis* and *Melania* ‡. It differs from *Melanopsis* also in its having no sinus, while it resembles it in the possession of a thickened columella above. From *Melania* it differs also in having this callous columella. The species on which it is proposed to found this genus has a mouth looking like a thick-lipped *Bulimus*. The operculum differs somewhat from that of any *Melanian* I have seen. Its polar point is subcentral, from which two or three spiral revolutions are made; then a thinner margin surrounds these spirals.

The animal has not been observed, and may and probably will prove very different from *Melania*. Its proper position, however, in the system will most likely be found to be between *Melanopsis* and *Melania*, and there I would at present place it.

A second and very distinct species may be added to this genus—the *Melania lævissima*, Sowerby, described in Deshayes' edition of Lamarck. It inhabits Colombia, and is a shorter, wider, and much thicker shell, with a large white mouth.

PACHYCHILUS CUMINGII. *P. testâ lævi, elevato-conicâ, subcrassâ, nitidâ, fusco-nebulosâ; spirâ elevatâ, acuminatâ; anfractibus undecim, convexiusculis; suturis linearibus; apertura parviusculâ, subrotundâ, ad basim rotundâ, intus fuscâ; labro valdè expanso; columellâ supernè incrassatâ.*

Hab. Large rivers, Copan, Central America.

Length 1.4, diam. .5 of an inch.

Remarks.—This is a very remarkable shell among the *Melaniens*. It is of fine symmetry, the whorls being very regular to the apex. The brownish cloudiness gives the whole surface a dark hue, while the smoothness of the whorls gives it almost a polished appearance. It differs very much in form from *Melania lævissima*, Sow., which naturally belongs to the same genus, and which is adopted above; but it has the same character of mouth and exterior colour. Both

* All the species described are in the Cabinets of Hugh Cuming and Isaac Lea.

† Παχὺς, thick, and χεῖλος, lip.

‡ Lamarck describes the family *Melaniens* as having a sharp outer lip, "le droit toujours tranchant;" but this genus naturally belongs to *Melania*, *Melanopsis*, and *Pirena*.

species under the microscope exhibit very minute revolving striæ. The aperture is rather more than one-fourth the length of the shell. The operculum has its polar point subcentral.

The genus *Melania* of Lamarck abounds in a most extensive number of species, and is undoubtedly the most interesting of the genera of the family *Melaniana*. It is distributed round the whole circumference of the globe, and inhabits the fresh waters of America at least as far north as 45° latitude, and it probably exists quite as far south, as it is found in New Zealand. In the north of Europe there is not a single species known, while very few are found in the southern part of that quarter of the world. In the middle, southern and south-western portions of the United States, the greatest number of species seem to be developed on this continent; and in the States of Kentucky, Ohio, Tennessee and Alabama they are the most profuse, and present an almost endless variety of forms, extending to an incredible number of species. The rivers and lakes of India and Africa have not yet been well explored; but while they present some of the most striking and beautiful species, it may be doubted if they abound in the variety of forms which are found in the United States. The Philippine Islands form a most prolific district, where the development of these forms seems to have been greatly extended. Mr. Cuming, with an industry, energy and perseverance which portray the true naturalist, devoted several years to the Mollusca of this remarkable group of islands, and his reward has been, the discovery of a vast number of species heretofore unknown to science; and he well deserves the gratitude of all students of this branch of natural history for his devotion to the collection of a museum, almost, if not quite, unequalled in the Mollusca.

MELANIA CANALIS. *M. testâ lævi, acuto-conoideâ, subtenui, tenebroso-castaneâ, flammis longitudinalibus ferrugineis ornata; spirâ elevatâ, ad apicem costatâ; suturis impressis canaliculatisque; anfractibus duodecim, subconvexis; aperturâ ovatâ, ad basim patulâ, intus albidâ.*

Hab. Small streams, island of Guimaras, Philippines.

Length 2·1, diam. ·6 of an inch.

Remarks.—This is rather a large and somewhat robust species. The full-grown specimens are of a dark chestnut-brown, the younger sometimes a pale horn-colour, with longitudinal flammate marks, nearly equidistant, and with distinct minute transverse striæ. The most remarkable character of this species is the impressed and rather sharp channel at the junction of the whorls. The aperture is nearly one-third the length of the shell, and the base is expanded, the columella below being flattened.

MELANIA FŒDA. *M. testâ lævi, conoideâ, subcrassâ, tenebroso-fuscâ, rufo-nebulosâ; spirâ subelevatâ; suturis subimpressis; anfractibus decem, planulatis; aperturâ ellipticâ, subcontractâ, ad basim subangulatâ, intus tenebroso-castaneâ; labro margine cærulescente.*

Hab. Rocky stream, Java.

Length 1·6, diam. ·5 of an inch.

Remarks.—In the adult specimens the edge of the aperture is bluish white, and within more or less brown. In all cases the columella is white in the four specimens under examination. They are covered nearly over the whole surface with a black deposit of oxide of iron. Near the base there are seven to ten indistinct striæ. The aperture is about one-third the length of the shell. The operculum is ovate, and does not present any peculiar character.

MELANIA SOBRIA. *M. testâ lævi, acuto-conoïdèd, subcrassâ, luteo-cornèd; spirâ elevatâ, ad apicem costatâ; suturis impressis; anfractibus duodecim, planulatis; aperturâ parvâ, subovatâ, intus albidâ, ad basim rotundatâ; columellâ regulariter curvatâ.*

Hab. Very small streams, Siquijor, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—A very regularly formed, light-coloured species. There are a few indistinct striæ near the base. The sutures are very regular and thread-like. The upper whorls are slightly maculate, and those nearest to the apex minutely plicate. The aperture is rather more than the fourth of the length of the shell, and is rounded at the base of the columella.

MELANIA SUBULA. *M. testâ lævi, acuto-conoïdèd, tenui, castaneâ; spirâ valdè elevatâ, acuminatâ; suturis impressis; anfractibus duodecim, subconvexis; aperturâ parvâ, contractâ, intus vel albidâ vel rufo-castaneâ.*

Hab. Small river in the province of Ho Ho, isle of Panay, Philippines.

Length 1·8, diam. ·4 of an inch.

Remarks.—This is a delicately formed species, very much attenuated, with six or eight impressed, small striæ at the base. In the darker specimens, the upper part of the whorl at the suture is lighter-coloured than the other part. The upper whorls are finely striate. The aperture is small, about one-fourth the length of the shell, and rounded at the base of the columella.

MELANIA ACUS. *M. testâ lævi, conoïdèd, subtenui, cornèd; spirâ acuminatâ, ad apicem costatâ; suturis subimpressis; anfractibus undecim planulatis; aperturâ parvâ, ovatâ, intus cærulescente; columellâ regulariter curvatâ.*

Hab. Small stream, Guimarães, Philippines.

Length 1·1, diam. ·3 of an inch.

Remarks.—This is a regularly formed, small species. The specimens under examination are nearly covered with a deposit of oxide of iron, which on removal displays a horn-coloured epidermis. The aperture is nearly one-third the length of the shell, and is rounded at the base.

MELANIA DERMESTOIDEA. *M. testâ lævi, politâ, subcylindraceâ, crassâ, tenebroso-castaneâ; spirâ subelevatâ; suturis impressis; anfractibus sex, subplanulatis; aperturâ ovatâ, ad basim canaliculatâ, intus rufescente; labro incrassato.*

Hab. Seychelles Islands.

Length $\cdot 6$, diam. $\cdot 2$ of an inch.

Remarks.—The most marked character of this species is the notched channel of the base, where the colour is rather darker. The outer lip is thick and rounded. The superior part of the whorl in some specimens is lighter in colour. In its general aspect this species resembles *Melania simplex*, SAY. The epidermis is very lustrous. The aperture is nearly one-half the length of the shell.

MELANIA CONTRACTA. *M. testá lævi, ovato-elongatá, pallidá, tenui; spirá elevatá; anfractibus novem, planulatis; aperturá ovatá, constrictá, ad basim canaliculatá, intus vel albidá vel rufá; columellá contortá reflexáque.*

Hab. Seychelles Islands.

Length $\cdot 8$, diam. $\cdot 3$ of an inch.

Remarks.—This, like the *dermestoidea*, herein described, from the same locality, is remarkable for the notched channel at the base. They may easily be distinguished by the *contracta* having a more elevated spire, greater number of whorls, being of a lighter colour, and in the aperture being longer and more twisted. There is a disposition in the upper part of the columella to be thickened and rufous, and the twist and backward turn are very remarkable. The aperture is about one-third the length of the shell.

MELANIA FERRUGINEA. *M. testá lævi, nitidá, ventricoso-conoided, inflatá, crassá, ferrugined; spirá subelevatá; suturis valdè impressis; anfractibus sex, convexis; aperturá magná, subtundá, intus albidá.*

Hab. Zanzibar, East Africa.

Length $\cdot 9$, diam. $\cdot 4$ of an inch.

Remarks.—The rather inflated form of this species gives it the aspect of some of the *Paludinae*. A single specimen, and not an entirely perfect one, has only been submitted for examination. It seems to differ from any described species, while it has no very distinctive character. The aperture is very nearly one-half the length of the shell.

MELANIA IMPURA. *M. testá lævi, subcylindraced, compressá, subcrassá, viridi-corned; spirá subelevatá; suturis valdè impressis; anfractibus planulatis, supra geniculatis; aperturá ellipticá, subcontractá, ad basim retusá, intus albidá; columellá regulariter incurvá.*

Hab. Naga, province of South Cumarines, Luzon, Philippines.

Length $\cdot 9$, diam. $\cdot 35$ of an inch.

Remarks.—The angle on the superior portion of the whorls gives this species a very distinct aspect. This angle is not very acute, but it is very marked in all the four specimens under examination. The apex in each being decollate, the number of whorls cannot of course be correctly ascertained; there may be about seven. The colour of the epidermis is uniform and of a greenish horn-colour. The aperture is rather more than one-third the length of the shell, and is rounded and retuse at the base.

MELANIA COCHLIDIUM. *M. testâ lævi, subulatâ, subcrassâ, rufo-cornâ; spirâ elevatâ, acuminatâ, ad apicem minutè plicatâ; suturis regulariter impressis; anfractibus tredecim, subcompressis, anfractu ultimo supra angulato, magno; aperturâ latè ovatâ, parvâ, ad basim retusâ, intus albidâ; columellâ regulariter incurvâ.*

Hab. Very small streams, islands of Siquijor and Guimaras, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—This is a very remarkable species, having a single elevated, revolving rib on the superior part of the last whorl, which causes a somewhat impressed channel above. The four specimens under examination from Siquijor are fresh and with perfect epidermis, which varies on the younger specimens to rather a pale horn-colour, while the more mature ones are of a reddish horn-colour. The four from Guimaras are “dead shells,” rather more robust, with a portion only of the epidermis remaining, which is rufous. The aperture is about one-fourth of the length of the shell. The operculum has its polar point near the base on the left side.

MELANIA CINCTA. *M. testâ lævi, subulatâ, subtenui, rufo-castanâ; spirâ valdè elevatâ, acuminatâ, ad apicem plicatâ; suturis impressis, linearibus; anfractibus tredecim, subconvexis; anfractu ultimo uno-vittato; aperturâ dilatâtâ, ovatâ, intus fusco fasciatâ, ad basim rotundâ; columellâ contortâ.*

Hab. India.

Length 2·2, diam. ·6 of an inch.

Remarks.—The form of this species is very much like that of *Melania aculeus* (nobis), but it is a more attenuate species. The single light band on the lower whorl seems to be peculiar to this species. It is below the middle part of the whorl, and is distinctly visible on the inside in the three specimens under examination. The upper whorls have regular, oblique, somewhat distant folds, on two of the specimens, which are crossed by minute striæ. The lower part of the whorl has indistinct striæ. The aperture is not large, being less than one-fourth the length of the shell, and it is rounded at the base. The columella is much incurved.

MELANIA LANCEA. *M. testâ lævi, subulatâ, subtenui, cornâ; spirâ elevatâ, ad apicem striatâ; suturis impressis; anfractibus duodecim, convexis; aperturâ ovatâ, intus albidâ, ad basim rotundâ; columellâ angulariter incurvâ.*

Hab. Ohcatarao, Society Islands.

Length 1·6, diam. ·5 of an inch.

Remarks.—This species is in form somewhat like the *M. aculeus* (nobis), but is a smaller shell and not quite so attenuate. In the four specimens under examination small striæ are distinctly marked on the superior or younger whorls, and on two of them some of the striæ are continuous on the lower whorls. The aperture is not large, being not quite one-third the length of the shell. The columella is much incurved and recurved.

MELANIA EPISCOPALIS. *M. testá plicatá, turritá, subcrassá, tenebroso-castaná; spirá elevatá; suturis impressis; anfractibus subconvexis, propé suturam superiorem concavis; plicis raris, subacuminatis; aperturá magná, ellipticá, intus cærulescente; columellá contortá.*

Hab. A sluggish river, Malacca.

Length 2·4, diam. ·8 of an inch.

Remarks.—This is a remarkable and interesting species, and differs from any which has been described, in having rather large and somewhat distant folds rising on the upper part into nodular points, in all the four specimens submitted for examination. The apex of these specimens being truncated, the number of whorls cannot be ascertained. A perfect adult would probably present about ten. The folds are distinct on the four lower whorls only. On the middle of the lower whorl there is a slightly elevated line, below which are about six obscure striæ. The aperture is large, and more than one-third the length of the shell; it is twisted, and has an elongated base. The columella is whitish and very much incurved. The operculum is more spiral than usual, and the polar point more toward the centre.

MELANIA BLATTA. *M. testá plicatá, elongatè conoides, crassá, castaneo-nigricante; spirá elevatá, crebrè costatá; anfractibus planulatis, infra suturas concavis; plicis crebris ornatis; aperturá magná, ovatá, supernè angulatá, ad basim rotundá, intus cæruleá; columellá tortá, supernè incrassatá.*

Hab. Rapid river and small streams, Luzon, Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—A very dark-coloured and remarkably fine species, with numerous, nearly parallel, perpendicular folds, which number some eighteen or twenty, and exist on every whorl in the eight specimens under examination. The four large ones are truncate, but the younger and more perfect would indicate the existence of about ten whorls. It differs from the *episcopalis* in being more attenuate, in having more folds and a much less twisted columella. The aperture is large, and rather more than one-fourth the length of the shell.

MELANIA COSTELLARIS. *M. testá plicatá, supernè striatá, acuminatá, subcrassá, tenebroso-castaná; spirá elevatá; suturis linearibus; anfractibus decem, subplanulatis; anfractu ultimo magno, geniculato; plicis numerosis; aperturá parvá, dilatatá, ovatá, supernè angulatá, ad basim rotundá, intus cærulescente; columellá incurvá.*

Hab. Small streams in the islands of Negros, Tanhay, Siquijor; Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The last whorl being angular gives this species a peculiar and remarkable character, and causes a channel immediately below the suture. Several of the specimens under examination have beautiful delicate impressed lines immediately above the sutures. In the superior whorls these lines cover the whole surface. The folds

terminate on the angle, and are disposed to be nodulous there. The aperture is rounded, angular above, and not quite one-third the length of the shell. The base of the shell is rounded.

MELANIA RECTA. *M. testâ plicatâ, attenuatâ, subcrassâ, tenebrosocastaned; spirâ valdè elevatâ; suturis irregulariter impressis, subcanaliculatis; anfractibus tredecim, subplanulatis; plicis numerosis; aperturâ parvâ, ovatâ, ad basim rotundâ, intus cærulescente; columellâ incurvâ.*

Hab. Very small streams, Siquijor and isle of Negros, Philippines. Length 1·7, diam. ·5 of an inch.

Remarks.—In many of its characteristics this species is like the *M. costellaris*. It differs entirely, however, in the enlargement of the last whorl, the angle on the superior part of it, and in the channel below the suture, which are important characters in the *costellaris*. Nor has it the minute revolving lines. The folds are remarkably regular and distinct, and number about eleven on each whorl in the eight specimens under examination. On two individuals the epidermis remains quite perfect, and is deposited in regular, revolving striæ. The aperture is about one-third the length of the shell; it is rounded below and angular above, where it is slightly set off from the body of the whorl. The columella is but slightly curved.

MELANIA AUSTRALIS. *M. testâ plicatâ, conicâ, tenui, diaphand, rubiginoso-corned; spirâ costatâ, prope apicem turbinatâ; suturis impressis; anfractibus septem, convexis, ad basim striatis; plicis numerosis; aperturâ magnâ, ellipticâ, intus salmoniâ; columella tortâ; labro supernè emarginato.*

Hab. Victoria river, North Australia.

Length ·9, diam. ·4 of an inch.

Remarks.—This is a very distinct little species, and the sudden enlargement of the third whorl below the apex gives it a somewhat turbinated appearance. The folds do not on the lower whorl reach the suture, and above and below these folds there are minute revolving striæ. The aperture is more than one-third the length of the shell. The outer lip is slightly crenulate and remarkably incurved near to its junction with the body whorl.

MELANIA TORNATELLA. *M. testâ plicatâ, fusiformi, crassâ, corned, infernè lineatâ; spirâ acuminatâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad apicem mucronatis, in medio concavis; plicis numerosis, crebris; aperturâ constrictâ, elongatâ, intus albâ; labro supernè incisâ; columellâ lævi, crassâ, contortâ, reflexâ.*

Hab. Shallow rivers, Tanhay, isle of Negros, Philippines.

Length ·9, diam. ·35 of an inch.

Remarks.—This belongs to a very remarkable group of *Melania*. The emargination of the outer lip, above the middle of the whorl, is strikingly characteristic of the group. It causes a slight flatness or convexity of the whorl, as well as a curve in the numerous ribs, which cover the whole surface in this species, except where it is superseded

by the transverse lines on the lower part of the whorl. These lines are remarkably parallel, regular and well-impressed, and in the four specimens under examination are six in number. The folds are like ribs, very numerous, closely set, and very distinct. The form of this species, described above, is very like *Tornatella*, and the twist in the columella also resembles that genus. The ribs continue on the apex and give it a scalariform appearance. The aperture is nearly one-half the length of the shell. The edge of the lip, below the emargination, is slightly crenulate. The columella is very thick towards and at the base, where it is so retuse as to permit the inside to be seen. One of the specimens is rubiginose at the base. No operculum accompanied the specimens.

MELANIA RUDIS. *M. testá plicatá, subfusiformi, crassá, corneá; spirá subelevatá; suturis irregulariter impressis; anfractibus planulatis transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturá parvâ, ovatâ, intus albidâ; labro supernè emarginato; columellâ lævi, subcrassâ, tortâ.*

Hab. Amboyna.

Length 1·1, diam. ·4 of an inch.

Remarks.—Allied to *Melania tornatella*, it forms one of the emarginate group, but differs in the size of the aperture and in the form of the ribs, which are transversely cut by numerous fine lines, in groups, which lines traverse the whole whorls. The aperture is about one-third the length of the shell, and the lip is crenulate. The three specimens under examination are all truncate at the apex, and the number of whorls therefore not ascertained. It has the spiral operculum usual to *Melania*.

MELANIA MICROSTOMA. *M. testá plicatá, subfusiformi, subcrassâ, luteo-corned; spirá elevatâ; suturis irregulariter impressis; anfractibus octo, planulatis, transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturâ maximâ, ovatâ, ad basim truncatâ, intus cærulescente; labro supernè emarginato; columellâ lævi, ad basim subcrassâ tortâque.*

Hab. Mountain streams, isle of Negros, Philippines.

Length ·9, diam. ·3 of an inch.

Remarks.—This belongs to the group with emarginate lip, along with *M. rudis* and *M. tornatella*. It is a more slender species, more subulate, and has a smaller aperture than either. It takes more the form of *Terebra*. It has groups of lines which decussate the ribs as in the *rudis*. The aperture is not one-third the length of the shell, and the lip is crenulate. No operculum was received with the shells.

MELANIA TRANSVERSA. *M. testá plicatâ, pyramidatâ, crassâ, corneâ, castaneo-maculatâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus subconvexis, transversim lineis impressis cinctis; costellis verticalibus raris; aperturâ parvâ, obliquè transversâ, rhomboideâ, intus maculatâ et cærulescente; labro terebræformi, crenulato; columellâ contortâ, supernè incrassatâ, infernè emarginatâ.*

Hab. Guiana.

Length 1·6, diam. ·5 of an inch.

Remarks.—This species is remarkable for the unusual obliquity of its aperture and its auger-shaped lip. In its ribs and decussate striæ it resembles the group consisting of *M. tornatella*, *M. rudis* and *M. microstoma*, but it has not the emarginate lip and therefore does not belong to them. The emargination at the base of the columella is quite a different character, and is very remarkable in this species, representing as it does *the bite* of the auger. The chestnut-coloured spots are small, but so distinct as to mark the interior of the shell, which is white and thick. The two specimens under examination are both truncate at the apex, and the number of whorls not ascertained, probably about ten. The aperture is rather more than one-fourth the length of the shell. The operculum is spiral, with the polar point nearly in the centre and with at least five revolutions, which is unusual with *Melania*. It is allied to *M. truncata*, Lam. (*semiplicata*, Fer.), but is less cylindrical and differs somewhat in the aperture.

MELANIA MAXIMA. *M. testâ striatâ, elevato-conoideâ, crassâ, corned; spirâ valdè elevatâ; suturis linearibus; anfractibus duodecim, planulatis; striis magnis, raris, tenebrosis; aperturâ magnâ, rhomboideâ, intus albidâ; columellâ valdè contortâ.*

Hab. Copan, Central America.

Length 3, diam. 1·1 inches.

Remarks.—This very large species has a remarkable outline, forming a perfectly regular, rather obtuse cone above. The aperture is very large, and in the youngest of the three specimens the coloured striæ are very distinct within. Under the microscope minute revolving lines may be observed over all the whorls. The aperture is rather more than one-third the length of the shell. The operculum has five revolutions and is very much like that of *M. transversa*, the polar point being nearly central.

MELANIA MINDORIENSIS. *M. testâ striatâ, elevato-conoideâ, subtenui, pallidâ, ad apicem acuminatâ; spirâ elevatâ; suturis impressis; anfractibus duodecim, subconvexis, striis crebris; aperturâ magnâ, ellipticâ, intus albâ; columellâ incurvatâ tortâque.*

Hab. Small streams, Puerto Galero, isle of Mindoro, Philippines.

Length 1·9, diam. ·7 of an inch.

Remarks.—The outline of this species is very regular, tapering to a fine point. There are five specimens under examination, all of which have raised striæ over the whole of the body whorl. Some of the specimens have the two next whorls ribbed, which ribs, the striæ decussating, form granular elevations. The remaining whorls are perfectly smooth, with a few delicately impressed transverse lines. Some have brown spots, which towards the apex are more numerous and flammate. The aperture is more than one-third the length of the shell. The operculum has its polar point on the lower edge, and the curved lines of growth do not make one-eighth of a revolution.

MELANIA INDEFINITA. *M. testâ striatâ, elevato-conicâ, sub-*

crassd, tenebroso-corned; spirá subelevatá; suturis valde impressis; anfractibus convexis, infra suturas impressis, striis crebris impressis; aperturá parvâ, ovatâ, intus cærulescente, ad basim rotundâ; columellâ regulariter incurvatâ.

Hab. Naga, Luzon, Philippines.

Length 1·6, diam. ·5 of an inch.

Remarks.—The species has a very close resemblance to the striate varieties of *M. Virginica*, Say. The three adult specimens under examination are truncate, and the number of whorls therefore not ascertainable, but probably about nine. The impressed revolving lines are somewhat distant, regular and delicate. Between these, under the microscope, may be seen very minute revolving striæ. The aperture is about one-fourth the length of the shell. The operculum has its polar point near to the edge of the lower margin.

MELANIA LUZONIENSIS. *M. testâ striatâ, conicâ, subtenui, tenebroso-corned; spirâ erosâ; suturis impressis; anfractibus sex, convexiusculis, transversim lineis rugosis impressis cinctis; aperturâ magnâ, elongato-ellipticâ, intus rubiginosâ; columellâ albâ tortâque.*

Hab. Small streams, Calanang, province of Bai, Philippines.

Length 1·1, diam. ·5 of an inch.

Remarks.—There is no peculiarity in the outline of this species, and the most striking character is perhaps in the impressed lines, which are somewhat distant, having minute numerous wrinkles across the groove. They are very distinctly visible under the microscope, and do not seem to have been observed in any other species. The superior part of the whorls is disposed to be granose, and one specimen has four rows of granules. Immediately under the sutures there is a yellow line. The aperture is one-half the length of the shell. The operculum has its polar point close to the lower margin.

MELANIA ALBESCENS. *M. testâ striatâ, elevato-conicâ, subtenui, albidd, lineis rufis interruptis ornatâ; spirâ acuminatâ; suturis impressis; anfractibus undecim, planiusculis, lineis transversis vix impressis; aperturâ ovato-oblongâ, intus albidâ, rufo-maculatâ, ad basim rotundâ; columellâ incurvâ.*

Hab. Small streams, isles of Guimaras, Negros and Siquijor, Philippines.

Length 2·5, diam. ·9 of an inch.

Remarks.—This is a very regularly formed and graceful species, with rather a high and tapering spire. The impressed revolving striæ are chiefly on the body whorl. The most striking characteristic is the numerous interrupted delicate brown lines, which cover nearly the whole of the whorls and are closer and better defined towards the apex. In some specimens there are beautiful brown spots on a white ground, below the sutures. The aperture is about one-third the length of the shell. The operculum has its polar point close to the lower margin on the left. There is a very great difference in the size and thickness of the specimens. Some of the old are very large, heavy, and covered with the oxide of iron, showing

beneath a brown epidermis and white naere. In these the peritreme is very thick, and the columella more remarkably thick than heretofore noticed in any *Melanian*.

MELANIA HASTULA. *M. testá striatá, nonnunquam plicatá, elongatè subulatá, diaphaná, tenui, fuscá, striis transversis crebris costulas decussantibus; spirá acuminatá; suturis linearibus; anfractibus plano-convexis; aperturá parvulá; ovatá, intus vel fuscá vel albidd; columellá incurvá tortáque.*

Hab. Various streams of Siquijor, Cagayan, Mindanao, and other Philippine Islands.

Length 3·3, diam. ·8 of an inch.

Remarks.—A very attenuate and greatly varied species, some being smooth with few striæ, others with striæ over the whole surface, and others again with numerous folds. In some of the specimens under examination the apex is eroded in a very unusual manner, the outer portion of the whorls there being so much decomposed as to present little more than the central column. Some of the specimens are dark brown, others are horn-colour with brown spots. There are probably about twelve whorls. Although some of the specimens have more or less distinct, somewhat distant folds, there are others which have no folds whatever. This species is placed among the striate group, as striæ are found more or less developed on every specimen. The striæ immediately below the suture are more deeply impressed and cause a slight groove. A variety from Camiguin is flatter on the whorls and less disposed to plication. The aperture is not quite one-fourth the length of the shell, is rather open and somewhat patulous below. The operculum has its polar point near to the margin on the left.

MELANIA JUNCEA. *M. testá striatá, elongatè subulatá, tenui, tenebroso-fuscá, infra suturas luteo-lineatá; spirá attenuatá; suturis valdè impressis, anfractibus undecim, convexis, lineis transversis impressis; aperturá parvulá, ovatá, intus fuscá; columellá valdè incurvá contortáque.*

Hab. Lake of Taal, province of Batauos, and small streams in Luzon, Philippines.

Length 2, diam. ·5 of an inch.

Remarks.—An attenuate and gracefully formed species. Some of the specimens are of a dark rich brown, others are flammate. Two have very small incipient folds on nearly all the whorls, others have a few towards the apex. From the same locality are four specimens, which, while they differ but little in form, are very different in colour, being yellowish, with longitudinal flammate brown marks. This variety answers very closely to *M. flammulata*, Von dem Busch, 'Conchylien,' &c. by Dr. Philippi, tab. 1. fig. 3, 4. The aperture is about one-fourth the length of the shell and is rather small, with a patulous lip having a whitish border. The operculum has its polar point rather near to the margin. Gualtierus (tab. 6. fig. G) gives a drawing of a freshwater shell closely resembling this variety. Another variety is rather thinner, diaphanous, horn-colour, and obscurely maculate.

MELANIA CONULUS. *M. testá minutè et creberrimè striatá, conicá, subtenui, fuscá; spirá obtusá; suturis linearibus; anfractibus septem, planulatis, uno-vittatis; aperturá elongato-ovátá, ad basim angulatá, intus fuscá; columellá tortá.*

Hab. Small streams, Fernando Po, West Africa.

Length 1·4, diam. ·5 of an inch.

Remarks.—This interesting species is remarkable for its peculiar striæ, which cover the whole surface of all the whorls. The lines are irregular, and so minute as to require the microscope to detect them. A little above the middle of the whorl there is an obscure, dark, rather broad band. The middle of the whorl is somewhat angular. The aperture is not quite one-half the length of the shell, and is somewhat angular below.

MELANIA OBRUTA. *M. testá striatá, conoideá, crassá, bivittatá, fuscá; spirá subelevatá; suturis impressis; anfractibus septem, convexiusculis, lineis crebris elevatis; aperturá parvulá, subpatulá, intus albá et bivittatá, ad basim emarginatá et retusá; labro crenulato et arcuato.*

Hab. —?

Length 1·3, diam. ·5 of an inch.

Remarks.—In general form and outline this species is very like to the striate variety of *M. Virginica*, Say. It differs in being thicker and in having a crenulate and patulous lip. In the four specimens submitted, the two dark brown bands are beautifully distinct inside, and stop short of the margin. Three specimens have a suddenly enlarged body whorl. Two of the specimens have obscure, longitudinal brown marks. The aperture is about one-third the length of the shell, is very much curved on the edge of the lip, and disposed to be canaliculate at the base. The striæ are coarse and elevated.

MELANIA TURRICULUS. *M. testá striatá, conoideá, subtenui, obscurè maculatá, corneá, spirá subelevatá; suturis impressis; anfractibus novem, convexiusculis, lineis subraris impressis, superne angulatis; aperturá parvâ, subconstrictá, intus albâ et obscurè maculatá, ad basim rotundá; columellá regulariter curvatá.*

Hab. Small rivers, Calanang, province of Bai, Luzon, Philippines.

Length 1·2, diam. ·4 of an inch.

Remarks.—This species, like *M. obruta*, resembles in size and outline very closely *M. Virginica*, Say. It differs from the former in being less thick, in being maculate and not banded, and in having impressed lines. It differs from the latter in being maculate, and in being angular immediately under the suture. The aperture is rather more than one-third the length of the shell, angular above and rounded below. The operculum has its polar point somewhat removed from the lower margin.

MELANIA APIS. *M. testá striatá, conicá, tenui, obscurè granosá, rufo-castaneá; spirá obtusá; suturis irregulariter impressis; anfractibus convexis, lineis paucis elevatis; aperturá parvâ, sub-*

rotundá, intus rufá, ad basim angulatá; labro repando, rufo-marginato; columellá incrassatá.

Hab. Marshy places, Vera Cruz, Mexico.

Length .8, diam. .3 of an inch.

Remarks.—Neither of the four specimens under examination are perfect, all being much eroded at the apex. Under the microscope the surface may be observed to be papillose, a character rarely found in this genus, though not very uncommon in *Helix*. The aperture is rather more than one-third the length of the shell and is unusually rotund. The rufous line surrounds the peritreme. The aperture is reddish inside.

MELANIA CUMINGII. *M. testá striatá, turritá, supernè unocarinatá, subcrassá, tenebroso-fuscá; spirá valdè elevatá; suturis regulariter impressis; anfractibus planulatis, lineis raris impressis; aperturá magná, subtriangulari, intus cærulescente; columellá retusá contortáque.*

Hab. Very small streams, island of Siquijor, Philippines.

Length 2.5, diam. .7 of an inch.

Remarks.—This is a very remarkable species. A single specimen only was sent by Mr. Cuming, and this unfortunately is by no means perfect. There is a good deal of ferruginous matter deposited over the surface, and the apex is so much eroded that the number of whorls cannot be well ascertained, perhaps about nine. The turritid form of the shell is very notable. Immediately under the suture there is an elevated and cordlike line, slightly angular on the superior part. Below this the whorl is slightly impressed. Part of the surface is wrinkled by the transverse striæ decussating longitudinal lines. The aperture is about one-third the length of the shell, and remarkable for its triangular form. The columella is unusually white, which shows in contrast with the dark epidermis. The operculum is large and thick, having its polar point near to the lower border.

MELANIA DACTYLUS. *M. testá striatá, valdè elevatá, supernè costatá, crassá, vel fuscá vel luteo-corned; spirá valdè elevatá; suturis impressis; anfractibus duodecim, convexis, lineis crebris elevatis ornatis; costellis verticalibus crebris; aperturá submagná, subrotundatá, intus vel salmonid vel cærules; columellá incrassatá, salmonid tortáque.*

Hab. Small streams in Guimaras, Mindanao, Luzon and Seyte, Philippines.

Length 3.2, diam. 1 inch.

Remarks.—This is a remarkably fine, large, and protean species. There are about two dozen specimens under examination from various islands of the Philippines. The prevailing character of the surface is striate with decussating costæ on the superior whorls; but some specimens have these costæ enlarged on the lower whorls, instead of their having vanished, as on others. Some again have their costæ rising into a series of pointed tubercles. Under the microscope many numerous minute striæ may be observed to revolve parallel with the coarser ones. Another variety is quite smooth on the upper whorls,

with fewer striæ and costæ. This looks like an immature shell. The aspect of these three varieties is quite different, but I do not consider it safe to separate them into species. The aperture is rather more than one-fourth the length of the shell. The operculum is large, having several revolutions, and the polar point is near to the centre.

MELANIA CRENIFERA. *M. testâ granulâtâ, acuto-conicâ, subfusiformi, subtenui, corned; spirâ granulâtâ, acuminatâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad basim striatis; aperturâ submagnâ, ovatâ, intus albidâ; columellâ albâ tortâque.*

Hab. Small river in Java.

Length .9, diam. .4 of an inch.

Remarks.—Three specimens under examination are all nearly covered with granules, a fourth has but few. It is a very symmetrical little species. The aperture is rather more than one-third the length of the shell. No opercula accompanied these specimens.

MELANIA NANA. *M. testâ granulâtâ, conicâ, fusiformi, tenui, diaphand, vel corned vel fuscâ, rufo-maculatâ; spirâ depressâ, granulâtâ; anfractibus sex, subplanulatis, ad basim striatis; suturis irregulariter impressis; aperturâ magnâ, ellipticâ, intus vel albidâ vel fuscâ; columellâ tortâ.*

Hab. Mountain streams, isle of Negros, Philippines.

Length .6, diam. .3 of an inch.

Remarks.—The colour varies in this species owing to the number of brown spots, which differ much in different specimens. One of those under examination is horn-coloured, with a few distinct brown spots; another is quite dark in consequence of the multiplicity of them. The largest granules are immediately below the suture, and the line there is disposed to be of lighter colour. The aperture is about one-half the length of the shell.

MELANIA TESSELLATA. *M. testâ granulâtâ, elevato-conicâ, crassâ, tenebroso-fuscâ; spirâ elevatâ, crebrè granulâtâ; anfractibus planulatis, ad basim striatis; suturis irregulariter impressis; aperturâ parvâ, ellipticâ, constrictâ, crenulatâ, intus tricostratâ, ad basim canaliculatâ; columellâ subrectâ.*

Hab. —?

Length 1.10, diam. .4 of an inch.

Remarks.—There is nothing striking in the general appearance of this shell; but in looking into the interior, there will be observed a character which has not been known to exist in any other species—three elevated, revolving ribs, terminating short of the outer lip. The columella is simple, nearly straight, and ends in the angle at the sinus. These remarkable ribs may involve a difference of organic structure of the animal, in which case a new genus would be required for this species. One of the three specimens is entirely white inside, the other two have dark bands. The apex being eroded in them all, the number of whorls cannot be ascertained, probably about nine. The aperture is about one-third the length of the shell. The operculum has its polar point near to the lower margin.

MELANIA CREBRUM. *M. testá cancellatá, elevato-conicá, crassá, tenebroso-castanée; spirá valde elevatá; anfractibus decem, convexiusculis, ad basim striis impressis; suturis impressis; aperturá parvulá, ovatá, intus albá; ad basim rotundá; columellá incurvatá.*

Hab. Small streams, Guimaras, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The symmetry of the outline and the extreme regularity of the decussating lines over the whole of the whorls, except at the base, are distinguishing characteristics of this species. The elevated portions between the decussating lines are quadrangular and resemble brickwork. The four specimens submitted are all “dead shells,” and are partly decomposed towards the apex. The aperture is rather more than one-fourth the length of the shell.

MELANIA RETICULATA. *M. testá cancellatá, conicá, crassá, pallidá; spirá elevatá; anfractibus septem, planulatis, crassè cancellatis, ad basim striatis; suturis impressis; aperturá magná, trapezoidé, ad basim angulatá, intus albá; columellá incurvatá, contortáque.*

Hab. China.

Length 1·8, diam. ·7 of an inch.

Remarks.—This is a very remarkable and distinct species, covered all over, except the lower part of the base whorl, with coarse, somewhat distant decussating striæ, which rise into nodes and form quadrangular areas. Altogether it is a rough *Cerithium*-looking species. The epidermis is remarkably thin and light-coloured, the upper portion of the spire being quite white in the two specimens under examination. The aperture is more than one-third the length of the shell.

MELANIA ACULEUS, Lea. *M. testá lævi, nonnunquam striatá vel granulatá, elongatè subulatá, crassá vel subcrassá, corned vel fusco-nigricante; spirá acuminatá; suturis linearibus; anfractibus planulatis; aperturá ovatá, intus cærulescente; labro expanso.*

Hab. Siquijor, Naga, Cagayan, and others of the Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—When this species was described by J. Lea in 1832 (*Trans. Am. Phil. Soc.*), he had seen but a single specimen, which had neither granules nor striæ. Among the large quantity of this genus taken by Mr. Cuming in his Eastern voyage, were about forty specimens of this singularly protean species. Were there but few, and these as different as many of them are, no one would hesitate to consider them as distinct species. But the large number and extraordinary difference in them enables one, or rather compels one to keep them in a group as curious divergent varieties. When we compare the large smooth variety with the small variety covered with granules, it is difficult to believe that they may have come from a common parent, but the *nuance* is too complete in the series to admit of a doubt.

It was deemed advisable to re-describe this species, so that it might
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embrace the various forms which it takes in the specimens now submitted by Mr. Cuming from various localities.

MELANIA DIADEMA. *M. testá spinosá, acuminato-ovatá, transversim lineatá, subpapyraceá, diaphaná, pallio lutescente; spirá scalariformi, acutá; suturá lineatá; anfractibus octo, supernè angulatis, planis supra et infra; angulo spinis instructo; spinis magnis, crebris, regularibus, brevibus, eversis, aliquando decurrentibus; lineis transversis, minimis, decussatis; anfractu ultimo bullato, ad basim lineato; aperturá magná, ovatá; columellá albidá, incurvá; epidermide hispídá.*

Hab. Small streams, isle of Guimaras, Philippines.

Length 1·4, diam. ·8 of an inch.

Remarks.—Differs from *M. amarula* in the thinness of its substance, and regularity and closeness of its spines, which are all bent outwards, at a regular angle.

MELANIA CORNUTA. *M. testá spinosá, elongato-ovatá, crassá, fuscescente vel viridescente; spirá exsertá, scalariformi, apice truncatá; suturá lineari; anfractibus medio angulatis, supernè subconcavis; angulo spinis instructo; spinis magnis, brevibus, incurvis, raris, acutis, basi latissimis, distortis, decurrentibus, anticè canaliculatis; anfractu ultimo magno, ad basim transversim striatulo; aperturá magná, ovatá; columellá lacted.*

Hab. Madagascar.

Length 1·5, diam. ·9 of an inch.

Remarks.—The spines are short, stout, and irregularly bent, presenting the appearance of horns, and distinguishing the shell from *M. amarula*, which it otherwise somewhat resembles.

MELANIA ACANTHICA. *M. testá spinosá, ovato-turritá, varicosá, transversim lineatá, subtenui, fuscá; spirá elongatá, conicá, scalariformi; apice truncatá; suturá lineari; anfractibus supernè angulatis, varicibus distortis; angulo spinis instructo; varicibus magnis, regularibus, subobliquis, supernè in spinis productis; spinis longis, tenuibus, irregularibus, extortis; lineis transversis, crebris, parvis, subalternantibus; anfractu ultimo parvo, ad basim lineato; aperturá ellipticá, infernè effusá; labro infernè producto; columellá parvá, infernè incrassatá.*

Hab. Manilla and isle of Negros, Philippines.

Length ·8, diam. ·4 of an inch.

Remarks.—Bears some resemblance to *M. scabra*, Férussac, and *M. bellicosa*, Hinds.

MELANIA ZEYLANICA. *M. testá lævi, ovatá, crassá, nitidá, albidá aut virido-fuscá; badió flammulatá, spirá brevi, acuminatá, apice acutá, aliquando erosá; suturá lineari; anfractibus quinque, convexis, ad suturam superiorem impressis, maculis flammulatis aut sagittatis badiis; anfractu ultimo magno, bullato; basi lævi; aperturá ovato-rotundá, supernè angulatá, infernè rotundatá, intus albidá; columellá magná, albá, supernè incrassatá, infernè curvatá.*

Hab. Seychelles and Ceylon.

Length .9, diam. .6 of an inch.

Remarks.—The markings are very variable, being sometimes oblique, zigzag lines, extending over the whole surface of the whorls, sometimes sagittate or short zigzag spots in transverse series. Indeed some specimens are of a uniform dark green. The last whorl sometimes has two impressed transverse lines. The mouth is nearly two-thirds the length of the shell.

MELANIA POLYGONATA. *M. testá tuberculatá, elevato-conicá, striatá, crassá, nigrá; spirá elevatá, conicá, apice erosá; suturá pæne obsoletá, flexuosá; anfractibus supernè et infernè striatis; medio angulatis; angulo serie unicá tuberculorum instructo; tuberculis maximis, transversè angulatis, lævibus; striis transversis raris; anfractu ultimo magno; basi crebrè striatá; aperturá supernè valde acutá, infernè productá et effusá, intus albidá; columellá albá, flexuosá; operculo parvo, subcentrali.*

Hab. Copan, Central America.

Length 3.5, diam. 1.3 inch.

Remarks.—One of the largest and finest of the *Melania*. The upper whorls are generally covered with a thick, smooth deposit, obliterating the sculpture. On them the tubercles appear to degenerate into elevated costæ. The operculum is much smaller than the mouth. The tubercles and striæ sometimes produce brown marks on the columella and inside the aperture.

MELANIA DENTICULATA. *M. testá spinosá, ovato-turritá, transversim striatá, denticulatá, tenui, diaphaná, ferruginè, maculis badiis minutis linearibus; spirá exsertá, conicá, scalariformi, apice acuminatá; suturá lineari; anfractibus septem, supernè angulatis, angulo denticulatis; denticulis parvis, acutis, obliquis; striis transversis, parvis, alternantibus, rugosis, maculatis, lineolis longitudinalibus minutissimis decussatis; anfractu ultimo parvo, ad basim striato; aperturá ovatá, infernè effusá; columellá flexuosá, tenui.*

Hab. Mountain streams, isle of Negros, Philippines.

Length .6, diam. .3 of an inch.

Remarks.—Allied to *M. spinulosa*, Lam., but may be distinguished by its abrupt denticulations.

MELANIA ARMILLATA. *M. testá cancellatá, ovato-turritá, crassiusculá, graniferá, viridescenti; spirá elevatá, subovatá, apice acutá; suturá parvâ, crenatâ; anfractibus undecim, planatis, propè suturam superiorem angulatis, supernè albidis, costis longitudinalibus obliquis graniferis crebris; granulis rotundatis, albidis; anfractu ultimo supernè compresso, infernè subturgido; basi transversè striatâ; aperturá ovatâ, supernè acutè angulatâ, infernè rotundatâ et effusâ; labro infernè producto; columellâ infernè angulatâ, supernè rectâ.*

Hab. India.

Length 1.4, diam. .5 inch.

Remarks.—Immediately below the angle of the whorls there is

apt to be a larger series of granules, with a very small one succeeding it.

MELANIA COCHLEA. *M. testá subspinosá, turrítá, costatá, striatá, tenui, fulvá, maculis badiis; spirá scalariformi, ovato-acuminatá, apice acutá; suturá lineari; anfractibus decem, infernè subconvexis, supernè angulatis et concavis; costis obliquis, longitudinalibus, anfractuum in angulo elevatis et acutè mucronatis, supernè vix obsoletis; striis transversis, minutis, aliquando obsoletis; anfractu ultimo parvo, ad basim striato; aperturá ovatá, supernè acutá, infernè effusá.*

Hab. —?

Length 1', diam. .4 of an inch.

Remarks.—On the last whorl of the only specimen submitted, the costæ are almost obsolete. The striæ are strongest near the sutures, and scarcely visible at the middle of the whorls.

MELANIA LATERITIA. *M. testá cancellatá, acutè ovatá, compressá, crassiusculá, striatá, graniferá, albidá, virido-fuscá, rufo fasciatá aut atrá; spirá elevatá, plerumque scalariformi, apice acutá aut erodá; suturá impressá, crenatá; anfractibus decem, planatis, supernè angulatis, supra angulum sæpe albidis; striis transversis crebris graniferis; granulis quadratis, abruptis, planatis, seriebus longitudinalibus positis; anfractu ultimo magno, subcompresso; basi graniferá; aperturá ovatá, supernè acutè angulatá et sinuatá, infernè latá, expansá et retusá, internè sæpe fasciatá; columellá contortá; operculo parvo, ovato.*

Hab. Philippines.

Length 1.6, diam. .7 of an inch.

Var. α. *Anfractibus supernè graniferis, infernè striis transversis impressis; basi vix lævi, striis raris.*

Var. β. *Striis graniferis alternantibus.*

Remarks.—A very variable species as to size, colour and sculpture. The operculum differs much in some individuals in both its shape and apex. This shell bears some resemblance to the *M. granifera*, Lam. Its most remarkable characteristic is its square, flattened granules, bearing some resemblance to brickwork.

MELANIA MODICELLA. *M. testá lævi, ovato-conicá, crassá, nitidá, virido-fuscá; spirá conicá, brevi, apice acutá, sæpe erodá; suturá lineari; anfractibus quinque, convexis, rapidè crescentibus, prope suturam superiorem depressis, prope suturam inferiorem striis parvis transversis duabus aut tribus; anfractu ultimo magno, medio striis tribus, basi lævi; aperturá ovato-rotundá, supernè subangulatá, infernè subeffusá, intus albidá; labro acuto; columellá lacteá, curvatá; operculo ovato, subcentrali, concentrico.*

Hab. Timor.

Length .7, diam. .5 of an inch.

Remarks.—This shell and the *M. zeylanica* may perhaps be taken as the types of a new genus or subgenus. Further investigation with respect to the animal may decide; in the meantime, the name of

RIVULINA is proposed provisionally. The general outline and operculum are those of the PALUDINA. In old specimens the peritreme of the mouth is continuous, but there is only a slight depression behind the columella in place of an umbilicus. The upper whorls are occasionally faintly lined or spotted with brown.

MELANIA PAGODA. *M. testá spinosá, turrítá, costatá, transversim striatá, tenui, diaphaná, corneá, maculis badiis minutis linearibus; spirá elongatá, subovatá, acuminatá, scalariformi; suturá lineari; anfractibus decem, supernè angulatis et subconcavis, angulo spinulosis; costulis obliquis longitudinalibus, infernè obsolete, supernè in spinulas aut denticula eversa productis, in anfractibus superioribus creberrimis et magnis, inferioribus minoribus rarioribusque; striis transversis, parvis, crebris, alternantibus, maculatis, lineolis longitudinalibus decussatis; anfractu ultimo usque ad basim striato; aperturá ovatá, supernè acutá, infernè effusá.*

Hab. Isle of Guimaras, Philippines.

Length 1·4, diam. ·6 of an inch.

Remarks.—A beautiful little species, with irregular spines, very strongly marked on the upper whorls, but which sometimes diminish to denticulations on the lower. It can be mistaken for none of its congeners, except perhaps the *M. cochlea*.

3. DESCRIPTION OF FIVE NEW SPECIES OF ANODONTÆ, COLLECTED BY H. CUMING, ESQ. IN THE EAST INDIES. BY ISAAC LEA.

ANODONTA GRACILIS. *A. testá latá, subcylindraceá, inæquilaterali; valvulis tenuibus; natibus subprominentibus; epidermide luteá; margaritá vel albá vel purpureá.*

Hab. Dingle, Isle of Panay.

Diam. 1; length 1·7; breadth 3·4 inches.

Remarks.—This species is more cylindrical than is usual with the *Anodontæ*, and differs from the other species taken by Mr. Cuming in this character: it is rounded anteriorly, and is subangular posteriorly. The dorsal margin is nearly straight, the basal margin is slightly emarginate, the disc being disposed to be flattish. In the specimens under examination, the beaks are all more or less eroded, but in the youngest there are slight indications of undulations. The ligament is thin and long; the marks of growth are distant and rather dark, and the epidermis in the young is yellow or greenish, in the older it is darker and brown; the anterior cicatrices are distinct; the dorsal small, and placed in the cavity of the beaks.

The five species herein described are remarkable in the character of the dorsal line, which rises immediately under the margin into a dentoid line, somewhat lamellar, and approaching in its character the more distinct tooth of the genus *Dipsas* (Leach). In the younger specimens this is much more distinctly marked, and in the older it becomes obsolete. This group of *Anodontæ*, having this dentoid character, would seem to form a natural connexion on one side with

the genus *Dipsas*, and on the other with the genus *Unio*, connecting with *U. Bengalensis*, brought by Dr. Burrough from India, and described by me in the 'Trans. Am. Phil. Soc.' vol. vi. pl. 2. fig. 3. This peculiar form of tooth, if it may so be called, is peculiar to that part of the world, so far as my observation extends; for among the numerous species examined by me from Europe, Africa and America, South as well as North, I have never met with this character developed as in those alluded to above.

ANODONTA CREPERA. *A. testá ellipticá, subcompressá, inæquilateralí; valvulis tenuibus; natibus subprominentibus; epidermide tenebroso-fuscá; margaritá vel albá vel purpureá.*

Hab. Bongabon, Luzon, Philippines.

Diam. 1·1; length 1·8; breadth 3·3 inches.

Remarks.—Five of the six specimens under examination are purple, the sixth whitish. The outline is nearly oval. One of the specimens is obtusely biangular posteriorly; the substance of the shell is slightly thickened anteriorly; the beaks are too much eroded to observe any undulations; the ligament is rather short and thin; anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks. The species is closely allied to *A. tenuis*, but is not quite so thin and is more transverse. Three specimens of the young have a well-defined anterior lamellar tooth and a distinct posterior raised line, which in the left valve is slightly divided. This is so marked in these young specimens, that one would scarcely hesitate to place them among the *Uniones* if we had not the adult, which have scarcely a vestige of the elevation on the dorsal line.

ANODONTA TENUIS. *A. testá ellipticá, compressá, inæquilateralí; valvulis pertenuibus; natibus subprominentibus; epidermide tenebroso-fuscá.*

Hab. Sual, Luzon, Philippines.

Diam. 1; length 1·7; breadth 3 inches.

Remarks.—This is very closely allied to *An. crepera* herein described, and may, perhaps, when more specimens of the old and young of both species are compared, prove only to be a variety. The specimens before me, however, differ in the *tenuis* being rather thinner and less elliptical, the outline inclining to oblong. The existence of teeth in the young, and the rudiments on the dorsal line in the adult, are very similar to the *crepera*. Of the four specimens before me, two have the nacre purple and two white. The beaks are too much eroded to observe any marks of undulations. The ligament is rather long and thin. Anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks.

ANODONTA SUBCRASSA. *A. testá oblongá, subinflatá, subæquilateralí; valvulis subcrassis; natibus prominentibus undulatisque; epidermide luteo-fuscá; margaritá albidá, colore salmonis tinctá et iridescente.*

Hab. Laguna de Bai, Luzon, Philippines.

Diam. 1·2; length 1·7; breadth 2·9 inches.

Remarks.—It is rare to meet with an *Anodonta* of the thickness of this species, but it still is not so ponderous as the *arcuata*, Fer., or as *lato-marginata* (Nobis). It cannot be confounded with either of these species, not being arcuate, and not having compressed beaks like the former, and being oblong and thinner than the latter, as well as also being destitute of the broad margin. The substance of the shell is slightly thickened anteriorly, and the basal margin is emarginate; the beaks are submedial, and when perfect are beautifully ornate with numerous small folds which form an acute angle from the point of the beaks, nearly parallel to the line of the umbonal slope; the ligament is short and rather thick; anterior cicatrices distinct; dorsal cicatrices large, and placed in the cavity of the beaks. The colour of a single young specimen before me is salmon inclining to purple, and the adults have the cavity of the beaks tinted in this manner. In the young specimen the lamellar line on the dorsal margin is very well defined, in the adults this character is nearly obliterated.

ANODONTA CUMINGII. *A. testá ellipticá, compressá, inæquilateralí; valvulis subcrassis; natibus vix prominentibus; epidermide atro-fuscá; margaritá albá et iridescente.*

Hab. Malacca.

Diam. 1; length 1·9; breadth 3 inches.

Remarks.—This is an interesting species, and remarkable in the form of the dorsal line, which is thickened and raised immediately under the beak, where it is slightly incurved. This disposition to form a curve tooth reminds us of that group of *Naiades* which M. D'Orbigny discovered in the rivers of South America, and which comprise his genus *Monococondylæa*. In fact, this species forms a perfect link between the *Anodontæ* and his genus, and it is allied very closely to that species of this group which I described in the 'Trans. of the Am. Phil. Soc.' vol. viii. pl. 18. fig. 39, under the name of *Margaratina Vonderbuschiana*, from Java. The form of the tooth of the *M. Bonellii* also approaches to these. The anterior margin of the *Cumingii* is rounded, the posterior is somewhat biangular; the anterior cicatrices confluent; the dorsal cicatrices form a line across the cavity of the beaks. In all the four specimens under examination, the beaks are too much eroded to observe any undulations. An unusually dark line marks the course of the pallial impression.

4. NOTE ON TRAGELAPHUS ANGASII. BY MR. PROUDFOOT.

The skins which I exhibit to the Society are those of an old ram and of a young female Antelope, which I shot on the banks of the Mapoota River, about sixty miles above its embouchure into Delagoa Bay. This river flows through the country of Mankazána, king of the Mathlengas (or Cutfaces), which people call this animal *Inyala*.

It is also found on another river called Umcoozi, running into St. Lucie Bay in the territory of Umpanda, king of the Zoolu, but very rarely.

On the Mapoota the *Inyala* are more numerous, and occur in small troops, composed of one ram and four or five females with their young.

They are always found in the densest bush: they browse chiefly on shrubs, and resemble the Bush-buck in their general habits.

The average height of an adult male is within a third of an adult Koodoo, and very much above that of a Bush-buck.

The female has no horns, resembles a female Koodoo in form, and is rather smaller in size.

July 23, 1850.

W. Yarrell, Esq., V.P., in the Chair.

The following papers were read:—

1. ON NEW SPECIES OF BIRDS FROM AUSTRALIA.
By J. GOULD, F.R.S., F.Z.S. ETC.

On the present occasion I propose to characterize seven more of the novelties sent home by Mr. MacGillivray, Naturalist to H.M.S. 'Rattlesnake.' *Vide* Proceedings, 1849, p. 109.

TANYSIPTERA SYLVIA.

Bill and feet sealing-wax red; crown of the head, wings, and five lateral tail-feathers on each side blue; ear-coverts, back of the neck and mantle black; in the centre of the latter a triangular mark of white; rump and two middle tail-feathers pure white; all the under surface cinnamon-red.

Total length, 15 inches; bill, $1\frac{1}{2}$; wing, $3\frac{5}{8}$; lateral tail-feathers, 3; middle tail-feathers, $9\frac{1}{8}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *T. Dea*. Fine specimens are contained in the British Museum collection.

HALCYON (SYMA?) FLAVIROSTRIS.

Bill fine yellow, passing into brown at the tip; crown of the head, back of the neck, ear-coverts and flanks cinnamon-red; at the back of the neck a narrow, broken collar of black; throat and lower part of the abdomen tawny white; back and wings sordid green; rump and tail greenish blue.

Total length, 7 inches; bill, $1\frac{7}{8}$; wing, 3; tail, $2\frac{1}{2}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—Smaller, but nearly allied to the *Syma Tirotoro* of M. Lesson. Some specimens have the crown of the head black. Fine specimens are contained in the collection at the British Museum.

DRYMODES SUPERCILIARIS.

Lores white; immediately above and below the eye a black mark, forming a conspicuous moustache; crown of the head and upper surface reddish brown, passing into chestnut-red on the rump and six middle tail-feathers; remainder of the tail-feathers black, tipped with white; wings black, with the base of the primaries and the tips of the coverts white, forming two bands across the wing; throat and

centre of the abdomen fawn-white; chest and flanks washed with tawny; bill black; legs fleshy brown.

Total length, $8\frac{1}{4}$ inches; bill, $\frac{7}{8}$; wing, $3\frac{3}{4}$; tail, 4; tarsi, $1\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *D. brunneopygia*. Fine specimens in the British Museum collection.

CARPOPHAGA ASSIMILIS.

Head, throat and ear-coverts grey; all the upper surface, wings and tail golden green; wing-coverts with a spot of rich yellow at the tip, forming an oblique band across the shoulder; line down the centre of the throat, chest and abdomen rich purple; under wing-coverts, vent, thighs and under tail-coverts rich orange-yellow; basal portion of the inner webs of the primaries and secondaries purplish cinnamon.

Total length, 14 inches; bill, 1; wing, 7; tail, 6; tarsi, $\frac{3}{4}$.

Hab. Cape York, Northern Australia.

Remark.—Very similar to *C. magnifica*, but considerably less in all its admeasurements. Specimens in the British Museum.

CHLAMYDERA CERVINIVENTRIS.

Upper surface brown, each feather narrowly margined, and marked at the tip with buffy white; throat striated with greyish brown and buff; under surface of the shoulder, abdomen, thighs and under tail-coverts light pure fawn colour.

Total length, $11\frac{1}{2}$ inches; bill, $1\frac{1}{4}$; wing, $5\frac{3}{4}$; tail, 5; tarsi, $1\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—Intermediate in size between *C. nuchalis* and *C. maculata*, and distinguished from both by the fine fawn colouring of the under surface. A specimen in the British Museum of the male, apparently somewhat immature.

NECTARINIA AUSTRALIS.

Crown of the head and upper surface olive-green; over and under the eye two very indistinct marks of yellow; throat and chest steel-blue; remainder of the under surface fine yellow; bill and feet black.

Total length, $4\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{2}$; tarsi, $\frac{5}{8}$.

Hab. Eastern coast of Australia.

Remark.—Differs from *N. franata* in its larger size, in its straighter bill, and in the stripe of yellow over the eye being almost obsolete. Specimens in the British Museum.

MONARCHA LEUCOTIS.

Crown of the head, back of the neck, back, primaries and six middle tail-feathers black; the three lateral tail-feathers on each side black with white tips; lores, a broad mark over the eye, ear-coverts, sides of the neck, scapularies and upper tail-coverts white; throat white, bounded below with black, the feathers lengthened and protuberant; chest and abdomen light grey; bill and feet lead-colour.

Total length, $5\frac{3}{4}$ inches; bill, $\frac{5}{8}$; wing, $2\frac{3}{4}$; tail, $2\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *M. trivirgata*. Specimens in the British Museum.

2. A MONOGRAPH OF MACROCHISMA, A GENUS OF GASTEROPODOUS MOLLUSCA BELONGING TO THE FAMILY FISSURELLIDÆ. BY ARTHUR ADAMS, R.N., F.L.S.

MACROCHISMA, Swainson.

Animal? Shell elongated, clypeiform, radiately ribbed, extremities elevated; foramen very large, elongated, placed near the hind part, with a groove posteriorly; the hind margin sinuated.

1. MACROCHISMA MAXIMA, A. Adams. *M. testá oblongá, costis parum elevatis subrugosis, striisque concentricis obsolete ornatá, fusco radiatim maculatá, dorso elevatá, lateribus planulatis, extremitate anticá rotundatá; posticá elevatá, subtruncatá; foramen dilatatum, posticè excavatum.*

Hab. — ?

2. MACROCHISMA DILATATA, A. Adams. *M. testá ovato-oblongá, radiatim costatá, rubrá, albo variegatá, utrinque rotundatá, lateribus dilatatis; foramen oblongum, in medio angustatum.*

Hab. — ?

3. MACROCHISMA HIATULA, Swainson, Manual of Malacology, p. 356.

Fissurella macrochisma, Sow.

- M. testá ovato-oblongá, radiatim costellatá, fuscá, subdepressá, lateribus concavis, utrinque rotundatá; foramen magnum, oblongum, posticè dilatatum, extremitate posticè valdè elevatá; margine vix sinuato.*

Hab. — ?

4. MACROCHISMA COMPRESSA, A. Adams. *M. testá angustè oblongá, albidá, roseo radiatim pictá, costellis granulosis striisque concentricis decussatá, utrinque rotundatá, dorso convexá, lateribus compressis, in medio inflexis, extremitate posticá valdè elevatá; foramen magnum, lanceolatum, posticè dilatatum.*

Hab. — ?

5. MACROCHISMA MEGATREMA, A. Adams. *M. testá ovato-oblongá, albidá, roseo radiatim pictá, costellis rugosis striisque concentricis sculptá, dorso subelevatá, lateribus planulatis; foramen ovato-lanceolatum, permagnum.*

Hab. — ?

6. MACROCHISMA CUSPIDATA, A. Adams. *M. testá ovato-oblongá, anticè angustatá, productá, acuminatá, posticè elevatá, rotundatá, margine valdè undulatá, fuscá, annulis fuscis concentricis ornatá, lineis elevatis et concentricis cancellatá, circa foramen pallidá, extremitate posticá valdè elevatá; foramen magnum, cuspidatum, posticè dilatatum.*

Hab. Cagayan, in insulis Philippinis; H. C. (Mus. Cuming.)

7. MACROCHISMA PRODUCTA, A. Adams. *M. testá angusto-*

oblongá, dorso elevatá, convexá, albidá, fusco pallide variegatá, lineis elevatis striisque concentricis obsolete decussatá, anticè angustá, productá, lateribus planulatis, extremitate posticá rotundatá, elevatá; margine valdè sinuatá; foramen perlongum, triangulare, posticè dilatatum.

Hab. in littoribus Australiæ. (Mus. Cuming.)

8. *MACROCHISMA ANGUSTATA*, A. Adams. *M. testá angustá, oblongá, dorso elevatá, utrinque rotundatá, albidá, lineis fuscis maculisque rufo-fuscis pictá et tessellatá, costellis obtusis subrugosis, lineisque depressis, concentricis, subdistantibus, sculptá, extremitate posticá elevatá, margine sinuato; foramen magnum, elongatum, subtriangulare, posticè dilatatum, excavatum.*

Hab. — ?

3. A MONOGRAPH OF *MODULUS*, A GENUS OF GASTEROPODOUS MOLLUSCA, OF THE FAMILY LITTORINIDÆ. BY ARTHUR ADAMS, R.N., F.L.S.

MODULUS, Gray.

Animal with the head probosciform, the tentacles tapering, with the eyes near their distal ends. Foot small, the sides simple, without lobes or filaments. Operculum thin, horny, orbicular, paucispiral. Shell globose or conical, whorls nodulous; aperture round, or quadrangular, not pearly within; columella anteriorly with a prominent lamelliform tooth; umbilicus more or less open.

Modulus, Gray.—Turbo, sp. *Adanson*—*Monodonta*, sp. *Lamck.*—*Monodonta, Swains.*—*Morulus, Reeve.*

The aperture of the shell not being pearly within, and the animal being destitute of eye-peduncles, head- and foot-lobes or filaments, at once distinguishes this genus from *Monodonta*, and removes it from the family *Trochidæ*.

1. *MODULUS LENTICULARIS*, Chemnitz.

Trochus lenticularis, Chem. Conch. 5. t. 171. f. 1665.

Trochus modulus, Linn. Gmel.

Hab. Mexico. (Mus. Cuming.)

2. *MODULUS TECTUM*, Gmel.

Trochus tectum, Gmel. p. 3569. no. 16.

Monodonta retusa, Lamck. Encyclop.

Hab. Siquejar, Philippines; *H. C.* (Mus. Cuming.)

3. *MODULUS CARCHEDONICUS*, Lamck.

Monodonta carchedonicus, Lamck. Hist. An. s. Vert. tom. vii. p. 33; *Chem. Conch.* 10. t. 165. f. 1583, 1584.

Monodonta Sayii, Nuttall.

Hab. Atooi, California; *Nuttall.* (Mus. Cuming.)

4. **MODULUS CIDARIS**, Reeve.

Morulus cidaris, Reeve, *Elements of Conch.* p. 141. pl. 13. f. 63.
Hab. St. Estivan; *H. C.* (Mus. Cuming.)

5. **MODULUS CERODES**, A. Adams. *M. testá turbinatá, umbilicatá, albidá, fusco sparsim inquinatá, lævigatá; anfractibus rotundatis, supra planulatis, in medio cingulá bituberculatá, infernè cingulis nodulosis ornatis; aperturá rotundá; labio purpureo tincto, labro intus lævigato; umbilico profundo, callo columellari subobtecto.*

Hab. ad Fretum Mosambicum. (Mus. Cuming.)

6. **MODULUS DUPLICATUS**, A. Adams. *M. testá orbiculato-conicá, umbilicatá, cærulescenti, fusco variegatá, spirá prominulá, acutá; anfractibus planulatis, transversim sulcatis, ad peripheriam cingulis duabus tuberculorum compressorum ornatis, tuberculis rufo-fusco maculatis, infimá fasciá convexá, concentricè sulcatá; aperturá intus violascenti; labro margine angulato, intus lirato; umbilico mediocri.*

Hab. —? (Mus. Cuming.)

7. **MODULUS OBLIQUUS**, A. Adams. *M. testá orbiculato-conicá, perobliquá, albá, umbilicatá, spirá depressá; anfractibus subplanulatis, liris transversis, elevatis, supra radiatim nodosoplicatis, ultimo in medio angulato, cariná prominulá instructo, infra cingulis transversis elevatis numerosis ornato; aperturá rotundá; columellá roseo tinctá; labro intus lirato.*

Hab. Mare Rubrum. (Mus. Cuming.)

EGLESIA CUMINGII, A. Adams. *E. testá turritá, solidá, albidá, longitudinaliter fusco-flammulatá; anfractibus rotundatis, cingulis acutis, transversis (in anfractu ultimo sex), lineisque elevatis, transversis, interpositis, ornatis, interstitiis longitudinaliter tenuissimè striatis, varicibus tenuibus, longitudinalibus, inæquidistantibus, instructis; aperturá rotundatá, peristomate continuo, labio incrassato, anticè producto, calloso, et reflexo; labro simplici, acuto.*

Hab. Japonia. (Mus. Cuming.)

The obscure longitudinal varices show the true position of this genus to be between *Turritella* and *Scalaria*.

4. **A MONOGRAPH OF CYLLENE, A GENUS OF GASTEROPODOUS MOLLUSCA.** BY ARTHUR ADAMS, R.N., F.L.S. ETC.

CYLLENE, Gray.

Animal unknown. Operculum thin, horny, unguiform, with terminal nucleus and imbricate elements. Shell ovate, volutiform; spire short; suture channeled; aperture oval; columella anteriorly with oblique grooves; outer lip thickened externally, notched in front, grooved within, and subreflected at the margin.

1. CYLLENE LYRATA, Lamarck.

Buccinum lyratum, *Lamk. Hist. An. s. Vert.* tom. vii. p. 272; *Kiener, Mon. Bucc.* pl. 22. fig. 88.

2. CYLLENE GRAYI, Reeve.

Cyllene Grayi, *Reeve, Elements of Conch.* pl. 3. fig. 12.

3. CYLLENE OWENII, Gray.

Cyllene Owenii, *Gray, MSS. Brit. Mus.*

4. CYLLENE PULCHELLA, Adams and Reeve.

Cyllene pulchella, *Adams and Reeve, Zool. of Voy. of H.M.S. Samarang*, tab. 10. fig. 11.

5. CYLLENE LUGUBRIS, Adams and Reeve.

Cyllene lugubris, *Adams and Reeve, Zool. Voy. Samarang*, tab. 10. fig. 10.

6. CYLLENE CONCINNA, Soland. *C. testá ovato-fusiformi; spirá productá, albá, maculis luteo-fuscis ornatá, longitudinaliter subsulcosá, transversim totá striatá; columellá anticè obliquè plicatá; labro extus lævi, incrassato.*

Hab. Guinea.

Buccinum concinnum, Sol.

7. CYLLENE ORIENTALIS, A. Adams. *C. testá ovato-fusiformi, albidá, maculis luteo-fuscis ornatá, longitudinaliter plicatá, transversim striatá; spirá prominulá; columellá anticè perobliquè sulcatá, labro intus lævi.*

Hab. Singapore, 6 fathoms, mud; *H. C.* Malacca, 6 fathoms, coarse sand; *H. C.*

8. CYLLENE STRIATA, A. Adams. *C. testá ovatá, albá, maculis rufo-fuscis ad suturas pictá, cingulis duabus maculorum luteo-fuscorum ornatá, longitudinaliter subplicatá, transversim totá striatá; columellá anticè obliquè sulcatá; labro tenui, intus lævi, anticè vix sinuato.*

Hab. Albrokkas Islands, under coral, low water; *Mr. Dring.*

9. CYLLENE FUSCATA, A. Adams. *C. testá ovatá, rufo-fuscá, fasciis transversis obscuris articulatis ornatá, longitudinaliter plicatá, plicis numerosis, subconfertis, supernè et infernè transversim valdè striatá; columellá anticè valdè corrugato-plicatá, labro anticè valdè sinuato.*

Hab. W. Africa.

10. CYLLENE PALLIDA, A. Adams. *C. testá ovatá, albidá, longitudinaliter subsulcatá, obscurè nodoso-plicatá, glabratá, supernè et infernè transversim striatá; columellá anticè plicis obliquis, labro anticè valdè sinuato.*

Hab. West Africa.

11. CYLLENE GRANA, Lamarck.

Buccinum grana, Lamk.; Kiener, Mon. pl. 16. fig. 58.

12. *CYLLENE GLABRATA*, A. Adams. *C. testá ovato-fusiformi, glabrátá, cinereá, fasciis albis tribus transversis rufo-articulatis ornatá, longitudinaliter subplicatá, plicis infernè evanidis, supernè et infernè transversim striatá; aperturá angustá; columellá anticè obliquè plicatá, labro anticè subsinuato.*
Hab. Pasicao, 9 fathoms, fine sand; *H. C.*

5. ON THE UMBRELLA BIRD (*CEPHALOPTERUS ORNATUS*),
 "UERAMIMBÉ," L. G. BY ALFRED R. WALLACE. COMMUNICATED BY MR. S. STEVENS.

Having had the opportunity of observing this singular bird in its native country, a few remarks on its characters and habits may not perhaps be uninteresting, at a time when a consignment from me will have arrived in England.

The Umbrella Bird is about the size of a crow, averaging about 18 inches in length. Its colour is entirely black, but varied with metallic blue tints on the outer margin of the feathers. The colour of the iris is greyish white. It is a powerful bird, the bill being very large and strong, the feet short, and the claws acute.

Were it not for its crest and neck plume, it would appear to an ordinary observer nothing more than a short-legged crow.

The crest is perhaps the most fully developed and beautiful of any bird known. It is composed of long slender feathers, rising from a contractile skin on the top of the head. The shafts are white and the plume glossy blue, hair-like, and curved outward at the tip. When the crest is laid back the shafts form a compact white mass, sloping up from the top of the head, and surmounted by the dense hairy plumes. Even in this position it is not an inelegant crest, but it is when it is fully opened that its peculiar character is developed. The shafts then radiate on all sides from the tip of the head, reaching in front beyond and below the top of the beak, which is completely hid from view. The top then forms a perfect, slightly elongated dome, of a beautiful shining blue colour, having a point of divergence rather behind the centre, like that in the human head. The length of this dome from front to back is about 5 inches, the breadth 4 to $4\frac{1}{2}$ inches. The other singular appendage of this bird is the neck plume. This is a long cylindrical plume of feathers depending from the middle of the neck, and either carried close to the breast or puffed out and hanging down in front. The feathers lap over each other, scale-like, and are bordered with fine metallic blue.

On examining the structure of this plume, it is found not to be composed of feathers only, growing from the neck, as seems to have been hitherto supposed. The skin of the neck is very loose; looser and larger, in fact, than in any bird I know of. From the lower part grows a cylindrical fleshy process about as thick as a goose-quill and an inch and a half long. From this grow the feathers to the very point, thus producing the beautiful cylindrical plume quite detached from the breast, and forming an ornament as unique and elegant as the crest itself.

When in motion, either flying or feeding, the crest is laid back and the plume carried close to the breast, so as not to be conspicuous. When at rest in the daytime, the crest is fully expanded, and the plume is rather enlarged and hanging forward. At night, when asleep, all the feathers are puffed out to their fullest extent, and sometimes the head is turned so as to bring the dome of the crest on the middle of the back. It then presents a most singular appearance, the head and feet being quite invisible, the plume and crest alone being conspicuous amidst the mass of feathers.

These observations I was enabled to make by having a fine male alive for ten days. He had received a shot in the head, but appeared to suffer no ill effects from it, till on the tenth day he suddenly fell off his perch and died. I found, on skinning him, that the shot had broken his skull and entered the brain.

The Umbrella Bird inhabits the islands of the rivers, never having been seen on the main land. It is perfectly arboreal, never descending to the ground. Its food is fruit of various kinds, but when this is scarce it eats insects: my hunter saw one with a large hairy spider (*Mygale*) in his mouth. On seizing an insect or fruit, it strikes its beak against its perch several times, apparently to kill or soften it, or secure it more firmly in its beak, and then after two or three bites swallows it entire. Some of the fruits it eats are about the size of a damson, and have a stone, which it ejects through its mouth an hour or two after eating.

Its note is very loud and deep, and it is from this that it has received its Indian name "Ueramimbé," signifying the "Piper-bird." It utters its note early in the morning and in the afternoon. It frequents the very loftiest forest trees, but is said to build its nest rather lower. Its nest is said to be formed of sticks very roughly, and the young are very naked and ugly. The colour or size of the eggs I have not been able to ascertain.

In ascending the Amazon, it first occurs opposite the mouth of the Madeira, in some islands. In the Sohuives, as far as the boundaries of Brazil, it also occurs, and probably further. The Rio Negro, however, is its head-quarters; and there, in the numerous islands which fill that river, it is very abundant. It extends at least four hundred miles up the river, and very probably much further. I have not heard of its occurring in the Rio Branco, Madeira, or any of the other great tributaries of the Amazon. I have been informed by a hunter, that towards the sources of the Rio Negro another species is found, and this I hope soon to have the means of verifying.

Barra do Rio Negro, March 10th, 1850.

The meeting was then adjourned to Tuesday, November 12.

November 12, 1850.

W. Yarrell, Esq., V.P., in the Chair.

Professor Owen read a paper "on the Cranium of the large species of *Dinornis* called *giganteus* and *ingens*.*" He commenced by referring to a former memoir, in which four generic types of structure had been determined in fossil crania of birds from New Zealand, viz. *Nestor*, *Notornis*, *Palapteryx*, and *Dinornis* proper; and proceeded to describe an additional series of fossil skulls obtained by Governor Sir George Grey from a cave in the district which lies between the river Waikato and Mount Tongariro, in the North Island. The most remarkable of these specimens was an almost entire skull, measuring eight inches in length and five inches across the broadest part of the cranium; which in the extent of the ossified part of the mandible and its downward curvature, resembled the smaller skull described in a former memoir, and there referred to *Dinornis*. In the structure of the occiput and base of the cranium, this large skull more resembled the characters of that ascribed to *Palapteryx*. The indications of the muscular attachments, and the form and size of the massive beak, bespoke the great power and force with which it had been habitually applied in the living bird.

Its anatomical characters were minutely detailed. Comparisons of the area of the occipital foramen for the transmission of the spinal marrow with that of the spinal canal in different vertebræ, were made with a view of determining the species to which the cranium in question might belong; and the peculiar contraction of the spinal canal in the vertebræ of *Dinornis* as compared with that in the Ostrich was pointed out. The inference deduced was, that the cranium, notwithstanding its great size, belonged probably to the species called *Palapteryx ingens*, which was the second in point of size.

A mutilated cranium of a much younger bird, showing all the sutures, but of nearly equal size with the skull first described, might belong to the *Dinornis giganteus*. Two crania, referable to two distinct species of smaller birds of *Palapteryx*, were described, and sections of the cranium were shown, to demonstrate the form and character of the brain. In the collection transmitted by Governor Grey, Professor Owen had, for the first time, recognized a portion of a diminutive wing-bone, similar, in the absence of the usual processes for the muscles of flight, to that in the *Apteryx*, and confirmatory, both by this character and its extreme rarity, contrasted with the abundance of vertebræ and leg-bones that had been transmitted, of the inference as to the rudimental condition of the wings in the *Dinornis* and *Palapteryx*.

The memoir concluded with a description of a cranium of the *Notornis*, more perfect than that fragmentary one on which the affinities

* This paper will appear in the Transactions as *Dinornis*, Part V., in continuation of Prof. Owen's previous memoirs.

of that bird to the *Rallidæ* or Coot-tribe had originally been founded, and its generic distinction from *Porphyrio* established. The specimen exhibited confirmed the accuracy of the conjectural restorations in the figure of the original specimen in a former volume of the Transactions of the Society.

The following papers were also read :—

1. NOTICE OF THE DISCOVERY BY MR. WALTER MANTELL IN THE MIDDLE ISLAND OF NEW ZEALAND, OF A LIVING SPECIMEN OF THE NOTORNIS, A BIRD OF THE RAIL FAMILY, ALLIED TO BRACHYPTERYX, AND HITHERTO UNKNOWN TO NATURALISTS EXCEPT IN A FOSSIL STATE. BY GIDEON ALGERNON MANTELL, ESQ., LL.D., F.R.S. ETC.

Amongst the fossil bones of birds collected by my eldest son in the North Island of New Zealand, which I had the honour of placing before the Zoological Society in 1848, in illustration of Professor Owen's description of the crania and mandibles of *Dinornis*, *Palapteryx*, &c., there were the skull, beaks, humerus, sternum, and other parts of the skeleton of a large bird of the Rail family, which from their peculiar characters were referred by that eminent anatomist to a distinct genus of *Rallidæ* allied to the *Brachypteryx*, under the name of *Notornis**; a prevision, the correctness of which is confirmed by the recent specimen that forms the subject of the present communication.

Towards the close of last year I received from Mr. Walter Mantell another extensive and highly interesting collection of fossils, minerals, and rock specimens, obtained during his journey along the eastern coast of the Middle Island, from Banks' Peninsula to the south of Otago, in the capacity of Government Commissioner for the settlement of native claims. This series comprised also a fine suite of birds' bones from Waingongoro, the locality whence the former collection was chiefly obtained, and among them were relics of the *Notornis*, and crania and mandibles of *Palapteryx*.

The results of my son's observations on the geological phenomena presented by the eastern coast of the Middle Island are embodied in a paper read before the Geological Society in February last, and published in vol. v. of the 'Quarterly Journal.' It will suffice for my present purpose to mention that they confirm in every essential particular the account given of the position and age of the ornithic ossiferous deposits, in my first memoir on this subject †.

The only fact that relates to the present notice is the nature of the bone-bed at Waikonaiti, whence Mr. Percy Earl, Dr. Mackellar, and other naturalists procured the first relics of the gigantic birds, sent by those gentlemen to England, which are figured and described in the 'Zoological Transactions.'

This so-called tertiary deposit is situated in a little bay south of Island Point, near the embouchure of the river Waikonaiti, and is

* Zoological Transactions, vol. iii. p. 366. † Geological Journal, vol. iv.

only visible at low-water, when bones more or less perfect are occasionally observable projecting from the waterworn surface of the bog. This deposit is about 3 feet in depth and not more than 100 yards in length; the extent inland is concealed by vegetation and a covering of superficial detritus, and is supposed to be very inconsiderable. This bed rests upon a blue tertiary clay that emerges here and there along that part of the coast, and which abounds in shells and corals, of species existing in the adjacent sea.

This bone deposit was evidently a morass or swamp, on which the New Zealand flax (*Phormium tenax*) once grew luxuriantly. Bones of the larger species of Moa have from time to time been obtained from this spot by the natives and European visitors; and, as in the menaccanite sand beds at Waingongoro, they are associated with bones of one species of dog and two species of seal: my son also collected crania and other remains of a species of *Apteryx* (probably *Ap. Australis*), Albatros, Penguin, and of some smaller birds whose characters and relations have not yet been ascertained: no bones of the *Notornis* were observed in this locality.

It was from this ancient morass that my son obtained the entire series of bones composing the pair of feet of the same individual *Di-nornis robustus*, standing erect, the one about a yard in advance of the other, as if the unfortunate bird had sunk in the slough, and unable to extricate itself had perished on the spot. The upper or proximal ends of the tarso-metatarsals were alone visible above the sod on the retiring of the tide; these were carefully dug round, and the phalanges exposed in their natural order and connection: the bones were numbered as they were extracted from the soil, and thus the normal elements of the locomotive organs of one of the colossal struthious bipeds of New Zealand were for the first time determined*.

It was in the course of last year, on the occasion of my son's second visit to the south of the Middle Island, that he had the good fortune to secure the recent *Notornis* which I have now the pleasure of submitting to this Society, having previously placed it in the hands of the eminent ornithologist Mr. Gould to figure and describe, as a tribute of respect for his indefatigable labours in this department of Natural History.

This bird was taken by some sealers who were pursuing their avocations in Dusky Bay. Perceiving the trail of a large and unknown bird on the snow with which the ground was then covered, they followed the foot-prints till they obtained a sight of the *Notornis*, which their dogs instantly pursued, and after a long chase caught alive in the gully of a sound behind Resolution Island. It ran with great speed, and upon being captured uttered loud screams, and fought and struggled violently; it was kept alive three or four days on board the schooner and then killed, and the body roasted and ate by the crew, each partaking of the dainty, which was declared to be delicious. The beak and legs were of a bright red colour. My son

* The principal dimensions of these bones are given in the Quarterly Journal of the Geological Society, vol. vi. p. 338; and figures with descriptions in 'The Pictorial Atlas of Organic Remains,' just published.

secured the skin, together with very fine specimens of the Kakapo or Ground Parrot (*Strigops*), a pair of Huia's (*Neomorpha*), and two species of Kiwi-kiwi, namely *Apteryx Australis* and *Ap. Oweni*; the latter very rare bird is now added to the collection of the British Museum.

Mr. Walter Mantell states, that, according to the native traditions, a large Rail was contemporary with the Moa, and formed a principal article of food among their ancestors. It was known to the North Islanders by the name of "*Moho*," and to the South Islanders by that of "*Takahé*;" but the bird was considered by both natives and Europeans to have been long since exterminated by the wild cats and dogs, not an individual having been seen or heard of since the arrival of the English colonists. That intelligent observer, the Rev. Richard Taylor, who has so long resided in the islands, had never heard of a bird of this kind having been seen. In his '*Leaf from the Natural History of New Zealand**,' under the head of "*Moho*," is the following note: "RAIL, colour black, said to be a wingless bird as large as a fowl, having a long bill and red beaks and legs; it is nearly exterminated by the cat: its cry was 'keo, keo.'" The inaccuracy and vagueness of this description prove it to be from native report and not from actual observation. To the natives of the paha or villages on the homeward route, and at Wellington, the bird was a perfect novelty and excited much interest. I may add, that upon comparing the head of the bird with the fossil cranium and mandibles, and the figures and descriptions in the '*Zoological Transactions*' (pl. 56), my son was at once convinced of their identity; and so delighted was he by the discovery of a living example of one of the supposed extinct contemporaries of the Moa, that he immediately wrote to me, and mentioned that the skull and beaks were alike in the recent and fossil specimens, and that the abbreviated and feeble development of the wings, both in their bones and plumage, were in perfect accordance with the indications afforded by the fossil humerus and sternum found by him at Waingongoro, and now in the British Museum, as pointed out by Professor Owen in the memoir above referred to.

It may not be irrelevant to add, that in the course of Mr. Walter Mantell's journey from Banks' Peninsula along the coast to Otago, he learnt from the natives that they believed there still existed in that country the only indigenous terrestrial quadruped, except a species of rat, which there are any reasonable grounds for concluding New Zealand ever possessed. While encamping at Arowenua in the district of Timaru, the Maoris assured him that about ten miles inland there was a quadruped which they called Káurēke, and that it was formerly abundant, and often kept by their ancestors in a domestic state as a pet animal. It was described as about two feet in length, with coarse grisly hair; and must have more nearly resembled the Otter or Badger than the Beaver or the *Ornithorhynchus*, which the first accounts seemed to suggest as the probable type. The offer of a liberal reward induced some of the Maoris to start for the interior of the country where the Káurēke was supposed to be located, but

* Published at Wellington, 1848.

they returned without having obtained the slightest trace of the existence of such an animal; my son, however, expresses his belief in the native accounts, and that if the creature no longer exists, its extermination is of very recent date.

In concluding this brief narrative of the discovery of a living example of a genus of birds once contemporary with the colossal Moa, and hitherto only known by its fossil remains, I beg to remark, that this highly interesting fact tends to confirm the conclusions expressed in my communications to the Geological Society, namely, that the *Dinornis*, *Palapteryx*, and related forms, were coeval with some of the existing species of birds peculiar to New Zealand, and that their final extinction took place at no very distant period, and long after the advent of the aboriginal Maoris. As my son at the date of his last letter was about to depart on another exploration of the bone deposits of the North Island, I indulge the hope that he will ere long have the gratification of transmitting or bringing to England additional materials for the elucidation of the extinct and recent faunas of New Zealand.

With much pleasure I resign to Mr. Gould the description of the ornithological characters and relations of this, in every sense, *rara avis*, from the Isles of the Antipodes.

Chester Square, Pimlico, November 1, 1850.

2. REMARKS ON NOTORNIS MANTELLI. BY J. GOULD, F.R.S.

(Aves, Pl. XXI.)

Dr. Mantell having kindly placed his son's valuable acquisition in my hands for the purpose of characterizing it in the Proceedings of the Society, and of afterwards figuring and describing it in the appendix to my work on the 'Birds of Australia,' I beg leave to commence the pleasing task he has assigned to me.

The amount of interest which attaches to the present remarkable bird is perhaps greater than that which pertains to any other with which I am acquainted, inasmuch as it is one of the few remaining species of those singular forms which inhabited that supposed remnant of a former continent—New Zealand, and which have been so ably and so learnedly described, from their semi-fossilized remains, by Professor Owen; who, as well as the scientific world in general, cannot fail to be highly gratified by the discovery of a recent example of a form previously known to us solely from a few osteological fragments, and which, but for this fortunate discovery, would in all probability, like the Dodo, have shortly become all but traditional. While we congratulate ourselves upon the preservation of the skin, we must all deeply regret the loss of the bones, any one of which would have been in the highest degree valuable for the sake of comparison with the numerous remains which have been sent home from New Zealand.

Upon a cursory view of this bird it might be mistaken for a gigantic kind of *Porphyrio*, but on an examination of its structure it will be



found to be generically distinct. It is allied to *Porphyrio* in the form of its bill and in its general colouring, and to *Tribonyx* in the structure of its feet, while in the feebleness of its wings and the structure of its tail it differs from both.

From personal observation of the habits of *Tribonyx* and *Porphyrio*, I may venture to affirm that the habits and æconomy of the present bird more closely resemble those of the former than those of the latter; that it is doubtless of a recluse and extremely shy disposition; that being deprived, by the feeble structure of its wing, of the power of flight, it is compelled to depend upon its swiftness of foot for the means of evading its natural enemies; and that, as is the case with *Tribonyx*, a person may be in its vicinity for weeks without ever catching a glimpse of it.

From the thickness of its plumage and the great length of its back-feathers, we may infer that it affects low and humid situations, marshes, the banks of rivers, and the coverts of dripping ferns, so abundant in its native country: like *Porphyrio*, it doubtless enjoys the power of swimming, but would seem, from the structure of its legs, to be more terrestrial in its habits than the members of that genus.

I have carefully compared the bill of this example with that figured by Professor Owen under the name of *Notornis Mantelli*, and have little doubt that they are referable to one and the same species; and as we are now in possession of materials whence to obtain complete generic characters, I hasten to give the following details, in addition to those supplied by Professor Owen.

Bill somewhat shorter than the head; greatly compressed on the sides, both mandibles being much deeper than broad; tomia sharp, curving downwards, inclining inwards and slightly serrated; culmen elevated, much arched and rising on the forehead to a line with the posterior angle of the eye; *nostrils* round, and placed in a depression near the base of the bill; wings very short, rounded, and slightly concave; primaries soft and yielding; the first short; third, fourth, fifth, sixth and seventh equal and the longest; tail-feathers soft, yielding, and loose in texture; tarsi powerful, longer than the toes, almost cylindrical; very broad anteriorly; defended in front and on either side posteriorly by broad and distinct scutellæ; the spaces between the scutellæ reticulated; anterior toes large and strong, armed with powerful hooked nails, and strongly scutellated on their upper surface; hind-toe short, strong, placed somewhat high on the tarsus, and armed with a blunt hooked nail.

Head, neck, breast, upper part of the abdomen and flanks purplish blue; back, rump, upper tail-coverts, lesser wing-coverts and tertiaries dark olive-green, tipped with verditer-green; at the nape of the neck a band of rich blue separating the purplish blue of the neck from the green of the body; wings rich deep blue, the greater coverts tipped with verditer-green, forming crescentic bands when the wing is expanded; tail dark green; lower part of the abdomen, vent and thighs dull bluish black; under tail-coverts white; bill and feet red.

Total length of the body, 26 inches; bill, from the gape to the

tip, $2\frac{1}{8}$; from the tip to the posterior edge of the plate on the forehead, 3; wing, $8\frac{1}{2}$; tail, $3\frac{1}{2}$; tarsi, $3\frac{1}{2}$; middle toe, 3; nail, $\frac{7}{8}$; hind-toe, $\frac{7}{8}$; nail, $\frac{3}{4}$.

I cannot conclude these remarks without bearing testimony to the very great importance of the results which have attended the researches of Mr. Walter Mantell in the various departments of science to which he has turned the attention of his cultivated, intelligent and inquiring mind, nor without expressing a hope that he may yet be enabled to obtain some particulars as to the history of this and the other remarkable birds of the country in which he is resident.

November 26, 1850.

R. H. Solly, Esq., F.R.S., in the Chair.

The following papers were read:—

1. LIST OF BIRDS PROCURED IN KORDOFAN BY MR. J. PETHERICK. WITH NOTES BY H. E. STRICKLAND, M.A., F.G.S.

(Aves, Pl. XXII. XXIII. XXIV.)

[Species not enumerated in Rüppell's 'Systematische Uebersicht der Vögel Nord-Ost-Afrika's,' 8vo, Frankfurt a. M. 1845, are marked N.

Species common to the West Coast of Africa are marked W. These are chiefly determined by reference to Dr. Hartlaub's valuable list of West African birds in the 'Verzeichniss der öffentlichen u. Privat-Vorlesungen am Hamburgischen Gymnasium,' 4to, Hamburg, 1850.]

1. *Neophron percnopterus*.
2. *Vultur occipitalis*.
3. *Otogyys auricularis*.

4. BUTEO RUFIPENNIS, Strickland, n. s. Upper parts cinereo-fuscous, nearly black on the crown; feathers of back and wing-covers with black shafts; cheeks cinereous, a black line below them from angle of mouth; chin whitish, with a medial dark streak; breast and sides ferruginous brown, with a conspicuous medial black streak one-sixteenth of an inch wide on each feather; belly, thighs and vent plain fulvous; primaries and secondaries bright ferruginous, tipped for about an inch and a half with black, and from three to five distant transverse black bands on the inner web; tail cinereo-fuscous, with five dark fuscous bands, each about a quarter of an inch wide, the distal one about half an inch, beyond which the extremity is cinereo-fuscous and the extreme tip white; cere and legs yellowish; beak and claws black.

Length 17 inches; wing, $12\frac{1}{4}$; medial rectrices, $7\frac{1}{2}$; external ditto, $7\frac{1}{8}$; tarsus, $2\frac{1}{4}$.

Hab. Kordofan. (Aves, Pl. XXII.)



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BUTEO RUFIPENNIS. Strickl.

5. *Aquila nœvia*.

6. *Aquila pennata*.

7. *W. Circaëtus brachydactylus*.

8. *Helotarsus ecaudatus*.

9. *Falco biarmicus*, Temm. (*F. peregrinoides*, Temm.; *F. chi-queroides*, Smith; *F. feldeggi*, Schlegel; *F. lanarius*, Schlegel; *F. rubeus*, Thienemann; *F. cervicalis*, Kaup.)

After a careful examination of many specimens, I feel justified in uniting the above synonyms under one species. This is essentially an African bird, extending from the Cape of Good Hope to Egypt, whence it has probably spread into Greece and Dalmatia, to which portions of Europe it is chiefly confined, though a single straggler has occurred in Germany. It is at once distinguished from *F. peregrinus* by the shorter toes, and the fulvous patch on the crown. The *Falco jugger*, Gray (*F. luggur*, Jerdon), of India is closely allied, but seems to differ constantly in the plumes of the tibia being uniformly dark brown, while in *F. biarmicus* they are cream-coloured or white, like the rest of the under parts, with a small brown spot on the centre of each feather. This is one of the many species to which the name *Falco lanarius* has been given, under the supposition that it may be the *Lanner* of the old works on falconry; but as the original *F. lanarius* of Linnæus is now admitted to be the young of *F. gyrfalco*, and as systematists are generally agreed not to trace binomial titles further back than Linnæus's *Systema*, of course the specific name *lanarius* must be dropped altogether, and the oldest binomial name, *Falco biarmicus*, Temm., adopted for the present species.

10. *W. Tinnunculus alaudarius* (Gm.). This widely diffused species extends, without variation of form or colour, from Britain southwards to Central Africa and eastwards to India.

11. *N. W. Nauclerus riocouri*, Vieill.

12. *Accipiter sphenurus*, juv.? Resembles *A. sphenurus*, Rüpp., in the cuneate form of the tail. Head and neck rufescent, with a fuscous medial stripe on each feather; belly white, barred with brown; back cinereous brown with rufous margins; *upper tail-covers white*; tail cinereous, with three broad fuscous bars, outer feather white, with five bars.

13. *N. Accipiter carbonarius* (Licht.). Two specimens agree with Lichtenstein's description (in his *Verzeichniss einer Sammlung von Säugethieren u. Vögeln aus dem Kafferlande*, 8vo, Berlin, 1842, p. 11), except in having only *three or four* white bands on the tail instead of *five*. With the exception of these bands, and the numerous light and dark brown bands on the remiges, the plumage is wholly black; cere and legs yellow.

Total length, 12 inches; wing, 7; tarsus, $1\frac{6}{10}$.

14. *W. Melierax gabar* (Daud.). (*Accipiter erythrorhynchus*, Sw.)

15. *Melierax polyzonus*, Rüpp. United by Mr. Gray to *M. canorus*, Rislach (*M. musicus*, Daud.), but differs in its smaller size, and in having the upper tail-covers banded grey and white, while in *M. ca-*

norus they are pure white. The wing in *M. polyzonus* measures 12 inches, in *M. canorus*, 15 inches.

16. *W. Polyboroides radiatus* (Scop.). (*Falco gymnogynys*, Temm.)

17. *N. Circus pallidus*, Sykes.

18. *W. Scops leucotis* (Temm.).

19. *W. Scotornis climacurus* (Vieill.).

20. *Caprimulgus infuscatus*, Cretzschm., female. Agrees with Rüppell's plate, but wants the white wing- and tail-spots of the male bird.

21. *W. Eurystomus afer* (Lath.). (*E. orientalis*, Rüpp.; *E. rubescens*, Vieill.; *Collaris purpurascens*, Wagl.)

22. *W. Coracias abyssinica*, Gm. (*Coracias caudata*, Wagl.)

23. *W. Coracias nœvia*, Daud. (*C. levaillanti*, Rüpp.; *C. nuchalis*, Swains.)

24. *W. Ceryle rudis* (Linn.). (*Ispida bicincta*, Swains.; *I. bitortuata*, Swains.) Identical with specimens from Smyrna and S. Europe. The individuals with two pectoral bands (*I. bicincta*, Swains.) are the males.

25. *N. W. Merops albicollis*, Vieill. (*M. cuvieri*, Licht.; *M. savignyi*, Swains.)

26. *W. Merops nubicus*, Gm. (*M. superbus*, Shaw; *M. cæruleocephalus*, Lath.)

27. *W. Merops lamarchi*, Cuv. (*M. viridissimus*, Sw.; *M. ægyptius*, Kittlitz; *M. viridis*, Rüpp.) Closely allied to *M. viridis*, Linn., of India, but smaller, with a larger mixture of golden yellow in the plumage, the throat not blue as in *M. viridis*, and the remiges are rufous on both webs, with scarcely any tinge of green externally.

28. *W. Merops erythropterus*, Gm. (*M. minutus*, Cuv.; *M. colaris*, Vieill.; *M. lafresnayei*, Guérin.)

29. *Irisor senegalensis* (Vieill.)? The Kordofan specimens agree, in the shortness and nearly straight form of their beak, with the black-beaked species of W. Africa, *I. senegalensis*, Vieill. (*Nectarinia melanorhynchus*, Licht.), but in the red colour of this organ they agree with the Cape species (*I. erythrorhynchus*). It is well known that the females of the latter have the beak much shorter and straighter than the males, yet in these Kordofan specimens the beak, though of the same length, is considerably straighter than in the female birds from the Cape. Like *I. senegalensis* they have a broad white bar crossing the inner webs of the first three, and both webs, shaft included, of the remaining primaries; while in *I. erythrorhynchus* the white bar of the primaries is much narrower, and divided by the black shaft.

30. *Nectarinia metallica*, Ehrenb.

31. *W. Nectarinia pulchella* (Linn.).

32. *Phylloscopus trochilus* (Linn.). Identical with British specimens.

33. *Saxicola deserti*, Temm.

34. *Saxicola tœnanthe* (Linn.).

35. *Saxicola isabellina*, Cretzschm. This is probably the *Sylvia*

leucorrhoea, Gm., in which case it extends to Senegal. It resembles *S. oenanthe*, but is paler on the upper part, and has less white on the lateral rectrices, the terminal black portion being $1\frac{1}{10}$ inch in length, while in *S. oenanthe* it is only about $\frac{3}{4}$ inch.

36. *Motacilla capensis*, Linn.

37. *Budytes melanocephala* (Licht.).

38. *Anthus* (undetermined species).

39. W. *Melanornis? erythropterus* (Gm.). (*Turdus erythropterus*, Gm.) This bird approaches nearly to the type of *Melanornis*, Gray (*Melasoma*, Sw.), though the beak is rather more elongated, and the rectal bristles less developed, than in *M. edolioides*, Sw. Rüppell refers it to Boie's genus *Cercotrichas*, which is synonymous with *Copsychus*, Wagl. Dr. Hartlaub places it in *Argya*, Lesson, which is synonymous with *Chatops*, Sw.

40. W. *Pycnonotus barbatus* (Desfontaines). (*Turdus barbatus*, Desfont. in Mém. Ac. Sc. 1787; *Turdus arsinoe*, Licht.; *Ixos obscurus*, Temm.; *I. inornatus*, Fraser; *Hæmatornis lugubris*, Less.)

41. *Oriolus galbula*, Linn.

42. W. *Dicrurus divaricatus*, Licht. (*D. lugubris*, Ehrenb.; *D. canipennis*, Swains.) Nearly allied to the *D. musicus*, Vieill., of S. Africa, but has the tail less deeply forked, the culmen of the beak more acute, and the primaries pale internally.

43. *Lanius algeriensis*, Less. in Rev. Zool. 1839. This is probably the species termed *L. excubitor* by Rüppell. It differs from the true *excubitor* of N. Europe in the greater extent of white on the primaries, and in the two external pairs of rectrices being wholly white (except the shafts). It closely approaches *L. lahtora* of India, and only differs in wanting the narrow band of black across the front.

44. *Lanius nubicus*, Licht. (*L. personatus*, Temm.)

45. *Lanius collurio*, Linn. A young male specimen appears referable to this species.

46. N. *Lanius isabellinus*, Ehrenberg, Symb. Phys. fol. e. This species is pale fulvo-cinereous above, cream-coloured below; rump and tail rufous; a broad blackish band from the nostril to the ear-covers, margined above by a whitish streak. It much resembles *L. arenarius*, Blyth, Journ. As. Soc. Beng. vol. xv. p. 304, but is of a more cinereous tinge above, and is distinguished from that and all the allied Asiatic species by possessing a conspicuous white band at the base of the fourth to the ninth primaries. The specimen from Kordofan has an obscure dark transverse band near the tips of the rectrices.

47. W. *Telophonus senegalus* (Linn.). (*Lanius erythropterus*, Shaw.)

48. W. *Corvus scapulatus*, Daud. (*C. leuconotus*, Sw.)

49. *Corvus umbrinus*, Sundevall. Distinguished by the length and curvature of the beak, and by the grey-brown tint of the head and neck.

50. W. *Juida rufiventris*, Rüpp.

51. W. *Juida chalybea*, Ehrenb. (*Lamprotornis cyanotis*, Sw.)

52. W. *Ploceus luteolus*, Licht. (*P. personatus*, Vieill., Jard. Contrib. to Ornith. 1849, p. 35. pl. 7.)

53. *W. Ploceus sanguinirostris* (Linn.).

54. *W. Pyromelana ignicolor* (Vieill.).

55. *W. Vidua paradisea* (Linn.). The series of immature specimens in the collection have enabled me to detect a curious structure connected with the development of the tail-feathers, which will be treated of in a separate paper. See Sir W. Jardine's 'Contributions to Ornithology,' 1850, p. 88. pl. 59.

56. *W. Vidua principalis* (Linn.). The specimen from Kordofan, like those from Senegal, has a black spot on the chin, but it is not yet proved whether the presence of this spot amounts to a specific distinction.

57. *W. Pytelia elegans* (Gm.).

58. *W. Amadina fasciata* (Gm.). (*Fringilla detruncata*, Licht.)

59. *W. Amadina cantans* (Gm.). A perfectly typical *Amadina*, though M. Rüppell makes it an *Estrilda*.

60. *W. Philetærus nitens* (Gm.). (*Amadina nitens*, Sw.) From the peculiar form of the beak I am disposed to refer this species, as well as *Estrilda squamifrons*, Smith, *E. musica*, Gray, and *Loxia frontalis*, Daud., to the genus *Philetærus*.

61. *Crithagra lutea* (Licht.), Temm. Pl. Col. 365.

62. *W. Passer simplex*, Licht. (*Pyrgita swainsoni*, Rüpp.)

63. *Emberiza striolata*, Rüpp.

64. *Galerida cristata* (Linn.)? This is probably the bird so designated by Rüppell, who states it to be abundant in the whole of N. Africa. It precisely agrees with European specimens in form, but is of a much paler colour, which however may be easily explained by the bleaching effect of the sun's rays in the scorching deserts which this bird frequents.

65. *N. MIRAFRA CORDOFANICA*, Strickland, n. s. Above ferruginous, the feathers of the crown and back with an indistinct medial dusky streak, and margined on their inner side with rusty white; tertials broadly margined with whitish, that colour being separated from the ferruginous of the medial portion by a narrow dusky line; secondaries ferruginous, margined externally with whitish; primaries ferruginous at the base, their distal half being pale rufo-fuscous; medial pair of rectrices ferruginous, the next pair pale rufo-fuscous, the two following pairs deep fuscous, with a very narrow rufescent margin, the penultimate pair deep fuscous internally; the external web, and part of the inner at the tip, white; external pair white, the inner web fuscous towards the base; cheeks pale rufo-fuscous, chin and throat white, breast and lower parts pale cream-colour, the former with a few pale rufo-fuscous subtriangular spots; lower wing-covers and sides rufescent; beak, feet and claws pale yellowish. (Aves, Pl. XXIII.)

Total length, $5\frac{1}{2}$ inches; beak to front, $\frac{1}{2}$, to gape, $\frac{6}{10}$; wing, $3\frac{2}{10}$; medial and external rectrices, $2\frac{7}{10}$; tarsus, $\frac{9}{10}$; middle toe and claw, $\frac{7}{10}$; hind toe, $\frac{3}{10}$; hind claw, $\frac{2}{10}$.

This, which seems to be a typical *Mirafra*, is remarkable for the predominance of a pure ferruginous tint on its upper parts. The hind



Illustration by J. G. Rehn

MESSENERIA CORDOPANICA. Strickl.





claw is remarkably short, though not more so than in some of the Indian species of *Mirafra*. The single specimen that occurred of this bird is now in the British Museum.

66. *ALAUDA ERYTHROGYIA*, Strickland, n. s. Upper parts deep fuscous brown, the feathers narrowly margined with rufo-fulvous; upper tail-covers ferruginous; remiges deep fuscous, almost black on both webs, secondaries narrowly tipped with pale fulvous; tail fuscous black, the middle rectrices narrowly margined with ferruginous, the bases of all ferruginous, extending obliquely nearly to the tips of the outer pair. Lower parts pale fulvous, the chin, throat and breast with a broad medial fuscous streak on each feather; lower wing-covers black, margins of wing fulvous; beak fuscous; legs flesh-colour; hind claw short and slightly curved. (Aves, Pl. XXIV.)

Length $7\frac{1}{2}$ inches; beak to front, $\frac{6}{10}$, to gape, $\frac{1\frac{1}{2}}{10}$; wing, $4\frac{1}{2}$; medial and-external rectrices, 3; tarsus, 1; hind claw, $\frac{3}{10}$.

Hab. Kordofan.

67. *W. Colius macrurus*, Linn. (*C. senegalensis*, Gm.)

68. *W. Tockus erythrorhynchus* (Kuhl).

69. *W. Palæornis torquatus*, Vig. (*P. cubicularis*, Wagl.) This species, which extends across Africa from Abyssinia to Senegal, is identical with specimens from India.

70. *W. Pogonius vieilloti*, Leach. (*P. senegalensis*, Licht.; *P. rubescens*, Temm.) N.B. This generic name was originally written *Pogonia* by Leach (Zool. Misc. vol. ii. p. 45), in which form it had been preoccupied by a genus of plants. Illiger's name, *Pogonias*, had also been preoccupied by a fish-genus; but Leach afterwards corrected it to *Pogonius*, which form had never been used before, and I therefore retain it instead of Mr. G. R. Gray's name *Laemodon* (erroneously written *Laimodon*).

71. *Trachyphonus margaritatus*, Rüpp. (*Tamatia erythropyga*, Ehrenb.)

72. *Funx torquilla*, Linn. Identical with specimens from Britain and from India.

73. *N. Oxylophus serratus* (Sparrm.). This Cape bird has never before, I believe, been obtained to the north of the equator. The nearly allied *O. jacobinus* (Bodd.) of India (*Cuculus melanoleucus*, Gm.; *C. passerinus*, Vahl) has the lower parts constantly white. Ehrenberg, in his 'Symbolæ Physicæ,' fol. r, describes a Nubian species under the name of *Cuculus pica*, which from the description seems to be identical with the white-bellied *O. jacobinus* of India. Rüppell erroneously refers this *C. pica* of Ehrenberg to the *Oxylophus afer*, Leach (Levall. Ois. Afr. pl. 209), of S. Africa, which differs in having dark streaks on the throat, and which appears from Rüppell's observations to be also an Abyssinian bird.

74. *W. Oxylophus glandarius* (Linn.).

75. *W. Columba guinea*, Linn. (*C. trigonigera*, Wagl.)

76. *Numida ptilorhyncha*, Licht.

77. *Francolinus clappertoni*, Vig. Mr. G. R. Gray has separated the *F. clappertoni* of Rüppell as a distinct species, under the name of

F. rüppelli; but the specimens from Kordofan seem to agree equally well with Rüppell's plate of *F. rüppelli* and with Gray's plate of what he regards as the true *clappertoni*, between which I can see no difference.

78. *Coturnix dactylisonans*.

79. N. W. *Pterocles quadricinctus*, Temm. (*P. tricinctus*, Sw.) This African species has long been confounded with the closely allied *P. fasciatus* (Scop.), (*Perdix indica*, Lath.), of India, figured by Mr. Jerdon in his 'Illustrations of Indian Ornithology,' pl. 10 and 36. Specimens sent by Mr. Jerdon have now enabled me to prove their distinction. The general arrangement of colour is almost identical in these two species, the chief distinction being in the feathers of the back, scapulars, tertials and greater wing-covers, which in *P. fasciatus* are marked transversely with bars of a dull iron-grey (or "inky hue," as Mr. Jerdon well describes it), while in *P. tricinctus* these bands are of a deep glossy black. In *P. fasciatus* the wing-covers next the body have two or three of these dark bands alternating with white ones of equal breadth, the subterminal one being dark, and the tip of the feather ochreous yellow. In *P. quadricinctus* the wing-covers have only one black band, (or a very faint trace of a second,) narrowly margined on both sides with a fine white line, the terminal and basal parts of the feather being ochreous. Temminck's original description of *P. quadricinctus* is evidently taken from the African bird, but he erroneously gives India as its habitat, in consequence of having confounded it with *P. fasciata*. Vieillot has increased the confusion by figuring the *quadricinctus* in his 'Galerie des Oiseaux,' pl. 220, under the specific name of *bicinctus*, while his description refers to the true *P. bicinctus*, Temm., a S. African bird.

80. W. *Otis rhaad*, Gm.

81. N. W. *Eupodotis denhami* (Vig.).

82. W. *Ortyxelos meiffreni*, Vieill.

83. W. *Ædienemus crepitans*, Linn. This seems to me to be undistinguishable from *Æ. senegalensis* (Swains. Birds W. Afr. vol. ii. p. 228), the description of which agrees with the European bird.

84. *Ædienemus affinis*, Rüpp. So exactly does this agree in size and form with *Æ. crepitans*, that I should have suspected it to be an immature bird, did not M. Rüppell appear so convinced of its distinctness.

85. *Pluvianus ægyptius* (Linn.).

86. *Glareola limbata*, Rüpp. Closely resembles *G. orientalis* of India, but has the external rectrices about an inch longer.

87. N. W. *Squatarola helvetica* (Linn.).

88. N. W. *Rhinoptilus chalconotus* (Temm.). (*Cursorius chalconotus*, Temm.) This, with the nearly allied *M. bitorquatus*, Blyth, of India, form a very distinct group, connecting *Cursorius* with *Charadrius*. Mr. Blyth first formed it into a genus, under the name of *Macrotarsus* (Journ. Asiat. Soc. Beng. vol. xvii. part 1. p. 254); but as the name has been previously used by Lacépède for genera of mammals and of birds, and by Schönher for a coleopterous insect, I

propose the name *Rhinoptilus*, indicating the advanced position of the frontal feathers, which, with other characters, distinguish it from *Charadrius*.

89. N. *Chaetusia gregaria* (Pall.).

90. W. *Lobivanellus albicapillus* (Vieill.). (*Vanellus strigilatus*, Swains.)

91. W. *Hoplopterus persicus* (Bonn.). (*H. spinosus*, auct. recentiorum.)

92. W. *Sarciophorus pileatus* (Gm.).

93. *Charadrius hiaticula*, Linn.

94. *Charadrius alexandrinus*, Linn. (*C. cantianus*, Lath.)

95. *Charadrius pecuarius*, Licht.

96. W. *Ardeola coromanda* (Bodd.). (*Ardea coromandelensis*, Kuhl; *A. coromandelica*, Licht.; *A. affinis*, Horsf.; *A. russata*, Temm.; *A. bicolor*, Vieill.; *A. ruficapilla*, Vieill.; *A. bubulcus*, Audouin; *A. caboga*, Franklin; *A. verrani*, Roux; *A. lucida*, Raff.; *Leptodas ibis*, Ehrenb.) I could have wished that M. Rüppell had given us the diagnoses of *A. bubulcus* and *coromandelica* when he pronounced them distinct. As far as my own comparisons extend, the African and Indian birds are specifically the same.

97. *Botaurus stellaris* (Linn.).

98. *Grus cinereus*.

99. W. *Ciconia alba*.

100. *Ibis ethiopia*.

101. W. *Glottis canescens* (Gm.). (*G. chloropus*, Nilss.)

102. W. *Totanus hypoleucus* (Linn.).

103. W. *Pelidna minuta*, Leisl.

104. W. *Pelidna subarquata* (Gm.).

105. *Machetes pugnax* (Linn.).

106. *Crex pratensis*, Bechst.

107. W. *Sarkidiornis africana*, Eyton.

108. *Chenalopez aegyptiacus*.

109. W. *Dendrocygna viduata* (Linn.). We have the authority of Jacquin, Azara, and other authors, for the occurrence of this bird in S. America. If this be the case, it will form the *only known instance* of a non-marine bird being indigenous to both the African and South American continents, without occurring in Europe, Asia, or North America. Before, however, admitting this remarkable exception to the laws of geographical distribution, the absolute specific identity of the African and American specimens should be established by careful comparison, which, as far as I am aware, has not yet been done.

110. *Sterna anglica*, Mont.

111. *Hydrochelidon nigra* (Linn.).

112. W. *Pelecanus rufescens*.

2. SYNOPSIS OF THE SPECIES OF DEER (CERVINA), WITH THE DESCRIPTION OF A NEW SPECIES IN THE GARDENS OF THE SOCIETY. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Mammalia, Pl. XXII.—XXVIII.)

The Deer, spread over all parts of the Globe, are easily recognized by their deciduous horns, which are covered, when they are first developed, with a hairy skin.

It has been supposed that the Deer were not to be found in Africa, but the discovery of a species in Barbary has dispelled that idea; they are rare in that extensive quarter of the world, their place being supplied by Antelopes.

Since the publication of Cuvier's Essay on Deer, in which he described several species from the study of the horns alone, many zoologists have almost entirely depended on the horns for the character of the species, and Colonel Hamilton Smith has been induced to separate some species on the study of a single horn. But the facilities which menageries have afforded of studying these animals, and watching the variations which the horns of the species present, have shown that several most distinct but allied species, as the Stag of Canada and India, have horns so similar that it is impossible to distinguish them by their horns. On the other hand, it has been shown that animals of the same herd, or even from the same parents, and sometimes even the same specimen, under different circumstances, in succeeding years have produced horns so unlike one another in size and form, that they might have been considered, if their history was not known, as horns of very different species. These observations, and the examination of the different cargoes of foreign horn which are imported for the uses of the cutler, each cargo of which is generally collected in a single locality, and therefore most probably belong to a single species peculiar to the district,—have proved to me that the horns afford a much better character to separate the species into groups, than to distinguish the allied species from one another.

Colonel Hamilton Smith, in his Monograph of the Genus, separated them into subgenera according to the form of the horns.

In the Proceedings of the Zoological Society for 1836 I drew attention to the glands on the hind-legs as affording very good characters to arrange the subgenera proposed by De Blainville and Colonel Smith into natural groups, which in most particulars agreed with the geographical distribution of the species.

Dr. Sundevall, in his Essay on Pecora, has availed himself of the suggestions in my paper, and has also pointed out some other external characters, such as the form and extent of the muffle, which afford good marks of distinction in these animals,—such as I believe are much more important for the distinction of the genera and species than those derived from the form of the skull or the modifications of the teeth, or the form and size of the horns; as they are not, like those parts, so liable to alteration from age, local circumstances and



M & H Barber: Imp.

COASSUS NEMORIVAGUS, ♂.

1904

PLATE 5. NEMORIVAGUS



M. & N. Hanhart Imp.

J. Wolf Lith

CARIACUS PUNCTULATUS

other changes during the growth of the animal, and they can be seen in the females as well as the males, which is not the case with the horns, as they can only be observed in the male sex.

The Deer may be thus divided :

- A. The DEER OF THE SNOWY REGIONS have a very broad muzzle, entirely covered with hair ; the horns are expanded and pal-
mated, and the fawns are not spotted.
 - a. The *Alcine Deer* have no basal anterior snag to the horns, and a small, bald muffle between the nostrils, as the genus *Alces*.
 - b. The *Rangerine Deer* have a large basal anterior snag to the horns, close on the crown or burr, and no muffle, as *Tarandus*.
- B. The DEER OF THE TEMPERATE OR WARM REGIONS have a tapering muzzle, ending in a bald muffle ; the fawn, and some-
times the adult, are spotted.
 - c. The *Elaphine Deer* have a distinct anterior basal snag to the horns, the muffle broad, and separated from the lip by a hairy band, and the tuft of hair on the outside of the hind-leg above the middle of the metatarsus, as *Cervus* and *Dama*.
 - d. The *Rusine Deer* have a distinct anterior basal snag to the horns, the muffle very high, and not separated from the edge of the lip, and the tuft of hair on the outside of the hind-leg above the middle of the metatarsus, as *Recevus*, *Panolia*, *Rusa*, *Axis*, *Hy-
elaphus*, and *Cervulus*.
 - e. The *Capreoline Deer* have no basal anterior snag to the horn, the first branch being some distance above the burr ; the suborbital crumen (and pit in the skull) generally small, as *Capreolus*, *Ca-
riacus*, *Blastocerus*, *Furcifer*, and *Coassus*.

The *Alcine* and *Rangerine* Deer are confined to the Northern part of both continents ; the *Elaphine* and *Rusine* Deer to the Eastern World, the latter almost exclusively to the warmer part of Asia ; the *Capreoline* Deer are peculiar to America. The only exception to these rules are, the Wapiti Deer of the *Elaphine* group is found in Northern America, and the *Roebuck* and *Ahu* of the *Capreoline* group are found in Europe and North Asia.

A. The DEER OF THE SNOWY REGIONS have a very broad end to the nose, which is entirely covered with hair, a short tail and pal-
mated horns ; the fawns are not spotted, but uniformly coloured like the adult ; the skull with a large nose-cavity, and with the intermax-
illaries not reaching to the nasal.

a. The ALCINE DEER or ELKS have no basal snag, the first branch of the horn being considerably above the crown.

1. **ALCES**; *Alce*, H. Smith.

The muzzle is very broad, produced, and covered with hair, but there is a small, moist, naked spot in front of the nostrils; the neck is short and thick; the hair is thick and brittle; the throat is rather maned in both sexes; the hind-legs have the tuft of hair rather above the middle of the metatarsus; the males have palmate horns. The nose-cavity in the skull is very large, reaching behind to a line over the front of the grinders; the intermaxillaries are very long, but do not reach to the nasal; the nasals are very short. They live in woods in the northern parts of both continents.

1. **ALCES MALCHIS**. The **ELK** or **MOOSE**.

Dark brown; legs yellow.

Alces, Gesner; Plin.—*Cervus Alces*, Linn. S. N. i. 92; Pallas, Zool. R. A. i. 201; H. Smith; Richardson, Fauna Bor. Amer. 232.—*Alces Malchis*, Ogilby, P. Z. S. 1836, 135; Gray, Knows. Menag. 56.—*Moose Deer*, Dudley, Phil. Trans. n. 368. 165.—*Elk*, Laws, Carol. 123; Pennant, Syn.—*Elan*, Brisson, H. N. xii. t. 7. Supp. vii. t. 25; Cuvier, R. A.—*Original*, La Houtan, Voy. 72; Charlev. Nouv. France, iii. 126.—*American Black Elk* (*C. alces* β.), H. Smith, G. A. K. v. 771.—*Loss*, Russians in Siberia.

Inhabits the Northern regions of America and Europe.

Several naturalists, especially Colonel Hamilton Smith, thought they had observed a difference in the horns of the Russian and American Elks; I have compared numerous specimens from both countries, but can discover no appreciable distinction between them.

The Elks, like most of the other Deer, and especially of the animals which inhabit the cold and mountain regions, present a very considerable difference in size, according to the scarcity or abundance of the food which the locality they inhabit affords, and the development of the horns appears to be greatly influenced by this cause; so that the horns of the animals inhabiting the more barren districts are much less developed than those found in more fertile situations, and I think I have observed this to be the case with both the Russian and the American horns: but on this head naturalists are like to be much misled, as the horns which are imported are generally chosen for their size and perfect development, and the small and less-developed specimens are only to be observed in the cargoes of horns which are imported for economic purposes.

These observations are equally applicable to the *Rein Deer*.

b. The **RANGERINE DEER** or **REINS** have a large and well-developed basal branch close on the crown of the horns.

2. **TARANDUS**; *Rangifer*, H. Smith.

The muzzle is entirely covered with hair; the tear-bag small, covered with a pencil of hairs; the fur brittle, in summer short, in winter longer, whiter, of the throat longer; the hoofs are broad, depressed, and bent in at the tip; the external metatarsal gland above

the middle of the leg; horns in both sexes elongate, subcylindric, with the basal branches and tip dilated and palmated; of the females smaller; skull with rather large nose-cavity, about half as long as the distance to the first grinder; the intermaxillary moderate, nearly reaching to the nasal; a small, very shallow, suborbital pit.

They live in the Arctic Regions in both hemispheres, migrating in flocks, and eating lichens.

1. TARANDUS RANGIFER. THE CARIBOU OR REIN DEER.

Dark brown in summer, grey in winter. Young: brown, yellow varied.

Tarandus, Plini.—*Rangifer*, Gesner.—*Cervus Tarandus*, Linn.; Pallas, Zool. Ross. A. i. 106; Cuvier, Mamm. Lith. t. ; Bennett, Gardens Z. S. 241. fig.; Richardson, Fauna Bor. Amer. 238.—*C. Tarandus sylvestris* (*Woodland Caribou*), Richardson, Fauna Bor. Amer. 250.—*C. rangifer*, Raii Syn. 88.—*C. platyrhynchos*, Vrolich, Rendier, t. 2 (1828).—*C. palmatus* and *C. mirabilis*, Jonston, Quad. t. 36, 37.—*Tarandus rangifer*, Gray, Knows. Menag. 57.—*Rein Deer*, Pennant.—*Caribou*, Sagard, Theodat. Canad. 751.—*Renne*, Buffon, H. N. xii. 79. t. 10–12. Supp. iii. t. 18*.—*Rhenne*, Cuvier, R. A.—*Caribou* or *Carrebœuf*, French Canadians.—*Oleen*, Russians in Siberia.

Var. Smaller; horns more slender, less palmated; hair short, smooth, close, brown, with throat and belly white in summer; hair very close, thick, waved, brittle and erect and white in winter.

Cervus Tarandus Americanus, H. Smith, G. A. K. v. 773.—*C. Tarandus v. Arctica* (*Barren-ground Caribou*), Richardson, Fauna Bor. Amer. 241. fig. 240, horns.—*Common Deer*, Hearne, Journ. 195. 200.

Inhabits Arctic parts of Europe and America.

Varies exceedingly in size. In the British Museum there are specimens varying from 20 to 28 inches high at the withers, and proportionally as large in the horns and all the other parts. The variety is confined to the barren grounds.

Dr. Richardson observes, "There are two well-marked and permanent varieties of *Caribou* that inhabit the fur countries; one of them (*Woodland Caribou*) confined to the woody and more southern districts, and the other (*Barren-ground Caribou*) retiring to the woods only in the winter, but passing the summer on the coasts of the Arctic seas, or on the barren grounds so often mentioned in this work."—*Fauna Bor. Amer.* 299.

The large Siberian variety are ridden on by the Tungusians. They also use them for draught, as the Laplanders do the smaller variety.

They have a large variety in Newfoundland, nearly as large as a heifer, having very large and heavy horns. There are some horns of this variety in the British Museum. M. Middendorf informed me that the horns of the large Siberian variety were as large as, and greatly resembled, the horns from Newfoundland (Nova Scotia) in the British Museum Collection.

Pallas observes, "Americæ forte continua gregatim verno tempore per glacies admigrant, paulo diversi a Siberiæ inquilinis et verosimilime Americani."—*Zool. Ross. Asiat.* i. 208.

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B. The DEER OF THE WARM OR TEMPERATE REGIONS have a tapering nose, ending in a naked, moist muffle; they generally have a well-developed tail, distinct crumen, and rather long false hoofs; their fawns are spotted, the spots generally disappearing in the adult, or only to be seen when the animals are in high condition; the fur is shorter and fulvous in the summer, becoming longer and greyer in the winter; the skulls have a moderate nose-cavity, and the intermaxillaries reaching to or nearly to the nasal bones.

c. The ELAPHINE DEER OR STAGS have a low, broad muffle, narrowed and rounded below, and nearly separated from the edge of the lip by a hairy band, which has only a narrow interruption in the middle, and rather elongated ears; they have rough horns, generally supported on a more or less long process of the frontal bones, furnished with a frontal basal branch or snag close on the burr or crown; the outer side of the hind-legs has a tuft of hair placed rather above the middle of the metatarsus, and another tuft on the inner side of the hock.

They are (except the *Wapiti*) exclusively confined to the woods of the Old or Eastern World.

3. CERVUS; *Elaphus*, H. Smith; *Cervus* and *Pseudocervus*, Hodgson.

Horns round, erect, with an anterior basal snag, a medial anterior snag, and the apex divided into one or more branches, according to the age of the animal; a well-developed crumen; narrow triangular, compressed hoofs; they are covered with brittle, opaque hairs; the rump is generally ornamented with a pale mark; skull with a large, deep, suborbital pit.

* The *True Stags* have one or two branches on the middle of the front of the beam.

† The *American kind* have rather broad semicircular hoofs, a very short tail, and the withers covered with softer hair in winter. *Strongyloceros*.

1. CERVUS CANADENSIS. THE WAPITI.

Red-brown; rump with a very large pale disk extending far above the base of the tail, and with a black streak on each side of it; male with hair of throat elongated, black, with reddish tips.

Stag, Dale, Phil. Trans. n. 444, 384.—*Cerf de Canada*, Perr. Anim. ii. 55. t. 45?; Cuvier, R. A. i. 256.—*Cervus Canadensis*, Brisson; Gray, Knows. Menag. 58.—*Cervus Elaphus*, var. *Canadensis*, Erxl.—*Cervus Strongyloceros*, Schreb. t. 247; Richardson, Fauna Bor. Amer. 251.—*C. major*, Ord.—*C. Wapiti*, Leach, Journ. Phys. lxxxv. 66.—*American Elk*, Bewick, Quad.—*North-Western Stag*, *C. occidentalis*, H. Smith, G. A. K. iv. 101. t. , f. 2, horn; Fischer, Syn. Mamm. 614, not Syn.—*Wapiti*, Warden, États Unis, v. 638; Wied, Voy. Amer. Sept. iii. 302.

Var. Smaller.

Red Deer (or *Canadian Stag*), Warden, États Unis, v. 637.—*Elk*, Lewis and Clerk.—*Stag*, Pennant, Arct. Zool. i. 27.—*Wewaskiss*, Hearne, Journ. 360.

Inhabits N. America.

In summer red-brown; ears, middle line of the back of the neck, and back of rump and front of legs blackish; rump-mark yellowish.

†† The species of the *Western World* have narrow, triangular hoofs, a moderate tail, and are covered with harsh hair. *Cervus*.

2. CERVUS ELAPHUS. The STAG.

Brown; rump with a pale spot extending rather above the upper surface of the base of the tail.

Cervus, Plin.; Gesner.—*Tragelaphus*, Gesner (old male).—*Cervus Elaphus*, Linn.; Gray, Knows. Menag. 58.—*C. vulgaris*, Linn.—*C. nobilis*, Klein.—*C. Germanicus*, Brisson.—*C. Elaphus* β. *Hippelaphus*, Fischer, Syn. (old male).—*Stag*, or *Red Deer*, Pennant.—*Cerf*, Buffon, H. N. vi. t. 9.—*Cerf commun*, Cuvier; F. Cuvier, Mamm. Lith. t. .

Inhabits Europe.

Mr. Blyth described a variety as the *Hungarian Stag* (Mus. Asiat. Soc. Beng. 1841, 750. t. 3. f. 11).

The Deer which Buffon (H. N. vi. 95. t. 11) describes under the name of the *Cerf de Corse*, has been regarded as a variety to be distinguished by the smallness of its size, but Buffon observes, that he believes the "size to depend on the scarcity of nourishment; for when moved to better pastures, in four years they became higher, larger and stouter than the Common Stags."

3. CERVUS BARBARUS. The BARBARY DEER.

Dark brown; obscurely white spotted, with a very indistinct, greenish brown, broad dorsal line, with a pale yellow spot extended considerably above the base of the tail; back of haunches white, with a dark stripe on each side.

Cervus Barbarus, Bennett, MSS. Catal. Gardens Zool. Soc.; Gray, Knows. Menag. 59; Frazer, Zoologia Typica, t. .—*Burk-Goat* (*Al-Wassai*), Moors (see Griffith, A. K. v. 775).

Inhabits Coast of Barbary; Tunis.

4. CERVUS WALLICHII. The BARA SINGA OF MORL.

Brown, with a very large white spot on the rump, extending on back of the haunches and far above the base of the tail; the horns with two basal and one or two apical branches.

Cervus Pygargus, Hardw. Linn. Trans.—*Cervus Wallichii*, Cuvier, Oss. Foss. iv. 50; F. Cuv. Mam. Lith. from Hardw. Icon.; Sundev. Pecora, 55; H. Smith, G. A. K. iv. 103. t. . (from Indian drawing); Gray, Knows. Menag. 60.—*Jaareel Stag*, Blyth, Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 7, young horn; Hodgson, Icon. ined. t. 198, called *Gyana*.—*Pseudocervus Wallichii*, Hodgson, Journ.

Asiat. Soc. Bengal, x. 914, xi. 284.—?*Cervus Caspianus* or *Hangool*, Falconer, MSS.; Gray, Cat. Osteol. Sp. B. M. 147.—?*Cervus Cashmeriensis*, Gray, Cat. Osteol. Sp. B. M. 65.—*Kashmir Stag?*, Blyth, P. Z. S. 1840, 72; Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 8, 9.—*Persian Deer*, *Maràl* or *Gevezu* or *Gookoohee*, MacNeil, P. Z. S. 1840, 11; Blyth, Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 10.

Inhabits Cachir (*Hodgson*); Persia (*MacNeil*).

The skull of Dr. Falconer's *Cashmere Stag* is 15 inches long; the suborbital pit is oblong, triangular, and rather deep. The skull and horns are very like Mr. Hodgson's specimen of *Cervus affinis*, but they are considerably smaller.

Sir John MacNeil informs us they are called by the Persians *Maràl*, or *Gevezu*, or *Gookoohee*, and are frequently noticed in their literature. It is found in all the wooded mountain districts of Persia, but apparently does not occur in the central parts of the country. They rarely descend into the plains. During the summer they are found in the highest wooded parts of the mountains, and during the winter in the lower ravines, near their bases, where they are frequently tracked in the snow. The horns of the adult males closely resemble those of the Red Deer of this country; inasmuch that I doubt whether an unscientific observer could distinguish them, except by the superior size of those of the *Maràl*.—P. Z. S. 1840, 11.

5. CERVUS AFFINIS. THE SAUL FOREST STAG.

Pale brown; rump without any distinct pale mark?; skull 16 or 17 inches long; suborbital pit large, oblong, trigonal, rather deep.

Cervus affinis (*Mool Baratingha*, or *Royal Stag of the Morung*), Hodgson, Icon. ined. B. M. n. 197; Journ. Asiat. Soc. Bengal, x. 741, 914; Calcutta Journ. N. H. iv. 291; Sundev. Pecora, 131; Gray, Cat. Ost. Sp. B. M. 65; Knowsley Menag. 60.—*C. Elaphus*, Hodgson, Journ. Asiat. Soc. Bengal, iv. 648.—*C. Wallichii*, part, Gray, Cat. Hodgson's Coll. in B. M. 32.—*C. Wallichii*, var. Blyth, Journ. Asiat. Soc. Bengal, 1841, 747.

Inhabits India; Saul Forest.

Mr. Hodgson, in his figure of this animal, does not represent any pale spot on the rump: if this is correct, it must be a most distinct species, as Dr. Falconer informs me the *Cashmere Stag* has a large white rump.

6. CERVUS SIKA. THE SIKA.

Dark brown; cheeks and throat rather paler; rump brown, without any pale spot; tail pale, white beneath; hair harsh; horns rather slender, with a basal and medial snag, and a subapical internal one.

Cervus Sika, Schlegel, Fauna Japon. t. 17; Sundev. Pecora, 55, 131; Gray, Knows. Menag. 60.—*C. Sitza*, Temm. Mus. Leyden.

Inhabits Japan. Mus. Leyden.

4. DAMA, H. Smith; *Platyceros*.

Horns, upper part expanded, smooth, and branched on the hinder edge; tail rather elongated; tear-bag well developed; hoofs narrow,

triangular, compressed; they are covered with thin, rather adpressed hairs, and have the hair of the nape reversed; the fur is spotted in summer; the skull with a short broad face, an oblong, rather shallow, infraorbital pit; intermaxillary broad, reaching to the short broad nasals.

1. DAMA VULGARIS. The FALLOW DEER.

Fulvous; white spotted, with the longitudinal streak on the lower part of the side, and the line across the haunches white.

Var. From nearly black to nearly pure white.

Platyceros, Plin.—*Cervus platyceros*, Raii Quad. 85.—*Cervus dama*, Linn.—*Dama vulgaris*, Gesner, Quad. 335. f. ; Gray, Cat. Osteol. Sp. B. M. 65; Knows. Menag. 60.—*Fallow Deer and Buck*, Pennant.—*Daim et Daime*, Buffon.—*Daim fauve*, F. Cuvier.—*Cervus coronatus*, H. Smith, G. A. K. iv. t. . f. 4, from monstrous horns.

Var. Blackish.

Cervus mauricus, F. Cuv. Bull. Soc. Phil. 1816.—*C. Dama maura*, Fischer.—*Daime noire*, F. Cuv. Mam. Lith.

Inhabits Persia. Domesticated in Europe.

This species is represented in the sculptures from Nineveh.

d. The RUSINE DEER or SAMBOOS have a large moist muffle, which is as high as broad, and extends to the edge of the upper lip; hind-leg with a large tuft of hair rather above the middle of the metatarsus, and with a pencil of hair on the inner side of the hock; a moderate tail, broad, short ears, and the fur consisting of hard, rather shining, thick, depressed hair; they have no white mark on the rump. The horns are cylindrical, generally rather longly peduncled, with a distinct anterior basal branch or snag close on the burr or crown, and are forked, and sometimes reforked, at the tip; they have no medial snag. The skulls have a large, very deep, suborbital pit. They are confined to South-Eastern Asia and its islands.

* In some the upper part of the horns is variously branched.

5. PANOLIA, Gray.

The horns round, curved backwards and outwards, with a large anterior basal snag close on the burr; the upper part bent in, forked, becoming rather expanded and branched on the inner or hinder edge; the fur formed of rather rigid, flattened hair; muffle large; skull with a narrow face, a large, oblong, very deep suborbital pit, and the nasals short, broad, and dilated behind; the frontal snag of the horns often has a tubercle or branch at the base.

1. PANOLIA EEDII. The SUNGNAI.

Panolia Eedii, Gray, Cat. Hodgson's Coll. B. M. 34; Knowsley Menag. 61.—*P. acuticornis*, Gray, Cat. Mam. B. M. 180.—*P. platyceros*, Gray, Cat. Mam. B. M. 180 (adult horn).—*Cervus lyratus*, Schinz, Syn. ii. 395.—?*Cervus Smithii*, Gray, Proc. Zool. Soc. 1837, 45.—*Cervus Eedii*, Calcutta Journ. N. H. ii. 413. t. 12.—*Cervus*

(*Rusa frontalis*, McClelland, Calcutta Journ. N. H. i. t. 12. f. 1, ii. 539, iii. t. 13; Sundevall, Pecora, 132.

Inhabits India.

General Hardwicke has a drawing of a Deer, the frontal snag of the horns very much elongated, and apparently forked: Colonel Hamilton Smith made an "improved" drawing from the sketch; and in the Proceedings of the Zoological Society for 1837 I mention the species under the name of *C. Smithii*, p. 48.

I am now doubtful if the sketch might not have been intended for this species or a new one allied to it.

6. RUCERVUS, Hodgson; *Rusa*, sp. H. Smith.

Horns cylindrical, with an anterior basal branch, and repeatedly forked at the tip; muffle large, high, continued to the edge of the upper lip below; they have a rather short, thick tail, a shortish face, a well-developed crumen, broad rounded ears, covered with hair, and narrow compressed hoofs. The fur is formed of rather soft adpressed hairs; they have no pale mark on the rump, and are indistinctly spotted. The skull has an elongate face, with a large nose-opening, and an oblong, rather shallow, suborbital pit.

1. RUCERVUS DUVAUCELLII. The BAHRAIYA.

Yellowish brown, without any rump-spot; back with an indistinct dark streak, with a row of white spots on each side; sides not spotted; hair black, with yellow tips; neck with rather longer hair; throat, chest and belly with longer, scattered, greyish white hairs; muzzle and front of leg dark; chin white. Fur in winter dark brown.

Cervus Duvaucellii, Cuvier, Oss. Foss. iv. t. 29. f. 6, 8.—*Rucervus Duvaucellii*, Gray, Cat. Hodgson's Coll. B. M. 33.—*Rucervus elaphoides*, Hodgson.—*R. Duvaucellii*, Gray, Knows. Menag. 61.—*Cervus Bahraiya*, Hodgson.—*C. enclodocerus*, Hodgson.—*C. Bahraiya*, Hodgson, P. Z. S. 1836, 46.—*C. Euryceros*, Knowsley Menag. t. 40, 41.—*Bahraiya*, Hodgson.

Inhabits India.

* The *True Rusas* have the upper part of the horns simply forked.

7. RUSA, H. Smith; *Cervus Hippelaphi****, Sundevall.

They are covered with hard, rigid, very thick hairs; they are not, or only obscurely, spotted; the horns are placed on a moderately long peduncle, have an anterior frontal snag close on the crown, and are simply forked at the tip.

† The *Larger kinds* have the hair of the neck elongated, forming a kind of mane, at least in the males.

1. RUSA ARISTOTELIS. The SAMBOO.

Tail not floccose, brown, rather darker at the end; blackish brown, with the feet, the region of the vent, and a spot over the eyes fulvous. Male maned. Young obscurely white spotted (*Hodgson*).

Gona Rusa, Daniel, Ceylon, t. .—*Cervus Aristotelis*, Cuvier, Oss. Foss. iv. 502. t. 39. f. 10; F. Cuv. Mam. Lith. t. ; Sundev. Pecora, 55.—*Cervus Hippelaphus*, *C. Aristotelis*, and *C. heteroceros*, Hodgson, Icon. ined.—*Rusa Aristotelis*, H. Smith; Gray, Cat. Hodgson's Coll. B. M. 67; Osteol. Spec. B. M. 67; Knows. Menag. 62.—*Cervus unicolor*, H. Smith, G. A. K. v. 780.—*Cervus Bengalensis*, Schinz, Syn. Mam. ii. 390.—*Daim noir de Bengal*, Duvaucell, Asiat. Res. xv. 157.—*Cerf noir de Bengal*, F. Cuvier, Menag. Lith. t. .—*Cervus equinus* (*Samboo Deer*), Bennett, Tower Menag. 185, fig.—*Elk*, Indian Sportsmen; Sykes, Proc. Zool. Soc.—Var. *Cervus heteroceros*, Hodgson, J. A. S. Beng. 1841, 722. t. .

Var. ? *Biche de Malacca*, F. Cuv. Mam. Lith. t. female.—*Cervus Malaccensis*, Fischer, Syn.

Inhabits India; Ceylon.

The skull is about 17 inches long, and has a very deep, oblong, subtriangular, suborbital pit.

The specimen from Ceylon, in the Zoological Gardens, differs from the common Samboos from India in having shorter and thicker horns.

Nearly black in October; the front of the muzzle rounded, the nose black, forming a band across the chin; front of chin (only) white; tail all black; face paler than back, and more grised, but uniformly coloured, without any black streak over the eyes or up the side of the nose; vent flesh-coloured. Much larger.

2. RUSA DIMORPHE. The SPOTTED RUSA.

Red-brown; back with distinct series of small white spots; sides indistinctly white spotted; limbs paler; neck and belly blackish; chin white; the horns (deformed?). Young bright fawn-red, white spotted.

Cervus Dimorphe, Hodgson, Journ. Asiat. Soc. Bengal, 1844, t. ; Ann. & Mag. Nat. Hist. xiv. 74; Sundevall, Pecora, 132.—*Rusa Dimorpha* (*Hodgson's Rusa*), Hodgson in Gray, Cat. Hodgson's Coll. in B. M. 33; Gray, Knows. Menag. 62.

Inhabits Saul Forest; Morang.

3. RUSA EQUINUS. The RUSA OR SMALLER SAMBOO.

Brown, not spotted; tail rounded, floccose, black at the tip; hair (summer) elongate, rigid, thick, waved. Young very obscurely spotted; hair rigid and rough.

Rusa, Raffles, Linn. Trans. xiii. 263.—*Cervus equinus*, Cuvier, Oss. Foss. iv. 44. t. 5. f. 30, 37, 38, 42; H. Smith, G. A. K. iv. 112. t. ; Sundevall, Pecora, 55; S. Müller, Nederl. Verh.—*Eland* or *Elk* of the Dutch Sportsmen.—*Rusa Equinus*, Gray, Knows. Menag. 62. t. 43.

Inhabits Sumatra; Borneo.

4. RUSA HIPPELAPHUS. The MIJANGAN BANJOE.

Greyish brown; tail not floccose, brownish at the tip; anal region not pale; cheeks and upper part of the neck of the males maned; hair (summer) short, rigid, close-pressed, not waved. Young: hair smooth.

Rusa ubi, *R. saput* and *R. Tunjuc*, Raffles, Linn. Trans. xiii. 260.—*Cervus hippelaphus*, Cuvier, Oss. Foss. iv. t. 5. f. 31, 34 & 42; F. Cuvier, Mam. Lithog. t. ; Raffles, Mem. 645.—*Cervus Tunjuc*, Vigors, in Raffles' Memoir, 645.—*Cervus Rusa*, S. Müller, Nederl. Verh. 45. t. 43.—*Great Muntjac*, Waterhouse, Cat. Mus. Zool. Soc. 1839, 39.—*Cerf noir de Bengal*, F. Cuvier, Mam. Lithog. t. 2, in summer.—*Cervus Leschenaultii*, Cuvier, Oss. Foss. v. , from horns only.—*Rusa Hippelaphus*, Gray, Knows. Menag. 62.
Var. Smaller. Eydoux, Guérin, Mag. Zool. 1836, 26.—*Cervus Moluccensis*, Quoy.—*Cervus Rusa Moluccensis*, S. Müller, Nederl. Verh. t. 45; Mus. Leyden, 1845.—*Cervus Rusa Timorensis*, Mus. Leyden, 1845.

Inhabits Java.

In all its states it was very distinct from the Samboo of Continental India. The horns are similar to those of *R. Equinus*, but the body and horns are smaller, and the hair of the young is smoother.

** The *Smaller Rusas* have no mane; the peduncles of the horns are rather elongated, and covered with hair.

5. RUSA PERONII. THE SMALLER RUSA.

Brown, paler beneath; hair rigid, thick, ringed; muzzle dark; tail brown, floccose; anal disk white; the hind part of the feet hairy; the horns are thick and heavy.

Cervus Peronii, Cuvier, Oss. Foss. iv. 46. t. 5. f. 41, 45; Sundev. Pecora, 56.—*Rusa Peronii*, Gray, Knows. Menag. 63.—*Cervus Kuhlii*, S. Müller, Nederl. Verh. 45. t. 44; Sundev. Pecora, 56.—*Rusa Kuhlii*, Gray, List. Osteol. Spec. B. M. 68.

Inhabits Timor, Luboc, Bavian and Ternate. Specimen in Brit. Mus.

6. RUSA PHILIPPINUS. PHILIPPINE RUSA.

Forehead brown; end of nose and eyebrows brownish; feet behind naked; hair rigid, not waved.

Cerf de Philippine, Desm. Mamm. 442.—*Cervus Philippinus*, H. Smith, G. A. K. iv. 147. t. 164. f. 5. head, v. 803; Fischer, Syn. 622; Sundev. Pecora, 56.—*Rusa Philippinus*, Gray, Knows. Menag. 63.

Var.? Tail black, dependent; front of face dark.

Cervus Marianus, Cuvier, Oss. Foss. iv. 45. t. 5. f. 30, 37, 38, 46; H. Smith, G. A. K. iv. 115. t. 168 (from Mus. Paris); Fischer, Syn. 453; Sundev. Pecora, 57.

Inhabits Philippines.

This species has the horn on an elongated peduncle, like the *Muntjacs*, but it is easily distinguished from them by the absence of the ridge and of the grooves on the face.

7. RUSA LEPIDA. THE LITTLE RUSA.

“Reddish brown; back and sides varied with pale, spotted hair; vent disk small, white, black edged above; tail longly hairy, white, above black; face brown, with a roundish white spot in front of the

usual oval black spot ; horns smooth, slender, nearly straight, elongate, the basal snag bent down on the forehead."—*Sundevall*.

Cervus (Hippelaphus) lepida, Sundev. Pecora, 57.—*Rusa lepida*, Gray, Knows. Menag. 63.

Inhabits Java. Mus. Frankfort. Scarcely as large as a Roebuck.

8. AXIS, H. Smith ; *Hippelaphus****, Sundev.

Covered with moderately thick, polished hairs ; fulvous and beautifully white spotted at all seasons ; the face is elongate, narrow, and the ears large, rather elongate and acute, with a rather elongate tail, and nearly equally long, slender legs ; the horns are placed on moderately long peduncles ; the skull is elongate, narrow, with an oblong, rather small, deep suborbital pit.

1. AXIS MACULATA. The AXIS or CHILTRA.

Fulvous, with a black dorsal streak, edged with a series of white spots ; sides with many white spots in an oblique curved line, and with a short white streak obliquely across the haunches.

Young fawn, spotted exactly like the adult.

Axis, Plin. ? ; Buffon, H. N. xi. t. 38, 39 ; Cuvier, Menag. Mus. t. ; Oss. Foss. iv. 38. t. 5. f. 24, 29.—*Cervus Axis*, Erxl. ; Schreb. t. 250 ; Bennett, Gard. Zool. Soc. 253 ; Sundev. Pecora, 57.—*Axis maculata*, Gray, Cat. Mamm. B. M. 178.—*A. major*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914.—*A. minor*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914.—*A. medius*, Hodgson, Icon. ined.—*Cervus pseudaxis*, Gervais, Voy. Bonite, 64. t. 12 ; Institute, 1841, 419 ; Sundev. Pecora, 57.—*C. Axis Ceylonensis*, H. Smith.

Var. Blackish. *Cervus nudipalpebra*, Ogilby, P. Z. S. 1831, 136 ; Sundev. Pecora, 57. 131.

Inhabits India.

The horns of this species vary greatly in size. Pennant describes two Deer under the names of 1. *Greater Axis*, Pennant, Syn. 52 ; Quad. 106 = *Cervus Axis* γ , Gmelin ; 2. *Middle-sized Axis*, Pennant, Quad. 106 = *Cervus Axis* β , Gmelin, from the horns alone : these are probably only large-horned examples of the common species ; 3. *C. pseudaxis*, which has been regarded as a species of *Rusa*, is only a small-horned variety.

9. HYELAPHUS, Sundev. ; *Axis*, sp. H. Smith.

Covered with moderately thick, polished hair ; fulvous, and spotted in the summer ; with a rather elongated tail, and rather short legs, the front being rather the shortest ; the face is short, broad, and arched in front ; the ears short and rounded ; the horns are placed on moderately long peduncles.

1. HYELAPHUS PORCINUS. The LUGNA PARA or SHGORIAH.

Brown or yellowish brown, with an indistinct darker dorsal streak, and with obscure whitish spots, but without any white streak on the sides or haunches ; in the winter brown and spotless ; front of face

and legs darker; line down the front and the inside of the thighs white.

Porcine Deer, Pennant, Syn. 42. t. 8. f. 2.—*Cerf Cochon*, Buffon, Supp. iii. 122. t. 18 (in summer).—*Cervus porcinus*, Zimmerm.; Schreb. t. 251; F. Cuvier, Mamm. Lithog. t. .—*Hyelaphus porcinus*, Sundev. Pecora, 58; Gray, Knows. Menag. 64. t. 42; Cat. Ost. B. M. 67.—*Axis porcinus*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914; Gray, Cat. Hodgson's Coll. B. M. 33.—*Cervus niger*, Hamilton, Icon. ined.; Blainv. Bull. Soc. Philom. 1816, 76; Fischer, Syn. 454; Sundev. Pecora, 60. 132.

Inhabits India.

Easily known from the *Axis* by being lower on its legs, and there is no distinct black dorsal streak, nor white streak on haunches; the tail bushy, and often carried erect: the males and females in summer are reddish brown, with numerous white spots, the middle of the back rather darker; in winter the whole fur becomes blackish brown, and the spots disappear: the horns are generally short, with only short snags or branches, but they are sometimes as large as those of the *Axis Deer*.

10. CERVULUS, Blainv. 1816; *Muntjacus*, Gray, 1821;
Stylocerus, H. Smith; *Prox*, Ogilby, Sundev.

Horns on elongated pedicels, supported by longitudinal ridges on the face, which have a naked, moist groove on their side; the canine teeth are exerted; the tear-bags are large and deep; the tail elongate and tufted; the hoofs triangular, and partly united in front by a web; the false hoofs are small and transverse; they are covered with thin shining hair, and are not spotted; they have no tuft of hair on the hind-legs; skull with a very large, deep, nearly hemispherical suborbital pit.

1. CERVULUS VAGINALIS. The KIJANG or MUNTJAC.

Dark reddish brown; narrow streak on the front edge of the thigh white.

Kijang, Marsden, Sumatra, 94.—*Cervus Muntjac*, Zimm. Schreb. t. 254; Horsfield, Java, vi. t. 1; Raffles, Mem. 645.—*Prox Muntjac*, Sundev. Pecora, 61.—*Cervus vaginalis*, Bodd, Elenc. i. 136.—*C. subcornutus*, Blainv. Schreb. t. 254 B. f. 2.—*Muntjacus vaginalis*, Gray, Cat. Mamm. B. M. 173.—*Cervus aureus*, H. Smith, G. A. K. iv. 148. t. . v. 805.—*Ribbed-face Deer*, Penn.—*Chevreuil des Indes*, Allam, Buff. Supp. v. 41. t. 17, vi. 195. t. 26; Cuvier, Oss. Foss. iv. t. 5. f. 48, t. 3. f. 49, 54.—*Cervulus vaginalis*, Gray, Knows. Menag. 65.

Inhabits Sumatra; Java.

This chiefly differs from the following in being darker-coloured.

2. CERVULUS MOSCHATUS. The KEGAN or KAKER.

Bright reddish yellow; streak on front of thigh and under part of the tail white; chin and gullet whitish; hair not ringed.

Var. With a triangular white spot on each side of the chest.

Musk Deer of Nepal, Ouseley, Orient. Collect. ii. t. .—*Cervulus*

moschatus, Blainv. Bull. Soc. Phil. 1816, 77; Schreb. t. 254 B. f. 1; H. Smith, G. A. K. iv. 149. t. . v. 806.—*Cervus moschus*, Desm. Mamm. 441.—*C. Ratwa*, Hodgson, Journ. Asiat. Soc. Bengal, i. 146. t. head; P. Z. S. 1834, 99; Royle, Flora Cashm. t. 5. f. 2.—*Stylocerus Ratwah*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914.—*Muntjacus vaginalis*, part, Gray, Cat. Hodgson's Coll. B. M. 31.—*Prox Ratwa*, Sundev. Pecora, 62.—*P. albipes*, Wagner, Suppl.; Sundev. Pecora, 62.—*P. stylocerus*, Wagner, Suppl.; Sundev. Pecora, 62, 64.—*Cervus melas*, Ogilby.—*Prox melas*, Sundev. Pecora, 62.—*Cervulus moschatus*, Gray, Knows. Menag. 65.

Inhabits India, Nepal.

3. CERVULUS REEVESII. The CHINESE MUNTJAC.

Greyish brown; hair short, paler ringed.

Cervus Reevesii, Ogilby, P. Z. S. 1838, 105.—*Prox Reevesii*, Wagner, Sundev. Pecora, 62.—*Cervulus Reevesii*, Gray, Knows. Men. 65. Inhabits China.

Mr. Ogilby observes, this species has a longer head and tail than the Common Indian Muntjac, also less red and more blue in the general shades of colouring, and is readily distinguished by the want of the white over the hoofs, which is so apparent in its congeners. The fawn is spotted.

The Earl of Derby has these three kinds at Knowsley; but they breed together, and it has hence become impossible to discriminate the mules from the original species.

e. The CAPREOLINE DEER or ROES have rugose, very shortly peduncled horns, without any basal snag or branch; the first branch arising some distance above the crown or burr; the upper part is more or less branched; the muffle is broad and naked; the suborbital gland and the pit in the skull are very small and shallow, except in *C. Pudu*. Some species have a distinct tuft of hair on the outer side of the metatarsus, and more have the pencil of hair on the inner side of the hock, and others are without either; indeed in some specimens of the same species the tuft of hair on the hinder legs is very visible, in others very indistinctly or not at all seen.

11. CAPREOLUS, H. Smith; *Capræa*, Ogilby.

Horns nearly erect, small, cylindrical, slightly branched, with a very short peduncle; they have no tail, but a large, white anal disk, a very indistinct tear-bag, and narrow triangular hoofs; the tuft on the hind-legs rather above the middle of the metatarsus; they are covered with thick brittle hair in winter, and thinner and more flexible hair in the summer; the adults are not spotted, and have a black spot at the angle of the mouth; the skull has a very small, shallow suborbital pit. Found in Europe and North Asia.

1. CAPREOLUS CAPRÆA. The ROEBUCK.

Inside of the ears fulvous; summer, red brown; winter, olive, pale punctated; horns short.

Capræa, Plin.; Gesner.—*Caprcolus*, Brisson.—*Cervus capreolus*,

Linn.; Pallas, Zool. Ross. A. i. 219.—*Capreolus Capræa*, Gray, Cat. Osteol. B. M. 64.—*Capreolus Europæus*, Sundev. Pecora, 61.—*Roe Buck*, Penn.—*Chevreuil* and *Chevrette*, Buffon, H. N. vi. 198.

Inhabits Europe. A larger variety is said to have formerly inhabited the Tyrol.

2. CAPREOLUS PYGARGUS. The AHU.

Interior of the ears fulvous; fur pale yellowish; horns elongate.

Cervus pygargus, Pallas, Reise, i. 97, 198, 433. ii. 159; Spic. xii. 7 (not Hardwicke); Schreb. Saugth. v. t. 253.—*C. capreolus* β , Pallas, Zool. Ross. Asiat. i. 219.—*Cervus Ahu*, Gmelin, Reis. iii. 496. t. 56; Griffith, A. K. iv. 122. t. —*Capreolus pygargus*, Sundev. Pecora, 61.—*Tailless Deer*, Pennant, Quad. i. 121.—*Tailless Roe*, Shaw.

Inhabits Central Asia. Collection of the British Museum.

12. FURCIFER, part. Wagner, Sundev.; *Mazama*, part. Gray, H. Smith; *Hippocamelus*, Leuckart, 1816; *Cerqueus*, Lesson; *Capreolus*? Gray.

Horns erect, forked, without any basal snag; ears narrow, acute; a short tail; covered with thick, brittle, waved hairs; there is a distinct pencil of hairs on the inside of the hock, but none on the outer sides of the metatarsus. Confined to South America. Differs from *Capreolus* in the want of the outer tuft on the leg.

1. FURCIFER ANTISIENSIS. The TARUSH or TARUGA.

Yellow grey; hairs rigid, quilled, brown, with a yellow subterminal ring; edge of muffle and throat white; face with a brown longitudinal streak, and a lyrate band between the eyes; the hoofs rather broad, worn in front.

Cervus Antisiensis, D'Orbigny, Voy. Amer. Merid. t. f. ; Dict. Univ. H. N. iii. 328; Tschudi, Faun. Peru, t. 18; Sundev. Pecora, 60.

Inhabits East coast of S. America; Bolivian Alps.

2. FURCIFER HUAMEL. The GEMUL.

Fur dark, closely yellow punctated; inside of the ears white.

Equus bisulcus, Molina, Chili, 520; Fischer, Syn. Mamm. 430.—*Auchenia Huamel*, H. Smith, G. A. K. v. 764.—*Cervus Chilensis*, Gay et Gervais, Ann. Sci. Nat. 1846, 91.—*Cloven-footed Horse*, Shaw, Zool. ii. 441.—*Guemul*, Chilians.—*Gemuel* seu *Huemul*, Vidaure, Chili, iv. 87.—*Camelus equinus*, Triverianus, Mus. Biol. ii. 179.—*Hippocamelus dubius*, Leuckart de Equo bisulco, 24. 1816.—*Cerqueus andicus*, Lesson, Nov. Tab. R. A. 173.—*Cervus (Capreolus) leucotis*, Gray, P. Z. S. 1849, 64. t. 12.—*Capreolus? Huamel*, Gray, Knows. Menag. 66.

Inhabits mountains on East coast of South America. Patagonia.

The female Gemul in the British Museum and in Lord Derby's Museum at Knowsley is considerably larger, and has the legs thicker, than the Siberian *Ahu*, which is much larger than the European Roe Buck.

MM. Gay and Gervais, who have compared the two species, consider them distinct.

13. **BLASTOCERUS**, Wagner, Sundev.; *Mazama*, sp. II. Smith;
Furcifer, part. Wagner and Sundevall.

Horns straight, erect, three-branched, without any basal snag; a very short tail, and rather large ears; are covered with very thin soft hair; they have a distinct pencil of hairs on the inside of the hock, but none on the outside of the metatarsus. Confined to Tropical America, east and west coasts.

1. **BLASTOCERUS PALUDOSUS**. The **GUAZU-PUCO**.

Fulvous; orbit, sides of muzzle, belly and under side of tail white; face-marks and feet blackish.

Cervus paludosus, Desm. Mamm. 443; H. Smith, iv. 134. t. . v. 796; Fischer, Syn. 444, 616; Licht. Darst. t. 17; Sundev. Pecora, 59.—*C. palustris*, Desmoul. Dict. Class. H. N. iii. 379.—*Cervus dichotomus* (*Guatzupucu*), Illiger, Abhand. Akad. d. W. 1804-1811, 117; Pr. Max. Neuw. Isis, 1821, 650. t. 6.—*Blastocercus paludosus*, Gray, Knows. Menag. 68.

Var.? *Mazama furcata*, Gray, Cat. Osteol. B. M. 64.

Inhabits the Brazils.

2. **BLASTOCERUS CAMPESTRIS**. The **MAZAME** or **GUAZUTI**.

Fulvous brown; the hairs of the lower part of the nape and front of the back reversed; the hoofs narrow. Young: middle of back not spotted; sides with small white spots, the upper series forming a regular line.

Mazame, Hernandez, Mex.; Buffon, H. N. xii. 317.—*Veado branco*, *Veado campo*, Anchieta, Notic. i. 127.—*Cervus bezoarticus*, Linn. S. N. ed. 10. 67.—*C. campestris*, F. Cuvier, Dict. Sci. Nat. vii. 484?; Cuvier, Oss. Foss. iv. 51. t. 3. f. 46, 47.—*C. campestris*, Licht. Darst. t. 19; Pr. Max. Abbild. t. . ; Darwin, Zool. Beagle, 29. fig. horns; H. Smith, G. A. K. iv. 136. t. . v. 797.—*C. leucogaster*, Goldfuss, Schreb. Saugth. 1127.—*Mazama campestris*, H. Smith; Gray, Cat. Osteol. B. M. 64.—*Biche de Savanne*, Buffon, Supp. iii. 126.—*Gouazouti*, Azara, Essai, i. 77.—*Furcifer campestris*, Gray, Knows. Menag. 68.

Inhabits S. America; N. Patagonia. Collection of British Museum.

The figure of *C. campestris* in F. Cuvier, Mamm. Lithog., is evidently a *Cariacus*, and not of this genus. The horns from Brazils figured by Cuvier (Oss. Foss. iv. t. 3. f. 48) appear to belong to quite a different species. It may be the variety of the Roebuck, figured in Griffith, A. K. iv. t. 164. f. 6.

14. **CARIACUS**, Gray; *Mazama*, Sundev.; *Mazama*, part. H. Smith.

Horns cylindrical, arched, with a central, internal snag, the tip bent forwards, and with the lower branches on the hinder edge; they are covered with soft thin hair, have a moderate tail furnished with long hair on the under side, a white anal disk, rather elongated, large, rounded ears; they generally have a tuft of white hair on the outer side of the hind-leg, rather below the middle of the metacarpus,

but it is sometimes not to be seen; the skull has a very small, shallow, suborbital pit, and the nasal bone is broad and subtriangular behind; the tail is elongate, slender, pale, with the lower part dark, and reaching nearly to the hocks in summer; much shorter and broader, and all dark olive in the winter. Confined to North America.

* *Hoofs narrow, elongate; tail hairy beneath.*

1. **CARIACUS VIRGINIANUS.** THE AMERICAN DEER.

Bright fulvous in summer, greyer in winter; tail fulvous above, the tip black, beneath white; carried erect when running; nose brown; side of mouth white, with an oblique black band from the nostrils; hoofs narrow, elongate.

Dama Virginiana, Raii Syn. 86.—*Fallow Deer*, Lawson, Carol. 23; Catesby, Carol. App. 28.—*Cervus Dama Americanus*, Erxl. Syst. 312.—*Cervus Mexicanus*, Licht. Darstell. t. 20.—*Cervus Strongyloceros*, part, Schreb. Saugth. 1074, not figure.—*Cervus campestris* (*Mazama*), F. Cuv. Mam. Lithog. t. .—*Cervus Virginianus*, Gmelin, S. N. i. 179; Desm. Mamm. 442; F. Cuvier, Mam. Lithog. t. 205.—*C. Mangivorus*, Schrank, Ann. Wetter. i. 327, 1819, from Buffon.—*C. (Mazama) Virginiana*, Bennett, Gard. Z. S. 205; Fischer, Syn. 449; Peale, U. S. Explor. Exped. 39; Sundeval, Pecora, 58.—*Cervus leucurus*, *Long-tailed Deer*, Douglas, Zool. Journ. xv. 330; Richardson, Faun. Bor. Amer. i. 258.—*C. Mazama leucurus*, Sundeval, Pecora, 59.—*Cariacus Virginianus*, *C. leucurus*, and *C. Mexicanus*, Gray, Cat. Osteol. B. M. 63, 64.—*Virginian Deer*, Penn. Syn. 51. t. 9. f. 2; Quad. i. 104. t. 11. f. 1.—*Cerf de La Louisiane*, Cuvier, R. A. i. 256; Oss. Foss. iv. 33. t. 5. f. 1-5.—*Chevreuil*, Charlev. Nouv. Fran. iii. 152.—*Cariacou*, Buffon, H. N. xiii. 347. t. 44.—*Cariacus Virginianus*, Gray, Knows. Menag. 66. t. 46, winter coat.

Inhabits N. America.

Mr. Peale observes,—“We believe that the same species of Deer inhabits all the timbered or partially timbered country between the Coast of the Atlantic and Pacific Oceans. They vary in size, as all the animals of this genus do, in different feeding-grounds, but they are specifically the same.” The Mexican Deer (Penn. Syn. 54. t. 9. f. 3, and Quad. i. 20), *Cervus Mexicanus* (Gmelin, S. N. i. 179; H. Smith, G. A. K. v. 729, iv. 130. t. ; Cuvier, Oss. Foss. iv. t. 5. f. 23), *Cervus ramosicornis* (Blainville), are all described from horns, which only appear to be much-developed horns of this species which have belonged to some well-fed animals.

The horns described and figured as *C. clavatus* (H. Smith, G. A. K. iv. 132. t.), appear to be only varieties of the common form.

1. The *Cervus Mexicanus* (Lichten. Darst. t. 20; Sundeval, Pecora, 59),
2. The *Cervus nemoralis* (H. Smith, G. A. K. iv. 157. t. ; Sundeval, Pecora, 59),
3. The *Cervus gymnotis* (Wiegmann, Isis, 1833; Sundeval, Pecora, 59),

all from Mexico, appear to be varieties of this species. *C. Mexicanus*

is said to have a brown tail and indistinct chin-band. The nakedness of the ears, which is peculiar to *C. gymnotis*, is often to be observed in these animals when in change of fur. *C. spinosus*, Gay and Gervais, is only known from a single horn from Cayenne.

2. CARIACUS LEWISII. The BLACK-TAILED DEER.

The tail black above towards the extremity, yellowish white beneath, covered with hair at all seasons, not carried erect when running; fulvous (in summer); hair very soft, not ringed; forehead and upper part of face before the eyes blackish; inside of the legs and belly white; chin-band distinct, black; front hoofs narrow, elongate. Horns like *C. Virginianus*, but generally more slender, and commonly without the first antler.

Black-tailed Deer, Anglo-American in Oregon.—*Black-tailed Fallow Deer*, Lewis and Clerk, Travels to the Pacific, ii. 26, 125 (London edit. 1807).—*Cervus macrotis* β . *Colombiana*, Richardson, Fauna Bor. Amer. i. 257.—*Long-tailed Deer (Cervus macrourus)*, H. Smith, G. A. K. iv. 134, v. 795, part; Fischer, Syn. 615.—*Cervus Lewisii*, J. Peale, U. S. Explor. Exped. 39. t. 9, ined. fig. at p. 43, fore-foot; Gray, Knows. Menag. 67. t. 44, in summer, t. 45, in winter fur.

Inhabits N.W. Coast of N. America.

3. CARIACUS PUNCTULATUS. The CALIFORNIAN ROE.

(Mammalia, Pl. XXVIII.)

Dark reddish brown (in summer), minutely punctulated by the yellow tips of the hair; chin-mark distinct; ears elongated, nakedish; base of the ears, orbits, round the muzzle, under side of tail, and the upper part of the inside of the leg, white; forehead, line down the face, and narrow streak on upper part of the nape black; legs brown; a very narrow, indistinct streak on the middle line of the rump yellowish; tail like back, with a blackish tip.

Inhabits California.

There is a female of this species in the Zoological Gardens. It is much smaller than the Black-tailed Deer, and darker than *C. Virginianus*, and it differs in the hair being dark, with a distinct yellow subterminal band.

** *The front hoof broad cordate; tail not hairy beneath.*

4. CARIACUS MACROTIS. The MULE DEER.

Brownish fulvous; chin without any or only an indistinct band; tail pale ferruginous, with a black tuft at the end, and without any hair beneath; ears very large; hoofs of the fore-feet broad cordate, nearly as broad as long, flattened and concave beneath; horns larger and more spreading than in *C. Virginianus*.

Mule Deer, Anglo-Americans of the Rocky Mountains.—? *Mule or Black-tailed Deer*, Le Raye; Lewis and Clerk, Travels; Wied, Voy. Amer. Merid. iii. 273, and Vig. A, B.—*Cervus macrotis*, Say, Long, Exped. Rocky Mount. ii. 88; H. Smith, G. A. K. v. 794; Fischer,

Syn. 444, 615 ; Sundeval, Pecora, 59 ; Richardson, Faun. Bor. Amer. 254. t. 20 ; Peale, U. S. Expl. Exped. 41. t. 10 (ined.), fig. at p. 43, fore-feet ; Gray, Knows. Menag. 67.—*C. auritus*, Desm. Dict. Class. H. N. iii. 379.

Inhabits N.W. America ; Arakansa.

We have several skulls of this genus in the British Museum, which offer very distinct characters, but unfortunately, not having the skins belonging to them, we cannot identify with certainty the species to which they belong.

These skulls vary considerably in width and comparative length of the face, and in the extent and depth of the suborbital pit ; in some, which are probably the skulls of the *Black-tailed Deer* as they come from the north-west coast, the pit is very large and deep ; and thirdly, in the extent of the intermaxillary lines. In some they scarcely reach to the nasal ; in others they reach to it and are united to it by a rather broad suture ; and in others they do not nearly reach to it, but stop abruptly, ending in a notch in the front upper edge of the maxillary.

There is imported by the North Western American Fur Company the flat skin of two Deer which probably belong to this genus, and appear distinct from the preceding : 1. The *Orenoka Deer* (of the Company's list). It came from Central America, is of a large size, of a bright red-brown colour, with the hair of the back short and rather adpressed, the chin and under part of the body white, the tail blackish ; 2. The *Yucatan Deer*, about the size of the *American Deer* (*C. Virginianus*), but very distinct from the skin of that species in the same store ; the fur is short red brown with blackish tips.

15. COASSUS, Gray ; *Subulo*, H. Smith, Sundeval.

Horns simple, rudimentary, shelving back ; ears rather short, broad, rounded ; tail short ; the facial line rather convex ; the fur short, of the forehead (in both sexes) elongate, forming a rhombic tuft between the horns and face ; legs without any tuft on the outside of the metatarsus, but with a pencil on the inside of the hocks. Confined to Tropical or South America.

* *Ears nakedish ; skull with a very small, shallow, suborbital pit ; supraorbital foramens in a groove.* East coast of America.
Coassus.

1. COASSUS NEMORIVAGUS. The CUGUACU-APARA.

(Mammalia, Pl. XXII. XXIII. XXVII. f. 1, 3, 5.)

Pale brown ; the hair dull-coloured, brown, with a yellow subterminal band which wears off ; a paler streak over the eyes. Young : brown, white spotted ; spots of sides unequal ; nape dark. Skull elongate, suborbital pit broad, subtrigonal shallow ; grinders moderate, infra-orbital ridge very distinct, sharp-edged. The intermaxillaries do not reach to the nasal but fit into a notch in the maxilla.

Cervus nemorivagus, F. Cuvier, Dict. Sci. Nat. vii. 485 ; Cuvier, Oss. Foss. iv. 54. t. 5. f. 50 ; Fischer, Syn. 446, 618 ; H. Smith, G. A. K. iv. 142. t. ; Sunder. Pecora, 60 ; Licht. Darstel. t. 21.—



J. Wolf del.

Hanhart imp.

CASSUS NEMORIVAGUS. ♀



J. Wolf del.

M. & T. Harbart, Imp.

COASSUS RUFUS.



J. Wolf lith.

M. A. H. Hanhart del.

1, 3, 5. COASSUS NEMORIVAGUS.

2. COASSUS RUPUS.

4. COASSUS SUPERCILIARIS.

6. COASSUS AURITUS.

Coassus nemorivagus, Gray, Cat. Osteol. B. M. 64; Knows. Menag. 68. t. 48.—*Cervus nemorum*, Desm. Mam. 446.—*C. simplicicornis*, Illiger, Pr. Max. Abbild. t. .—Young? *Moschus delicatula*, Shaw, Mus. Lever. t. 36.

Inhabits Brazils.

A male specimen at Knowsley Menagerie, drawn by Mr. Wolf in Nov. 1850 (Pl. XXII.), was dark brown; streak on each side of the forehead, upper part of the legs and spot on the angles of the lower lip blackish; streak over each eye yellowish; under lip and spot on upper lip near muffle, underside of the tail and inner side of the upper part of the thighs white; muffle smooth, bluish, upper edge slightly arched; ears small, lower half of the inner side black.

This male was the size of a full-grown Roebuck, as is the largest of the genus in the Menagerie.

There is a female at Knowsley (Pl. XXIII. and XXVII. f. 3), drawn by Mr. Wolf in November 1850, which is probably a young female of this species. Mr. Fraser thus described it: "A female: dark grey, tinged with brown, greyer on the head and neck; the lower part, and the inside of legs, the belly and round the eyes rust-coloured; the purple brown patch in the ears smaller and less distinct than *C. rufus*. A small white stripe in front of the eyes and the under surface of the tail white; from the eyes to the nose short and thick compared with the other specimens."

2. COASSUS RUFUS. The CUGUACU-ETE OF PITA.

(Mammalia, Pl. XXIV. XXVII. f. 2.)

The fur bright shining red; crown and neck grey; sides of face and chest paler. Young: reddish, white spotted, spots of side unequal; nape with a distinct white-edged dark central streak; the muffle carunculated, rather angularly produced above.

Var. With white rings above the hoofs.

Cervus rufus, F. Cuvier, Dict. Sci. Nat. vii. 485; Cuvier, Oss. Foss. iv. 53. t. 3. f. 41, 42, t. 5. f. 44; H. Smith, G. A. K. iv. 140. t. .; Pr. Max. Abbild. t. .; Fischer, Syn. 446, 618; Licht. Darst. t. 20; Sundeval, Pecora, 60.—*Cervus simplicicornis* (*Apara* β.), H. Smith, G. A. K. iv. 141. t. .—*C. dolichurus*, Wagner, Supp. iv. 389.—*Cariacou de la Guyane*, Buffon, ix. 90.—*Biche rouge*, Buffon, Supp. iii. 126.—*Gouazou pita*, Azara.—*Coassus rufus*, Gray, Knows. Men. 69. t. 47.

Inhabits S. America.

The males cast their horns in the month of September, and they are very shortly replaced by a new pair.

Mr. Fraser has kindly sent me the following description of the female at Knowsley, figured by Mr. Wolf in November 1850 (Pl. XXIV.): "A female: light red brown, neck and head greyer; darker grey on the hocks and upper part of the fore legs; the forehead with one black stripe on each side a grey one in the centre, which leaves two brown yellow stripes on each side; ears with a purplish brown patch of about a third of the whole extent inside; the muffle is carunculated as figured Pl. XXVII. f. 2, of a purplish hue."

No. CCXVI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

3. COASSUS SUPERCILIARIS. The EYEBROWED BROCKET.

(Mammalia, Pl. XXV. XXVII. f. 4.)

Bright shining red; neck and head grey; forehead darker; hocks and front of the fore legs grey; stripe in front of the eye and under-surface of the tail white; muffle deeply arched above; ears moderate.

Coassus superciliaris, Gray, Gleanings Knows. Menag. t. 48.

Inhabits the Brazils. Para.

This species chiefly differs from the former in the form of the muffle and in the presence of the white streak over the eyes. There is a male at Knowsley, and formerly there was a female in the Gardens of the Society.

4. COASSUS AURITUS. LARGE-EARED BROCKET.

(Mammalia, Pl. XXVI. XXVII. f. 6.)

Bright pale red brown; head and neck grey; orbits pale brownish; spot on side of upper lip, chin, belly, hinder side of fore and front side of hinder thighs and under side of tail, white; crown dark grey brown; ears very large, broad, acute, more than half the length of the head, with two lines of hairs in them.

Inhabits the Brazils.

There is a female of this species in the Gardens of the Society; it greatly resembles the Indian *Muntjac* in the distribution of its colour.

In the British Museum there are two skulls which belong to these species. They have the face shorter and thicker than the skull of *C. nemorivagus*, the nasals are wider behind; the suborbital pit small or less impressed, and the grinder larger.

The first belongs to a young specimen in the Museum Collection, apparently of *C. rufus*. It has a small slightly impressed pit just in front of the edge of the orbit. The second belongs to a more adult female, sent, without the skin, from Para by Mr. Reginald Graham; it is considerably larger than the preceding, and there is scarcely any visible impression in front of the orbit, only a slight concavity of the general surface. This skull exactly resembles that of *C. superciliaris*, which was in the Zoological Society's Gardens.

** *Ears thickly covered with short hairs; skull with a very deep oblong suborbital pit; face short; grinders large.* West coast of America. *Pudu*.

5. COASSUS PUDU. The VENADA.

Fur rufous, blackish in front and darker behind, and on the forehead and lower part of the leg; hairs ringed, of cheeks and neck greyish, of forehead and ears bright rufous; ears short; tail very short.

Cervus humilis, Bennett, P. Z. S. 1831, 27. fem.; Sundev. Pecora, 60.—*C. rufus*, Wagner, Supp. iv.—*Capra Pudu*, Molina.—*Chevrevil*, Poepfig, Froriep's Notiz. 1829; Férussac, Bull. Sci. xix. 95.—*Cervus Pudu*, Gervais, Ann. Sci. Nat. 1846, 90.—*Antilope (Mazama) Temmamazama*, H. Smith, G. A. K. iv. 291?

Inhabits Chili; Conception and Chiloe (*King*). Brit. Museum.



J Wolf Lith

M A N Hanhart Imp

COASSUS SUPERCILIARIS.



F. Wolf, Lith.

G. E. Hebert, Imp.

COASSUS ACUTUS, Gray

3. ON THE HABITS OF *HELIX LACTEA*.

BY J. S. GASKOIN, F.Z.S. ETC.

As all facts relating to animated nature, elucidating the habits and powers of living creatures, however low their station in the scale of creation, must be interesting and instructive, I do not hesitate to place before the Zoological Society a few observations I have been enabled to make on some individuals of the genus *Helix*. In April 1849, I purchased four or five specimens of *Helix lactea* (African), and placed them in water to be cleaned for my cabinet; one, some hour or two after immersion, resuscitated, and escaped from the vessel. These specimens were selected from a great many others, all of which had been together in a dry dusty drawer in the dealer's shop for more than two years, and had been imported by a merchant of Mogadore, in whose possession they had remained, in a similar condition, for a still longer period. The test of submersion in water was afterwards practised on the whole stock of the dealer, and none reviving, it was concluded all were dead. I placed the living stranger under a large glass bell on a tub of earth, and it lived well on cucumbers and the outside leaves of cabbages, &c., quite alone, until the end of the following October, when I discovered about thirty minute black helices, not the twenty-fifth of an inch in diameter, crawling on the inside of the glass, on the mould, &c. At first I had doubts as to their origin, but with growth the markings and form of my African captive being approached, the point was no longer to be mistaken. Some of these are now (October 30, 1850) nearly as large as the parent, which measures $1\frac{5}{8}$ inch across the long diameter of the aperture, although the lip in no instance has begun to evert; thus twelve months have not sufficed to attain the adult state. Now as the *Helix* is known to be bi-sexual, and not hermaphrodite, it follows that in this instance impregnation or conception must have occurred prior to the capture of the animal, after which it fell into a state of suspended animation, and is traced to have remained so for more than four years; and we know nothing of the time it may have remained in the hands of the native gatherer before he took his collectings to the town dealer for sale; and I see no reason why, vitality having been latent for so lengthened a period, it might not have continued so almost indefinitely, and on the restoration of animation all the functions of the system resumed at once their natural powers: and what is most remarkable, utero-gestation resumed its process to accomplish the period, from the time it had been arrested, as though no circumstance had suspended the operation, and the time destined by Nature for its completion. I conclude the *Helix* to be unsusceptible of prospective fecundation, that is, one communication of the sexes being sufficient for more than one conception, or there would probably before this time have been another brood of young ones, as the parent is still living and flourishing.

To render this paper more perfect, I will add a few other examples relating to the same subject. Dr. Baird has recorded in the 'Annals of Natural History' for July last, the circumstance of an Egyptian *Helix*, the "Snail of the Desert," the *Helix maculosa* of De Férussac, having remained gummed to a tablet in a show-case of the British

Museum during four years, when the existence of an apparently recently formed epiphragm being observed, it was removed from the tablet and placed in tepid water, and in a short time crawled away. It fed on cabbage-leaf, and began very soon the completion of a repair of the aperture of its shell, which had been broken prior to its capture, the suspension of animation having arrested the execution of the work. It resuscitated on the 15th of March last, but has shown neither signs nor result of fecundation, although still living.

I am indebted to Mr. T. Vernon Wollaston (who interspersed his entomological pursuits, during a two seasons' residence on the island, with a no less fruitful and valuable research in terrestrial conchology) for several species of living mollusks, principally *Helices*, indigenous to Madeira and its adjacent rocks: all these had lain in a box in dry canvas bags for a year and a half, and had been restored to vitality by placing them in water. They were put under glass shades, on flower-pots filled with mould, or in large glass cases, and all fed well. Three individuals of the *Helix undata* of Lowe, within forty hours, deposited more than two hundred small, white, semipellucid pearl-like eggs, which, on exposure to the air, soon became of an opaque white; not in a covering, nor agglutinated, but together, loose in the earth. One portion or nidus, about sixty in number, I immediately restored to their situation, about three-quarters of an inch below the surface, covering them with mould, hoping therefrom to learn the period of incubation. The parents burrowed their heads and bodies into the earth, remaining in that position some twenty or thirty hours, or forced themselves, shell and all, below the turf, and so deposited their ova. Other species have also produced eggs.

Curious and instructive as these facts may be, perhaps the continuance of the vital principle in mollusks removed from their native element may seem still more so, especially in the case of a bivalve, which has so much less perfectly the power of excluding the influence of atmospheric air on its animal substance; yet the latency of animation is a quality obviously necessary for the inhabitants of ponds and other shallows, which of course at certain seasons are liable to be dried, or the existence of the species would soon become extinct. An *Unio*, which lives in ponds, and much resembles the British species, *Unio tumidus* of Retzius, but is somewhat higher and shorter, was packed up by the Rev. Robert King, on the 26th of January 1849, at Wide Bay in Australia, having been enclosed in a dry drawer for 231 days, but was first submitted to the test of water, when its valves opened and it was alive. On its arrival at Southampton about the latter end of June 1850, 498 days after it had been taken from the pond, Mr. Newnham, to whom it was consigned, in consequence of what Mr. King had written, a second time placed it in water, when it expanded its valves and was living. It was then forwarded, *inter alia*, to the British Museum, and is restored to its element with full vital powers, in the care of Dr. Baird of that establishment, to whom I am indebted for this relation.

I have now living, the *Helix Fraseri*, Australia; *H. lactea*, Africa; *H. turricula*, Madeira; *H. laciniosa*, Madeira; *H. undata*, Madeira; *H. tectiformis*, Madeira; and the *Carocolla Wollastoni*, Madeira.





1858

M & N Hanhart. Imp^t

AMAZONIA DREHMANI (Linn.)





M & H Hanhart Imp.

PALAEORNIS ERYTHROGENYS. Fraser.

J. Wolf Lith.

4. ON NEW BIRDS IN THE COLLECTION AT KNOWSLEY. BY MR. LOUIS FRASER. IN A LETTER TO THE SECRETARY.

(Aves, Pl. XXV.—XXIX.)

Knowsley Hall, November 11, 1850.

SIR,—Having received a notification, through Lord Derby, of my appointment to the Consulship at Whydah, my stay in England is necessarily drawing to a close. I have endeavoured to meet your wishes by forwarding a few brief descriptions from novelties contained in this extraordinary Collection, and with his lordship's permission I forward the original drawings made by Mr. Wolf, who has been engaged here for some considerable time.

I have the honour to be, Sir,

Your obedient servant,

LOUIS FRASER.

D. W. Mitchell, Esq., Sec. Zool. Soc. Lond.

The first specimen to which I would wish to draw the attention of the Society is a Parrakeet of large size, which I propose calling

PALÆORNIS DERBIANUS. (Aves, Pl. XXV.)

Forehead, round the nostrils, a small stripe from the nostrils to the eyes, and a broad moustache, black; head, towards the bill and round the eyes, green, passing into a light violet-blue on the occiput and ear-coverts; the remaining upper parts of the bird, the thighs, vent and under tail-coverts green, being more yellow on the back of the neck and centre of the wings; the shafts of the two centre tail-feathers dark purplish brown, with their webs, towards the apex, blue; from the hinder part of the ears, down the side of the neck, and behind the moustache, runs a narrow line of light rose-coloured purple, which colour extends over the whole under surface; the under side of the tail-feathers greyish yellow; bill black; feet the usual parrakeet colour; eyes pale straw-colour.

Length from base of beak to tip of tail, 20 inches.

Curve of upper mandible. $1\frac{5}{8}$ „

Wing $8\frac{3}{8}$ „

Tail $10\frac{1}{2}$ „

Hab. —?

This specimen has been many years in this collection, and I have chosen for its specific name that of its noble owner. The species is easily distinguished from all the other members of the genus by its larger size, and the colours of the bill, head and breast.

The next bird is a second species of the same genus.

PALÆORNIS ERYTHROGENYS. (Aves, Pl. XXVI.)

Male: Green; the back, between the shoulders, mealy; cheeks and ear-coverts red, which colour passes on to the hind head, where

it meets, in a more rosy tint; moustache black; the tips of the two centre tail-feathers blue; upper mandible red, lower black; legs grey.

Length from base of bill to end of tail,	15½ inches.
Curve of upper mandible	1⅜ ,,
Wing	7½ ,,
Tail	9 ,,

Hab. — ?

This bird is nearly allied to *P. longicauda*, Bodd., but is larger; the tint on the cheeks is different; the belly and under wing-coverts are green; the primaries are not edged with blue; the centre tail-feathers are only blue for half their length; and the rump is green.

CRAX ALBERTI. (Aves, Pl. XXVII. XXVIII.)

Male: Black, with blue gloss; the lower part of the belly, vent, under tail-coverts, and the tips of the tail-feathers, white; cere beautiful azure blue; bill yellowish green horn-colour; eyes dark hazel.

Female: Red-brown; head and crest-feathers barred alternately with black and white; rump and tail barred with brown, yellow and dark brown; bill black horn-colour; eyes dark hazel.

Hab. — ?

The pair of birds from which the accompanying descriptions and figures were taken, are now living in his lordship's aviaries. A new and beautiful species of a limited family like the Curassows must be looked upon as a valuable addition to our stock of ornithological acquaintances, and deserving of a distinguished cognomen. I therefore propose to name it after Her Most Gracious Majesty's illustrious consort, His Royal Highness Prince Albert, forming at the same time a companion to my *Goura Victoriae*.

The male is at once distinguished from its nearest ally (*Crax Allector*, Linn.) by the blue cere: the female differs from all the specimens I have had an opportunity of examining by the broad bands on the tail.

PENELOPE NIGER. (Aves, Pl. XXIX.)

Male: Black, with blue, and in some lights green reflections; bill, throat (nearly naked), tarsi and feet red.

Female: Brown, with green reflections, each feather having several bars of rust-colour, the colour and markings being less distinct on the under surface of the bird.

Length from base of beak to tip of tail,	23 inches.
Gape	1½ ,,
Wing	9 ,,
Tail	11½ ,,
Tarsi	2¾ ,,

Hab. — ?

There are three specimens in this museum, two males and one female; one of the males lived in the aviaries for many years.



J. WOOD CUT.

M. & T. HARRIS DEL.

TACU ALBERTI. Fraser 3



J. Wolf. Lith.

M. & N. Hanhart. Imp.

C. RAY ALBERTI. Fraser. f.



J. Wolf del.

M. & Y. Harmer sculp.

PENELOPE NIGER, Fraser.

5. AN ACCOUNT OF FISHES DISCOVERED OR OBSERVED IN MADEIRA SINCE THE YEAR 1842*. BY THE REV. R. T. LOWE, M.A.

Family ZENIDÆ.

1. ZEUS CONCHIFER. *Lilacino-cinereus, capite inermi; thorace pinnaque dorsali analique utrinque scutatis; spinis dorsalibus anterioribus brevissime filamentosis; pinnis ventralibus 1+5-radiatis; caudali lunata.*

D. 9 v. 10 + 25 v. 26; A. 2 + (1 + 25 v. 26); P. 13; V. + 5;

- C. $\frac{1 + \overline{I. + V.}}{1 + \overline{I. + VI.}}$; M. B. 7; Vertebrae, 13 abd. + 21 caud. = 34.

An example of this very fine new Dory was communicated, with a short notice, to the Zoological Society in 1845 †. The row of large and remarkable naked bony scutellæ on each side, at the base of the dorsal and anal fins, and along the breast or ventral line, afford a very striking character. They resemble the depressed shells of a *Fissurella* seen in profile, and are beautifully radiato-striate, with a bright iridescent rose or lilac lustre, like the inside of a *Trigonia*. The umbo forms a smooth short strong spine or recurved prickle. The dark thumb-mark on the middle of the sides is present, as in *Z. Galus*, L. Three examples only have occurred, measuring from eighteen inches to a little more than two feet in length.

The supposed affinity between *Zeus* and *Oreosoma*, Cuv. ‡, is much corroborated by this fish.

2. ARGYROPELICUS OLFERSII. (*Sternoptyx Olfersii*, Cuv. R. An. (2nd edit.) ii. 316. t. 13. f. 2.)

A single example, caught with a boatscoop on the surface of the water in the Bay of Funchal, June 6, 1845.

The name of *Pleurothysis*, proposed in the 'Fishes of Madeira,' p. 64, for this portion of the Cuvierian genus *Sternoptyx*, has been anticipated by that of *Argyropelicus*, previously assigned to a Mediterranean species by the Italian naturalist Cocco, and adopted in the 'Fauna Italica' by the Prince of Canino.

I have now succeeded in obtaining both the Cuvierian species of *Sternoptyx* in this part of the Atlantic; though *St. diaphana* (Le St. d'Herman, Cuv.) cannot, like *Arg. Olfersii*, be perhaps fairly claimed at present to belong to the Madeiran fauna §.

The Atlantic and Mediterranean species of *Argyropelicus* may be thus distinguished:

ARG. OLFERSII, CUV. *...pore altiore, altitudine dimidium longitudinis (dempta pinna caudali) superante; parte postica (caudali) abbreviata; capite duplo altiore quam longo; sterno*

* Proc. Zool. Soc., June 1843, part 11. p. 81.

† *Ibid.* part 13. p. 103.

‡ Fishes of Madeira, Preface, p. xii.

§ Proc. Zool. Soc. part 11. p. 85.

postice in forcipem, præoperculo inferne in aculeum simplicem desinente. (St. Olfersii, Cuv. l. c.)

ARG. HEMIGYMNUS, Cocco. *Corpore angustiore, altitudine dimidium longitudinis (dempta pinna caudali) æquante; parte postica (caudali) elongata; capitis longitudine altitudinem æquante; sterno postice in angulum simplex acutum, præoperculo inferne in aculeos duos desinente.* (Arg. hemigygnus v. Sternoptyx mediterranea, Cocco et Buon. Faun. Ital. cum fig.)

This extraordinary group of fishes offers many points of analogy with *Berycidae*.

Fam. LICHIIDÆ.

3. TEMNODON VADIGO. (*Lichia vadigo*, Cuv. et Val. viii. 363. t. 235.)

A single example was taken in February 1846, but it appeared to be quite unknown to the fishermen, and is therefore to be regarded as a mere straggler in these seas.

If the genus *Temnodon* be retained, this fish has precisely the same claims to a place in it as the common "Anchova" of Madeira (*T. saltator*, Cuv. et Val.).

Fam. SCOMBRIDÆ.

4. SCOMBER COLIAS (Gm.), Cuv. et Val. viii. 39. t. 209. (*The Spanish Mackerel*, Yarr. Brit. Fish. i. 131.)

In April 1844, the market in Funchal was plentifully supplied with these fishes for two or three successive days. They were said to have been brought from Porto Santo.

5. AUXIS VULGARIS, Cuv. et Val. viii. 139. t. 216.

A single example, February 3, 1845. Not quite unknown to the fishermen, but its occurrence said to be a mere chance.

6. PELAMYS SARDA, Cuv. et Val. viii. 149. t. 217.

October 27, 1844: a single example, called "Sarda" by the fishermen, to whom it is not absolutely unknown, though, like the last, of merely casual occurrence.

Fam. TENIOIDÆ.

7. TRACHYPTERUS GRYPHURUS. *Corpore elongato, macula posteriore laterali spatium tertiam partem totius longitudinis æquante a basi pinne caudalis amota; pinnarum radiis scabris; linea laterali inermi, postice supra marginem ventralem desinente.*

D. 5+166; P. 10 v. 11; V. 1+5; A. 0; C. $\frac{VIII.}{5}$; M. B. 6.

Intermediate between *T. falx* and *T. iris* (of Cuvier and Valenciennes' 'Histoire,' vol. x. pp. 333, 341) approaching, perhaps, nearest to the latter, but differing in its deeper shape ($D = \frac{L}{5\frac{1}{2}}$, instead

of $\frac{L}{9 \text{ or } 10}$), and in the backward position of the third dark side-spot. The ventral fins are short, only equalling one-twelfth of the body without the caudal fin, and the four first produced rays of the first dorsal are equal in length to the ventral fins. The lateral line ends as in MM. Cuvier and Valenciennes' figure (t. 297) of *T. iris*, but is quite unarmed. The ventral line is serrulate, and the whole surface, particularly towards the ventral line, is finely shagreened or granulate; the granulations becoming stronger towards the ventral line, as in the same figure.

In shape and proportions it agrees better with *T. falx*, but differs in several important particulars from MM. Cuvier and Valenciennes' description of that fish.

The only individual examined of this beautiful and extraordinary fish occurred in June 1845, and has been added by me to the collection of the Cambridge Philosophical Society. It was scarcely quite dead when I first saw it, and was in the most perfect state of preservation. Another *Trachypterus* had occurred in June 1844, and was probably the same species; but the example was unfortunately thrown away by the person to whom it had been mis-sent without my seeing it. It was said to have been about three feet long.

The whole body is pure bright silver, appearing as if frosted from the fine granulations of the surface. The fins are of a delicate scarlet or vermilion, the lower point or angle of the caudal being tipped, and the hinder end of the dorsal edged with black. On the sides are three blackish oval or elliptic spots. This example was twenty-five inches long, exclusive of the caudal fin, which resembles a bat's or griffin's wing, and is erected in a fan-like manner; the lower lobe or portion being suppressed or undeveloped, and only indicated by the presence of five short spinules or abortive rays.

Fam. LABRIDÆ.

8. *LABRUS LARVATUS*. *Flavus, capite humerisque griseo-nigrescente larvatis; pinna dorsali antice caudaque utrinque infra lineam lateralem rectiusculam unimaculatis; corpore oblongo elongato; dentibus validis crebris, antice biseriatis; pinnae caudalis apicibus analisque ventraliumque margine cœruleo-nigris.*

D. 17+13; A. 3+11; P. 16; V. 1+5; C. $\frac{3 \text{ v. } 4 + \text{VI.}}{2 \text{ v. } 3 + \text{V.}}$; B. M. 5;

Squamæ lin. lat. 42—45.

In general appearance, shape, and the peculiar straightness of the lateral line, this fine species much resembles *Cossyphus Darwini*, Jen.; but it is a true *Labrus*, with the dorsal and anal fins naked, and the preopercle quite entire. Its nearest allies are therefore *L. mixtus* and *L. Scrofa*; from which however, besides other characters, the numerous strong teeth distinguish it. A single example only has occurred, measuring seventeen inches and a quarter in length.

Fam. CHEIRONECTIDÆ.

Gen. CHAUNAX, Lowe.

Gen. Char. Corpus subcubico-oblongum, sufflabile, nudum, cute præsertim ad ilia ventremque flaccidissima laxa; antice obesum, postice abrupte attenuatum subcompressum. Caput osseum magnum subtetrahedrum, superne nuchaque latum planatum, utrinque s. ad genas declive; oculis lateralibus, spatio interoculari convexo; ore rictuque amplissimis transversis plagio-plateis s. depressis. Dentés intermaxillares vomerinique palatinique parvi scobinati. Nares simplices (nec pedicellatæ nec tubulosæ). Spiracula (foramina branchialia) postica s. ad ilia pone pinnarum pectoralium axillas. Pinna dorsalis unica; pectoralibus (pedicellatis) carnosis; ventralibus jugularibus spathulatis carnosis; analis postica; caudalis simplex truncata. Cirri, præter unicum in fossula internasali, nulli.

9. CHAUNAX PICTUS, Lowe in Trans. Zool. Soc. iii. part 4. p. 340. t. 51.

D. 11; A. 5; P. 11; V. 4; C. $\frac{1+IV}{2+II}$.

Species adhuc unica. *Hab.* in mari Maderensi.

I have nothing to add to the full account of this curious fish above referred to, except by way of correction to the second paragraph in p. 344, which has been erroneously printed, and should stand thus:

“Whilst *Cheironectes* seems its most natural, *Halieutæa* is its nearest technical ally. Agreeing with *Lophius* in the wide transverse mouth, and in the backward position of the breathing orifices in the flanks, but with *Cheironectes* more in shape, in the granular or velvety roughness of the skin, and in colour; it differs from both, and approaches *Halieutæa*, in the absence of crests or cilia on the back, and in the single dorsal fin. In these last two points, and in the roughness of the skin, it agrees with *Halieutæa*, but differs in its *Diodon*-like shape, and in the position of the breathing-holes considerably behind, instead of above or before, the axils of the pectoral fins.”

Fam. SCOPELIDÆ.

Gen. PHÆNODON.

Gen. Char. Caput magnum compressum, oculis magnis, rostro brevissimo obtuso, rictu magno pone oculos longe diducto, mento subtus ad symphysin cirro barbato. Dentés intermaxillares uniseriati; anteriores (5 v. 6 utrinque) validi tenues prælongi laniarii subrecurvi remoti distincti, extrorsum supra labia invicem claudentes; ossibus palati dentibus minoribus uniseriatis, lingua biseriatis, armatis. Opercula simplicia plana. Corpus elongatum compressum nudum? s. exsquameum; abdomine punctis argenteis (ut in SCOPELO) seriatis. Linea lateralis recta pinnæque fere ut in SCOPELO, pectoralibus brevioribus.

10. PHÆNODON RINGENS. (*Scopelus barbatus*, nob. MS. olim.)

1^{ma} D. 16; 2^{da} D. 0; A. 16; V. 7; P. 9; C. $\frac{9 + \overline{\text{I.} + \overline{\text{IX.}}}}{6 + \overline{\text{I.} + \overline{\text{VIII.}}}$; M. B. ?

Closely allied to *Scopelus*, but with the head and teeth of *Echiostoma*, which it also resembles in its single cartilaginous beard or barbule.

A single example occurred in May 1845, and was placed by me in the collection of the Cambridge Philosophical Society, under the MS. name of *Scopelus barbatus*. It was seven inches long, and the above fin-formula is taken from it.

I have been favoured by the Duc de Leuchtenberg this winter with the opportunity of examining a second individual, procured from a fisherman. It agreed in all important details with the former, but was only from five to six inches long, and had a much shorter barbule.

Both these examples were entirely devoid of scales, but from certain appearances I am inclined to attribute this defect to injury.

The colour is a uniform brownish or coal-black, except the silver pits, which are disposed in rows along the throat and belly, exactly as in *Scopelus*.

11. SCOPELUS MADERENSIS (Suppl. in Trans. Zool. Soc. iii. part 1. p. 14).

Appears to be distinguished from *Sc. Humboldti* by the forwarder (medio-dorsal) position of its first dorsal fin, and by the long pectoral fins, which are contained from four to four and a half times in the whole length, and reach to the end of the base of the first dorsal fin. The anal fin has fourteen rays.

Examples have occurred of two other forms or species, with shorter pectoral fins, in one of which the anal fin has fourteen, and in the other twenty-two rays. In the first of these, the length of the pectoral fin is one-sixth of the whole length of the fish ($P = \frac{L}{6}$); in the second it is one-fifth and four-sevenths of the same ($P = \frac{L}{5\frac{4}{7}}$); *i. e.* rather longer. But further investigations will be requisite before these can be safely proposed as species. In general habit, colour, and appearance, they agree with *S. maderensis*.

12. METOPIAS TYPHLOPS (Proc. Zool. Soc. 1843, vol. xi. p. 90).

Another example has occurred of this most curious and anomalous little fish. It was brought to me in May 1849, from the same place, Magdalena, at which I obtained the former. It is of much larger size, measuring three inches and a half in length. I find nothing whatever to correct in the account above referred to, except that the maxillary teeth, instead of being "uniseriate," are in a scobinate or brush-like band in both jaws; narrow in the upper, broader in the lower jaw.

The acquisition of a second example, confirming the peculiar characters before set down, is the more satisfactory, from the former

having been unfortunately destroyed by the wasting of the alcohol in which it was kept.

Fam. GADIDÆ.

13. *PHYCIS FURCATUS*, Flem. (not Bowdich); Yarr. Brit. Fish. ed. 1. ii. 201. (*Le Merlus barbu*, Duham. Cuv. R. An. ed. 2. ii. p. 335.)

A single example occurred May 8, 1845; not quite agreeing with the figure in the 'British Fishes,' yet certainly distinct from the common "Abrotea" of Madeira (*P. mediterraneus*, Lar.), of which, on the other hand, the *P. furcatus* of Bowdich (Excurs. p. 122. f. 28) was unquestionably a mere accidentally fork-tailed individual.

Fam. ECHENEIDÆ.

14. *ECHENEIS VITTATA*, Suppl. to Synops. in Trans. Zool. Soc. vol. iii. part 1. p. 17, and Hist. Fish. Mad. p. 77. t. 11.

The acquisition of an adult example measuring 2 feet 6½ inches in length, has proved the fish above described to have been a young individual of *E. vittata*, Rüppell (Neu. Wirbel. p. 82). It is fortunate that the happy coincidence of name necessitates no change or confusion in rendering justice to my learned friend's prior claim in the establishment of this well-marked species. The lateral dark band or *vitta* becomes indistinct in adult individuals. In the large full-grown example above mentioned it had disappeared entirely.

Fam. MURÆNIDÆ.

Gen. LEPTORHYNCHUS, nob.

Gen. Char. Caput scolopaciforme, callo elongato distinctum; maxillis in rostrum tenue productis, utraque dentibus minutissimis limæ instar scabra; rictu pone oculos diducto. Nares oculis contiguæ approximatae, simplices nec tentaculatae. Oculi magni. Corpus nudum anguilliforme compressum, gracile, elongatum; postice longissime attenuato-productum filiforme, apice acuto. Aperturæ branchiales sat magnæ, ante pinnas pectorales oblique deorsum fissæ. Pinnæ pectorales distinctæ lanceolatae, sat magnæ; pinna dorsali ad nucham paullo ante, anali ad gulam paullo post pinnas pectorales incipiente; utraque usque ad apicem caudæ continuata, membranacea, nec cute cooperta, sed radiis sat validis distinctis.

15. *LEPTORHYNCHUS LEUCHTENBERGI*. (*The Snipe-Eel*.)

I am indebted for an opportunity of describing this interesting new type of *Murænidæ* to the favour of His Imperial Highness the Duc de Leuchtenberg, to whom an example was brought by a fisherman in January last. It approaches the *Anguillidæ* by its well-developed pectoral fins. The prolonged beak-like muzzle also reminds one of that of *Leptognathus*, Swainson. The unique individual examined, which measured 2 feet 9 inches in length, scarcely half an inch in height, and four lines in thickness, is included in the extensive col-

lections formed with so much scientific ardour and discrimination by His Imperial Highness the Duc de Leuchtenberg, during his late six months' residence in Madeira.

Fam. BALISTIDÆ.

16. *MONACANTHUS AURIGA*. *Hispidus, cauda utrinque dense hispido-villosa; pallide olivaceo-murinus, sublutescens, fuscolutoso-maculatus v. interrupte longitudinaliter subfasciatus; fasciis luteis inconspicuis evanescentibus 3 v. 4 ab oculis antice oblique radiantibus; radiis 1 v. 2 anticis dorsalis primæ aliquando in filamentum productis.*

1^{ma} D. 1; 2^{da} D. 31; A. 30 v. 31; P. 13 v. 14; C. 1+X. +1.

From eight to ten or eleven inches long. On each side, towards the base of the caudal fin, is an oblong patch, like plush or velveteen, of close thickset hairs or bristles. The occasional production of the second or first two rays of the second dorsal fin is perhaps sexual. Such examples have the muzzle rather longer and more produced before the eyes than those which have not the elongated dorsal filament. They are perhaps the *M. filamentosus* of M. Valenciennes, to whose figure and description, however, in MM. Webb and Berthelot's 'Canarian Fishes,' I regret I have not access.

Several examples have occurred, chiefly in the autumn, during the last five or six years, of this previously in Madeira unobserved or unrecorded species.

SQUALIDÆ.

Fam. ALOPECIDÆ.

17. *ALOPIAS VULPES*, BUON. (*The Fox Shark*, Yarr. ii. 379.)

An example occurred this spring of unusual size, measuring eighteen feet in length, of which the tail was ten feet. The skin was preserved by the Duc de Leuchtenberg.

Fam. SPINACIDÆ.

18. *CENTROPHORUS SQUAMOSUS*, Müll. und Henle, p. 90, with a figure.

The *Ramudo* or *Raimudo* of Madeira, not unfrequently taken off the Dezertas at a depth of twelve or fourteen "*linhas*," i. e. from 350 to 400 fathoms, belongs apparently to the above species, the habitat of which was unknown to its describers, MM. Müller and Henle. I have only examined female examples, and the fishermen profess themselves to be entirely unacquainted with the male, which I have however formerly (March 10, 1838) once seen, though without opportunity for a close or accurate examination, and so perhaps without remarking any spine near the tips of the claspers or ventral fin-appendages. The individuals examined were five or six feet long, but the fish is said to grow to a much larger size.

Madeira, May 25, 1850.

December 10, 1850.

Prof. Owen, V.P., F.R.S., in the Chair.

The following papers were read :—

1. DESCRIPTION OF SEVERAL NEW SPECIES OF ENTOMOSTRACA.
By W. BAIRD, M.D., F.L.S. ETC.

(Annulosa, Pl. XVII. XVIII.)

Legion BRANCHIOPODA.

Order PHYLLOPODA.

Family APODIDÆ.

Genus LEPIDURUS, Leach.

1. LEPIDURUS VIRIDIS, Baird. (Pl. XVII. f. 1.)

Body of animal, including the flap of tail segment, about two inches long and one broad. The carapace and whole body are of a fine green colour, the carapace covering about two-thirds of the abdomen; the edges of the notch in the posterior part of carapace are strongly toothed, and those of the inferior half of the carapace are very finely serrated; these teeth are of two sets, the one much larger than the others; the larger teeth are of a green colour, tipped at the point with dark brown; they are about eleven in number, and between each there are two or three much smaller ones interspersed. The appendages of the first pair of feet are very short and small, scarcely extending beyond the edge of the carapace. The segments of the abdomen are each studded with a row of stout, slightly curved spines of a green colour tipped at their edges with dark brown. The tail flap is oval, keeled down the centre, the keel being beset with short sharp spines, and the edges of the flap are finely serrated. The long setæ of the tail are nearly the length of the whole animal, and are covered with short hairs.

Hab. Van Diemen's Land. British Museum.

Legion LOPHYROPODA.

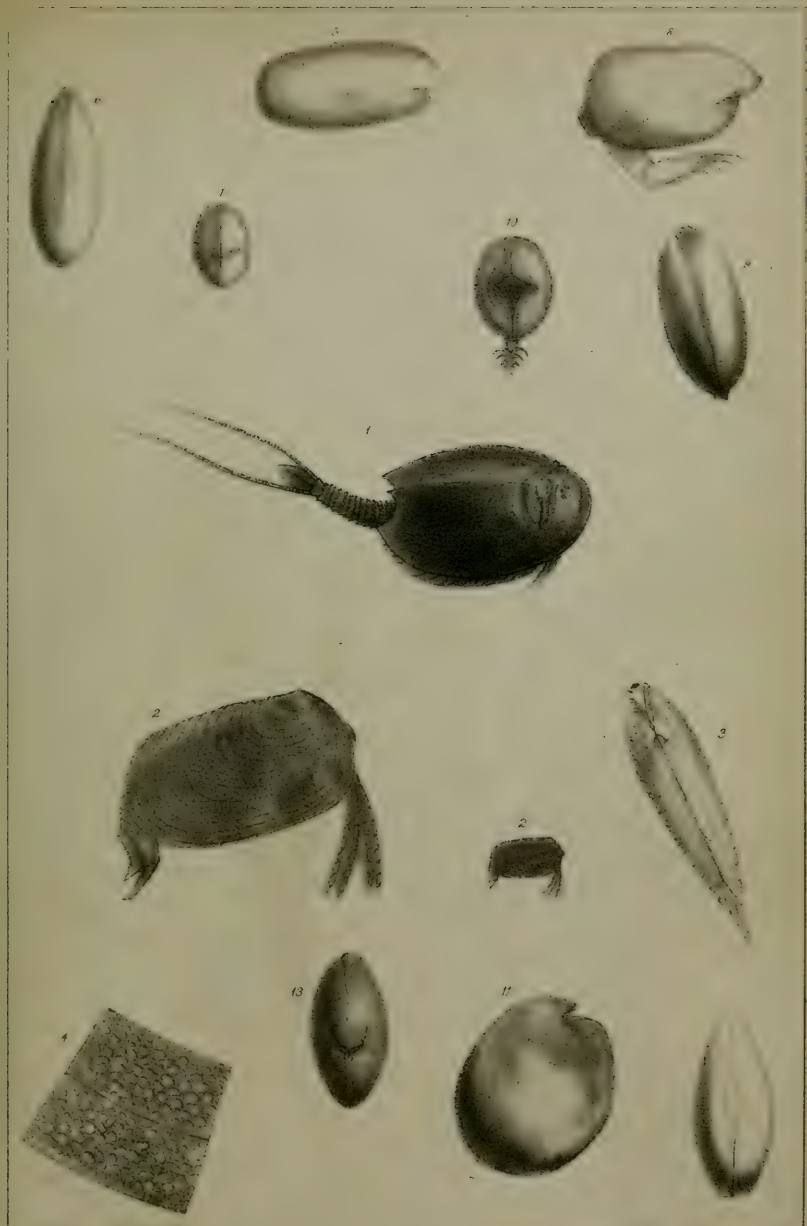
Order OSTRACODA.

Family CYPRIDIDÆ.

Genus CYPRIS, Müller.

1. CYPRIS DONNETII, Baird. (Pl. XVIII. f. 19-21.)

Carapace valves elongate oval. Anterior extremity narrower than posterior, and considerably flatter; posterior extremity rounded and very convex; dorsal edge arched; ventral slightly reniform. The surface of the valves is smooth and shining, of a brown colour, varie-



W. Wang del. et lith.

Ford & Vest, Lithographers, 54, Nassau Garden.

1. LEPIDURUS VIRIDIS. 2, 3, 4. ESTHERIA DAHALACENSIS.
 5, 6, 7. CYPRIDINA MARLE 8, 9, 10. CYPRIDINA INTERPUNCTA
 11, 12, 13. CYPRIDINA ZEALANDICA

gated with patches of a darker shade. The pediform antennæ are provided with about six bristles of considerable length.

Hab. Freshwater ponds, Coquimbo; collected by — Donnet, Esq., Surgeon R.N. Brit. Mus.; from the collection of H. Cuming, Esq.

2. *CYPRIS CUNEATA*, Baird. (Pl. XVIII. f. 22–24.)

Carapace valves wedge-shaped, much broader at anterior than posterior extremity. Dorsal margin highly arched; ventral deeply sinuated in the centre, giving the shell a reniform appearance. Valves very convex in the centre, and surrounded by a prominent margin, which at the anterior extremity, when highly magnified, is seen to be minutely and finely serrated. The whole carapace is of a deep green colour, and covered with fine hairs.

Hab. Duddingston Loch, near Edinburgh; August 1850.

Genus *CANDONA*, Baird.

1. *CANDONA LACTEA*, Baird. (Pl. XVIII. f. 25–27.)

Carapace valves oblong ovate, convex. Dorsal margin nearly straight; ventral slightly sinuated in the centre. Anterior and posterior extremities of nearly equal size. Surface of valves smooth and shining, and of a dull white colour.

This species resembles in shape the *Candona reptans*, but is only about one-fourth the size, and is of a uniform dull white colour.

Hab. Freshwater pond at Charing, Kent; collected by W. Harris, Esq., to whom I am indebted for specimens. Regent's Park (*T. Rupert Jones, Esq.*).

Genus *CYTHERE*, Müller.

1. *CYTHERE TARENTINA*, Baird. (Pl. XVIII. f. 31–33.)

Carapace valves obovate. Anterior extremity much broader than posterior, and having a broad flat margin striated on the surface and toothed round the edge; posterior extremity pointed, having the same margin, but not so broad, and with much fewer teeth. The valves are very convex in the middle, of a greyish colour, with a white patch in the centre, and are slightly pitted all over. Dorsal and ventral margins both somewhat prominent.

Hab. Tarentum. In Mr. Williamson's collection.

2. *CYTHERE SETOSA*, Baird. (Pl. XVIII. f. 28–30.)

Carapace valves oval. Anterior extremity narrower than posterior. Dorsal margin arched; ventral sinuated about its anterior third. Surface of valves shining white, and studded all over with short stiff hairs.

Hab. Moreton Bay, Australia, and Tenedos. Mr. Williamson's collection.

Genus *CYTHEREIS*, Jones.

1. *CYTHEREIS AUSTRALIS*, Baird. (Pl. XVIII. f. 10–12.)

Carapace valves somewhat quadrilateral. Dorsal and ventral mar-

gins nearly straight. Anterior extremity broader than posterior, and finely toothed; teeth numerous. Posterior extremity emarginate on upper or dorsal edge, and toothed on ventral; teeth few, and stronger than those on anterior margin. Surface of valves roughened with small asperities, and having one tubercle on about the anterior third of its length. A raised margin encircles the whole valve.

Approaches very near *Cypridina hieroglyphica* of Bosquet, Entomost. Maestricht, t. 3. f. 4.

Hab. Moreton Bay, Australia. Mr. Williamson's collection.

2. *CYTHEREIS RUNCINATA*, Baird. (Pl. XVIII. f. 7-9.)

Carapace valves ovate, flat. Anterior extremity broader than posterior, and rounded; posterior extremity emarginate on upper or dorsal margin. Surface of valves very flat and rugose; a flat projecting border surrounds each valve, which is serrulated at anterior extremity and toothed on posterior; a high raised sharp ridge runs across the centre of the valve somewhat in a diagonal direction, which is serrulated along its whole length, and a smaller similar ridge is seen near the ventral margin.

Hab. Tenedos. Mr. Williamson's collection.

3. *CYTHEREIS FISTULOSA*, Baird. (Pl. XVIII. f. 1-3.)

Carapace valves nearly quadrilateral, elongate. Anterior extremity a little more rounded than posterior, and armed with seven or eight small teeth; posterior extremity armed with five or six larger teeth. Dorsal and ventral margins nearly straight. Surface of valves granular and ornamented by four elevated straight ridges, which are perforated near their margins with small round holes.

Hab. Manilla. Mr. Williamson's collection.

4. *CYTHEREIS PRAVA*, Baird. (Pl. XVIII. f. 13-15.)

Carapace valves subquadrangular. Anterior extremity considerably broader than posterior, rounded, smooth round the edge, and having a broad flat margin beset on inner edge with small round tubercles; posterior extremity emarginate, and furnished on inferior half with several short teeth. Valves extremely gibbous in centre, and the surface very rough, wrinkled, and tubercled.

Hab. Tenedos. Mr. Williamson's collection.

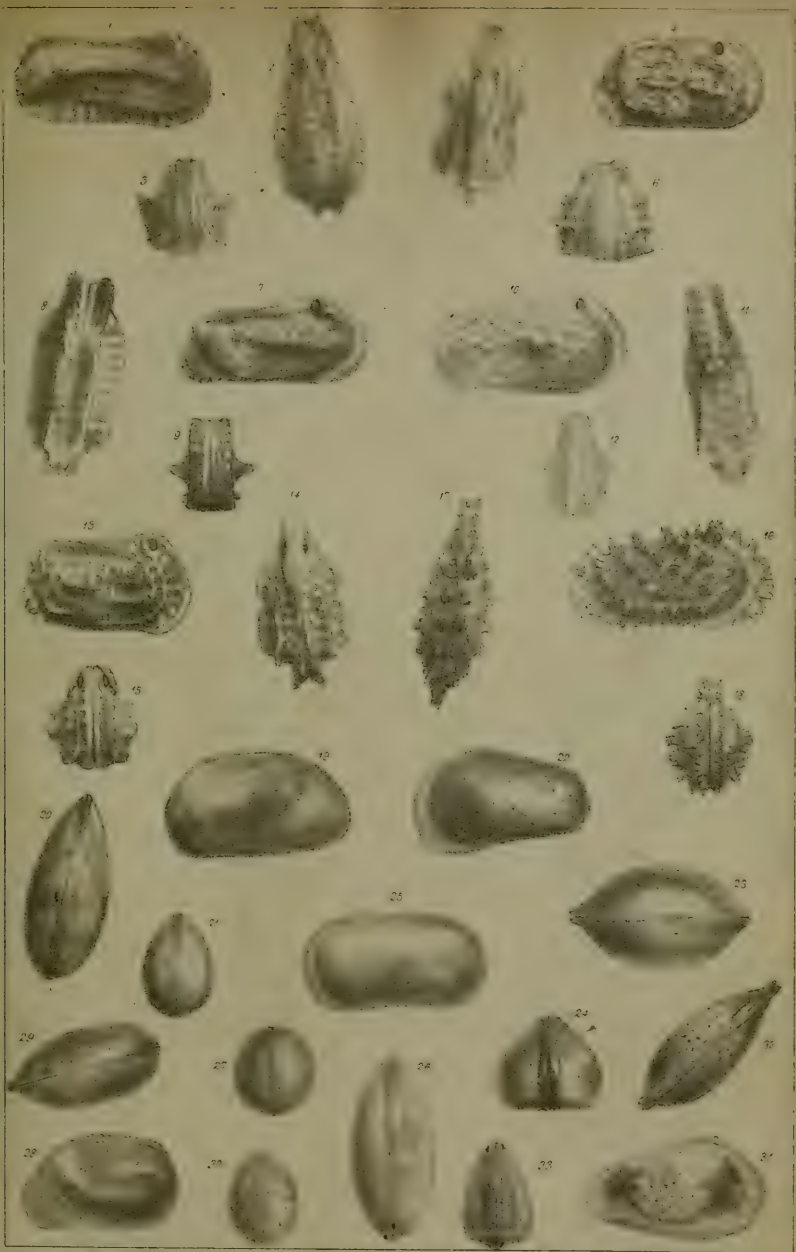
5. *CYTHEREIS DEFORMIS*, Baird. (Pl. XVIII. f. 4-6.)

Carapace valves ovate, short and gibbous; the two extremities of nearly the same size. Dorsal and ventral margins nearly straight. Surface of valves very coarsely granulated and tubercled; roughly ridged, but the ridges not perforated as in the preceding species.

Hab. Manilla. Mr. Williamson's collection.

6. *CYTHEREIS SENTICOSA*, Baird. (Pl. XVIII. f. 16-18.)

Carapace valves flat, ovate. Anterior extremity broader than posterior, and rounded. Dorsal margin sloping towards posterior extre-



W. Wmf. del et lith.

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- 1,2,3. *CYHEREIS PISTULOSA*. 4,5,6. *CYHEREIS DEFORMIS*.
 7,8,9. *CYHEREIS RUNCINATA*. 10,11,12. *CYHEREIS AUSTRALIS*.
 13,14,15. *CYHEREIS PRAVA*. 16,17,18. *CYHEREIS SENTICOSA*.
 19,20,21. *CYPRIS DONNETII*. 22,23,24. *CYPRIS CUNEATA*.
 25,26,27. *CANDONA LACTEA*. 28,29,30. *CYHERE SETOSA*. 31,32,33. *CYHERE TARENTINA*.

mity; ventral nearly straight. The surface of the valves is very rough, wrinkled, and beset all over, but especially near the margins, with strong spinous laciniae.

Hab. Tenedos. Mr. Williamson's collection.

Genus CYPRIDINA, M.-Edwards.

1. CYPRIDINA ZEALANICA, Baird. (Pl. XVII. f. 11-13.)

Carapace valves of an oval form, somewhat flattened, but convex in the centre and striated; the striæ are numerous, close-set, and of a waved appearance. Surface of valves covered with minute punctations, which probably give origin in the fresh state to short hairs, though they are not visible in the dried specimens. The anterior extremity is slightly narrower than posterior. The whole carapace is of a uniform white colour. Natural size one-fourth of an inch long and one-fifth of an inch broad.

Hab. New Zealand. Two specimens were sent to the British Museum by the Rev. R. Taylor, of Waimati in New Zealand, along with a collection of marine and freshwater shells, but without any history attached to them.

2. CYPRIDINA INTERPUNCTA, Baird. (Pl. XVII. f. 8-10.)

Carapace valves oval. Anterior extremity narrower than posterior; the notch near anterior extremity very wide, and its anterior margin blunt and projecting in form of a beak straight upwards; posterior extremity obtusely rounded, and terminating near the ventral margin in a short blunt point. Dorsal and ventral margins nearly straight or slightly arched. The surface of the valves is of a dull white colour, and is densely and rather coarsely covered with impressed punctations.

The carapace is convex, but much less so than in *C. M'Andrei*, and is of a much more oval shape.

Hab. Near the Isle of Skye; collected by R. M'Andrew, Esq., August 1850.

3. CYPRIDINA MARLÆ, Baird. (Pl. XVII. f. 5-7.)

Carapace valves elongate oval, of exactly the same size at each extremity; extremities rounded. Dorsal and ventral margins nearly plane, or very slightly arched. Surface of valves of a white shining colour, mottled with a few spots of a dull white, and covered with minute superficial punctations. Notch or ventral margin of anterior extremity blunt, leaving the upper and lower margins of the notch very obtuse.

Approaches *Asterope elliptica* of Philippi somewhat in figure of carapace, but is much more elongate, and is one-third larger.

Hab. Off the Isle of Skye; collected by R. M'Andrew, Esq., August 1850.

Pl. XVII. f. 2-4. *Estheria Dahalacensis*. Vide Proc. Zool. Soc. 1849, p. 89. No. 5.

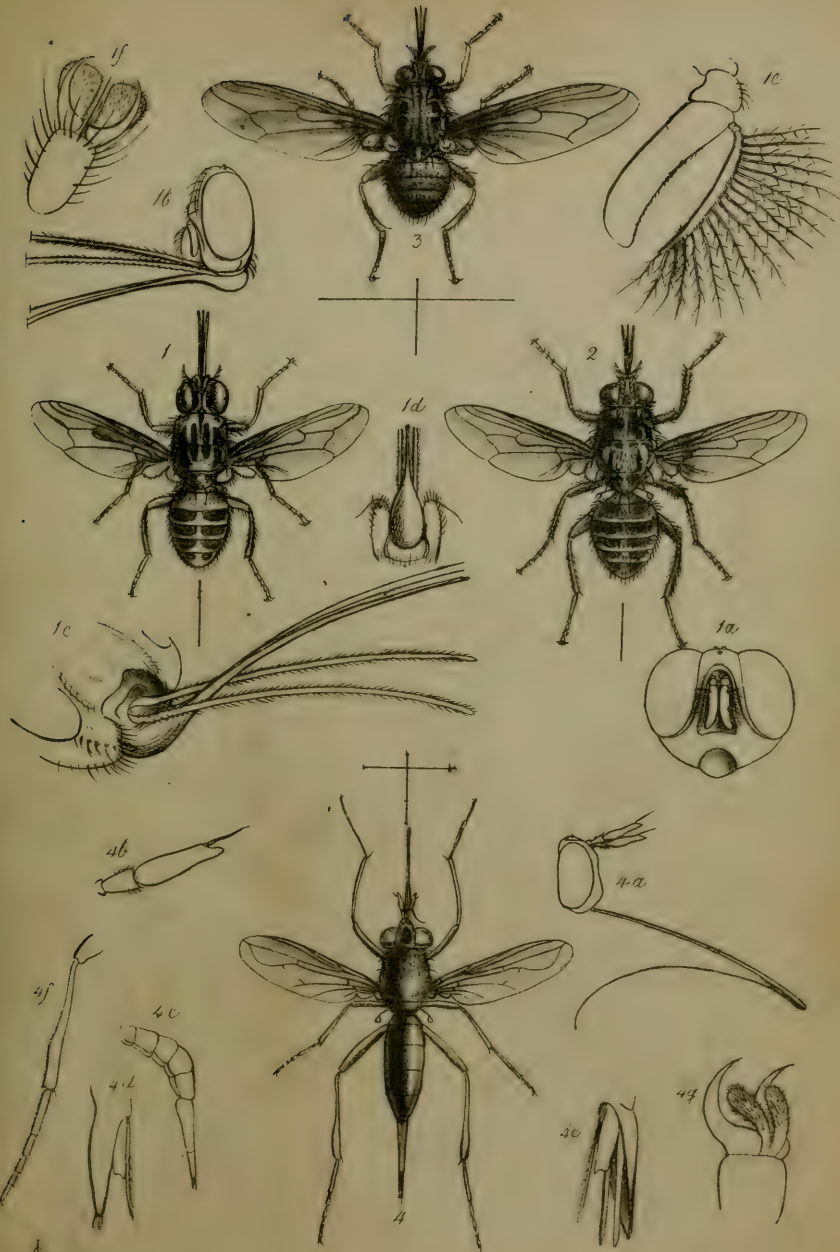
No. CCXVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

2. OBSERVATIONS ON THE DESTRUCTIVE SPECIES OF DIPTEROUS INSECTS KNOWN IN AFRICA UNDER THE NAMES OF THE TSETSE, ZIMB, AND TSALTSALYA, AND ON THEIR SUPPOSED CONNEXION WITH THE FOURTH PLAGUE OF EGYPT. BY J. O. WESTWOOD, F.L.S., PRES. ENT. SOC. ETC.

(Annulosa, Pl. XIX.)

The species of insects which attack the larger of our domestic quadrupeds may be divided into two chief classes; first, those which do so in order to obtain a supply of food for their own support; and second, those which do so with the object of depositing their eggs in such a position, that the larvæ, when hatched from them, will be certain of finding a proper supply of food derived from some part of the animal, either external or internal.

The insects composing the first of these two classes require for the performance of their dreaded functions an organization of the parts of the mouth especially fitting them to pierce the skins and hides of the quadrupeds upon the blood of which they subsist, and we accordingly find that it is precisely these insects which have the mouth-organs most fully developed in the different families to which they respectively belong. The *Stomoxys calcitrans*, and especially the different species of *Tabanus*, are pre-eminent in this respect; and the formidable array of lancets in the mouth of one of the latter insects is not to be met with elsewhere among the whole of the flies composing the order Diptera, to which they belong. The effects of the attacks of these insects upon the horse are perceived by the drops of blood which flow from the orifices caused by their bites, and sometimes these wounds are so numerous, that the beasts "are all in a gore of blood." A still smaller species, named by Linnæus the *Culex equinus*, also infests the horse in infinite numbers, running under the mane and amongst the hair, and piercing the skin to suck their blood. This insect, although given by Linnæus as a *Culex*, appears from his description to belong to the genus *Simulium*, to which genus also belongs an insect of fearful note, which attacks the horned cattle in Servia and the Bannat, penetrating the generative organs, nose, ears, &c. of these animals, and by its poisonous bite destroying them in a few hours. A species of the same genus of minute *Tipulidæ* is common in marshy districts in England, and I have often experienced its attacks, which have resulted in the raising of a tumour on the part of the flesh which has been attacked, attended by a considerable amount of local inflammation; and hence we may readily believe the well-authenticated effects produced upon the cattle above described. There are various other insects which attack the horse and ox, such as the *Hippoboscæ*, various species of ticks, *Anthomyiæ*, &c.; and if these do not, from their smaller size, cause a discharge of blood like the large *Tabanidæ*, it is certain that the irritation which they produce not only by their presence upon the skin, but also by the sharpness of their bite, must be very irritating to the quadrupeds which they infest.



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1 GLOSSINA MORSITANS, Westw. 2. GL. TACHINOIDES, Westw.
 3. GL. TABANIFORMIS, Westw. 4. STYLOMYIA LEONUM, Westw.

The insects which do not themselves feed upon our cattle, but simply infest them for the purpose of depositing their eggs in some convenient place or other upon their bodies, are in no instance that I recollect provided with an increased development of the mouth organs; on the contrary, the *Æstridæ* are either entirely destitute of a mouth, or have only very small rudiments of some of the ordinary parts of the mouth, so as to be entirely unfitted for biting or wounding cattle. The effects however which some of these species produce are as annoying as those caused by the bites of the *Tabani*. The female fly of the common horse bot, *Æstrus Equi*, it is true, instils no dread into the horse round which she is intently engaged in flying, depositing her eggs here and there in particular spots where the horse is certain to lick the hairs, by which means the eggs are introduced into the mouth and pass into the stomach. So little indeed is the horse affected by the presence of this insect, that I have often stood close to one round which the *Æstrus Equi* has been flying, until the latter has come within reach of my hand, when I have caught it without trouble. Another species, *Æstrus hæmorrhoidalis*, is however much more troublesome; depositing her eggs on the lips of the horse, and producing in her endeavours to effect this such an excessive titillation, as to cause great uneasiness to the horse, which tosses its head about to drive off its enemy, gallops about, and as a last resource takes refuge in some neighbouring water, where the *Æstri* never follow it. The same kind of effect is also produced in rein deer by the *Æstrus Tarandi**, and in oxen by another species of *Æstrus*, *Æst. Bovis*, respecting which however much difference of opinion has arisen. At certain seasons, the whole terrified herd, with their tails in the air, or turned upon their backs, or stiffly stretched out in the direction of the spine, gallop about the pastures, finding no rest till they also get into the water. This *Æstrus* is asserted by some writers to make a strong humming noise, and hence it has been supposed that the herd of cattle are alarmed at the noise; but this must surely be an incorrect conjecture, as the *Æstri*, if they make any hum at all, are far outstripped in this respect by many other insects which instil no dread into oxen. Neither are they alarmed in consequence of being subjected to the same kind of attack upon so sensitive a part as the lips, as is the case with the horses attacked by *Æstrus hæmorrhoidalis*. It is however asserted by some writers, that the dread is produced by the pain inflicted by the *Æstrus* in depositing her eggs, her ovipositor being represented as constructed like an auger or gimlet, only having several longer points it can wound with more effect. When it is stated, however, that the female *Æstrus Bovis* does not occupy more than a few seconds in depositing each egg, we may fairly doubt whether, with her long, fleshy, tubular ovipositor, she has been able to pierce the hide of an ox; or whether, as Mr. Bracy Clark suggests, she only

* At the present time (April 1851) some of the rein deer in the Gardens of the Society, which were imported last autumn from Lapland, are infected to a remarkable extent with the tumours of this species; there must, I think, be from fifty to a hundred tumours on one of these animals.

makes use of this long instrument to thrust the egg down to the surface of the skin, which she does not pierce, but only glues its eggs to it, the young larvæ when hatched burrowing into the flesh. If this be the case, the act of oviposition must be unattended with pain, as in the case of the deposition of the eggs of *Æstrus Equi*, and we must search for the cause of the alarm of the herd, either in an instinctive knowledge that a certain insect flying around them is the parent of a grub which at a future time will be a torment to them, or in the attacks of some other insect; and I confess that I am inclined to consider that Virgil's beautiful description of the annoyance caused by

"Myriads of insects fluttering in the gloom,
(*Æstrus* in Greece, *Asilus* named at Rome,)
Fierce and of cruel hum"—

has a *Tabanus* rather than an *Æstrus* for its origin.

The larva of the *Æstrus Equi* resides beneath the skin of the back of the ox, causing large tumours, and having the extremity of its body constantly placed at the orifice of the wound, where it was introduced as an egg, or introduced itself as a grub, the openings of its respiratory apparatus being placed at that part of the body.

These introductory remarks on the different modes in which insects attack our horses and oxen, and the different effects which they produce, will enable us the better to estimate the effects produced by an insect, or several species of insects, of tropical Africa upon the horses of travellers who have lately returned from that part of the world, where their enterprising researches have been rewarded by the discovery of the great central lake Tehad. Captain Frank Vardon, a gentleman who has travelled far in the interior of Africa, has placed in my hands some fragments of Dipterous insects which attacked his horses, causing the death of one of them. The following is an extract from his note to me in reply to my inquiry as to the mode of its attack:—

"33 Oxford Terrace, Hyde Park, May 1850.

"DEAR SIR,—I had always heard that the fly of South Africa so destructive to cattle was a large gad-fly, the size of a bee or hornet. This is quite erroneous: it is not very much larger than the common house-fly, but a longer and more 'rakish'-looking insect, and easily distinguished by the transverse black bars on its body.

"I fancy it is not met with south of the Tropic of Capricorn. It is usually found on hills, plains being free from it. I have ridden up a hill and found the *Sëtsé* increasing at every step, till at last forty or fifty would be on my horse at once. The specimens you saw cost me one of the best in my stud. He was stung by some ten or a dozen of them, and died in twenty days. I myself have been bitten by the *Sëtsé*; you would almost fancy it was a flea biting you. Some parts of South Africa are, I should say, rendered inaccessible by the presence of this pest; I mean of course to a man who travels in the usual way, with his oxen and horses.

"How far the *Sëtsé* extends in the interior is of course as yet unknown, but I have certain information as to its being 200 miles north

of the 'Great Lake' recently discovered by my friends, Messrs. Livingston, Oswell and Murray.

"Yours faithfully,

"FRANK VARDON."

"J. O. Westwood, Esq."

The various specimens forwarded to me by Captain Vardon have enabled me to determine that the insect is a new species of Wiedemann's genus *Glossina*, which may be thus characterized:—

GLOSSINA MORSITANS, Westw. (Pl. XIX. fig. 1. and details.)

Luteo-albida, thoracis dorso subcastaneo, griseo subtomentoso, vittis quatuor longitudinalibus in medio interruptis nigris, scutelli apice punctis duobus parvis fuscis; abdomine pallide lutescenti, segmento basali utrinque macula parva laterali nigra, singulo segmentorum quatuor proximorum ad basin fascia nigricanti, in medio interrupta, notatis; alis parum infumatis.

Long. corp. lin. 5; expans. alar. lin. $8\frac{1}{2}$.

The head is of a dirty buff colour, narrower than the thorax, with large eyes; the epistoma is paler coloured and clothed with whitish hairs; the proboscis is rather longer than the height of the head; it consists of a slender, horny seta or compound bristle, chestnut-coloured in its chief length, but dilated at the base into a large oval bulbous horny lobe, and upon maceration I was enabled to withdraw from the upper side of the seta (which is consequently grooved), two very delicate styles as long as the proboscis; the sides of this instrument are defended by a pair of elongated, slender setose palpi, as long as the proboscis itself; these are concave on the inside and blackish at the tips, and the setæ with which they are clothed are also black, as well as the branched setæ with which the arista of the antennæ is furnished; the outer surface of the arista itself, under a powerful microscope, is evidently villose. The antennæ are inserted in a depressed obconic space between the eyes, rounded above, and there are two dark spots on the upper part of the epistoma; the two basal joints of the antennæ are dark in front, and the large third joint is dirty buff-coloured. The thorax is chestnut-red, clothed with a very delicate grey tomentosity and finely punctured; it is impressed across the middle of the dorsum, and is marked with four longitudinal broad black bars, abbreviated in front and behind, the two central ones being longest in front, and the two lateral ones longest behind; the two former are united in front by a black streak from the front margin. The scutellum is dirty buff, with two dark dots at its extremity, from which, as well as from various dark dots at the sides, arise long black setæ; the halteres are nearly white. The wings are slightly stained with dusky; the veins black, except at the base of the wing, where they are dirty-buff. The legs are dirty-buff, with the outside of the thighs stained with dark brown. The last two joints of the tarsi are black, with large pulvilli. The abdomen is flat, oval in outline, and dirty fulvous buff in colour, clothed above with numerous minute

black setæ, which are greatly elongated at the base of the abdomen and the extremity and sides of each segment; the first segment is marked at each side close to the anterior angle with a round black spot, and each of the four following segments has a broad basal fascia of dark brown, interrupted in the middle. The sides and under surface of the thorax are varied with black patches; the abdomen is pale-coloured beneath, with a large terminal oval plate, down the middle of which runs a pale longitudinal line, preceded by two small oblique oval patches, thickly clothed with minute black setæ.

The peculiarities of the genus *Glossina*, whereby it is at once distinguished from *Stomoxys*, to which it is nearly allied, consist in the dilatation of the extremity of the discoidal cell, the rounded horny bulbous base of the proboscis, which is not angulated at its base, and the long and slender flattened palpi, which together form a sheath protecting the proboscis. Wiedemann's typical species (which has remained unique to the present time), *Glossina longipalpis*, (subsequently described by Robineau Desvoidy under the name of *Nemorhina palpalis*), is a native of Sierra Leone, where it was collected by Afzelius. M. Macquart, judging from the structure of the mouth, considers it probable that it does not live upon the blood of animals, like *Stomoxys*, but upon the nectar of flowers; the two setæ which are enclosed in the proboscis and compose the sucker being so slender, that it is difficult to conceive that they can pierce the skin, the palpi being also elongated so as to form a protection to it, and thus further indicating its weakness. There is however so great a difference between the structure of the proboscis in these insects and *Stomoxys*, that I do not doubt that they are able to pierce the skin of a horse, the proboscis of *Glossina* being a long, straight, horny, needle-like instrument, and not elbowed, with fleshy lips, as is that of *Stomoxys*. Moreover, the bulbous dilated base of the proboscis must evidently play an important part in the economy of the insect, either by giving additional support to the proboscis when in the act of piercing the skin, or by containing powerful muscles for the action of the enclosed setæ; or, as suggested to me by Prof. Owen, this dilated base may be analogous to the dilated base of the sting of the Scorpion, and like it contain a reservoir of some powerfully poisonous liquid.

The account of the irritating powers of the *Glossina* given by Captain Vardon is, it is true, not so detailed as could have been desired, but we learn sufficient to arrive at the conclusion that its effects are, to a certain extent, exactly like those of the *Tabanidæ*; how far the attacks may be attended with tumours, similar to those produced by the *Simulium*, and whether a tropical climate may not extend the effects of the attack, producing inflammatory action upon animals perhaps never before in those latitudes, are questions which have yet to be answered. One thing however appears to me evident, that the Sëtsé is no other than the Zimb of Bruce, (an insect respecting whose real family and even existence so many doubts have been expressed,) or at least that that insect is a larger species of *Glossina*, to whose real habits Bruce has added those of a species of *Æstrus*. With the view of establishing this assertion, as well as of clearing up what I

consider the inconsistencies of Bruce's account, I shall beg to introduce his description of the Zimb.

"Nothing was more opposite than the manners and life of the Cushite and of his carrier the shepherd. The mountains of the Cushite and the cities he built afterwards were situated upon a loamy black earth, so that, as soon as the tropical rains began to fall, a wonderful phenomenon deprived him of his cattle. Large swarms of flies appeared wherever that loamy earth was, which made him absolutely dependent in this respect upon the shepherd; but these affected the shepherd also. This insect is called the Zimb * in modern or vulgar Arabic; it has not been described by any naturalist. It is in size very little larger than a bee, of a thicker proportion, and the wings, which are broader than those of a bee, are placed separate, like those of a fly. They are of pure gauze, without colour or spot upon them; the head is large; the upper jaw or lip is sharp, and has at the end of it a strong pointed hair of about a quarter of an inch long; the lower jaw has two of these pointed hairs, and this pencil of hairs, when joined together, makes a resistance to the finger nearly equal to that of a strong hog's bristle; its legs are serrated on the inside, and the whole covered with brown hair or down. As soon as this plague appears and its buzzing is heard, all the cattle forsake their food and run wildly about the plain till they die, worn out with fatigue, fright and hunger. No remedy remains but to leave the black earth and to hasten down to the plains of Atbara, and there they remain whilst the rains last, this cruel enemy never daring to pursue them farther.

"What enables the shepherd to perform the long and toilsome journeys across Africa is the camel, emphatically called by the Arabs the ship of the desert. Though his size is immense, like his strength, and his body covered with a thick skin defended with strong hair, yet still is he not capable to sustain the violent punctures the fly makes with his pointed proboscis. He must lose no time in removing to the sands of Atbara, for when once attacked by this fly, his body, head and legs swell out into large bosses, which break and putrefy to the certain destruction of the creature. Even the elephant and rhinoceros, who, by reason of their enormous bulk and the vast quantity of food and water they daily need, cannot shift to desert and dry places as the season may require, are obliged to roll themselves in mud or mire, which when dry coats them over like armour, and enables them to stand their ground against this winged assassin; yet I have found some of these tubercles upon almost every elephant and rhinoceros that I have seen, and *attribute them to this cause*. All the inhabitants of the sea-coast of Melinda, down to Cape Gardafan, Saba, and the south coast of the Red Sea, are obliged to put themselves in motion and change their habitation to the next sand in the beginning of the rainy season, to prevent all their stock of cattle from being destroyed.

"Of all those that have written upon these countries, the prophet Isaiah alone has given an account of this animal and the manner of

* "See Appendix. It is the same name as Zebul in Hebrew.—E."

its operation (Isaiah, vii. 18, 19): 'And it shall come to pass in that day, that the Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt . . . and they shall come, and shall rest all of them in the desolate valleys, and in the holes of the rocks, and upon all thorns, and upon all bushes.'" (Travels, ii. pp. 314-317.)

"*Tsalsalya, or Fly.*—We are obliged with the greatest surprise to acknowledge that those huge animals, the elephant, the rhinoceros, the lion and the tiger, inhabiting the same woods, are still vastly this fly's inferiors; and that the appearance of this small insect, nay, his very sound, though he is not seen, occasions more trepidation, movement and disorder, both in the human and brute creation, than whole herds of these monstrous animals collected together, though their number was in a tenfold proportion greater than it really is. Providence from the beginning it would seem had fixed its habitation to one species of soil, being a black fat earth, extraordinarily fruitful.

"We cannot read the history of the plagues which God brought upon Pharaoh by the hands of Moses, without stopping a moment to consider a singularity, a very principal one, which attended the plague of the fly. The land of Goshen, the possession of the Israelites, was a land of promise which was not tilled or sown, because it was not overflowed by the Nile. But the land overflowed by the Nile was the black earth of the Valley of Egypt, and it was here that God confined the flies.—I have magnified him about twice the natural size.—He has no sting, though he seems to me to be rather of the bee kind; but his motion is more rapid and sudden than that of the bee, and resembles that of the gad-fly in England. There is something particular in the sound or buzzing of this insect. It is a jarring noise, together with a humming, which induces me to believe that it proceeds, at least in part, from a vibration made with the three hairs at his snout.

"The Chaldee Version is content with calling this animal simply Zebub, which signifies the fly in general as we express it in English. The Arabs call it Arob in their translation, which has the same general signification. The Ethiopic translation calls it Tsal tsalya, which is the true name of this particular fly in Geez, and was the same in Hebrew. The Greeks have called this species of fly *Cynomyia*, which signifies the dog-fly; in imitation of which, those I suppose of the church of Alexandria that, after the coming of Frumentius, were correcting the Greek copy and making it conformable to the Septuagint, have called this fly *Tsal tsalya Kelb*, in answer to the word *Cynomyia*. *Salal* in the Hebrew signifies 'to buzz' or 'to hum,' and as it were alludes to the noise with which the animal terrifies the cattle; and *Tsal tsalya* seems to come from this by only doubling the radicals: *t'Tsalalou**, in Amharic, signifies 'to pierce with violence.'"—*Appendix, vii. 284 et seq.*

* "The name of this fly is undoubtedly derived from a word signifying 'to buzz' in Hebrew and Ethiopic. The drawing seems to have been made from a preserved subject, an eminent naturalist (the late Prof. Walker) *having observed that some of the finer parts are wanting in it. These may have been lost in keeping, or during the drawing of it at home.*—EDIT."

From this account we learn that it is the sound of this insect which produces a great amount of trepidation in the cattle of Abyssinia. This accords with Bracy Clark's ideas of *Æstrus Bovis*. Bruce's description of the position of the wings clearly indicates a Dipterous insect, and his figure shows a bee-like insect, with a long straight porrected proboscis exactly like that of *Glossina*. Bruce adds, that the insect punctures the thick skin of the camel with its proboscis, the parts attacked breaking out into large bosses, which are also occasionally found upon the rhinoceros and elephant. It will be observed however that Bruce merely supposed these tumours to arise from the attack of the Zimb.

I think we have sufficient grounds for believing that Bruce has here jumbled together the notion of the buzzing of the *Æstrus* instilling dread into a herd of cattle, his knowledge of the piercing powers of the proboscis of the Sêtsé, and his knowledge of the tumours caused by the presence of the larvæ of *Æstri* under the skin of the camel*, rhinoceros and elephant. The College of Surgeons possesses a specimen of the larva of the *Æstrus* of the rhinoceros, and the camel is also subject to the attacks of a species of the same genus; whilst I consider that Bruce's figure is made up from memory, taking the statement of its resemblance to a bee and its possession of a proboscis together †. No instance, in fact, is known of a species which attacks these animals with its proboscis, forming tumours upon their backs such as are described by Bruce, which agree on the whole with the tumours caused by the larvæ of *Æstrus Bovis*; and we have already seen that no *Æstrus* is capable of inflicting a wound with the organs of the mouth, of which in fact all the known species are destitute, whilst the boring powers of their ovipositors are very questionable.

The accounts given by Mr. R. Gordon Cumming of the destructive powers of the Tsetse fully confirm the opinion here advanced, and prove that although "its bite is certain death to oxen and horses," it causes no dorsal tumours like an *Æstrus*. "This hunter's scourge," he says, "is similar to a fly in Scotland called *Kleg* ‡, but a little smaller; they are very quick and active, and storm a horse like a swarm of bees, alighting on him in hundreds and drinking his blood. The animal thus bitten pines away and dies, at periods varying from a week to three months, according to the extent to which he has been bitten." . . . "The next day one of my steeds died of the 'Tsetse.' The head and body of the poor animal swelled up in a most distressing manner before he died; his eyes were so swollen that he could

* Pliny was aware of the attacks of *Æstri* upon the camel, and he informs us that the merchants of Arabia were in the habit of anointing their camels with whale- and fish-oils. (Hist. Mund. lib. xxxii. p. 302, et lib. xi. cap. 16. p. 36. edit. Pancoucke.)

† It is evident from the note added by the editor of the 8vo edition, from which the above extracts have been made, that the drawing of the insect was not a *bonâ fide* one made on the spot, but was manufactured at home.

‡ *Kleg* is the local name for the *Hæmatopota pluvialis*.

not see, and in darkness he neighed for his comrades who stood feeding beside him *.”

The Marquis di Spineto, in a memoir published “On the Zimb of Bruce as connected with the Hieroglyphics of Egypt †,” endeavoured to ascertain the characters of this insect, and came to the conclusion that it belongs to the order Diptera, notwithstanding Bruce says that it very much resembles the Bee genus, and that it has “several of the properties of the *Bombylius*, the *Tabanus*, the *Æstrus*, and the *Hippobosca*, without belonging to any of them. In some of its generic and even specific characters it is like the *Bombylius* and *Æstrus*, in others like the *Hippobosca* and the *Muscidæ*, in a few like the *Tabanus* and the Dog-fly, whilst in the aggregate it differs from every one of these insects.” The Marquis points out the various relationships which the insect, as described by Bruce, presents to these different genera, considering that the porrected hairs or bristles forming the mouth “perform the office of suckers, simply because it does not lay its eggs in the flesh of animals; for according to the account which Bruce gives of the evils attending the attacks of this fly, the bosses which are produced swell, break and putrefy, but never exhibit any larvæ or maggots,” thus differing from the habits of the *Æstri*; to which however he adds, by some curious misconception, that “the larvæ of the *Æstrus* live in wood, which does not seem to be the case with the Zimb.”

The Marquis however identifies the Zimb with the *Κυνόμυια* or ‘Dog-fly’ of the Greeks, the ‘Tsal tsalya Kelb’ of the Alexandrian Church, the ‘Af an oulor’ of the ancient Egyptians, the ‘Arob’ or ‘Oreb’ of Exodus viii. 21, and the ‘*Æstrus*’ of Aristotle; and considers that it is the precise species of fly which caused the fourth of the plagues of Egypt ‡. As such, he also regards it as the insect represented on the Egyptian monuments at the head of the cartouches which enclose the hieroglyphical titles of the Pharaohs, and as a symbol of Lower Egypt (where only the insect occurs), the preceding figure being intended for a sceptre, in contradiction to the opinion of M. Champollion, who regards the figure of the insect as that of a bee; and consequently the signification of the two symbols as that of “King of an obedient people.” I can by no means however agree with this opinion of the Marquis Spineto, since an examination of various Egyptian monuments in the British Museum and elsewhere (in all of which the insect is represented under precisely the same form) has convinced me that it is intended to represent a Hymenopterous insect, and not one of the Diptera. It is in fact more like the figure of a common Wasp than any other ordinary insect; the

* Five Years of a Hunter's Life in the Far Interior of South Africa, ii. pp. 220, 227.

† Lond. and Edinb. Phil. Mag. 1834, vol. iv. p. 170.

‡ In the Article “Musquitoe” (Brit. Cyclop. Nat. Hist. iii. 299), I have suggested various reasons for supposing that the fourth plague of Egypt was caused by some species of *Culicidæ*, which, although not disproved, are certainly weakened by the knowledge now obtained of the real habits of the *Tsetse* or *Zimb*.

appendages of the head, which are obliquely porrected, are evidently intended for antennæ, and not for a bipartite proboscis; the wings, it is true, are only represented as two in number, but as the two on each side of the body in the Hymenoptera are hooked together, they would, by common observers, be regarded as but one; while the contracted form of the base of the abdomen is precisely that of some of the *Vespidæ* figured in the great French work upon Egypt. The *Polistes* represented in pl. 8. fig. 2 ♂. of that work indeed might almost be considered as the identical species intended to be represented on the monuments.

Mr. S. Birch indeed informs me that there is a coloured representation of this hieroglyphic figure on one of the Egyptian monuments in the British Museum, and that the banded colours of the abdomen leave no doubt that it is intended for a Wasp. Moreover the Egyptian name of this insect was the same as that of Upper Egypt, whilst the preceding figure was intended for a reed as emblematical of Lower Egypt, and consequently the two figures indicated the power of the monarch over both these parts of the empire.

To render this article more complete, I have added descriptions of two more tropical African species of *Glossina*, from the Collection of the Rev. F. W. Hope, together with that of another remarkable hitherto undescribed genus allied to *Glossina*, but distinguished by the very singular recurved proboscis and long styliiferous abdomen, also from tropical Africa.

GLOSSINA TACHINOIDES, Westw. (Pl. XIX. fig. 2.)

Cinerea, faciei striga longitudinali media fulva, epistomate argenteo-sericeo, thoracis dorso brunneo-maculato, scutello griseo maculis duabus brunneis punctisque duobus minutis apicalibus nigris, abdominis dorso carneo-griseo segmento singulo maculis duabus maximis fuscis, pedibus luteo-albidis, tarsis supra nigris.

Long. corp. lin. 4; expans. alar. lin. $8\frac{1}{2}$.

Hab. in Africa occidentali tropicali. (Mus. D. Hope.)

This species is smaller than the preceding and differently coloured. The terminal joint of the antennæ is more lunate in form and dusky coloured in front; the palpi are dusky coloured at the tip and clothed with black hairs. The upper surface of the thorax is ash-coloured, divided across the middle by an impressed line; the anterior half is marked on each side towards the fore angles with an oval brown spot, extending laterally and backwards into a lunate line, enclosing a smaller oval spot on each side towards the hinder angles: in the middle are two slender abbreviated brown lines, and two minute spots resting upon the transverse impressed line over which they are extended and dilated into a pair of somewhat larger spots in the middle of the upper surface of the thorax, each with a slender transverse line extending from it to the sides of the thorax, where it meets a curved lateral brown line enclosing a fainter oval spot, the hind extremity of each of which nearly joins, at the hinder angles of the back of the thorax, a straight line running forwards into the disk, where it vanishes.

The upper side of the abdomen may be described as of a brown colour, with the lateral and posterior edges and an ill-defined longitudinal central band of fleshy ash: it is thickly clothed with minute black hairs on the disk, and with long ones at the base and sides. The wings and their veins are coloured as in *Gl. morsitans*.

GLOSSINA TABANIFORMIS, Westw. (Pl. XIX. fig. 3.)

Griseo-fusca epistomate sericeo, thorace fusco-maculato, abdomine fusco-rufescenti apice sensim obfuscatō, pedibus fusco-luteis tibiis tarsisque nigro lineatis alis fusco infumatis.

Long. corp. lin. 6; expans. alar. lin. $13\frac{1}{2}$.

Hab. apud littus aureum Africæ tropicalis occidentalis. (Mus. D. Hope.)

This species is very much larger than either of the preceding. The head is comparatively much smaller and the wings much larger; the front of the head is dusky; it, as well as the basal joints of the antennæ, is rather thickly clothed with black hairs; the arista of the antennæ is luteous, with a dark line behind, and the branching setæ with which it is furnished are black; the palpi are thickly clothed externally with short black setæ; the thorax is dark greyish brown, also very thickly clothed with short black setæ and long curved lateral bristles; the back of the thorax is marked with a dark central longitudinal line, having a less distinct one on each side of it, between which and each side are two large brown spots, one behind the other; the scutellum is paler, and marked with two ill-defined dusky spots; the wings are stained brown; the legs are dirty luteous buff; the tibiæ marked with one, and the tarsi with three very delicate longitudinal black lines; the tibiæ are compressed, and the black line occupies the superior compressed ridge.

Tribe MYOPARIE, Macquart, Hist. Nat. Ins. Dipt. ii. 29.

Genus STYLOMYIA, Westw. (*Stylogaster*, Wlk. nec Macq.)

Corpus subelongatum capite thorace parum latiori, facie antice dimidio supero carinato, dimidio infero valde concavo. Antennæ porrectæ articulo basali minimo, 2do obconico, 3tio subovali præcedentis longitudine, vel præcedenti multo longiori compresso parum curvato, arista versus apicem marginis superi inserta, porrecta. Haustellum capite et thorace conjunctim triplo longius, porrectum, in medio geniculatum, dimidio basali parum deflexo et ad ejus apicem crassiori, dimidio apicali valde incurvato. Thorax brevis quadratus. Abdomen supra subconvexum parum curvatum, apice pone segmentum 5um in stylum elongatum (longitudine quinque articulorum præcedentium æqualem), deflexum valde angustum, contracto, hujus styli apice supero in uno sexu, oblique truncato; seta elongata supra hirsuta, lobo breviori compresso filamentisque duobus elongatis simplicibus in cavitate truncata insidentibus. Alæ breves cellula 1ma postica clausa pediculata et postice dilatata, vena obliqua cellulam postice contiguam claudente sub-

obsoleta; cellula anali brevissima vix pone pseudahulam extensa vena brevissima transversa clausa. Pedes elongati gracillimi, calcaribus duobus tibiæ parum elongatis, tibiis posticis difformibus, unguibus pulvillisque minutissimis.

This genus is very close to the American genus *Stylogaster*, but especially differs from the description given thereof by M. Macquart, in the very minute condition of the anal cell of the wings. The form of the head and the unequal division of the haustellum, as represented in M. Macquart's pl. 13. fig. 15, are also characters at variance with those of the insects of which I have composed the present genus. The anal cell is of small size in *Stachynia*, Mcq. (*Dalmannia*, Rob. D.), but it is still more minute in *Stylomyia*. The long slender legs and minute claws and pulvilli are also unlike those of all the other *Myopariæ*.

STYLOMYIA LEONUM, Westw. (Pl. XIX. fig. 4, and details.)

Rufo-fulva, facie argenteo-sericea antennis rufo-fulvis arista nigra, vertice subplano macula ovali nigra ocellos postice includente, haustello nigro basi subtus parum pallidiori, thorace scutello abdomineque rufo-fulvis stylo concolori fascia lata fere apicali nigra, pedibus fulvis tarsis apice fuscis, tibiis duabus posticis dimidio basali fusco, apicali albido; tarsis nigris.

Long. corp. lin., stylo excluso, 4; expans. alar. lin. 6.

Hab. in Sierra Leona, Africæ. (In Mus. D. Hope.)

The facets of the middle portion of the inner margin of the eyes are rather larger than the posterior ones. The wings are but slightly tinged with grey, and the veins are blackish. The extremity of the anal style with its filaments are fulvous coloured. The two posterior tibiæ are very slender at the base; the apical half is dilated on the upper edge, the under edge not being quite straight.—*Note.* All the details are taken from the species figured.

STYLOMYIA CONFUSA, Westw. *Fulva, facie argentea, vertice omnino nigro; antennis fulvis articulo 3tio antennarum longitudinem 2di vix superanti, ovali-conico, arista nigra; tuberculo antennifero pallide fulvo, haustello nigro basi fulvo; thorace supra nigro marginibus lateralibus angulisque anticis distincte et irregulariter luteis setis longis nigris. Scutello fusco setis duabus longis terminalibus nigris, pedibus quatuor anticis omnino luteo-albidis tibiis apice obscuris, femoribus duobus posticis fascia angusta ante alteraque pone medium fuscis; tibiis dimidio basali fusco fascia lata media alba, tertia parte apicali fusco, tarsis fuscis; abdomine fulvo segmentis 2do—5to margine postico tenui obscuro; styli dimidio basali fulvo-rufo; apicali nigro, genitalibus exertis fulvo-rufis; corpore subtus fulvo-albido. Præcedenti e tertia parte minor.*

Hab. —? (In Mus. Brit.)

Although in general form and proportion of its parts, especially of the terminal style of its abdomen, the specimen of this species in the British Museum agrees exactly with *St. Leonum*, yet the short third

joint of the antennæ, and the extraordinarily enlarged size of the middle facets of the inner margin of the eyes, might indicate it to be the opposite sex of the preceding. The second segment of the abdomen is furnished on each side with a small fascicle of elongated black hairs.

This species is introduced by Mr. F. Walker into his 'List of the Dipterous Insects in the Collection of the British Museum' (part iii. p. 680), under the name of *Stylogaster stylatus*; but it appears to me that it neither accords with Macquart's generic characters of *Stylogaster*, nor with the concise Fabrician specific description of *Conops stylata* (Syst. Antl. 177), nor yet with Wiedemann's more detailed observations, especially with reference to the sexual difference in the form of the antennæ (Auss. Eur. Zw. Ins. ii. 245).

DESCRIPTION OF THE FIGURES.

(ANNULOSA, PL. XIX.)

Fig. 1. *Glossina morsitans*, magnified. 1a, the head seen in front with the haustellum removed; 1b, the head seen sideways, the tips of the parts of the haustellum removed; 1c, the lower part of the head, with the parts of the haustellum separated and the hirsute palpi removed; 1d, the underside of the extremity of the head and the bulb seen beneath, showing the bulbous base of the haustellum; 1e, antenna greatly magnified, showing the villose anterior edge of the arista and the hirsute hairs with which it is furnished; 1f, the terminal joint of the tarsus, showing the strong unguis and the large setose pulvilli.

Fig. 2. *Glossina tachinoides* magnified.

Fig. 3. *Glossina tabaniformis* magnified.

Fig. 4. *Stylomyia leonum* magnified. 4a, the head and haustellum seen sideways; 4b, antenna; 4c, abdomen seen sideways; 4d and 4e, extremity of the abdomen with its appendages; 4f, hind leg; 4g, unguis and pulvilli.

3. ON THE MARINE MOLLUSCA DISCOVERED DURING THE VOYAGES OF THE HERALD AND PANDORA, BY CAPT. KELLETT, R.N., AND LIEUT. WOOD, R.N. BY PROFESSOR EDWARD FORBES, F.R.S. ETC.

(Mollusca, Pl. IX. & XI.)

Out of 307 species of shells collected by the voyagers, 217 are marine Gasteropoda, 1 is a Cephalopod, and 58 marine bivalves. The genera of which species are most numerous are—*Murex*, *Purpura*, *Trochus*, *Terebra*, *Strombus*, *Conus*, *Columbella*, *Littorina*, *Oliva*, *Cypræa*, *Natica*, *Patella*, *Chiton*, *Venus*, and *Arca*. Among the more local genera represented in this collection are, *Monoceros*, *Pseudoliva*, *Cyrtulus*, *Saxidomus*, and *Crassatella*. The specimens are usually in very fine preservation. Many of the species are rare or local.

The localities at which they were chiefly collected were the coast of southern California, from San Diego to Magdalena, and the shores of Mazatlan. Unfortunately the precise locality of many of the individual specimens had not been noted at the time, and a quantity of Polynesian shells, mingled with them, have tended to render the value of



W. H. Baile

Printed by Bullmandel & Walton.

Fig. 1. *Trochita spirata*. Forbes
 2. *Natica Bitchardi*. "
 3. *Natica Woodwardi*. "
 4. *N. Cooperi*. "
 5. *Panaxis pigra*. "
 6. *P. nigrutella* "

Fig. 7. *Trochus aureotinctus*. Forbes
 8. *T. Gallina*.
 9. *T. castaneus*. Nuttall
 10. *T. Hillii*. Forbes
 11. *T. purpuratus*. "
 12. *Purpura analoga*. "
 13. *P. fusca*. "



the collection as illustrative of distribution less exact than it might have been. A few specimens of considerable interest were taken by the 'Herald' at Cape Krusenstern. The new species are all from the American shores. There are no products of deep-sea dredging.

As many of the following new forms are from the coast of Mazatlan, Mr. Cuming, whose experience and advice has been taken, and magnificent collection consulted in drawing up this report, has considered it desirable that some undescribed shells contained in his collection, from that region, should be described and figured at the same time.

TROCHITA SPIRATA, sp. nov. (Pl. XI. fig. 1.)

T. testâ conicâ, fusco-purpureâ, longitudinaliter radiato-sulcatâ, sulcis numerosis, prominentibus, subrugosis; anfractibus 6, angustis; lamina internâ spirali, depressâ, magnâ, margine undulatâ.

Diam. $2\frac{3}{10}$, alt. $1\frac{4}{10}$ unc.

A very handsome species of this group, allied to *Calyptraea sordida* of Broderip, and differing from the well-known *T. trochiformis* in having very much narrower and more numerous whorls, as well as in its internal colouring. It was procured at Massaniello, in the Gulf of California.

TROCHUS CASTANEUS. Nuttall, MSS. (Pl. XI. fig. 9.)

T. testâ latè-conicâ, crassâ, læte castaneâ, spiraliter flavo-lineatâ, anfractibus 6, convexiusculis, omnibus spiraliter sulcatis, sulcis numerosis, ultimo lato, basi subangulatâ, convexo, imperforato, aperturâ subquadratâ, margaritaceâ, suturis impressis. Operculum?

Alt. $\frac{8}{10}$, lat. $\frac{8}{10}$, long. apert. $\frac{4}{10}$ unc.

The number of sulcations in the second whorl is about six; the cavities are always rich chestnut, the elevations yellowish. The general form is intermediate between that of *ziziphinus* and *alabastrites*. The shell has long been known under Nuttall's manuscript name, but never, so far as I am aware, described. It is from Upper California.

1871. 1053. **TROCHUS (MONODONTA) GALLINA, sp. nov.** (Pl. XI. fig. 8.)

T. testâ obtusè pyramidalî, crassâ (adultus ponderosus), spirâ magnâ, anfractibus 5, glabris, obsoletè obliquè striatis, convexiusculis, albidis, fasciis angustis numerosis purpureis ornatis, anfractu ultimo prope suturam subcanaliculatâ, basi lateribus rotundatis, umbilico albo, imperforato, impresso, aperturâ subquadratâ, labro externo subpatulo, margine acuto, lævi, nigrescente, labro columellari bidentato, albo, faucibus margaritaceo-albis, operculo circulari, corneo, fusco, spiris numerosissimis, confertis. Testa junior spirâ depressiusculâ.

Alt. $1\frac{1}{10}$, lat. max. $1\frac{2}{10}$, alt. apert. $0\frac{6}{10}$ unc.

Probably from the Mazatlan coast.

1871. 1053. **TROCHUS (MONODONTA) AUREO-TINCTUS, sp. nov.**

(Pl. XI. fig. 7.)

T. testâ obtusè pyramidalî, crassâ, spirâ mediocri, anfractibus 4 vel

5, *convexusculis*, *obtusè angulatis*, *subcanaliculatis*, *spiraliter 1-2 latè sulcatis*, *striis spiralibus minutis*, *longitudinalibus minutissimis sculptis*, *colore nigro obscurè minutissimèque griseo-lineato*, *ultimo anfractu basi subplanato 4-5 sulcis profundis spiralibus sculpto*, *marginè obtusè subangulato*, *umbilico profundè perforato*, *lætè aurantio*, *aperturá subrotundá*, *labro externo tenui*, *nigro marginato*, *labro columellari albo 1-2-dentato*, *dentibus inæqualibus munitis*, *dente inferiore minimo*, *fauce albo-margaritaceo*.

Alt. $0\frac{7}{10}$, lat. max. 1, alt. apert. $0\frac{4}{10}$ unc.

Variat costis obliquis transversis.

With the last

TROCHUS (MARGARITA) PURPURATUS, sp. nov.

(Pl. XI. fig. 11.)

T. testá turbinatá, *spirá depressá*, *prominulá*, *anfractibus 5*, *convexusculis*, *nitidis*, *lævigatis*, *striis incrementi minutissimis*, *roseolis fasciis spiralibus læte purpureis cinctis*, *suturis impressis*, *basi marginè subrotundato*, *umbilico imperforato*, *albo*, *aperturá subrotundá*, *labro externo tenui*, *labro interno lævi*, *obsoletè undulato*, *albo-margaritaceo*, *faucibus purpureo-margaritaceis*.

Alt. $0\frac{4}{12}$, lat. max. $0\frac{5}{12}$, alt. apert. $0\frac{2}{10}$ unc.

A beautiful little species. W. coast of N. America?

TROCHUS (MARGARITA) HILLII, sp. nov. (Pl. XI. fig. 10.)

T. testá latè turbinatá, *heliciformi*, *spirá obtusá*, *parvâ*, *depressâ*, *anfractibus 5 convexusculis*, *lævigatis*, *politis*, *ad suturas appressis*, *flaveo-albidis*, *ultimo anfractu maximo*, *basi convexo*, *marginibus rotundatis*, *centraliter excavato*, *imperforato*, *aperturá obliquè-subrotundá*, *labro externo tenui*, *columellari leviter arcuato*, *albo*; *faucibus albo-margaritaceis*.

Alt. $0\frac{4}{12}$, lat. max. $0\frac{5}{12}$, alt. apert. $0\frac{3}{12}$ unc.

From the northern shores of the W. coast of N. America?

I have dedicated this species to — Hill, Esq., Master of the 'Herald.'

NATICA PRITCHARDI, sp. nov. (Pl. XI. fig. 2.)

N. testá subglobosá, *spirá brevî*, *anfractibus 5*, *nitidis*, *sub lente striatis*, *flaveolis*, *fasciis transversis fusco-purpureis*, *angulato-undulatis flammulatis*, *in adulto obsoletis seu fascias obscuras spirales simulantibus*; *aperturá ovatá*, *superne obsoletè angulatá*, *columellá costá callosá albá spirali in umbilicum obliquè intrante*, *umbilico superne perforato*; *faucibus fasciato-fuscatis*. *Operculo calcareo*, *albo*, *lævi*, *polito*, *sulco angustissimo prope marginè externo*, *marginè interno recto*, *crenulato*.

Alt. 1 unc.; long. anfr. ult. $\frac{9}{10}$, lat. $\frac{9}{10}$ unc.; long. apert. $\frac{8}{10}$ unc.

Mazatlan. I have dedicated this pretty shell, which reminds us of the Atlantic *intricata*, to my friend Dr. Pritchard, Assistant-Surgeon of H.M.S. Calypso, who assiduously collected on the coast of Mazatlan, where he, as well as the officers of the 'Herald' and 'Pandora,' met with this species in abundance.

Fig. 2 c. represents the young shell.

PLANAXIS NIGRITELLA, sp. nov. (Pl. XI. fig. 6.)

P. testá ovato-lanceolatá, crassiusculá, fusco-nigrídá, spirá brevi, acutá, anfractibus 6, spiraliter sulcatis, interstitiis latis, planis, sulcis in medio anfractús ultimi obsolete, aperturá ovatá, patulá, supernè unidentatá, labro externo tenui, margine interno obsolete crenulato, labro columellari, supernè striato, infernè abbreviato, lævi; canali brevissimá, faucibus atropurpureis.

Long. $\frac{5}{12}$, lat. $\frac{3}{12}$, long. apert. $\frac{3}{12}$ unc.

Straits of Juan del Fuaco. The operculum is preserved in some of the numerous specimens, and has a subspiral nucleus (see fig. 6 a).

PLANAXIS PIGRA, sp. nov. (Pl. XI. fig. 5.)

P. testá ovato-lanceolatá, crassá, flaveolá, spirá mediocri, acutá, anfractibus 6, planatis, lævigatis, aperturá brevè-ovatá, patulá, supernè obsolete unidentatá, labris incrassatis, marginibus lævibus, canali brevissimá, faucibus albis.

Long. $\frac{4}{12}$, lat. $\frac{2}{12}$, long. apert. $\frac{2}{12}$ unc.

Its surface is invested with a soft yellow epidermis. The operculum is corneous, of subconcentric elements, with a lateral subspiral nucleus.

Pitcairn's Island.

NASSA COOPERI, sp. nov. (Pl. XI. fig. 4.) BM.1855.4.5.13

N. testá lanceolatá, turritá, crassá, anfractibus 6, convexiusculis, spiraliter sulcato-striatis, longitudinaliter 8-costatá; costis distantibus, fortibus, distinctis; anfractu ultimo $\frac{1}{2}$ longitudinis testæ æquante, aperturá ovatá, canali brevi; labro externo crasso, simplici; labro columellari reflexo, albo; caudá albá; anfractibus fuscis, obscure albo-fasciatis.

Long. $\frac{8}{12}$ unc., lat. anfr. ult. $\frac{4}{12}$, long. apert. $\frac{3}{12}$.

Marked from the Sandwich Isles. Dedicated to Lieut. Cooper, R.N., of the 'Herald.'

NASSA WOODWARDI, sp. nov. (Pl. XI. fig. 3.) BM.1855.4.5.18

N. testá lanceolatá, turritá, crassá, albá, rufo-fasciatá, anfractibus sex convexiusculis, spiraliter sulcatis, longitudinaliter densè-costatis, spirá vix longitudinem ultimi anfractús æquante; aperturá ovatá, caudá brevissimá; labro columellari reflexá, albá; caudá albá; fauce striato.

Long. $\frac{5}{12}$ unc.; lat. $\frac{2}{10}$ unc.; long. apert. $\frac{2}{12}$ unc.

With the last. Dedicated to — Woodward, Esq., R.N., Purser to the 'Herald.'

PURPURA ANALOGA, sp. nov. (Pl. XI. fig. 12.)

P. testá turritá, albidá, spiraliter latè rufo-fasciatá; spirá exertá; anfractibus 5 rotundatis, costis spiralibus (6 ad 8 in anfractu penultimo), quadratis, numerosis cinctis, interstitiis crenulatis, ad suturam obsolete, labro subdenticulato.

Long. $1\frac{4}{12}$, lat. $\frac{8}{12}$, long. apert. $\frac{8}{12}$ unc.

This species (from the Californian coast?) bears a striking resemblance to the Atlantic *Purpura lapillus*, and is intermediate between

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it and the *Purpura decemcostata* of Middendorff, from the Icy Sea at Behring's Straits, the place of which it probably takes on the western shores of North America.

Purpura, nov. sp.? A single specimen, to which I abstain giving a name, since its characters are intermediate between those of *decemcostata* and *Freycinetii* (a Kamtschatka shell); it is probably a variety of the former.

PURPURA FUSCATA, sp. nov. (Pl. XI. fig. 13.)

P. testâ oblongâ, subturritâ, fuscâ; spirâ brevi; anfractibus convexis, costis spiralibus (2 in anfractu penultimo) paucis distantibus subsquamosis cinctis, interstitiis costis obsoletis; aperturâ dilatâ, columellâ albâ.

Long. $1\frac{1}{2}$, lat. $\frac{8}{12}$, long. apert. $\frac{8}{12}$ unc.

A species of the *Lapillus* group. Said to have been taken at the Sandwich Islands.

Among the *Purpura* in the collection are *P. planospira*, *P. columellaris*, and *P. Carolensis*, all Galapagos species, and probably collected during the visit to those islands.

FUSUS KELLETII, sp. nov. (Pl. IX. fig. 10.) *See p. 53*

F. testâ crassâ, fusiformi, pyramidatâ, anfractibus 9, spiraliter striatis, angulatis, noduloso-costatis, costis in anfractibus omnibus 8, prope suturam obsoletis excavatis appressisque; anfractu ultimo $\frac{2}{3}$ testæ occupante; aperturâ elongato-pyriformi, superne angulatâ; inferne canali obliquo plus $\frac{1}{3}$ aperturæ æquante; labro columellari, reflexo, incrassato, labro externo attenuato, subdenticulato; caudâ incrassatâ, contortâ, reflexâ; colore sordide albido, ore albo.

Long. $3\frac{1}{2}$ unc.; lat. max. anfr. ult. $1\frac{2}{10}$ unc.; long. apert. $2\frac{3}{4}$ unc.; long. caud. $\frac{9}{10}$.

This remarkable shell was taken on the Californian coast, and is very distinct from any known *Fusus*. In general aspect it closely resembles a *Fasciolaria*, reminding us strongly of the European *Fasciolaria tarentina*, but is greatly larger and has no plaits on the pillar lip. The striæ which wind round the whorls are grouped in twos and threes. They become very strongly marked and assume the character of sulcations on the caudal portion of the body whorl. The ribs are mainly developed a little above the centre on the angulated portion of the body whorl and on the lower halves of the upper whorls, so prominently as to appear like large tubercles.

I have dedicated this unique shell to the eminent conductor of this important expedition.

Fusus Oregonensis was taken on the Californian coast, and *F. salebrosus* on the coast of Mazatlan.

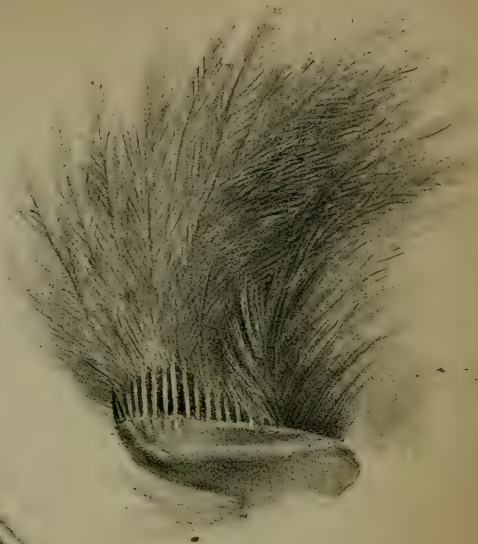
4. ON THE GENUS APTERYX. BY A. D. BARTLETT.

(Aves, Pl. XXX. XXXI.)

In calling the attention of the Meeting this evening to the large collection of specimens of the genus *Apteryx* on the table, I beg to state that I have been led to make a careful examination of all the



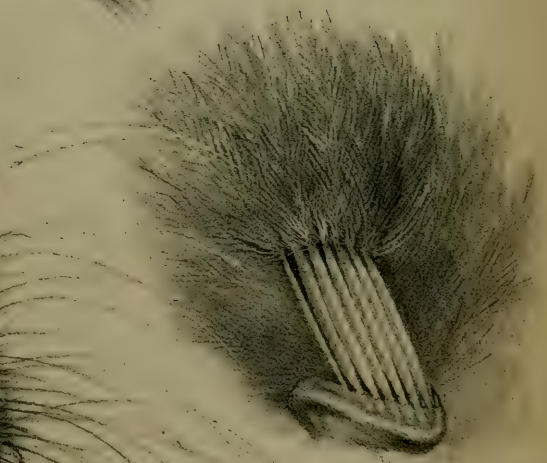
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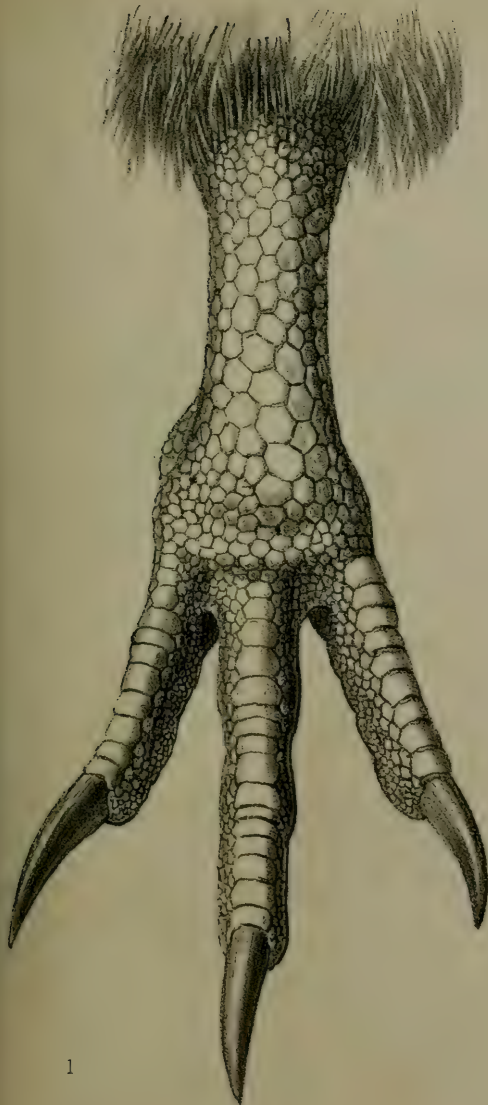


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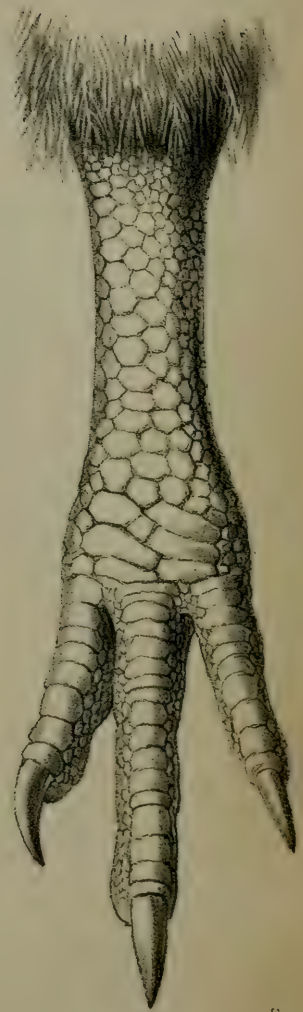
Wolf, lith.

M. & N. Hanhart, imp.

1. 2. *APTERYX AUSTRALIS*, — 3. 4. *A. MANTELLI*.



1



2

Wolf lith.

M. & N. Hanhart, Imp'

1. . . APTERYX AUSTRALIS. — 2. . . A. MANTELLI .

individuals I could find in the Collections of the British Museum, the Museums of the Zoological Society, the Royal College of Surgeons, and elsewhere, in consequence of an *Apteryx* belonging to Dr. Mantell having been placed in my hands by that gentleman a few days since, which appeared to me to differ from all that I had before seen. As a careful comparison of this bird with the specimens in the collections before mentioned fully justified me in considering it as a distinct species, I was about to describe it as a new one; but most fortunately, I heard that the original specimen figured and described by Dr. Shaw (to which he applied the name *Apteryx Australis*) was in the collection of the Earl of Derby at Knowsley. It is with much pleasure I have to acknowledge the kindness of his lordship in honouring me with the loan of this bird, which has enabled me to identify the large *Apteryx* placed in my hands by Dr. Mantell as belonging to this species, and also to determine most satisfactorily the distinctive characters of the common species, which is considerably smaller, and to which the name of *Apteryx Australis* has long been erroneously applied. This bird differs from the original *Apteryx Australis* of Dr. Shaw in its smaller size, its darker and more rufous colour, its *longer tarsus which is scutulated in front*, its shorter toes and claws, which are dark horn-coloured, its smaller wings, which have much stronger and thicker quills, and also in having long straggling hairs on the face. I may however remark, that although individuals of this species differ much in size, depending probably on age, sex, &c., I have found no exception to the distinctive characters above given. I therefore propose the name of *Apteryx Mantelli* for this smaller and more common species,—a humble effort to commemorate the exertions of Walter Mantell, Esq., to whom we are indebted for so many valuable discoveries in the natural history of New Zealand.

I subjoin a short description of the two species, together with figures of their legs and wings, in order that they may be more readily distinguished.

APTERYX AUSTRALIS.	APTERYX MANTELLI.
Colour pale greyish-brown, darkest on the back.	Colour dark rufous brown, darkest on the back.
Entire length 30 inches*.	Entire length 23 inches*.
Bill from forehead . . 6 „	Bill from forehead . . 4 „
Tarsus (reticulated) . 2 $\frac{1}{2}$ „	Tarsus (scutulated) . 2 $\frac{3}{4}$ „
Middle toe and claw 3 $\frac{5}{8}$ „	Middle toe and claw 2 $\frac{1}{2}$ „
Claws nearly equal in length, and white.	Middle claw longest, all the claws dark horn-colour.
Wings with soft slender quills; face with short hairs.	Wings with strong thick quills; face with long straggling hairs.

In conclusion, I would remark that the specimen of *Apteryx Australis* belonging to Dr. Mantell was collected by his son in *Dusky*

* The entire length, being taken from skins, I consider of little value; the entire length of a bird ought always to be taken before the bird is skinned.

Bay; and I have been informed by J. E. Gray, Esq., that the original bird described by Dr. Shaw was brought from the same locality. As far as I am able to ascertain, all the specimens of *Apteryx Mantelli* are from the North Island.

5. NOTE UPON BUCEROS GINGINIANUS. BY LIEUT. HARDY, IN A LETTER TO COLONEL SYKES, F.R.S., F.Z.S. ETC. COMMUNICATED BY COLONEL SYKES.

MY DEAR COLONEL,—I was out shooting one day beyond Palunpore, when a dull slate-coloured bird, about the size and figure of a magpie, flew past me; my beaters roared out to me to fire at it, but I let it go by. They made however such a fuss about it, and had marked it down on a tree, that I went after it and to their great delight shot it. They then told me that it was very valuable to them; that they would chop up the flesh, pickle and preserve it in a bottle, and sell it as a medicine to alleviate the pangs of child-birth, for which it was highly prized. In the course of the day two sepoy came to my tent and begged to have the bird, as they had been sent out by the Mewab expressly to shoot one, but had been out two days without success. They call it "Seerötra." None of my brother officers had ever seen or heard of it before. I kept the beak, and the other day turned it out with some other little trophies, and had it put together; if you will keep it as a little sporting tribute to my father's friend, I shall be very proud.

Sincerely yours,

EDMUND HARDY.

6. NOTE UPON TURDUS VULPINUS, HARTL. BY DR. HARTLAUB.

(Aves, Pl. XXXII.)

In presenting the accompanying figure of my *Turdus vulpinus*, from Caraccas, I have little to add to the description of it in the *Revue et Magasin de Zoologie*, 1849, p. 276. The only specimen I ever saw of this bird is in the Hamburg Museum. It is certainly a very aberrant species of *Turdus* and its American divisions, and would consequently justify a subgeneric separation, which however I leave to another.

7. ON NEW AUSTRALIAN BIRDS IN THE COLLECTION OF THE ZOOLOGICAL SOCIETY OF LONDON. BY JOHN GOULD, F.R.S. ETC.

(Aves, Pl. XXXIII. XXXIV.)

The first three species which I am about to describe in the present communication formed part of a collection presented to the Zoological Society of London by the late Captain Owen Stanley, R.N., whose



Wolf, lith.

M. & N. Hanhart, Imp.

TURDUS VILPINUS, Hartlaub.



Wolf, lith

M. & N. Hanhart Imp^r

MACHÆRIRHYNCHUS FLAVIVENTER *Gould.*

untimely death is a real cause of regret to every one who is interested in the sciences which he cultivated with equal ardour and success.

The collection in question was remarkable for the extreme beauty of the preparations, as well as for the rarity and interest of the species of which it was chiefly composed.

MALURUS AMABILIS.

Male: Head, ear-coverts and centre of the back delicate violet-blue; lores, throat, breast, crescent across the upper part of the back and the rump deep bluish black; scapularies chestnut; wings brown, the secondaries slightly margined with white; abdomen white, very slightly tinged with buff on the flanks; tail dull greenish blue, the four lateral feathers margined externally and largely tipped with white; bill black; irides and feet dark brown.

Total length, $5\frac{1}{2}$ inches; bill, $\frac{1}{2}$; wing, 2; tail, $2\frac{3}{4}$; tarsi, $\frac{7}{8}$.

Hab. Cape York, Northern Australia.

Remark.—This species is nearly allied to *Malurus Lamberti*, *M. elegans*, and *M. pulcherrimus*, but differs from them all in having the lateral tail-feathers distinctly margined and tipped with white, and in having a lighter-coloured abdomen. I consider it to be the most beautiful species of the genus yet discovered; the only example I have seen is in the collection of this Society.

Family MUSCICAPIDÆ?

Genus MACHÆRIRHYNCHUS.

Gen. Char.—Bill rather shorter than the head, very much depressed and widely dilated, causing it to assume a lancet-like form; culmen elevated, forming a distinct ridge down the centre of the upper mandible, and continued over its extremity in the form of a sharp hook; under mandible convex; tomie straight, the upper very slightly overlapping the lower; rictus beset with fine but stiff bristles; nostrils oblong, partly covered with an operculum, and seated in large and deep depressions occupying the basal half of the upper mandible; wings short and somewhat rounded, the first quill very short, the second much shorter than the third, the fifth the longest; tail moderate in length, distinctly graduated, the outer feather being little more than half the length of the central ones; tarsi moderate in length and slight in structure; toes feeble, particularly the anterior ones; the two outer toes equal in length, and united from the base to the first joint; hind toe rather long; claws hooked and very sharp.

MACHÆRIRHYNCHUS FLAVIVENTER. (Aves, Pl. XXXIII.)

Crown of the head, lores, ear-coverts, wings and tail black, the wing-coverts tipped with white; the secondaries margined with white, and the outer tail-feathers margined on the apical portion of the external web and largely tipped with white, the white becoming less and less, until only a slight trace of it is found on the central feathers; back olive-black; throat white; line from the nostrils over each eye,

the breast, abdomen and under tail-coverts bright yellow ; bill black ; feet bluish black.

Total length, 5 inches ; bill, $\frac{5}{8}$; wing, 2 ; tail, $2\frac{1}{4}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

In the possession of the Zoological Society.

PTILOTIS FILIGERA. (Aves, Pl. XXXIV.)

Upper surface, wings and tail rich olive-brown, with numerous small marks of greyish white on the apical portion of the nuchal feathers ; the wing-coverts broadly, and the remainder of the feathers narrowly edged with brownish buff ; from the gape beneath the eye a streak of white ; ear-coverts blackish grey ; from the centre of the lower angle of the ear-coverts a very narrow streak of silky yellow, which, proceeding backwards, joins the line of white from beneath the eye ; throat brownish grey ; under surface sandy buff, the feathers of the breast and the middle of the abdomen with lighter centres ; bill olive-black ; naked space beneath the eye yellow ; legs and feet slate-colour.

Total length, $7\frac{3}{4}$ inches ; bill, 1 ; wing, 4 ; tail, 3 ; tarsi, $\frac{7}{8}$.

Hab. Cape York, Northern Australia.

Remark.—The young is destitute of the white marks on the nape, and has the under surface more rufous, and without the lighter centres.

This species is somewhat allied to *Ptilotis unicolor*.

In the collection of the Zoological Society.

ARSES KAUPI.

Small spot on the chin, crown of the head, lores, line beneath the eye, ear-coverts, broad crescentic band across the back, and a broad band across the breast, deep shining bluish black ; wings and tail brownish black ; throat and a broad band across the back of the neck white ; lower part of the back and abdomen white, the base of the feathers black, which, occasionally showing through, give those parts a mottled appearance ; bill bluish horn-colour, becoming lighter at the tip ; feet black.

Total length, $6\frac{1}{2}$ inches ; bill, $\frac{1}{2}$; wing, $3\frac{1}{8}$; tail, $3\frac{1}{4}$; tarsi, $\frac{3}{4}$.

Hab. North coast of Australia.

Remark.—I embrace this opportunity of paying a just compliment to my friend Dr. Kaup, whose ornithological labours are so well known to all naturalists : the compliment is the more appropriate, as he is at this time engaged in preparing a monograph of the *Muscicapidæ*, to which family this bird belongs.

Genus PYCNOPTILUS.

Gen. Char.—Bill shorter than the head, slightly notched at the tip ; culmen inclining downwards ; nostrils basal, rather large, and partially covered with an operculum ; base of the bill beset with a few fine bristles ; wings short, very concave, round in form, the first quill very short, the second, third, fourth and fifth gradually increasing in length, the sixth, seventh, eighth and ninth equal and the longest ; tail moderately long, rounded, the feathers soft and yielding ; tarsi



Weif. lith.

M. & N. Hanhart, Impf.

PTILOTTIS FILIGERA. *contd.*





J. Wolf, lith.

M & N. Hanhart imp^t

ORIOLUS BRODERIPII. Bonap

considerably longer than the toes ; hind-toe strong, lateral toes equal ; plumage dense and silky.

PYCNOPTILUS FLOCCOSUS.

General plumage brown, inclining to rufous on the lower part of the back, upper tail-coverts and tail ; forehead, lores, throat and breast dark reddish buff, with a very narrow crescent of dark brown at the tip of each feather ; centre of the abdomen greyish brown, crossed by crescentic bands of black ; flanks and vent brown, passing into deep rufous on the under tail-coverts ; bill brown ; base of the under mandible fleshy brown ; legs and feet fleshy brown.

Total length, 7 inches ; bill, $\frac{5}{8}$; wing, $2\frac{3}{4}$; tail, 3 ; tarsi, $1\frac{1}{8}$.

Hab. Interior of New South Wales.

8. DESCRIPTIONS OF TWO NEW SPECIES OF ORIOLE.

BY CHARLES LUCIEN, PRINCE BONAPARTE.

ORIOULUS BRODERIPPII, Bp. (Aves, Pl. XVIII.) *O. vividè flavo-aurantius ; coronâ occipitali, alis, reatricibusque ad basim mediis duabus ferè omnino nigris ; speculo alari flavo.*

Hab. in insulâ Sumbava.

Magistratui illustri, litium Conciliatori intricatissimarum, qui intimas Doctrinæ Naturalis recessus Populo humanissimè patefacit !

After the separation of *aureus* and *regens* this new species is certainly the most splendid of the true *Orioli*, of which I know fifteen species. It must therefore stand first in the series coming from *Sericulus*. Its nearest approach is *O. cochinchinensis* (*hippocrepis*, Wagl.), similar in form and stature. But in addition to its even stouter bill, the general orange hue and the yellow spot on the wing will at once distinguish our *Broderippii*.

Having dedicated an Oriole to Broderip, I dedicate a second new species to our Italian Broderip, Professor Fr. Baraffi of Turin, the celebrated and learned traveller.

ORIOULUS BARAFFII, Bp. *O. flavo-olivaceus ; cervice, corporeque subtus flavissimis ; capite, nuchâ, juguloque nigerrimis ; alis nigris, speculo angustè albo ; reatricibus nigris, apice externarum magis magisque flavis.*

Hab. Ashantee.

This bird, received at the Leyden Museum from the West Coast of Africa, is similar in stature and colour to *Oriolus moloxita*, Rüpp. of the Eastern Coast, but well distinguished by the conical marking on the tail, which is similar to that of the common Oriole, the *Broderippii*, and *chinensis*, entirely wanting on the tail of *O. moloxita*.

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ERRATUM.

Page 106, Art. 4, for *Metopocerus cornutus* read *Iguana rhinolopha* throughout.

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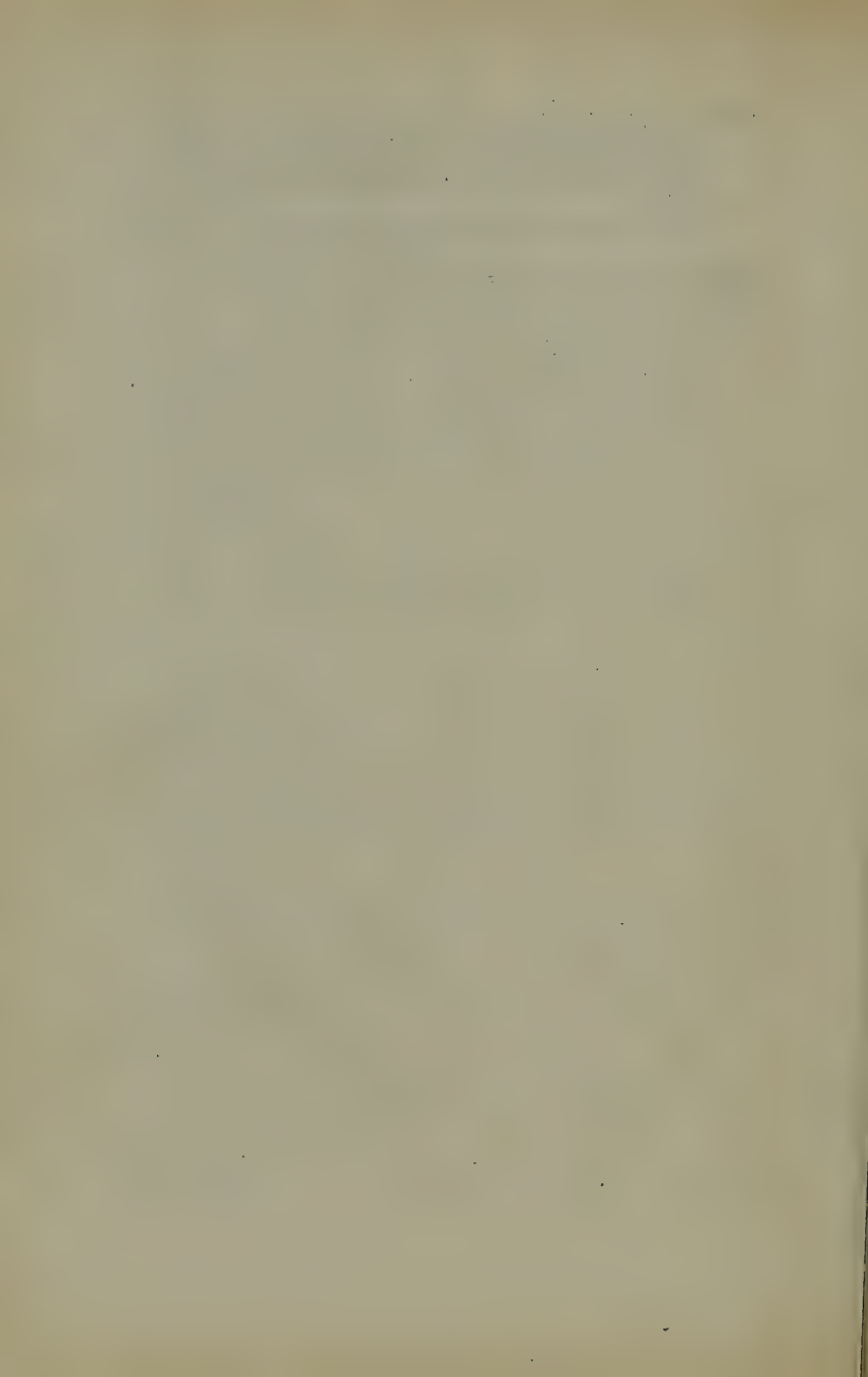
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BALENNIER. *Sula leucogaster*

M. & N. H. CO. N. Y.

PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 14, 1851.

Prof. Owen, F.R.S., Vice President, in the Chair.

The following papers were read:—

1. ON A NEW AND MOST REMARKABLE FORM IN ORNITHOLOGY.
BY JOHN GOULD, F.R.S. ETC.

(Aves, Pl. XXXV.)

I have the pleasure of introducing to the notice of the Society on the present occasion the most extraordinary bird I have seen for many years, and which forms part of a collection made on the banks of the upper part of the White Nile, by Mansfield Parkyns, Esq., of Nottingham. For this bird I propose the generic name of *BALENICEPS*, with the following characters:—

Bill enormously robust, equal in breadth and depth; sides of the upper mandible much swollen; culmen slightly elevated, depressed in the middle of its length, and terminating at the point in a very powerful hook; tomia sharp, turning inwards and very convex; lower mandible very powerful, with a sharp concave cutting edge and a truncated tip; nostrils scarcely perceptible, and placed in a narrow slit at the base of the bill, close to the culmen; orbits denuded; head very large; occiput slightly crested; wings very powerful, the third, fourth and fifth feathers the longest; tail of moderate length and square in form; plumage soft and yielding; skin of the throat loose, and capable of dilatation into an extensive pouch; tibiae and tarsi lengthened, the latter a fourth shorter than the former; the lower third of the tibiae denuded; toes four in number, all extremely long, and without the slightest vestige of interdigital membrane; hind-toe on the same plane as the anterior ones and directed inwards; tibiae and tarsi reticulated, the reticulations becoming much smaller

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on the joints; upper surface of the toes scutellated; nails powerful, and not much curved; the nail of the centre toe impectinated.

BALÆNICEPS REX.

Bill pale yellow, becoming horn-colour on the culmen and tip, and blotched with dark brown; orbits pale yellow; head and neck slaty grey, darkest on the crown; chest ornamented with lanceolate feathers of a similar colour, with a dark stripe down the centre; abdomen, flanks, thighs and under tail-coverts very pale grey; upper surface generally very dark grey, most of the feathers margined with light grey; primaries, secondaries and tail blackish grey; rump and upper tail-coverts light grey; legs greyish black.

Total length, from the tip of the bill to the extremity of the tail, 52 inches; from the tip of the bill to the end of the centre toe, 67; bill, from the gape to the tip, 9; depth of the bill, $4\frac{3}{4}$; breadth, 4; wing, 27; tail, 12; tibiæ, 13; tarsi, 10; middle toe and nail, 7; external toe and nail, $6\frac{1}{2}$; internal toe and nail, $5\frac{1}{4}$; hind toe and nail, 4.

Hab. The upper part of the White Nile, in Eastern Africa.

Remark.—This is evidently the Grallatorial type of the *Pelecanidae*; at least such is the conclusion to which I am directed after a careful examination and comparison of it with *Pelecanus*, *Grus*, *Ardea*, and *Cancroma*, to none of which genera is it so nearly allied, except in general contour, as to *Pelecanus*. Perhaps the most singular feature connected with this form is the entire absence of interdigital membrane, a character so conspicuous in the Storks, Herons, and the Boat-bill, which latter bird is as nearly allied to *Nycticorax* as the present bird is to *Pelecanus*. Both *Cancroma* and *Nycticorax* have the nail of the centre toe strongly pectinated, which character is not found in *Pelecanus* nor in *Balæniceps*.

2. DESCRIPTIONS OF TWENTY SPECIES OF COLUMBELLÆ, AND ONE SPECIES OF CYPRÆA. BY J. S. GASKOIN.

1. COLUMBELLA TENUIS. *Testa pyramidalis, subventricosa, laevis, tenuis, albicans, maculis irregularibus fuscis magnis longitudinaliter dispositis; anfractibus octo, duobus anticis gibbosis; spirâ subelongatâ, acuminatâ; aperturâ latâ, anticè divergente, posticè acuminatâ, labio externo tenui, internoque edentulo, varice externo subelevato; striis tenuibus ab varice anticè continuis; canali brevi.*

Shell pyramidal, rather ventricose, smooth, thin, of a dull whitish colour, with large distant dark brown markings extending, irregularly, in width and form longitudinally over the volutions, which are eight in number, the two anterior being gibbous, the others proceed to form an acuminated apex; the spire constitutes more than one-half the length of the shell*; aperture wide, diverging anteriorly,

* In estimating the proportionate length of the spire of the shell, I take the measurement from the termination of the last volution at its junction to form the posterior point of the aperture; and the width, at the largest diameter of the anterior whorl.

acuminated posteriorly; outer lip curved outwards, thin, without denticulations, as is also the inner lip, which is shining, and within of the same colour as the shell; a slightly elevated varix terminates the inner edge of the aperture, from which fine striæ pass obliquely forward over the dorsum to the anterior portion of the outer lip; channel short, slightly curved.

Length, $\frac{6.0}{100}$ of an inch; width, $\frac{2.7}{100}$ of an inch.

Hab. —? Cab. Gaskoin, specimen unicum.

2. *COLUMBELLA ALBINODULOSA.* *Testa oblongo-ovata, pallidissime luteo-fulva, fasciis angustis interruptis tribus brunneis; spirâ acuminatâ, anfractibus septem; nodulis latis prominentibus subdistantibus albi-coronatis; aperturâ oblongâ subquadratâ albâ; labio externo crasso, recto, submarginato, intus denticulato; dentibus posticis majoribus, labio interno dentibus irregularibus subvaricosis; canali recto latiusculo subelongato.*

Shell oblong-ovate, of a very light yellowish brown colour, with three interrupted or dotted dark brown narrow bands, the first extending from the anterior point of the outer lip to the centre of the aperture, the second from the anterior third of the margin of the outer lip to the posterior part of the aperture, and the third from the posterior third of the margin of the outer lip along the anterior portion of the volutions spirally to the apex; broad nodules or tubercles, moderately prominent and rather distant, exist from the posterior portion of the outer lip over the dorsum or shoulder, and continuously on the centres of the whorls, and as the whorls become narrow, occupy them longitudinally on to the point of the spire, each nodule being crowned with an opaque white blotch; opaque white irregular markings are also on the anterior volution; spire acuminated, constituting rather less than one half the length of the shell; seven volutions, rather convex; aperture straight, rather wide; outer lip sharp at its edge, straight, curving suddenly on forming the channel; just within the lip is a row of about eight rather prominent teeth, the posterior being the larger; inner lip slightly denticulated with about six irregular varices, with a slight sharp prominence at its margin, the large whorl ribbed with fine striæ, most prominent anteriorly; channel straight, rather wide, slightly elongated and recurved.

Length, $\frac{4.5}{100}$ of an inch; width, $\frac{2.0}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

3. *COLUMBELLA INTERRUPTA.* *Testa oblongo-ovata, albicans, fasciis duabus interruptis latis rufescenti-brunneis; fasciâ anticâ pallidiore; spirâ acuminatâ, anfractibus septem vel octo; aperturâ latiusculâ præcipuè ad partem posticam; labio externo crasso margine acuto, intus denticulato, denticulis quatuor vel quinque; labio interno cum margine externo denticulato, aurantiaco; testâ extus cancellatâ striis spiralibus validis, longitudinalibus tenuibus; peritremate pallide aurantiaco, posticè subobtusè angulari; canali breviusculo latiusculo.*

Shell oblong-ovate, of a dull greyish white colour, with two distinct,

strongly marked, interrupted, broad, dark reddish brown bands, the anterior being the less deeply coloured, the markings being rather crescentic, with the horns pointing towards the aperture becoming more arrow-shaped advancing onwards; the anterior band extends from the fore part of the outer lip to the middle of the inner side of the aperture, the second from the posterior part of the edge of the outer lip over the dorsum at the shoulder, and spirally on the centres of the volutions to the apex; at the superior portion on the aperture side of each marking is an opaque white colouring; spire acuminate, seven to eight whorls; at the suture, spirally on to the apex, is a fine whitish varix having interrupted brown markings along its entire course; aperture rather straight and broad, widening posteriorly; outer lip thick, sharp at its edge, orange-coloured at its inner border, where there are four or five slight denticulations; inner lip has a finely denticulated ridge at its outer edge of an orange colour, within it is an angular projection forming the commencement of the channel; the whole external shell is cancellated, the transverse striæ being much stronger than the longitudinal, and especially anteriorly; peritreme of a light orange colour, rather obtusely angular posteriorly; channel rather short and moderately wide.

Length $\frac{4.0}{100}$ of an inch; width, $\frac{2.1}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

4. *COLUMBELLA LEUCOSTOMA.* *Testa ovata, albicans, nitens, posticè fasciâ latâ brunneâ spirali ornata; apice albicante dimidio antico anfractûs ultimi albido; spirâ acuminatâ, anfractibus septem; aperturâ gulâque albis latiusculis, illâ posticè subquadratâ, labio externo intus subdenticulato, dentibus sex posticis majoribus; canali brevi latiusculo.*

Shell ovate, shining, of a whitish colour, having a broad brown band occupying the posterior half of the anterior volution and the entire of the sixth, fifth and fourth, except at their posterior edge, which is white, the brown band terminating in an undefined line near the suture; the three apicine whorls are white, with very fine lightly coloured linear markings, and in like manner is the white anterior half of the last whorl finely but irregularly streaked; spire acuminate, seven volutions, which constitute the greater half of the length of the shell; aperture white, as is also the interior, rather broad, somewhat square posteriorly; outer lip gradually curved inwards, having within it about six slight denticulations, the posterior being the larger; inner lip smooth, spiral; a few fine striæ extend obliquely forwards over the dorsum of the channel from the slight varix at its outer edge; channel short, rather broad.

Length, $\frac{3.5}{100}$ of an inch; width, $\frac{1.7}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

5. *COLUMBELLA PACIFICA.* *Testa oblongo-ovata, lacteo-opaca, maculis irregularibus distantibus rufescenti-brunneis ornata; intus alba; spirâ acuminatâ, anfractibus convexis septem vel octo posticè obtusissimè coronatis; aperturâ latâ rectiusculâ;*

labii externi margine tenui intus edentulo; labio interno lævi externè margine tenui; anfractu ultimo anticè valde striato, striis tenuioribus longitudinaliter decussantibus; canali brevi, lato, subrecurvo.

Shell oblong-ovate, of an opaque milk-white colour, distantly maculated with dark reddish brown irregular markings, internally white; spire acuminate, constituting the greater half of the length of the shell; volutions seven to eight, convex, their posterior margin generally very obtusely and distantly coronated; aperture wide, rather straight; outer lip thin at the edge, even, no denticulation within, marginated; inner lip even, having a very slight straight edge or varix externally, from which rather strong striations pass over the anterior of the dorsum to the outer lip, and very much finer striæ longitudinally pervade the same; channel short and wide, very slightly curved.

This shell differs from *Columbella Miser*, Sowerby, in the absence of denticulation, in the last volution being much more gibbous, the aperture much wider, the channel decided, the spire more pyramidal, and much less coloration and markings.

Length, $\frac{4.5}{100}$ of an inch; width, $\frac{2.5}{100}$ of an inch.

Hab. Sandwich Islands. Cab. Gaskoin.

6. *COLUMBELLA VARICOSA*. *Testa oblongo-ovata, nitens, crassa, albicans, colore nigricanti-brunneo irregulariter induta; marginibus posticis anfractuum albicantibus; spirâ acuminatâ, anfractibus septem vel octo subventricosis varicosis validis prominentibus subobliquis instructis; parte anticâ ultimi anfractûs lævigatâ, anticè supra canalem transversè striatâ; aperturâ oblongâ subquadratâ rectâ intus cærulescente, labio externo recto, marginato posticè incisurâ magnâ instructo, intus denticulato denticulis posticis validiusculis, labio interno lævi margine elevato tenui; canali brevi latiusculo.*

Shell oblong-ovate, shining, thick, strong, of a white colour, generally irregularly and greatly covered, more or less intensely, with an almost black-brown coloration, excepting the posterior edges of the whorls, where it remains nearly white; spire acuminate, constituting one half the length of the shell, has seven to eight volutions, rather convex, slightly diagonal; strong, prominent, somewhat distant varices exist on the posterior margin of the last whorl, the anterior portion of which have many striæ passing transversely and obliquely forwards from the columellar edge of the aperture; aperture oblong, rather square and straight, internally of a bluish white colour; outer lip straight, marginated, having a rather large notch at the junction with the body of the shell, and having anteriorly to this notch, within, about five or six slight denticulations, the posterior being the larger; inner lip smooth, without denticulation, edge slightly elevated and thin; channel short, rather broad.

Length, $\frac{8.0}{100}$ of an inch; width, $\frac{3.5}{100}$ of an inch.

Hab. Peyta, Peru. Cab. Cuming, Gaskoin.

7. *COLUMBELLA AUSTRALIS*. *Testa oblongo-ovata, albicans,*

maculis parvis irregularibus brunneis inæqualibus ornata, majoribus saturatoribusque apud marginem posticum anfractuum positis; spirâ acuminatâ, anfractibus octo subgibbosis, apice albicante; aperturâ latiusculâ intus cærulescente, labio externo recurvo ad canalem convergente, intus denticulis septem ad octo subprominentibus subdistantibus, labio interno lævi anticè angulifero; canali latiusculo brevi recurvo, anfractu ultimo anticè transversim striato; peritremate posticè angulari.

Shell oblong-ovate, of a whitish colour, greatly covered with small, irregular, dark brown, conjoined specklings, of unequal intensity in coloration, the larger and darker markings being at the edges of the whorls; three rather narrow interrupted bands traverse the last whorl, the posterior one proceeding along the anterior margin of the volutions; spire acuminated, being rather the greater half-length of the shell; volutions eight, slightly gibbous, the four apicue white; aperture rather broad, internally of a bright pinkish blue-white colour, slightly iridescent; outer lip a little curved, converging at the channel; within are seven or eight irregular, slight elevations or denticulations, rather distant, at the anterior portion of the edge are several fine denticulations; inner lip smooth, with a very slight thin varix at the anterior part; an obtuse angularity forms the commencement of the channel; channel rather wide, short, and a series of rather fine parallel striæ traverse the anterior part of the last whorl; peritreme angular posteriorly.

Length, $\frac{80}{1000}$ of an inch; width, $\frac{25}{1000}$ of an inch.

Hab. Sydney. Cab. Gaskoin, Cuming.

8. **COLUMBELLA CANCELLATA.** *Testa ovata, pallidè aurantiaco-brunnea; apice roseo, superficie omnino cancellatâ, serie posticâ granulorum majore; spirâ acuminatâ anfractibus septem; aperturâ latiusculâ brevique, labio externo-subrecurvo convergente, intus denticulis quatuor vel quinque subprominentibus, labio interno lævi; canali latiusculo, brevi, peritremate posticè obtusè angulari.*

Shell ovate, of an uniform light orange-brown colour, except the apex, which is pink, deeply cancellated over its entire surface, having the posterior line of nodules larger than the others; spire acuminated, and forms rather more than half the length of the shell; volutions seven; aperture rather broad and short; outer lip slightly curved, converging towards the channel; within it are four or five rather prominent denticulations; inner lip smooth, very obtusely nodulated at its exterior slightly elevated edge; channel moderately broad, short, curved towards the columella; peritreme obtusely angular posteriorly.

Length, $\frac{35}{1000}$ of an inch; width, $\frac{18}{1000}$ of an inch.

Hab. West Indies. Cab. Gaskoin.

9. **COLUMBELLA PULLA.** *Testa oblongo-ovata, saturate brunnea; parte anticè ultimi anfractûs, columellâque albicantibus; spirâ acuminatâ, anfractibus octo vel novem, convexiusculis,*

suturá lævi; aperturá latiusculá posticè acuminatá, labio externo tenui lævi, intus subdenticulato, saturate brunneo, labio interno lævigatè subdenticulato, anticè subalbido, margine interno varicem rectum efformante, parte anticè testæ transversim striatá; canali mediocri, recto.

Shell oblong-ovate, of an uniform dull, very dark brown colour, and also within, excepting the columella and edge of the outer lip, which are white; spire acuminated; volutions eight or nine, slightly convex, even at the suture; aperture rather acuminated posteriorly; outer lip thin, smooth, internally slightly denticulated; inner lip shining, with slightly elevated nodules or teeth, and its edge forms a fine straight varix, from which a few thin striæ pass over the dorsum of the channel; channel moderately wide and straight.

Length, $\frac{5.2}{100}$ of an inch; width, $\frac{2.0}{100}$ of an inch; length of spire, $\frac{3.0}{100}$ of an inch; length of last whorl, $\frac{2.2}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

10. COLUMBELLA INTEXTA. *Testa oblonga, angusta, lævis, albicans, strigis punctulisque irregularibus saturate brunneis ornata; spirá acuminatá, anfractibus novem vel decem; marginibus posticis anfractuum brunneo maculatis, ultimo anfractu anticè similariter colorato; suturá elevatá; aperturá breviusculá angustáque, labio externo arcuato, ad marginem acutiusculo, extus crassiusculo, ad canalem convergente, labio interno ad marginem subvaricoso, lævi, edentulo; canali breviusculo, angustato, extus transversim striato.*

Shell elongated, narrow, smooth, of a dull whitish colour, having dark brown irregular dottings and streaks pervading the entire surface of the shell; irregular, rather large and distant, similarly coloured spots are on the posterior margin of the volutions to the apex, and a band, similarly indicated at the anterior part of the last whorl; spire acuminated, constituting about two-thirds of the length of the shell; volutions nine to ten, suture elevated; aperture rather short and narrow; outer lip arched, sharp at its edge, thickened externally, converging towards the channel; inner lip slightly ridged at its edge, smooth, without denticulations; channel rather short, somewhat narrow, externally transversely striated.

Length, $\frac{5.5}{100}$ of an inch; width, $\frac{2.0}{100}$ of an inch.

Hab. Australia. Cab. Cuming, Gaskoin.

11. COLUMBELLA CONTAMINATA. *Testa oblonga, lævis, saturate brunnea, intus subalbida, lineâ suturali albicante subinterruptâ; spirá acuminatá dimidium testæ superante, anfractibus octo vel novem convexiusculis; aperturá posticè latá, anticè angustiore, margine externo lato, crasso, intus denticulis linearibus sex vel septem; margine interno tenui, albicante, intus denticulis prominentibus confertis albicantibus sex supra columellam continuis, columellâ interstitiisque rufescenti-brunneis; canali prominente angusto subrecurvo, margine interno violaceo, parte externâ transversim striatá.*

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Shell oblong, smooth, of an uniform light brown colour, whitish within; a narrow interrupted white band proceeds from the middle of the margin of the outer lip and continues along the posterior edge of the volutions to the apex; a less defined band traverses the dorsum more anteriorly, and terminates at the middle of the inner side of the aperture; spire acuminated, comprising more than one half the length of the shell; volutions eight to nine, slightly convex, suture a little elevated; aperture rather wide, shining, broader posteriorly; outer lip whitish, and thick externally, edge sharp, violaceous for a little distance within, with six or seven linear denticulations; inner lip, a fine whitish varix extends from the curve of the aperture to the anterior point of the channel; within this varix, at its centre, are five or six denticulations, closely set, parallel, prominent, proceeding over the columella, whitish at their edges, the interstices and the portion exterior to them being of a reddish brown colour; channel projecting, narrow, slightly recurved, with a dark violaceous colour within; a number of rather strong striæ pass from the inner side of the aperture to the edge of the anterior half of the outer lip.

Length, $\frac{5.0}{100}$ of an inch; width, $\frac{2.0}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

I have seen but one of this characteristic species: the aperture is allied in form to that of *Columbella Puella*, Sowerby. It may be convenient to readers to state, that the species *Col. Puella* is by accident, in the index of the 'Thesaurus Conchyl.' of Sowerby, jun., entered as *Col. Nympha*.

12. COLUMBELLA MARQUESA. *Testa oblongo-ovata, albicans; anfractibus sex vel septem; 4 vel 5 posticis roseis, longitudinaliter striatis, anfractibus tribus anticis lævibus spiraliter rufescenti-brunneo lineatis; spirâ acuminatâ, dimidium testæ æquante; aperturâ mediocri rectiusculâ; labii externi margine tenui posticè marginato, extus incrassato, edentulo, labio columellari lævi nitido, margine crassiusculo elevato; canali extus transversim striato, brevi.*

Varietas hujus testæ major differt pro colore.

Shell oblong-ovate, of a dull white colour; spire acuminated, forming about one-half the length of the shell; volutions six to seven, which, with the last volution, the columellar side of the shell forms an even convexity; the first four or five whorls are of a rose or bluish-pink colour, minutely longitudinally striated; the others are smooth, with somewhat distant fine brown lines, seven, eight, or so in number, passing spirally and continuously from just within the outer lip along the three last whorls, to the commencement of the pink striated volutions; aperture moderately wide and long, rather straight; outer lip sharp at its edge, forming a notch at its junction with its next whorl, thickened externally, without denticulation; inner lip also edentulate, smooth, shining, externally forming a rather thick, slightly elevated varix, which extends to the extremity of the channel, and from the whole length of this varix fine striæ pass over

the dorsum of the channel to the anterior portion of the outer lip ; channel short.

A variety of this species is rather larger in size, with the markings along the posterior edge of the three last whorls in somewhat distant, brown, square spots, from which rather distant undulating lines of a lighter colour pass longitudinally over the volutions, while in some specimens the colour is more *en masse* on the last whorl with small circular spots in it, showing the colour of the shell.

Length, $\frac{3.5}{100}$ of an inch ; width, $\frac{1.5}{100}$ of an inch.

Hab. Marquesas. Cab. Gaskoin, Gubba.

13. COLUMBELLA AUSTRINA. *Testa oblongo-ovata, lævis, nitens, albicans, punctulis distantibus pallidissime brunneis, fasciâ anticâ latâ brunneâ ornata ; spirâ acuminatâ, anfractibus septem vel octo, convexiusculis ; suturâ distinctâ ; aperturâ latiusculâ, labio externo posticè intus emarginato ; margine acutiusculo versus canalem incurvo, intus denticulis prominentibus octo vel novem ; labio columellari recto, nitido, denticulis septem anticè positis, margine externo subelevato ; peritremate albicante, aperturâ intus violaceo-brunneâ ; canali subprominente, latiusculo, dorso canalis transversim striato.*

Shell oblong-ovate, of a dull white colour, smooth and shining, with light brown coloration, or interrupted from the anterior side of the volutions of the spire, and extending, more or less faintly, over them ; a much darker broad band occupies three-fourths, at its centre, of the last whorl, the colour gradually softening into the whitish anterior, posterior, and outer portions of the whorl ; spire acuminated, constituting less than one half the length of the shell ; volutions seven to eight, rather convex, slightly ridged at the suture ; aperture rather long, and moderately wide and straight ; outer lip forms a broad notch at its juncture with the body of the shell, edge sharp, curving much towards the channel, externally thickened ; within are eight or nine rather prominent denticulations, diminishing in size from their commencement at the anterior edge of the notch ; inner lip straight, smooth and shining, with a row of about seven small, even, round teeth, which extend over the columella, and a very slightly raised sharp varix forms the outer edge of the aperture proceeding to the end of the channel ; from this varix fine striæ pass over the dorsum of the channel to the anterior part of the outer lip ; peritreme whitish, the interior of the shell of a rather violaceous colour ; channel slightly projecting, moderately wide.

Length, $\frac{5.0}{100}$ of an inch ; width, $\frac{2.2}{100}$ of an inch.

Hab. Australia. Cab. Cuming, Gaskoin.

14. COLUMBELLA BACCATA. *Testa oblongo-ovata, albicans, fasciis tribus interruptis saturate rufescenti-brunneis, punctulis opacis albicantibus rotundis per lineas obliquas vel longitudinaliales positis ; spirâ acuminatâ, anfractibus septem, quorum tribus anticis lævibus, posticis obtuse longitudinaliter striatis ; apice albicante ; aperturâ latiusculâ intus albicante fasciis*

brunneis tribus conspicuis; labio externo crassiusculo denticulis paucis intus prope centrum positis; labio interno recto, ad marginem externum varice prominente instructo; canali lato, obtuso.

Shell oblong-ovate, of a dull white colour, with three dark reddish brown interrupted bands traversing the last whorl, the anterior extending from the fore-part of the outer lip to that of the aperture, the second continuing along the anterior margin of the volutions to near the apex, and the third passing similarly on their posterior margin to the same extent; opaque, whitish, distinct, small round spots pervade the four anterior volutions, being in rows, obliquely or longitudinally placed; shell, within of a dull white colour, the three bands being conspicuous; spire acuminate; volutions seven, the three anterior smooth, the posterior obtusely striated longitudinally, apex whitish; aperture rather wide and straight; outer lip somewhat thick, having a few (one or two) rather prominent denticulations within the edge, about the centre; inner lip straight, with a rather strong varix at its outer edge; channel wide and obtuse; a few striæ pass obliquely over the anterior part of the columellar side of the dorsum.

Length, $\frac{2}{100}$ of an inch; width, $\frac{1}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

15. COLUMBELLA SAGITTA. *Testa oblonga, subcylindracea, angustata, levis, nitens, semipellucidula, pallidissime brunnea; fasciis duabus angustis interruptis albidio-pacis, ab postico margine anfractuum ad apicem continuis; spirâ acuminatâ, 3-5 longitudinis testæ; anfractibus octo; aperturâ brevi, latâ; labio externo crassiusculo extus margine albini-opaco, versus canalem incurvato, labio interno levi nitido; dorso antiçè transversim striato; canali longiusculo, latiusculo; peritremate subquadrangulo.*

Shell oblong, subcylindrical, narrow, smooth, shining, semitransparent, of an extremely pale brown colour, with a very narrow interrupted opaque white band arising from about the middle of the outer lip, and continuing along the anterior edge of the whorls to the apex; the markings forming this band are pointed, the points being toward the outer lip; large white opaque markings occupy the entire posterior margin of the volutions, conjoined at the suture by broad bases, and, diminishing pyramidally to a point, extend across the volutions, and between each pyramidal mark, fitting the interstices, are dark, reddish-brown, barb-shaped colorations; spire acuminate, constituting three-fifths the length of the shell; volutions eight, very slightly convex; aperture short, rather wide; outer lip moderately thick, much incurvated to form the channel, with a whitish opaque strong margin externally, edentulous; inner lip even, and shining, with a slight varix along its outer border, from which several rather prominent striæ traverse the anterior part of the dorsum to the fore part of the outer lip; the columella terminates angularly at the beginning of

the channel; channel rather long, moderately wide; peritreme subquadrangular.

Length, $\frac{3.2}{100}$ of an inch; width, $\frac{1.2}{100}$ of an inch.

Hab. Africa; West Indies. *Cab.* Metcalfe, Cuming, Gaskoin, &c.

16. *COLUMBELLA CONSPERSA.* *Testa oblongo-ovata, pyramidalis, pallide brunnea, maculis anticis, albi-opacis, irregularibus; fasciis tribus albi-opacis, brunneo interruptis, duabus posticis ab aperturâ ad apicem continuis; spirâ acuminatâ anfractibus novem vel decem convexiusculis; aperturâ rectâ, latiusculâ; labio externo ad marginem acuto, margine externo lato prominente, intus denticulis quatuor quinque vel sex parvis; labio interno lævi, nitido, intus varice parvo denticulato, extus varice subprominente ad laterem canalis extenso; striis tenuibus per anticam partem dorsi continuis; canali longiusculo, angusto, leviter recurvo; peritremate subquadrangulo, lilacino.*

2 Pr. G. C. 2
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Shell oblong-ovate, pyramidal, of a dull pale-brown colour, with opaque white, irregular markings on the anterior half of the last whorl; three opaque white bands; the two anterior, interrupted and edged posteriorly with dark brown coloration, traverse the last whorl; the second, arising from the middle of the outer lip in narrow streaks, continues along the *anterior* edge of the volutions close to the suture, on to the apex; the third arises at the posterior part of the outer lip, sometimes in conjoined nodules, edged anteriorly and interrupted by a dark brown colour, passes over the dorsum and continues in irregularly broad, even streaks on the *posterior* margin of the whorls on to the apex. [These characters are marked in fine specimens, but are sometimes rendered less conspicuous by irregularity in the opaque white deposition.] Spire acuminated, constituting rather more than one-half the length of the shell; volutions nine to ten, slightly convex; aperture straight, moderately wide; outer lip sharp at the edge, converges abruptly to form the channel, a broad prominent margin externally, within are four, five, or six denticulations; inner lip smooth and shining, within is a little ridge forming about six nodules or teeth, and at the outer edge is a rather strong varix extending on to the side of the channel, and from the outer side of which varix fine striæ traverse the anterior portion of the dorsum; channel rather long and narrow, slightly recurved; peritreme rather quadrangular, and of a lilac colour.

Length, $\frac{5.0}{100}$ of an inch; width, $\frac{2.2}{100}$ of an inch.

Hab. —? *Cab.* Gaskoin.

17. *COLUMBELLA FORMOSA.* *Testa oblongo-ovata, lævis, nitida, colore flori-lacteo induta; fasciis duabus maculis albicantibus brunneisque interruptis; spirâ acuminatâ, ad dimidium longitudinis testæ equali; anfractibus septem vel octo convexiusculis, suturâ subprominente; aperturâ latiusculâ et breviusculâ; labio externo lævi tenui, interno lævi; canali lato.*

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Shell oblong-ovate, smooth and shining, of a light delicate cream colour, with two interrupted bands of opaque white and brown mark-

ings mingled together, the first arising from the anterior point of the outer lip, and proceeding to the inner edge of the aperture; the second from the middle of the outer lip, and extending along the anterior margin of the volutions to the apex; spire acuminate, of half the length of the shell; volutions seven to eight, rather convex, suture slightly prominent; aperture somewhat wide and short; outer lip smooth and thin; inner lip even and also edentulous, no varix at its inner border; channel short and wide; a few striæ traverse the anterior part of the dorsum.

Length, $\frac{4}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? *Cab.* Gaskoin.

18. COLUMBELLA HIRUNDO. *Testa ovato-pyramidalis, lævis, nitens, pallida, strigis punctisque brunneis leviter maculata; spirâ mucronatâ, dimidium longitudinis testæ æquante; anfractibus novem vel decem planis; aperturâ latiusculâ; labio externo crasso albo semicirculari, dentibus duobus vel tribus latis posticis internis, margine externo crasso albo; labio interno lævi, subspirali, dente solitario majusculo ad posticam partem; canali longo, latiusculo, recurvo, rostris prominentibus, externo divergente quasi furcato ut in formâ caudæ hirundinis.*

Shell ovato-pyramidal, smooth and shining, pale in colour, lightly speckled with fine brown streaks and dottings, with intermissions of colour along the darker coloration of the posterior edge of the volutions; spire sharply mucronated, being about half the length of the shell; nine to ten flat volutions; aperture rather broad; outer lip thick, white, semicircular, with two or three broad denticulations within posteriorly, converges abruptly to form the channel; external margin strong and white; inner lip smooth, subspiral, with a single rather large node or tooth at the posterior part; channel long and moderately wide, recurved, beaks prominent, outer one diverging, giving a forked appearance, as in the tail of the swallow.

This species is of the stamp of *Col. bicanalifera* of Sowerby, Proc. Zool. Soc. part ii. page 113; Sowerby's Thesaurus, fig. 144.

Length, $\frac{6}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. Per the 'Samarang.' *Cab.* Gaskoin.

19. COLUMBELLA CALIFORNIANA. *Testa oblongo-ovata, subpyramidalis, lævis, nitens, brunnea, vel brunneo variabilis, aliquando lineis tenuibus, fortioribus, aut latiusculis irregularibus; spirâ acuminatâ dimidium testæ subæquante; anfractibus septem convexis; aperturâ latâ subquadrangulâ; labio externo tenuiusculo intus denticulato, labio interno leviter denticulato; dorso anticè transversim striato; peritremate purpureo-nigricante; canali brevi.*

Shell oblong-ovate, smooth and shining, rather pyramidal, of a brown colour, varying much in intensity and markings, in being sometimes uniform, in others with one or two thin darker coloured cinctures, or with broad and continuous dark irregular markings

spirally passing on the whorls to be lost in the deeper colour of the apicine volutions; spire acuminate, about half the length of the shell; volutions seven, convex; aperture wide, subquadrangular; outer lip rather thin, denticulated within on its whole extent; inner lip slightly denticulated along its rather angular inner edge; fine striæ traverse the anterior part of the dorsum; peritreme of a dark purple-brown colour; channel very short.

Length, $\frac{4.0}{100}$ of an inch; width, $\frac{2.0}{100}$ of an inch.

Hab. Sandeagó, California. *Cab.* Cuming, Gaskoin.

20. *COLUMBELLA IODOSTOMA*. *Testa oblongo-ovata, irregulariter brunnea; spirá acuminatá, apice cæruleo-brunneo; anfractibus septem vel octo raptim longitudinaliter decrescentibus; costellis prope aperturam minus prominentibus, costis ad posticum marginem in tuberculis posticè terminantibus; aperturá posticè latiusculá, anticè subacutá; labio externo tenui, intus denticulato; labio interno intus denticulato, varice prominente marginato; dorso anticè extus striato; canali longiusculo; margine peritrematis purpureo-brunnescente.*

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Shell oblong-ovate, of an irregular brown colour; spire acuminate, apex dark bluish brown colour; volutions seven to eight, greatly decreasing in circumference on to the apex, strongly ribbed longitudinally, less strongly towards the aperture, the ribs terminating in colourless nodules at the posterior edge of the volutions; aperture rather broad posteriorly, subacute anteriorly; outer lip thin, denticulated to its full extent within; inner lip denticulated within, bordered by a rather prominent varix, from the outside of which striæ pass over the dorsum of the channel; channel rather long and broad; edge of peritreme of a dark purplish brown colour.

Length, $\frac{5.0}{100}$ of an inch; width, $\frac{2.2}{100}$ of an inch.

Hab. Port Essington. *Cab.* (specimen unicum) Gaskoin.

CYPRÆA CLARA. *Testa subcylindraceo-ovalis, rufescenti-cinerea, anticè et posticè supra extremitate maculá brunneá ornata; fasciis latis saturatoribus tribus; basi marginibusque albescentibus; aperturá latiusculá subspirali; labio externo crassiusculo, dentibus circa viginti-sex, regularibus, prominentibus; interno subspirali, dentibus circa viginti; sulco columellari profundo latoque, intus denticulato; marginibus rotundatis, incrassatis; extremitatibus obtusis, punctis minutissimis nigris notatis.*

Shell subcylindrical-ovate, of a lightish red-ash colour, with three broad bands placed about the anterior and posterior thirds and middle of the shell, the middle one being narrowest, the lighter colour of the shell being observed between them; a rather large reddish-brown marking over the anterior and posterior extremities, gradually fading along the margins; base whitish in a degree tinted with pink, round; the calcareous deposit forming the denticulations extends on to the sides of the shell; aperture moderately wide, subspirally; outer lip thick, with about twenty-six regular, even, rather prominent teeth occupying the entire thick edge of the lip but not extending on to

the base; inner lip subspiral, about twenty projecting teeth terminating outwardly in an even line at the edge of the aperture; columellar sulcus broad and deep, which about eight of the anterior teeth traverse and strongly serrate its inner border, no columellar groove; the posterior teeth, proceeding but a little distance within the aperture, terminate on the columella; the sulcus being so deep causes a rather angular prominence of the inner side of the channel; margins thick and round; extremities, the external posterior broad and obtuse, the internal edge-formed concave within; the anterior project moderately and converge; all are dotted with very minute black points which extend in a slight degree on to the margins; channels, anterior rather narrow and short, posterior moderately wide, both inclining towards the columella.

Length, $1\frac{2\frac{5}{10}}{10}$ inch; width, $\frac{7\frac{5}{10}}{10}$ of an inch.

Hab. —? Cab. Cuming.

This species is of the stamp of *Cyp. Isabella*, Linn.

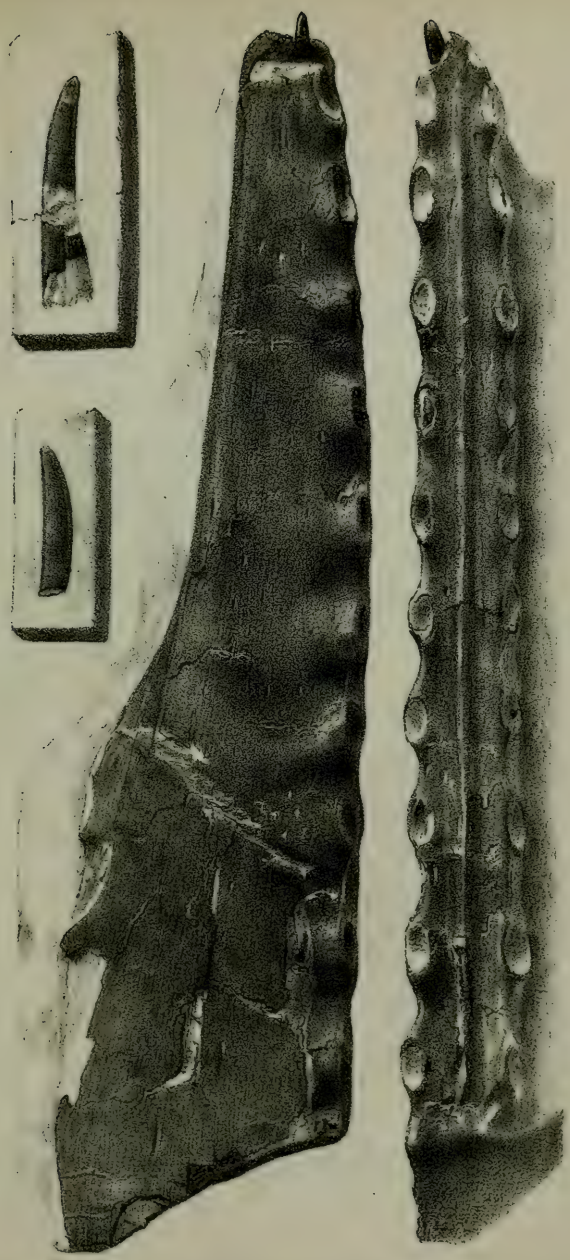
3. ON THE PTERODACTYLES OF THE CHALK FORMATION.

By J. S. BOWERBANK, ESQ., F.R.S. ETC.

(Reptilia, Pl. IV.)

On the 14th May 1845 I exhibited at the Meeting of the Geological Society the snout and under jaws, extending from the point to about the middle of the cavitas narium, of a new and gigantic species of *Pterodactylus*, with some other bones, a portion of which belonged to the same individual, and others which have every appearance of having belonged to another animal of the same species*, and I then stated my belief that the bone figured by Prof. Owen, in the 'Transactions of the Geological Society,' vol. v. pl. 39, 2nd Series, would probably ultimately prove to be that of a Pterodactyl. From the great size of the snout, and the gigantic proportions also indicated by the bones accompanying it, I was induced to give it the specific name of *giganteus*. On a subsequent occasion, June 9, 1847, I continued my remarks on these Reptile remains, in a paper entitled "Microscopical Observations on the Structure of the Bones of *Pterodactylus giganteus* and other fossil animals," in which I endeavoured to prove, by the strongly-marked peculiarities of the bone-cells in Mammals, Birds and Reptiles, that the whole of the bones described in my former paper, and those figured by Prof. Owen in the Trans. Geol. Soc., 2nd Series, vol. vi. pl. 39. figs. 1 & 2, were in truth of purely Reptilian character; and I also figured a radius and ulna from the Cabinet of Mrs. Smith of Tunbridge Wells, of nearly the same gigantic proportions as the one formerly in the possession of the Earl of Enniskillen, but now in my collection (fig. 1. pl. 39, Geol. Trans.), and a bone from the Cabinet of Mr. Toulmin Smith, equivalent to that represented by Prof. Owen in the same plate, fig. 2, which bones presented the same structural evidence of their Reptilian nature, and

* Quart. Geol. Journ. vol. ii. p. 7. pl. 1. figs. 1-6.



8. 11. 3



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NEW BIRD.—(BALENICEPS REX), FROM THE WHITE NILE

lished by the Palaeontographical Society, and to which species the bones in question have been referred.

Manchester and Birmingham have also manifested a similar jealousy to cooperate with the suggestions of the Executive Committee for the generous disposition of each section of contributions. The arrangements of London Committee have been somewhat marked by delay, and, to our own regret, in occasional instances, by a careless and apathetic spirit. Sheffield, is reported as behind-hand in its departments. Contributors in the division are urged to be early in forwarding their specimens. The fixing of tensile machinery is not the work of a day, and, unless proper efforts are made, it is feared that this, which should be the strongest point of our national display, will be but poorly represented.

A reception of goods has commenced, the first arrival from our Continental exhibitors being a specimen of German sculpture, on the 12th instant.

An Agricultural Committee announce that implements, &c. will be received the 29th of March; all stands, frames, and fittings to be on the ground arch 22nd. The judges to select implements will meet at the Building on 3rd of April. The field implements will at once be sent into the country for trial; the others will be then and there tried. A force of sixty constables of the reserved men of the A Division, with an adjutant and sergeants, under the command of Superintendent Pearce, have possession of the approaches and entrances. They are to strictly enforce regulations of the Executive Committee relative to the workmen and attendances engaged in the admission of packages containing articles for the Exhibition. The men will be in attendance, each division relieving the other at certain days of the day.

A conversation in the House of Commons, on the 10th, between the member calling and the Home Secretary, shows how completely the Commissioners are themselves independent of any assistance from the Government. (See Parliamentary Report, page 121 of SUPPLEMENT, published with the Program.)

Persons employed by the Customs, and foreign exhibitors, &c., must enter at the east end of the Building; British exhibitors, &c. will have to enter at the west end; all carmen in charge of carts, &c. will enter at the south side only; and persons of the Commission will be admitted at the central entrance.

Three kinds of passes will be issued, signed by Mr. Digby Wyatt—those available more than one day, those for one day only. Personal application must be made in every case to Mr. Wyatt for the pass two days before it is wanted.

Admission will specify the entrance and particular part of the Building to which the exhibitor will only be admitted. Exhibitors will also have a brass counter placed in the room which they will deposit as they enter, and resume as they leave; and it can thus at once be ascertained whether any individual is in the building or not. Every pass-bearer will be first required to sign a declaration form to the rules of the Executive Committee, not to part with his ticket, and to generally assist in the protection of the property, &c. of the Exhibition. Restrictive as these and other temporary requirements appear, they are necessary work under the responsibility of the Executive Committee, for the two months and a half, must be considered; what with delays of exhibitors, and what with arrangements to be undertaken by the contractors, the location and disposal of the thousands of industrial specimens yet to be received, no chance of interruption must be tolerated; and the entrance to the interior of the Building be watched like the Gardens of the Hesperides, or, as the *Times* says, "like the mouth of a powder magazine."

A resolution of Mr. Deputy Britton has been adopted by the Common Council for the renewal and legible repainting of the names of streets in the metropolis will be well if this hint is taken by the street authorities at the West-end specially of the circuit of the Exhibition itself.

Very so frequent have been the inquiries for season tickets, that an official list has appeared, stating that they are now in the course of preparation, and ready will be obtainable at several offices specially appointed by the Executive Committee for the disposal of them.

British and Foreign Bible Society will display a polyglot arrangement of the Scriptures, in 150 dialects, already accomplished through their exertions. A list of their efforts for the last forty-six years, with the advantages they offer, in the modern and old languages, will be furnished at the stand appointed to the Society in the Exhibition.

The Dresden porcelain ware a curious specimen will be afforded, in a camel-corn. Every leaf to the spectator is a real leaf, more or less developed, every blossom marks a distinct stage in the growth of the flower up to its maturity.

The value of the diamond ornaments for the Queen of Spain to be exhibited exceeds, it is affirmed, 1,000,000 francs. They are enumerated among the productions of a jeweller in the Place Vendôme.

An accompanying list of articles from the United States, mainly of the character of the previous classes, is the announcement of the employment of

alarm was given that a sloop was on fire with powder on board. The Captain was shortly there, and, with assistance, very judiciously thought of the powder first, and got it safely landed on the beach. The powder, consisting of six barrels, proved to be stowed in the boat on deck, with tarpaulin over it; the hold being full when he left the docks. The fire was caused by the overheating of the cabin stove. The cabin was destroyed, as was also the bulkhead between it and the hold; a considerable damage was done to the cargo. At this time there were on five other vessels lying in the immediate neighbourhood, with powder on board. There was, as you may suppose, great consternation among the inhabitants, to whom the fact of a vessel on fire with powder on board came known; many ran from their houses attired as they were changed to one poor woman was so alarmed as to be in danger of losing her intellect.

MONETARY TRANSACTIONS OF THE WEEK.

(From our City Correspondent.)

A fluctuation of $\frac{1}{2}$ per cent. in Consols is a good indicator of the amount of business, either speculative or real, that has been transacted in the English market during the past week. The monthly settling was complete Wednesday without difficulty, but the market has not been remarkable for steadiness since, notwithstanding the support arising from purchases by the Government broker. Exchequer Bills are a shade lower, evidencing an increased demand for money in commercial transactions; while on the Stock Exchange temporary scarcity gave rise to a belief that the directors of the Bank of England would probably increase the present rate of interest. The committee on 3rd day separated, however, without making any alteration. At the close of the week the Market was ditto, at the following rates:—Bank Stock, 215; London, 97; Consols, 94; New Three-and-a-Quarter per Cent. Annuities Long, 94; Annuities, to expire January, 1860, 74; India Bonds, £1000, 62 p; under £1000, 66 p; Consols for Account, 94; Exchequer Bills, 54 p; £500, 54 p; Small, June, 54 p.

Spanish Stock has been the only security showing any animation in the Foreign Exchange during the week; fluctuation, however, being confined to Active and Passive Bonds. The extreme range of the Active fluctuation has been between 19 and 20, and the Passive between $\frac{1}{2}$ and $\frac{1}{4}$. The proposal of the Madrid Government was acquiesced in at a meeting of the Spanish bondholders held on Wednesday, except that portion which relates to the Consols, and for which the creditors demand that the capital should remain intact, a miserable expedient of cutting down the interest to 1 per cent., and raising gradually until it reaches three per cent. in nineteen years, is enough, without calling upon the bondholders to give up their capital. For the payment of the interest in London is strongly insisted on, and alterations in the proposition are just sufficient to enable the Spanish Government to withdraw the offer, an opportunity that, not at all improbable it will avail itself of, bad faith and trickery having characterised all its previous affected intentions of settling Danish and Russian Bonds, continue firm, with an upward tendency. There have also improved a fraction. At the close of the week, the official quote were, for Buenos Ayres Bonds, 6 per Cent., 52; Ditto, Account, 52; C. Bonds, 3 per Cent., 65; Mexican, 5 per Cent., ex Jan. Coupons, 33; Peruvian, $\frac{1}{2}$ per Cent., 80; Ditto, Deferred, 36; Portuguese, Converted, 34; ex div.; Ditto, 4 per Cent., 33; Russian Bonds, 114; Ditto, $\frac{1}{2}$ per Cent., 97; Spanish, 5 per Cent., 1840, 20; Ditto, Account, 20; Ditto, Passive, 3 per Cent., 38; Dutch, $\frac{1}{2}$ per Cent., 88; Ditto, 4 per Cent., 91.

At a meeting of the Eastern Counties Company on Thursday, the arrangements between that line and the Eastern Union were agreed to, the shareholders betraying a most remarkable apathy on the occasion. The parties most interested in the amalgamation being the speakers, every thing passed off satisfactorily. The Eastern Union Company also held a meeting on the same day agreeing to the proposition; and the Norfolk meeting will, without difficulty accommodate itself to so desirable an offer. At the Great West meeting, also held on Thursday, a dividend after the rate of $\frac{1}{2}$ per cent. annum was declared. The market has been fluctuating during the week, prices now show much firmness, and a large business doing seems to render further advance in the dividend paying lines probable. Speculation has been with the low-priced shares of the Chester and Holyhead, Caledonians, Oxford, and Wolverhampton, &c. A comparison of the subjoined list with that of the previous week will show some extraordinary advances in the value of shares, upon which any hopes of a dividend for years to come would be of height of sanguine absurdity.—Aberdeen, 13; Ambergate, Nottingham, and Eastern Junction, 3; Bristol and Exeter, 85; Buckinghamshire, Caledonian, 112; Chester and Holyhead, 212; Ditto, Preference, 16; L.

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which description of evidence has, I am happy to say, been more fully developed and firmly established by the talented coadjutor of Prof. Owen, Mr. Quekett of the Royal College of Surgeons, who has publicly taught it in the Theatre of that Institution without question or contradiction of its truth. This great radius and ulna in Mrs. Smith's Collection I referred to my previously established species, *P. giganteus*, believing at that time that they were probably the bones of a fully developed animal, while those previously described were the remains of animals not developed to the full extent of their capability.

Since the publication of these specimens it has been my good fortune to obtain the snout of another and still larger species of *Pterodactyl*, from the same pit at Burham in Kent, and which it is probable will ultimately prove to belong to the species to which the enormous pair of bones in the Cabinet of Mr. Charles of Maidstone belongs. Should this hereafter prove to be the case, it will then remain to be shown whether the beautiful specimen of radius and ulna in the Collection of Mrs. Smith of Tunbridge Wells, and the bone nearly corresponding in size with them, and which was in the possession of the Earl of Enniskillen, belong to the newly discovered species, which I purpose designating *Pterodactylus Cuvieri*, or to the previously named species, *P. giganteus*; or whether there be yet a third species existing in the chalk, to which these bones of an intermediate size may hereafter be referred*.

The snout of the new species, *P. Cuvieri*, differs materially in its form from the same part of *P. giganteus*: while the latter agrees as nearly as possible in that respect with *P. crassirostris* and *P. brevirostris*, the former appears to approach very closely the proportions of *P. longirostris*. Thus, if we take the length of the snout from the distal end of the *cavitas narium*, as compared with its height, at the same point of *P. crassirostris*, *P. brevirostris* and *P. giganteus*, we find the relative proportions to be,—of the first-named, 29 of height to 56 of length; of the second, 28 of height to 50 of length; and of the third, 28 of height to 58 of length; we may therefore reasonably conclude that, when perfect, the head of *P. giganteus* very closely resembled in its proportions that of *crassirostris*. The length of the fragment of the snout of *P. Cuvieri* at the upper portion of the head is 7·20 inches; at the palatal bones, 6·38 inches; and in this space there are sockets for twelve teeth on each side. The distance between each tooth is about $1\frac{1}{2}$ of the long diameter of the sockets, which are somewhat irregularly placed, but are nearly equidistant from each other. The pair of teeth at the distal end of the snout appear, both from the position of the sockets and the tooth remaining *in situ*, to have been projected more or less forward, in a line with the palatal bones. The head appears to have been exceedingly narrow throughout the whole of its length. At the third pair of teeth from the distal

* A third species, *C. compressirostris*, has since been described by Prof. Owen, page 95, Part III. of 'The Fossil Reptilia of the Cretaceous Formations,' published by the Palæontographical Society, and to which species the bones in question have been referred.

end of the snout it measures $\cdot 66$ inch, and at the eleventh pair of teeth, $\cdot 78$ inch wide. Opposite the seventh pair of teeth the skull curves upward suddenly and considerably, which is not the case at any part of the corresponding portion of the skull of *P. longirostris*; it is therefore probable, that although in the number and disposition of the teeth in the upper jaw, as far as our evidence goes, it strongly resembles *longirostris* in its structure, yet in the length of its skull it is probably shorter in proportion than that species, apparently in that respect being intermediate between *longirostris* and *crassirostris*; thus uniting the long-nosed with the short-nosed species of *Pterodactyls*.

There are no remains of the *cavitas narium* in the new species, but it is not to be expected that it should make its appearance so near to the termination of the snout, as in *longirostris* the distal portion of that cavity is situated as far backward from the last of the dental series of the upper jaw as that tooth is from the end of the snout. The number of teeth on each side of the upper jaw in *P. longirostris* is twelve, and the like number of sockets are apparent in our specimen; it is therefore probable that we have the whole of that portion of the head.

If we estimate the size of the head on the scale of *P. longirostris*, it would appear to be $25\cdot 52$ inches in length; but as we have observed that the skull curves upward considerably at the seventh pair of teeth, it is probable that its length may not be so much.

The length of the wing of *P. crassirostris* in proportion to the length of its head is $3\cdot 91$ times. The length of the wing of *P. longirostris* compared with the length of its head is $2\cdot 51$; if therefore we assume, from the peculiar form of the snout of *P. Cuvieri*, that the head as regards length is intermediate in its proportions between *P. crassirostris* and *P. longirostris*, it should be $3\cdot 21$ parts of the length of the wing.

The snout contracts in width gradually upwards from the sockets of the teeth, so that its upper portion forms a narrow ridge, and this is its form as far backward as it can be traced. The palatal bones are depressed, the suture forming a prominent ridge as far as it is visible, but not in so great a degree as in *P. giganteus*.

One of the first pair of teeth remains in its socket; the whole of the other large teeth are displaced, but there are two of them imbedded in the chalk, one within an inch and the other an inch and a half of the sockets, and in the fifth right and eighth left socket there is a rudimentary tooth *in situ*. The largest of the displaced teeth exceeds $1\cdot 32$ inch in length, and has been buried in the socket for nearly an inch; the second large tooth, which is imbedded near the third pair of sockets, does not exceed an inch in length; both teeth are slightly curved, smooth, and are hollow at the base.

The great diversity in the size of these remarkable Reptiles will render a short review of some of the known species interesting; and if we arrange them in order, as they increase in size, the following will be the series:—1. *P. brevisrostris*, 2. *P. longirostris*, 3. *P. crassirostris*, 4. *P. Bucklandi*, 5. *P. grandis*, 6. *P. giganteus*, 7. *P. Cuvieri*; and to these may be added the bones in the possession of Mrs. Smith, the

Earl of Enniskillen, and Mr. Charles. Of these, *brevirostris*, *crassirostris* and *giganteus* are short-nosed species, *longirostris* and *Cuvieri* long-nosed. With regard to relative length and proportions of the other parts of the skeleton we have ample means to arrive at tolerably correct conclusions, in consequence of the nearly perfect condition of *brevirostris*, *crassirostris* and *longirostris*. In the former two we find the cervical vertebræ short and thick, the length being about equal to the height in the latter of the two, while in *longirostris* they vary in length from three to five times their own diameter at the middle. Very uncertain results therefore would arise from finding single bones of this portion of the skeleton, excepting that a long and attenuated cervical vertebra would seem to indicate a corresponding length of snout; but from the other bones of the animal, more especially those of the wing, much more satisfactory results may arise. Upon a careful measurement of the casts in the British Museum from the original specimens, I find the following to be the length of the bones of the wing of *P. longirostris*:—

	inch.	
Humerus	1·25 =	8·55 of length of wing.
Radius and ulna	1·90 =	5·57 " "
Carpus	0·13 =	0·82 " "
Metacarpus	1·34 =	7·97 " "
1st Phalange	1·90 =	5·57 " "
2nd " 	1·75 =	6·10 " "
3rd " 	1·25 =	8·55 " "
4th " 	1·17 =	9·13 " "
	10·69	

	inches.
The length of the head	4·25
From the tip of the nose to the commencement of the cavitas narium	2·10
Height of the skull at the commencement of the cavitas narium	0·38
Length of the femur	1·34
Length of the tibia	1·90
Smallest diameter of the radius near the distal extremity	0·14

By these measurements it is apparent that the tibia, radius and ulna and 1st phalange are equal in length. The humerus and 3rd phalange are also equal to each other, and so likewise are the metacarpus and femur equal to each other. If we also compare the smallest diameter of the radius, 0·14 inch, with its length, 1·90 inch, we find that the bone is $13\frac{8}{11}$ diameters long, and in *P. Macronyx* (*Bucklandi*) it is $13\frac{3}{2}$. We may therefore be enabled, by keeping these comparative measurements in view, to predict with a tolerable degree of certainty the spread of wing of any Pterodactyl of which we may find one or more of the principal bones of the wing, and especially if

we take into consideration the comparative length of each bone with regard to its total extension, as exhibited in the table of the dimensions of *P. longirostris*. In the case of the great specimens of radius we may arrive at their length in many cases, although the bone may be imperfect at even both terminations. Thus the diameter of the smallest portion of the bone formerly in the possession of the Earl of Enniskillen and figured by Prof. Owen, is .81 inch at the smallest portion of the shaft: this bone therefore, on the scale of $13\frac{1}{2}$ diameters to its length, should be 10.93 inches in length. The measurement of the smallest portion of the bone belonging to Mrs. Smith (Geol. Journ. vol. iv. pl. 2. fig. 1a) is .77 inch: we may therefore, by the same rule, conclude that its length was 10.39 inches when perfect. The length of the imperfect ulna beside it is 9.25 inches in the specimen. The diameter of the smallest portion of the bone (Geol. Journ. vol. ii. pl. 1. fig. 6) is .45 inch, which, in the proportion of $13\frac{1}{2}$ diameters to its length, will give 6.07 inches for its length. The width of the corresponding bone in the possession of Mr. Charles of Maidstone is 1.25 inch at the smallest diameter: by the same rule, therefore, the approximate length should be 16.87. The remains of the bone alongside of it is, although imperfect at both ends, actually 12.25 inches in length.

Upon these grounds therefore, in every case derived as much as possible from direct measurements from the skeletons of the respective species, I have given the following table of the dimensions of a series of species of Pterodactyls, the most interesting either from the state of perfection in which their remains have been found, or from the gigantic proportions which they present; and thus have endeavoured to realize to the mind an idea, as nearly as possible correct, of the dimensions of the animals when alive.

Table of the relative proportions of known species of *Pterodactylus*, with the length of each of the wing-bones and half of the width of the body.

	Humerus.	Radius and Ulna.	Carpus.	Metacarpus.	1st Phalange.	2nd Phalange.	3rd Phalange.	4th Phalange.	Half width of body.	Total expansion from tip to tip of wing.
	in.	in.	in.	in.	in.	in.	in.	in.	ft. in.	ft. in.
<i>P. brevirostris</i> ...	0.48	0.75	0.06	0.52	0.82	0.76	0.48	0.35	0.19	0 9
<i>P. longirostris</i> ...	1.25	1.90	0.13	1.34	1.90	1.75	1.25	1.17	0.47	1 10
<i>P. crassirostris</i> ...	2.08	4.42	0.34	1.32	2.83	2.53	2.08	2.32	1.10	3 2
<i>P. Bucklandi</i>	3.25	4.25	0.40	3.75	3.91	4.83	3.25	3.00	1.06	4 7
<i>P. grandis</i>	3.75	5.70	0.39	4.02	5.70	5.50	2.75	3.51	1.42	5 5
<i>P. giganteus</i>	4.43	6.74	0.46	4.75	6.74	6.21	4.43	4.14	1.68	6 7
<i>P. (Mrs. Smith's)</i>	6.76	10.39	0.70	7.26	10.39	9.49	6.76	6.33	2.59	10 2
<i>P. Cuvieri</i>	10.99	16.87	1.14	11.79	16.87	15.56	10.99	10.29	4.22	16 6

In the above table I have presumed that the largest bones should be associated with the snout described as the type of *P. Cuvieri*, but the truth of this assignment of the bones belonging to Mr. Charles

can alone be determined by the acquisition of more complete specimens of the animal than those at present known.

In the construction of this table I have taken the proportions of *P. longirostris* as the foundation, as it is the only species from which I could get the measurements of all the bones of the wing from the same animal; but it must not be supposed that the restorations effected in the table will be absolutely correct at all times in its application, for we see that in *P. longirostris* the radius and first phalange are equal, but in *crassirostris* and *Bucklandi* this is not the case: the greatest discrepancy rests with *crassirostris*, while *Bucklandi* and *brevirostris* accord much more nearly with the proportions of *longirostris*; and if we may judge by the comparative difference between those bones in *longirostris* on the one part, and *Bucklandi* and *crassirostris* on the other, it may perhaps be fairly surmised that the greater length of wing would be found to exist in the long-nosed species, and consequently that *Bucklandi* will prove to belong to the short-nosed ones; and this also would seem to be indicated by what remains of the cervical vertebræ in the original specimen in the British Museum.

Prof. Owen, in treating of these animals in my late friend Mr. Dixon's work 'On the Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' has thought proper to re-name *P. giganteus*, and designate it *P. conirostris*, Owen. I certainly did not lend my specimens to my late friend Mr. Dixon for the illustration of his work, with a view of having the name which I had assigned to this new and gigantic species subverted, and without in the slightest degree being consulted on the subject. Nor can I concur with the reasons given by Prof. Owen for thus re-naming it, as the name *giganteus* was not given, as stated by the learned Professor, "because certain bones of another and larger animal, of a different species, have been erroneously referred to it;" but, in truth, from its being the largest distinct species at that time known, exceeding *P. Bucklandi* (or *Macronyx*) by two feet in the spread of its wings, and *P. grandis* of Cuvier by above a foot. The beautiful specimen of radius and ulna in the possession of Mrs. Smith, and subsequently figured in my second paper, was at that time unknown to me, and the bone then in the possession of the Earl of Enniskillen was claimed by the Professor as that of a bird. I had therefore no other material than that in my own possession on which to base my name of *giganteus*.

If the learned Professor's reason for the proposed change of name is to hold good, that of exclusive fitness in specific nomenclature, then the one he proposes is also inappropriate, as it might be with equal propriety given to either *crassirostris* or *brevirostris*; or if specific names, based on comparisons of size, are to be extinguished, and new names given on the discovery of new species, there would be no end of the confusion generated; thus, as *P. brevisrostris* is thicker in its proportions than *crassirostris*, they would require to exchange names, or the latter at least to be re-named; *medius* would no longer be *medius*, with the addition of our new species, and *grandis* would no longer be grand in comparison. Into what an unenviable state of confusion

should we not plunge nomenclature if we were to adopt the *practice* of the learned Professor, instead of the precepts so judiciously laid down by himself and others of the Committee of Nomenclature of the British Association, and which I quote as a justification on my part for my refusal to adopt the learned Professor's exchange of my name for the one he has proposed!

In page 4 of the Report, under the head of "Law of Priority the only effectual and just one," we find the following passages:—"It being admitted on all hands that words are only the conventional signs of ideas, it is evident that language can only attain its end effectually by being permanently established and generally recognized. This consideration ought, it would seem, to have checked those who are continually attempting to subvert the established language by substituting terms of their own coinage." "Now in zoology no one person can subsequently claim an authority equal to that possessed by the person who is the first to define a new genus or describe a new species; and hence it is that the name originally given, even though it be inferior in point of elegance or expressiveness to those subsequently proposed, ought, as a general principle, to be permanently retained. To this consideration we ought to add the injustice of erasing the name originally selected by the person to whose labours we owe our first knowledge of the object." To these excellent principles the learned Professor has given the sanction of his signature. Prof. Owen, in the article on *Pterodactylus* in Mr. Dixon's work, has not quoted my observations on those Reptiles so fully as I could have wished; inasmuch as he has adverted to the strongly-marked peculiarities of the bone-cells, which are the principal characters in the question at issue, in so slight a manner, as almost to induce me to imagine that he must have forgotten them entirely. I shall simply content myself in challenging Prof. Owen to produce any such general structure and proportions of the bone-cells from the skeleton of any recent or extinct bird as those existing in the long bone described as *Cimoliornis*, or to produce any such radius and ulna of a bird containing similar bone-cells as those in the possession of Mrs. Smith, and figured by me in my paper in the 'Quarterly Journal of the Geological Society for February 1848,' vol. iv. pl. 2.

On the subject of the strictures with which Prof. Owen has favoured me at the conclusion of his observations in Mr. Dixon's work, and how far I have been "wanting in a due comprehension of the subject, and have been a hindrance instead of a furtherance of true knowledge," I am content to leave to the judgement of those who may feel a sufficient degree of interest to induce them to peruse what I have written in my former papers on the Pterodactyles of the Chalk.

January 28, 1851.

R. H. Solly, Esq., F.R.S., in the Chair.

The following papers were read :—

1. ON A NEW SPECIES OF PTERODACTYLE (*PTERODACTYLUS COMPRESSIROSTRIS*, OWEN) FROM THE CHALK; WITH SOME REMARKS ON THE NOMENCLATURE OF THE PREVIOUSLY DESCRIBED SPECIES. BY PROF. OWEN, F.R.S.

(Reptilia, Pl. V.)

The honour of having first made known the existence of remains of the Pterodactyle in the Chalk deposits belongs to James Scott Bowerbank, Esq., F.R.S. This indefatigable collector had the good fortune to receive in 1845, from the Kentish Chalk, the characteristic jaws and teeth, with part of the scapular arch and a few other bones, of a well-marked species of Pterodactyle, and the discovery was briefly recorded in the 'Quarterly Journal of the Geological Society of London,' and in the 'Proceedings' of the Society for May 14, 1845, with an illustrative plate (pl. 1).

Mr. Bowerbank concludes his notice by referring to a large fossil wing-bone from the chalk, previously described and figured by me in the 'Geological Transactions,' and remarks that, "if it should prove to belong to a Pterodactyle, the probable expansion of the wings would reach to at least eight or nine feet. Under these circumstances," he says, "I propose that the species described above shall be designated *Pterodactylus giganteus*." (*loc. cit.* p. 8.) Subsequent discoveries and observations have inclined the balance of probability in favour of the Pterodactylian nature of the fossils to which Mr. Bowerbank refers, but have shown them to belong to distinct species.

These fossils are not, indeed, amongst the characteristic parts of the flying reptile: one of them is the shaft of a long bone exhibiting those peculiarities of structure which are common to birds and pterodactyles; the other shows an articular extremity, which, in our present ignorance of those of the different bones of the Pterodactyle, has its nearest analogue in the distal trochlea of the bird's tibia. These two specimens, which are figured in the sixth volume of the Second Series of the 'Transactions of the Geological Society,' 1840, pl. 39. figs. 1 & 2, were transmitted to me by the Earl of Enniskillen and Dr. Buckland, as being "the bones of a bird" (p. 411), and my comparisons of them were limited to that class.

The idea of their possibly belonging to a Pterodactyle did occur to me, but it was dispelled by the following considerations. The act of flight—the most energetic mode of locomotion—demands a special modification of the Vertebrate organization, in that subkingdom, for its exertion. But in the class *Aves*, in which every system is more or less adapted and co-adjusted for this end, the laws of gravitation seem to forbid the successful exercise of the volant powers in species beyond a certain bulk; and when this exceeds that of the Condor or Albatros,

as, for example, in the Cassowary, the Emeu, or the Ostrich, although the organization is essentially that of the Vertebrate animal modified for flight, flight is impossible; and its immediate instruments, to the exercise of which all the rest of the system is more or less subordinated, are checked in their development; and, being unfitted for flight, they are not modified for any other use. There is not, perhaps, a more anomalous or suggestive phænomenon in nature than a bird which cannot fly! A small section of the Mammalia is modified for flight; but the plan of the organization of that warm-blooded class being less directly adapted for flight than that of birds, the weight and bulk of the body which may be raised and transported through the air are restricted to a lower range, and the largest frugivorous Bat (*Pteropus*) does not exceed the Raven in size. The Reptilian modification of the Vertebrate type would seem to be still less fitted for any special adjustment to aerial locomotion; and in the present day we know of no species of the class that can sustain itself in the air which equals a Sparrow in size. And the species in question—the little *Draco volans*—sails rather than flies, upborne by its outstretched costal parachute in its oblique leaps from bough to bough.

Of the remarkable reptiles now extinct, which, like the Bats, had their anterior members modified for plying a broad membranous wing, no species had been discovered prior to 1840 which surpassed the largest of the *Pteropi*, or Flying-Foxes, in the spread of those wings, and there was, *à priori*, a physiological improbability that the cold-blooded organization of a Reptile should by any secondary modification be made to effect more in the way of flight, or be able to raise a larger mass into the air, than could be done by the warm-blooded Mammal under an analogous special adaptation. When, therefore, the supposed bird's bone (Geol. Trans. 1840, pl. 39. fig. 1) was first submitted to me by Dr. Buckland, which on the Pterodactyle hypothesis could not be the humerus, but must have been one of the smaller bones of the wing, its size seemed decisive against its reference to an animal of flight having a cold-blooded organization. The subsequent discovery of the portion of the skull of the Pterodactyle, described by Mr. Bowerbank at the last meeting of the Society (Jan. 14), shows that the resources of Creative power in past time surpass the calculations that are founded upon actual nature.

It is only the practised Comparative Anatomist that can fully realize the difficulty of the attempt to resolve a palæontological problem from such data as the two fragments of long bones first submitted to me in 1840. He alone can adequately appreciate the amount of research involved in such a generalization as that "there is no bird now known, north of the equator, with which the fossils can be compared;" and when, after a wearying progress through an extensive class, the species is at length found to which the nearest resemblance is made by the fragmentary fossil, and the differences are conscientiously pointed out—as when, in reference to the humerus of the Albatros, I stated that "it differs therefrom in the more marked angles which bound the three sides"—the genuine worker and searcher after truth may conceive the feelings with which I find myself misrepresented as

having regarded the specimens "as belonging to an extinct species of Albatros." My reference of the bones even to the longipennate tribe of natatorial birds is stated hypothetically and with due caution: "On the supposition that this fragment of bone is the shaft of the humerus, its length and comparative straightness would prove it to have belonged to one of the longipennate natatorial birds equalling in size the Albatros." (*loc. cit.* p. 411.)

Since the discovery has been made of the manifestly characteristic parts of the genus *Pterodactylus* in the Burham chalk-pit, it has been objected that the bones first discovered there, and described by me as resembling birds of flight, "are so extremely *thin*, as to render it most improbable that they could ever have sustained such an instrument of flight as the powerful wing of the Albatros, or of any other bird: their tenuity is in fact such," says the *ex post facto* Objector, "as to point out their adaptation to support an expanded membrane, but not pinions *."

The reply to this assertion need only be a simple reference to nature: sections of the wing-bones of birds may be seen in the Museum of the Royal College of Surgeons, and have been exposed to view, since the discovery of their structure by the Founder of that Collection, in every Museum of Comparative Anatomy worthy to be so called.

To expose the gratuitous character of the objection above cited, I have placed on the table a section of the very bone that directly sustains the large quill-feathers in the Pelican; its parietes are only half as thin as those of the antibrachial bone of the great Pterodactyle which is figured in my 'History of British Fossil Reptiles,' pl. 4, and is not thicker than those of the bone figured in the Geological Transactions, 1840; above cited.

HUNTER, who had obtained some of the long bones with thin walls and a wide cavity from the Stonesfield slate, has entered them in his MS. Catalogue of Fossils as the "Bones of Birds," and perhaps no practical anatomist had had greater experience in the degree of tenuity presented by the compact walls of the large air-cavities of the bones in that class. Of all the modifications of the dermal system for combining extent of surface with lightness of material, the expanded feather has been generally deemed the consummation. Well might the eloquent Paley exclaim, "Every feather is a mechanical wonder: their disposition all inclined backwards, the down about the stem, the overlapping of their tips, their different configuration in different parts, not to mention the variety of their colours, constitute a vestment for the body so beautiful and so appropriate to the life which the animal is to lead, as that, I think, we should have had no conception of anything equally perfect, if we had never seen it, or can imagine anything more so." It was reserved for the author of the 'Wonders of Geology' to prefer the leathern wing of the Bat and Pterodactyle as the lighter form, and to discover that such a structure as is displayed in the bone described and figured in the 'Geol. Trans.'

* Mantell, 'Wonders of Geology,' 1848, vol. i. p. 441.

vol. vi. pl. 39, was a most improbable one to have sustained a powerful wing of any bird!* Let me not be supposed, however, to be concerned in excusing my own mistake; I am only reducing the unamiable exaggeration of it. Above all things, in our attempt to gain a prospect of an unknown world by the difficult ascent of the fragmentary ruins of a former temple of life, we ought to note the successful efforts, as well as the occasional deviations from the right track, with an equal glance, and record them with a strict regard to truth. The existence of a species of Albatros, or of any other actual genus of bird during the period of the Middle Chalk, would be truly a wonder of Geology; not so the existence of a bird of the longipennate family.

I still think it for the interest of science, in the present limited extent of induction from microscopic observation, to offer a warning against a too hasty and implicit confidence in the forms and proportions of the Purkingean or radiated corpuscles of bone, as demonstrative of such minor groups of a class as that of the genus *Pterodactylus*. Such a statement as that "these cells in *Birds* have a breadth in proportion to their length of from one to four or five; while in *Reptiles* the length exceeds the breadth ten or twelve times," only betrays the limited experience of the assessor. In the dermal plates of the Tortoise, *e. g.*, the average breadth of the bone-cell to its length is as one to six, and single ones might be selected of greater breadth.

With the exception of one restricted family of Ruminants, every Mammal, the blood-discs of which have been submitted to examination, has been found to possess those particles of a circular form: in the *Camelidæ* they are elliptical, as in birds and reptiles. The bone-cells have already shown a greater range of variety in the Vertebrate series than the blood-discs. Is it then a too scrupulous reticence to require the evidence of microscopic structure of a bone to be corroborated by other testimony of a plainer kind, before hastening to an absolute determination of its nature, as has been done with regard to the Wealden bone, figured in the Geol. Trans., 2nd Series, vol. v. pl. 13. fig. 6†? As a matter of fact, the existence of Pterodactylian remains in the chalk was not surmised through any observation of the microscopic structure of bones that are liable to be mistaken for those of birds, but was first plainly proved by the characteristic portions of the Pterodactyle defined by Mr. Bowerbank, as follows, in his original communication of this discovery to the Geological Society of London, May 14, 1845:—

"I have recently obtained from the Upper Chalk ‡ of Kent some

* Mantell, 'Wonders,' &c. ed. 1848, vol. i. p. 441.

† Compare, for example, two of the longest of the cells figured by Mr. Bowerbank in pl. 1. fig. 9, 'Quarterly Journal of the Geological Society,' vol. iv. as those of a bird, with two of the widest of the cells figured in fig. 1 of the same plate as those of the Pterodactyle; and contrast the want of parallelism in the bone-cells of the Wealden bone, fig. 9, with the parallelism of the long axes of the cells in that of the Albatros, fig. 3.

‡ Mr. Toulmin Smith, in an able paper "On the Formation of the Flints of the

remains of a large species of *Pterodactylus*. The bones consist of—

“1. The fore part of the head as far as about the middle of the *cavitas narium*, with a corresponding portion of the under jaws, many of the teeth remaining in their sockets.

“2. A fragment of the bone of the same animal, apparently a part of the coracoid.

“3. A portion of what appears to be one of the bones of the auricular digit, from a chalk-pit at Halling.

“4. A portion of a similar bone, from the same locality as No. 1.

“5. The head of a long bone, probably the tibia, belonging to the same animal as the head, No. 1.

“6. A more perfect bone of the same description, not from the same animal, but found at Halling.”

In a subsequent communication, dated December 1845, Mr. Bowerbank states with regard to the specimens Nos. 5 and 6, which he supposed to be parts of a tibia, that “on a more careful comparison with the figures of *Pterodactylus* by Goldfuss, I am inclined to believe they are more likely to be portions of the ulna.”

With respect to the long bone, No. 6 in the above list, comparing it with that figured in the *Geol. Trans.*, 2nd Series, vol. vi. pl. 39. fig. 1, and referred by me to *Cimoliornis diomedeus*, Mr. Bowerbank writes:—

“Although the two specimens differ greatly in size, there is so strong a resemblance between them in the form and regularity of the shaft, and in the comparative substance of the bony structure, as to render it exceedingly probable that they belong to the same class of animals;” and he concludes by remarking, that “If the part of the head in my possession (see fig. 1) be supposed similar in its proportions to that of *Pterodactylus crassirostris*,—and there appears but little difference in that respect,—it would indicate an animal of comparatively enormous size. The length of the head, from the tip of the nose to the basal extremity of the skull, of *Pt. crassirostris* is about $4\frac{5}{8}$ inches, while my specimen would be, as nearly as can be estimated, $9\frac{1}{8}$ inches. According to the restoration of the animal by Goldfuss, *Pt. crassirostris* would measure as nearly as possible three feet from tip to tip of the wings, and it is probable that the species now described would measure at least six feet from one extremity of the expanded wings to the other; but if it should hereafter prove that the bone described and figured by Prof. Owen belongs to a *Pterodactyle*, the probable expansion of the wings would reach to at least eight or nine feet. Under these circumstances I propose that the species described above shall be designated *Pterodactylus giganteus*.” (*Quarterly Geol. Journ.* vol. ii. p. 8.)

In a subsequent memoir, read June 9, 1847, and published in the ‘*Quarterly Journal of the Geological Society*,’ vol. iv. February 1848, Mr. Bowerbank gives figures of the ‘bone-cells’ from the jaw of a

Upper Chalk,” in the ‘*Annals of Natural History*,’ vol. xx. p. 295, affirms that no upper chalk exists in the localities whence the above-defined specimens came. They are from the “Middle Chalk.”

Pterodactyle (pl. 1. fig. 1), from the shaft of the bone in question (*ib.* fig. 2), and from the femur of a recent Albatros (*ib.* fig. 3), in corroboration of the required proof: and he adds, "Fortunately the two fine specimens from the rich collection of Mrs. Smith of Tonbridge Wells, represented by fig. 1. pl. 2, in a great measure justify this conclusion; and in the bone *a*, which is apparently the corresponding bone to the one represented by fig. 1 in Prof. Owen's paper, the head is very nearly in a perfect state of preservation." (*op. cit.* p. 5.) Mr. Bowerbank, in his explanation of plate 2, describes the two fine specimens above mentioned as "Fig. 1. Radius and ulna of *Pterodactylus giganteus*, in the cabinet of Mrs. Smith of Tonbridge Wells." (*tom. cit.* p. 10.) He proceeds to state, "There are two other similar bones, imbedded side by side, in the collection of Mr. Charles of Maidstone, of still greater dimensions than those from the cabinet of Mrs. Smith;" and he assigns his grounds for the conclusion, that "the animal to which such bones belonged could, therefore, have scarcely measured less than fifteen or sixteen feet from tip to tip of its expanded wings."

The Committee of the British Association for the Reform and Regulation of Zoological Nomenclature, amongst other excellent rules, have decided that, "A name which is glaringly false shall be changed" (Report, p. 113). I submit that this is the case when the name *giganteus* is proposed for a species less than half the size of others previously discovered. Now, although those remains of the truly gigantic Pterodactyles had not been demonstrated to be such, yet they were suspected so to be by Mr. Bowerbank when he proposed the name *giganteus*; and the name is in fact proposed, subject to the condition of that demonstration, and under the evident belief that they belonged to the same species as the obvious Pterodactyle remains he was describing. He says, "Under these circumstances I propose that the species shall be designated '*giganteus*,'" and the circumstances referred to are the probable case that the bones, which from their large size I had supposed to belong to a bird, should prove to belong to a Pterodactyle.

The Committee for the Reform of Zoological Nomenclature next proceed to determine that, "Names not clearly defined may be changed. Unless a species or group is intelligibly defined when the name is given, it cannot be recognised by others, and the signification of the name is consequently lost. Two things are necessary before a zoological term can acquire any authority, *viz.* definition and publication. Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable." (Report, pp. 113, 114.) Now with regard to the *Pterodactylus giganteus*, Mr. Bowerbank had unreservedly applied the term to the species to which the long wing-bone first described by me might appertain, under the circumstances of its being proved to belong to a Pterodactyle; inasmuch as he had figured two similar and equal-sized bones in the 'Quarterly Journal of the Geological Society,' vol. iv. pl. 2. fig. 1 (Proceedings of the Society for June 9, 1847), as the "radius and ulna

of *Pterodactylus giganteus*." So far as a species can be intelligibly defined by figures, that to which the term *giganteus* was in 1845 provisionally, and in 1847 absolutely applied, seemed to be clearly enough pointed out by the plate 2 in the work above cited. But, with the large bones appropriately designated by the term *giganteus*, some parts of a smaller Pterodactyle, including the portions of jaws first announcing the genus in the Chalk, had been associated under the same name. Supposing those bones to have belonged to a young individual of the *Pterodactylus giganteus*, no difficulty or confusion would arise. After instituting, however, a rigid comparison of these specimens, when drawing up my Descriptions for Mr. Dixon's work, I was compelled to arrive at the conclusion that the parts figured by Mr. Bowerbank in plate 2, figs. 1 & 2, of vol. ii. of the 'Quarterly Geological Journal,' and the parts figured in plate 2, figs. 1 *a* & *b*, of vol. iv. of the same Journal, both assigned by Mr. Bowerbank to the *Pterodactylus giganteus*, belonged to two distinct species. The portions of the scapula and coracoid of the Pterodactyle (pl. 1. fig. 2, *tom. cit.*) indicated by their complete ankylosis that they had not been part of a young individual of the species to which the large antibrachial bones (pl. 2. fig. 1 *a* & *b*, *tom. cit.*) belonged; although they might well appertain to the species to which the jaws (pl. 1. fig. 1) belonged. Two species of Pterodactyle were plainly indicated, as I have shown in the above-cited work, by my lamented friend Mr. Dixon, 'On the Tertiary and Cretaceous Deposits of Sussex,' 4to, p. 402. The same name could not be retained for both, and it was in obedience to this necessity, and not with any idea of detracting an iota from the merit of Mr. Bowerbank's original announcement of the existence of a Pterodactyle in the chalk, that I proposed the name of *conirostris* for the smaller species, then for the first time distinctly defined and distinguished from the larger remains to which the name *giganteus* had also been given by Mr. Bowerbank. I proposed the name, moreover, provisionally and with submission to the 'Committee for the Reform of Zoological Nomenclature,' according to whose rules I believed myself to be guided.

My conclusions as to the specific distinction of the remains of the smaller Pterodactyle (pl. 1, *tom. cit.* 1845) from those figured in plate 2. *tom. cit.* 1848, have received full confirmation by the valuable discovery of the portion of the cranium of the truly gigantic Pterodactyle, about to be described, to which they belonged; and it is certainly to be wished that, in determining to assign to Mrs. Smith's specimens the name of '*giganteus*,' Mr. Bowerbank should have conformed to the following equitable rule of the 'Committee of Nomenclature':—"The author who *first* describes and names a species, which forms the groundwork of later generalizations, possesses a higher claim to have his name recorded than he who afterwards defines a genus which is found to embrace that species. By giving the authority for the *specific* name in preference to all others, the inquirer is referred *directly* to the original description, habit, &c. of the species, and is at the same time reminded of the date of its discovery." (Reports of the British Association, 1842, p. 120.)

Now the species which I originally described under the name of *Cimoliornis diomedæus* comes precisely under this category: it has formed the groundwork of later generalizations, which have led to its being embraced by another genus. In this case the Committee of Nomenclature, whilst determining that the specific name should be retained, recommend that the describer should "append to the original authority for the species, when not applying to the genus also, some distinctive mark, such as (*sp.*), implying an exclusive reference to the specific name." In conformity with the above recommendation, the gigantic species of Pterodactyle, of which parts have been described by Mr. Bowerbank, and parts previously by myself, would be entered into the Zoological Catalogues as follows:—

Pterodactylus diomedæus, Owen (*sp.*), Proceedings of the Zoological Society, January 1851.

Cimoliornis diomedæus, *Ibid.*, British Fossil Mammals and Birds, p. 545, cuts 230, 231 (1843–1846).

Osteornis diomedæus, Gervais, Thèse sur les Oiseaux Fossiles, 8vo, p. 38 (1844).

Pterodactylus giganteus, Bowerbank, Quarterly Journal of the Geological Society, vol. iv. p. 10. pl. 2. figs. 1 & 4 (1848).

Leaving, however, the question of names, regarding which I have no personal feeling except that they should indicate their objects without ambiguity or obvious impropriety, I proceed to lay before the same Society to which Mr. Bowerbank has communicated his last interesting and important discovery, similar evidence of a third species of Pterodactyle from the chalk, intermediate in size between the species of which the jaws were figured as the *Pterodactylus giganteus* in 1845, and the truly gigantic species which he has named *Pterodactylus Cuvieri*.

The specimens, which consist of two portions of the upper jaw, form part of that gentleman's collection, and were in fact exhibited on the table, but unnoticed, at our last meeting, their true nature not having been recognised. The chief portion might well indeed be mistaken, at first sight, for a crushed portion of an ordinary long bone; and it was not until after a close comparison of several specimens of these rare and interesting remains of Pterodactyles, kindly confided to me by Mrs. Smith of Tonbridge Wells, Mr. Toulmin Smith of Highgate, Mr. Charles of Maidstone, and by Mr. Bowerbank himself, for description in my forthcoming 'Monograph on the Fossil Reptiles of the Chalk,' that I discovered them to be parts of a skull of an undescribed species of Pterodactyle.

In order to make this understood, it will be necessary to premise a few words on the Pterodactyles in general, and on some of the characters of the jaw of the *Pterodactylus Cuvieri* in particular.

The Order *Pterosauria* includes species of flying reptiles so modified in regard to the structure and proportions of the skull, the disposition of the teeth, and the development of the tail, as to be referable even according to the partial knowledge we now possess of this once extensive group, to different genera.

M. Von Meyer *e. g.* primarily divides the Order into—

A. *DIARTHRI*, with a two-jointed wing-finger.

Ex. *Pterodactylus (Ornithopterus) Lavateri*.

B. *TETRARTHRI*, with a four-jointed wing-finger.

Ex. All the other known species of the order.

These again are subdivided into—

1. *Dentirostres*. Jaws armed with teeth to their ends; a bony sclerotic ring; scapula and coracoid not confluent with one another*; a short moveable tail.

Ex. *Pterodactylus* proper.

2. *Subulirostres*. Jaws with their ends produced into an edentulous point, probably sheathed with bone; no bony sclerotic; scapula and coracoid confluent; a long and stiff tail.

Ex. *Pterodactylus (Ramphorhynchus) Gemmingi* †.

The extremity of the upper jaw of the *Pterodactylus Cuvieri* is sufficiently perfect to demonstrate that it had a pair of approximated alveoli close to its termination, and we may therefore refer it to the Dentirostral division.

In this division, however, there are species which present such different proportions of the beak, accompanied by differences in the relative extent of the dental series, as would without doubt lead to their allocation in distinct genera, were they the living or recent subjects of the modern Erpetologist. In the *Pterodactylus longirostris*, the first species discovered and made known by Collini in 1784 ‡, the jaws are of extreme length and tenuity, and the alveoli of the upper jaw do not extend so far back as the nostril. In the *Pterodactylus crassirostris*, Goldfuss §, on the other hand, the jaws are short, thick, and obtusely terminated, and the alveoli of the upper jaw reach as far back as the middle of the vacuity which intervenes between the nostril and the orbit, and which Goldfuss terms the ‘*cavitas intermedia*.’

In the solid or imperforate part of the upper jaw anterior to the nostril, the *Pterodactylus longirostris* has twelve long, subcompressed teeth, followed by a few of smaller size: the same part of the jaw in the *Pt. crassirostris* has but six teeth, of which the first four are close together at the end of the jaw, and the first three shorter than the rest. The *cavitas intermedia* in *Pt. longirostris* is much smaller than the nostril; in the *Pt. crassirostris* it is larger than the nostril. Were these two species of dentirostral *Pterosauria* to be taken, as by the modern Erpetologist they assuredly would, to be types of two

* The condition of the scapular arch in the *Pt. giganteus*, Bow., *Pt. conirostris* mihi, demonstrates the fallacy of this character.

† Palæontographia, Heft 1, 4to. 1846, p. 19.

‡ Acta Academiæ Theodoro-Palatinæ, V. p. 58; tab. 5.

§ Beiträge zur Kenntniss verschiedener Reptilien der Vorwelt, 4to. 1831, sec. 1. tab. 7, 8, 9.

distinct genera, the name *Pterodactylus* should be retained for the longirostral species, as including the first-discovered specimen and type of the genus; and the crassirostral species should be grouped together under some other generic name.

The specimen of gigantic *Pterodactyle* described by Mr. Bowerbank at the last meeting of the Society consists of the solid anterior end, *i. e.* of the imperforate continuous bony walls, of a jaw, compressed and decreasing in depth, at first rapidly, then more gradually, to an obtusely-pointed extremity. As the symphysis of the lower jaw is long and the original joint obliterated, and its depth somewhat rapidly increases by the development of its lower and back part into a kind of ridge in some smaller *Pterodactyles*, the present specimen, so far as these characters go, might be referred to the lower jaw, and its relatively inferior depth to the upper jaw in the *Pt. conirostris* would seem to lead to that conclusion. But the present is plainly a species which has a longer and more slender snout in proportion to its size, and the convex curve formed by the alveolar border, slight as it is, decides it to be part of the upper jaw. The lower jaw, moreover, might be expected, by the analogy of the smaller *Pterodactyles*, to be flatter or less acute below the end of the symphysis.

The specimen of *Pt. Cuvieri* consists of the anterior extremity of the upper jaw, of seven inches in extent, without any trace of the nasal or any other natural perforation of its upper or lateral parietes, and corresponds with the parts marked *a, b*, in figs. 10 & 11. From the number of teeth contained in this part, the *Pt. Cuvieri* presents a much closer resemblance to the *Pt. longirostris* than to the *Pt. crassirostris*; and if the entire skull were restored according to the proportions of the *Pt. longirostris*, it would be twenty-eight inches in length.

But nature seems never to retain the same proportions in species that differ materially in bulk. The great *Diprotodon*, with the dental and cranial characters of a Kangaroo, does not retain the same length of hinder limbs as its living homologue; the laws of gravity forbid the saltatory mode of locomotion to a Herbivore of the bulk of a Rhinoceros; and accordingly, whilst the hind-legs are shortened the fore-limbs are lengthened, and both are made more robust in the *Diprotodon* than in the Kangaroo. The change of proportions of the limbs of the Sloths is equally striking in those extinct species which were too bulky to climb, *e. g.* the *Megatherium* and *Myloodon*. We may therefore infer, with a high degree of probability, when a longirostral *Pterodactyle* much surpassed in bulk the species so called 'par excellence,' that the same proportions were not maintained in the length of the jaws; and that the species to which the fine fragment belonged, far as it has exceeded our previous ideas of the bulk of a flying reptile, did not sustain and carry through the air a head of two feet four inches in length, or nearly double the size of that of the Pelican.

Although the fractured hinder part of the jaw of the *Pt. Cuvieri* shows no trace of the commencement of the wide nasal aperture, there is a plain indication that the jaws were less prolonged than in the *Pt.*

longirostris, in the more rapid increase of the vertical breadth of the jaw. Opposite the ninth tooth, *e. g.*, the depth of the jaw equals two-fifths of the length in advance of that tooth, whilst in the *Pt. longirostris* it is only two-sevenths. The contour of the upper border of the jaw in the *Pt. Cuvieri* differs from that in both the *Pt. longirostris*, *Pt. crassirostris*, and *Pt. Gemmingi*, in sinking more suddenly opposite the ninth, eighth and seventh teeth, than it does along the more advanced part of the jaw; a character which, while it affords a good specific distinction from any of those species, indicates the hinder parts of the head that are wanting in the present specimen to have been shorter and deeper than in the *Pt. longirostris*.

The first pair of alveoli almost meet at the anterior extremity of the jaw, and their outlet is directed obliquely forwards and downwards; the obtuse end of the premaxillary above these alveoli is about two lines across. The palate quickly expands to a width of three lines between the second alveoli, then to a width of four lines between the fourth alveoli, and more gradually, after the ninth alveoli, to a width of six lines between the eleventh alveoli: here the palate appears to have been slightly crushed; but in the rest of its extent it presents its natural form, being traversed longitudinally by a moderate median ridge, on each side of which it is slightly concave transversely. It is perforated by a few small irregular vascular foramina. There are no orifices on the inner side of the alveoli; the successional teeth emerge, as in the Crocodiles, from the old sockets, and not, as in certain Mammalia and Fishes, by foramina distinct from them. The second and third alveoli are the largest; the fourth, fifth and sixth the smallest, yet they are more than half the size of the foregoing, with which the rest are nearly equal. The outlets of the alveoli are elliptical, and they form prominences at the side of the jaw, or rather the jaw sinks gently in between the alveoli, and is continued into the bony palate without any ridge, the vertical wall bending round to form the horizontal plate. The greatest breadth of the under surface of the jaw, taken from the outside of the alveoli, varies only from seven lines across the third pair to nine lines across the eleventh pair of alveoli; and from the narrow base the sides of the jaw converge with a slight convexity outwards at the anterior half of the fragment, but are almost plane at the deeper posterior half, where they seem to have met at one acute superior ridge; indeed such a ridge is continued to within an inch of the fore part of the jaw, where the upper border becomes more obtuse.

The whole portion of the jaw appears to consist of one uninterrupted bone—the premaxillary; the delicate crust of osseous substance, as thin as paper, is traversed by many irregular cracks and fissures, but there is no recognizable suture marking off the limits of a maxillary or nasal bone. The bone offers to the naked eye a fine fibrous structure, so fine as to produce almost a silken aspect, the fibres or striæ being longitudinal, and impressed at intervals of from two to six lines by small vascular foramina.

Having premised so much with reference to the characters of the

Pt. Cuvieri, I proceed to the description of the distinct species, for which I propose the name of *Pterodactylus compressirostris*.

PTERODACTYLUS COMPRESSIROSTRIS, Owen.

(Reptilia, Pl. V. figs. 1, 2 & 3.)

This species is represented by two portions of the upper jaw, obtained from the Middle Chalk of Kent, the hinder and larger of which includes the beginning of the external nostril (figs. 1 & 2, *n*). The depth of the jaw at this part is fourteen lines, whence it gradually decreases to a depth of ten lines at a distance of three inches in advance of this, indicating a jaw as long and slender as in the *Pt. longirostris*, supposing the same degree of convergence of the straight outlines of the upper and alveolar borders of the jaw to have been preserved to its anterior end: that this was actually the case is rendered most probable by the proportions of the smaller anterior part of the jaw (figs. 1', 2', 3'), obtained from the same pit, if not from the same block of chalk, and which, with a vertical depth of seven lines at its hinder part, decreases to one of six lines in an extent of one inch and a half in advance of that part. The sides of the jaw as they rise from the alveolar border incline a little outwards before they converge to meet at the upper border. This gives a very narrow ovoid section at the fore part of the larger fragment (fig. 2), the greatest diameter at its lower half being four lines, and the sides meeting above at a slightly obtuse ridge. This very gradually widens as the jaw recedes backwards, where the entireness of the walls of the smoothly convex upper part of the jaw proves that the narrowness of that part is not due to accidental crushing. Had that been the case, the thin parietes arching above from one side to the other would have been cracked. The only evidence of the compression to which the deep sides of the jaw have been subject is seen in the bending in of the wall above the alveoli, close to the upper ridge at the fore part of the fragment.

In an extent of alveolar border of three and a half inches there are eleven sockets, the anterior one on the right side retaining the fractured base of a tooth: the alveoli are separated by intervals of about one and a half times their own diameter; their outlets are elliptical, and indicate the compressed form of the teeth: they are about two lines in long diameter at the fore part of this fragment, but diminish as they are placed more backwards, the last two being developed beneath the external nostril. The bony palate is extremely narrow, and presents in the larger portion (fig. 3) a median smooth convex rising between two longitudinal channels, which are bounded externally by the inner wall of the alveolar border. There is no trace of a median suture in the longitudinal convexity. The breadth of the palate at the back part of the fragment is eight lines; at the fore part it has gradually contracted to less than three lines, but it is somewhat crushed here. The naso-palatine aperture, *p*, commences about half a line in advance of the external nostril, three inches behind the fore part of the larger portion (fig. 3) of the upper jaw; which exemplifies the characteristic extent of the imperforate bony palate formed by the

long single premaxillary bone in the genus *Pterodactylus*. The fragment from the more advanced part of the jaw (fig. 3') contains five pairs of alveoli in an extent of two inches, these alveoli being rather larger and closer together than in the hinder part of the jaw. Owing to the compression which the present portion has undergone, the orifices of the alveoli are turned outwards, the bony palate being pressed down between the two rows, and showing, as the probable result of this pressure, a median groove between two longitudinal convex ridges; but the bone is entire and imperforate.

The form of the upper jaw in the present remarkable species differs widely from that of the two previously known species from the chalk, in its much greater elongation and its greater narrowness; and from the *Pt. Cuvieri*, in the straight course of the upper border of the jaw, as it gradually converges towards the straight lower border in advancing to the anterior end of the jaw. The alveoli, and consequently the teeth, are relatively smaller in proportion to the depth of the jaw than in the *Pt. Cuvieri*, and are more numerous than in the *Pt. giganteus*; they are probably also more numerous than in the *Pt. Cuvieri*; although, as the whole extent of the jaw anterior to the nostril is not yet known in that species, it would be premature to express a decided opinion on that point. As we may reasonably calculate from the fragments preserved (Pl. II. figs. 1, 2, 3), that the jaw of the *Pt. compressirostris* extended seven inches in front of the nostril, it could not have contained less than twenty pairs of alveoli, according to the number and arrangement of those in the two portions preserved.

The osseous walls in both portions present the characteristic compactness and extreme thinness of the bones of the skull of the genus: the fine longitudinal striæ of the outer surface are more continuous than in the *Pt. Cuvieri*, in which they seem to be produced by a succession of fine vascular orifices produced into grooves. The conspicuous vascular orifices are almost all confined to the vicinity of the alveoli in the *Pt. compressirostris*. This species belongs, more decidedly than the *Pt. Cuvieri*, to the 'longirostral' section of the *Pterosauria*: whether it had an edentulous prolongation of the fore part of the upper and lower jaw remains to be proved.

In attempting to form a conception of the total length of the head of the very remarkable species of Pterodactyle represented by the portions of jaw above described, we should be more justified by their form in adopting the proportions of that of the *Pt. longirostris* than in the case of the *Pt. Cuvieri*: but allowing that the external nostril may have been of somewhat less extent than in the *Pt. longirostris*, we may still assign a length of from fourteen to sixteen inches to the skull of the Pterodactyle in question.

It could not have been anticipated that the first three portions of Pterodactylian skull—almost the only portions that have yet been discovered in the cretaceous formations—should have presented such well-marked distinctive characters, one from the other, as are described and illustrated in Mr. Bowerbank's Memoirs and in the present communication. Such, nevertheless, are the facts: and, however improbable it may appear, on the doctrine of chances, to those not con-

versant with the fixed relations of osteological and dental characters, that the three corresponding parts of three Pterodactyles for the first time discovered, should be appropriated to three distinct species, I have no other alternative, in obedience to the indications of nature, than to adopt such determination*.

2. DESCRIPTION OF TWO NEW GENERA AND SOME NEW SPECIES OF SCUTELLIDÆ AND ECHINOLAMPIDÆ IN THE COLLECTION OF THE BRITISH MUSEUM. BY JOHN EDWARD GRAY, ESQ., F.R.S., P.B.S. ETC.

The collection of the British Museum is extremely rich in species of recent *Echinoids*, and fortunate in possessing long series of different ages of several of the species.

Having been recently occupied in arranging and forming a catalogue of these animals, I transmitted to the 'Annals of Natural History' for February a description of several genera and species of *Spatangidæ*.

MM. Agassiz and Desor having recently published, in the Monograph of Echini and other papers on these animals, all the species of these two families then known to them, and as they had every facility for examining the British Museum specimens, the species now to be described are but few in number.

Fam. 1. SCUTÉLLIDÆ.

Genus ECHINANTHUS.

Among the species which have the base concave, of which *E. rosaceus* may be considered the type, are to be added—

1. ECHINANTHUS AUSTRALASIÆ.

Vent beneath, at a little distance from the edge; back very convex

* The same criticism or objection may be offered to the conclusions in the text, as the following one, which was called forth by my determinations of the species of *Balenodon* found in the red crag. "The specimens exhibited by Prof. Henslow were only *eleven* in number; so that, without allowing anything for the circumstance of each whale having *two* tympanic bones, and the probability of some of the above being in *pairs*, we have the first twelve determinable cetaceous bones discovered in the red crag appropriated to no less than *five* species. I have no pretensions to call in question the decision of Prof. Owen upon osteological grounds, but I must own that I am disposed, upon the doctrine of chances, to consider it hardly probable that these determinations are accurate."—*Searles V. Wood*, Feb. 16, 1844, London Geol. Journal, p. 35. The *fifth* species is a gratuitous addition to the four described by me, the determinate characters of which have been confirmed by numerous additional discoveries. Mr. Wood should have remembered, before he attempted to discredit the determinations from anatomy, and to substitute the numerical test, that the second mammalian fossil from the oolite, although a lower jaw, like the first, was of a different species, and that of five subsequently discovered unequivocal mammalian remains from Stonesfield, *all* are parts of the lower jaw, whilst two of them demonstrate a *third* species. Very improbable this to him, on the doctrine of chances; but only showing, as Sir Charles Lyell has remarked, "the fragmentary manner in which the memorials of an ancient terrestrial fauna are handed down to us."

in the middle; upper margin rather flattened, with a slight concavity at the end of the ambulacra; under side flat near the margin, deeply concave in the middle; spines of the under side near mouth very fine.

Hab. Australia; N.S.W., Brisbane Water.

2. *ECHINANTHUS TESTUDINARIUS*.

Vent beneath a little within the edge, depressed; back slightly raised, evenly convex; under surface rather concave from the edge.

Hab. Indian Ocean; Borneo.

3. *ECHINANTHUS OBLONGUS*.

Ovate-oblong, elongate, rounded at the end; sides thick, rounded; back depressed round the end of the ambulacra; crown rather convex; ambulacra ovate, lanceolate, broad, and closed at the end; under side concave nearly to the edge; ambulacral grooves indistinct; vent near the margin.

Hab. Philippines; Siquijor.

4. *ECHINANTHUS PRODUCTUS*.

Shell ovate, elongate, the hinder end produced and flattened, the edge rather thick, thinner behind; the ambulacral petal broad, the bands not quite united at the end; under side concave to the margin; vent near the margin.

Hab. — ?

5. *ECHINANTHUS COLEÆ*.

Shell ovate, subpentagonal, depressed; margin thick, rounded; back depressed as far as the end of the ambulacra, and then rather convex in the middle, the under side concave nearly to the edge; ambulacral petal ovate lanceolate, closed at the end; vent near the margin.

Hab. Mauritius. Lady Mary Cole.

To those which have a flat base may be added—

6. *ECHINANTHUS EXPLANATUS*.

Depressed, much expanded, centre of the back rather convex; ambulacra occupying rather more than half the space between the vertex and margin, the lines of pores of the anterior pair and posterior odd one far apart at the end; cavity with thin concentric lines of short compressed columns near the margin; jaws depressed.

Hab. Mauritius?

Genus *ROTULA*.

The British Museum series induces me to believe that *Rotula digitata* of Agassiz is not distinct from *R. Rumphii*, as M. Agassiz first considered it to be.

Genus *ECHINODISCUS*.

I cannot find any permanent difference to distinguish *Lobophora bifissa* from *L. aurita*; they are found together in the same habitat in the Red Sea.

Genus MELLITA.

The larger spines on the back of this, the former, and succeeding genus are short, equal in size, and furnished with a more or less spherical head.

The Museum series of specimens show a very gradual passage between the *Echini* which have been called *Mellita testudinaria* and *M. quinquefora* by Agassiz.

The species which have six slits on the disc are found on the coast of Tropical America, and others on the shores of the Red Sea; I believe they form two species, which appear to have been confounded under one name.

The American *Mellita hexapora* has only narrow linear bands of larger tubercles (bearing the larger spines) between the branched lines radiating from the mouth on the under surface, and these lines are very much branched.

Mellita similis and *M. lobata* of Agassiz, also from the West Indies; the first appears to be only a variety, and the latter a monstrosity of this species.

The Red Sea species I have named

MELLITA ERYTHRÆA.

Shell depressed, with five ambulacra and one posterior interambulacral slit; inferior oral grooves branched, branches very slightly divided; the larger spines and tubercles in a broad band, occupying nearly the whole interambulacral space between the inferior oral grooves.

Hab. Red Sea. Sir J. Gardiner Wilkinson.

There is a new genus which has the edge of the disk perforated and the vent near the mouth, as in *Echinoglyphus*, but differs in the oral grooves being more simple and only branched near the edge, in the lanceolate form of the ambulacra, and in the square form of the tesseræ of the ambulacral zones beyond the tip of the ambulacra.

Genus LEODIA.

Body depressed, with a posterior slit and five perforations between the end of the ambulacra and edge; the marginal ambulacral tesseræ squarish, like the interambulacral ones; ambulacra lanceolate, acute at the tip, the anterior one most narrow and longest; pores united by a groove; ovarial plate pentangular; ovarial pores three; oral grooves simple, slightly impressed, converging towards the margin in front of the ambulacral perforations; vent near the mouth, in front of the anal perforation, with a group of three or four larger spines between it and the mouth.

1. LEODIA RICHARDSONII.

Body suborbicular, slightly depressed, five-lobed, hinder edge transverse; ambulacra lanceolate, not reaching to the discal perforations;

discal perforations ovate, small, the anterior smaller, the hinder largest, with two pairs of rather large tesseræ between the ends of the ambulacra and the foramen, the upper pair subtrigonal; oral grooves simply forked near the edge.

Hab. West Indies.

The single specimen I have seen of this species was presented by Sir John Richardson. It is rather deformed and sinuous on the right side, the hinder lateral perforation being nearly obliterated on that side.

In *Echinoglyphus* the tesseræ of the ambulacral bands are broad and band-like between the ambulacra and the ambulacral slits.

Genus ECHINOGLYPHUS, Van Phelsum. The ENCOPE of Agassiz.

The large Brazilian species of this genus appear to be very variable. The young specimens have large notches on the edge of the shell, and as the animal increases in size, the marginal edges of these notches more or less approximate together, and sometimes even become united, so as to transform the notch into a perforation. M. Agassiz on these variations has formed several species; but the Museum series, from the Brazils and other parts of the east coast of Tropical America, show that they are all mere variations of the species which Van Phelsum called *Echinoglyphus frondosus*, and Lamarck *Scutella emarginata*. I am induced to believe that *Scutella quinqueloba* of Eschscholtz, *Encope Valenciennesii*, *Encope subclausa*, *Encope oblonga*, and *Encope Michelini*, are only varieties of this species: they are all remarkable for the large size and longly-rayed star-like form of the madreporiform plate.

GENUS FIBULARIA.

The following species is peculiar as having an oblong, longitudinal vent.

1. FIBULARIA OBLONGA.

Shell ovate, elongate, ventricose; vent oblong, longitudinal, according to the axis of the shell.

Hab. N. Australia.

Fam. 2. ECHINOLAMPIDÆ.

Genus ECHINOLAMPAS.

The species of this genus may be divided into two sections, according to the form of the ambulacra.

Echinolampas oviformis and its allies have the porous bands of the anterior and other pair of ambulacra equal; the lower side of the shell flat; the mouth oblong, transverse, with (5) tubercles between the oral ambulacra.

The other species have the anterior porous band of the anterior pair of ambulacra shortest; under side rounded, convex; mouth oblong, transverse, large, marked with no tubercles, and only very rudimentary oral ambulacra.

1. ECHINOLAMPAS DEPRESSUS.

Ovate, depressed, subpentangular; back regularly convex.

Hab. —?

Genus MORTONIA.

Shell ovate, thin, rather produced in front, rounded behind, covered with small tubercles; vertex central, convex; internal cavity quite simple; ambulacra petaloid, narrow, open at the end; bands rather diverging; pores rather crowded, united by an oblong groove; beneath concave, especially near the mouth and vent; mouth rather large, roundish oblong, transverse, without any ambulacral star; vent large, transverse, oblong, in the middle of the space between the mouth and hinder edge; ovarial pores four; madreporiform plate small, central.

? *Echinocyamus*, sp., *Desmoulin*.

Mortonia, *Gray*, *Cat. Echinoida in Brit. Mus.*

This genus differs from *Echinocyamus* in the thinness of the shell, and especially in the ambulacra being larger, more perfect, and in the pores of the ambulacra being united in pairs by a cross groove. It differs from the fossil genus *Pygaulus* in the vent being inferior, intermediate between the mouth and edge, and transverse.

This genus is named after Dr. Morton, the historian of Northamptonshire, who first attempted to arrange the fossil *Echini* into generic groups.

MORTONIA AUSTRALIS.

Elliptical, depressed, rather acute in front, rounded behind, under side concave near the mouth and vent; vent large, oblong, transverse, in the centre between the mouth and hinder margin.

Fibularia australis, *Desm. Tab. Syn.* 240.

Echinocyamus australis, *Agassiz et Desor, l. c.* 140.

Hab. South Sea. Mallet.

February 11, 1851.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

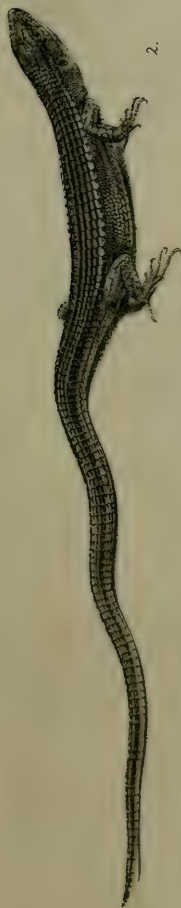
1. DESCRIPTION OF A NEW GENUS AND FAMILY OF CYCLOSAURIAN LIZARDS, FROM PARA. BY J. E. GRAY, ESQ., F.R.S., P.B.S.

(Reptilia, Pl. VI.)

This interesting Lizard has lately been purchased by the Museum, from a collection of Saurians recently made by Messrs. Wallace and Bates, during their excursion within a circuit of about 300 miles of Para.



1.



2.



3.

1. ANADIA OCELLATA. 2. EMMINIA OLIVACEA. 3. IPHISA ELEGANS.



J. Wolf, lith

M. & N. Hanhart, Imp^t

SAUROPHAGUS DERBIANUS. *Kaup*

It is exceedingly interesting as presenting an entirely new form, different in many particulars from any before observed; so much so, that I am induced to form for it a new family, to be placed near *Anadiadæ* and *Cherviolidæ*, which may be thus characterized:—

1. IPHISADÆ.

Scales of the back, belly, nape and throat smooth, broad, six-sided, transverse, forming a single series on each side of the tail, narrow, lanceolate, elongate, regularly keeled, in rings alternating with each other; head shielded; chin shielded; ear open, circular; femoral pores distinct.

IPHISA.

Head depressed, shielded; anterior frontal single, broad, four-sided; posterior frontals two, small, subtrigonal; vertebral single, rather elongate; posterior vertebral two, small, five-sided; occipital three, larger, middle one narrow, longitudinal; superciliary shield 3-3, hinder smaller, anterior smallest; temple with small shields; labial shields moderate; rostral and mental broad; chin entirely shielded; anterior single, transverse, first pair very large, triangular, covering nearly the whole of the chin, second pair small, at the outer hinder angle of the former; nostrils lateral, in the lower edge of the nasal shield, between it and the labial shield; eyes large, lateral; eyelids scaly?; ears circular, open; nape, back, throat and belly covered with two series of broad, smooth scales; sides rounded, covered with three or four series of six-sided, smooth scales, placed in oblique series; chest with a collar of five scales, the central one elongate, triangular, the lateral ones four-sided, the outer pair very narrow; preanal shields three, the central one elongate, narrow, subtriangular; limbs short, weak, covered with broad smooth shields above, the hinder shield beneath; femoral pores 10-10, distinct, the series nearly united in front of the preanal plates; toes 5-5, unequal, the inner very short, the outer hinder separated from the other by a space like a thumb; tail elongate, cylindrical, tapering, covered above and below with whorls of narrow, elongate, regular, lanceolate, strongly keeled pointed scales, those of each series alternating with those that succeed and follow it.

1. IPHISA ELEGANS. (Reptilia, Pl. VI. fig. 3.)

Olive-brown black marbled; sides darker, white varied; chin and beneath yellowish white.

Hab. Para.

2. DESCRIPTIONS OF SOME NEW BIRDS IN THE MUSEUM OF THE EARL OF DERBY. BY DR. KAUP.

(Aves, Pl. XXXVI. XXXVII. XXXVIII.)

During my visit to London last year I had the honour to receive an invitation from the Earl of Derby, to visit his collection at Knowsley Hall, with permission to use the materials I might find there for

the monography of *Muscicapidæ* on which I was engaged. Of that collection I had already formed very high expectations; but I was agreeably surprised by finding them all surpassed, so great is the richness of this noble collection. It contains more than 14,000 specimens of stuffed birds, besides skins, which are not yet numbered. What adds still greater interest to this collection is, that it contains a large number of the original specimens described by Latham and other English authors, of whose writings these specimens are the only explanation. To the pleasure of working in so rich a collection must be added the command of a colossal library, to which not one work of importance is wanting. All this, with the aviaries of magnificent living birds, from every zone of the world, must have the greatest charm for the naturalist, and make Knowsley Hall for him a perfect Eden, which once seen shall never be forgotten.

The new birds described here include only one portion of my researches, because I could not finish so many genera. The materials of the very rich family of *Muscicapidæ* are too extensive, for a complete elucidation during the limited period of my visit from a foreign country; I wish my descriptions therefore to be considered only as fragments.

The object of my visit to England was to collect materials for a complete monography of the *Muscicapidæ*; but notwithstanding the many favours I received, and the extreme liberality with which my labours were facilitated in every English collection, I must confess with sorrow that I shall never be able to make a complete whole (perfectly free from objection), with materials collected in different museums. A perfect arrangement can only be achieved by the study of the materials present together, so that at every moment a comparison may be made between any two or any number of the species.

Were it my good fortune to assemble the whole materials of one family in my rooms at Darmstadt, one winter only would be necessary to finish each family in such a manner as to satisfy the requirements of modern science.

Were any one museum willing to accord me the whole materials in its possession, it is probable that all the supplementary species not contained in that collection would be readily furnished by other museums, as the absence of a few species for a short period would be of little or no importance.

That we can only climb to the summit of our science by means of well-made monographies, there can be no possible doubt; and I attach a higher value to a monography constructed on philosophical principles, than to the best fauna of any single part of the world: for only by a strict comparison of the birds of the five parts of the globe can we know what is a family, a subfamily, genus, species and subspecies. Only in this way—a difficult way no doubt—can we learn the true harmony of nature; and thus shall we be filled with admiration, when we see that every species, genus, family or order represents a certain type, and must receive its place in a scheme of classification according to fixed laws, which man must discover, but over which he has no control.

This charm can never belong to merely descriptive ornithology, because even the best descriptions are only like mosaic stones, which, when placed without rules, or arranged according to false principles, give us only a scattered mass of heterogeneous materials, or a picture destitute of truth.

These claims I have urged over and over again in my dissertations, but hitherto without effect. When shall the time arrive when a catholic spirit shall guide the destinies of science, and lead onward to that triumph of true knowledge, in which every director of a museum, and every student of the works of nature, may take his part?

At present it is impossible that a naturalist can without help arrange the whole materials of one class in his museum. Our museums are little more than great exhibitions for the people, who look too often only to colour, instead of being stores of nature's treasures, ready to be communicated to every naturalist who has proved himself worthy of the name. Every museum ought to accord freely and liberally the wished-for materials, for this is the cheapest way in which a family can be properly named and accurately classed. The common excuse that the lent materials might come to harm, is little more than an excuse. Time and destructive insects will do the harm, without the slightest advantage to science.

NISUS (seu ACCIPITER) CHIONOGASTER, Kaup.

Diagnosis.—Above dark blue grey, beneath pure white.

Description.—The male is less than the *Nis. fringillarius*. Above dark blue grey, the crown, lorum, and a stripe over the eye- and ear-cover feathers more approaching to black; ear-covering, cheek and crop with fine black quill lines; tail with three black bands and a broader band at the end, which is white bordered; the underside of the tail has the bands more silver-grey; the first tail-feather with five bands before the large end-band; the wings on the inner side with four bands before the large end-band. Before the emarginations the bands are grey, and after them whiter.

The larger female with a white eye-stripe, and broader black quill stripe on the crop; the cover feathers of the tibia with a fine rufous tint.

According to the ticket of M. de Lattre, the iris of the female is orange, and that of the male dark brown, like burnt sienna.

These two specimens were procured by M. de Lattre in Coban, in the year 1843.

Dimensions in millimetres.—

	♂	♀
Head	40	45
Gape	16	19
Wings	173	206
Tail	140	160
Tibia	47	56
Middle toe without nail ...	32	37

We possess several species in the genus *Nisus*, Cuv., seu *Accipiter* of the English authors. Most of these are very near to the common Sparrow-Hawk; and I think some of them, like the North American

fuscus seu *velox*, the African *rufiventris*, the *madagascariensis*, and perhaps the *erythrocnemius* of G. Gray, are not true species, but that they are subspecies of the common European *Nisus fringillarius*, forming a group amongst themselves, and exhibiting by no means the decided differences apparent between *fringillarius* and *pileatus*, or *pileatus* and *tachiro*.

In the same near relation to the *chiquera* of Western Africa do I consider the true *chiquera*, Vaill. 30, from India; and this opinion I found on the following characteristics.

The West African *chiquera* has the body above darker cinereous, with very distinct narrow black lines, and the stripe beneath the eye, and the black stripe over the eye and ear-covers, are more distinct; and the rufous head with darker fine stripes.

The Indian *chiquera* has the head without stripes; the body above lighter grey, with very few traces of black bands; and the black semi-circle round the eye is shorter and not so complete.

But these slight differences will not justify us in considering the West African *chiquera* as a true species distinct from the Indian true *chiquera*; it is only a subspecies of the latter true species. As such we must make a distinction, and as such it must be accorded a place in the system. I think the best way is to give a description of the oldest known subspecies, and arrange all the other subspecies with different names, distinguished by the letters of the alphabet, *a*, *b*, *c*, &c., amongst the true species. In this way it would only be necessary to give a very short description of the subspecies, consisting of the few marks by which it differs from the old known subspecies. Until we have discovered all the species contained in one and the same subgenus, we can never say with certainty whether a given specimen represents a true species, or only a subspecies; I must therefore confess that in the following descriptions of the family *Muscicapidae*, it is very probable that I have described as species some specimens which hereafter will be arranged as subspecies, when the whole species composing the subgenus are completely known.

One of the most interesting birds in the collection of Lord Derby is a little Falcon, belonging to the subfamily *Falconinae*, which enabled me to correct the characters of the genus *Harpagus*.

The characters must be changed as follows:—Bill large, with two teeth, slender and indistinct, or strong and distinct; wings short, and in the proportions of the quills very like *Nisus* seu *Accipiter*; toes short, and the inner and outer toes of the same length.

The genus *Harpagus* must be divided into two subgenera.

The older subgenus *Harpagus* must be distinguished by the following characters:—Two strong and distinct teeth; the nostrils placed near the end of a soft membrane covering a large cavity; tibia with scales not divided.

Two species, *diodon* and *bidentatus*.

The other subgenus, in which this new species must be placed, must be characterized:—Two slender indistinct teeth; the nostrils round, very small, and bored in the nasal bones; the first wing-

feathers with very distinct emarginations, the fourth the longest; tibia with whole and divided scales (fig. 3).

I give this subgenus the name of *Spiziapteryx*, and the species I have named

HARPAGUS CIRCUMCINCTUS.

Diag.—Size of the Kestrel, with white stripe over the eye, which encircles the whole head and is connected with a white collar; the tail-covers, above and beneath, white.

Descr.—Rufous ash-grey, beneath lighter, with dark brown shaft-stripes; the white stripe over the eye, and the collar black margined; tibia-covers white; the arm and hand wings white at the roots, and like the stronger cover-feathers, with white spots and bands on the inner and outer webs; the first wing-feather without spots on the exterior web, and with fine white spots on the interior web; tail black-brown; beneath with white roots and three small white bands and an end band; the fifth without spots on the exterior web; the fourth with only traces; the third exhibits round white spots; and the two exterior feathers are white-banded. From this very irregular distribution of spots, the tail, seen from above, exhibits a very irregular drawing. Cere, naked eye region and feet yellow; nails dark brown.

I apprehend that this specimen, the only one in England, is not a very old bird. Lord Derby received this bird from Chili, by Mr. Bridges.

Dimen.—Head, 49; bill, from the cere, 16; from the gape, 22; height, 13; breadth, 20; over wing, 123; tip of the wing, 56; middle tail-feather, 148; outer tail-feather, 115; tarsus, 45; middle-toe, 26; nail, 11; outer-toe, $17\frac{1}{2}$; nail, 10; inner-toe, 16; nail, 12; after-toe, 13; nail, 13.

A new species of the subgenus SAUROPHAGUS, Swains.

In the little subgenus *Saurophagus*, Swains., we had, till now, only three species. These are, *lictor*, *sulphuratus*, and *flavus*. I received by Mr. Wollweber from Zacatecas in Mexico an only specimen of a fourth species; but I found in the collection of Lord Derby, and in the British Museum, a great number of the same species.

To this species I have given the name of *Derbyanus*, as a mark of my respect for that distinguished patron of ornithological science, the Earl of Derby, President of the Zoological Society.

All the species of this little subgenus have the same general colouring, and are distinguished only by very few characters taken from the colouring of the wings and from the dimensions. The young ones have, like the young birds of *Scaphorhynchus*, the bill shorter and bigger, and the head is black, without the beautiful crest of the old birds. The old birds have a white front, connected with a white band over the eyes and over the black ear-covers, and surrounding the black head, which in the middle is ornamented with a yellow crest; the chin and underpart of the neck white; breast, belly,

under-wings and tail-covers yellow; back olive-coloured; wings and tail brown, with red margins.

SAUROPHAGUS LICTOR, Gray & Mitch. Genera of Birds, t. 62.

Lanius lictor, Licht.—*Saurophagus pusillus*, Swains.—*Swainsonii*, Gould.

Diag.—Only the margins of the outer webs of the wings rufous; wings 86 mm. long. It shows the finest bill, a more graduated tail, and the smallest dimensions.

Hab. Brazil, Para.

SAUROPHAGUS SULPHURATUS.

Lanius, Gmel.—*Tyrannus*, Vieill. Enl. 296.

Diag.—Only the margins of the outer webs of the wings rufous; wings 110–114 mm. long.

Hab. Amer. meridional.

SAUROPHAGUS FLAVUS, Gray.

Corvus, Gmel.

Diag.—Only the margins of the outer webs of the wings rufous; wings 126–130 mm. long.

Hab. Brazil meridional. Bolivia.

SAUROPHAGUS DERBIANUS, Kaup. (Aves, Pl. XXXVI.)

Diag.—The wing-feathers from the second to the sixteenth have the whole outer webs on the greatest part of the length rufous; wings 128 mm. long.

Hab. Zacatecas, in Mexico.

Comparison of the dimensions.—

	<i>Saur. lictor.</i>	<i>Saur. sulphuratus.</i>	<i>Saur. flavus.</i>	<i>Saur.Der- bianus.</i>
Head	41	53–58	60–62	60
Bill, from the forehead . . .	22	29–30	35	32
— from the gape	26	32–36	40–42	38
Wings	86	110–114	130	128
Tail	74	82–86	100	92
Tarsus	16	25–27	28	29
Middle-toe with the nail . . .	—	21	30	26

In these dimensions *Saurophagus Derbianus* is very near to *Saur. flavus*.

In what relation with the subgenus *Scaphorhynchus*, Pr. Max., this little subgenus *Saurophagus* is to be placed, I shall determine in my next monography, *Muscicapidæ*.

Of the subgenus *Scaphorhynchus*, Ch. Bonaparte, in his very useful *Conspectus*, has given five species:—*pitangua*, *flaviceps*, *atriceps*, *audax*, and *chrysocephalus*.

The species *flaviceps* and *atriceps* must go down, because *flaviceps*, Sw., is a female, and *atriceps* a young bird of *pitangua*; *audax* does

not belong to this subgenus, and is to be placed in the neighbourhood of *rufinus*, Spix, and *circumcinctus*, Sw., which have the same bill and similar covering.

We have only two species, *pitangua* and *chrysocephalus*, Tchudi, in the section of *Scaphorhynchus*.

Scaphorhynchus, with its broad bill, shorter and feebler tarsi and toes, represents more the Swallow type, and must be placed in the second rank of his genus.

Before I finish I may allow myself the observation, that, till now, the whole family of *Muscicapidae* has been in a condition of the greatest confusion, and that the greatest number of genera must go down, or must be considered as subgenera of some larger genera. As an example of the way in which this is to be effected, I give for instance the genus *Psaris*, into which I transplant three genera of the new authors.

Some remarks on the genus PSARIS, Cuv.

The genus *Psaris*, which is synonymous with *Tityra*, Vieill., is a true genus, which cannot be considered as the only type of a subfamily, and which cannot be divided into several genera. It is an indivisible genus, which I have separated into some little subgenera only. I prefer, from well-known reasons, the name *Psaris*.

The characters of this genus are:—Thick, strong, slightly compressed bill, without strong bristle-feathers on the mouth gape; tarsi moderately high, with broad scales on the front; on the sides and behind with small scales. *The old males have the second hand wing-feather abnormally short and of an unusual formation.* The females and young birds have the wings regular.

The species of this large genus are limited to the southern parts of America.

a. Subgenus CHLOROP SARIS.

They have the bill and the feathered lorum of the *Pachyrhamphus*, but the wings are shorter and the tail more graduated. Size of a Sparrow, colouring more variegated and greenish on the back.

1. PSARIS CUVIERI, Swains. Spix, tab. 45. 2.
2. PS. ATRICAPILLUS. *Muscicapa*, Gmel. Enl. C. 871 ♂. 831 ♀.
3. PS. VERSICOLOR. *Vireo*, Hartlaub.

b. Subgenus PACHYRHAMPHUS, G. Gray.

The bill unicolor black, shorter than the head, not compressed on the sides; the bristle-feathers moderately long; the enormous hand-feather like *Chloropsaris*, with broader inner webs and emarginated only on the tip; tail unicolor, very little graduated. Size of a *Lanius colorio*. The colouring is dark and not so variegated.

We can give by the diagnosis the colouring of the enormous hand-feather of the males.

4. PS. VALIDUS. *Lanius validus*, Licht.

The second hand wing-feather with a long white spot on the inner web, which reaches to the third part of its length.

5. PS. NIGRESCENS. *Pach. nigrescens*, Cab.

The second hand wing-feather black, with white margin on the exterior web.

6. PS. PECTORALIS. *Pach. pectoralis*, Swains.

The second hand wing-feather black, with white spot near the root, and fine white exterior margin.

7. PS. AGLAË. *Pach. Aglaia*, Lafr.

The second hand wing-feather with an oval white spot near the root, and without white exterior margin.

c. Subgenus PSARIS.

The red and black bill on the anterior part more compressed, and like *Cassius*, with broad root, surrounded by the frontal feathers; lorum and eye region naked; the bristle-feathers over the gape very indistinct; the second hand wing-feather extremely narrow, formed like a sword, without an emargination on the tip. The colouring is silver-grey, like *Lanius excubitor*, with more or less black head, face, wings and tail. Size of *Lanius excubitor*.

8. PS. CAYANUS, Cuv.

The black colour covers the whole head, and extends to the tip of the ear-feathers; the bill two-thirds red-coloured; tail black, on the root only white or silver-grey; the wings 116-122, and the abnormous second hand-feather 40 mm. long.

9. PS. BRASILIENSIS, Swains.

The black of the ear-feathers extends further than the black of the head; the bill one-third red-coloured; the inner webs of the wings white-bordered; the wings 129, and the abnormous second hand-feather 41 mm. long.

This species is probably a subspecies of *cayanus*.

10. PS. SEMIFASCIATUS. *Pach. semifasciatus*, Spix, t. 442.

The black on the head covers only the front to the eye, and descends to the anterior ear-feathers round the eye to the chin; tail black, with a silver-grey or white band under the tail-covers, and a white band on the tip; the wings 127-134, and the abnormous second hand-feather 46 mm. long; it is on the exterior web black, and on the interior white.

The female with dirty brown head and a greyish brown back, with a tinge of red.

11. PS. MAXIMUS, Kp.

In the collection of Lord Derby I found a young bird of very large



J. Wolf, lith.

M & N. Hanhart, Imp^t

PSARIS FRASERII. *Kaup*. ♂.



J. Wolf lith.

M & N. Hanhart, Imp.

PSARIS FRASERI *Kaup*. ♀

dimensions, which does not belong to any of the preceding species. The bill is reddish on the root; the under parts are lighter than on the young *cayanus*; the stripes are more obsolete, and are reduced on the side as black shaft-stripes; shafts of the tail reddish brown; under tail and interior wing-covers white, without spots.

	<i>Ps. cayanus.</i>	<i>Ps. maximus.</i>
<i>Dimen.</i> —Head	52	56
Gape.....	35	35
Wing	129	129
Tail	70	73
Height of the bill	11	13
Breadth	12	13½

It would be very interesting to discover the old bird of this species.

d. Subgenus ERATOR.

It unites the size, colouring and formation of the second hand-feather of the true *Psaris* with the bill and feathered lorum and eye region of the other subgenera.

This little subgenus, with its mixed characters, gives the clearest proof that *Psaris*, *Pachyrhamphus* and *Bathmidurus* cannot be considered as true genera.

12. PS. INQUISITOR, Orb. *Lanius inquisitor*, Olf.

Diag.—Tail black.

Descr.—The male with black head and white ear-covers, connected with a white collar, which divides the black head from the silver-grey body; tail black, at the root white, which extends to the margins of the inner webs; end of the tail without white band; the second hand-feather on the inner web white.

The female (*Jardini*, *erythrogenys*, *Selbyi*, and *Nattereri*, Sw.) with white front and rufous ear-covers.

13. PS. FRASERII, Kaup. (Aves, Pl. XXXVII. XXXVIII.)

Diag.—Tail two-thirds white, with black white-bordered end.

Descr.—The head to the ear-covers black; ear-covers and under the posterior part of the eye white; the second hand wing-feather light ash-grey, with white root.

The dimensions of these two species are nearly the same:—head, 52; gape, 32; height of the bill, 10; breadth, 14–15; wing, 105–113; tail, 63–70.

I give to this very distinct species the name of a very able zoologist, who is going a second time to Western Africa. From this journey we may anticipate the greatest benefit to our science, and we wish Mr. Fraser the best success. For all his kind assistance in the collection of Lord Derby I give him my best thanks.

e. Subgenus BATHMIDURUS, Cab.

They have the bill like *Chloropsaris*, *Pachyrhamphus* and *Eerator*, but the tail in most of the species is more graduated. The colouring

of it is black, with white or yellow end spots. Size of a Finch. The predominating colour of the males is black, white and grey.

In this little subgenus we have different type-species, about which the different subspecies arrange themselves. One of these is

Ps. MARGINATUS.

Head-feathers black, on the tip with steel-blue; wings black; shoulder-covers, wing-covers and arm-wings white marginated; tail graduated, black with broad white tip.

The female has all the margins and the under parts rufous yellow, the back greenish, and the head darker coloured.

a. Ps. MARGINATUS MINOR.

Lorum and a small line on the front whitish; ear-covers, back part of the neck, lower part of the back light grey; upper part of the back black; all the under parts white with grey tint; the abnormal second hand-feather white, on the exterior web on the root with a black spot, and from this spot till the end; along the shaft on the interior web a small long black stripe.

b. Ps. MARGINATUS MAJOR. Bathmidurus major, Cab.

Lorum and a small line on the front whitish; before the eye a black spot of bristle-feathers; the shoulder-covers all white; over-back black; the abnormal second hand-feather longer, white, with a small stripe along the shafts on both sides.

c. Ps. MARGINATUS TRISTIS, Kp.

Without a small white line on the front; lorum and the whole head black; the feathers on this part are more massive on the tip, and have more lustre; the shoulder-covers only on the tip white; the whole neck and upper part of the back black; lower part of the back, ear-covers and all the under parts dark grey, mixed with black; the tail has not so much white on the tip; the under side of the wings with smaller white margins; the second abnormal hand wing-feather on the inner web whitish with grey spots, on the outside black, with a grey margin on two-thirds of the upper part; the emargination on the tip very distinct.

Mus. Derb.

Comparison.—

	<i>Ps. marg. minor.</i>	<i>Ps. marg. major.</i>	<i>Ps. marg. tristis.</i>
Head	35 ..	♀ 38 ♂ 36 ..	37
From the gape to the tip of the bill	18 ..	19 19 ..	20
Wing	65 ..	84 73 ..	75
Tail	50 ..	64 56 ..	62

A new species in the collection of Lord Derby and in the British Museum, forming a second type-species, I have called

Ps. PARINUS, Kaup.

Size of *Parus major*; head-feathers black, with a soft violet lustre, and not imitating the form of scales; lorum, ear-covers and all the

under parts dirty white; the whole back and shoulder-covers grey; the little plumage of the wings black or grey, with whitish margins; hand-wings black, arm-wings dark grey, margined with whitish yellow; the inner webs of the wings broadly margined with whitish yellow; tail-feathers grey, along the shafts black and on the margin narrowly bordered with yellowish white; the second enormous hand-feather with broader inner web black, with white margin from the emargination to the end, and with a large long white spot from the root to two-thirds of the feather.

The female rufous with darker head; wings black-brown, with predominating rufous yellow margins; belly and under tail-covers lighter-coloured.

This species comes from Para.

Very near to this species must be placed the *Psaris surinamus* (*Muscicapa*, Gmel.), which is characterized with the following diagnosis:—*Caudā rotundatā, apice albā; corpore nigro, subtus albo.*

I have not hitherto seen this species, nor *Ps. niger variegatus* and *melanoleucus*.

Dimensions of *Ps. parinus*:—head, 34; gape, 17; wing, 68; tail, 49.

GENUS SETOPHAGA, Swains.

This genus is one of the finest of the whole family of *Muscicapidæ*. It is found only in America. Only one species inhabits the northern part, namely the very distinct species, *Set. ruficilla*, with its yellow or red-banded wings and tail. The tail-feathers are pointed.

The greater part inhabit the southern parts. They form various little subgenera, distinguished by their very different colouring. One of these, and I think the most beautiful, is the little section to which the following species belong. They have much yellow on the head and under side; on the over parts dark cinereous.

SETOPHAGA RUFICORONATA, Kp.

Diag.—With red head-spot; the first tail-feather all white.

Descr.—The hind ear-feathers black; front, lorum and eye-region yellow; the first tail-feather all white; the second white, with black spot on the outer web, and black margin on the inner web; under tail-covers black-spotted.

Mus. Derbyanum.

Very near to this species is

SET. RUFICAPILLA, Cab.,

of which Bonaparte gives the diagnosis in the following manner:—*Fusco-plumbea, subtus omnino flava, lateribus fuscis; pileo castaneo, reetricibus extimis apice albis.* Guiana.

SET. LEUCOPHOMMA, Kp.

Diag.—Lorum, eye-region and chin white.

Descr.—Ear-covers black, the yellow colour reaching only to the after part of the eye; tail and under tail-covers like *ruficoronata*.

Hab. Bogota. *Mus.* Derb.

SET. ORNATA, Boss.

Diag.—The whole head beautiful yellow.

Descr.—The head-feathers longer (10 mm.); the face and chin white; the anterior ear-feathers on the tip black, the hind ear-feathers all white; the first tail-feather all white, the second only on the basal inner web black; under tail-covers black-spotted.

Hab. Andes. Mus. Derb.

SET. FLAVEOLA, Lafr.

Diag.—The hind ear-feathers with black stripes.

Descr.—The face orange; the anterior ear-feathers black, the hind ear-feathers yellow, black-striped; under tail-covers white; the first to the third tail-feather with white shaft and shaft-spot, which is enlarged on the tip.

Hab. Columbia. Mus. Derb.

A third type-species is **VULNERATA**, Wagl.

The species belonging to this type-species have the breast and belly beautiful red.

They are natives of Mexico.

SET. VULNERATA, Wagl.

Above cinereous, with black front, throat and rufous spot on the head; first to third tail-feather with white spots on the tip.

SET. PICTA, Swains. Zool. Ill. t. 3. *tricolor*, Licht.

Above, throat and sides of the lower parts black; margins of the first hand-wing and the three least arm-wings white, like the cover-feathers of the wings; the first and second tail-feather nearly all white, the third white, with broad black margin on the inner web.

SET. MULTICOLOR, Bonap.

Black; front, small band over the wing-covers, belly and the tips of the tail-feathers white.

A fourth type-species is

SET. VERTICALIS, Lafr.

Cinereous, head rufous; breast and belly yellow; the first tail-feather three-fourths, the second half, and the third only on the tip white.

Hab. Bogota. Mus. Derb.

SET. FLAMMEA, Kp.

Breast and belly orange; the first to the third tail-feathers only on the tips white.

Hab. Guatemala. Mus. Derb.

SET. MELANOCEPHALA, Tchudi, p. 192. t. 12. 1.

A small line of the front, lorum, eye-region, like all the lower parts, yellow; the four exterior tail-feathers white.

Hab. Peru. Mus. Derb.

Genus TYRANNŪLA, Swains.

The genus *Tyrannula*, as Prince Ch. Bonaparte has apprehended it, is too large, and the forty species must be divided into some natural genera and different subgenera.

The manner of arranging these species in geographical sections is very simple, but very often the wrongest way, although so very clear that it can be understood by everybody. It is true that some genera are limited to a certain part of the world; but there are also many genera which are composed of species from all parts of the world, or from different zones of the same part of the earth.

A very natural section is formed by the species which Bonaparte called "Ultimi Tyrannorum sive Tyrannularum primæ."

The bill of the length of the head; over the nostrils as high as broad; the back rounded off; the gape bristle-feathers of moderate length; the wings moderately long, reaching to the tail-cover feathers; the tip of the wing short; the first wing-feather as long as the eighth, third and fourth the longest; the long tail of the length of the body; the head unicolor, without yellow crest, but the feathers can be erected; above dirty olive, with darker-coloured head; gorge and over breast ash-grey; the belly yellowish; the margins of the wings and tail rufous.

1. TYR. COOPERI. *Muscicapa*, Nuttall.

With shorter wings than *mexicanus*, but with longer bill, like *crinita*; throat and over breast light grey, not so dark as *crinita*; the black stripe along the inner webs of the tail-feathers is broader, like *stolida*.

Hab. Northern America and Chili. Brit. Mus.

2. TYR. CRINITA. *Muscicapa*, Linn.; *irritabilis*, Vieill.

With longer wings; throat and over breast darker grey; all the wing-feathers, except the first, black-brown with rufous margins.

Hab. North America. In every museum.

3. TYR. GOSSII, Bonap.

With longer wings; the anterior part of the outer webs of the first and second hand-wing whole rufous; the head darker, and the ash-grey dark, like *crinita*.

Hab. Jamaica. Brit. Mus.

4. TYR. MEXICANA, Kaup.

With short wings; all the wing-feathers, except the first, with rufous margins; breast light ash-grey; above lighter.

Mr. Wollweber sent me this species, which I found also in the British Museum.

5. TYR. STOLIDA. *Myobius*, Gosse.

With short wings; the rufous margins on the wing-feathers very fine; the black stripe along the shafts of the inner webs of the tail-

feathers reaching only to the middle of the feathers; the inner webs of the exterior tail-feathers with extinguished bands.

Hab. Jamaica. Brit. Mus.

Comparison of the dimensions.—

	<i>Tyr.</i> <i>Cooperi.</i>	<i>Tyr.</i> <i>crinita.</i>	<i>Tyr.</i> <i>Gossii.</i>	<i>Tyr.</i> <i>mexicana.</i>	<i>Tyr.</i> <i>stolida.</i>
Head	46 ..	45 ..	48 ..	43 ..	43
Bill from the gape	28 ..	28 ..	31 ..	24 ..	24
Wing	94 ..	100–105 ..	104 ..	93 ..	86
Tail	88 ..	89–94 ..	95 ..	86–90 ..	82
Tarsus	22 ..	19 ..	24 ..	22 ..	19

It is possible that all these species are subspecies of one or two type-species. This point, however, can only be determined by future researches.

Genus *TODIRHAMPHUS*.

I found in the collection of Lord Derby two new species belonging to this genus.

TOD. PECTORALIS.

Green, with a white spot before the eye; throat and chin dark ash-grey; next this with white on the crop; breast light ash-grey; the inner margins of the wing-feathers and the inner wing-covers yellow; outer margins of the wing-feathers and tail olive; belly and sides white.

Head, 28; gape, 14; wing, 45; tail, 42; tarsus, 15 mm. long.

Hab. ? Mexico.

TOD. RUFICEPS.

With red head and dark ash-grey occipital feathers; next this an ash-grey collar; over part of the wings black, with two light yellow bands; wing- and tail-feathers with olive margins, which on the arm-wings are more white; lorum black; ear-covers brownish; chin and throat white, with brownish tint, and divided from the yellow under parts with a black striped band; the tibial feathers black.

Head, 26; gape, 13; wing, 46; tail, 36; tarsus, 17 mm. long.

Hab. ? Mexico.

PHRYNORHAMPHUS, Kaup. *Smithornis*, Ch. Bonap.

The bill very broad, half as high as broad, with sharp culmen; the wings short; the first wing-feather long, nearly as long as the seventh, the second as long as the third and fourth; outer toe at the base connected with the middle toe.

I am strongly inclined to believe that this section does not possess the song-muscles.

PHRYNORHAMPHUS CAPENSIS. *Platyrrhynchus capensis*, A. Sm.

Descr.—Upper mandible black, lower mandible yellow; front and lorum rufous yellow; head black; the bristle-feathers with white

roots; ear-covers ash-grey, with whitish shafts and shaft-spots; back olive-grey, with black spots; the roots of all the feathers on the back pure white; wing-covers with rufous yellow margins, which form two small bands; lower parts white, on the sides tinted with brownish rufous, and with broad black shaft-spots; the middle of the throat, belly and under tail-covers white; tail black-brown, with olive margins.

Head, 40; gape, 22; height of the bill, 7; breadth, 12; wing, 72; tail, 55; tarsus, 18; middle toe, 15 mm. long.

Lord Derby's collection. Brit. Mus.

A communication was received from Dr. G. R. Bonyan, of British Guiana, on the Raptorial Birds of that country, of which the following is an abstract:—

3. NOTES ON THE RAPTORIAL BIRDS OF BRITISH GUIANA. BY DR. G. R. BONYAN.

There are, I believe, only three species of Vulture in British Guiana. The first is the well-known

KING OF THE VULTURES.

Sarcorhamphus Papa of Dumeril.—*Irubicha*, Azara.—*Vultur Papa*, Linn.—*Le Roi des Vautours*, Cuv.—*Carrion Crow Governor* of negroes.

There is a very good drawing of this bird in Latham's 'General History of Birds.' It is by no means common in Demerara, but young birds are occasionally brought from the upper rivers, particularly the upper parts of the Mahaica and Mahaicony creeks, where they abound, to the town. They are easily tamed and eat any sort of meat, not showing a particular predilection to putrid meat. Although I have seen this bird in its wild state, I have never witnessed it alighting upon a carcase; the common Carrion Crows, it is said, cede place until the king has fed. Mr. Waterton witnessed this singular fact, and I have heard it corroborated by more than one person of veracity. I know nothing of its habits or nidification. The colours about the head and neck are remarkably beautiful and varied, and have a downy bloom as it were, which it is impossible to imitate by painting the preserved specimen.

THE COMMON CARRION CROW. *Cathartes iota*.

If this bird be the same as "*Vultur iota*" of Charles Bonaparte, it is imperfectly described by Cuvier as having only the head naked; whereas it has the head and the neck more than half way down, naked, warty and black; nor is its plumage of a shining black, but dull and inky. The Carrion Crow is seen over the whole surface of the country, either soaring on dry sunny days at an immense height in the air, or swooping down in wide gyrations towards the ground. If a carcase be thrown out on a dam, no Carrion Crow being within the range of vision, after a short time one will be seen in a distant

part of the horizon ; presently another will appear ; then another and another, until they will be observed coming from all quarters ; not, however, in a direct line towards the object, but in more or less extensive gyrations. There can be no doubt that the first Carrion Crow that sees the object, by an increased energetic quickness of its flight, gives notice to those which are within its sphere of vision that there is game in view, which accounts satisfactorily enough for the vast number of these birds which are collected from every quarter of the horizon in so short a time after a dead body is exposed. Indeed, to the eye of the common observer, the difference of motion of a *Vultur iota* on the look-out, and after it has sighted its quarry, is very remarkable. The former is a slow, steady and gentle soar, in small gyrations, at an equal height ; the head of the bird, if it be examined with a glass, being seen turning from side to side. The latter is a rapid and energetic advance, every hundred yards or so the speed being increased by several vigorous flaps of the wings. It appears to me to be quite unnecessary to enter into the discussion, as to whether this bird hunts by sight or scent, as it is quite sufficiently established that it is assisted by both senses. The instant a snake is killed, the Carrion Crow will, if in the neighbourhood, sight the object, and speedily descend and commence his attacks upon the dead animal. Or if a negro lets fall a calabash with eggs, and they are broken, the Carrion Crow will soon be seen feasting on the unwonted luxury. If, on the other hand, a body be imperfectly interred, this bird will, so soon as putrefaction has commenced, be seen in the neighbourhood perched upon a tree or tombstone, and apparently much puzzled to know where the piece of mortality can lie concealed which evolves the, to him, delicious fragrancy. If the body be that of a tough-skinned animal, such as an ox or horse, the Crows will wait, perched on trees in the neighbourhood, until putrefaction has softened it sufficiently for them to feed on it. Their bills and feet are remarkably weak. They build in very high trees nests of broken sticks. The eggs when broken have a semi-putrid odour. It is worthy of remark that the Carrion Crow is common about the streets of New Amsterdam, scarcely getting out of the way of the passengers ; while in Georgetown, not more than sixty miles distance, this bird is never seen in the streets. The former town is said to be much more cleanly and well-kept than the latter.

The YELLOW-NECKED CARRION CROW.

This bird is smaller and more slender than the common Carrion Crow. It is found principally about the creeks of Mahaica and Mahaicony. It is less numerous than the Black-headed Carrion Crow. It is not either so gregarious a feeder, and appears to search for smaller carcases, such as the putrid fish on the dried savannahs bordering the creeks. There is certainly, with the exception of the colour of the head and neck, the absence of warts, and the slender form of the body, but a very slight specific difference between this bird and the former. The colour is black, with blue and greenish iridescence.

The FISHING-HAWK. *Pandion*.

A very handsome little fishing Eagle. I do not think this is the same species as *Le Balbusard* of Cuvier. It enlivens very much the scene about the flat swampy lands of the sea-coast, when the trenches are full with the mixed tide and bush water. It hovers for a length of time in one spot at a considerable height, and then suddenly descends vertically on its finny prey, or it alters its position to another part of the trench. When it makes a capture it flies off to a neighbouring tree to devour it.

The LARGE BLUE HAWK OF THE CATARACTS.

This bird I shot with a single bullet while descending the long and swift rapid of Twansinki, lat. 5°, on the Essequibo. It is very rarely seen on the lower parts of the rivers. The manner of its death was as follows, as I find on referring to my journal of the trip:—10th November. An exciting day's journey in the descent of the rapids between Twansinki and Waraputa. Some of these we did not venture to *shoot*, as it is called, but had to let the boat down, by means of the tow-line, most ignominiously, stern foremost. We had, however, the satisfaction of being very nearly swamped in descending a long rapid in the lower Twansinki range, which made up somewhat for the slight we considered had been put upon our courage by our coxswain, Hermanus, refusing to shoot down those rapids he considered to be dangerous. Our indignation against the noble captain was considerably cooled. The great danger in the descent of these long rapids is from the boat being carried down by the rush of the torrent, and the bow being at the same time more or less submerged by the curling back of the water, when it meets the resistance of the rocks in its passage. Thus the descent, although very swift, is in a succession of violent plunges, at each of which the boat, if not built with a sufficient *spring* in the bow, which was unfortunately the case with us, takes in a large quantity of water, and is in great danger of being swamped before it reaches the foot of the rapid. Everything depends of course on the *way* the boat has on it, and our crew, on this occasion, urged by the frantic gestures and shouting of the steersman and bowman, pulled with amazing vigour and energy. In the very midst of the hurly-burly of this descent, a Large Blue Hawk flew rapidly across our bow and alighted on a high dry tree. My soul had long yearned after a "Blue Hawk" of the Cataracts. Before I could fairly cover it, the bird was eighty yards behind us. The report of the gun was scarcely audible in the tremendous noise, and the Hawk for a second remained immovable and apparently unharmed, when his head sunk, his body swung forward, and the powerful grasp of his talons relaxing in death, he fell plumb down.

There are three species of *Ibycter*, or "Carracarra Hawks," as they are called by the creoles. These are very numerous on the banks of the rivers and creeks, and appear to be continually on the alert, flying from tree to tree, alighting and scratching on the sands, and indeed being the only specimens of the bird kind on the higher

rivers which are always to be met with during the whole day. The first is

The LAUGHING HAWK.

A well-known bird, which has been described by Waterton, Schomburgk and others. It is remarkably noisy, and is generally seen in company with three or four others of the same species flying about and perching on the high trees on the borders of creeks, uttering almost constantly a discordant loud gabbling, from whence it has got the name of the "Laughing Hawk." This bird feeds on eggs, young birds, insects, and does not despise certain sorts of fruit. It is, in fact, omnivorous.

The YELLOW-HEADED CARRACARRA HAWK.

Smaller than the preceding. Three or four are generally seen together. They frequent chiefly in the months of September, October, and November, when the guana and river turtle lay their eggs, the extensive sand-banks on the river Essequibo, beyond the first rapids in latitude $6^{\circ} 10'$. I have seen them in companies of from three to five, assiduously scratching up the sand in which the guana or turtle had laid; and as these reptiles deposit their eggs at least eight inches beneath the surface, their rasorial powers are very considerable. The sands on this part of the Essequibo extend in every direction, lying on the beautiful bosom of the placid river, among finely wooded islands of all sizes, with most inviting sand beaches, enticing you to land at every turn. If you do land, you will probably see on the hard fine sand the scrambling track of a guana, which, if petrified, would set a palæontologist frantic with delight. Close by, the steadier and more decided footstep of the cayman, clearly showing that he is made of somewhat sterner stuff than his herbivorous friend, and still further off, a camoude has dragged his slow length along. There are tracks of turtle, ducks, snipes, lizards, and all sorts of *Coprice*; in fact, a first-rate piece of interesting geology, only not baked or compressed yet. Edging the bank is the eternal forest.

The RED-HEADED CARRACARRA.

This bird is of the same size as the preceding, but its habits are somewhat different, as its food appears to be principally confined to insects and small reptiles. I found the stomach of one I dissected full of fragments of beetles. Mr. Swainson places these birds at the head of the Kites, where they are certainly more naturally situated than among the Eagles, where they are placed by Cuvier.

The next birds are the Awl-beaked Fish-Hawks. I only know two, and they are very near one another.

The LARGER AWL-BEAKED FISH-HAWK

Is remarkable for the great length of the curve of the upper mandible, and is somewhat larger than the next. Both are savannah birds, feeding on freshwater fish. They are often seen in large flocks, particularly on an extensive savannah, through a part of which is dug

the freshwater canal called the "Lamaha," which was intended to supply the city of Georgetown with water. They prey particularly on the Hassar (*Callichthys*, Schomb.). This curious fish, which builds a nest in or under which it lays its eggs, is found in abundance in the small pools and water-holes of the savannahs. It is a very domestic fish. The female, when the time for spawning arrives, collects a number of small pieces of stick, and places them together, across one another; it then, descending beneath this structure, which is about a foot in diameter, expungates a quantity of viscid matter, which, being mingled with air, causes the nest to float. In this viscid expungation the eggs are laid, and both the male and female remain near the nest, making furious strokes at any intruder; and as they are provided with a very sharp bony first ray to the dorsal fin, if a wound be inflicted it is generally a severe one. The form of the beak of the Fish-Hawk is admirably adapted for separating the plates of mail in which the Hassar is enveloped. It is when the water in the pools and water-holes is reduced in the first part of the dry season to soft mud, that flocks of these birds are seen on the savannahs, feasting on Hassar.

THE SMALLER AWL-BEAKED FISH-HAWK.

Habits the same as the former. From the habits of this group of birds of scouring the savannahs in search of prey, the length of their wings, and the strength of their claws, they approach near to the Harriers.

THE SCISSORS-TAILED KITE. *Nauclerus furcatus*.

This is a very graceful bird, and is generally seen soaring, with widely-forked tail, above the lower parts of creeks, or over rivers when the water is fresh. They are, when perched, generally in companies of from five to six. They strike at small birds, creepers and such like, when feeding. I do not think that they strike at birds on the wing, and I never saw the *Nauclerus* pounce on a fish, although they appear to prefer to soar over the broad parts of creeks and fresh rivers. In fact, they are scarcely ever seen elsewhere. The Camouni creek, a few hours' sail up the Demerary river, is a favourite haunt of the Scissors-tail. Here they may be seen by the now rare traveller in this once thickly populated and very beautiful creek, either soaring high up in the brilliant sunshine, with a gentle undulatory motion, moving the head from side to side, and alternately opening and shutting the fork of the tail, whence their name of "Scissors-tail"; or perched in a small company upon some high creek-side tree, attracted probably by a flock of creepers or manakins. In coming down the Camouni one morning with a pleasant company of sportsmen—we had bivouacked near the source of the river the night before—I was much struck with the remarkable gracefulness and beauty of the *Nauclerus*. A company of six had selected a high tree close to the water's edge, at a wide and graceful bend. The approach of our boat alarmed them, and they flew up and around the tree as if inclined to settle again after we had passed on; but on one of our party firing, the

birds, finding the danger impending, sought for safety in the higher regions of the atmosphere, and it was in their gyrations to obtain a suitable elevation that their gracefulness and beauty were particularly remarkable. I am not acquainted with any Hawk which soars to such a height as the *Nauclerus*. I have seen them over the river Pomeroun, at an elevation so great as to be scarcely visible.

The whole of the next group, nine in number, with the exception of three, are birds which frequent the extensive abandoned fields near the sea and the courida trees (*Avicenna nitida et tomentosa*), which form a narrow belt of vegetation along the coast, between the sea and the high roads. These fields, which were for the most part formerly in cotton, are often inundated, either from imperfect drainage of bush-water, or the incursion of the sea, which, since the British people commenced to make us pay the penalty of having had slaves, is fast resuming its ancient dominion, from whence it was dammed out by our Dutch predecessors. Over these fields may be seen hunting with indefatigable industry the first two of the group; viz.

The BROWN-BACKED HARRIER, and

The LONG AND SLENDER-LEGGED BUZZARD.

They search every bush, destroying old and young alike, snatch up the little grass-finches, and in fact are a most dreadful scourge to the feathered inhabitants of these woe-begone and miserable looking swamps, remembrances of our former glory and shame. The next is

The CHESTNUT HARRIER.

A very rare bird, which was shot while flying over the Mahaica creek. Nothing whatever is known of its habits, but from its structure they must be similar to those of the two former.

The LARGE SEA-FISHING HAWK.

The coasts of Demerara, it may not be unnecessary to inform the English reader, are bound by vast mud-flats, which at high tide are covered by the sea. At dead low tide the water-mark is, at many parts of the coast, not visible. It is on the courida trees which border the coast landward that the Large Sea-fisher may be seen waiting patiently for the influx of the tide, which brings with it his food. At about half-tide he begins to bestir himself, and as there is always an abundance of fish brought up by the water, he soon captures as much mullet and other such-like coast-fish as gratifies his hunger. The Sea-fisher fishes on the hover from a considerable height, pouncing down vertically on its prey. The next is

The BIRD HAWK,

With striated chestnut belly, which does not hunt on the wing, but sights its prey, small birds, from the perch, generally a courida tree. It builds a nest of dry sticks upon these trees. The next is

The PARROT-BEAKED BUZZARD.

A rare bird, and was shot in a cocoa-nut tree in the Mahaicony. It sights its prey, small birds, from the perch. Another species,

The LONG-LEGGED SNAKE-EATER,

Leads us back to the abandoned fields. This bird, a large, brown, dirty and ruffianly-looking animal, is very often seen, particularly on the east sea-coast, undergoing the punishment peculiarly appropriated to bullies, namely, being severely thrashed by fellows much smaller than himself. The Kiskadee, a tyrant shrike, is the little champion who thrashes the Snake-eater. Sometimes two or three of these birds will be seen, always keeping above it, pecking the Hawk most unmercifully, and they seldom fail in bringing it to the ground, when the sight of its powerful talons I presume, reminding them that the better part of valour is discretion, causes them to fly off to some neighbouring tree and set up a glorious "Io Pæan" of Kiskadee, Kis-kis-kiskadee over their victory. I have seen this Hawk capture snakes more than once and fly off to its perch to devour the prey. Another species,

The CRAB-EATER,

Frequents the courida trees, from whence it sights its prey on the mud-flat, namely crabs. It pounces upon any unwary crab that quits its hole, and, unlike the Snake-eater, consumes it on the spot where it takes it, and then returns to its look-out. They build a nest of sticks in the courida bush. Another species,

The INSECT-EATER,

Is the most ignoble of all our Hawks. Its feet and claws are singularly weak, and it feeds almost exclusively on beetles and other insects, which it captures on the courida bush, which it frequents. I have opened them and taken a large quantity of the fragments of insects out of the stomach.

The CRESTED AND BOOTED EAGLE.

A live specimen of this beautiful bird was brought to me as a present by an old servant who had left me a long time, and had been living far up the Demerary river. He unfortunately knew nothing of its habits, and told me that it was the only one he had seen. I have never seen one in the wild state. This bird lived for some days, but would not eat. Apparently, the beautiful semicircular crest of black feathers with a white central star was only elevated when the bird was excited. This however was almost constantly the case, from extreme wildness. The cry was a loud, plaintive, diminishing ha-ha-ha-ha-ha-ha. This bird certainly has most of the characters of a true Eagle. It is heavy and robust, with a beak somewhat straight at base; tarsi plumed to the toes; wings moderately long, with the fourth feather the longest; and the general air is that of an Eagle.

There are only three Falcons that I have seen here ; the first two true Falcons, with the typical characters and habits marked, and the third with all the typical characters (excepting the two-toothed beak) and the habits wanting. The first two are little Falcons, namely,

The CHESTNUT-BELLIED FALCON, and

The WHITE MOTTLE-BELLIED FALCON.

They are both birds that strike their prey on the wing, and are capable of killing birds nearly as large as themselves. The yellow-bellied species may be seen very busy at dusk, hunting bats with amazing swiftness. I have never been able to find either of their nests.

The TWO-TOOTHED BARIDI.

A bird with precisely similar habits to the next three birds. Like them, the Baridi never strikes, but confines himself to pillaging nests and destroying young birds. He is a sneaking marauder and burglar, and not audacious enough to commit highway robbery and murder, like the true Falcons. His wings are very short, and the characteristic formula of the quill-feathers is wanting. Consequently, I have placed this bird at the head of the succeeding group.

The PLAID-CHESTED SHORT-WINGED HAWK.

The BROWN-BACKED SHORT-WINGED HAWK.

The YELLOW-CERED SHORT-WINGED HAWK.

They are characterized by the same habits as the Baridi, stealing eggs and murdering unfledged birds.

The two next Hawks are large and powerful. The first is a large Black Hawk. It is a very fierce and destructive bird. It will kill rats and other small quadrupeds, as the Adouri (*Cavia agouti*), &c., and will strike at and kill so large a bird as a Currycurry (*Ibis rubra*). My huntsman Benjamin tells me that some time ago he shot a Currycurry, and before the bird fell to the ground, a large Black Hawk seized it and bore it away. It is very destructive to hen-roosts. The next species is found far up the river Demerary, and is by no means common. Mr. John King, a very respectable bird-stuffer and an observant naturalist, tells me that in a period of many years, constantly occupied in procuring species of birds and animals, he has only seen a few specimens of this bird. I have ascertained from the same authority, that its habits are very similar to the Large Black Hawk of the coasts.

I only know of five Owls in this country ; of four I have procured specimens. The first two, Booted Owls without ears, are common enough, and I have not been able to ascertain anything in their habits differing from the well-known and frequently described habits of their European congeners.

The SMALL-BOOTED BROWN OWL.

This is seen frequently at dusk in company with the Little Bat-falcon, hunting bats. The larger one, or Large-booted Black and White Owl, is strictly a night bird, and found principally in the forests. The next two are likewise strictly night birds.

The LARGE LONG-LEGGED STRIX, or JUMBI BIRD,

Inhabits hollow cabbage-trees or old and dilapidated houses, unfortunately that style of habitation in Georgetown, and over the whole country, being at this time the rule, and not the exception. They make a great noise at night, a sort of clack, clack, clack, &c., terminating with a harsh, disagreeable and ominous scream. They are held here, as elsewhere, to be birds of ill omen, portending death, wherefore they are called "Jumbi," or Ghost Birds, by the negroes.

The LITTLE LONG-LEGGED STRIX

Is a very handsome little mouse-coloured Owl, which preys upon moths and other night insects as well as small bats. They are mostly seen on the savannahs and in the courida bushes, and are strictly nocturnal.

It will be perceived that I have not described the *Harpya destructor*. This is in consequence of my not having had an opportunity of examining a dead specimen; a living specimen which I have access to, in the possession of Governor Barkly, being altogether too fierce to take liberties with. It has a very owlsh appearance, both in its facial disk and soft plumage. I have seen another imperfect skin of a very large Eagle feathered to the toes, with tremendous talons; both this and the Harpy I hope to be able to describe in a subsequent communication.

February 25, 1851.

R. H. Solly, Esq., F.R.S., in the Chair.

Mr. Gould directed the attention of the Meeting to two Hybrid Birds, concerning which he read the following letter, which had been addressed to Mr. B. Leadbeater, F.Z.S.

"Cottimore, Walton-on-Thames, December 17, 1850.

"SIR,—With reference to the bird which you now have of mine to preserve, I will tell you all which I have ascertained concerning it. It was shot at Henley Park, in the county of Surrey, by the keeper of H. Halsey, Esq., on a part of his property called the Peat Moor, and not far from the Frimley ridges; a wild tract of country, with a good many black-game upon it. The keeper was shooting pheasants for the supply of the house, and this bird rose on the opposite side

of the hedge to that on which he was, on the outside of a large covert : he did not see it distinctly ; but as in rising it made the sort of cry or crowing which a cock-pheasant is apt to do when disturbed, he shot it. I found it hung up in the larder, but was just in time to rescue it from the cook, and Mr. Halsey allowed me to take possession of it to be preserved. There is no doubt of its being a hybrid between the black-cock and hen-pheasant, as it appears that a black-cock has for the last two years frequented this particular covert and fed with the pheasants. The keeper, after feeding his pheasants, has frequently hid himself, to count his stock of those beautiful birds, and always saw this black-cock come to feed with them ; and so it lasted for two years or more. I have no doubt that this bird is the produce of his intimacy with a hen-pheasant. The old black-cock used to play like a cock-turkey, the keeper tells me, dragging his wings, and could drive all the cock-pheasants, being completely master over them ; which I wonder at, as the pheasant has spurs and he has none. The hybrid was shot on the 26th of October, and had he lived another month, would have been a beautiful bird. You will observe that he crowed on rising as a cock-pheasant does, which I believe a black-cock does not do. As far as I can ascertain in the number of instances of hybrids mentioned in Yarrell's 'British Birds,' they seem all to be the produce of cock-pheasants and grey-hens, whereas there is no doubt this is the reverse.

"I may mention while on this subject, that in another wood on Mr. Halsey's property two Hybrids were produced between the cock-pheasant and hen golden pheasant ; this took place about thirteen years ago. A hen golden pheasant had escaped from confinement, and it was known that she was alive in the coverts ; and in one particular wood it was remarked that the pheasants were always disturbed and driven out of it, and it was not known for some time by what ; till at last, by watching at the feeding-places, it was discovered that this golden hen-pheasant and two other curious-looking birds were so pugnacious, that they drove every thing from the place. They were all three shot, when the other two proved to be cock-birds, and there is no doubt whatever of their parentage, both from their shape and plumage. They are small birds and not handsome, partaking of the plumage of both sorts of pheasants, without any of the beauty of either. I believe this to be the first instance on record of their ever breeding in a wild state ; and you must remember that they were not in a Norfolk covert, full of half-tame pheasants, but in one of the wildest parts of England, as the presence of black-game will tell you. They were shot in the month of November, and therefore had probably got as good plumage as they ever would have. They are now in my possession through the kindness of Mr. Halsey.

"I think it a very curious circumstance that these birds should have been produced in a wild state, as I find in the 'Gardens and Menagerie of the Zoological Society,' vol. ii. Birds, under the head of Golden Pheasant, that in China, where the two sorts are wild, they have never been known to produce a mixed breed, and that in confinement it is sometimes obtained, but with the greatest difficulty. Also,

in the 'Natural History of Ireland,' vol. ii. Birds, by W. Thompson, it is stated, as a reason for the Golden Pheasant not doing well in a wild state in this country if introduced where the common pheasant is now abundant, that they are such a shy, timid bird, and would be easily driven off by the other species. This fear is evidently groundless, as not only the half-bred birds, but the golden hen drove all the other pheasants, as was seen frequently by the keeper; and they were so cunning, and so well able to take care of themselves, that after it was known they were there, and the mischief they did, the covert was beat in the usual way for pheasants, in the hopes of being able to destroy these birds, but without meeting with them, and the keeper was obliged to watch for them and shoot them at feed.

"I remain, your obedient servant,

"JOHN W. G. SPICER."

The following papers were also read:—

1. ON THE ANATOMY OF THE WART-HOG (*PHACOCHÆRUS PALLASII*, VAN DER HOEVEN).
BY PROF. OWEN, F.R.S., F.Z.S. ETC.

The female *Phacochoærus* died, without previous symptoms of ailment, on Wednesday, February 5th, having lived in the Menagerie of the Society ten months, during which it thrived, like the male, and grew rapidly; its weight at the time of its death was 105 lbs.

The length of the body from the extremity of the jaws to the root of the tail was 3 feet 6 inches; the length of the head 1 foot; that of the tail 1 foot: this part is naked, very slender, tapering towards the end, which is subcompressed, a little dilated, and ornamented with a tuft of long and slender black bristles, growing chiefly from the opposite margins, as in the Elephant. A layer of lard or fat adhered to the under surface of the corium, as in the Common Hog, preventing the movement of the skin by a panniculus carnosus.

The hair is of one kind, coarse, scanty, and moderately long; the bulb of each is imbedded in a flattened whitish body, about 3 lines broad. The cuticle is impressed by curved lines, giving it the appearance of being composed of imbricated scales from 3 to 4 lines in breadth. There is a strong callosity in front of each carpus, formed by, or connected with, the frequent habit of this animal of walking on its fore-knees. The suborbital wart-like appendage, situated $1\frac{1}{2}$ inch below the eye, is composed of a mass of fibrous and adipose tissue. A double row of strong cilia project from the upper eyelid; but there are none on the lower lid. There is a broad 'membrana nictitans.' An arch of long black hairs forms an eyebrow. The upper lip is bent upwards, or folded over the base of the upper tusk, and many short hairs grow from the thickened margin of this fold. There is a slightly curved callous ridge of the integument, 5 inches in length, parallel with the middle of the lower border of the lower jaw. There are but four nipples, one pair abdominal, about an inch behind the umbilicus; the other pair inguinal.

The anus is situated about an inch below the base of the tail, is a transverse crescentic aperture, with a thick upper border. The vulva is situated about 10 lines below the anus; it is a little peaked below, and the clitoris, like a small caruncle, projects 4 lines within the margin.

There was no appearance of incisors in either jaw; but in the substance of the alveolar border of the lower jaw were four rudimental incisors, 9 lines long by 2 lines wide, which probably were never destined to come through, and are smaller than those in the Caffrarian *Phacochoere*, called 'Harruja,' in the British Museum. The present specimen also differed from that species in having no incisor in the upper jaw; not even the rudiment of one could be found in the substance of the premaxillary. Hence I conclude the species to be that which Van der Hoeven has characterized by the absence of incisors in both jaws, and has called *Phacochoerus Pallasii*. The exerted crown of the canine tusks was $2\frac{1}{2}$ inches long in the upper, and 2 inches long in the lower jaw. Five molars were apparent on each side the upper jaw, and four molars on each side the lower jaw. The first in each jaw was a small, obtusely rounded premolar, with three long diverging fangs above and two below, answering to *p* 3; the second molar in the upper jaw was a much-worn milk-tooth, *m* 4; the third grinder above and the second below were the first true molar, *m* 1, with the crown worn down nearly to the roots. The fourth grinder above and the third below were the second true molar, *m* 2, with a body or crown $1\frac{1}{3}$ of an inch in length before the giving off of the short bent fangs. The last tooth in both jaws was the anterior point of the third true molar just beginning to cut the gum*.

The absence of any incisors above the gum in this young animal, and the presence of four rudimental ones hidden in the lower jaw, just where they are occasionally found in old individuals of the *Phacochoerus Pallasii*, show that this hidden condition and small size are not due to age, but are specific characters.

The roof of the mouth presented about twenty-two pairs of transverse, arched, palatal ridges, with their convexities turned forwards; gradually decreasing as they were placed more backwards, and terminating opposite the end of the molar series; beyond this part the membrane of the palate was smooth and soft. The tongue is long and narrow, with small, obtuse, well-defined papillæ below its margins, with a smooth dorsum, beset with very fine gustatory papillæ for two-thirds of its extent. At the base of the tongue, 6 inches from the tip, are two large fossulate papillæ, on the same transverse line, and behind these the dorsum of the tongue is beset with numerous soft, moderately large, pointed and retroverted papillæ.

* The grinding surface of the teeth in place closely corresponded with those of the *Phacochoerus Pallasii* figured in my Memoir on the Teeth of the Wart-Hogs (Philosophical Transactions, 1840, pl. 34. fig. 8, *m* 1, *m* 2 and *m* 3). The present specimen shows a stage anterior to the one there figured, the last milk-tooth intervening between the first molar and the small premolar in the upper jaw. There was no trace of the germ of a *p* 4 above the crown of *d* 4 in place, whence it may be concluded that, at corresponding phases of dentition, the *Phac. Pallasii* has fewer grinders than the *Phac. Eliani*.

Two mucous sacculi, about 1 inch in diameter and $1\frac{1}{2}$ inch in depth, are produced from the upper and back part of the pharynx into the pterygoid fossæ, on each side the basisphenoid. Between the mouths of these sacculi there projects from the back part of the pharynx a glandular prominence or caruncle, about 7 lines long by 5 lines broad. At the lower and back part of the pharynx a third median sacculus is developed, just below the '*constrictores pharyngis*'; in this remarkable structure the Wart-Hog resembles the Babyrussa*. The œsophagus commences between this sacculus behind and two large post-arytenoid sacculi in front, and is divided from both by a transverse membranous ridge or wall. The long ligamentous crura of the epiglottis are continued from the sides and back part of the post-arytenoid sacculi to that cartilage, which is unusually distant from the larynx. The convex border of the broad epiglottis projects into the posterior nostril. The œsophagus descends behind the trachea to the thorax, and in the posterior mediastinum it is suspended by a fold of the pleura, about $1\frac{1}{2}$ inch broad, which attaches the tube to the descending aorta, after it has passed through the arch.

The stomach is of small size and simple shape; its length in a straight line is 9 inches; following its greater curvature 1 foot 7 inches; the lesser curvature, or the distance from the cardia to the pylorus, being only 3 inches. The left end extends about $3\frac{1}{2}$ inches beyond the cardia, and the right end projects about 2 inches to the right of the pylorus. It presents the usual form of the simple stomach, but the cardiac blind end is marked off by a slight constriction, hardly, however, to the same degree as in the Common Hog; and far from presenting the complexity of the stomach in the Babyrussa. The great omentum is continued from behind the great curvature, and was folded or crumpled up behind and beneath the stomach, enclosing the spleen, which was to the left and a little behind the great end of the stomach. No part of the omentum was visible when the abdominal cavity was exposed, and but little of the stomach could be seen. Almost the only viscera that presented themselves were the large spiral coils of the colon, closely united together by mesocolic bands laden with fat, about an inch in breadth. The cæcum was in the left lumbar region. The stomach extended from the left hypochondrium across the epigastric to the right hypochondriac regions. The liver extended from the right hypochondrium to the left, but did not cover all the great end of the stomach. The small intestines lay concealed behind the colon.

The œsophagus, which is 2 inches in circumference at its termination in the stomach, opens nearer the posterior than the anterior surface of the lesser curvature, $3\frac{1}{2}$ inches from the left end, which forms a prominence above the concavity leading to it from the gullet.

The œsophageal epithelium is continued a little way on the inner surface of the stomach, forming a thin, narrow, oval patch, extending $1\frac{1}{2}$ inch to the left of the cardia, $\frac{2}{3}$ rds of an inch to the right and

* See Prof. Vrolik's excellent memoir on that animal, '*Recherches d'Anatomie comparée sur le Babyrussa*,' 4to, p. 30, pl. 3.

back part of the cardia, and $\frac{1}{3}$ rd of an inch to the front of the cardia. The rest of the stomach is lined by the usual gastric vascular membrane, which in the distended state shows one or two short and very narrow, straight rugæ, and is smooth in the rest of its extent, except near the commencement of the short and narrow canal leading to the pylorus, where a number of longitudinal rugæ converge. The muscular coat of the stomach is 2 lines in thickness at the cardia, where its texture is unusually firm; it diminishes in thickness to 1 line after a course of 2 inches from the cardia, and is less than half a line thick over the great dilated portion of the stomach. It resumes its thickness of 2 lines at the narrow pyloric portion. A few longitudinal rugæ radiate from the cardia a little way upon the epithelial part, but there is no valvular apparatus there.

The form of the pylorus is crescentic, bounded below by an arched protuberance, receiving in its concavity a single longitudinal protuberance from the upper side.

The bile-tube (*ductus choledochus*) opens on a mammillary eminence half an inch from the pylorus.

The duodenum, which is about 1 inch in diameter at its commencement, where it receives the ductus choledochus and pancreatic duct, contracts to a diameter of $\frac{2}{3}$ rds of an inch as it bends down in front of the right kidney, suspended by a narrow mesentery; it then crosses the first lumbar vertebra, and becomes attached to the back of the ascending colon; there it ascends a little way, bending obliquely round the colon, and becomes suspended, as jejunum, upon the proper mesentery. The jejunum and ilium lie in close coils suspended by the narrow mesentery, which is loaded with fat, terminating next the intestine in lobes which project as a free border on each side the junction of the mesentery to the gut. The mesenteric vessels pass straight through this fat, without forming anastomotic arches. The mesenteric glands are arranged in a semicircle about the root of the mesentery. The small intestines preserve a pretty uniform diameter until near the end of the ilium, which gradually contracts to a diameter of about half an inch. The length of the small intestine is from 18 to 20 feet, or about five times the length of the body; which is proportionally one-half the length of the small intestines of the domestic Hog. The ilium passes near its termination from the right to the left lumbar region, and ascends to terminate in the cæcum, to which it is attached by a duplicature of the peritoneum. The cæcum was situated in the advanced part of the left lumbar region. It was $3\frac{1}{2}$ inches in length, and about $2\frac{1}{2}$ in diameter, with an obtuse rounded end; its parietes were slightly puckered or sacculated on two longitudinal bands, about 4 lines in breadth, a third band commencing near the entry of the ilium; its circumference is 7 inches. It is divided by a constricted neck, $3\frac{1}{2}$ inches in circumference and $1\frac{1}{2}$ inch in length, from the colon, and this contracted part was sacculated only on one side, the other side being smooth, with a strong coat of longitudinal fibres external to the circular ones. At this part the ilium, cæcum and beginning of the colon are attached by a strong mesentery to the spine: the colon ascends

in front of the left kidney to the great curvature of the stomach, and bends over to the right side in front of the epiploon, and descending describes a large spiral curve, then a second, third and fourth, progressively diminishing in extent; the last and innermost is folded upon itself, and repeats two spiral coils in the opposite direction, the extent of these increasing; and the gut, quitting the mass of closely connected coils, passes backwards, and bends round the root of the mesentery, adhering to that part and to the pancreas above, then descends in front of the duodenum, much diminished in size, and getting to the back of the lumbar region becomes the rectum, and is continued, tightly bound to the sacrum, behind the genital organs and bladder to the vent. The coils of the colon, which are the first viscera that present themselves, and conceal almost all the others in the abdomen, are attached to one another by bands of mesocolon of about an inch in breadth; and these were laden with lobes of fat. There were many small, dark-coloured glands at the root of the mesocolon, from which straight blood-vessels radiated in groups of from four to eight or ten. The colon, where it forms the first series of coils, is 10 inches in circumference, and is slightly sacculated on two longitudinal bands. The sacculi subside with a slight diminution of diameter in the returning coils.

The length of the 'large intestines' was 13 feet 6 inches, or nearly four times the length of the entire animal.

The mucous membrane of the small intestines is produced in the duodenum into four or five narrow longitudinal folds, which in the jejunum are six or seven in number, and are here or there connected together by oblique folds. Towards the middle of the jejunum these folds disappear, and then reappear at intervals progressively increasing; and in the ilium the mucous lining is even and simply villous. In the partial or interrupted extents of the plicated structure, the rugæ are more reticulate in their arrangement. The lining membrane of the colon was smooth and even, but gorged with blood, and varied in many parts from a deep vinous to an almost black colour. The lining membrane of the rectum was disposed in numerous fine longitudinal rugæ. The small intestines contained only mucus; the large intestines a dark fluid matter of the usual fæcal odour, with one or two masses of hard fæces, about the size and shape of a pullet's egg.

The liver weighed 2 lbs. 4 oz. it consisted of three principal lobes, viz. a right, middle and left; the right is the largest, and is partially subdivided at its free extremity, which is closely connected with the right supra-renal body and the summit of the right kidney. The middle lobe is bifid, a gall-bladder 4 inches long by $1\frac{1}{2}$ inch broad being lodged in the cleft; a small 'lobulus Spigelii' projects near the neck of the gall-bladder. The left lobe of the liver terminates on the left side, about 3 inches from the cardiac end of the stomach. The hepatic duct joins the cystic after a course of an inch; the 'ductus communis' is about the same length, and has a width of 3 lines at its termination, which is at the upper part of the beginning of the duodenum.

The pancreas is a long flattened band, from an inch to an inch

and a half in breadth, extending in two directions from the beginning of the duodenum, where its duct terminates. One portion follows the first part of the curvature of the duodenum to the extent of 6 inches; the other and chief part of the gland passes from the pylorus behind the stomach to the spleen, and is 7 inches in length.

The spleen is a long, flattened, ellipsoid body, about 11 inches in length and $2\frac{1}{2}$ inches across its broadest part at the middle. It weighed 3 oz.

The kidneys together weighed $6\frac{1}{2}$ oz.; they are not cleft or lobulated, and are situated symmetrically at the back of the hypochondria. The supra-renal bodies are of an elongate, subcylindrical shape.

The heart is a somewhat flattened cone, with a produced pointed apex formed by the left ventricle. The pericardium adheres to the sternum; it was covered with much fat. There is a large pleural sac between the pericardium and the diaphragm, which contains the azygous lobe of the lung, the long intra-thoracic inferior cava, the œsophagus and descending aorta.

The right lung is divided into three lobes and the 'lobulus azygos'; the left lung into two lobes, the upper and smaller lobe being slightly subdivided. The tracheal rings overlap each other behind. The thymus gland extended from the fore-part of the pericardium into the neck. The thyroid gland consists of one elongate, narrow lobe, concave where it is applied to the fore-part of the trachea, convex where it is covered by the 'sterno-thyroides'; it is about 2 inches in length and 8 lines wide. The thyroid cartilage is of unusual length, shaped like the side or section of a vase, convex outwards at its lower half, and concave above, by the bending outwards of its broad upper margin; its length is $2\frac{1}{2}$ inches, its breadth $1\frac{1}{2}$ inch. The arytenoid cartilages are still more unusual in their conformation; they are very long, curved backwards, and confluent at their apices; on each side of this prolonged confluent point they are deeply cleft, so as to form two lateral pointed processes or appendages. A fold of membrane is continued from each lateral appendix outwards to the ligamentous crura of the epiglottis; these folds form the outer walls of two large post-arytenoid sacculi, which intervene between the larynx and pharynx. A median fold of membrane is continued backwards from the middle line and confluent apices of the arytenoids, and forms the septum between the post-arytenoid sacculi. The mucous membrane of the larynx is continued from the anterior and upper border of the thyroid forwards and upwards into the concavity of the basihyal, forming a wide but not very deep anterior sacculus.

The brain weighed $3\frac{1}{2}$ oz.

Female Organs.—The ovarium, 9 lines long, 6 broad and 4 thick, is kidney-shaped, and is suspended by the middle of the concave border by a short, thick peduncle, to which is attached the commencement of the ostium abdominale of the oviduct; this orifice is not fimbriated, but has some delicate wrinkled processes on its inner surface. The peritoneal fold continued from this part to the end of the cornu uteri, and which approximates it thereto, forms one side of the opening of a wide ovarian pouch, upon the outer and fore-part of which

the oviduct describes its convolutions in its course towards the uterus. The stroma ovarii contained at its periphery a few advancing ovisacs about a line in diameter.

Each cornu uteri is about 1 foot 4 inches in length, and of a nearly uniform circumference of 2 inches. It is beset with narrow, wrinkled, oblique, irregular rugæ, forming longitudinal elevations as they approach the body of the uterus, and again becoming oblique—patches of the rugous surfaces alternating with smooth patches.

The common uterus presents large, longitudinal, wrinkled rugæ for the first inch of its extent, and then a spiral valve begins to be formed, about 2 lines in thickness, which describes thirteen close coils before subsiding in the common vagina; the length of the spiral portion, which may be compared to the 'cervix uteri,' is $3\frac{1}{2}$ inches; the length of the vagina is 4 inches. The rugæ of the vagina are longitudinal, and longer at its beginning and end, where they terminate on a well-defined circular fold, dividing the vagina from the urogenital canal, and constricting the orifice; the free borders of the spiral valve are beset by free, fine, longitudinal folds of the lining membrane of the uterus.

The urethra is about 3 inches in length, and becomes closely connected with the vagina 2 inches before it terminates. Its orifice is defended by two longitudinal folds.

In comparison with the Common Hog, the Wart-Hog, as regards its internal anatomy, differs in the more simple form of the stomach, the relatively shorter small intestines, and the relatively longer large ones; but, like the Common Hog, the cæcum is small, and the colon disposed in spiral coils, in both which characters they resemble the Ruminants; the cæcum is broader in proportion to its length than in the Common Hog. In both the Common Hog and Wart-Hog the intestinal canal is more tied down by the fat-laden processes of peritoneum, and appears to have less motion allowed it, than in other quadrupeds. The liver and gall-bladder, the kidneys and the thoracic viscera, much resemble those of the Common Hog. The inner surface of the jejunum shows a reticulate disposition of rugæ in the Common Hog, but not the regular longitudinal folds in the duodenum and beginning of the jejunum, as in the Wart-Hog.

The epiglottis passes into the posterior nares in both the Wart-Hog and Common Hog, and has the hyo-epiglottidei muscles; but the pharynx in the Common Hog does not present the superadded sacculi, nor the larynx those peculiarities which distinguish the Wart-Hogs. These resemble the Babyrussa in the sacculated structure of the pharynx, but differ in the more simple stomach. The Wart-Hog differs from the Common Hog in the smaller size and more simple form of the ovaria, and the fewer mammæ. The most marked difference from all other *Suidæ*, and that which best justifies the generic separation, is presented by the dentition of the *Phacochoerus*; the modifications of the alimentary canal are not of the same degree.

2. AN ENUMERATION OF SPECIES OF RECENT SHELLS, RECEIVED BY W. J. HAMILTON, ESQ., FROM BORNEO, IN NOVEMBER 1850, WITH DESCRIPTIONS OF THE NEW SPECIES. BY W. METCALFE.

1. HELIX BROOKEI, Adams and Reeve, Zoology of the Voyage of the Samarang, Mollusca, p. 60. pl. 15. fig. 4 a, b.
2. HELIX VITTATA, Adams and Reeve, Zool. of the Samarang, Mollusca, p. 60. pl. 15. fig. 7 a, b, c.

This species, having been previously described by Mr. Benson, in the 'Magazine of Natural History,' under the name of *H. reglis*, ought to retain that name.

In addition to the variety figured in the Mollusca of the Samarang, Mr. Hamilton received two other varieties, in which the pale green bands are wanting, the brown colour more or less predominating, with bands of yellowish brown, and a brown circle surrounding the umbilicus.

3. HELIX SCHUMACHERIANA, Pfeiffer.

4. HELIX RESPLENDENS, Philippi in Zeitschr. f. Malak. 1846, p. 192.

5. HELIX NASUTA, nobis. *H. testá subdiscoideá, sinistrorsá, carinatá, angustè perforatá, tenuissimá, lineis incrementi et spiralibus confertis subtilissimè decussatá, pellucidá, hyaliná; lined angustá pallidè brunneá ad carinam ornatá; spirá subconicá; anfractibus 5½ planulatis, ultimo acutissimè carinatá, subtus nitescente; aperturá subrhomboidé, ad angulum exteriorem valdè productá et coarctatá; peristomate simplici, tenui, margine superiore vix reflexo, basali anticè reflexiore, umbilicum subtegente.*

Long. $1\frac{4}{10}$; lat. $1\frac{1}{10}$; alt. $\frac{5}{10}$ unc.

This elegant species is covered with a thin epidermis, of a pale straw colour, under which the shell is milky white. It bears some analogy to *H. Tayloriana* (Adams and Reeve, Zool. of the Samarang, Mollusca, pl. 15. fig. 2 a, b), but the projection at the extremity of the aperture is much more acute, and the shell is of a more gelatinous texture: it differs also in being sinistral.

6. HELIX GLUTINOSA, nobis. *H. testá orbiculato-convexá, angustè perforatá, tenui, nitidissimá, diaphaná, pallidè brunneá, carinatá; supra carinam fuscá, infraque lined angustá flavescens, ornatá; spirá conoidé, obtusá; anfractibus 5 parum convexis; ad carinam supra infraque lined impressá circulari, striisque numerosissimis transversis notatá; peristomate simplici, acuto, margine columellari vix reflexo.*

Long. $1\frac{1}{10}$; lat. 1; alt. $\frac{6}{10}$ unc.

A bright shell, resembling a thin film of glue, with a keel of a darker shade; slightly indented above and below the keel, the in-

dentation elegantly crossed with slight striæ, the effect of which, as well as the darker line, is partially visible throughout the sutures.

7. *HELIX CONICOIDES*, nobis. *H. testâ imperforatâ, trochiformi, acutè carinatâ, tenui, pellucidâ, luteo-cornedâ; spiraliter leviter striatâ, striis ad suturam majoribus, confertioribus; apice mamillari; anfractibus 7, superioribus subconvexis, duobus ultimis planulatis, ultimo subtus convexo, nitido, ad carinam et in medio depresso; aperturâ trapeziformi, subtus arcuatâ; peristomate simplici, acuto, subtus flexuoso, marginibus callo tenui junctis.*

Long. $\frac{7}{10}$; lat. $\frac{6}{10}$; alt. $\frac{4}{10}$ unc.

8. *BULIMUS CITRINUS*, Bruguière; Reeve, Conch. Icon. Bul. pl. 31. fig. 187 a.

9. *BULIMUS CHLORIS*, Reeve, Conch. Icon. Bul. pl. 37. fig. 223.

10. *CYCLOSTOMA BORNEENSIS*, nobis. *C. testâ suborbiculari, depresso-conoideâ, acuminatâ, albâ, fusco-variegatâ, maculis ad suturam, cinguloque infra medium fusco ornatâ; striis obliquis minutis, aliisque circularibus minutissimis impressâ; anfractibus quinque planiusculis, carinatis; ultimo magno, margine acutè carinato, circa umbilicum obtusè angulato; aperturâ subcirculari; peritremate albo, reflexo; supra productiore, subtus reflexo, ad columellam subsinuato; umbilico magno, profundo; operculo corneo, tenui.*

Long. $1\frac{6}{10}$; lat. $1\frac{3}{10}$; alt. $\frac{9}{10}$ unc.

Varietas minor, magnitudine solum diversa.

Shell bearing some characters in common with both *C. aquilum*, Sow., and *C. acutimarginatum*, Sow.; but having a more depressed spire, and flatter whorls than either of those species.

11. *CYCLOSTOMA*, apparently *C. parvum*, Sow. Thes. Conch. Cycl. fig. 254, 255.

12. *CYCLOSTOMA UNDATUM*, nobis. *C. testâ globoso-pyramidalî, tenui, pellucidâ, albâ, lineis hyalinis undatis decurrentibus ornatâ, tenuiter striatâ; anfractibus 6, parum rotundatis, primis conicis regulariter crescentibus; ultimo magno, obtusè carinato; aperturâ circulari, supernè angulatâ; peritremate lato, expanso, vix nisi ad columellam reflexo; suturis mediocribus; umbilico parvo.*

Long. $\frac{6}{10}$; lat. $\frac{5}{10}$; alt. $\frac{6}{10}$ unc.

This species belongs to the division of the genus of which *C. læve*, Gray, may be considered the type.

13. *CYCLOSTOMA TENUILABIATUM*, nobis. *C. testâ discoideâ, spirâ depressâ, planâ, colore pallido, supernè castaneo-maculatâ et undulatâ; epidermide luteo-castaneâ, indutâ; anfractibus 5 rotundatis, 4 primis lævibus, ultimo lineis impressis irregularibus ruguloso; suturâ impressâ; aperturâ circulari; peritremate duplici; interno simplici, supernè emarginato; ex-*

terno tenui, lato, planiusculo, supra ascendente, fornicato, dein compresso; umbilico patulo; anfractibus intus distinctis.

Long. $1\frac{1}{10}$; lat. $\frac{8}{10}$; alt. $\frac{3}{10}$ unc.

Belonging to the genus *Pterocyclos* of Benson.

14. *CYCLOSTOMA BICILIATUM*. *Pterocyclos biciliatum*, Mousson, Land- und Süss. Moll. von Java, p. 49. t. 20. fig. 9.

Several individuals of this species having been received, its locality is thus fixed. It is observable that the complete shell, which was not known to Mousson, exhibits a tubular spiracle near the aperture, similar to that apparent in *C. spiraculum*, Sow.; also, that the aperture is circular, depressed, with the peritreme white, expanded, slightly reflected, and at the upper part faintly undulated.

15. *SCARABUS PLICATUS*, Fer. *var. major*.

This variety, in place of the usual purple colour of the shell, exhibits a deep yellow ground, with four broad bands of dark brown colour.

16. *SCARABUS BORNEENSIS*, A. Adams.

17. *AURICULA SUBNODOSA*, nobis. *A. testá ovato-oblongá, crassá, albá, epidermide castaneo-fuscá, infra suturas decussatim granosá, medio lævi, ad basim striis decussatá; anfractibus convexiusculis, suturis distinctis, subrenulatis; anfractu ultimo supernè longitudinaliter plicato-subnodoso; aperturá medio paululum angustatá; columellá biplicatá.*

Long. $2\frac{3}{10}$; lat. $1\frac{3}{10}$ unc.

A species distinguishable from *A. Mida* by the convexity of the upper whorls and the smoothness of their lower halves, the depth of the sutures, and the longitudinal nodulous folds which surround the upper part of the final whorl: the aperture is also proportionally wider than in *A. Mida*. In the single specimen received, the columellar lip has an interior protuberance above the upper fold.

18. *AURICULA POLITA*, nobis. *A. testá ovato-oblongá, basi angustiore, spirá brevi; epidermide castaneo-fuscá, nitidá; striis numerosis minutissimè granulosis circumdatá, granis superius distinctioribus; aperturá medio coarctatá; columellá triplikatá, plicá infimá lineari.*

Long. $1\frac{6}{10}$; lat. $\frac{8}{10}$ unc.

Although the characters of the aperture resemble those of *A. Juda*, the form of the shell differs entirely in its greater breadth, and in the shortness of the spire.

19. *AURICULA FELIS*, Lam.

20. *AURICULA MUSTELINA*, Desh.

21. *NERITINA CREPIDULARIA*, Lam. Conch. Ill. fig. 25.

22. *NERITINA BECKII*, Reclus, Thes. Conch. fig. 13.

23. *NERITINA PIPERINA*, Chemn. Thes. Conch. fig. 166, 167.

24. NERITINA DUBIA, Chemn. Thes. Conch. fig. 81-88.

25. MELANIA CIRCUMSTRIATA, nobis. *M. testá elongatá, turrítá, solidá, fusco-viridí; anfractibus convexiusculis, infra suturam paululum constrictis; superioribus striis 6 transversis elevatis, plicisque 8 majoribus longitudinalibus ornatis; ultimo striis 13; aperturá ovali-oblongá, basi dilatátá, superius acuté angulatá, et ferè rimatá, intus albidá; peritremate sinuato, columellá callosá.*

Long. $2\frac{6}{10}$; lat. $\frac{8}{10}$ unc.

26. MELANIA SUBSUTURALIS, nobis. *M. testá turrítá, fusco-viridí, lineis castaneis longitudinalibus obliquis variegatá; anfractibus ferè planis, quorum superiores striis elevatis perpauca validis, inferiores pluribus minoribus inæqualibus ornati; ultimo ad basin crebristriato; suturá distinctá, excavatá; aperturá ovali, supernè angulatá, intus albido-cærulescente; peritremate acuto, sinuato, extus effuso.*

Long. $1\frac{4}{10}$; lat. $\frac{5}{10}$ unc.

27. PALUDINA HAMILTONI, nobis. *P. testá ovato-conicá, tenui, perforatá, viridí, concolore; striis transversis undulatis, aliisque longitudinalibus tenuissimè decussatá; anfractibus 5 rotundatis, superioribus ætate erosis; suturá impressá; aperturá ovali, supra angulatá, intus cærulescente, margine paululum incrassato, albido; peristomate acuto, lineá tenui uigrá circumdato.*

Long. $\frac{9}{10}$; lat. $\frac{6}{10}$ unc.

The Bornean specimens being scarcely adult, the description is drawn up from individuals in my cabinet, which have long been there without any locality assigned.—W. M.

28. LITTORINA SCABRA. *Helix* sc., Linn.

29. LITTORINA MELANOSTOMA, Gray, Zool. of Beechey's Voy.

30. LITTORINA ALBICANS, nobis. *L. testá ovato-oblongá, acuminatá, tenui, albidá, apice lævi, nitente; anfractibus 7 vel 8, quorum 5 ultimi striis numerosis paulatim crescentibus ornati; ultimus rotundatus, ætate varicosus, striá unicá majore, quasi carinatus, striis ad basim minoribus circumdatus; aperturá rotundato-lunari, lacted; peristomate subreflexo.*

Long. $\frac{7}{10}$; lat. $\frac{4}{10}$ unc.

A delicate species, of a milk-white hue, the older specimens having many varices produced by the previous reflexions of the outer lip.

31. CERITHIUM OBTUSUM, Lam.; Zool. of the Samarang, Moll. pl. 13. fig. 3.

32. CERITHIUM UNICARINATUM, nobis. *C. testá turrítá, tenui, apice truncato, hinc inde varicosá, cinereá, longitudinaliter plicatá, interstitiis longitudinaliter striato-rugosis; suturá parum impressá; anfractibus vix rotundatis, regulariter crescentibus; ultimo acuté carinato, infra curinam crebristriato; aperturá*

mediocri subfuscá; columellá rectá; peritremate modicè reflexo, albescente.

Long. $1\frac{6}{10}$; lat. $\frac{5}{10}$ unc.

33. AMPULLARIA, probably *A. Celebensis*, Quoy, Voy. de l'Astr. pl. 57. fig. 1-4.

34. NATICA MACULOSA, Lam. *pellis-tigrina*, Chem.

35. NOVACULINA OLIVACEA, nobis. *N. testá oblongá, valdè inequilaterali, epidermide olivaceá, ad extremitates fuscéscente, indutá; natibus erosis; antérius rotundatá, posterius angulato-rotundatá; margine superiore ferè recto, posticè paululum descendente, ventrali medio subcompresso; intus albá, dentibus lamellatis duobus recurvatis in utrâque valvâ, posteriore bifido.*

Long. $\frac{9}{10}$; lat. $3\frac{3}{10}$ unc.

A large example of this species, in the Collection of H. Cuming, Esq., exhibits a character which will probably be found generic; namely, a shelly protuberance in each valve, attached to the interior ligament at nearly its hinder extremity. These shelly substances have not, that I am aware, hitherto been noticed. It is probable that they become detached in most specimens by the removal of the animal.

36. CYRENA TRIANGULARIS, nobis. *C. testá trigoná, solidiusculá, epidermide fusco-virescente, transversim striatá, striis marginalibus lateralibusque eminentioribus, sulco ab umbone ad marginem posteriorem leviter impressá; margine antico descendente, vix excavato, angulo anteriore rotundato; margine superiore subrotundato, posticè ferè biangulato, propter sulcum dorsalem subsinuato; intus lacteá, margine continuo nitentiore; dentibus cardinalibus in utrâque valvâ tribus, duobus bifidis; dentibus lateralibus brevibus, tenuissimè rugosis, haud striatis.*

Long. 3; lat. $3\frac{1}{10}$; alt. $1\frac{8}{10}$ unc.

The characters of this shell bear some resemblance to *C. Sumatrensis*, Sow. Gen.; but on comparison with the type of that species, now in the Cabinet of Sylvanus Hanley, Esq., the present is found to differ materially, in its triangular outline, as well as in the characteristic furrow from the umbo to the posterior margin, affecting the curvature of the posterior angle, and producing a slight sinuosity in the margin.

37. UNIO.

38. UNIO.

I am unwilling to describe as new these two species of the genus *Unio*, from want of acquaintance with the great American collections of the genus.

Although no letter accompanied this box of shells, Mr. Hamilton presumes that they have been sent to him by his friend Sir J. Brooke, Rajah of Sarawak. The remittance is undoubtedly from Borneo.

March 11, 1851.

J. E. Gray, Esq., F.R.S., in the Chair.

The following papers were read:—

1. A FEW WORDS ON THE SYNONYMY OF *DISTICHOCERA*, A GENUS OF LONGICORN COLEOPTERA FROM NEW HOLLAND, WITH CHARACTERS OF THREE SPECIES SUPPOSED TO BE UNDESCRIBED. BY EDWARD NEWMAN, F.L.S. ETC.

(Annulosa, Pl. XX.)

Among the invaluable labours of the late Mr. Kirby, none are more useful to the general entomologist than his lucid and masterly descriptions of new and remarkable forms of exotic Coleoptera; and of these, none afford to myself so much instruction and pleasure as that entitled "A Description of several New Insects collected in New Holland by Robert Brown, Esq.," and published in the twelfth volume of the 'Linnean Transactions.' In this admirable paper is the first description I can find of the extraordinary genus *Distichocera*, although, as Mr. Kirby himself informs us, it was known long previously under the same name, and although he himself gives it as "*Distichocera* of MacLeay," a name which I am inclined to conclude existed in manuscript only. Concerning the genus in question I lay no claim to any additional knowledge of the structure, habits or affinities of the insect described by Mr. Kirby; but the labours of collectors, amid the seemingly inexhaustible riches of our Australian colonies, have placed within my reach a greater number and greater variety of specimens. Mr. Kirby has only made us acquainted with a single species, and a single sex of that species. Mr. MacLeay has added a second, which has also been described by Guérin, Boisduval and myself under a variety of names. Three other forms of the genus have occurred to me, making the number five in all. Of these, three are certainly females, and two as certainly males. The object of this communication is to express my views as to associating the sexes, and to make known two supposed species which were previously uncharacterized.

Genus *DISTICHOCERA*, MacLeay (MSS.?).

Distichocera, Kirby, Trans. Linn. Soc. xii. 471.

"Labrum transversum, tetragonum. Labium membranaceum apice bilobum: lobis divaricatis. Mandibulæ trigonæ, edentulæ apice incurvæ acutæ. Maxillæ basi trigonæ, apertæ. Palpi filiformes. Mentum transversum, trapeziforme. Antennæ sensim crassiores, disticho-ramosæ."—*Kirby, l. c.*

1. *DISTICHOCERA MACULICOLLIS*.

Mas. *Distichocera maculicollis*, Kirby, l. c.

Distichocera maculicollis, Audinet Serville, Ann. Ent. Soc. Fr. iii. 59.

Distichocera maculicollis, Boisduval, Faune de l'Océanie.

"Corpus fere cuneiforme, subtus pilis argenteis nitidum, supra nigrum, obscurum. Caput subcordatum, pilosum, canaliculatum utrinque ante antennis carinatum. Oculi brunnei. Antennæ breviores, nigrae: articulis omnibus apice biramosis (duobus primis brevissime); ramis oppositis compressis vertice rotundatis sinistris paulo longioribus, articulo extimo simplici clavato. Thorax subcylindricus: maculis quatuor dorsalibus quadratim ordinatis. Elytra cuneiformia: lineis tribus longitudinalibus elevatis: striga apud scutellum et alia majori in medio apud suturam piloso-argenteis, apice truncata. Femora brunnea. Tibiæ bicalcaratæ. Alæ elytris longiores."—*Kirby, l. c.*

Fem. *Distichocera rubripennis*, MacLeay, App. King's Voyage.

"Rufo-testacea subtomentosa, capitis lateribus oreque nigris, vertice canaliculato, antennis nigris, articulis vix biramosis, ramis sinistris brevissimis; thorace atro, vittâ utrinque rufo-testaceâ, scutello nigro, elytris rufo-testaceis tomentosissimis apice obtusis dehiscentibus; corpore cuneiformi subtus villo argenteo micante, abdomine utrinque nigro maculato, pedibus nigris."—*MacLeay, l. c.*

Distichocera ferruginea, Guérin, Voyage de la Coquille.

Distichocera ferruginea, Boisduval, Faune de l'Océanie, 467.

"Nigra; capite maculâ frontali, thorace vittis duabus elytris que dense villosis."—*Boisduval, l. c.*

Distichocera fulvipennis, Newman, Ent. Mag. v. 492.

"Antennæ nigrae; caput nigrum, fronte fulvo: prothorax niger, lineis 2 dorsalibus, longitudinalibus, latis, fulvis: scutellum nigrum: elytra fulva: abdomen piceum, lanugine argentea vestitum: pedes picei. (Corp. long. 9 unc.; lat. 3 unc.)"—*Newman, l. c.*

I have cited entire the original specific characters in every instance, in order to save the reader the trouble of making the references. I will now proceed to give more detailed characters.

Male.—Head somewhat cordate, black, velvety, having a slight epicranial sulcus, which is prolonged anteriorly between the bases of the antennæ: face slightly inclined, rather long: eyes arcuate, reniform, pitchy brown, large, approaching on the epicranium, somewhat dilated on the cheeks: antennæ as long as the body, 12-jointed, black; the first joint short, stout, somewhat obconical; the second very short; the following, to the eleventh inclusive, moderately short, still much longer than the second, somewhat cyathiform as regards the shaft, and emitting from its apex two long branches; these increase in length from the first pair, and those on one side of each antenna are uniformly longer than those on the other; this discrepancy is particularly observable in the third (or first branched) joint; the twelfth joint is club-shaped and undivided; it is longer than either of the others, yet scarcely exceeds in length the branches of the eleventh. Prothorax subquadrate, its anterior and posterior margins nearly equal, its lateral margins somewhat uneven, but not produced into a central

tooth; pronotum somewhat uneven, black, with four greyish spots, which are due to a grey velvety pilosity; the two smaller of these touch the anterior, the two larger the posterior margin, and appear as though forming parts of two vittæ, each of which is interrupted in the middle; prosternum produced between the procoxæ and there deeply notched, pitchy red, and clothed with a grey pilosity. Scutellum rounded, black, and glabrous. Elytra black, broad at the base, gradually tapering to the apex, where they are slightly divaricate, truncate, and furnished with a small obtuse and obscure tooth in the middle as well as at each angle of the truncature: each elytron has three carinæ; the first is prominent, originates near the base, and curves towards the suture but without reaching it, terminating in the apical area; the second originates on the disk considerably below the humeral angle, and running parallel with the first, unites therewith in the apical area; the third is nearly obsolete; it is situated on the apical half of the elytron, between the second carina and the costal margin; the costal margin is pitchy red, and clothed with a grey pubescence: the wings are fuliginous, slightly longer than the elytra, and unfolded: the legs are rather long; the metatibiæ slightly incurved, and furnished with two apical spines: the under surface of the thoracic and abdominal segments is of a pitchy red colour, clothed with a sparse grey pubescence; the legs are of a similar colour, but the pubescence is scarcely observable.

Fem.—Head somewhat cordate, black, velvety, with a large fulvous spot occupying the face and extending to the epicranium between the eyes, but not reaching the anterior margin of the prothorax; a deep longitudinal epicranial sulcus extends forwards to between the bases of the antennæ: eyes arcuate, reniform, pitchy black: antennæ more than half the length of the body, 11-jointed; the first joint rather short, somewhat obconical; the second very short; the third the longest, but still not disproportionately so, dilated at the apex; the fourth and fifth of the same form, but shorter; the remainder, to the eleventh, slender at the base, but dilated and somewhat cupshaped at the apex, receiving into the cup the base of the next succeeding joint, and being produced into a strong obtuse lobe, tooth, or serrature on one side; this is very conspicuous, and gives the antenna a subserrated appearance; on the opposite side is a very slight, scarcely perceptible indication of a like lobe; the eleventh joint is sesquialterous. Prothorax nearly equal in length and breadth, the anterior narrower than the posterior margin, the lateral margins uneven and slightly lobed in the middle; pronotum uneven, with a slightly impressed anterior and posterior submarginal transverse sulcus, velvety black, with two broad irregular longitudinal vittæ of a bright fulvous orange colour; prosternum produced between the procoxæ, and the process notched. Scutellum short, rounded, black, shining. Elytra at the base much wider than the prothorax, gradually narrowing to the apex, where they are slightly dehiscent, truncated, and the truncature produced in the middle into an obtuse, scarcely perceptible tooth; each elytron has three carinæ; the first is prominent, originating near the base, and curves very gradually to-

wards the suture without reaching it, terminating in the apical area; the second is indistinct, originates near the humeral angle, and running parallel with the first, ceases in the apical area; the third is still less distinct, and its limits are obscure; at both extremities a junction between the first and second carinæ may be made out, but is not very manifest: the wings are fuliginous, slightly longer than the elytra, but scarcely so long as the abdomen; the entire under-surface is pitchy red clothed with a silvery grey pubescence, but there is an ovoid denuded space on each side of each abdominal segment. Legs pitchy red; tarsi pitchy black; metatibiæ with two apical spines.

Obs.—I believe that no author has hinted at the union of these very dissimilar insects under one specific name, but I think such a proceeding will be borne out by the evidence. In the first place I would observe that both forms are equally abundant; that they occur in the same situations and at the same season; that collectors have several times reported them as only sexually different; and finally, that all the individuals of *maculicollis* are males, and all the individuals of *fulvipennis* females. Then, as regards structure, the cibarian organs of the two forms closely approximate; so also does the direction and general figure of the head; the antennæ indeed are remarkably different, but this discrepancy obtains equally in several genera of longicorns and in many other groups of Coleoptera, the males invariably possessing in such instances the longer, more compound and more ornate antennæ. The discrepancy in the prothorax, which at first is very striking, will be found more in appearance than in fact, and more in colour than in figure; and even in colour an analogy exists that would be likely to escape the superficial observer; the two fulvous vittæ so conspicuous in *fulvipennis* appear divided, paler, and semi-obsolete in *maculicollis*, and the difference in the figure of this part is in simple accordance with the more robust habit in the supposed female: the discrepancy in the elytra again is considerable as regards width, and particularly striking as regards colour; but their structure is normally the same; the number, direction and comparative length of the carinæ being identical: the legs are precisely alike in the two forms in structure, proportions, size and colouring. So that the reasons for uniting the forms under one specific name are stronger than any that can be urged for keeping them distinct; and their not having been united by Kirby, MacLeay, Guérin, or Boisduval, merely implies that the idea did not occur to those distinguished entomologists: there is no evidence that they maturely weighed and then rejected the conclusion.

2. *DISTICHOCERA* PAR. *Sexuum amborum color par: testaceofusca, maris capite prothoracisque disco saturatioribus; omnino pilis cinereis obsita.*

Maris long. corp. .525 unc.; elytrorum lat. max. .2 unc.

Feminæ long. corp. .7 unc.; elytrorum lat. max. .225 unc.

Male.—Antennæ, anterior margin of prothorax, elytra, legs, and entire under-surface testaceous brown, the head and disk of the prothorax being darker; a longitudinal, narrow, silvery spot, due to the



DISTICHCERA KIRBIL. Newmar. d

presence of a velvety pilosity, is observable in the centre of each elytron; every part of the body is more or less thickly beset with a grey pilosity.

Female.—Almost exactly resembling the male, but the prothoracic disk is not darker than the elytra, and there is no silvery mark in their centre.

In both sexes the carination of the elytra follows that of *D. maculicollis*, but is less pronounced.

Compared with *D. maculicollis* both sexes of this species are of smaller size, and the discrepancy in breadth is rather more obvious than in length; the antennæ of the males are very similar, but the apical joint is more clavate in *par*; their colour is decidedly different, in *maculicollis* being black, in *par* testaceous, with the apices of the ramuli slightly darker; the prothorax is more rounded at the sides in *par* than in the older species; but the plainness and purity of colour in *par* are sufficient at once to distinguish it.

Male and female in the cabinet of Mr. Scott, to whom I am indebted for the opportunity of describing it.

3. DISTICHOCERA KIRBYI.

Mas. Caput nigrum, longitudinaliter sulcatum, antennæ dimidio corporis longiores, 11-articulatæ, articulis 3-10 biramosis, 11o sesquialtero: prothorax niger vittis 2 latis fulvis, dorso inæqualis lateribus medio 1-dentatus: scutellum nigrum: elytra fulva, 5-carinata, apice dehiscentia, singulo truncato, truncaturâ bisinuata: pedes nigri.

Corp. long. 1.15 unc.; elytrorum lat. max. .3 unc.

Fem. Caput nigrum, longitudinaliter sulcatum, antennæ dimidio corporis vix longiores, 11-articulatæ articulis 4-8 apice emarginatis: prothorax niger vittis 2 latis fulvis, lateribus medio 1-dentatus: scutellum nigrum lateribus fulvum: elytra fulva 5-carinata apice dehiscentia, singulo truncato, truncaturâ bisinuata, pedes nigri.

Corp. long. 1.25 unc.; elytrorum lat. max. .375 unc.

Male.—Head black, with the exception of a scarcely perceptible fulvescent tinge on the short velvety down of the epicranium; a deep epicranial longitudinal sulcus extends forwards between the antennæ: eyes arcuate, reniform, pitchy black, large, approaching on the epicranium, dilated and gibbose on the cheeks: antennæ more than half the length of the body, 11-jointed; the first joint rather short, stout, somewhat in the common shape of a reversed cone; the second joint very short; the following, to the tenth inclusive, short, somewhat cup-shaped towards the base, and emitting at the apex two long branches, which are slightly incrassated externally; the eleventh joint is much longer than either, slender towards the base, somewhat club-shaped and very decidedly sesquialterous: prothorax uneven on the back, somewhat restricted just behind the anterior margin; lateral margins produced in the middle into a decided strong but obtuse tooth; the posterior half of each lateral margin concave, yet the anterior and posterior margins are straight and nearly equal in breadth; the colour

of the prothorax is black, with the exception of two broad fulvous irregular vittæ extending from the anterior to the posterior margin: prosternum black, shining, projecting between the anterior coxæ, and the projection deeply emarginate: scutellum rather long, blunt at the apex, perfectly black: elytra fulvous, slightly divaricating, conspicuously carinated, truncate at the apex, and the truncature sinuate carinated; the carinæ five discoidal, one costal and one sutural; the first discoidal originates at the base, and nearly runs into the sutural at about one-third of its length; the second unites with the first at the base and runs into the apical area of the wing; the third originates at the base and runs into the apical area; the fourth originates in the humeral angle, dividing at one-third of its length, and the two branches counting as two carinæ, there uniting with the two previously described in a confused manner in the apical area: the wings are fuliginous, slightly longer than the elytra, and scarcely folded at the tip: the abdomen and legs are black, the latter of moderate size and proportion: the metatibiæ are armed with two spurs.

Fem.—Head black, with the exception of a fulvescent tinge on the short velvety down of the epicranium: eyes reniform, or almost arcuate, ferruginous (probably by accident): antennæ rather more than half as long as the body and moderately stout, 11-jointed; the first joint moderately long; the second very short; the third about equal in length to the first, and together with the fourth, fifth, sixth, seventh and eighth inclusive, deeply notched at the apex, and receiving the base of the next preceding joint in the notch: prothorax uneven on the back, somewhat curved anteriorly, and the anterior half of each lateral margin uniting therewith in producing a somewhat semicircular outline; the posterior half of each lateral margin is concave, and a strong but obtuse central tooth is produced on each side at the point of union of the convex and concave portions of the margin; the posterior margin is nearly straight; the colour is velvety black, with two broad fulvous vittæ, extending from the anterior to the posterior margin: prosternum black, thickly sprinkled with a grey pilosity, projecting somewhat between the procoxæ, and the projection emarginate: scutellum rather long, rounded at the apex, velvety black with fulvous margins: elytra bright fulvous, conspicuously carinated, slightly divaricating, truncate at the apex, and the truncatures sinuate: the carinæ on each elytron are five in number, and are thus disposed; the first is near the suture and parallel therewith for rather more than a third of its length; it unites with the second at the base, and this runs into the apical area and there joins the third; the third originates at the base, exceeds the second slightly in length, and joins the fourth in the apical area; the fourth originates near the humeral angle and divides at about a third of its length; both branches proceed to the apical area, and there unite with the second and third: wings fuliginous, exceeding the elytra in length, and scarcely folded at the tip: legs black.

Hab. Australia. I have seen but a single specimen of the male, which is in the Cabinet of the Zoological Society, and one of the female, in the Cabinet of the British Museum.

4. DISTICHOCERA MACLEAYII.

Fem. *Caput nigrum, fronte ferrugineâ, longitudinaliter sulcatum: antennæ desunt: prothorax ferrugineo-lanuginosus, lateribus bituberculatus, haud dentatus: scutellum ferrugineo-lanuginosum lateribus nigrum, glabrum: elytra ferruginea 5-carinata apice vix dehiscentia vix truncata: pedes nigri.*

Corp. long. 1.35 unc.; elytrorum lat. max. 5 unc.

Fem.—Head, including the eyes, black; the face clothed with ferruginous down; epicranium impressed with a longitudinal sulcus, which is very deep between the eyes; the eyes are moderately large and reniform, the lower or cheek lobe being the largest; the face has a large and deep depression occupying the basal or upper portion of the clypeus; the first and second joints of the antennæ alone are present: prothorax black, clothed with ferruginous down, without any trace of that central black velvety vitta which obtains in the females of other described species; the anterior portion of the prothorax is smooth and somewhat ring-like; the rest of the dorsal surface uneven and tuberculated on each side; it has two obtuse tubercles: prosternum produced between the procoxæ into two short incurved, backward-directed processes which approximate at their apices, leaving an aperture through which the point of a needle may be passed: scutellum semicircular, clothed with ferruginous, with the exception of the margin, which is glabrous: elytra ferruginous and clothed with ferruginous down, wide at the base, narrowing to the apex and then truncate, the angles of the truncate being obtuse; the elytra are carinated, each having five carinæ; the first is very short and nearly obtuse; it commences near the scutellum and ceases before it has reached a third of the length of the elytron; the second and third commence near the base of the wing and unite in the apical area; the third and fourth commence almost together just below the humeral angle, and unite in the apical area; the two pairs are also united, and below their union several other raised anastomosing lines form a kind of network: the abdomen and legs are black, with a short hairy pubescence; metatibiæ with two distinct apical spines.

Hab. Australia. A single specimen of the female, taken by Mr. Ince, R.N., in that gentleman's cabinet.

Perhaps I may be permitted to avail myself of the opportunity of stating that I am assiduously engaged in the preparation of a descriptive list of the longicorn Coleoptera of our Australian colonies, and that I shall feel deeply indebted to any members of the Zoological Society who would kindly assist me by the communication of specimens. As the extent and value of her colonies have always been a distinguishing character of Great Britain, so I think should the industry of her sons take precedence of other nations in making known to the world the abundant riches of those colonies in the field of Natural History.

2. A CATALOGUE OF THE SPECIES OF EMARGINULA, A GENUS OF GASTEROPODOUS MOLLUSCA, BELONGING TO THE FAMILY FISSURELLIDÆ; IN THE COLLECTION OF H. CUMING, ESQ. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus EMARGINULA, Lamarck.

Head proboscoidiform; tentacles subulate, with the eyes on tubercles at their external bases; foot with a range of cirrhi round the sides; mantle-margin simple; branchial plumes two; anal siphon with its angulated membranous sides projecting from the edges of the fissure; tongue with a central laminar subquadrate tooth and numerous lateral teeth.

Shell conical, with an elevated slightly recurved entire vertex turned towards the posterior end; surface cancellated; aperture emarginated in front by a slit, which runs for some distance up the shell; interior without a partition; muscular impression crescentic, interrupted in front.

Emarginulus, Montf.—*Patella*, sp. Linn.

1. EMARGINULA FISSURA, Linn.

Patella fissura, Linn. Syst. Nat. ed. 12. p. 1261.—*Emarg. fissura*, Flem.—*Emarg. lævis*, Recluz.—*Emarg. curvirostris*, Macgil.

Hab. British Islands. Mus. Cuming.

2. EMARGINULA RETICULATA, Chemn.

Emarg. reticulata, Chemn.; Sowerby, Genera (Emarg.), f. 5.

Hab. Malta, on stones. Mus. Cuming.

3. EMARGINULA CANCELLATA, Philippi.

Emarg. cancellata, Phil. En. Moll. Sicil. pl. 7. fig. 15.—?*Patella crystallina*, Wood.

Hab. Sicily, and island of Paros. Mus. Cuming.

4. EMARGINULA FISSURATA, Chemn.

Patella fissurata, Chemn. 11. 1929–30; Sowerby, Genera (Emarg.), fig. 3.—*Emarg. rubra*, Lam. Hist.

Hab. Seas of Europe. Mus. Cuming.

5. EMARGINULA CURVIROSTRIS, Deshayes.

Emarg. conica, Blainville, Man. pl. 48. fig. 4.

Hab. ———?

6. EMARGINULA ROSEA, Bell.

Emarg. rosea, Bell, Zool. Journ. vol. i. 1824.—*Emarg. pileolus*, Michaud.—*Emarg. capuliformis*, Philippi.

Hab. British Islands. Mus. Cuming.

7. EMARGINULA CRASSA, J. Sowerby.

Emarg. crassa, J. Sowerby, Min. Conch. pl. 33; Forbes and Hanley, Brit. Moll. pl. 63. fig. 2.

Hab. Norwegian Seas. Mus. Cuming.

8. EMARGINULA HUZARDII, Payrandeau.
Emarg. Huzardii, Payr.
Hab. — ?
9. EMARGINULA SOLIDULA, Costa.
Emarg. solidula, Costa.
Hab. Catania. Mus. Cuming.
10. EMARGINULA ELONGATA, Philippi.
Emarg. elongata, Phil. En. Moll. Sicil. pl. 110. fig. 2.
Hab. Mediterranean. Mus. Cuming.
11. EMARGINULA VANICORENSIS, Quoy et Gaimard.
Emarg. Vanicorensis, Quoy et Gaimard, Voy. de l'Astrol. pl. 68.
 fig. 19, 20.
Hab. Vanicoro. Mus. Cuming.
12. EMARGINULA STRIATULA, Quoy et Gaimard.
Emarg. striatula, Quoy et Gaimard, Voy. de l'Astrol. pl. 68.
 fig. 21, 22.
Hab. — ? Mus. Cuming.
13. EMARGINULA CUVIERI, Savigny.
Emarg. Cuvieri, Savigny, Egypt, tab. 3. fig. 2.
Hab. Egypt. Mus. Cuming.
14. EMARGINULA CLYPEUS, A. Adams. *E. testá elongato-ellipticá, valdè depressá, testaceá, maculá luteolá in medio dorsi, vertice subcentrali, posticè inclinato; costis confertis, æqualibus, radiantibus, imbricato-asperis, ornatá; basi arcuato; apertura margine crenulato, anticè valdè fissurato; fissurá magná; aperturá intus bimaculosá.*
Hab. Isle of Burias, Philippines, on dead shells, 7 fathoms, sandy mud. Mus. Cuming.
15. EMARGINULA SCABRIUSCULA, A. Adams. *E. testá elongato-ellipticá, depresso-conicá, testaceá, vertice subpostico, retrorsum inclinato; costis inæqualibus, radiantibus, imbricato-subaculeatis, asperis, et lineis elevatis, concentricis, cancellatá; aperturá anticè angustatá, basi arcuatá, margine creno-denticulato.*
Hab. — ? Mus. Cuming.
16. EMARGINULA OBOVATA, A. Adams. *E. testá elongatá, obovatá, depresso-conicá, testaceá, vertice subcentrali, retrorsum inclinato, costellis radiantibus, imbricato-asperis, et liris elevatis, concentricis, cancellatá; aperturá posticè rotundatá, anticè angustatá, margine creno-denticulato, anticè profundè inciso.*
Hab. Catbalonga, isle of Samaar, on stones, 4 fathoms. Mus. Cuming.

17. EMARGINULA INCISURA, A. Adams. *E. testá elongato-ovali, planulatá, pallide fulvá, vertice antico retrorsum inclinato, costellis inæqualibus, radiantibus, longitudinalibus, imbricato-asperis, et lineis elevatis, concentricis, decussatá, basi arcuato, aperturæ margine crenulato, anticè declinato, valdè fissurato, incisurá magná, longá, haud usque ad verticem productá, marginibus intus callosis.*

Hab. —? Mus. Cuming.

18. EMARGINULA MICANS, A. Adams. *E. testá elongato-orali, pallide fuscá, nitidá, vertice posticè declinato, costellis radiantibus et lineis elevatis transversis, regulariter cancellatá, cancelli quadrati; aperturæ margine denticulato, incisurá magná et longá.*

Hab. Rains Island, North Australia (*Lieut. Ince*). Mus. Cuming.

19. EMARGINULA PUNCTATA, A. Adams. *E. testá ovato-conicá, albidogriseá, pulcherrimè viridí punctatá, vertice subcentrali, posticè inclinato; costis longitudinalibus (majoribus cum minoribus alternatis) concinnè granulatis; aperturæ margine crenulato, excurvato, anticè valdè fissurato.*

Hab. San Nicholas, island of Zebu, under stones, low water. Mus. Cuming.

20. EMARGINULA VARIEGATA, A. Adams. *E. testá ovato-conicá, albidá, rufo-fusco variegatá, vertice acuto, subcentrali, posticè inclinato, costellis radiantibus, æqualibus, imbricato-asperis, ornatá; aperturæ margine denticulato, anticè fissurato, fissurá brevi subquadratá.*

Hab. Isle of Camaguan, Philippines, on exposed rocks, low water. Mus. Cuming.

21. EMARGINULA PUNCTICULATA, A. Adams. *E. testá elevato-conicá, capuliformi, albd, fusco punctulatá, costellis planulatis, crebris, longitudinalibus, radiantibus, ornatá; aperturá ovali, margine crenulato, anticè profundè fissurato; fissurá magná et longá.*

Hab. Calapan, island of Mindoro, Philippines, on stones, 12 fathoms. Mus. Cuming.

22. EMARGINULA FULIGINEA, A. Adams. *E. testá ellipticá, valdè depressá, fuliginéa, apice subcentrali, posticè inclinato, costellis æqualibus, radiantibus, granulosis, confertis, et lineis incrementi concentricis, ornatá; aperturá ovali, intus viridí, margine crenulato, anticè fissurato, incisurá intus in canalem productá.*

Hab. —? Mus. Cuming.

23. EMARGINULA GALERICULATA, A. Adams. *E. testá obliquè conicá, capuliformi, vertice valdè curvato, ultra marginem posteriorem decumbente, costellis angustis, crenulatis, radiantibus, interstitiis lineis elevatis, transversis, concinnè clathratis;*

costâ anticâ, supra incisuram, granulato-punctatâ; apertura margine crenulatâ, anticè profundè inciso.

Hab. Calapan, isle of Mindoro, on stones, 12 fathoms. Mus. Cuming.

24. EMARGINULA PULCHRA, A. Adams. *E. testâ depresso-conicâ, viridî, albo pulcherrimè radiatim pictâ, vertice subcentrali, posticè inclinato, costis radiantibus, inæqualibus, aculeato-asperis, interstitiis lineis elevatis transversis clathratis; apertura margine denticulato, anticè inciso, fissurâ brevi subquadratâ.*

Hab. Isle of Camaguan, Philippines, on exposed rocks, low water. Mus. Cuming.

25. EMARGINULA CONCINNA, A. Adams. *E. testâ ovato-depressâ, albidâ, vertice postico, ad marginem declinato, costis sulcosis, distantibus, radiantibus (circa 12), interstitiis lineis longitudinalibus, et transversis, concinnè decussatis; apertura margine dentato, anticè profundè inciso.*

Hab. —? Mus. Cuming.

26. EMARGINULA VIMINEA, A. Adams. *E. testâ ovato-conicâ, albidâ, vertice centrali, retrorsum inclinato, costellis radiantibus, nodulosis, subæqualibus, et lineis crassis, transversis, regulariter cancellatâ; cancelli profundi, punctiformes; apertura margine crenato, anticè profundè inciso.*

Hab. Philippine Islands. Mus. Cuming.

27. EMARGINULA EXCURVATA, A. Adams. *E. testâ elongato-ellipticâ, depresso-conicâ, testaceâ, apice acuto, subpostico, retrorsum inclinato, costis radiantibus, et liris concentricis, elevatis, cancellatâ, liris ad costas nodulosis, basi arcuato; apertura margine excurvato, crenulato, anticè profundè inciso.*

Hab. —? Mus. Cuming.

28. EMARGINULA DILECTA, A. Adams. *E. testâ elongato-ovali, subquadrangulari, albâ, valdè depressâ, vertice subpostico, retrorsum declinato, costis subdistantibus, radiantibus, asperulatis, et liris elevatis, concentricis, pulcherrimè cancellatâ; basi arcuatâ; apertura margine denticulato, anticè valdè fissurato.*

Hab. King George's Sound, South Australia. Mus. Cuming.

29. EMARGINULA SCABRICOSTATA, A. Adams. *E. testâ ovali, valdè depressâ, albidâ, fasciis tribus, lutescentibus, radiantibus, anticè ornatâ; vertice subcentrali, posticè inclinato, costis radiantibus, distantibus, corrugatis, interstitiis valdè clathratis et corrugatis; apertura margine dentato et denticulato, anticè valdè inciso.*

Hab. Isle of Corrigidor, Bay of Manila, on dead shells, sandy mud, 12 fathoms. Mus. Cuming.

30. EMARGINULA CANDIDA, A. Adams. *E. testâ ellipticâ, depresso-conicâ, obliquâ, albâ, vertice subpostico, retrorsum decli-*

nato, costis radiantibus, imbricato-asperis (majoribus cum minoribus alternatis), interstitiis clathratis; aperturæ margine denticulato, anticè profundè inciso.

Hab. Port Adelaide, Australia, on the sands. Mus. Cuming.

31. EMARGINULA BELLULA, A. Adams. *E. testá elongato-ellipticá, subdepressá, albidd, vertice subpostico, declinato, costis distantibus prominentibus, lineisque transversis concinnè sculptis; cariná, supra incisuram, puncturatá; aperturæ margine denticulato, intus sulcato, anticè profundè inciso.*

Hab. Catanuan, province of Toyabos, island of Luzon, on dead shells, 10 fathoms. Mus. Cuming.

32. EMARGINULA RETECOSA, A. Adams. *E. testá elevato-conicá, ellipticá, albidd, vertice subcentrali, posticè inclinato, costis radiantibus, æqualibus, subnodosis, ornatá; interstitiis regulariter cancellatis, cancelli in serie unico dispositi; aperturæ margine crenulato, incisurá profundá.*

Hab. Bolinao, province of Tambalas, island of Luzon, sandy mud, 10 fathoms. Mus. Cuming.

33. EMARGINULA EXIMIA, A. Adams. *E. testá elongato-ovali, valdè depressá, albá, subpellucidá, vertice postico retrorsum inclinato, costis radiantibus, distantibus, prominentibus, imbricato-nodosis, interstitiis liris transversis et longitudinalibus latè cancellatá; totá superficie lineolis radiantibus et concentricis pulcherrimè decussatá; aperturæ margine denticulato, anticè profundè inciso.*

Hab. San Nicholas, island of Zebu, under stones, low water. Mus. Cuming.

34. EMARGINULA PLANULATA, A. Adams. *E. testá elongato-ovali, complanatá, vertice subcentrali, posticè inclinato, albidd, costellis radiantibus, æqualibus, imbricato-asperis, lineisque concentricis incrementi decussatá, basi arcuato; aperturæ margine anticè valdè inciso; incisurá latá et profundá.*

Hab. Singapore, coarse sand and shells, 7 fathoms. Mus. Cuming.

35. EMARGINULA CUCULLATA, A. Adams. *E. testá obovali, obliquè conicá, albá, vertice producto, subpostico, intorto; costis prominentibus, nodulosis, radiantibus, interstitiis cancellatis; aperturæ lateribus anticè angustatis, margine denticulato, posticè rotundato, anticè profundè fissurato, incisurá longá et latá.*

Hab. Singapore, on shells, 7 fathoms. Mus. Cuming.

36. EMARGINULA ACULEATA, A. Adams. *E. testá elongato-ovali, depressá, rufescente, vertice subpostico, retrorsum inclinato; costis radiantibus, aculeato-asperis, prominentibus, interstitiis valdè clathratis; aperturæ margine denticulato, anticè fissurato, fissurá profundá.*

Hab. —? Mus. Cuming.

37. *EMARGINULA LÆVICOSTATA*, A. Adams. *E. testá parvá, ellipticá, valde depressá, apice subpostico, retrorsum inclinato, costis lævibus, radiantibus (circa 14), interstitiis costellis longitudinalibus, et lineis transversis latè clathratis; aperturæ margine denticulato, lateribus anticè angustatis, anticè valdè inciso.*

Hab. —? Mus. Cuming.

Subgenus *CLYPIDINA*, Gray.

Shell ovate, conical, surface with radiated ribs; vertex acute, central, not recurved; aperture with the margin crenulated; muscular impression fungiform, anal groove and emargination inclining towards the right anterior margin (in the natural position of shell).

1. *CLYPIDINA NOTATA*, Linn.

Patella notata, Linn. Chemn. Conch. vol. x. p. 321. Vign. 25. fig. C. D.

Hab. West Indies. Mus. Cuming.

2. *CLYPIDINA RUGOSA*, Quoy and Gaimard.

Emarginula rugosa, Quoy and Gaim. Voy. de l'Astr. p. fig. .
Emarg. conoidea, Reeve, Conch. Syst. pl. 160. fig. 7.

Hab. Australia. Mus. Cuming.

3. *CLYPIDINA ASPERA*, Gould.

Emarginula aspera, Gould, Expedition, Shells, p. 12.

Hab. Sydney, New South Wales. Mus. Cuming.

4. *CLYPIDINA FUNGINA*, Gould.

Emarginula fungina, Gould, Expedition, Shells, p. 12.

Hab. Upolu. Mus. Cuming.

5. *CLYPIDINA SULCIFERA*, A. Adams. *C. testá ovali, depresso-conicá, viridescenti, vertice obtuso, ad partem posteriorem posito; costellis radiantibus, interstitiis haud æquantibus, et striis incrementi ornatis; basi arcuatá; aperturæ margine crenulato, incisurá haud profundá, sublaterali, intus in canalem productá.*

Hab. —? Mus. Cuming.

6. *CLYPIDINA RUDIS*, A. Adams. *C. testá crassá, rudi, albidá, depresso-conicá, costis octo angulatis radiantibus, interstitiis costellis longitudinalibus et lineis concentricis decussatis; apice subcentrali; basi arcuato; aperturæ margine crenato, anticè sinuato, sinu intus in canalem producto.*

Hab. —? Mus. Cuming.

7. *CLYPIDINA STELLATA*, A. Adams. *C. testá solidulá, albidá, ellipticá, depresso-conicá, apice subcentrali, costis elevatis, subspinulosis, radiantibus; interstitiis costellis et striis crebris decussantibus, exasperatis; aperturæ margine dentato, sinu sublaterali, intus in canalem apicem versus producto.*

Hab. Australia. Mus. Cuming.

8. CLYPIDINA SCABRICULA, A. Adams. *C. testá elongato-ovali, obliquè conicá, costis radiantibus, elevatis, distantibus, asperulatis, interstitiis costellis longitudinalibus et lineis scabriusculis valdè cancellatá; vertice subcentrali, posticè inclinato; aperturæ margine dentato-crenulato; incisurá profundá, intus in canalem productá.*

Hab. Australia. Mus. Cuming.

9. CLYPIDINA ANNULATA, A. Adams. *C. testá crassá, ellipticá, albidá, annulo luteo-fusco circumcinctá; costis elevatis asperis radiantibus distantibus, interstitiis costellis longitudinalibus et lineis transversis elevatis concinnè clathratis; aperturæ margine duplicato, incrassato, pulcherrimè fimbriato, sinu quadrato intus in canalem producto; aperturá intus annulá albidá.*

Hab. Australia. Mus. Cuming.

10. CLYPIDINA ACUMINATA, A. Adams. *C. testá elevato-conicá, albidá, viridí annulatá, costis longitudinalibus radiantibus, imbricato-asperis, interstitiis tricostulatis, costellis imbricatis asperis; sulcis transversis concentricis, distantibus, impressá; vertice acuminato, acuto, subcentrali; aperturæ margine valdè crenulato, sinu subquadrato, intus in canalem producto.*

Hab. Australia. Mus. Cuming.

11. CLYPIDINA CANDIDA, A. Adams. *C. testá ellipticá, solidulá, conicá, candidá, costellis asperulatis inæqualibus, radiantibus, et striis elevatis transversis, concentricis, decussatá; vertice subcentrali; aperturæ margine crenulato, sinu brevi, intus in canalem producto.*

Hab. Port Adelaide, Australia. Mus. Cuming.

Subgenus TUGALI, Gray.

Shell oblong, narrow anteriorly, back elevated, cancellated; apex posterior and recurved; aperture with the margin crenulated, and deeply sinuated anteriorly.

1. TUGALI ELEGANS, Gray.

Tugali elegans, Gray, Cat. Moll. New Zealand.

Hab. New Zealand. Mus. Cuming.

2. TUGALI INTERMEDIA, Reeve.

Parmophorus intermedius, Reeve, Proc. Zool. Soc. 1842; Conch. Syst. pl. 139. fig. 5, 6.

Hab. —? Mus. Cuming.

3. TUGALI OSSEA, Gould.

Emarginula ossea, Gould, Expedition, Shells, p. 13.

Hab. Feejee Islands. Mus. Cuming.

4. TUGALI CINEREA, Gould.

Emarginula cinerea, Gould, Expedition, Shells, p. 13.

Hab. —? Mus. Cuming.

5. TUGALI PARMOPHOROIDEA, Quoy et Gaimard.

Emarginula parmophoroidea, Quoy et Gaim. Voy. de l'Astrol. pl. 68. fig. 15, 16.

Hab. Eastern Seas.

6. TUGALI CARINATA, A. Adams. *T. testá elongato-ovali, dorso carinatá, costis longitudinalibus, radiantibus, confertis, et striis transversis, concentricis, decussatá; apice posticè declinato; basi arcuatá; apertura margine crenulato, extremitate anteriori sinuato, sinu intus in canalem producto.*

Hab. Philippines. Mus. Cuming.

15 7/2. 7. TUGALI CICATRICOSA, A. Adams. *T. testá elongato-ovali, albá, dorso valdè depressá, costellis radiantibus et lineis concentricis elevatis decussatá, vertice subpostico depresso excavato quasi cicatricoso, subpellucido; basi arcuato; apertura margine crenulato, extremitate anteriori sinuato, sinu intus in canalem producto.*

Hab. Philippines. Mus. Cuming.

8. TUGALI SCUTELLARIS, A. Adams. *T. testá elongato-ovali, virido-fuscá, tenui, dorso planulatá, vertice postico, acuto, vix elevato, costellis radiantibus subdistantibus, et striis concentricis incrementi, decussatá; extremitate anteriori vix sinuato; apertura intus fuscá, margine subcrenulato.*

Hab. Bais, Philippines. Mus. Cuming.

9. TUGALI RADIATA, A. Adams. *T. testá elongato-ovali, luteolá, valdè depressá, costis radiantibus, rotundatis, elevatiusculis, distantibus, et striis concentricis, ad incrementum ornatá; apertura intus albidá, margine crenulato, extremitate anteriori vix sinuato.*

Hab. Catanuan, Philippines. Mus. Cuming.

10. TUGALI DECUSSATA, A. Adams. *T. testá elongato-ovali, albídá, planulatá, dorso carinatá, costellis longitudinalibus, radiantibus, et lineis elevatis concentricis eleganter clathratá; vertice acuto, postico; apertura margine crenulato, anticè sinuato, sinu intus in canalem producto.*

Hab. Philippine Islands. Mus. Cuming.

Subgenus SUBEMARGINULA, Blainville.

Shell conical, compressed, vertex inclined towards the posterior margin; aperture with the anterior margin folded in the form of a gutter or channel; surface cancellated.

Hemitoma, Swainson.

1. SUBEMARGINULA EMARGINATA, Blainv.

Emarginula emarginata, Blainv. Man. de Malac. pl. 48 bis. fig. 2.

Hab. Honduras. Mus. Cuming.

2. SUBEMARGINULA OCTORADIATA, Gmel.
Patella octoradiata, Gmel.; Lister, 532.11.—*Emarg. Listeri*, Aut.
Hab. —? Mus. Cuming.
3. SUBEMARGINULA DEPRESSA, Blainv.
Emarginula depressa, Blainv. Man. de Malac. pl. 48 bis. fig. 3.
Hab. Honduras. Mus. Cuming.
4. SUBEMARGINULA CLATHRATA, Adams and Reeve.
Emarginula clathrata, Adams and Reeve, Moll. Zool. Voy. Samarang, pl. 11. fig. 6.
Hab. Mindoro Sea. Mus. Cuming.
5. SUBEMARGINULA PANIHENSIS, Quoy et Gaimard.
Emarginula Panihensis, Quoy et Gaim. Voy. de l'Astrol. pl. 67. fig. 7, 8.
Hab. Island of Panhi. Mus. Cuming.
6. SUBEMARGINULA TRICOSTATA, Chemn.
Patella tricostata, Chemn.; Sowerby, Gen. of Shells, No. 34. fig. 6.
Hab. —?
7. SUBEMARGINULA AUSTRALIS, Quoy et Gaimard.
Emarginula australis, Quoy et Gaim. Voy. de l'Astrol. pl. 68. fig. 11, 12.
Hab. Australia. Mus. Cuming.
8. SUBEMARGINULA ELARGIE, Quoy et Gaimard.
Emarginula elargie, Quoy et Gaim. Voy. de l'Astrol. pl. 68. fig. 9, 10.
Hab. Philippines. Mus. Cuming.
9. SUBEMARGINULA GALEATA, A. Adams. *S. testá griseo-rufescente, elevato-conicá, tenui, vertice subcentrali, posticè inclinato, costis tuberculosis, radiantibus, albidis, et lineis transversis, elevatis, subclathratis, costá anticá prominenti; aperturæ margine dentato, anticè valdè sinuato, sinu intus in canalem producto.*
Hab. Philippine Archipelago. Mus. Cuming.
10. SUBEMARGINULA ARABICA, A. Adams. *S. testá albidá, crassá, depresso-conicá, vertice obtuso subcentrali, posticè inclinato; costis radiantibus tuberculosis et liris elevatis transversis clathratá; aperturæ margine incrassato, crenato, anticè sinuato, sinu intus in canalem producto.*
Hab. Red Sea. Mus. Cuming.
11. SUBEMARGINULA ALVEOLATA, A. Adams. *S. testá tenui, albá, subpellucidá, depresso-conicá, vertice subcentrali, posticè inclinato; costis radiantibus lirisque transversis irregulariter alveolatá; costis ad liras nodulosis; alveolis pellucidis; aperturæ margine dentato, anticè sinuato, sinu intus in canalem producto.*
Hab. Honduras. Mus. Cuming.

12. SUBEMARGINULA IMBRICATA, A. Adams. *S. testá ovato-oblongá, subquadrangulari, cinereo-albidá, vertice parvo, centrali, posticè inclinato; costis radiantibus imbricato-asperis, inæqualibus, et lineis crassis irregularibus incrementi decussatá; apertura margine dentato, anticè valdè sinuato, sinu subquadrato, intus in canalem producto.*

Hab. Mouth of Victoria River, north-east coast of Australia, under stones, low water. Mus. Cuming.

13. SUBEMARGINULA PUMILA, A. Adams. *S. testá orbiculato-ovali, valdè depressá, apice subcentrali, posticè inclinato; costis radiantibus, nodosis, inæqualibus, et lineis elevatis concentricis incrementi, decussatá; apertura margine denticulato-crenato, anticè profundè sinuato; sinu subquadrato, intus in canalem producto.*

Hab. —? Mus. Cuming.

14. SUBEMARGINULA CATILLUS, A. Adams. *S. testá elongato-ovali, valdè depressá, vertice vix elevato, posticè inclinato; costis radiantibus nodulosis, crassis, et lineis incrementi transversis, ornatá; apertura margine irregulari, crenulato, intus calloso, anticè valdè sinuato.*

Hab. —? Mus. Cuming.

15. SUBEMARGINULA DENTICULATA, A. Adams. *S. testá elongato-ovali, albá, novem-radiatá, vertice acuto posticè inclinato, costis novem, crassis, rugulosis, radiantibus; intervallis costellatis, costellis longitudinalibus, asperulatis; apertura margine dentato, et denticulato, anticè emarginato, incisuræ lateribus incrassatis, anticè in dentes duos productis.*

Hab. Mexico. Mus. Cuming.

16. SUBEMARGINULA POLYGONALIS, A. Adams. *S. testá elongato-ovali, depresso-conicá, albá, octoradiatá, vertice subcentrali, posticè inclinato, costis radiantibus subnodulosis, longitudinalibus (octo majoribus), lineis concentricis incrementi asperá; apertura octagonalis, margine crenulato, anticè valdè sinuato, sinu intus in canalem producto.*

Hab. Catanuan, Philippines. Mus. Cuming.

17. SUBEMARGINULA CRASSILABRUM, A. Adams. *S. testá ellipticá, crassá, rudi, albá, depresso-conicá, vertice subcentrali, eroso, costis radiantibus distantibus, inæqualibus, subaculeatis, ornatá; apertura margine crenato-denticulato, posticè recto, anticè rotundato, sinuato, sinu intus in canalem producto.*

Hab. —? Mus. Cuming.

18. SUBEMARGINULA NODULOSA, A. Adams. *S. testá ovatá, obliquè conicá, albido-rufescenti, vertice subcentrali, posticè declinato; costis longitudinalibus nodosis, radiantibus, duabus latere anterioribus permagnis, liris irregularibus transversis,*

decussatá; aperturæ margine irregulari, posticè acuminato, anticè truncato, sinuato, sinu intus in canalem producto.

Hab. Sibonga, island of Zebu, on small stones, 10 fathoms. Mus. Cuming.

19. SUBEMARGINULA CRATITIA, A. Adams. *S. testá ovatá, conicá, albidá, vertice obtuso, centrali, posticè haud inclinato, costis radiantibus distantibus, nodulosis; interstitiis costellis duabus longitudinalibus, et lineis elevatis, transversis, eleganter cancellatis; aperturæ margine crenulato, anticè sinuato, sinu quadrato, intus in canalem producto.*

Hab. —? Mus. Cuming.

20. SUBEMARGINULA SCULPTILIS, A. Adams. *S. testá ovali, obliquè conicá, albidá, viridí radiatim maculatá; vertice subcentrali, posticè valdè declinato; costis radiantibus, longitudinalibus, corrugatis; interstitiis pulcherrimè punctato-clathratis; costá anticè prominenti, crenulatá; aperturæ margine undulato et crenulato, posticè rotundato, anticè truncato et sinuato, sinu intus in canalem producto.*

Hab. Calapan, island of Mindoro, on small stones, 12 fathoms. Mus. Cuming.

3. DESCRIPTION OF A NEW SPECIES OF BULIMUS FROM CALLAO,
COLLECTED BY ERNESTE DENICKE.
COMMUNICATED BY J. E. GRAY, ESQ., V.P.Z.S.

Mr. Erneste Denicke, a sailor on board a Hamburg vessel trading with Chili, called at the British Museum, and informed me that he had a new species of *Bulimus*, which he had discovered on the Whitesand Hill at Chala, near Callao. He further stated that he had collected the Chilian shells, and had studied shells in general, and that he was convinced that it was a new species. Having compared the shell with the species in the English collections and the descriptions in Pfeiffer, and being satisfied that M. Denicke was correct in his idea, I propose that it should be named after that conchologist.

It was pleasing to see the intimate knowledge which he had acquired of the genera and species of shells, and the interest which he took in the study, when we consider the laborious nature of his occupation, and the very little time that he had at his command. The only holidays he had while his ship was in London were spent at the British Museum, at Mr. Cuming's collection, and in the gardens of the Zoological Society.

BULIMUS DENICKEI.

Shell conical, trochiform, white, the upper whorls small, forming a rather produced tip, the others rapidly enlarging, slightly convex, forming a conical spire, the last angularly keeled; axis perforated; mouth rhombic; outer lip slightly reflexed, acute; throat deep rose-coloured.

Hab. Chala, near Callao, on the Whitesand Hills.

To the preceding communication by Mr. Gray, the following details were added by Mr. Lovell Reeve :—

BULIMUS DENICKEI. *Bul. testá pyramidali-conicá, subampliter umbilicatá, apice papillari, anfractibus supernè convexo-declivibus, medio acutangulis, carinatis, undique peculiariter corrugatis et malleatis, opaco-albis, immaculatis, aperturá suboblongo-ovatá, labro tenui, simplici, effuso, aperturæ fauce intense purpureo-roséa.*

Hab. Found imbedded in sand at the top of a lofty hill near the Port of Chala, Peru, by Mr. Erneste Denicke.

This interesting species of *Bulimus* is of about the same size and form, and belongs to the same type, as *B. lemniscatus*, inhabiting Ilo, Peru. Specifically it is very distinct, the entire surface of the shell being peculiarly indented and shrivelled, and of an opaque unspotted white. The interior of the aperture is of a deep purple-rose colour.

4. ON A NEW SPECIES OF MUSOPHAGA.

BY JOHN GOULD, F.R.S.

Mr. Gould exhibited to the meeting a drawing by Lieut. J. R. Stack, of a new and beautiful species of *Musophaga*, of which a living example had been for the last ten years in the possession of Lady Ross, at St. Helena. Mr. Gould also exhibited some feathers shed from the wings and tail of the bird, an examination of which, and of the drawing, satisfied him that the bird was quite distinct from all previously described members of the genus.

Lady Ross, who is at present in England, had informed Mr. Gould that the bird was about the size of a hen-pheasant, and that it had been brought to St. Helena from the western coast of Africa, but the precise locality in which it had been procured was unknown to her.

For this interesting addition to the *Musophagæ* Mr. Gould proposed the specific appellation of *Rossæ*, in honour of its amiable owner, who has promised that in the event of her not returning to St. Helena, she will have the bird brought to England, where its arrival will be hailed with pleasure by every lover of ornithological science.

MUSOPHAGA ROSSÆ.

Body, wings and tail rich deep blue; primaries and secondaries arterial blood-red, narrowly margined and more broadly tipped with purplish brown, as in the other species of the genus; crown surmounted with a high rounded crest of hair-like blood-red feathers; bill and denuded orbits yellow; irides brown.

March 25, 1851.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

1. CATALOGUE OF THE SPECIES OF *NASSA*, A GENUS OF GASTEROPODOUS MOLLUSCA BELONGING TO THE FAMILY BUCCINIDÆ, IN THE COLLECTION OF HUGH CUMING, ESQ., WITH THE DESCRIPTION OF SOME NEW SPECIES. BY ARTHUR ADAMS, F.L.S. ETC.

Subgenus *NASSA*.

Shell cassiform; spire short; inner lip with the callus greatly developed.

A. Shell ribbed or nodulous.

- NON
DEF 1. *NASSA ARCULARIA*, Linn.
Bucc. arcularia, Linn.; List. Conch. pl. 970. f. 24; Kien. Bucc. pl. 28. f. 115.
Hab. Mauritius; Philippines, on the reefs (*H. C.*).
- NON
ZM 2. *NASSA PULLUS*, Linn.
Bucc. pullus, Linn.; Gualtieri, Test. pl. 44. fig. R; Kien. Mon. Bucc. pl. 28. f. 114.
Hab. ———?
- NON
ZM 3. *NASSA CORONATA*, Brug.
Bucc. coronatum, Brug.; Gualtieri, Test. pl. 44. fig. C, D; Kien. pl. 28. f. 112.
Hab. Philippines, on the reefs (*H. C.*).
- NON
ZM 4. *NASSA MUTABILIS*, Linn.
Bucc. mutabile, Linn.; List. Conch. t. 975. f. 30; Kien. pl. 24. f. 30.
Hab. Red Sea; Philippines, coarse sand, 6 fathoms (*H. C.*).
- NON
ZM 5. *NASSA MARGINULATA*, Lam.
Bucc. marginulatum, Lam.; Gualtieri, pl. 44. fig. *n*; Kien. Mon. Bucc. pl. 29. f. 117.
Hab. Cagayan, Philippines (*H. C.*).
- NON
ZM 6. *NASSA TIARULA*, Kien.
Bucc. tiarula, Kien. Mon. Bucc. pl. 30. f. 4.
Hab. Isle of Ticao, Philippines, under stones (*H. C.*).
- NON
ZM 7. *NASSA POLYGONATA*, Lam.
Bucc. polygonatum, Lam. Voy. de l'Astrol. pl. 32. f. 28, 29.
Hab. Port Jackson, New Holland.

8. *NASSA LUTEOSTOMA*, Kien. NON
BM
Bucc. luteostoma, Kien. Mon. Bucc. pl. 30. f. 1.
Hab. Coast of Senegal.
9. *NASSA PAUPERATA*, Lam. NON
BM
Bucc. pauperatum, Lam.; Gualtieri, pl. 44. fig. m.
Hab. Signet Bay, North Australia (*Mr. Dring*).
10. *NASSA LIVESCENS*, Phil. NON
BM
Bucc. livescens, Phil. Zeit. f. Malac. 1848, p. 135.
Hab. Philippines (*H. C.*).
11. *NASSA CANDENS*, Hinds. B.H. 197359
Nassa candens, Hinds, Voy. Sulph. Zool. Moll. pl. f.
Hab. Marquesas Islands.
12. *NASSA GEMMULATA*, Lam. NON BM
Bucc. gemmulata, Lam.; Petiver, Amb. pl. 64. f. 7; Kien. Mon.
 Bucc. pl. 22. f. 84.
Hab. Indian Seas.
13. *NASSA ANTILLARUM*, Phil. NON
BM
Bucc. antillarum, Phil. Zeit. f. Malac. 1848, p. 139.
Hab. West Indies.
14. *NASSA STURMII*, Phil. NON
BM
Bucc. Sturmii, Phil. Zeit. f. Malac. 1848, p. 135.
Hab. Philippines (*H. C.*).
15. *NASSA NODIFERA*, Phil. NON
BM
Bucc. nodiferum, Phil. Zeit. f. Malac. 1848, p. 136.
Hab. Island of Ticao, Philippines (*H. C.*).
nl "re revised on 10/1/1899
16. *NASSA MAESTA*, Hinds. B.H. 1824.9.23.3-4
1987.8.26.63
Nassa maesta, Hinds, Moll. Zool. Sulph. pl. f.
Hab. Central America.
17. *NASSA LYRILLA*, Beck.
Nassa Lyrilla, Beck.
Hab. East Indies.
18. *NASSA ISABELLEI*, d'Orb.
Bucc. Isabellei, d'Orb. Voy. Amér. Mérid. t. 61. f. 19.
Hab. Central America.
19. *NASSA CREMATA*, Hinds.
Nassa cremata, Hinds, Zool. Voy. Sulph. pl. 9. f. 8, 9.
Hab. Philippines.
20. *NASSA VENUSTA*, Dunker. NON
BM
Bucc. venustum, Dunker; Phil. Abild. t. 2. f. 1.
Hab. Corrigidor Island, 6 fathoms, coarse sand (*H. C.*). Mus. Cum.

21. *NASSA GRUNERI*, Dunker.*Bucc. Gruneri*, Dunker; Phil. Abild. (Buccinum) t. 2. f. 2.*Hab.* Island of Ticao. Mus. Cuming.22. *NASSA CRASSA*, Koch; Phil. Abild. (Buccinum) t. 2. f. 4.*Bucc. crassum*, Koch.*Hab.* Swan River; Philippines. Mus. Cuming.23. *NASSA MARGARITIFERA*, Dunker.*Bucc. margaritifera*, Dunker; Phil. Abild. (Buccinum) t. 2. f. 12.*Hab.* —?24. *NASSA CAPERATA*, Philippi.*Bucc. caperatum*, Phil. Abild. t. 2. f. 18.*Hab.* Philippines.25. *NASSA JONASI*, Dunker.*Bucc. Jonasi*, Dunker; Phil. Abild. (Buccinum) t. 2. f. 10.*Hab.* —?26. *NASSA GEMMA*, Philippi.*Bucc. gemma*, Phil. Abild. (Buccinum) t. 1. f. 5.*Hab.* Island of Ticao, under stones, low water. Mus. Cuming.27. *NASSA SEMIGRANOSA*, Dunker.*Bucc. semigranosum*, Dunker; Phil. Abild. t. 1. f. 9 (Buccinum).*Hab.* —?28. *NASSA ALBESCENS*, Dunker.*Bucc. albescens*, Dunker; Phil. Abild. (Buccinum) t. 2. f. 15*Hab.* —?29. *NASSA SPLENDIDULA*, Dunker.*Bucc. splendidulum*, Dunker; Phil. Abild. t. 3. f. 13.*Hab.* —?

30. *NASSA CORONULA*, A. Adams. *N. testá ovato-conicá, cinerescente, fasciá supra albidd, infra fusco ornatá; spirá brevi; anfractibus ad suturas angulatis, longitudinaliter costatis, costis distantibus rotundis supra nodulosis; labio callo crasso oblecto; columellá rugosá; labro extus marginato, intus lirato.*

Hab. Corrigidor, Bay of Manila, under stones, low water (H. C.).
Mus. Cuming.

31. *NASSA DISPAR*, A. Adams. *N. testá ovato-conicá, ventricosá, lavi, lutescente, rufo cinereoque varie pictá; anfractibus supernè gibbosis; labio callo albo mediocri tecto; columellá transversim corrugatá; labro anticè dentato, intus lirato.*

Hab. Philippines, sandy mud (H. C.). Mus. Cuming.

32. *NASSA STIGMARIA*, A. Adams. *N. testá ovato-ventricosá, rufescente, albo fuscoque variegatá et punctatá; liris granosis*

transversis ornata, granis planis quadratis; labio laevi, callo albo nitido oblecto, labro margine dentato.

Hab. Island of Siquijor, Philippines, under stones (*H. C.*). Mus. Cuming.

33. *NASSA SIQUIJORENSIS*, A. Adams. *N. testâ ovata, subturrita, rufescente, fasciâ pallidâ cinctâ, longitudinaliter costellatâ; suturâ tuberculis moniliformibus ornata, costellis permultis confertis, interstitiis transversim striatis; columellâ corrugatâ, labro anticè valdè dentato.*

B.M. 197418

Hab. Island of Siquijor, Philippines (*H. C.*). Mus. Cuming.

34. *NASSA RETECOSA*, A. Adams. *N. testâ ovata, acuminatâ; spirâ acutâ, rufescente, suturâ canaliculatâ, cingulis albis transversim et longitudinaliter cancellatâ; labro crenato, anticè dilatato et sinuato; labio callo, subexpanso, anticè recto.*

B.M. 197319

Hab. Albay, Luzon, coarse sand, 6 fathoms (*H. C.*). Mus. Cum.

35. *NASSA VERRUCOSA*, A. Adams. *N. testâ ovato-acuminatâ, spirâ productâ; suturâ canaliculatâ, rufescente, fusco sparsim punctatâ, iris transversis granosis ornata, granis rotundis verruciformibus in seriebus obliquis longitudinalibus dispositis; labio valdè calloso, tuberculato, albo; labro margine serrato.*

B.M. 197320

Hab. Eastern Seas.

36. *NASSA VARIEGATA*, A. Adams. *N. testâ ovato-ventricosâ, albido-grisâ, fuscoque variegatâ, longitudinaliter striatâ, iris transversis granosis subdistantibus ornata, granis rotundis in seriebus obliquis longitudinalibus dispositis; labio tuberculato callo tenui expanso tecto, labro margine crenato.*

B.M. 197321

Hab. Dalmaguete, island of Negros, Philippines (*H. C.*). Mus. Cuming.

37. *NASSA CÆLATA*, A. Adams. *N. testâ ovata, acuminatâ, subturrita, albida, fasciâ rufâ cinctâ, suturâ tuberculis moniliformibus ornata, longitudinaliter costellatâ; costellis simplicibus, interstitiis concinnè clathratis, labio callo tenui oblecto, labro margine crenulato.*

B.M. 197212

Hab. Cagayan, Mindanao, sandy mud, 25 fathoms (*H. C.*). Mus. Cuming.

38. *NASSA RAVIDA*, A. Adams. *N. testâ ovata, acuminatâ, subturrita, rufescente, cingulis transversis granosis sculptâ, granis elongatis subquadratis in seriebus obliquis longitudinalibus dispositis; columellâ rugosâ; labio non calloso, labro valdè dentato.*

B.M. 1973123

Hab. Burias, 6 fathoms, coral sand (*H. C.*). Mus. Cuming.

39. *NASSA SORDIDA*, A. Adams. *N. testâ ovata, albida, fusco fasciatâ; suturâ tuberculis moniliformibus ornata; longitudinaliter costatâ, transversim valdè lirata; labio callo albo crasso tecto; columellâ corrugatâ; labro margine calloso reflexo.*

B.M. 1973124

Hab. Siquijor, on the reefs.

3111 1073124 40. *NASSA CUMINGII*, A. Adams. *N. testá ovatá, ventricosá albídá, rufo nebulosá; suturá canaliculatá, liris transversis granosis sculptá, granis quadratis in seriebus longitudinalibus dispositis; aperturá ringente; labio corrugato, tuberculífero; labro intus valde sulcato.*

Hab. China. Mus. Cuming. Unique specimen.

3111 1073125 41. *NASSA CRENELLIFERA*, A. Adams. *N. testá ovatá, acuminatá, subturritá, albídá, fasciá pallidá rufá cinctá; suturá canaliculatá, margine crenellífero, transversim striatá, longitudinaliter tenuissimè costatá; columellá sublevi; labro integro.*

Hab. —? Mus. Cuming.

3111 1073125 42. *NASSA SULCIFERA*, A. Adams. *N. testá ovato-ventricosá; spirá productá, cinerescente, luteo-fusco variegatá, longitudinaliter subplicatá, transversim liratá; anfractu ultimo infra suturam sulco impresso; labii callo crasso mediocri; collumellá anticè biplicatá; labro intus lirato.*

Hab. Algoa Bay.

3111 1073126 43. *NASSA CORTICATA*, A. Adams. *N. testá ovato-conicá, spirá productá, epidermide viridi-fusco obtectá; anfractibus supernè nodosis; anfractu ultimo anticè cingulá subnodosá ornato, posticè nodulis coronato; labio vix calloso; columellá anticè biplicatá; labro extus marginato, intus lirato.*

Hab. New Zealand.

3111 1073124 44. *NASSA LABECULA*, A. Adams. *N. testá ovato-conicá, obliquá; spirá subacuminatá, pallidè fuscá; anfractu ultimo fasciá fuscá obsoletá cincto; anfractibus planulatis supremis costatis, ultimo supernè costato, infernè plano; labii callo expanso, tenui, nitidá labeculá fuscá ornato; labro posticè incrassato, intus dentato.*

Hab. Burias, 6 fathoms, coral sand (H. C.). Mus. Cuming.

3111 1073126 45. *NASSA MULTICOSTATA*, A. Adams. *N. testá ovatá, acuminatá, albo rufoque variegatá, longitudinaliter costatá; costis planis obliquis confertis permultis; labio cum callo parvo tecto; columellá levi, anticè biplicatá; labro intus sulcato, margine acuto integro.*

Hab. Batangas, island of Luzon, 4 fathoms, coarse sand (H. C.). Mus. Cuming.

3111 1073124 46. *NASSA COSTATA*, A. Adams. *N. testá ovato-conicá, spirá acutá, productá, pallidá, anfractu ultimo maculá rufo-fuscá ornatá; anfractibus convexiusculis, longitudinaliter costatis, interstitiis planis; anfractu ultimo anticè transversim striato; labio cum callo circumscripto tecto; columellá transversim rugosá; labro anticè dentato, intus lirato.*

Hab. Island of Burias, sandy mud, 6 fathoms (H. C.). Mus. Cuming.

3111 1073124 47. *NASSA CALLOSA*, A. Adams. *N. testá parvá, ovatá, spirá acutá, albá fusco-maculatá, longitudinaliter costatá, transversim sulcatá; labio cum callo magno albo nitido expanso tecto; columellá*

anticè triplicatâ; labro margine incrassato calloso, intus dentato-lirato.

Hab. Bais, island of Negros, 7 fathoms, sandy mud (*H. C.*). Mus. Cuming.

48. *NASSA GEMMULIFERA*, A. Adams. *N. testâ ovato-conicâ, spirâ acutâ, productâ, cinerescente rufo variegatâ, longitudinaliter plicatâ, transversim cingulatâ, cingulis ad plicas noduliferis; labio cum callo expanso albo tecto; columellâ transversim corrugatâ; labro intus lirato.*

Hab. Burias, 6 fathoms, coarse sand (*H. C.*). Mus. Cuming.

49. *NASSA FISSILABRIS*, A. Adams. *N. testâ ovato-conicâ, obliquâ, cinerescente, pallidè fasciatâ, longitudinaliter costatâ, anfractu ultimo anticè transversim sulcato; labio cum callo expanso oblecto; columellâ anticè tuberculis duobus transversis; labro anticè sinuato, posticè valde inciso.*

Hab. Cagayan, Prov. Misamis, island of Mindanao, 25 fathoms, sandy mud (*H. C.*). Mus. Cuming.

50. *NASSA NODICOSTATA*, A. Adams. *N. testâ ovato-conicâ, albâ, fasciâ pallidâ fulvâ cinctâ; anfractibus planulatis, longitudinaliter costatis, transversim evanide liris; costis nodis distantibus instructis, supernè nodosis; labio cum callo circumscripto tecto; columellâ rugosâ, anticè acutâ, productâ; labro extus limbato, anticè valde sinuato.*

Hab. Island of Corrigidor, 6 fathoms, coarse sand (*H. C.*). Mus. Cuming.

51. *NASSA DELICATA*, A. Adams. *N. testâ ovato-conicâ, subpelucidâ, albâ, fasciâ angustâ, fuscâ, maculisque fuscis ornatâ, longitudinaliter costatâ, costis planulatis supernè nodosis, interstitiis lineis elevatis transversis clathratis; labio calloso; columellâ anticè plicis quatuor; labro margine acuto, intus longitudinaliter sulcato, transversim lirato.*

Hab. Sorsogon, Albay, Luzon, coarse sand, 6 fathoms (*H. C.*). Mus. Cuming.

52. *NASSA CANCELLATA*, A. Adams. *N. testâ ovato-conicâ, spirâ acutâ, fulvescenti, fusco variegatâ, longitudinaliter costatâ, costis planis rotundatis, interstitiis concinnè cancellatis; labio callo magno expanso crasso oblecto; columellâ lævi, simplici; labro margine calloso incrassato, anticè subsinuato.*

Hab. Masbate, under stones (*H. C.*). Mus. Cuming.

53. *NASSA CLATHRATULA*, A. Adams. *N. testâ ovatâ, spirâ acutâ, anfractibus convexis, nived, longitudinaliter costatâ; costis nodulosis, interstitiis valde clathratis; labio cum callo mediocri oblecto; columellâ anticè buplicatâ; labro extus varicoso, intus lirato.*

Hab. Island of Siquijor, deep water, sandy mud (*H. C.*). Mus. Cuming.

B.M. 197320 54. *NASSA CRENOLIRATA*, A. Adams. *N. testâ parvâ, ovatâ, pallidâ, lineis angustis transversis fuscis ornatâ, longitudinaliter costatâ, costis nodulosis, supernè nodosis; aperturâ angustatâ; labio cum callo obtecto; columellâ plicis quatuor transversis instructo; labro extus marginato, intus valde dentato-lirato.*

Hab. —? Mus. Cuming.

B.M. 197321 55. *NASSA SINUSIGERA*, A. Adams. *N. testâ ovato-conicâ, obliquâ; spirâ acuminatâ, pallidâ, fusco variegatâ, longitudinaliter costatâ, costis supernè nodulosis, transversim sulcatâ; labio cum callo mediocri tecto; columellâ transversim corrugato-plicatâ; labro anticè valde sinuato.*

Hab. Catbalonga, island of Samaar, 8 fathoms, coarse sand (H. C.). Mus. Cuming.

B.M. 197329 56. *NASSA GENICULATA*, A. Adams. *N. testâ parvâ, ovato-conicâ, fulvâ, albo variegatâ; fasciâ latâ, transversâ, cinereo-fuscâ cinctâ, transversim striatâ, longitudinaliter costatâ; costis geniculatis; labio subcalloso, anticè bituberculato; labro extus incrassato, intus dentato-lirato.*

Hab. Island of Ticao, 4 fathoms, sand (H. C.). Mus. Cuming.

B.M. 197329 57. *NASSA SPECIOSA*, A. Adams. *N. testâ ovato-conicâ, acuminatâ, lutescente, albo variegatâ, transversim lirâtâ, liris confertis granulosis, longitudinaliter plicatâ; plicis distantibus obliquis, supernè nodosis, nodulis albis; aperturâ albâ, anticè rufo-fusco maculatâ; columellâ lævi, callo subexpanso tectâ; labro intus evanidè lirato, margine anticè maculâ fuscâ.*

Hab. —? Mus. Cuming.

B.M. 19733 58. *NASSA OBTUSATA*, A. Adams. *N. testâ ovato-conicâ, spirâ obtusâ, pallidâ, rufo-fusco variegatâ, transversim lirâtâ, longitudinaliter costatâ, costis distantibus supernè nodosis; labio callo crasso albo obtecto; labro intus incrassato, sulcato et transversim lirato.*

Hab. Island of Ticao, coral sand, 7 fathoms (H. C.). Mus. Cuming.

B.M. 197310 59. *NASSA ABYSSICOLA*, A. Adams. *N. testâ parvâ, ovato-conicâ, sordidè albâ; costellis confertis longitudinalibus permultis, interstitiis concinnè clathratis ornatâ; labio arcuato, mediocriter calloso; labro intus dentato-lirato, extus incrassato.*

Hab. Loay, island of Bohol, clayey ground, 60 fathoms (H. C.). Mus. Cuming.

B.M. 1973130 60. *NASSA PUSIO*, A. Adams. *N. testâ parvâ, ovato-conicâ, fulvâ, fusco variegatâ et maculosâ; costellis planis, longitudinalibus confertis ornatâ; anfractu ultimo anticè sulcato, labio cum callo nitido subexpanso tecto; labro intus sulcato, margine subreflexo.*

Hab. Sorsogon, Albay, isle of Luzon, 6 fathoms, coarse sand (H. C.). Mus. Cuming.

B. Shell spinulose; inner lip with the callus moderate, defined.

61. *NASSA SUBSPINOSA*, Lam.

Bucc. subspinosa, Lam.; Kien. Mon. Bucc. pl. 26. f. 103.

Hab. Gindulman, island of Bohol, Philippines, low water (*H. C.*).

NASSA
B.M.

62. *NASSA MURICATA*, Quoy et Gaim.

Bucc. muricatum, Quoy et Gaim. Voy. de l'Astr. pl. 32. f. 32, 33.

Hab. Puerto Galero, island of Mindoro (*H. C.*).

NASSA
B.M.

63. *NASSA VIBEX*, Say.

Bucc. vibex, Say.

Hab. West Indies, Philippines.

NASSA
B.M.

64. *NASSA AMBIGUA*, Montag.

Bucc. ambiguum, Mont.; Kien. Bucc. Mon. pl. 21. f. 81.

Hab. British Islands.

65. *NASSA HORRIDA*, Dunker.

Bucc. horridum, Dunker; Phil. Abild. t. 2. f. 8.—*Bucc. scabrum*,
Dunker, olim.

Hab. Eastern Seas.

NASSA
B.M.

66. *NASSA HISPIDA*, A. Adams. *N. testd ovato-acuta, albido-*
cinered, rufo-fusco punctata, nodispinosa, longitudinaliter plicata;
plicis cum seriebus novem tuberculorum spiniformium armatis.

B.M. 197341

Hab. Loon, island of Bohol, on the reefs, low water (*H. C.*).

Mus. Cuming.

Plicated, the rows of tubercles rather close together, the upper
row distinct from the rest.

67. *NASSA ECHINATA*, A. Adams. *N. testd elongato-ovata, al-*
bida, nodispinosa, longitudinaliter plicata, plicis quinque, seriebus
tuberculorum spiniformium armatis.

B.M. 197311

Hab. Galeo, island of Mindoro, 3 fathoms, sandy mud (*H. C.*).

Plicated, with the upper row of tubercles larger and distinct from
the others.

Subgenus *EIONE*, Risso.

Shell with the back gibbous; inner lip with the callus greatly de-
veloped, surrounding the circumference of the shell.

1. *EIONE GIBBOSULA*, Linn.

Bucc. gibbosulum, Linn.; List. Conch. t. 973. f. 28; Kien. Mon.
Bucc. pl. 28. f. 116.

Hab. —?

NASSA
B.M.

2. *EIONE CLATHRATA*, Kien.

Bucc. clathratum, Kien. Mon. Bucc. pl. 27. f. 108.

Hab. —?

NASSA
B.M.

3. *EIONE GRANIFERA*, Kien.

Bucc. graniferum, Kien. Mon. Bucc. pl. 27. f. 111.

Hab. —?

NASSA
B.M.

4. *EIONE THERSITES*, Brug.

Bucc. Thersites, Brug.; List. Conch. t. 971. f. 26; Kien. Mon. Bucc. pl. 28. f. 113.

Hab. —?

B.M. 197311 5. *NASSA CIRCUMCINCTA*, A. Adams. *N. testá ovatá, cinerá, nitidá, dorso gibbosá; spirá brevi, acutá, suturá fuscá; labio cum callo crasso albo nitido tecto, marginibus usque ad spiram decurrentibus fusco marginatis; columellá lævi, anticè uniplicatá; labro calloso marginato, intus lævi.*

Hab. Red Sea. Mus. Cuming.

B.M. 197335 6. *NASSA DORSUOSA*, A. Adams. *N. testá ovatá, depressá; spirá acutá, dorso in medio nodatá, olivacé, lævi, longitudinaliter subplicatá; labio cum callo magno crasso lutescente tecto, marginibus incrassatis usque ad spiram decurrentibus; columellá lævi, labro margine calloso incrassato, intus sublirato.*

Hab. Masbate, on the mud-banks at low water (H. C.). Mus. Cuming.

B.M. 197312 7. *NASSA ORBICULATA*, A. Adams. *N. testá semiorbiculari, convexo-depressá, lævi, olivacé, apud dorsum gibbá; spirá brevi, labio cum callo expanso crasso tecto, marginibus usque ad spiram decurrentibus, columellá lævi, labro extus calloso incrassato.*

Hab. —? Mus. Cuming.

B.M. 197319 8. *NASSA CALLOSPIRA*, A. Adams. *N. testá ovatá, pallidá, fasciá transversá cinerá ornatá; spirá acutá, transversim lirátá, plicis nodosis longitudinalibus instructá; labio cum callo magno albo extenso tecto, marginibus usque ad spiram decurrentibus; columellá anticè biplicatá; labro crasso calloso, marginato, intus valde lirato.*

Hab. Island of Burias, 6 fathoms, coral sand (H. C.). Mus. Cuming.

B.M. 197313 9. *NASSA NANA*, A. Adams. *N. testá ovatá, spirá acutá; anfractibus rotundatis, rufescente, fasciá pallidá luteá ornatá, longitudinaliter plicatá, transversim semistriatá; labio cum callo expanso tenui tecto; columellá rugosulá; labro marginato, intus sulcato.*

Hab. Dumaguete, island of Negros, coarse black sand, 11 fathoms (H. C.). Mus. Cuming.

B.M. 197316 10. *NASSA BELLULA*, A. Adams. *N. testá ovatá, spirá acuminatá, acutá; anfractibus angulatis, pallidulá, fasciá luteolá ornatá, longitudinaliter plicatá, transversim lirátá; interstitiis concinnè longitudinaliter striatis, labio callo magno tecto; columellá rugosá; labri margine rugoso calloso, intus crenulato.*

Hab. Catbalonga, island of Samaar, under stones, low water. Mus. Cuming.

B.M. 197317 11. *NASSA BIMACULOSA*, A. Adams. *N. testá suborbiculari, apud dorsum valde convexá, nodosá; spirá acutá, longitudinaliter sub-*

plicatá, anticè transversim sulcatá, olivacéa, fasciá pallidá transversá cinctá, labio cum callo crasso albo magno suborbiculari cincto; columellá levi, anticè uniplicatá; labro valde incrassato marginato, anticè sinuato, intus lirato, extus maculis duabus rufofuscis ornato.

Hab. Island of Siquijor, on mud-banks (*H. C.*). Mus. Cuming.

12. *NASSA LEPTOSPIRA*, A. Adams. *N. testá ovatá, apud dorsum convexá, nodosá; spirá productá, acutá, lutescente longitudinaliter plicatá, anticè transversim striatá, labio cum callo luteo crasso tecto; columellá corrugatá, labro intus lirato.*

B.M. 197347

Hab. Ilo Ilo, island of Panay, on mud-banks, low water (*H. C.*). Mus. Cuming.

Subgenus *ALECTRION*, Montfort.

Shell bucciniform; spire elevated; inner lip with the callus moderately developed; outer lip dentate, or serrate at the margin.

A. Shell papillose; inner lip spread.

1. *NASSA PAPILOSA*, Linn.

Bucc. papillosum, Linn.; List. Conch. t. 969. f. 23.

Hab. Island of Capul, on the reefs (*H. C.*).

NON
BM

2. *NASSA NASSOIDES*, Reeve.

Bucc. nassoides, Reeve, Conch. Icon. Mon. Buccinum, pl. f.

Hab. ———?

3. *NASSA NODIFERA*, Powis.

Nassa nodifera, Powis.

Hab. Philippines.

B.M. 197367

4. *NASSA MONILIS*, Kien.

Bucc. monile, Kien. Mon. Bucc. pl. 11. f. 40.

Hab. New Guinea.

NON
BM

5. *NASSA CRENULATA*, Brug.

Bucc. crenulatum, Brug.; Petiver, Gaz. t. 64. f. 8; Kien. Mon. pl. 23. f. 90, pl. 14. f. 49.

Hab. Indian Seas.

NON
BM

6. *NASSA HIRTA*, Kiener.

Bucc. hirtum, Kien. Mon. Bucc. pl. 19. f. 72.

Hab. New Holland.

NON
BM

7. *NASSA JACKSONIANA*, Kiener.

Bucc. Jacksonianum, Kien. Mon. Bucc. pl. 19. f. 73.

Hab. Port Jackson, New Holland.

NON
BM

8. *NASSA VARIABILIS*, Phil.

Bucc. variabile, Phil. Ed. Moll. Sicil. vol. i. p. 221.—*B. subdiaphanum*, Bivon.—*B. stolatum*, Gmel.—*B. zonale*, Brug.—*B. costu-*

NON
BM

latum, Brocc.—*B. angulatum*, Brocc.—*B. Cuvieri*, Payr.—*B. Ferussacii*, Payr.—*B. corrugatum*, Brocc.
Hab. Mediterranean.

B.M. 197366 9. *NASSA COMPLANATA*, Powis.

Nassa complanata, Powis.
Hab. Atacamas, West Columbia.

B.M. 1973134 10. *NASSA SEMINODOSA*, A. Adams. *N. testd ovato-conicd, acuminatd, laevi, nitidd, fulvo-fuscescente; suturd tuberculis moniliformibus ornatd; longitudinaliter plicatd, plicis supernè sub-nodulosis; anfractu ultimo anticè transversim sulcato, labio laevi, cum callo tenui expanso oblecto, labro anticè dentato intus lirato.*

Hab. Island of Annaa, South Seas, on the reefs (*H. C.*). Mus. Cuming.

B. Shell smooth, polished.

NON
BM

1. *NASSA GLANS*, Linn.

Bucc. glans, Linn.; List. Conch. t. 981. f. 40; Kien. Mon. pl. 15. f. 52.

Hab. Island of Ticao, Philippines, on the reefs (*H. C.*).

NON
BM

2. *NASSA SUTURALIS*, Lam.

Bucc. suturale, Lam. Chem. pl. 125. f. 1199, 1200; Kien. Mon. pl. 24. f. 96.

Hab. Swan River.

NON
BM

3. *NASSA ELEGANS*, Kien.

Bucc. elegans, Kien. Mon. Bucc. pl. 24. f. 97.

Hab. Indian Ocean.

NON
BM

4. *NASSA RUFULA*, Kien.

Bucc. rufulum, Kien. Mon. Bucc. pl. 24. f. 95.

Hab. Swan River.

NON
BM

5. *NASSA LÆTA*, Philippi.

Bucc. lætum, Phil. Zeit. f. Mal. 1848, p. 141.

Hab. —?

NON
BM

6. *NASSA BRONNII*, Philippi.

Bucc. Bronnii, Phil. Zeit. f. Malac. 1848, p. 137.

Hab. Corrigidor, 6 fathoms, coarse sand (*H. C.*).

B.M. 11844.9.23.17

7. *NASSA GAUDIOSA*, Hinds.

Nassa gaudiosa, Hinds, Moll. Voy. Sulph. pl. . f. .

Hab. Straits of Malacca.

NON
BM

8. *NASSA PICTA*, Dunker.

Buccinum pictum, Dunker, Phil. Abild. (*Buccinum*), t. 2. f. 6.

Hab. Philippines. Mus. Cuming.

9. *NASSA REEVIANA*, Dunker.*Buccinum Reevidum*, Dunker, Phil. Abild. (*Buccinum*), t. 2. f. 3.*Nassa filosa*, Gray MSS.*Hab.* Philippines. Mus. Cuming.

10. *NASSA MUCRONATA*, A. Adams. *N. testá ovato-conicá, sub-
lævi, nitidá, longitudinaliter plicatá, lutescenti fusco variegatá;
anfractibus rotundatis, ultimo gibboso; spirá acutá, mucronatá;
labio lævi; labro intus lirato.* B.M. 1973135

Hab. Dumaguete, isle of Negros, 11 fathoms, black sand (*H. C.*).
Mus. Cuming.

11. *NASSA OBLIQUATA*, A. Adams. *N. testá ovato-conicá, obliquá,
lævissimá, nitidá; lineis fuscis transversis, fasciá pallidá ornatá,
cinerescente, albo variegatá; labio lævi, simplici; labro intus
lirato.* NOT FOUND 1975

Hab. Cagayan, province of Misamis, island of Mindanao, sandy
mud, 25 fathoms (*H. C.*). Mus. Cuming.

12. *NASSA PUNCTATA*, A. Adams. *N. testá ovato-conicá; spirá
acuminatá, lævi, cinereá, albidó punctatá, lineolis fuscis transversis
ornatá; labio callo tenui expanso tecto; columellá rugosá; labro
extus incrassato, intus lirato.* B.M. 1973136

Hab. Puerto Galero, province of Albay, isle of Luzon, coarse sand,
6 fathoms (*H. C.*). Mus. Cuming.

13. *NASSA LENTIGINOSA*, A. Adams. *N. testá ovato-conicá; spirá
acuminatá, lævi, nitidá, lutescente aut cinerescente, lineis
undulatis confertis pictá, lineolis fuscis transversis ornatá; labio
cum callo tenui tecto; columellá anticè rugosá; labro margine in-
crassato, intus valde lirato.* B.M. 197346

Hab. Masbate, 7 fathoms, sandy mud (*H. C.*). Mus. Cuming.

14. *NASSA LUCTUOSA*, A. Adams. *N. testá ovatá, elongatá, acu-
minatá, subnitidá, transversim sulcatá, nigricante nonnunquam
fasciis albo-articulatis ornatá; anfractibus planulatis; labio callo
nitido obtecto; columellá anticè buplicatá et tuberculis tribus in-
structá; labro extus incrassato, intus valde lirato.* B.M. 197348

Hab. Cagayan, province of Mindanao, under
stones on the reefs (*H. C.*). Mus. Cuming.

15. *NASSA STOLIDA*, A. Adams. *N. testá ovato-conicá; spirá
acuminatá, solidá, cinereá, fusco maculatá, longitudinaliter pli-
catá; aperturá anticè effusá; labio reflexo, lævi, valde calloso;
labro intus lævi, fusco alboque fasciato.* B.M. 1973137

Hab. —? Mus. Cuming.

16. *NASSA DISTORTA*, A. Adams. *N. testá ovato-conicá, nitidá; spirá
acuminatá, distortá, pallidá, cinereo variegatá, lineis fuscis
transversis ornatá; aperturá anticè valde effusá; labio lævi, an-
ticè buplicato; labro anticè producto, intus lirato.* B.M. 197344

Hab. —? Mus. Cuming.

B.M. 1973132 17. *NASSA MARMOREA*, A. Adams. *N. testá ovato-conicá, laevi, nitidá; spirá subacuminatá, albidd, fusco marmoratá, fasciis duabus pallidis ornatá; anfractibus planiusculus; labio corrugato; labro extus varicoso, intus lirato.*

Hab. Cagayan, Mindanao, 25 fathoms, sandy mud (H. C.). Mus. Cuming.

B.M. 1973139 18. *NASSA SPIRATA*, A. Adams. *N. testá ovato-conicá, acuminatá, laevi, nitidá, albidd, luteo-fusco nebulosá; anfractibus convexiusculis, prope suturas angulatis; labio laevi; labro intus lirato, extus incrassato, anticè margine simplici non dentato.*

Hab. Swan River. Mus. Cuming.

C. Shell smooth or ribbed. Inner lip defined.

1. *NASSA OLIVACEA*, Brug.

Bucc. olivaceum, Brug. Favanne Conch. pl. 33. f. 2; Kien. Mon. Bucc. pl. 15. f. 53.

Hab. Philippines.

2. *NASSA CANALICULATA*, Lamarck.

Bucc. canaliculatum, Lam. Chem. Conch. pl. 125. f. 1194-95; Kien. Mon. Bucc. pl. 23. f. 89.

Hab. Philippines.

3. *NASSA UNICOLOR*, Kiener.

Bucc. unicolor, Kien. Mon. Bucc. pl. 19. f. 69.

Hab. Australia.

4. *NASSA ORNATA*, Kiener.

Bucc. ornatum, Kiener, Mon. Bucc. pl. 124. f. 168.

Hab. Tranquebar, Ceylon, Indian Seas.

B.M. 197364 5. *NASSA EXILIS*, Powis.

Nassa exilis, Powis.

Hab. —?

B.M. 197362 6. *NASSA RUFOCINCTA*, A. Adams. *N. testá ovato-conicá, sub-turritá, albidd, fasciá transversá rufá ornatá, longitudinaliter plicatá, transversim striatá; anfractibus subrotundatis; labio callo albo circumscripto tecto; labro extus marginato, intus sulcato.*

Hab. Honduras (Dyson). Mus. Cuming.

B.M. 197363 7. *NASSA MICANS*, A. Adams. *N. testá ovato-fusifirmi, albidd, laevi, nitidissimá; anfractibus convexiusculis supremis costellatis; labio callo tenui tecto; labro anticè crenulato, intus lirato.*

Hab. Cagayan, Misamis, Mindanao, 25 fathoms, sandy mud (H. C.). Mus. Cuming.

B.M. 197361 8. *NASSA PALLIDULA*, A. Adams. *N. testá ovatá, subacuminatá, pallidá, laevi, anfractu ultimo anticè transversim sulcato; suturá*

canaliculatá; labio cum callo circumscripto tecto; columellá simplici; labro extus marginato, intus lirato.

Hab. Malacca, coarse sand, 10 fathoms (H. C.).

9. *NASSA COMPTA*, A. Adams. *N. testá ovato-conicá, subturritá, lævi, nitidá, rufescente pallidè variegatá; anfractibus convexiusculis, supremis costellatis; labio cum callo circumscripto tecto; columellá anticè corrugatá; labro margine incrassato, albo, sub-reflexo.*

Hab. Cape St. Antonio, Africa.

10. *NASSA SUCCINCTA*, A. Adams. *N. testá ovatá, subturritá, lævi, cinerescente; fasciá pallidá, cinctá, anfractibus planulatis, supremis costellatis; suturá subcanaliculatá; labio cum callo incrassato circumscripto tecto; columellá dentato-rugosá; labro posticè inflexo, anticè valde sinuato et dentato, extus limbato, intus lirato.*

Hab. Masbate. Mus. Cuming.

11. *NASSA ZONALIS*, A. Adams. *N. testá ovato-acuminatá, lævi, nitidá, longitudinaliter striatá; anfractu ultimo transversim sulcato; lutescente, fasciis tribus transversis rufo-fuscis cinctá; labio cum callo tenui expanso tecto; columellá lævi; labro extus incrassato, intus lirato.*

Hab. Isle of Ticao, on the reefs (H. C.). Mus. Cuming.

12. *NASSA SERTULA*, A. Adams. *N. testá ovatá, acuminatá, lævi, nitidá, fulvá, albo nebulosá; anfractibus convexiusculis, supremis costellatis; labio cum callo circumscripto tecto; columellá transversim corrugatá; labro extus incrassato, intus lirato.*

Hab. Masbate, on the reefs (H. C.). Mus. Cuming.

13. *NASSA SEMIPLICATA*, A. Adams. *N. testá ovato-conicá, cineréá, fasciá pallidá transversá ornatá, nitidá, sublævi, longitudinaliter plicatá, plicis in anfractu ultimo sæpè evanidis, interstitiis transversim striatis; labio callo circumscripto; columellá transversim corrugato-plicatá; labro extus albo marginato, intus lirato.*

Hab. Chusan (Benson). Mus. Cuming.

14. *NASSA CINNAMOMEA*, A. Adams. *N. testá ovato-acuminatá, cinnamoméá, lævi, nitidá, lævigatá, sempellucidá, anfractibus convexis; labio simplici; labro extus marginato, intus sublirato.*

Hab. Dumaguete, isle of Negros, under stones, low water (H. C.). Mus. Cuming.

15. *NASSA BADIA*, A. Adams. *N. testá ovato-acuminatá, lævi, nitidá, castanéá; anfractibus planis, supremis longitudinaliter plicatis, anfractu ultimo transversim striato; labio simplici vix calloso; labro extus marginato, intus plicato.*

Hab. Sinaat, province of North Ilocos, island of Luzon, on the reefs (H. C.). Mus. Cuming.

B.M. 1973142

16. *NASSA MITRALIS*, A. Adams. *N. testá ovato-conicá, acuminatá, fuscá, sublevi, longitudinaliter semiplicatá; anfractibus planiusculis, ultimo anticè transversim sulcato; labio subcorrugato; labro extus marginato, intus valde lirato.*

Hab. Isinimalan, isle of Negros, on the mud-banks (H. C.). Mus. Cuming.

B.M. 1973143

17. *NASSA SEROTINA*, A. Adams. *N. testá turritá, acuminatá, serotind, anfractu ultimo anticè cingulis duabus elevatis articulatis ornato; transversim substriatá, longitudinaliter plicatá, plicis rotundis subdistantibus; aperturá albá; columellá levi, subcallosá; labro extus incrassato, intus lirato.*

Hab. Australia.

/ 2.

not found 1915

18. *NASSA PULCHELLA*, A. Adams. *N. testá turritá, acuminatá, nitidá, albidá, luteo variegatá, fasciá fuscá transversá ornatá; longitudinaliter plicatá, plicis subdistantibus rotundatis tuberculis albis transversis instructis; labio calloso nitido; labro extus marginato, intus lirato.*

Hab. Cape of Good Hope. Mus. Cuming.

B.M. 1973150

19. *NASSA TERETIUSCULA*, A. Adams. *N. testá subturritá, acuminatá, lutescente aut plumbeá, fasciá angustá fuscá transversá ornatá; levi, nitidá, longitudinaliter valde plicatá; labio cum callo mediocri tecto; columellá anticè tortuosá, plicatá; labro extus limbato, intus lirato.*

Hab. Eastern Seas. Mus. Cuming.

B.M. 1973151

20. *NASSA VARICIFERA*, A. Adams. *N. testá turritá; spirá acuminatá, pallidá, fasciis fuscis duabus transversis ornatá; anfractibus subplanulatis, varicibus albis, spiraliter instructis; suturá canaliculatá; columellá anticè plicis tribus transversis; labro extus marginato, posticè angulato, intus valde lirato.*

Hab. Eastern Seas.

B.M. 1973152

21. *NASSA SCALARIS*, A. Adams. *N. testá ovato-conicá, subturritá, pallidá, rufo-fusco fasciatá; longitudinaliter costatá, transversim liratá; anfractibus rotundatis, tuberculis moniliformibus apud suturam; suturá subcanaliculatá; labio cum callo subexpanso tenui tecto; columellá corrugatá, anticè biplicatá; labro anticè crenulato, intus lirato.*

Hab. Island of Corrigidor, 7 fathoms, coarse sand (H. C.). Mus. Cuming.

B.M. 1973153

22. *NASSA PLANOCOSTATA*, A. Adams. *N. testá ovato-conicá, cinerescens, fasciá rufo-fuscá transversim cinctá; costellis planis confertis longitudinalibus, interstitiis concinnè clathratis ornatá; labio cum callo circumscripto tecto; columellá transversim plicatodentatá; labio anticè denticulato, intus valde lirato.*

Hab. Payta, Peru, under stones, low water (H. C.). Mus. Cuming.

D. Shell scalariform, cancellated.

1. *NASSA SCALARIFORMIS*, Valenc. NON
BM
Buccinum scalariforme, Val. ; Kiener, Monograph Bucc. pl. 21.
 f. 80.
Hab. New Guinea.
2. *NASSA ROISSYI*, Deshayes. NON
BM
Bucc. Roissyi, Belang. Voy. aux Ind. Or. pl. 3. f. 3, 4 ; Kiener,
 Mon. Bucc. pl. 21. f. 82.
Hab. Indian Ocean.
3. *NASSA REEVEI*, A. Adams.
Bucc. elegans, Reeve.
Hab. — ?
4. *NASSA NUCLEOLUS*, Philippi. NON
BM
Bucc. nucleolus, Philippi.
Hab. — ?
5. *NASSA NODATA*, Hinds. BM. 1844.9.23.15
Nassa nodata, Hinds, Moll. Voy. Sulphur, pl. . f. .
Hab. Malacca.
6. *NASSA PERPINGUIS*, Hinds. BM. 1844.9.23.15
Nassa perpinguis, Hinds, Moll. Voy. Sulphur, pl. . f. .
Hab. Bay of Magdalena, California. Mus. Cuming.
7. *NASSA MIGA*, Adanson. NON
BM
Bucc. miga, Adanson, Voy. au Senegal, pl. 8. f. 10 ; Kiener, Mon.
 Bucc. pl. 22. f. 87.
Hab. Senegal. Mus. Cuming.
8. *NASSA MYRISTICATA*, Hinds. BM. 1844.9.23.11
Nassa myrasticata, Hinds, Moll. Voy. Sulphur, pl. 9. f. 10, 11.
Hab. Cape of Good Hope.
9. *NASSA PALLIDA*, Powis. BM. 1973.68
Nassa pallida, Powis.
Hab. Panama, sandy mud, 6 fathoms. Mus. Cuming.
10. *NASSA NODULIFERA*, Philippi.
Buccinum noduliferum, Phil. Abild. (Bucc.) t. 1. f. 3. — See 795
11. *NASSA ANGULIFERA*, A. Adams. BM. 1872.2
N. testâ ovato-conicâ, sub-
turrîtâ, pallidè fulvâ ; fasciâ fuscâ cinctâ, transversim sulcatâ,
longitudinaliter plicatâ, plicis distantibus, posticè apud suturas
angulatis ; labio cum callo albo nitido tecto ; labro margine sub-
reflexo, intus crenulato.
Hab. Galapagos Islands, 10 fathoms (H. C.). Mus. Cuming.

- B. 11. 1973154 12. *NASSA NODICINCTA*, A. Adams. *N. testâ ovato-turritâ; spirâ acuminatâ, pallidâ, lineis rufis transversis cinctâ, transversim sulcatâ; plicis distantibus longitudinalibus, apud suturas noduliferis ornatâ; labio cum callo albo lævi nitido tecto; labro extus varicoso, intus lirato.*
Hab. Galapagos Islands, 7 fathoms (H. C.). Mus. Cuming.
- B. 11. 1973155 13. *NASSA SANCTÆ HELENÆ*, A. Adams. *N. testâ ovato-conicâ, subturritâ; spirâ productâ; anfractibus rotundatis, albidâ rufo-variegatâ, longitudinaliter costatâ, costis distantibus subnodosis; anfractu ultimo anticè transversim sulcato; labio lævi, calloso; columellâ anticè multiplicatâ; labro intus lirato.*
Hab. St. Helena, sandy mud, 20 fathoms (H. C.). Mus. Cuming.
- B. 11. 1973156 14. *NASSA CINCTELLA*, A. Adams. *N. testâ ovato-conicâ, albidâ, lineis fuscis transversis cinctâ, longitudinaliter valde plicatâ, plicis distantibus, liris transversis albis, interstitiis fuscis ornatâ; labio corrugato, vix calloso; labro extus varicoso, intus valde lirato.*
Hab. St. Helena, 20 fathoms, sandy mud.
- B. 11. 1973157 15. *NASSA CORRUGATA*, A. Adams. *N. testâ elongatâ, subturritâ, fulvescente, rufo nebulosâ; transversim liratâ, longitudinaliter plicatâ; plicis nodulosis; anfractibus convexiusculis; labio simplici, non calloso; labro intus lirato, margine crenulato; columellâ tortuosâ, anticè productâ.*
Hab. Eastern Seas. Mus. Cuming.
- B. 11. 1973158 16. *NASSA TURRITA*, A. Adams. *N. testâ elongatâ, subturritâ, pallidè fulvâ; anfractibus rotundatis; suturâ subcanaliculatâ, longitudinaliter plicatâ, transversim liratâ, liris subnodulosis; labio cum callo tenui tecto; columellâ anticè abruptè truncatâ; labro intus valde lirato.*
Hab. —? Mus. Cuming.
17. *NASSA JAPONICA*, A. Adams. *N. testâ turritâ, pallidè fulvâ, fasciâ rufo-fuscâ cinctâ; longitudinaliter plicatâ, cingulis transversis ad plicas nodulosis ornatâ, interstitiis longitudinaliter striatis; labio subrugoso; columellâ anticè productâ; labro intus lirato.*
Hab. Japan (Dr. Siebold). Mus. Cuming.
- B. 11. 1973159 18. *NASSA DENTICULATA*, A. Adams. *N. testâ ovato-conicâ, fulvescente rufo maculosâ; anfractibus convexiusculis, longitudinaliter plicatâ, transversim liratâ, liris planis, interstitiis tenuissimè longitudinaliter striatis; labio cum callo albo nitido tecto, anticè producto, libero; labro intus lirato, margine denticulato.*
Hab. —? Mus. Cuming.
- B. 11. 1973160 19. *NASSA NIVEA*, A. Adams. *N. testâ ovato-conicâ, candidâ, nitidâ; anfractibus planulatis plicis longitudinalibus distantibus, transversim sulcatâ; labio cum callo mediocri tecto, margine acuto*

producto; labro margine subcrenulato, intus lirato; columellâ anticè triplicatâ.

Hab. Batangas, island of Luzon, 21 fathoms, coarse sand (H. C.).
Mus. Cuming.

20. *NASSA PLICATELLA*, A. Adams. *N. testâ ovato-conicâ, fulvâ; labro albo; anfractibus subrotundatis longitudinaliter plicatis transversim liratis, liris ad plicas nodulosis; labio cum callo mediocri; columellâ anticè uniplicatâ; labro margine acuto, intus lirato.* B.M. 1973157

Hab. Wallwich Bay, Africa. Mus. Cuming.

Subgenus TRITONELLA, Adams; *Tritonia*, Fleming.

Shell turrited, cancellated; aperture rounded, not produced into an anterior canal; outer lip not dentate, with a marginal varix.

1. *NASSA DECUSSATA*, Kiener. 202
34

Bucc. decussatum, Kien. Mon. Bucc. pl. 30. f. 3.

Hab. Brisbane Water, East Australia (*Mr. R. Strange*).

2. *NASSA TRITONIFORMIS*, Kien. 202
34

Bucc. tritoniformis, Kien. Mon. Bucc. pl. 30. f. 2.

Hab. Senegal.

3. *NASSA ASCANIAS*, Brug. 202
34

Bucc. ascanias, Brug. Dict. no. 42.—*B. asperulum*, Brocc.—*B. macula*, Montag.—*N. rudis*, Gualt.—*B. Lacepedii*, Payr.—*Tritonia varicosa*, Fleming.—*B. coccinella*, Lam.—*B. incrassatum*, Müll.—*B. minutum*, Penn.

Hab. Mediterranean.

4. *NASSA FASCIATA*, Lamk. 202
34

Bucc. fasciatum, Lam.; Gualtieri, pl. 43. fig. m; Kien. Mon. Bucc. pl. 22. f. 86.

Hab. New Holland.

5. *NASSA DENTIFERA*, Powis. B.M. 197363

Nassa dentifera, Powis; Kien. Mon. Bucc. pl. f. .

Hab. South America.

6. *NASSA FESTIVA*, Powis. B.M. 197365

Nassa festiva, Powis.

Hab. —?

7. *NASSA ANOMALA*, Reeve.

Triton anomalus, Hinds, Moll. Voy. Sulph. pl. 4. f. 13, 14.

Hab. Island of Quibo, Veragua.

8. *NASSA SCABRIUSCULA*, Powis. B.M. 197364

Nassa scabriuscula, Powis.

Hab. —?

- NON
304 9. *NASSA MULTIGRANA*, Dunker.
Bucc. multigranum, Dunker; Phil. Abild. t. 2. f. 13.
Hab. —?
- NON
304 10. *NASSA SIGNATA*, Dunker.
Bucc. signatum, Dunker; Phil. Abild. t. 2. f. 17.
Hab. —?
- NON
304 11. *NASSA OBLIQUEPLICATA*, Dunker.
Bucc. obliqueplicatum, Dunker; Phil. Abild. (Buccinum) t. 1. f. 13.
Hab. —?
- B.M. 197327 12. *NASSA FUSCATA*, A. Adams. *N. testá ovatá, spirá acuminatá, anfractibus convexiusculis, fuscá, longitudinaliter plicatá, transversim liratá, plicis ad liras tuberculatis, interstitiis transversim striatis; columellá rugosá; labro posticè sinuato, intus dentato-lirato.*
Hab. —? Mus. Cuming.

Subgenus TRITIA, Risso.

Shell turritid; inner lip spreading; outer lip not dentate, without a marginal varix.

- NON
304 1. *NASSA RETICULATA*, Linn.
Bucc. reticulatum, Linn.; List. Conch. t. 966. f. 21 a; Kien. Mon. Bucc. pl. 23. f. 91 & pl. 19. f. 71.
Hab. Mediterranean.
- NON
304 2. *NASSA GAYII*, Kiener.
Bucc. Gayii, Kien. Mon. Bucc. pl. 21. f. 79.
Hab. St. Helena, sandy mud.
- NON
304 3. *NASSA SULCATA*, Kien.
Bucc. sulcatum, Kien. Mon. Bucc. pl. f. .
Hab. —?
- B.M. 197362 4. *NASSA CONCINNA*, Powis.
Nassa concinna, Powis.
Hab. Philippines.
- NON
304 5. *NASSA TRIVITTATA*, Say.
Bucc. trivittatum, Say.
Hab. New York.
- B.M. 197331 6. *NASSA DEALBATA*, A. Adams. *N. testá ovato-conicá, acuminatá, subturritá, albidá, fasciá pallidá luteá cinctá; anfractibus planulatis longitudinaliter plicatis, plicis nodulosis, transversim liris; columellá tuberculato-dentatá; labro extus incrassato, intus dentato-lirato.*
Hab. Dumaguete, isle of Negros, 11 fathoms, black coarse sand (H. C.). Mus. Cuming.

7. *NASSA COSTELLIFERA*, A. Adams. *N. testâ ovato-conicâ, acuminatâ, albidâ, fusco-variegatâ, fasciâ fuscâ in ultimo anfractu longitudinaliter costulatâ, transversim liratâ; costellis nodulosis; anfractibus planiusculis; labio transversim corrugato-plicato; labro intus lirato.* B.M. 1973167

Hab. Curimas. Mus. Cuming.

8. *NASSA TRIFASCIATA*, A. Adams. *N. testâ ovato-acuminatâ; spirâ acutâ, productâ, pallidè cærulescente aut albidd, fasciis tribus transversis rufis ornatâ, longitudinaliter subplicatâ, transversim sulcatâ; columellâ lævi, callo cum nitido expanso tecto; labro margine acuto, intus lirato.* B.M. 1973168

Hab. Vigo Bay (*M^cAndrew*). Mus. Cuming.

Subgenus DESMOULEA, Gray.

Shell subglobose, covered with a downy epidermis; spire short; apex papillary.

1. *NASSA ABBREVIATA*, Wood.

Bucc. abbreviatum, Wood, Chem. Conch. pl. 153. f. 1463; Kien. Mon. Buccinum, pl. 26. f. 105.

Hab. Indian Ocean.

2. *NASSA RETUSA*, Lam.

Bucc. retusum, Lam., Chem. Conch. t. 153. f. 1465; Kien. pl. 24. f. 94.

Hab. —?

3. *DESMOULEA PINGUIS*, A. Adams. *D. testâ ovatâ, abbreviatâ, ventricosâ; spirâ brevi, apice mucronato; anfractibus gibbosis, lutescente albo variegatâ; epidermide fusco villosa tectâ, transversim striatâ; labio calloso; columellâ lævi, anticè tuberculo unico, uniplicatâ; labro intus lirato.* B.M. 1973159

Hab. Senegal. Mus. Cuming.

4. *DESMOULEA PYRAMIDALIS*, A. Adams. *D. testâ ovato-conicâ; spirâ acuminatâ, apice obtuso, violascente, longitudinaliter evanidè plicatâ, transversim sulcatâ; labio fusco subcalloso simplici; labro extus marginato, intus lirato.* B.M. 1973160

Hab. —? Mus. Cuming.

5. *DESMOULEA CRASSA*, A. Adams. *D. testâ ovato-conicâ, abbreviatâ, solidâ, lævi; spirâ obtusâ, apice violaceo; anfractibus supernè gibbosis, rufescente albo variegatâ, transversim sulcatâ; labio cum callo crasso tecto; columellâ transversim liratâ, anticè uniplicatâ, tuberculis duobus instructâ; labro intus lirato.* B.M. 1973161

Hab. Japan. Mus. Cuming.

6. *DESMOULEA JAPONICA*, A. Adams. *D. testâ ovatâ, lævi, nitidâ, anticè transversim sulcatâ, fulvescente, maculis lineisque transversis fuscis ornatâ, albo variegatâ; labio anticè calloso; columellâ anticè tuberculis tribus instructâ; labro extus incrassato, intus lirato.* B.M. 1973162

Hab. Japan (*Siebold*). Mus. Cuming.

Subgenus ACICULINA, A. Adams.

Shell turritid; inner lip with a circumscribed callus free anteriorly; outer lip with the margin thickened and flexuose.

B.M. 197360 1. ACICULINA COSTATA, A. Adams. *A. testá turritá, acuminatá, serotiná, nitidá, longitudinaliter costatá, transversim sulcatá; labio calloso, anticè fusco, producto; labri margine subrecto, intus lirato.*

Hab. —? Mus. Cuming.

not found 1975
2. ACICULINA STRIATA, A. Adams. *A. testá ovato-turritá, fuscá, fasciá pallidá transversá ornatá, anfractu penultimo gibboso ad suturas longitudinaliter plicatá, transversim valde striatá; labio calloso; labri margine vix incrassatá, intus lirato.*

Hab. San Nicholas, isle of Zebu, 5 fathoms, sandy mud (H. C.).
Mus. Cuming.

B.M. 197345 3. ACICULINA LABIATA, A. Adams. *A. testá turritá, acuminatá, nitidá, cinerescente, fasciá pallidá transversá ornatá, longitudinaliter costatá, costis ad suturam nodulosis, transversim sulcatá; labio fusco, calloso; labro margine incrassato, fusco, valde flexuoso, posticè sinuato, in medio producto.*

Hab. Malacca, coarse sand, 10 fathoms (H. C.). Mus. Cuming.

B.M. 197340 4. ACICULINA GLABRATA, A. Adams. *A. testá turritá, acuminatá, lævi, nitidá, longitudinaliter substriatá, albidá, fasciis cinerescentibus maculisque fuscis ornatá; labio calloso, anticè uniplicato; labri margine incrassato, flexuoso, in medio producto.*

Hab. Philippines. Mus. Cuming.

B.M. 1973161 5. ACICULINA MACULATA, A. Adams. *A. testá turritá, lævi, nitidá, albá, maculis luteo-fuscis longitudinalibus ornatá, transversim sulcatá, sulcis distantibus; labio calloso, anticè producto; columellá uniplicatá; labro extus marginato, intus lirato.*

Hab. Banaug, Sargassinan, isle of Luzon, muddy sand, low water (H. C.). Mus. Cuming.

B.M. 1973162 6. ACICULINA VITTATA, A. Adams. *A. testá turritá, albidá, nitidá, fasciá transversá fuscá interruptá ornatá, transversim sulcatá, longitudinaliter costatá; labio calloso; columellá bituberculatá, et anticè valde uniplicatá; labro extus varicoso, intus dentato-lirato.*

Hab. Ticao, coral sand, 6 fathoms (H. C.). Mus. Cuming.

2. ON A NEW SPECIES OF THE GENUS MONTIFRINGILLA.

By JOHN GOULD, F.R.S.

For a knowledge of this species we are indebted to Lord Gifford, by whom several examples were killed in Thibet. It is intimately allied to *Montifringilla Gebleri*, but differs in being of a larger size,

in the darker colouring of the head and face, and in the deeper tint of the back and rump; the latter part is moreover ornamented with a patch of blood-red, which has suggested the specific name of *hæmatopygia* as an appropriate appellation; it also differs from *M. Gebleri* in being destitute of the orange-red mark on the shoulders.

MONTIFRINGILLA HÆMATOPYGIA.

Face and forehead brownish black, gradually blending into the light greyish brown of the upper surface; rump stained with blood-red; upper tail-coverts brown, tipped with dull white; tail dark brown, each feather margined externally with white; wing-coverts hoary; wings dark brown, the first four primaries narrowly edged with white, the next five primaries with a broad streak of white along the basal portion of their external webs, terminating in a line with the extremities of the secondaries, which are externally fringed with hoary; spurious wing dark brown, margined at the base with whitish; under surface very light brown, gradually becoming paler, until on the under tail-coverts the hue is buffy white; bill and feet bluish black.

Total length, $6\frac{1}{2}$ inches; bill, $\frac{1}{2}$; wing, $4\frac{1}{4}$; tail, $2\frac{1}{2}$; tarsi, 1.

3. ON SOME NEW SPECIES OF TROCHILIDÆ.

BY JOHN GOULD, F.R.S.

Mr. Gould exhibited some remarkably fine examples of the *Trochilus Jardinii* of Bourcier, and then characterized the following species:—

TROCHILUS (—?) AMABILIS.

Crown of the head shining metallic green; chin black; breast beautiful shining blue, with a line of lustrous green commencing at the angle of the bill, passing down the sides of the neck and surrounding the base; upper surface bronzy green; tail-coverts and central tail-feathers greenish bronze; lateral tail-feathers brownish black; wings purplish brown; under surface like the upper, but less brilliant; centre of abdomen and under tail-coverts grey, the centre of the latter bronzy green.

Total length, $3\frac{5}{8}$ inches; bill, $\frac{3}{4}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. New Grenada.

Remark.—About the size of *T. albirostris*.

PHAËTHORNIS GRISEOGULARIS.

Head, upper surface and wing-coverts bronzy brown; upper tail-coverts rufous; ear-coverts blackish brown; wings purple brown; base of the tail dark brown, the apical third of the two central feathers dark grey, tipped with white, the apical third of the next feather on each side grey on the inner web, buff on the outer web, and tipped with white; the three lateral feathers on each side tipped with buff; under surface sandy buff, with a wash of dull grey down the chin and a crescent of black across the breast; upper mandible black; basal

two-thirds of the under mandible yellow, apical third blackish brown ; feet yellow.

Total length, $3\frac{3}{4}$ inches ; bill, 1 ; wing, $1\frac{1}{2}$; tail, $1\frac{2}{3}$.

Hab. Columbia.

Remark.—Nearly allied to *P. Eremita* and *P. pygmæa*, but differing from them in being of a larger size, in the total absence of any crescentic black mark on the chest, in having the throat clouded with dark grey instead of buff, and the two central tail-feathers tipped with grey and their shafts black.

4. NOTE ON THE SUBORBITAL GLAND OF THE NYLGHAU.

BY H. N. TURNER, ESQ., JUN.

Among the cranial characters of the genus *Portax* I have adduced the want of a suborbital depression, and the existence of a smooth line running along the surface of the bone ; and as I had observed appearances of a suborbital sinus in the living animal, which I could not detect in the dried specimens, I felt much interested in the examination of the parts in one that recently died in the Gardens, and which Mr. Mitchell kindly forwarded to me for dissection.

Externally there is a slight pit immediately in front of the orbit, and anteriorly to it a small longitudinal fold of the skin, in the middle of which is a little round pore, through which exudes a yellowish secretion, furnished by a gland placed just underneath. The gland itself is slightly larger than a hazel-nut, and is laid upon the surface of the bone without any fossa to receive it, but is firmly attached to the smooth line before observed. The tendo oculi, and a few fibres of the orbicularis palpebrarum are attached to it.

The small pit immediately in front of the orbit is merely the space below the tendo oculi, between the gland and the rim of the orbit. In the Nylghau, the existence of a "lacrymal sinus" has usually been acknowledged ; but it affords a good example of the incertitude with which we can ever deny that it exists in a species of which fresh specimens have not been examined with a view to this character, and in which no traces of the organ are discernible, either in the dry skin, or in the existence of a fossa in the skull.

Pimlico, March 1851.

5. LETTER ON THE DEAL-FISH, FROM DR. DUGUID TO DR. BARKER. COMMUNICATED BY MR. YARRELL.

"Kirkwall, 5 March 1851.

"In April 1829, I received from Mr. Strang, Sanday, a specimen of a fish which had been found on the shores of that island, with a request that I should give him some information about it. He mentioned that he had met with many specimens during a series of years,—that it was well known to the natives of the island, by whom it was called the *Deal*-fish, and that they often found it thrown ashore, and even occasionally used it as food. I easily ascertained, from the works to which I had access, that it was a fish unknown to

the British *Fauna*, but could not determine what it really was. The specimen being a good deal mutilated about the head and abdomen, and in a state of partial decomposition, I did not attempt to preserve it, but drew up as correct a description of it as its condition admitted of, which I sent to Dr. Fleming, along with all the information about it which I could obtain from Mr. Strang, and also a somewhat rough drawing. Dr. Fleming wrote, of date 8th May, 1829, at once determining the fish to be the *Gymnogaster arcticus* of Brunnich, or *Vaagmaer*, as described by Cuvier in his 'Règne Animal,' ii. 246, a native of the seas of Iceland;—at the same time mentioning some slight discrepancies, which more perfect specimens, since procured, have completely removed. With my consent, he drew up a notice of it, which was inserted in the 4th volume of 'Loudon's Magazine of Nat. Hist.,' along with a plate from the drawing sent. This article I have not met with, having merely seen Yarrell's quotations from it. Since 1829 I have met with seven or eight specimens, some of which were mutilated by birds, and some quite entire, and from the latter I have ascertained the existence of ventral fins, which are exceedingly minute and rudimental, and easily overlooked, more especially if the specimen be not quite fresh and perfect. I am now therefore enabled to say with certainty that there can be no doubt of the identity of the fish occurring in these islands with the *Vaagmaer*, as described and figured in Yarrell's Supplement to the 1st edition of his 'British Fishes,' from information supplied by Professor Reinhardt of Copenhagen, and there named *Trachypterus vogmarus*. In the first figure, given at page 14, the ventral fins are much too long and conspicuous, but they are quite correctly represented in the vignette at page 18. The late Dr. John Reid, of St. Andrews, published an article in the *Annals of Nat. Hist.*, June 1849, describing a specimen of the *Trachypterus Bogmarus* thrown ashore on the coast of Fifeshire, in which he says, 'No unquestionably genuine specimen of this rare fish has, as far as I am aware, been hitherto found in the British seas; for the description and figure of the fishes thrown ashore in Orkney, supposed to be specimens of the Deal-fish or *Vaagmaer*, given by Dr. Fleming on the authority of Dr. Duguid, differ in so many important points from the *Vaagmaer* as must excite doubts as to their identity.' Now Dr. Reid has not stated what the important points of difference are between my description and that of Prof. Reinhardt. It is true there is one important point—important as determining the proper classification of the fish—the existence or non-existence of ventral fins. These I did not detect; but it is not surprising, considering their minuteness, and the mutilated condition of the only specimen I had then seen. We have at this moment three dried ones in the Orkney Museum, not so perfect as could be desired, but sufficiently so to determine this point, as well as the identity of the fish with the Icelandic *Vaagmaer*. It is strange also that Dr. Reid never mentions the existence of ventral fins in his specimen at all, and that also, while he denies that the fishes thrown ashore in Orkney are the *Deal-fish* or *Vaagmaer*, he should forget that the popular name *Deal-fish* is strictly of Orcadian origin."

6. ON AN UNDESCRIBED SPECIES OF MEGAPODIUS.
 BY L. LLEWELLYN DILLWYN, ESQ., F.G.S., F.Z.S. ETC.

(Aves, Pl. XXXIX.)

My friend Mr. James Motley, who is now conducting the operations of the Eastern Archipelago Company in Labuan, has lately sent me home a box of zoological specimens which he has collected in that island, and among the birds was the pair of the Megapodius, one of which I now produce; it is, I believe, identical with the species in the British Museum sent home by Mr. Cuming from the Philippine Islands. In the catalogue accompanying the specimens, and in several letters which I have received from him, he has described some of the habits of these curious birds, and deeming that original observations, however scanty, on the habits of almost any animal from that remote region might not be uninteresting to the Society, I have abstracted from his communications to me the following notice respecting them:—

These birds are said to be principally confined to small islands, and to such more especially as have sandy beaches; they are not uncommon in Labuan, but are, however, very rarely to be seen, as they are very shy, and frequent dense flat parts of the jungle, where the ratans grow and where the luxuriance of the vegetation renders concealment easy.

The Malays snare them by forming long thick fences in unfrequented parts of the jungle; in these they leave openings at intervals in which they place traps; the birds, running through the cover in search of food, meeting the obstruction caused by the fence, run along it till they come to one of the openings, through which they push their way and are trapped.

Their food principally consists of seeds and insects.

In walking they lift their feet very high from the ground, and set up their backs something like guinea fowls; they frequently make a loud noise, like the very loud screech of a chicken when caught.

They are very pugnacious, and fight with great fury by jumping upon one another's backs and scratching with their long strong claws.

The eggs are of a fine dark cream-colour, and of very large size, three of them weighing nearly as much as a full-grown bird. According to the general account given to Mr. Motley by the Malays, each bird lays about eight or ten at each time of breeding; the place they select for depositing them is always situated near the beach, and close within the edge of the jungle, and here they bury them in the sandy soil to the depth of about eighteen inches; over the place where they are thus buried the bird collects a large heap of shells and rubbish, so that a person who has seen their nest has no difficulty in finding it again; the eggs thus deposited are left to be hatched by the heat of the sun, and thus the natives assert requires between three and four months to complete. Mr. Motley himself found upon breaking an egg which had been thus situated for nearly six weeks, that it contained merely the embryo of a chick, about as much advanced as that of a hen's egg at four days. Some other eggs which



M. & N. Hammett Imp.

MEGALOPTERUS CUMINGII, *Delong*

were brought him, but which he had no means of ascertaining how long they had been laid, he buried in a box of sand about 3 feet deep and exposed to the weather. At the end of about three weeks a young bird came up, not downy, but covered with little shafts or pens ready to form feathers. One of the Malays employed by Mr. Motley saw it emerge, and said that it just shook off the sand and ran away so fast that it was with difficulty caught. On the next day, when Mr. Motley first saw it, it appeared to him to be about half-grown. From the first it fed itself without hesitation, scratching and turning up the earth like an old bird. Two more afterwards emerged in the same state. According to Mr. Motley, the sexes are alike, except that the naked skin about the head is redder in the male than in the female.

In his investigations respecting the nidification of these birds, Mr. Motley was much assisted by Mr. Low, who is resident in the island.

As the Philippine specimens brought home by Mr. Cuming have not yet been characterized, I propose to name this species

MEGAPODIUS CUMINGII.

Sp. Char. Olivaceous brown above; blackish slate colour with a slight olivaceous tinge below; the feathers on the throat and nape are thinly dispersed, so as to leave that part nearly bare; on the hind head the feathers are somewhat lengthened, forming a kind of crest; bill black at the base, yellowish towards the tip; legs, feet and claws black; the bare skin about the head is redder in the male than in the female.

	in.	lin.
Length from the tip of the bill to the end of the tail, about	14	0
—— of bill from gape	1	1
—— of bill from front	0	10
—— of wings	8	6
—— of tail, not quite	3	0
—— of tarsus	2	1
—— of middle toe	1	11
—— of hallux	1	5

The front toes are nearly equal, the middle toe being rather the longest, and the inner one shortest.

To the foregoing account some additional details of considerable interest may be subjoined. These details, although dated Labuan, July 1850, were not received until after Mr. Dillwyn's communication:—

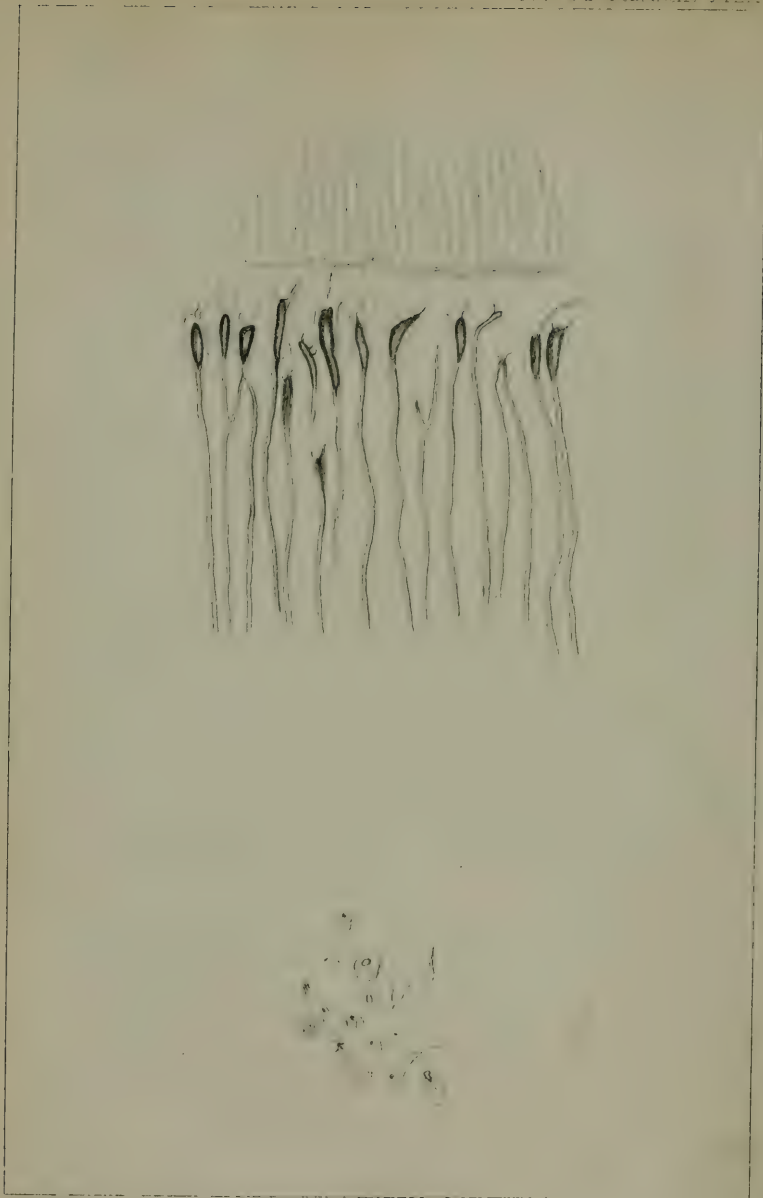
**EXTRACT FROM A LETTER FROM MR. HUGH LOW, DATED
LABUAN, 4TH OF JULY, 1850.**

“I have been using great exertions to procure for the Earl of Derby a very remarkable Gallinaceous bird, the existence of which I ascertained only three months back; having no books I am unable to refer to its genus, but it is nearer a Guinea fowl than anything else. I heard from the natives that such a bird existed, and that its eggs

were occasionally to be procured. I offered a dollar each for all they would bring me; and first one was brought, afterwards five, but I could not succeed in hatching either of these under fowls. The first, after having been set upon for a month, was picked to pieces by its foster-parent, and the chick had apparently but just begun to form. The five eggs were addled. Having learned that the birds abounded on a small island, about a hundred miles along the coast, I hired a boat and five men, and sent them, about fourteen days since, with snares, &c., to endeavour to catch some of the old birds and to seek for the nests, this being the laying season, and to gather plants of *Phalcinopsis*, which grows on the same island (Pulo Tigu and Pulo Guya). They returned yesterday, bringing with them 102 eggs and only two birds, both of which had their legs injured by the snares. The sight of the eggs and birds have perfectly astonished me, the body of the former being no larger than that of a bantam, while the egg is as long, though not so broad, as that of a Chinese goose. The men say that on the different islands they visited they found a good many nests, which are placed at a little distance from the sea-shore, in the jungle of small islands, the spot being invariably marked by a large collection of sticks and branches. The eggs are found about three feet deep in the sand, and the men assure me that the bird has no communication with them except by rasping away the sand. The man I employed has lived all his life on small islands, hunting for tortoise-shell, and well knows the habits of the bird; he says the eggs are hatched entirely by the sun's heat, or rather the heat in the sand. One of the birds he brought died this morning, and I shall put its skin together with some of the eggs in a box, that you may send them to Earl Derby. I do not like to take the liberty of writing to his lordship myself, but if I can succeed in getting a lot of young birds, I shall not fail to send them to him by the very first opportunity. I have placed some of the eggs under fowls, and some in sand out of doors; some also in sand in a warm house, where I can regulate the temperature; and I have hopes of rearing, or at least of hatching, some of the chicks, if the eggs are still good: but I think that by sending the men again in three months' time with snares I might catch a lot of the young ones hatched naturally, and be able to rear them. The bird is said not to be found on the mainland: the eggs are reported excellent eating.

“Aug. 12. Of the eggs I wrote to you so much about last mail, one only has hatched: the chick came up full-fledged from under three feet of sand, and immediately ran about with the most surprising activity. It eats rice, ants' eggs, &c. with the greatest avidity, and as it is now three weeks old, I have every hope of preserving it. More of the eggs appear to have chickens in them, and I hope will hatch. The bird, as I have ascertained, is an undescribed species of *Megapodius*.”





11 Plate

East & West, Imp

Molar tooth of the American Tapir:
section through the crown.

April 8, 1851.

Professor Thomas Bell, Sec. R.S., in the Chair.

The following papers were read:—

1. ON THE STRUCTURE OF THE TEETH OF THE AMERICAN AND INDIAN TAPIRS. BY JOHN TOMES, F.R.S.

(Mammalia, Pl. XXIX.)

It is now upwards of fifteen years since the attention of physiologists and comparative anatomists was drawn to the structure of the tissues which enter into the composition of the dental organs. In 1678 Leeuwenhoek communicated a paper to the Royal Society, on the Structure of the Teeth and other Bones, in which he described the dentinal tubes. His researches, however, were not confirmed by subsequent observers, and indeed were almost entirely overlooked until the period to which I have referred. Purkinjé, in 1835, confirmed the correctness of Leeuwenhoek's observations, at the time unconscious that the tubular structure of the dentine had been previously recognised. He also described the structure of the cementum.

Prof. Retzius was in the same year engaged in examining the structure of the dental tissues, and published the results in 1836. In 1837 Prof. Retzius published a work on the subject, the substance of which was in 1839 printed in our own language by Mr. Nasmyth.

In the latter part of 1837 I was engaged in examining the dental tissues, at that time unconscious that the subject had occupied the attention of the German or Swedish anatomists. In June 1838 the results of my examination were read before the Royal Society. In September of the same year, Prof. Owen read a paper on the Structure of the Teeth, before the British Association. In 1840 the publication of Prof. Owen's 'Odontography' was commenced, and completed in 1845. In this work will be found descriptions of the structure of the teeth of animals belonging to each division of Vertebrata.

In these various essays the authors agreed generally in the main facts of dental structure, and in each successive publication new facts were related. Judging from the amount which had been published, it might have been concluded that the subject was well nigh exhausted. Such however was not the case: many blunders, in the hurry which is incident to a new subject, had been committed and required correction, while many important facts had failed to be recognised. Prof. Owen pointed out that in the Order Edentata the teeth are destitute of enamel, while it is present in the other mammalian orders, with the exception of a few isolated cases.

Having neglected the subject of dental structure for some years, in consequence of more urgent pursuits, in 1847 I again entered on the inquiry, which to me possessed great attractions, not only on account of various modifications which are to be found in the arrange-

ment of the components of the tissues in different animals, but also in minor modifications in the teeth of the same animal.

My inquiries were first directed to human teeth; the results, both as regards structure and development, were published in my 'Lectures on Dental Physiology and Surgery,' 1838. The teeth of marsupial animals next occupied my attention. In this order it was found that the dentinal tubes are continued into and form a considerable portion of the enamel, excepting only in the Wombat. The results of these investigations will be found in the Second Part of the 'Philosophical Transactions' for 1849.

By the help of this Society I have been enabled to make an extensive series of investigations in the teeth of the Order Rodentia, with results which have far exceeded my expectations. Each family, as arranged by Mr. Waterhouse, has its peculiar structure of enamel, an account of which, with illustrations, is published in Part 2 of the 'Philosophical Transactions,' 1850.

Having, by way of preface, given a very cursory and imperfect indication of what has been done in dental structure, or rather of what has been recognised as peculiar to certain groups of mammalian animals, in order to show that the subject is not without importance, I shall proceed to lay before the Society certain peculiarities which I find exist in the teeth of the two Tapirs, and which are, to the best of my belief, confined to those creatures. It should however be understood, that similar conditions may be found in the teeth of other animals, but at present I believe they have not been seen. I have myself examined numerous examples from each of the mammalian orders, and from the great majority of the genera, and have failed to find a condition of dentine similar to that of the Tapir's tooth. Under these circumstances, it may, I think, be fairly assumed to be characteristic of those animals, and hence has a degree of importance which it otherwise would not possess. With this impression, I have thought it desirable that the facts should be recorded.

The dentine of the molar teeth, when exposed by making a longitudinal section through the centre of the crown and fangs, and reducing it sufficiently thin to be viewed by transmitted light, is seen to be composed of tubes which pursue a uniform course. Those which are destined to reach the highest parts of cusps or ridges pursue a straight course, subject to slight undulations, while others, which pass to the sides of the cusps, are turned in the latter part of their course away from the central line of the cusps or ridges; others again, which pass to the lowest points of the depressions on the masticating surface of the tooth, follow a tolerably straight course. The dentine which forms the sides of the tooth is occupied by tubes which in the outer third of their course describe a bold curve outwards, the convexity of which is directed towards the crown of the tooth, but on approaching the enamel turns a little upwards. In the fangs of the teeth, the dentinal tubes, in addition to describing a double curve, are subject to strongly-marked secondary undulations. The dentinal tubes, as they leave the pulp-cavity for the crown of the tooth, have

a diameter of about the 7500th of an inch, which is gradually diminished to the 15,000th. When within a short distance of the enamel, they suddenly dilate into a more or less oval cell, from which a few very minute tubes pass off towards the line of junction of the enamel and dentine. The bulbous terminations of the tubes are more constant and larger about the prominences of the cusps, and diminish in size and frequency on the sides of the tooth, where the enamel becomes thin, at the termination of which they altogether cease. The bulbs have an average diameter of about 3450, and are in length about the 1000th of an inch. In addition to the terminal dilatations, the coronal tubes are subject to occasional dilatations in their course. It is by no means uncommon to find instances where a peripheral layer of cells lies underneath the enamel, into which the dentinal tubes pass, and through which an anastomosis is effected; but in no other teeth save those of the Tapir do the coronal tubes terminate in well-marked and uniform cell-like dilatations having distinct parietes. I have pointed out several examples, in my paper on the teeth of Rodentia, in which these peripheral cells are found, but they are irregular in shape, have not distinct parietes, and are entered by the ultimate branches of the dentinal tubes; whereas in the Tapir the cells are formed by the expansion of the tubes, which previous to the expansion give off few if any branches. Some however subdivide once or twice in their course; in which case the smaller of the divisions do not commonly dilate into terminal cells, but form anastomoses with other tubes similarly circumstanced.

In the fangs the dentinal tubes leave the pulp-cavity with a diameter of the 7500th of an inch, and speedily dilate to the 6000th. During the greater part of their course they give off very minute, hair-like, short branches; but when near their termination they increase in size, turn a little upwards towards the crown of the tooth, and send out numerous branches, the majority of which pass from the lower sides of the tubes. The ultimate branches pass into the granular tissue, which, interspersed with irregular cells, forms the outer part of the dentine of the fangs. Near the neck of the tooth the granular dentine exists as a thin layer, which becomes thickened and more opaque from the greater number of cells in the lower part of the fang.

Partially obliterated vascular canals enter from the surface of the fang, and proceed in straight lines through the dentine to the pulp-cavity. In the Indian species similar vascular canals proceed from the pulp-cavity towards the ridges of the masticating surface, and appear to terminate in loops. They have a diameter of about the 1000th of an inch. In a molar tooth of the American Tapir, for which I am indebted to the Society, vascular canals do not exist in the crown. This difference will, if found to be constant, serve to distinguish the molars of the two species. Near the extremities of the fangs the dentine graduates insensibly into the granular condition, and this again into the cementum, without offering any generic peculiarities.

The cementum is in no part of the fang very abundant, as compared with the amount which is found in the teeth of many other animals. Near the neck of the tooth it is arranged in minute rods or columns, similar to that which I have described as existing in the teeth of many Rodents. In this situation it is destitute of lacunæ; but in tracing it downwards towards the root of the tooth, where it is increased in quantity, lacunæ possessing the usual characters are found. In addition to the lacunæ the cementum is traversed in parts by ill-defined canaliculi, which proceed from the surface of the fang in tolerably straight lines.

In tracing a longitudinal section of a molar tooth downwards from the crown to the end of the fang, it will be seen that at places the dentine has been removed and the space filled up with cementum. Here and in other parts the cementum is abundantly supplied with vascular canals.

The enamel does not differ in any material points from that of the teeth of Ruminants. The fibres have a minutely granular appearance and have a diameter of about the 5000th of an inch. On the sides of the tooth they pursue an outward course, and make one bold curve, the convexity of which is directed towards the masticating surface, while on the crown of the tooth their course is wavy and irregular; an arrangement which no doubt adds much to the strength of the tissue in that part where the greatest strength is required.

In the incisor teeth similar peculiarities may be observed, but they are much less strongly marked than in the molar teeth. Vascular canals are, too, of less frequent occurrence in the incisor teeth.

I hope on a future occasion to be enabled to lay before the Society a statement of the peculiarities which pertain to and are characteristic of other groups of animals.

2. DESCRIPTION OF A NEW GENUS OF GORGONIADÆ.

By J. E. GRAY, ESQ., F.R.S., P.B.S. ETC.

(Radiata, Pl. III.)

The Coral here described was sent to me by Sir John Richardson.

It is nearly allied to *Gorgonia*, but the branches are erect, clavate, and very rarely subdivided. The bark is very thick, formed of numerous close diverging cells radiating round a very thin, small, black compressed axis, each of the cells ending in a conical prominent tubercle closely covered externally with red calcareous spicula. The expanded base and the base of the stem and the interspaces between the cells are covered with smaller red calcareous granules.

This genus may be named and characterized thus:—

GONIGORIA.

Coral clavate, slightly branched; the root dilated; axis horns black, compressed, thin; bark thick, calcareous, covered with conical tubercles, each covered externally with numerous close red spicula.

1



2



Ascomythium *hirsutum* 9-

2 *Nidalia occidentalis* Gray

1 *Composita clavata* Gray

GONIGORIA CLAVATA. (Radiata, Pl. III. fig. 1.)

Coral clavate, rounded at the end, simple, or rarely forked.

Hab. —?

The coral is almost two inches high, and the thickest part is about one-third of an inch in diameter.

I take this opportunity of presenting a figure of another Coral, which, although described by me several years since, has not yet been engraved.

NIDALIA OCCIDENTALIS, Gray, Proc. Zool. Soc. 1835, p. 60. (Radiata, Pl. III. fig. 2.)

Hab. West Indies, Montserrat.

see MS 1-1

3. DESCRIPTION OF A NEW GENUS OF BIVALVE SHELLS, AND A SEA EGG, FROM NEW ZEALAND.

By J. E. GRAY, ESQ., F.R.S., P.B.S. ETC.

Mr. Richard Taylor, of Wanganui, New Zealand, has kindly sent to the British Museum a series of marine and freshwater shells, collected by him in 1847. Among many other interesting specimens is one which combines the form and internal appearance of a *Solen* with the hinge-characters of a *Maetra*, and evidently forming the type of a genus not hitherto observed. It may be thus named and characterized:—

VANGANELLA.

Shell equivalve, oblong, transverse, thin, compressed, rounded behind, rather produced and tapering in front, covered with a thin, hard, polished periostraca; the inner surface of each valve straight, with two diverging, thickened ribs just within the stars of the adductor muscles, which are large and far apart, and the upper front edge of the valve double; siphonal inflection short, broad; hinge-tooth of left valve folded together, moderate; of right valve small, separate; lateral teeth short, small, close to hinge-tooth of left valve double; the ligament small, just within the cardinal edge, not separated by any shell plate from the cartilage, and partly hidden from view by the upper edge of the hinge-margin; the cartilage very large, inclosed in a large, elongate, shallow, triangular pit on the upper part of the hinder internal rib.

The position of the cartilage-pit and the internal ribs at once separate this genus from *Spisula*.

VANGANELLA TAYLORII.

Shell rather compressed, white, smooth, covered with a pale brownish-white polish; periostraca darker coloured on the upper part of the front edge; the upper hinder slope irregularly wrinkled with periostraca.

Hab. New Zealand.

ARACHNOIDES ANTIPODARUM.

Body rather convex, with five broad sunken grooves, rather more than one-third the width of the sections of the body, and forming inflexed spaces on the edge of the circumference; ambulacra nearly straight, and regularly diverging, without any isolated pores between the end of the ambulacra and the circumference of the body.

Hab. New Zealand. Coast of Wanganui.

This species is easily known from the *A. placenta* of the North Sea (Agassiz, Monog. t. 21. fig. 25-42) by its being rather larger and considerably more convex, and in the grooves edged above by the ambulacra being broader compared to the sections of the shell. It differs also in having the ambulacra nearly straight and without any isolated pores between them, as in the edge of the shell figured by Agassiz, t. 21. f. 39.

The specimen was unfortunately broken in the carriage from New Zealand, and the part of the shell containing the ovarial pores was destroyed.

The upper and lower part of the shell is supported by compressed perpendicular columns, about one-third the width of the disk; near the oral disk there are placed five pairs of short processes for the support of the jaws; the jaws are triangular; they agree, as does the disposition of the spire, tubercle, and all the other external characters, with the northern species as figured by Agassiz from the specimen in the Museum collection.

4. REMARKS ON THE GENUS HAPALOTIS.

BY JOHN GOULD, F.R.S.

With the view of correcting some errors respecting the members of the genus *Hapalotis*, and of describing two new species, Mr. Gould exhibited an extensive series of specimens, including several species of this curious form of Rodent, from his own collection: viz.—

1. HAPALOTIS ALBIPES, Licht.

2. HAPALOTIS APICALIS, Gould, n. s.

This new species is about the size of, and similar in colour to, *H. albipes*, but it has larger ears, and its feet, which are perfectly white, as in that animal, are much more delicately formed, and the tail is nearly destitute of the long brushy hairs towards the tip; the eye is also much smaller.

Face and sides of the neck blue-grey; upper part of the head, space between the ears, the ears and upper parts of the body, pale brown interspersed with numerous fine black hairs; under surface white; flanks mingled grey and buffy white; fore feet white, with an oblique mark of dark brown separating the white from the greyish brown of the upper surface; hinder tarsi and feet white; basal three-fourths of the tail brown, apical fourth thinly clothed with white hairs.

	inches.
Length from the tip of the nose to the base of the tail	8
—— of the tail	$8\frac{1}{2}$
—— of the tarsus and toes	$1\frac{3}{4}$
—— from the tip of the nose to the base of the ears	$1\frac{3}{4}$
—— of the ears	$1\frac{1}{8}$

3. HAPALOTIS HIRSUTUS, Gould.

Mus hirsutus, Gould in Proc. Zool. Soc. part x. 1842, p. 12.

Since this singular species was brought from Port Essington by Mr. Gilbert, at the close of 1841, a second and more perfect individual, also from the northern coast of Australia, has been deposited in the British Museum.

This is the largest species of the genus.

4. HAPALOTIS CONDITOR, Gould in Sturt's Narr. of Exp. to Central Australia, vol. i. pl. in p. 120; vol. ii. App. p. 7.

5. HAPALOTIS LONGICAUDATUS, Gould, Proc. Zool. Soc. part xii. p. 104.

6. HAPALOTIS GOULDII, Gray, App. to Grey's Trav. in Australia, vol. ii. pp. 404, 413; List of Mamm. in Brit. Mus. Coll. p. 116.

H. Richardsonii, Gray, on specimens in Brit. Mus.

H. macrotis, Gray, on specimens in Brit. Mus.

H. Mitchellii, Gould, Mamm. of Australia, part i. pl. 15.

Hab. Western and Southern Australia.

7. HAPALOTIS MURINUS, Gould, Proc. Zool. Soc. part xiii. 1845, p. 78.

Hab. South Australia and the Liverpool Plains in New South Wales.

8. HAPALOTIS CERVINUS, Gould, n. s.

The whole of the head, upper surface and sides of the body, of the most delicate fawn colour, interspersed with numerous fine black hairs on the head and back; whiskers greyish black; nose and under surface white; tail pale brown, lighter beneath; ears very large, somewhat pointed, and nearly destitute of hairs.

	inches.
Length from the tip of the nose to the base of the tail	$4\frac{1}{2}$
—— of the tail	$5\frac{1}{2}$
—— of the tarsus and toes	$1\frac{1}{4}$
—— from the tip of the nose to the base of the ears	$1\frac{1}{8}$
—— of the ears	$1\frac{1}{8}$

This beautiful species was brought from the interior of South Australia by Captain Sturt. It is one of the smallest members of the genus, and is remarkable for the delicacy of its colouring and for the large size of its tail in comparison with that of its body.

5. NOTE ON A NEW SPECIES OF FRANCOLIN.
 BY DR. NICHOLSON, H.E.I.C. MEDICAL SERVICE.

(Aves, Pl. XL.)

While in Arabia in February 1836, I proceeded into the interior as far as the town of Moosa, about twenty miles to the eastward of Mocha in Yemen, accompanied by Captain Bull of the Indian Navy, in quest of plants and other objects of natural history, as well as with the view of seeing the country. Having delivered our introduction to the chief of that district, he assigned us quarters in his palace and appointed an Arab huntsman to attend us—as well to show us game, as to be a guardian to our persons. We started at daylight, mounted on asses, and pursued our course to the eastward for about six miles, when at the foot of a range of hills, in a jungle of *Acacia arabica*, we came on several large coveys of guinea-fowl. We soon found that it was of no use to attempt to get a shot by walking after them, as they soon left us; so we followed, and whenever they entered a thick piece of jungle we ran up in time to get a shot at them, being pressed to take wing. In this way we made a very good bag, to which we afterwards added a bustard (differing from the Indian) and several small hares, which were very abundant. At the first shot I brought down, as I supposed, a couple of guinea-fowl, right and left, but on picking them up found that one of them was a fine species of Francolin, coloured as in the accompanying sketch.

Bill and legs coral-red, the latter with blunt knobs for spurs; the top of the head, a line under the eye from the angle of the mouth, and a patch below it, black; round the eye and some way down the neck, buff; breast and side covered with large patches of black, buff, and light blue or french-grey; all the back and other parts french-grey; the quills are light buff.

This magnificent bird we found afterwards in pairs, betraying the same habits as the two species of Francolin in India, the male often standing and crowing on some small eminence. These birds are fully as large as the gallina, which is not quite so large as the domesticated species, but as large as a good-sized fowl.

I propose for this bird the name of *Francolinus yemensis*.



J. Wolf, Lith.

M. & N. Hanhart, Imp^r

FRANCOLINUS YEMENSIS *Nicholson*.



May 13, 1851.

John Edward Gray, Esq., F.R.S., in the Chair.

The following papers were read:—

1. OBSERVATIONS ON THE EYE OF THE MOLE, IN A LETTER
ADDRESSED TO W. SPENCE, ESQ., F.R.S.
BY JOHN DAVY, M.D., F.R.S.

In a letter with which you favoured me some weeks ago, you made mention of Schiödte's 'Faunæ Subterraneæ Specimen,' and of the interesting discoveries described in it of several species of eyeless animals, the inhabitants of caves into which the sun's rays never penetrate, and where, in utter darkness, visual organs would consequently be useless.

Reflecting on the subject, I thought it worth while to examine with some care the eyes of the common Mole, an animal that spends the greater portion of its time beneath the surface of the earth, and seems in its general organization specially adapted for a subterranean life.

I shall chiefly notice what, in the dissections I have made, appears to be peculiar.

The first peculiarity that arrests attention is, that the eyes of the Mole are not contained in bony sockets, but lie unprotected by any bony prominences in the cellular tissue, beneath the common integuments; and, in consequence, were this animal an extinct one, and its skeleton found in a fossil state, there being no orbit, the palæontologist might be led to infer that it is a species destitute of eyes.

The next peculiarity I would mention is in regard to eye-lashes. These too it seems to be destitute of. The hair in which the eyes are buried, and by which they are defended, seems to be the common fur of the head. I could detect in that immediately surrounding them no hairs of larger dimensions, or in any respect different from those of which its fine fur is composed.

The apertures for the admission of light constitute another peculiarity. When the fur is removed from the skin surrounding the eyes, a minute aperture appears over each, about $\frac{1}{25}$ th of an inch in length when closed, and, in this state, linear and straight, but circular when fully expanded. The extreme margins of these openings in the integuments being covered with fur, there is no well-marked appearance of eyelids,—indeed, it may be a question, whether the Mole, in strictness, can be said to possess these appendages. From the observations I have made, I am disposed however to infer that it does possess them, but imperfect;—imperfect, not having been able to detect beneath the marginal cutis any vestige of ciliary cartilages, and yet having found in the surrounding subcutaneous cellular tissue muscular fibres so arranged as if designed for closure, resembling an orbicular muscle, and probably designed for and performing the part of such a muscle.

NO. CCXXVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

As to the other muscles of the eye, one only, an abductor, was distinguishable from adjoining muscles. It is of large size comparatively, and it may be inferred powerful: by acting on it, seizing it with a forceps, and drawing it upwards, the ball of the eye was retracted, thus denoting its office. I sought in vain for other muscles. That they were not discovered, supposing them to exist, is not surprising, considering the smallness of the organ and its peculiar un-insulated position, most unfavourable for discriminating the subordinate parts pertaining to it, such as the muscles.

Relative to the constituent parts of the organs themselves, excepting their delicacy and minuteness, I am not aware of any peculiarity. The eye-ball is about $\frac{1}{2}$ th of an inch in diameter; the iris dark brown; the pupil circular; the lens about $\frac{1}{10}$ rd of an inch in diameter. Traces of a vitreous humour, and also of an aqueous, were observable; the former in the appearance of a cellular texture, as seen under the microscope with a high power; the latter as an exudation of moisture, a just perceptible quantity of fluid, when the ball was ruptured. From the situation of the eyes low down in the face, the optic nerves are necessarily of unusual length.

The dissections, of which I have thus briefly given the results, I need hardly remark were made chiefly under water, and with the aid of the microscope.

To return to the subject which led to the inquiry, viz. the subterraneous eyeless Fauna brought to light by the Danish naturalist, you in your letter briefly advert to the speculations which this curious discovery gives rise to, as, "whether these animals originally had eyes, and have lost them from want of use by inhabiting for ages dark caves; or, whether they were originally created without eyes, for those abodes where they have no occasion for them," &c. Allow me to ask—fully appreciating the difficulty of solving such problems—whether the preceding observations on the eyes of the Mole are not rather in favour of the latter than of the former solution? It is easy to imagine how the optic nerve and the more important parts of the organ of vision might diminish in size from little use; but it is difficult to suppose that the same circumstance could have any material effect in obliterating a cavity in bone—the eye's orbit—and, if the Mole's eyes were thus originally designed, why may not the eyeless animals have been formed in the first instance without eyes? Do not we see throughout Nature the most perfect harmony between the organic structure and the modes of life and habits of the living beings, so that the one is the true index of the other,—and that in the most minute details? Excuse my touching on these speculative questions, which, probably, from their nature, always must be speculative,—unless indeed the eyeless species are found otherwise identical with species possessing eyes, and there be found also a gradation in them, as to power and size in accordance with the degrees of light to which the individuals have been habituated, as in advancing from the open air and the entrance of the dark abodes to their deepest recesses. Also, excuse me if the matter of this letter should not be new to you.

Lesketh How, Ambleside, April 28, 1851.





J. Wolf lith.

HERESTES SMITHI.

M & N Hanhart Imp^r





M & N Hanhart, Imp.

CYNICTID MACCARTHII *E. Gray*

Plate 53

P.S.—It may be deserving of mention, that notwithstanding the small size of the eye of the Mole, its appearance in fetal development is early: thus, in a fœtus which I have recently examined, the length of which was about three-quarters of an inch, the eyes were distinct; they were visible—conspicuous in the naked face, even without the aid of a magnifying glass, and indeed were not much smaller than those of the adult, and but little different in appearance: the diameter of each was about $\frac{1}{150}$ th of an inch.

2. NOTICE OF TWO VIVERRIDÆ FROM CEYLON, LATELY LIVING IN THE GARDENS. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Mammalia, Pl. XXX., XXXI.)

The specimens here noticed were brought from Ceylon by Alex. Grace, Esq., and lived some time in the Gardens of the Society.

The first is the species which I described some years ago under the name of *Herpestes Smithii* (Mag. Nat. Hist. 1837, ii.), from a specimen which was living in the Surrey Zoological Gardens, now preserved in the Collection of the British Museum: that specimen was said to have been sent from the Cape of Good Hope, but this must have been a mistake, as it is quite unknown to Dr. Burchell, Dr. A. Smith, Mr. Smut, Dr. Wahlberg, or other zoologists who have written on the animals of South Africa.

Mr. Grace informs me that it is an inhabitant of the interior part of Ceylon. It is by far the most beautiful species of the genus, as will be seen from the accompanying illustration (Mamm., Pl. XXX.).

The second is a new species of CYNICTIS, which I propose to call

CYNICTIS MACCARTHLÆ. (Mammalia, Pl. XXXI.)

Teeth normal. Red brown; hair elongate, flaccid, pale brown, with a broad, black subterminal band, and a long whitish brown tip; of hands and feet shorter. Feet blackish brown, hair white tipped. Claws elongate, slender, compressed, especially of the two middle toes of the fore feet. Tail redder; hair elongate, one-coloured, red. Ears rounded, hairy.

Hab. Ceylon; Jaffna, North of Ceylon (*A. Grace, Esq.*).

This species somewhat resembles *Cynictis melanura* in general colour, but the hairs are much longer, not so adpressed, and, when the individual colour of the hair is examined, most distinct.

I have proposed to name this interesting animal after Mrs. MacCarthy, the wife of the Treasurer of the Colony and the daughter of Mr. Hawes, the Assistant Secretary to the Colonies, who is much interested in the study of natural history, and has kindly sent me several very interesting natural productions from Ceylon.

The skull differs from all the other *Herpestes* that I have examined, in the back of the ~~nape~~ being deeply and sharply notched instead of transversely truncated, the notch in the living animal being filled up with a cartilaginous septum.

palate

3. DESCRIPTIONS OF FIFTY-TWO NEW SPECIES OF THE GENUS
MITRA, FROM THE CUMINGIAN COLLECTION.

BY ARTHUR ADAMS, F.L.S. ETC.

132. 1. MITRA SEROTINA, A. Adams. *M. testá oblongo-fusififormi, acuminatá, serotiná; spirá productá, longitudinaliter plicatá, plicis confertis, undulatis; transversim sulcatá, sulcis subdistantibus; aperturá anticè dilatátá; columellá quadriplicatá, basi contortá et recurvátá; labro intus lirato, margine recto, anticè subangulato.*

Hab. Marquesas.

A light orange species, with a produced spire, and the outer lip produced and rather angulated anteriorly.

133. 2. MITRA CRATITIA, A. Adams. *M. testá oblongo-fusififormi, albidd, nitidd, liris elevatis transversis, acutis, et lineis elevatis, longitudinalibus, decussatim ornatá; interstitiis subtilissimè longitudinaliter striatis; aperturá intus aurantiacá; columellá plicis quinque instructá.*

Hab. South Africa.

The shell from which the description is taken is worn, and not in good condition, but it appears to be distinct from any species already described.

134. 3. MITRA STRAMINEA, A. Adams. *M. testá oblongo-fusififormi, stramineá; anfractibus planulatis, liris transversis rugulosis, interstitiis cancellatis, suturá subcanaliculatá; aperturá oblongá, anticè subproductá; columellá plicis quatuor, basi subrecurvatá; labro intus lævi.*

Hab. —?

An oblong, transversely-ridged species, rather faintly cancellated between the interstices.

4. MITRA INSIGNIS, A. Adams. *M. testá ovato-acuminatá; spirá acutá, lævi, nitidd, albidd; anfractibus planis, fasciá angustá albo fuscoque articulatá, ornatá; anfractu ultimo anticè transversim striato; columellá sinuatá, biplicatá, anticè incurvatá.*

Hab. Rains Island (*Mr. Ince*).

This is a very peculiar form, reminding one almost of the genus *Pusionella* of Gray.

5. MITRA LÆVIS, A. Adams. *M. testá oblongo-fusififormi, apice acuto, lævi, nitidd, albidd; anfractibus planis, supremis cancellatis, ultimo fasciá latá transversá, rufescenti ornato; columellá plicis quatuor, supremis magnis imbricatis.*

Hab. Zanzibar.

A smooth *Oliva*-shaped species, with a polished surface, and a red-brown band blending into the white of the last whorl; the plates of the columella are imbricate.

135. 6. MITRA TIGRINA, A. Adams. *M. testá oblongo-ovatá; spirá crassiusculá, apice mucronato, rufo, albo strigosá; anfractibus*

planiusculus, transversim subsulcatis; columellâ plicis quinque; labro intus rufo.

Hab. Philippines.

Several specimens of this species, all agreeing in form, were collected by Mr. Cuming; but one only retained the natural colour of the surface.

7. MITRA TIARELLA, A. Adams. *M. testâ oblongo-ovatâ, fuscâ, nodulis albis, ad suturas coronatâ, longitudinaliter subplicatâ, transversim lirâtâ, interstitiis valdè punctatis; columellâ plicis quatuor; labro margine crenulato.* B.M.

Hab. Island of Ticao, sandy mud, 6 fathoms.

This small, brown-coloured species is beautifully crowned, in adult specimens, with a diadem of white nodules at the suture of the whorls.

8. MITRA PIGRA, A. Adams. *M. testâ oblongo-fusiforâ, obscuro-fuscâ, lineis pallidulis transversis prope suturas, albidâ, maculis rufis, ornatâ; levi; spirâ acuminatâ; anfractibus septem, planulatis; aperturâ subdilatatâ, intus albâ; columellâ plicis quatuor, albis, obliquis, instructâ, anticè subintortâ.* B.M.

Hab. Australia.

This species partakes somewhat of the character of *M. sacerdotalis*.

9. MITRA LUCTUOSA, A. Adams. *M. testâ oblongo-fusiforâ, obscuro-fuscâ, fasciâ unicâ pallidâ transversâ ornatâ; spirâ acutâ, anfractibus planulatis, transversim lirâtâ; interstitiis valdè clathrato-punctatis; aperturâ oblongo-ovatâ; spirâ breviori; labio crassiusculo; columellâ plicis quatuor salientibus.* B.M.

Hab. China Seas.

This species was obtained during the voyage of H.M.S. Samarang.

10. MITRA INSCULPTA, A. Adams. *M. testâ ovato-fusiforâ; spirâ brevi, acutâ; aperturâ breviori; anfractibus planulatis, pallidè fuscâ, maculis rufis, longitudinalibus, variegatâ; cingillis integris, acutis, prominentibus, æquidistantibus; liris intermediis submoniliformibus; interstitiis longitudinaliter valdè sulcatis; aperturâ elongatâ; columellâ plicis tribus; labro acuto margine crenulato.* B.M.

Hab. Ceylon (Dr. Gardner).

This species also belongs to the same group as *M. cingulata*.

11. MITRA EXARATA, A. Adams. *M. testâ ovato-fusiforâ; spirâ aperturam æquante; anfractibus subrotundis; suturâ subcanaliculatâ, olivacâ, fasciis duabus pallidis transversis, longitudinaliter costatâ; costellis æqualibus, subdistantibus; interstitiis lineis insculptis, profundis, transversis; columellâ plicis tribus, validis, instructâ.* B.M.

Hab. Bais, island of Negros, coarse sand, 7 fathoms.

The most characteristic feature of this species is the sculpture between the ribs, consisting of deep, engraved, transverse lines.

12. MITRA RUFOCINCTA, A. Adams. *M. testá ovato-fusiformi; spirá aperturam aquante; anfractibus rotundis, sordidè albá, fasciá transversá latá rufo-fuscá; longitudinaliter costatá, costis obtusis, rotundis, distantibus; interstitiis lineis impressis transversis; aperturá subdilatatá; columellá plicis quatuor instructá; labro tenui anticè dilatato.*

Hab. —?

A small, slightly-worn specimen serves for this description, but it is of peculiar form and sculpture.

13. MITRA NITIDA, A. Adams. *M. testá ovato-fusiformi; spirá aperturá breviori; anfractibus subrotundis, laevi, nitidá, badid, anfractu ultimo anticè et posticè sulcis nonnullis transversis instructo; aperturá oblongá, anticè subdilatatá; columellá plicis quatuor; labro simplici.*

Hab. —?

A small, brown, shining species, with only a few transverse spiral lines for sculpture.

14. MITRA COMPTA, A. Adams. *M. testá ovato-fusiformi; spirá aperturá longiore; anfractibus subrotundis, supernè angulatis, sordidè albá, longitudinaliter plicatá; transversim lirátá, liris apud plicas nodulosis; interstitiis valdè et regulariter clathratis; anfractu ultimo anticè angustato et reflexo; columellá plicis quinque instructá; labro internè sulcato, margine crenulato.*

Hab. China Seas.

This species, remarkable for the strong cancellations between the longitudinal plicæ, was brought home in H.M.S. Samarang.

15. MITRA LIGATA, A. Adams. *M. testá ovato-fusiformi; spirá aperturá longiore, anfractibus planis; castaneo-fuscá, lined unici pallidá, transversá in medio anfractuum, longitudinaliter plicatá, transversim sublirátá; columellá plicis quatuor; labro simplici, margine acuto.*

Hab. Pasacao, province of South Camarinas; isle of Luzon, on the sands.

The colouring of this species is very different from the allied species, and the sculpture is peculiar to many species belonging to the subgenus *Turris* of Schumacher.

16. MITRA VIBEX, A. Adams. *M. testá ovato-fusiformi; spirá aperturam aquante; anfractibus rotundis; fuscá, prope suturas pallidá, zonulá albá angustá transversá in medio anfractuum; longitudinaliter corrugato-plicatá, transversim lirátá, liris apud plicas nodulosas; interstitiis longitudinaliter striatis; anfractu ultimo angustato et anticè subreflexo; columellá plicis quatuor instructá; labro acuto.*

Hab. —?

This species somewhat resembles *armillata* of Reeve, but the corrugated nature of the plicæ distinguishes it.

17. MITRA INTERRUPTA, A. Adams. *M. testá ovato-fusiformi; spirá acuminatá; aperturá breviori; anfractibus planis, propè suturas angulatis; albidd, rufo-fusco variegatá; cingulá transversá fuscá moniliformi in medio anfractuum; longitudinaliter plicatá, plicis æqualibus, obliquis, obtusis, distantibus; transversim corrugato-liratá; interstitiis punctatis; anfractu ultimo anticè recurvato; columellá supernè excavatá, plicis tribus instructá; labro simplici.* Bm.

Hab. North Australia.

The peculiar interrupted, dark, transverse band distinguishes this elegant species.

18. MITRA EXIMIA, A. Adams. *M. testá ovatá; spirá brevi, obtusá; nitidá, aurantiacá, maculis triangularibus albis, cingillis levibus, latis, transversis; interstitiis valdè longitudinaliter clathratis; aperturá lineari-oblongá; columellá plicis quatuor; labro intus lævi, margine crenulato.* Bm.

Hab. — ?

This pretty little species belongs to the same group as *M. læta*, but the sculpture and markings are quite different, although the colour is nearly similar.

Bm. 19. MITRA MULTILIRATA, A. Adams. *M. fusiformis, spirá acuminatá, aperturam æquante; anfractibus rotundatis, ad suturas angulatis; pallidè rufo-fuscá, cingillis levibus transversis, æquidistantibus, obtusis, ornatá; interstitiis lineis longitudinalibus, elevatis, subconfertis, instructis; anfractu ultimo anticè producto et subreflexo; columellá anticè truncatá, plicis quatuor instructá; labro intus sulcato, margine crenulato.* Bm.

Hab. China Seas.

This species was obtained during the voyage of H.M.S. Samarang. Bm.

✓ 20. MITRA LÆTA, A. Adams. *M. testá ovatá, crassiusculá, aurantiacá, punctis albis ornatá; longitudinaliter plicatá; anfractibus planiusculis, transversim nodoso-liratá; interstitiis simplicibus; columellá plicis quinque instructá; labro crenulato.*

Hab. Ticao, under stones, low water.

An oblong-ovate, shining, orange species, with scattered round white granules and regular nodulose liræ; the spire is obtuse; the whorls are flattened and longitudinally plicate.

Bm. 21. MITRA ORNATA, A. Adams. *M. testá oblongo-fusiformi, acuminatá; spirá acutá; anfractibus novem, ad suturas angulatis; suturá subcanaliculatá; albá, fasciis transversis rufo-fuscis ornatá; longitudinaliter costatá; costis regularibus, obliquis, subcrenatis; interstitiis transversim valdè clathratis; anfractu ultimo anticè subumbilicato et recurvo; columellá plicis quatuor; labro posticè subangulato.* Bm.

Hab. — ?

This species is peculiar for its regular form and exactness of sculpture, as well as for its beauty of colouring.

22. MITRA NODILIRATA, A. Adams. *M. testâ oblongo-fusiforâ, pallidè fulvâ, fasciâ latâ rufâ transversâ ornatâ; spirâ acuminatâ, turrîtâ; anfractibus octo planis, infra suturas angulatis; nitidâ, longitudinaliter plicatâ; plicis distantibus, prominentibus, obliquis, prope suturas valdè nodulosis; interstitiis lineis impressis transversis ornatis; columellâ plicis quatuor; labro acuto.*

Hab. —?

An elegant form, with the pliciform ribs strongly nodulose at their hind part.

23. MITRA PURA, A. Adams. *M. testâ fusiforâ; spirâ aperturâ longiori; anfractibus subplanulatis; albâ; cingulis transversis angustis, subelevatis, crenulatis, rufo subarticulatis; liris tribus intermediis; interstitiis valdè punctatis, ornatâ; aperturâ oblongâ, anticè dilatatâ; columellâ plicis quinque; labro intus sulcato, margine crenato.*

Hab. —?

An elegantly formed species, with the last whorl somewhat recurved.

24. MITRA CINGULATA, A. Adams. *M. testâ ovato-fusiforâ; spirâ acutâ, aperturam æquante; anfractibus planulatis; sordidè albâ; cingillis prominentibus subcrenulatis, acutis, transversis; interstitiis longitudinaliter valdè clathratis, ornatâ; anfractu ultimo anticè producto et recurvato; columellâ plicis tribus.*

Hab. —?

This species belongs to that group in which the whorls are encircled with transverse ridges.

25. MITRA RETICULATA, A. Adams. *M. testâ ovato-fusiforâ; spirâ aperturâ breviori; anfractibus subrotundis; albâ; cingulis transversis, æquidistantibus, acutis, crenulatis, sulcis obliquis longitudinalibus decussatis, ornatâ; columellâ plicis quatuor; labro intus sulcato.*

Hab. Port Essington, 7 fathoms, sandy mud (Jukes).

Remarkable for the acute, crenated, transverse ridges which give the surface a reticulated appearance.

26. MITRA ASPERULATA, A. Adams. *M. testâ oblongo-fusiforâ, pallidè rufo-fuscâ, ad suturas albâ, longitudinaliter sulcatâ, transversim lirâtâ, liris nodulis, subacutis, asperulatis; spirâ productâ; anfractibus sex, subrotundis; aperturâ spiræ dimidium æquante, anticè abruptè truncatâ; columellâ plicis tribus; labro acuto.*

Hab. Australia.

The transverse ridges are set with subacute nodules, which give a rough appearance to the surface.

27. MITRA MIRABILIS, A. Adams. *M. testâ fusiforâ; spirâ acuminatâ, aperturâ longiori; anfractibus novem, planulatis, superne angulatis; albâ, maculis rufis triangularibus, et punctis transverso-elongatis, rufescentibus, ornatâ; longitudinaliter plicatâ,*

plicis obtusis, regularibus, distantibus, nodosis; nodis posticè prominentibus; cingulis transversis nodulosis, obtusis, elevatis, instructis; anfractu ultimo in medio angustato; anticè productis et subreflexis; aperturâ elongatâ; columellâ plicis quatuor; labro posticè angulato, in medio inflexo, intus sulcato, margine crenulato.

Hab. Socotra.

28. MITRA ALBINA, A. Adams. *M. testâ oblongo-fusiforimi, albâ; spirâ conicâ, longitudinaliter plicatâ; anfractibus subrotundatis, liris transversis ornatis; anfractu ultimo lævi, posticè subplicato, anticè sulcis transversis punctatis ornato; columellâ plicis quinque; aperturâ oblongo-lineari; labio subcalloso; labro acuto.*

Hab. Batangas, Isle of Luzon, on the reefs.

This *Mitra* is perfectly white, and of a very peculiar form; Mr. Cumings possesses but a single specimen.

29. MITRA AMÆNA, A. Adams. *M. testâ oblongo-fusiforimi, albâ, maculis rufis variegatâ; spirâ acuminatâ; anfractibus octo, subrotundis, carinulis transversis, lævis, elevatis, rufo-fusco articulatis, lirâ intermediâ crenulatâ, interstitiis eleganter longitudinaliter clathratis; aperturâ angustâ; columellâ plicis quinque; labro tenui, acuto.*

Hab. Red Sea.

This elegant species belongs to the annulated group.

30. MITRA RUTILA, A. Adams. *M. testâ oblongo-fusiforimi, acuminatâ, aurantiacâ, maculis albis sparsis ornatâ, fasciis pallidis transversis prope suturas, suturis maculis aurantiacis maculatis; spirâ productâ, acutâ; anfractibus septem, transversim liratâ; anfractu ultimo liris anticè distinctioribus; aperturâ dilatâ; columellâ plicis quatuor; labro acuto, anticè crenato.*

Hab. — ?

aurora Dohrn in this

31. MITRA DELICATA, A. Adams. *M. testâ ovato-fusiforimi; spirâ aperturâ longiore; anfractibus planis; suturâ subcanaliculatâ, sordidè albâ, fasciis transversis duabus pallidis; longitudinaliter plicatâ, plicis angustis, acutis, crenulatis, interstitiis transversim clathratis, anfractu ultimo anticè angustato et recurvato; columellâ plicis quatuor; labro margine acuto, crenulato.*

Hab. Cape York, 8 fathoms (Jukes).

A species of great delicacy, both of colour and sculpture.

32. MITRA RUFESCENS, A. Adams. *M. testâ ovato-fusiforimi; spirâ acuminatâ, sordidè albâ, rufo variegatâ, cingillis transversis, acutis, subdistantibus, liris duabus intermediis, interstitiis longitudinaliter valdè sulcatis, sulcis subdistantibus; columellâ anticè tortuosâ, plicis quatuor obliquis instructâ; labro internè sulcato, margine crenato.*

Hab. China Seas.

This species, obtained during the voyage of H.M.S. Samarang, partakes of the same kind of sculpture as *M. annulata* and others, for which Swainson has formed a subgenus.

33. MITRA FORMOSA, A. Adams. *M. testá oblongo-fusiformi, albo rufoque eleganter variegatá; spirá acutá; anfractibus 8, rotundis, ad suturas subangulatis, cingillis transversis nodulosis ornatá, nodulis subquadratis, in seriebus regularibus; aperturá spirá brevioré; columellá plicis quatuor; labro acuto, margine crenato.*

Hab. Marquesas (Rohr).

A very handsome species, entirely covered with close-set granules arranged in transverse rows.

34. MITRA SACERDOTALIS, A. Adams. *M. testá oblongo-fusiformi; spirá acuminatá; anfractibus novem, subplanulatis; fulvá, lineis fuscis transversis ornatá, prope suturas albidá, rufo maculósá; levi, sulcis distantibus, transversis insculpti; anfractu ultimo basi recurvatá; aperturá spirá dimidium aequante, recurvatá et anticè truncatá; columellá plicis quatuor, obliquis; labro albo, acuto, anticè rotundato.*

Hab. Australia.

A fine species of a peculiar character, both as regards form, colour and sculpture.

35. MITRA MACROSPIRA, A. Adams. *M. testá pyramidali-turritá; spirá valdè productá, albidá, maculis rufis irregularibus ornatá; anfractibus planis, longitudinaliter costellatá, costellis levibus subconfertis, interstitiis clathrato-punctatis; anfractu ultimo anticè angustato, basi subrecurso; columellá plicis quinque; labro intus lirato, margine acuto, anticè producto subangulato.*

Hab. —?

A whitish species with a produced acuminate spire, and the short aperture with the base narrowed; the outer lip dilated anteriorly.

36. MITRA BELLULA, A. Adams. *M. testá oblongo-fusiformi, albd, nitidá, maculis rufis moniliformibus ad suturas ornatá; transversim sulcatá; anfractibus planis, supremis cancellatis; aperturá angustá, anticè productá, contortá, et recurvá; columellá plicis quatuor instructá.*

Hab. Isle of Capul, on the reefs, low water.

A small, transversely grooved, polished species, with a necklace-like row of reddish spots near the sutures.

37. MITRA ECHINATA, A. Adams. *M. testá fusiformi-turritá; spirá acuminatá, albido-carneolá, ad apicem rufescente, ad basin fasciá latá transversá rufescenti ornatá; anfractibus planis, longitudinaliter costatá, costis prominentibus, prope suturas echinato-nodulosis, et infernè subnodosis, interstitiis sulcato-clathratis; labro intus lirato; columellá plicis quatuor instructá.*

Hab. —?

38. MITRA SCITULA, A. Adams. *M. testá fusiformi-turritá; spirá acuminatá, anfractibus planiusculis, carneolá; punctis rufescentibus sparsim pictá; longitudinaliter costatá, costis undulatis, levibus, subdistantibus; interstitiis valdè clathratis; aperturá*

anticè angustata, basi subrecurva; columellâ plicis quatuor instructâ.

Hab. China Seas.

A small, turreted, light-coloured species, with undulating ribs and clathrated interstices.

39. MITRA MARMOREA, A. Adams. *M. testâ fusiformi-turritâ; spirâ acuminatâ; anfractibus planiusculis; olivaced, rufo-fusca marmoratâ, longitudinaliter costatâ, costis lævibus, crassis, supernè subnodosis; interstitiis transversim exaratis; columellâ plicis quinque; basi subcontortâ et recurvâ.*

Hab. Tambay, Isle of Negros, coarse sand, 10 fathoms.

Greenish, marbled with fuscous; ribs flat and broad; interstices with transverse engraved lines.

40. MITRA TURRICULA, A. Adams. *M. testâ fusiformi-turritâ, albâ, carneo sparsim pictâ, anfractibus supernè angulatis; longitudinaliter costatâ, costis crassis, lævibus, distantibus, supra nodosis, interstitiis sulcato-clathratis; aperturâ spiram æquante; columellâ plicis quatuor, supremis duabus duplicatis; basi vix recurvâ.*

Hab. —?

A small, elegant, turreted species, with smooth, thick ribs, and the interstices punctate-clathrate.

41. MITRA PALLIDA, A. Adams. *M. testâ turrito-fusiformi; spirâ productâ, acuminatâ; anfractibus convexiusculis; albâ, sparsim rufo-fusco pictâ, longitudinaliter costatâ, costis nodulosis, interstitiis clathrato-punctatis; aperturâ brevi, anticè angustatâ, basi productâ, tortuosâ et recurvâ; columellâ quaduplicatâ.*

Hab. Marquesas.

A delicate, small, pale species, with scattered red-brown blotches, and with the interstices between the ribs clathrate-punctate.

42. MITRA JUKESII, A. Adams. *M. testâ ovato-fusiformi; spirâ acutâ, aperturâ dimidium æquante; anfractibus planis, prope suturas angulatis; albâ, fasciis castaneis transversis ornatâ; transversim sulcatâ, sulcis, prope suturas, profundioribus; longitudinaliter plicatâ, plicis obtusis, distantibus, prope suturas nodulosis; columellâ plicis quatuor instructâ; labro intus lævi.*

Hab. North Australia (Jukes).

This species is intermediate between *M. corrugata* and *M. vulpêcula*, but is distinct from both.

43. MITRA CRENICPLICATA, A. Adams. *M. testâ ovato-fusiformi; spirâ acuminatâ; anfractibus planulatis; brunneâ, longitudinaliter plicatâ, plicis crenatis tenuibus; transversim liratâ, liris æqualibus, confertis, nodulosis ad plicas; aperturâ spiram æquante; labio posticè calloso, anticè dilatato; columellâ plicis quatuor instructâ; labro intus dentato-lirato, margine incrassato.*

Hab. —?

This species belongs to the group named by Mr. Gray *Zierliana*.

44. MITRA CRENILABRIS, A. Adams. *M. testâ fusiformi; spirâ aperturam æquante; anfractibus planis; fulvâ, longitudinaliter substriatâ, transversim sulcatâ; aperturâ oblongâ, anticè dilatâ; columellâ plicis quatuor, anticè incurvatâ; labro, in medio, recto, margine crenato et incrassato.*

Hab. —?

This *Mitra* resembles in many particulars *M. fulva*, Reeve, but in all the specimens I have seen the outer lip is thin and smooth in that species.

45. MITRA CASTANEA, A. Adams. *M. testâ ovato-fusiformi; spirâ productâ; anfractibus rotundatis; castaneâ, nitidâ, transversim punctato-striatâ; aperturâ quàm spira breviorè, anticè dilatâ; columellâ plicis quinque.*

Hab. —?

This species most closely resembles *M. badia*, Reeve, but the whorls are rounded, and it differs in other particulars.

46. MITRA DICHROMA, A. Adams. *M. testâ ovato-fusiformi; spirâ acuminatâ; anfractibus planis; suturâ canaliculatâ, anticè castaneofuscâ, posticè albâ; longitudinaliter substriatâ, transversim sulcatâ, sulcis anticè profundis; aperturâ anticè dilatâ; columellâ plicis quinque instructâ, anticè productâ; labro intus lirate, margine crenulato.*

Hab. —?

47. MITRA DEALBATA, A. Adams. *M. testâ ovato-fusiformi; spirâ apice cancellato; anfractibus planulatis; suturâ profundâ, albâ, transversim sulcatâ, sulcis distantibus; aperturâ oblongâ, anticè dilatâ; columellâ posticè excavatâ; plicis sex; labro anticè dilatato, intus lirate.*

Hab. —?

This species somewhat resembles *M. crenilabris* in form, but it is much more slender, and the sculpture is different.

48. MITRA NODULIFERA, A. Adams. *M. testâ turritâ, fusiformi; spirâ quàm apertura longiore; anfractibus, prope suturas, angulatis; albâ, longitudinaliter plicatâ, plicis, ad suturas, nodulosis, prominentibus, distantibus; transversim liratâ, interstitiis longitudinaliter striatis; aperturâ intus fulvâ, posticè angulatâ; columellâ plicis quatuor; labro margine flexuoso.*

Hab. —?

A small species, somewhat resembling *M. cymelium*, Reeve, but without the transverse black lines.

49. MITRA MARLE, A. Adams. *M. testâ ovato-conicâ; spirâ acuminatâ; anfractibus planis, cingulis tribus, transversis, acutis, elevatis, interstitiis longitudinaliter profundè sulcatis, instructis; posticè albâ, anticè hepaticâ, reticulationibus albis punctisque rufofuscis, ornatâ; anfractu ultimo, sulcis transversis, interstitiis*

simplicibus; columellâ plicis quinque instructâ; labro intus sulcato, margine crenulato.

Hab. Eastern Seas.

Somewhat like *M. incisa*, but of very different form and colour.

50. MITRA PUSILLA, A. Adams. *M. testâ ovato-fusifor-
mi; spirâ elongatâ; anfractibus subrotundatis; albâ, fasciâ latâ
transversâ, carneâ, anticè ornatâ; longitudinaliter costatâ, costis
regularibus, æqualibus, subconfertis, interstitiis transversim valde
sulcatis; aperturâ brevi; columellâ plicis quatuor.*

Hab. — ?

A small species, with a single, transverse, faint pink band at the fore part of the last whorl.

51. MITRA COLUMBELLINA, A. Adams. *M. testâ ovato-fusifor-
mi; spirâ brevi, acutâ; anfractibus subrotundatis, albo castaneoque
concinne pictâ, transversim evanide sulcatâ; aperturâ ovato-ob-
longâ, anticè dilatatâ; columellâ plicis quatuor; labro intus lævi.*

Hab. — ?

This species is very prettily painted with white and dark chestnut-brown, and in form somewhat resembles a *Columbella*.

52. MITRA PHILIPPINARUM, A. Adams. *M. testâ ovato-fusi-
formi; spirâ brevi, acuminatâ; anfractibus planulatis, cinereâ,
flammulis rufo-fuscis, longitudinalibus, variegatâ; transversim
sulcatâ, sulcis regularibus, subdistantibus, profundis; aperturâ
lineari-oblongâ, intus fuscâ; columellâ plicis sex; labro margine
albo, crenato.*

Hab. Philippines.

This species is figured in Mr. Reeve's Monograph as *M. flammea* of Quoy, the original type of which, however, Mr. Cuming possesses, and it is entirely different.

May 27, 1851.

W. Yarrell, Esq., V.P.L.S., in the Chair.

The following communications were received and read:—

1. NOTICE OF THE BIRDS OF MADEIRA, IN A LETTER
ADDRESSED TO THE SECRETARY.

By EDWARD VERNON HARCOURT, ESQ.

SIR,—According to your request, I send you a short account of the birds that breed in Madeira, together with a list of those that visit the island.

The birds of Madeira are less numerous than might be expected in so genial a climate, and most of them are merely varieties, where they differ from European species.

The birds that breed in Madeira are these :—

<i>Latin Name.</i>	<i>English Name.</i>	<i>Portuguese Name.</i>
1. <i>Falco Tinnunculus, Linn.</i>	Kestrel.	Francelho.
2. — <i>Buteo, Linn.</i>	Buzzard.	Manta.
3. <i>Strix flammea, Linn.</i>	Barn Owl.	Coruja.
4. <i>Turdus Merula, Linn.</i>	Blackbird.	Mérlo-preto.
5. <i>Sylvia Rubecula, Lath.</i>	Redbreast.	Papinho.
6. — <i>atricapilla, Lath.</i>	Black-cap Warbler.	Tinto-Negro.
(<i>Curruca Heinckenii, Jard.</i>)	Variety of the former.	Tinto-Negro de Capello.
7. <i>Curruca conspicillata, Gould.</i>	Spectacle Warbler.	None.
8. <i>Regulus — ?</i>	— ?	Abibe.
9. <i>Motacilla boarula, Linn.</i>	Grey Wagtail.	Lavandeira amarella.
10. <i>Anthus pratensis, Bechst.</i>	Meadow Pipit.	Corre de Caminho.
11. <i>Fringilla butyracea, Linn.</i>	Green or Wild Canary.	Canario.
12. — <i>Carduelis, Linn.</i>	Goldfinch.	Pinta Silva.
13. — <i>Petronia, Linn.</i>	Ring Sparrow.	Pardao.
14. — <i>Tintillon, Webb & Berthelot.</i>	Buff-breasted Chaffinch.	Tentilhao.
15. — <i>cannabina, Linn.</i>	Greater Redpole or Linnet.	Tinto roxo.
16. <i>Cypselus unicolor, Jard.</i>	Lesser Swift.	Andorinha da Serra.
17. — <i>murarius, Temm.</i>	Common Swift.	— do Mar.
18. <i>Columba Trocaz, Hein.</i>	Long-toed Wood-pigeon.	Trocaz.
19. — <i>Palumbus, Linn.</i>	Ring-dove.	Pombo.
20. — <i>Livia, Briss.</i>	Rock-pigeon.	Pombinho.
21. <i>Perdix rubra, Briss.</i>	Red-legged Partridge.	Perdix.
22. — <i>Coturnix, Lath.</i>	Quail.	Cordonez.
23. <i>Scolopax Rusticola, Linn.</i>	Woodcock.	Gallinhola.
24. <i>Sterna Hirundo, Linn.</i>	Tern.	Garajao.
25. <i>Larus argentatus, Brunn.</i>	Herring Gull.	Gaio, Guivata (after 3rd aut. moult).
26. <i>Procellaria Puffinus, Linn.</i>	Cinereous Shearwater.	Cagarra.
27. — <i>Anglorum, Temm.</i>	Manks Shearwater.	Boeiro.
28. — <i>obscura, Gmel.</i>	Dusky Petrel.	Pintainho.
29. { — <i>anginho, Hein.</i>	Angel Petrel.	Anginho.
{ — <i>Bulwerii, Jard.</i>	Bulwer's Petrel.	
30. — ?	— ?	Roque de Castro.

The Kestrels are very numerous and very tame, perching on the roofs of houses, from whence they dart frequently at canary-birds hanging in their reed cages outside the windows, and they generally succeed in securing their prey ; they live principally on lizards, grasshoppers, and mice.

The Buzzard is seldom seen about the town, but confines his flights to the highest mountains, feeding on small birds, insects, and reptiles.

The Barn Owl inhabits the ravines in small numbers ; it is a little darker than the British Owl. It may be remarked that all the birds of Madeira are darker than their European brethren.

The Redbreast is very common ; it is frequently caged, and seems to flourish in captivity.

The Blackbird, which in some parts is very plentiful, does not differ from the English bird.

The Black-cap Warbler, which is here the most domestic songster, has been sometimes called the Madeira Nightingale; there is a fulness in its warble which in a degree justifies such praise. A Madeiran variety of this bird has been described by Sir William Jardine* as a new species, under the name of *Curruca Heinekeni*; Dr. Heineken, however, in his paper on the subject in the 'Zoological Journal,' No. xvii. Art. xvii., disproves the supposition of its being a distinct species, and I am able to confirm the view that Dr. Heineken takes of it. The popular belief amongst the natives is, that where the nest of a "Tinto Negro" contains five eggs, the fifth always turns out a "Tinto Negro de Capello." The variety is much prized; for where you could buy a common "Tinto Negro" for sixpence or a shilling, you would be asked eight or ten shillings for a "Tinto Negro de Capello." The size of the two birds is precisely the same in all particulars; the chief difference consists in the black cap in the variety being extended to the shoulders, and I have sometimes seen the black extended over all the under parts: the under parts are generally much the same as those of the common female Black-cap, and the upper parts as those of the common male.

The Wren is one of the prettiest feathered inhabitants of Madeira; it lives amongst the laurel forests, in the less frequented parts of the island. It seems intermediate between the Gold and Fire-crested Wrens of Britain, and is a little larger and brighter than either.

The Spectacle Warbler is very locally distributed; it is found in brakes and bushes in some of the unfrequented parts.

The Grey Wagtail is very common, frequenting the cisterns attached to houses, as well as the streams; where, from its familiar habits amongst the washerwomen, it has been admitted in Madeiran phraseology into the ranks of the sisterhood, under the title of "Lavandeira."

The Meadow Pipit is plentifully found on the cliffs and fields near the sea, and on the serras.

The Green Canary is the original stock of the bird so well known to us as the Yellow Canary; it flies about in large flocks, with linnets and other birds, and is easily distinguished by its song, which is the same as that of the captive variety. The price of a good singing canary, either in Madeira or the Canary islands, varies from five to nine shillings, so that in fact it may be bought much cheaper in London. This bird has been admirably described by Dr. Heineken, in the 'Zoological Journal,' No. xvii. Art. xvii.

The Goldfinch is very common, and differs in no respect from our own.

The Ring Sparrow here takes the place, in a way, of our House Sparrow: it is universal; on the bleak serras, near houses, on the rocks by the sea; there is no place that it does not frequent. It differs thus in habits, though in nothing else, from the Ring Sparrow of Europe.

* Edinb. Journ. of Nat. and Geog. Science, Jan. 1830, vol. i. p. 243.

The Chaffinch of Madeira is nearly identical with the bird figured, under the name of "*Fringilla Tintillon*," in Webb and Berthelot's work on the Canary islands.

The Greater Redpole is very abundantly met with; it differs from the English Linnet in retaining its carmine colouring through the year.

The Lesser Swift is mentioned in Brewster's 'Journal,' by Dr. Heineken, under the title of "Black-chinned Swift." This property is however by no means general amongst the species: I have several in my possession with the chin fully as white as that of the common Swift. One of the chief differences is in size, the '*unicolor*' being much the smallest. The tail is forked about an inch and a half, and the plumage is rather darker than that of the common Swift.

The common Swift is not quite so plentiful as the Lesser Swift. Both species remain in the island throughout the year; their nests are built in the cliffs; their habits vary from those of Swifts in England; here they seem to take the place of the Swallow, hunting and skimming along the ground in a manner that would appear very degrading to their northern brethren.

The Ring-dove appears to be rather larger than the English bird; in other respects it is similar. It lives in the forests on the north side of the island.

The Long-toed Wood Pigeon has been described by Dr. Heineken, in 'Brewster's Journal,' under the name of "*Columba Trocaz*;" it is about an inch longer than the Madeiran Ring-dove; one of its chief peculiarities, and which seems to have escaped observation, is the great length of its centre toe, being more than an inch longer than that of the Ring-dove; it has a silvery ring all round its neck; it is darker in its general plumage than the Ring-dove, and is excellent eating. It inhabits the forests on the north side of the island, feeding upon grasses and the acorns of the laurel-trees.

The Rock Pigeon inhabits the sea cliffs, and rocks in the ravines all over the island. There is a variety here which is darker in its plumage and in the colour of its feet than the common Rock Pigeon.

The Red-legged Partridge is shot on the serras.

The Quail is more plentiful than the Partridge, and approaches nearer to the habitations of man; it pairs, laying about sixteen eggs, and has three or four broods in the season.

The Woodcock is found chiefly in the west, and on the Paul da Serra, sometimes plentifully. It is a large bird, but I think of inferior flavour; it breeds in the island, and is met with throughout the year.

The Tern appears chiefly at the Dezerta islands and at Point São Lourenço.

The Herring Gull is common everywhere; Dr. Renton says it is quicker by some months in obtaining its mature plumage than with us.

The Cinereous Shearwater breeds plentifully on the Dezerta islands; its cry, whether on the wing or on shore, is very remarkable; the natives salt it and consider it eatable.

The Manks Shearwater is also very plentiful at the Dezertas; it is

easily distinguished from the Dusky Petrel, which is another inhabitant of the Dezertas, by its superior size, and by the colour of its feet. In the Dusky Petrel the feet are bluish ash-colour, and in the Manks Shearwater flesh-colour; in the Dusky Petrel all the secretions are green, and in the Manks Shearwater yellow. The Dusky Petrel is a very tame bird, and will live upon almost anything; it runs along the ground on its belly, and uses its curious-shaped bill in climbing up the rocks.

The Angel Petrel of Heineken has the tail slightly forked, and differs from the other smaller Petrels in having no white about the rump or flanks; it is entirely uniform black; it is very common on the Dezerta islands; when approached it emits a highly offensive matter.

The Bulwer's Petrel, as described by Sir Wm. Jardine †, I never saw at Madeira, nor have I ever met with any one that has seen it there. Sir Wm. Jardine says, "it is easily distinguished from any other, by having the two centre tail-feathers elongated, as in the genus *Lestris*, and not even or forked, like the other Petrels." It is probably identical with the Angel Petrel.

There is another Petrel, called by the natives "Roque de Castro," pronounced "Roque de Crasto," which differs from any I have ever seen described; it approaches perhaps nearer to Leach's Petrel than any other, though the shape of the bill alone is sufficient to separate it from that species. It is common on the Dezerta islands, where it breeds, though it is by no means so abundant as the Angel Petrel.

The following is a list of the stragglers found in Madeira:—

<i>Latin Name.</i>	<i>English Name.</i>	<i>Authority †.</i>
31. <i>Cathartes peregrinus</i> , <i>Temm.</i>	Egyptian Vulture.	* * *
32. <i>Falco nisus</i> , <i>Linn.</i>	Sparrow Hawk.	* * *
33. <i>Corvus corax</i> , <i>Linn.</i>	Raven.	* * *
34. — <i>corone</i> , <i>Linn.</i>	Carrion Crow.	Mr. Lowe.
35. <i>Oriolus galbula</i> , <i>Linn.</i>	Golden Oriole.	* * *
36. <i>Sturnus vulgaris</i> , <i>Linn.</i>	Common Starling.	* * *
37. <i>Turdus iliacus</i> , <i>Linn.</i>	Redwing.	Mr. Lowe.
38. — <i>musicus</i> , <i>Linn.</i>	Common Thrush.	Mr. Penfold.
39. <i>Sylvia hortensis</i> , <i>Lath.</i>	Greater Petty-chaps.	Mr. Penfold.
40. <i>Troglodytes europæus</i> , <i>Selb.</i>	Common Wren.	Mr. Lowe.
41. <i>Motacilla alba</i> , <i>Linn.</i>	Pied Wagtail.	* * *
42. <i>Alauda arvensis</i> , <i>Linn.</i>	Skylark.	Mr. Lowe.
43. <i>Fringilla chloris</i> , <i>Linn.</i>	Green Grosbeak.	* * *
44. — <i>domestica</i> , <i>Linn.</i>	Common Sparrow.	Mr. Penfold.
45. <i>Cuculus canorus</i> , <i>Linn.</i>	Cuckoo.	* * *
46. <i>Musophaga africana</i> , <i>Temm.</i>	African Bee-eater.	Mr. Lowe.
47. <i>Upupa epops</i> , <i>Linn.</i>	Hoopoe.	* * *
48. <i>Merops apiaster</i> , <i>Linn.</i>	Bee-eater.	Mr. Lowe.
49. <i>Alcedo ispida</i> , <i>Linn.</i>	King-fisher.	Mr. Lowe.

† Sir W. Jardine on the Birds of Madeira, 'Edinb. Journ. of Nat. and Geog. Science,' Jan. 1830, p. 245, and 'Illustrations of Ornithology,' by Jardine and Selby.

‡ Where there are stars it is on my own authority.

<i>Latin Name.</i>	<i>English Name.</i>	<i>Authority†.</i>
50. <i>Hirundo urbana</i> , Linn.	House Martin.	* * *
51. — <i>rustica</i> , Linn.	Chimney Swallow.	* * *
52. — <i>riparia</i> , Linn.	Bank Martin.	Doubtful.
53. <i>Caprimulgus europæus</i> , Linn.	European Goatsucker.	Mr. Hinton.
54. <i>Columba œnas</i> , Linn.	Stock-dove.	Mr. Lowe.
55. — <i>Turtur</i> , Linn.	Turtle-dove.	* * *
56. <i>Ædicnemus crepitans</i> , Temm.	Thick-knee.	Mr. Lowe.
57. <i>Calidris arenaria</i> , Ill.	Sanderling.	Mr. Lowe.
58. <i>Vanellus cristatus</i> , Meyer.	Crested Lapwing.	* * *
59. <i>Charadrius hiaticula</i> , Linn.	Ringed Plover.	Mr. Lowe.
60. — <i>pluvialis</i> .	Golden Plover.	Mr. Hewitt.
61. <i>Streptopelia interpres</i> , Leach.	Turnstone.	Mr. Lowe.
62. <i>Ciconia nigra</i> , Temm.	Black Stork.	Mr. Lowe.
63. ? <i>Ardea cinerea</i> .	Common Heron.	* * *
64. <i>Ardea russata</i> , Wagler.	Buff-backed Heron.	* * *
65. — <i>purpurea</i> , Linn.	Purple Heron.	* * *
66. — <i>minuta</i> , Linn.	Little Bittern.	* * *
67. — <i>stellaris</i> , Linn.	Common Bittern.	Mr. Lowe.
68. — <i>nycticorax</i> , Linn.	Night Heron.	* * *
69. <i>Limosa melanura</i> , Leisler.	Black-tailed Godwit.	* * *
70. <i>Numenius arquata</i> , Lath.	Common Curlew.	Mr. Hinton.
71. — <i>phæopus</i> , Temm.	Whimbrel.	Mr. Lowe.
72. <i>Tringa pugnax</i> , Linn.	Ruff.	* * *
73. — <i>subarquata</i> , Temm.	Pigmy Curlew.	Mr. Lowe.
74. — <i>variabilis</i> , Meyer.	Dunlin.	* * *
75. — <i>cinerea</i> , Temm.	Knot.	Mr. Lowe.
76. <i>Totanus hypoleucos</i> .	Sandpiper.	* * *
77. — <i>glottis</i> , Bechst.	Greenshank.	* * *
78. <i>Scelopax gallinago</i> , Linn.	Common Snipe.	Mr. Hinton.
79. — <i>major</i> , Temm.	Great Snipe.	* * *
80. <i>Crex Baillonii</i> , Temm.	Baillon's Crake.	* * *
81. <i>Gallinula chloropus</i> , Lath.	Gallinule.	* * *
82. <i>Ortygometra crex</i> , Temm.	Land-rail.	Mr. Lowe.
83. <i>Fulica atra</i> , Linn.	Coot.	* * *
84. <i>Anser segetum</i> , Steph.	Bean Goose.	* * *
85. <i>Mareca penelope</i> , Selb.	Wigeon.	Mr. Penfold.
86. <i>Anas crecca</i> , Linn.	Teal.	* * *
87. — <i>boschas</i> , Linn.	Mallard.	Mr. Penfold.
88. <i>Sterna nigra</i> , Linn.	Black Tern.	Mr. Lowe.
89. — <i>Dougallii</i> , Mont.	Roseate Tern.	Sir W. Jardine.
90. <i>Larus tridactylus</i> , Lath.	Kittiwake.	* * *
91. <i>Lestris cataractes</i> , Temm.	Skua.	* * *
92. <i>Colymbus glacialis</i> , Linn.	Northern Diver.	* * *
93. <i>Sula alba</i> , Temm.	Gannet.	Mr. Lowe.
94. <i>Procellaria Leachii</i> , Temm.	Leach's Petrel.	Sir W. Jardine.
95. — <i>pelagica</i> , Linn.	Stormy Petrel.	Doubtful.

I have the honour to remain, Sir,

Yours, &c.,

EDWARD VERNON HARCOURT.

† Where there are stars it is on my own authority.

2. DESCRIPTION OF NEW LAND SHELLS FROM THE COLLECTION
OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. *HELIX AUDEBARDI*, Pfr. *H. testâ imperforatâ, conoideo-globosâ, solidulâ, nitidâ, castaneo-fulvâ, strigis saturationibus confertis ornatâ; spirâ conoidea, apice obtusiusculâ, albidâ; anfractibus 5½ convexis, summis granulatis, ultimis irregulariter rugoso-striatis, ultimo inflato, anticè deflexo; columellâ perdeclivi, subarcuatâ, latâ, planâ, albâ; aperturâ perobliquâ, truncato-ovali, intus cœruleâ, nitidâ; peristomate incrassato, subreflexo, albo.*

Diam. maj. 48, min. 39, alt. 35 mill.

Hab. St. Domingo (Sallé).

2. *HELIX ALBERSIANA*, Pfr. *H. testâ umbilicatâ, subturbinato-depressâ, tenui, acutè et confertim costatâ, diaphand, rufo-corneâ; spirâ subturbinatâ, apice acutâ; anfractibus 4½ convexis, celeriter accrescentibus, ultimo anticè deflexo, basi juxta umbilicam angustè constricto; aperturâ perobliquâ, lunato-ovali; peristomate tenui, marginibus subconniventibus, dextro breviter expanso, columellari dilatato, reflexo, intus plicâ obliquâ, dentiformi munito.*

Diam. maj. 14½, min. 12, alt. 8½ mill.

Hab. St. Domingo (Sallé).

3. *HELIX PUBESCENS*, Pfr. *H. testâ angustissimè umbilicatâ, depressâ, tenui, pilis mollibus, brevibus, confertis pubescente, diaphand, lutescente; spirâ vix convexâ, obtusâ; anfractibus 5, convexiusculis, ultimo subrotundato, latiore quam lato, non descendente; aperturâ vix obliquâ, rotundato-lunari; peristomate simplice, recto, margine columellari supernè breviter reflexo.*

Diam. maj. 11, min. 10, alt. 6 mill.

Hab. St. Domingo (Sallé).

4. *HELIX LEUCORHAPHE*, Pfr. *H. testâ angustè umbilicatâ, depresso-turbinatâ, subtilissimè striatâ, diaphand, luteo-corneâ, fasciâ angustâ, cretaceâ, ad suturam ornatâ; spirâ subturbinatâ, apice obtusiusculâ; anfractibus 6 planiusculis, ultimo convexiore, non descendente, basi subplanato; aperturâ vix obliquâ, lunari; peristomate simplice, recto, margine columellari reflexiusculo.*

Diam. maj. 10, min. 9, alt. 6 mill.

Hab. St. Domingo (Sallé).

5. *SUCCINEA DOMINICENSIS*, Pfr. *S. testâ ovali, solidulâ, substriatâ, corneo-albidâ, punctis corneis irregulariter aspersâ; spirâ conicâ, acutâ; anfractibus 3½ convexis, summis corneis, ultimo ¾ longitudinis æquante; columellâ subcallosâ, vix recedente; aperturâ parvam obliquâ, ovali, subregulari, supernè vix angulatâ.*

Long. 11½, diam. 7, alt. fere 6 mill. Apert. 7½ mill. longa, medio 4½ lata.

Hab. St. Domingo (Sallé).

6. *BULIMUS MOUSSONI*, Pfr. *B. testâ perforatâ, oblongo-conicâ, sublevigatâ (lineis impressis spiralibus obsolete notatâ), nitidulâ,*

albd, fasciis sub 5, roseis ornatd; spirá conicá, apice acutá, rubrá; anfractibus 6, subplanis, ultimo spirá paulò brevioré; columellá arcuatá, supernè subtortá; aperturá oblongo-ovali, intus concolore; peristomate simplice, recto, margine columellari fornicatim reflexo.

Long. 26, diam. 12 mill. Apert. 12 mill. longa, 7 lata.

Hab. St. Domingo (Sallé).

Next allied to *B. Hondurasanus*, Pfr.

7. *ACHATINA DUNKERI*, Pfr. *A. testá turrítá, tenuiusculá, lævigatá, pellucidá, nitidá, fulvescente; spirá elongatá, apice obtusá; suturá impressá, marginatá, obsolete crenulatá; anfractibus 9, vix convexiusculis, ultimo $\frac{1}{2}$ longitudinis non attingente; columellá arcuatá, altè et subverticalitè truncatá; aperturá subtriangularemiovali; peristomate simplice, margine dextro antrorsum arcuato.*

Long. 28, diam. $7\frac{1}{2}$ mill. Apert. 9 mill. longa, medio 4 lata.

Hab. St. Domingo (Sallé).

8. *ACHATINA IMPRESSA*, Pfr. *A. testá oblongo-turrítá, tenui, lævigatá, lineis impressis longitudinalibus irregularitè notatá, fulvidá; spirá turrítá, apice acutiusculá; suturá impressá, submarginatá; anfractibus $6\frac{1}{2}$ planis, ultimo $\frac{2}{3}$ longitudinis subæquante; columellá arcuatá, basi abruptè truncatá; aperturá obliquá, sinuato-ovali; peristomate simplice, margine dextro basi recedente.*

Long. $8\frac{1}{2}$, diam. $2\frac{2}{3}$ mill. Apert. 3 mill. longa, medio $1\frac{1}{2}$ lata.

Hab. St. Domingo (Sallé).

9. *BALEA DOMINICENSIS*, Pfr. *B. testá subperforatá, sinistrorsá, turrítá, sublævigatá, nitidá, olivaceo-corneá; spirá regularitè attenuatá, apice acutá; anfractibus 12, convexis, ultimo infra medium subangulato; aperturá verticali, subovali; peristomate simplice, recto, margine columellari verticali, breviter reflexo.*

Long. $11\frac{1}{2}$, diam. 3 mill. Apert. $2\frac{1}{2}$ mill. longa, $1\frac{2}{3}$ lata. (An adult.?)

Hab. St. Domingo (Sallé).

10. *CYLINDRELLA MONILIFERA*, Pfr. *C. testá subrimatá, oblongá, solidulá, truncatá, confertissimè et arcuatim costulato-striatá; opacá, sordidè albidá; suturá impressá, nodulis albidis subdistantibus notatá; anfractibus (superst.) 9, convexis, ultimo non soluto, basi subacutè carinato; aperturá obliquè subcirculari, ad carinam canaliculatá; peristomate albo, reflexiusculo-expanso, supernè appresso.*

Long. 19, diam. supra medium 6 mill. Apert. cum peristomate oblique 5 mill. longa, $4\frac{1}{2}$ lata.

Hab. St. Domingo (Sallé).

11. *CYLINDRELLA ADAMSIANA*, Pfr. *C. testá vix rimatá, oblongo-pupiformi, truncatá, nitidá, confertè striato-punctatá, albidá, cornea, irregularitè strigatá et variegatá; suturá lineari, albo-crenulatá; anfractibus (superst.) 8-9, planis, ultimo angustiore, non soluto, basi cristá compressá, obtusá munito; aperturá vix*

obliquè, subcirculari, ad cristam subcanaliculatà; peristomate albo, breviter expanso-reflexo, supernè interrupto.

Long. 14–15½, diam. 5 mill. Apert. 4¼ mill. longa et lata.

Hab. St. Domingo (Sallé).

12. *CYLINDRELLA SALLEANA*, Pfr. *C. testà non rimatà, cylindraceà, gracili, truncatà, obliquè confertissimè costulato-striatà, nitidà, pallide fuscescente, vel rufo-fuscà; anfractibus (superst.) 17–18, vix convexiusculis, ultimo angustiore, basi carinà compressà, acutà munito, antrorsum breviter porrecto; aperturà subobliquà, rhombeo-rotundatà, ad carinam distinctè canaliculatà; peristomate albo, nitido, undique reflexiusculo-expanso.*

Long. 27, diam. (prope basin) 5 mill. Apert. cum peristomate 4⅔ mill. longa et lata.

Hab. St. Domingo (Sallé).

13. *CYLINDRELLA GOULDIANA*, Pfr. *C. testà vix subrimatà, turrità, truncatà, confertissimè costulato-striatà, sericè, pallide concoloratà; suturà impressà, subdenticulatà; anfractibus (superst.) 9, convexiusculis, ultimo soluto, antrorsum breviter descendente, basi subcompressa; aperturà subobliquà, ferè circulari, latere dextro subangulatà; peristomate albo, undique breviter expanso.*

Long. 10, diam. 2⅓ mill. Apert. 2 mill. longa et lata.

Hab. St. Domingo (Sallé).

14. *CYCLOSTOMA ORBIGNYI*, Pfr. *C. testà subperforatà, elongato-pupoideà, solidà, confertim arcuato-striatà, rubello-fulvè; spirà subcylindricà, sensim attenuatà, apice conicà; suturà profundà; anfractibus 8 vix convexis, penultimo lato, ultimo fascià latà violacè, antrorsum evanescente, ornato, basi cristà compressà, obtusà munito; aperturà circulari; peristomate incrassato, subreflexo, supernè appresso, infra cristam anfractibus penult. subexciso. Operculum tenue, albidum, extus concavum, arctispirum.*

Long. 27, diam. 9 mill.

β. *Unicolor virenti-fulvum.*

γ. *Minus, interdum omnino violaceum, anfractibus convexioribus.*

Hab. St. Domingo (Sallé).

15. *HELICINA VERSICOLOR*, Pfr. *H. testà depressà, tenui, laevigatà, citrinà, sæpe viridi variegatà, suturà vel vertice purpureo; spirà parùm elevatà, obsolete papillatà; anfractibus 4½, planiusculis, rapidè accrescentibus, ultimo lato, subdepresso, anticè vix descendente; aperturà diagonali, subtriangulari-semiovali; columellà brevissimà, callum crassum, semicircularem, nitidum, album emittente; peristomate breviter expanso, margine basali subreflexo, immediatè in columellam continuato. Operculum tenue, submembranaceum, castaneum, margine columellari et nucleo pallidis.*

Diam. maj. 8, min. 6⅔, alt. 5½ mill.

Hab. St. Domingo (Sallé).

16. *HELICINA DOMINICENSIS*, Pfr. *H. testà globoso-conicà, solidulà, concentricè confertim striatà, parùm nitidà, albidà, luteco-*

vel fulvo-zonatá; spirá conicá, acutá; anfractibus 6, planiusculis, suturá profundá junctis, ultimo convexiore, víx descendente; columellá brevissimá, basi denticulatá, callum emittente tenuem, víx circumscriptum; aperturá parùm obliquá, semiovali; peristomate acuto, subrecto. Operculum tenue, testaceum, carneum, margine columellari elevato.

Diam. maj. $6\frac{1}{3}$, min. $5\frac{3}{4}$, alt. 5 mill.

Hab. St. Domingo (Sallé).

3. CONTRIBUTIONS TOWARDS A MONOGRAPH OF THE TROCHIDÆ, A FAMILY OF GASTEROPODOUS MOLLUSCA.
BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus 1. TROCHUS, Linn.—*Pyramidea*, sp. Swains.

1. TROCHUS NILOTICUS, Linn.

Trochus niloticus, Linn.; Gmel. p. 3565. no. 1; Chemn. Conch. v. t. 167. f. 1605, t. 168. f. 1614.—*Trochus marmoratus*, Lamk. (young).

Hab. North Australia (*Dring*).

2. TROCHUS MAXIMUS, Koch.

Trochus maximus, Koch; Phil. Abbild. Trochus, t. 6. f. 3.

Hab. —?

3. TROCHUS ACUTANGULUS, Chemn.

Trochus acutangulus, Chemn. Conch. v. t. 163.—*Trochus conus*, Gmel.

Hab. Burias.

4. TROCHUS SPINOSUS, Lamk.

Trochus spinosus, Lamk. Hist. An. s. Vert. t. vii. p. .

Hab. —?

5. TROCHUS ASPERULUS, Lamk.

Trochus asperulus, Lamk. Hist. An. s. Vert. t. vii. p. 22.

Hab. —?

6. TROCHUS CUMINGII, A. Adams. *T. testá turrito-conicá, violaced, maculis viridibus pulcherrimè pictá; anfractibus planis, cingulis, granorum moniliformibus ornatis, infernè nodoso-plicatis, anfractu ultimo angulato, peripheriá radiatim nodo-spinosá, basi concavá, cingulis granulosis, insculptá, centro profundè excavato umbilicum simulante; columellá supernè tortuosá, basi dente terminatá; aperturá tetragoná; labro intus lirato.*

Hab. Sibonga, island of Zebu, under stones at low water (*H. C.*).
Mus. Cuming.

377 195 7. TROCHUS FASTIGIATUS, A. Adams. *T. testá conicá, imperforatá, rubrá, maculis albis longitudinalibus variegatá; an-*

fractibus planis, in medio concavis, supernè cingulis tribus nodulorum ornatis, ad suturam nodis subspinosis instructis, basi planè, concentricè liratè; liris crenulatis; columelli posticè canaliculatè, anticè truncatè; labro in medio angulato.

Hab. —?

Genus 2. *CARDINALIA*, Gray. *Pyramidea*, Swains.

1. *CARDINALIA VIRGATA*, Gmel.

Trochus virgatus, Gmel. p. 3580. no. 83.

Hab. —?

Genus 3. *PYRAMIS*, Chemn.

Tectus, Montf.—*Pyramidea*, sp. Swains.

1. *PYRAMIS DENTATUS*, Forskal.

Trochus dentatus, Forsk. Egypt. Desc. Anim. p. 125. no. 67.—

Trochus foveolatus, Gmel.

Hab. Port Essington (*Jukes*).

2. *PYRAMIS NODULIFERUS*, Lamk.

Trochus noduliferus, Lamk. Hist. An. s. Vert. t. vii. p. 18.

Hab. Mindanao and Madagascar.

3. *PYRAMIS CÆRULESCENS*, Lamk.

Trochus cærulescens, Lamk. Hist. An. s. Vert. t. vii. p. 18.

Hab. —?

4. *PYRAMIS OBELISCUS*, Gmel.

Trochus obeliscus, Gmel. p. 3579.—*Trochus pyramis*, Chemn.

Hab. Bolinao, island of Luzon, on the reefs (*H. C.*).

5. *PYRAMIS ACUTUS*, Lamk.

Trochus acutus, Lamk. Hist. An. s. Vert. t. vii. p. 23.

Hab. Ticao, on the reefs.

6. *PYRAMIS TRISERIALIS*, Lamk.

Trochus triserialis, Lamk. Hist. An. s. Vert. t. vii. p. 22.

Hab. Philippines.

7. *PYRAMIS PRASINUS*, Menke.

Trochus prasinus, Menke, Moll. Nov. Holl. sp. p. 16. no. 64.

Hab. Eastern Seas.

8. *PYRAMIS MAURITIANUS*, Gmel.

Trochus mauritianus, Gmel. p. 3582. no. 99.

Hab. Capul, on the reefs.

9. *PYRAMIS FENESTRATUS*, Gmel.

Trochus fenestratus, Gmel.; Chemn. Conch. v. t. 163. f. 15-49-50.

Hab. —?

10. PYRAMIS CRENULATUS, Lamk.

Trochus crenulatus, Lamk. Hist. An. s. Vert. t. vii. p. 22.

Hab. Guimaras, under stones (*H. C.*).

11. PYRAMIS ARCHITECTONICUS, A. Adams. *P. testá conicá, imperforatá, albidd; anfractibus planis, subimbricatis, longitudinaliter costatis, costis crassis, rotundis, subnodosis, basi planá, liris concentricis exarátá; columellá brevi, tortuosá, anticè truncatá; labro margine fimbriato.*

Hab. Signet Bay, North Australia (*Dring*).

12. PYRAMIS LEUCOGASTER, A. Adams. *P. testá conicá, imperforatá; spirá acutá, in medio tumidd, albd, viridi variegatá; anfractibus planulatis, longitudinaliter corrugatis, transversim cingulis nodulosis ornatis, ad suturam nodis sulcatis fimbriatis, basi planá, albd, concentricè sulcatá; columellá brevi, valde tortuosá; labro anticè intus lirate.*

Hab. —?

Genus 4. TEGULA, Lesson.

1. TEGULA PELLIS-SERPENTIS, Wood.

Trochus pellis-serpentis, Wood, Ind. Test. Suppl. pl. 5. f. 4.—*Trochus strigillatus*, Anton.

Hab. —?

Genus 5. INFUNDIBULUM, Montf.—*Carinidea*, Swains.

1. INFUNDIBULUM CONCAVUM, Linn.

Trochus concavus, Linn.; Chemn. v. pl. 168. f. 1620–21.

Hab. —?

2. INFUNDIBULUM RADIATUM, Chemn.

Trochus radiatus, Chemn. v. pl. 170. f. 1640–42.

Hab. Zanzibar.

3. INFUNDIBULUM CARINIFERUM, Beck.

Trochus cariniferus, Beck; Reeve, Conch. Syst. pl. 218. f. 8.

Hab. Signet Bay, North Australia.

4. INFUNDIBULUM KOCHII, Phil.

Trochus Kochii, Phil. Abbild. Trochus, vi. t. 3. f. 8.—? *Trochus Listeri*, Wood, Ind. Test. Suppl. p. 5. f. 8.

Hab. —?

5. INFUNDIBULUM DELICATULUM, Phil.

Trochus delicatulus, Phil. Zeit. f. Malac. 1846, July, p. 105; Chemn. v. pl. 171. f. 1669.

Hab. St. Elena.

6. INFUNDIBULUM SAGA, Phil.

Trochus Saga, Phil. Zeit. f. Malac. 1846, July, p. 103.

Hab. —?

7. INFUNDIBULUM DEPRESSUM, Gmel.

Trochus depressus, Gmel. 3573; Chemn. Conch. v. pl. 171. f. 1668.

Hab. —?

1871. 1953

8. INFUNDIBULUM CHLOROMPHALUS, A. Adams. *I. testâ depresso-conicâ, pseudo-umblicatâ, viridi, atro-purpureo punctatâ; anfractibus planis, cingulis confertis granorum ornatâ, basi concavâ, cingulis inæqualibus articulatis insculptâ, regione umbilicali infundibuliformi, intus viridi; columellâ supernè tortuosâ, tuberculatâ.*

Hab. —?

1871. 1953

9. INFUNDIBULUM CALIFORNICUM, A. Adams. *I. testâ depresso-conicâ, pseudo-umblicatâ, albidd, viridi rufoque variegatâ; anfractibus planis, supra angulatis, ultimo angulatâ, cingulis tuberculorum subdistantium multiformium ornatâ; interstitiis longitudinaliter obliquè costatis, basi concavâ, cingulis confertis crenulatis insculptâ, regione umbilicali infundibuliformi, viridi, lined albâ elevatâ cincto; columellâ supernè tortuosâ, tuberculatâ.*

Hab. California.

Genus 6. POLYDONTA, Schumacher.—*Lamprostoma*, Swains.

1. POLYDONTA MACULATA, Linn.

Trochus maculatus, Linn.; Chemn. v. pl. 168. f. 1615-18.

Hab. Port Essington, adhering to rocks, deep water (*Jukes*).

2. POLYDONTA INÆQUALIS, Chemn.

Trochus inæqualis, Chemn. v. pl. 170. f. 1635-36.—*Trochus granosus*, Lamk.

Hab. Philippines.

3. POLYDONTA REGIA, Chemn.

Trochus regius, Chemn. v. p. 170. f. 1637.

Hab. —?

4. POLYDONTA TENTORIUM, Chemn.

Trochus Tentorium, Chemn. v. p. 169. f. 1628.

Hab. Philippines.

5. POLYDONTA STELLATA, Chemn.

Trochus stellatus, Chemn. v. pl. 169. f. 1630.

Hab. —?

6. POLYDONTA VERRUCOSA, Gmel.

Trochus verrucosus, Gmel.; Chemn. v. pl. 170. f. 1638.—*Trochus elatus*, Lamk.

Hab. Zanzibar.

7. POLYDONTA COSTATA, Chemn.

Trochus costatus, Chemn. v. pl. 169. f. 1633-34.

Hab. —?

8. POLYDONTA SPENGLERI, Chemn.
Trochus Spengleri, Chemn. v. pl. 169. f. 1631.
 Hab. —?
9. POLYDONTA OCHROLEUCOS, Gmel.
Trochus ochroleucos, Gmel.; Chemn. v. pl. 169. f. 1629.
 Hab. —?
10. POLYDONTA VERNALIS, Chemn.
Trochus vernalis, Chemn. v. pl. 169. f. 1625-26.—*Trochus ver-*
mis, Gmel.—*Trochus subviridis*, Phil.
 Hab. —?
11. POLYDONTA VIRIDESCENS, Chemn.
Trochus viridescens, Chemn. v. pl. 170. f. 1643-44.—*Trochus vi-*
ridis, Gmel.
 Hab. Capul, Philippines.
12. POLYDONTA RETICULATA, Wood.
Trochus reticulatus, Gray in Wood, Ind. Test. Suppl. pl. 6. f. 38.
 Hab. Benconet, Sumatra, on the reefs (*H. C.*).
13. POLYDONTA LINEATA, Lamk.
Trochus lineatus, Lamk. Hist. An. s. Vert. tom. vii. p. 23.
 Hab. Swan Point (*Dring*).
14. POLYDONTA HANLEYANA, Reeve.
Trochus Hanleyanus, Reeve, Conch. Syst. t. f. —*Trochus en-*
grainus, Philippi.
 Hab. Swan Point (*Dring*).
15. POLYDONTA TIARATA, Quoy & Gaim.
Trochus tiaratus, Quoy & Gaim. Voy. de l'Astr. t. 64. f. 8.—*Poly-*
donta elegans, Gray.
 Hab. New Zealand (*Earl*).
16. POLYDONTA INCRASSATA, Lamk.
Trochus incrassatus, Lamk. Hist. An. s. Vert. tom. vii. p. 20;
 Chemn. Conch. v. p. 169. f. 1632.
 Hab. —?
17. POLYDONTA ELEGANTULA, Wood.
Trochus elegantulus, Gray in Wood, Ind. Test. Suppl. p. 5. f. 9.
 Hab. —?
18. POLYDONTA ASPERA, Chemn.
Trochus asper, Chemn. Conch. v. pl. 169. f. 1633-34.
 Hab. Banguey, province of North Iloco, island of Luzon, on the
 reefs at low water (*H. C.*).
19. POLYDONTA CONCINNA, Philippi.
Trochus concinnus, Phil. Zeit. f. Malac. 1846, July, p. 105.
 Hab. —?

20. POLYDONTA TURRIS, Phil.

Trochus turris, Phil. Zeit. f. Malac. 1846, July, p. 102.*Hab.* — ?

21. POLYDONTA INCARNATA, Phil.

Trochus incarnatus, Phil. Zeit. f. Malac. 1846, July, p. 103.*Hab.* Suez, Red Sea.

22. POLYDONTA IGNOBILIS, Phil.

Trochus ignobilis, Phil. Zeit. f. Malac. 1846, July, p. 102.*Hab.* — ?

23. POLYDONTA PUSTULOSA, Phil.

Trochus pustulosus, Phil. Kust. Conch. Cab. pl. 44. f. 6.*Hab.* — ?

24. POLYDONTA GIBBERULA, A. Adams. *P. testá elevato-conicá, in medio gibbosá, anfractu ultimo angustato; albidá, lineis roseis flammulatis radiatim pictá; anfractibus subconvexis, cingulis granosis transversis ornátá, ultimo obtusè angulato; basi convexiusculá, albá, fasciis roseis radiatim pictá; centro excavato, umbilicum mentiente; columellá supernè solutá, margine tuberculo-denticulato; labro intus lirato, infernè denticulato.*

Hab. Philippines.

37, 1763

25. POLYDONTA PALLIDULA, A. Adams. *P. testá elevato-conicá, albidá, maculis luteolis pictá; anfractibus planis, cingulis tuberculorum ornátá, tuberculis infernè in costas excurrentibus, basi convexá, cingulis granosis ornátá, cavitate contortá umbilicum simulante; columellá supernè solutá, margine tuberculato-dentato; labro intus lirato, infernè denticulato.*

Hab. — ?

26. POLYDONTA CORRUGATA, A. Adams. *P. testá elevato-conicá, albidá, rufo-fusco variegatá; anfractibus planiusculis, sulcis transversis, sulcisque obliquis nodoso-reticulatis, infernè obliquè costatis, costis nodosis ornatis; basi planiusculá, in medio concavá, excavatá, umbilicum mentiente; columellá supernè solutá, margine tuberculato-dentato; labro intus lirato, infernè denticulato.*

Hab. — ?

27. POLYDONTA SQUAMIGERA, A. Adams. *P. testá elato-conicá, albidá, cinereo-viridi radiatim pictá; anfractibus planiusculis, cingulis granulorum tribus ornatis, infernè obliquè costatis, costis in spinis squamiformibus excurrentibus, basi planá strii granosis, fasciisque rufo-viridibus ornátá, centro excavato umbilicum simulante, intus albo lineis elevatis cincto; aperturá lineis acutis elevatis, transversis in faucibus instructá.*

Hab. — ?

Genus 7. PHORCUS, Risso.—*Omphalius*, Philippi.

1. PHORCUS MELALEUCOS, Jonas.
Trochus melaleucos, Jonas, Zeit. f. Malac. 1844, p. 169; Phil.
 Abbild. Trochus, t. v. f. 7.
 Hab. —?
2. PHORCUS OCCULTUS, Phil.
Trochus occultus, Phil. Abbild. p. 17. t. 5. f. 8.
 Hab. —?
3. PHORCUS MODESTUS, Koch.
Trochus modestus, Koch; Phil. Abbild. Trochus, p. 30, t. 5. f. 10.
 Hab. —?
4. PHORCUS VARIEGATUS, Chemn.
Trochus variegatus, Chemn. v. pl. 171. f. 1677.—*Trochus viridulus*, Gmel.; Wood, Ind. Test. p. 28. f. 42.—*Trochus Byronianus*, Wood.—*Trochus Brazilianus*, Menke.
 Hab. —?
5. PHORCUS CARNEUS, Gmel.
Trochus carneus, Gmel. 3574?—*Trochus indusii*, Chemn.
 Hab. —?
6. PHORCUS CRUCIATUS, Chemn.
Trochus cruciatus, Chemn. pl. 171. f. 167.
 Hab. —?
7. PHORCUS QUADRICOSTATUS, Wood.
Trochus quadricostatus, Gray in Wood, Ind. Test. Suppl. p. 5. f. 15.
 —*Trochus torulosus*, Phil. Abbild. t. 2. f. 12.
 Hab. —?
8. PHORCUS DENTATUS, Gmel.
Turbo dentatus, Gmel.; Chemn. Conch. v. p. f.
 Hab. —?
9. PHORCUS QUADRICARINATUS, Gmel.
Trochus quadricarinatus, Gmel.; Chemn. ii. t. 196. f. 1892–93.—
Trochus rubro-flammulatus, Koch.
 Hab. —?
10. PHORCUS UMBILICARIS, Linn.
Trochus umbilicaris, Linn.; Chemn. v. p. f. —*Trochus excavatus*, Lamk.—*Trochus cinereus*, Da Costa.
 Hab. —?
11. PHORCUS SCALARIS, Anton.
Trochus scalaris, Anton.; Phil. Abbild. Trochus, p. 18. t. 2. f. 7.
 Hab. —?

12. PHORCUS FUSCESCENS, Phil.

Trochus fuscescens, Phil. Abbild. Trochus, t. 3. f. 8.

Hab. — ?

13. PHORCUS NODICINCTUS, A. Adams. *P. testá conoideá, umbilicatá, fuscá luteo variegatá, lævi; anfractibus subplanulatis, cingulis tribus nodulosis, liris elevatis transversis ornatis, anfractu ultimo subangulato, basi convexiusculá, lineis elevatis concentricis sculptá, regione umbilicali albidd; columellá brevi, arcuatá, basi dentibus duobus terminatá; labro fusco marginato.*

Hab. — ?

14. PHORCUS GRANIFER, A. Adams. *P. testá orbiculato-conicá, fuscá, cingulis transversis granorum distantium ornatá, cingulis remotiusculis, interstitiis transversim liris; anfractibus rotundatis, suturá canaliculatá; umbilico aperto, perspectivo; columellá sinuatá, basi dentibus duobus terminatá; labro intus crenulato.*

Hab. — ?

15. PHORCUS LIRATUS, A. Adams. *P. testá conoideá, umbilicatá, fuscá, lineis pallidis undulatis ornatá, cingulis distantioribus transversis insculptá; columellá sinuatá, basi dentibus tribus terminatá, umbilico aperto, perspectivo, peromphalo viridulo; labro intus lævi.*

Hab. — ?

16. PHORCUS SEMIGRANOSUS, A. Adams. *P. testá orbiculato-conoideá, umbilicatá, purpureo alboque variegatá, transversim tenuiter striatá; anfractibus planiusculis, cingulis confertis subgranosis ornatis, ultimo subangulato, basi planiusculá, cingulis granosis insculpto; margine umbilici lineá albá elevatá cincto; labio supra calloso; columellá supernè sinuatá, basi in tuberculis duobus terminatá et infra tuberculos dentibus duobus instructá; labro intus lævi, anticè callo marginato.*

Hab. West Indies.

17. PHORCUS CALIFORNICUS, A. Adams. *P. testá orbiculato-conicá, profundè umbilicatá, viridi, atro-purpureo radiatim maculatá, liris transversis subnodulosis inæqualibus ornatá; anfractu ultimo subangulato; basi convexiusculá; umbilico perspectivo; labro in medio valde excavato, columellá anticè dentatá, intus lævi.*

Hab. California. Mus. Cuming.

Genus 8. CLANCULUS, Montfort.

Polydonta b., Schum.—*Fragella*, Swainson.—*Apiculum*, sp., Humph.—*Monodonta*, sp., Lamk.—*Otavia*, Risso (not Cantraine).

1. CLANCULUS PHARAONIS, Linn.

Trochus Pharaonis, Linn. Syst. Nat. ed. 12. no. 584; Chemn. Conch. pl. 171. f. 1672-73.

Hab. — ?

2. CLANCULUS CORALLINUS, Gmel.
Trochus corallinus, Gmel. no. 3576; Adans. Senegal, p. 183. t. 12.
 f. 4.—*Monodonta punicea*, Phil.
Hab. —?
3. CLANCULUS SMITHII, Wood.
Trochus Smithii, Gray in Wood, Ind. Test. Suppl. pl. 5. f. 20.
Hab. Japan.
4. CLANCULUS MAUGERI, Wood.
Trochus Maugeri, Gray in Wood, Ind. Test. Suppl. pl. 5. f. 27.
Hab. Australia.
5. CLANCULUS FLORIDUS, Phil.
Trochus clangulus, Gray in Wood, Ind. Test. Suppl. pl. 5. f. 31.
Hab. New Zealand (*Jukes*).
6. CLANCULUS MEDITERRANEUS, Wood.
Trochus mediterraneus, Wood, Ind. Test. Suppl. pl. 5. f. 32.—
Monodonta Vieilloti, Payr.—*Mon. Araonis*, Bast.
Hab. Naples; on rocky ground (*Philippi*).
7. CLANCULUS CLANGULOIDES, Wood.
Trochus clanguloides, Gray in Wood, Ind. Test. Suppl. pl. 6. f. 39.
Hab. —?
8. CLANCULUS LIMBATUS, Quoy et Gaimard.
Trochus limbatus, Quoy et Gaim. Voy. de l'Astrol. p. 245. pl. 63. f. 16.
Hab. —?
9. CLANCULUS PATAGONICUS, d'Orbigny.
Monodonta Patagonica, d'Orb. Voy. dans l'Am. Mérid. t. 55. f. 2.
Hab. —?
10. CLANCULUS COUTURII, Payr.
Monodonta Couturii, Payr. Cat. p. 134. t. 6. f. 19, 20.
Hab. Malta.
11. CLANCULUS RINGENS, Menke.
Monodonta ringens, Menke, Moll. Nov. Holl. sp. p. 14.
Hab. New Holland.
12. CLANCULUS AGRESTIS, Chemn.
Trochus (Globulus) agrestis, Chemn. Conch. p. 171. f. 1678.—
Monodonta villana, Phil.
Hab. —?
13. CLANCULUS GUIANICUS, Chemn.
Trochus (Globulus) Guianicus, Chemn. Conch. pl. 171. f. 1680.—
Trochus Guineensis, Gmel.—*Trochus (Globulus) Subucula*, Chemn.
 (var.).
Hab. —?

14. CLANCULUS JUSSIEUI, Payr.

Monodonta Jussieui, Payr. Cat. pl. 6. f. 17.*Hab.* Corsica; Languedoc; France.

15. CLANCULUS TURGIDULUS, Brocchi.

Trochus turgidulus, Brocchi.*Hab.* Corsica.

16. CLANCULUS LUPINUS, Menke.

Monodonta lupina, Menke, Moll. Nov. Holl. sp. p. 15.*Hab.* —?

17. CLANCULUS KRAUSII, Phil.

Monodonta Krausii, Phil. Zeit. f. Malac. 1846, July, p. 101.*Hab.* —?

18. CLANCULUS CORRUGATUS, Koch.

Trochus corrugatus, Koch; Phil. Abbild. p. 67. Troch. t. 2. f. 7.*Hab.* —?

19. CLANCULUS OCHROLEUCUS, Phil.

Trochus ochroleucus, Phil. Zeit. f. Malac. 1846.

20. CLANCULUS SPADICEUS, Phil.

Trochus spadiceus, Phil. Zeit. f. Malac. 1846.

21. CLANCULUS ANUS, Phil.

Trochus anus, Phil. Zeit. f. Malac. 1846.

22. CLANCULUS PERSONATUS, Phil.

Trochus personatus, Phil. Zeit. f. Malac.*Hab.* New Holland. Mus. Hanley.

23. CLANCULUS SCABROSUS, Phil.

Trochus scabrosus, Phil. Zeit. f. Malac. 1846.

24. CLANCULUS LUDWIGI, Krauss.

Trochus Ludwigi, Krauss, Sudafrik Moll. t. 5. f. 33.

25. CLANCULUS MARGARITARIUS, Phil.

Monodonta margaritaria, Phil. Zeit. f. Malac. 1846, July, p. 100.

26. CLANCULUS ORMOPHORUS, A. Adams. *C. testá depresso-conicá, umbilicatá; anfractibus rotundatis, cingulis granorum aequalibus ornatis, cingulo primo, secundo et tertio granis fuscis albis alternantibus, quarto granis fuscis ornatis; anfractu penultimo gibboso, ultimo rotundato; umbilico crenulato; columellá callosá, subreflexá, basi dente triplicato.*

Hab. —?

27. *CLANCULUS VARIEGATUS*, A. Adams. *C. testá depresso-conicá, pallidá, rufo-fusco variegatá; anfractibus supra tumidis, cingulis granorum ornatis; interstitiis striis obliquis longitudinalibus; anfractu ultimo aculé angulato, basi plano; umbilico crenulato; columellá supra tortuosá, margine reflexá, crenulatá, basi dente buplicato terminatá; labro intus dentibus lamellaribus, superiore majore.*

Hab. Island of Siquijor, under stones (*H. C.*).

28. *CLANCULUS CINGULIFER*, A. Adams. *C. testá elevato-conoideá, carneold, cingulo albo rufoque articulado, ornata; anfractibus rotundatis, cingulis transversis granosis sculptis; basi concavá, peromphalo albo roseo radiato, margine plicato; columellá crassá, supra nodosá, infra uniplicatá; basi dente triplicato terminatá; labro intus lirato; tuberculo maximo, prope marginem superiorem.*

Hab. —?

62, 1953

29. *CLANCULUS MACULOSUS*, A. Adams. *C. testá elevato-conoideá, rufo-fuscá, maculis albidis variegatá; anfractibus rotundatis, cingulis granorum ornatis, interstitiis obliquè striatis, margine umbilici crenulato; columellá supra tuberculo magno instructá, basi dente buplicato terminatá; labro intus lirato, lirá supremá maximá.*

Hab. —?

63, 1953

30. *CLANCULUS SULCARIUS*, A. Adams. *C. testá parvá, albidá, fasciis fuscis radiatim ornata, cingulis distantioribus granorum instructá, interstitiis longitudinaliter obliquè striatis; anfractibus parum convexis; margine umbilici crenulato; columellá dente pliciformi; labro intus crenulato.*

Hab. Island of Masbate, sandy mud, 7 fathoms (*H. C.*).

64, 1953

31. *CLANCULUS ACUMINATUS*, A. Adams. *C. testá elevato-conicá; spirá acuminatá, fuscá, nigro-fusco punctatá, cingulis transversis subdistantibus granorum ornata; interstitiis lineis transversis et longitudinalibus decussatis; margine umbilici subnoduloso; columellá margine reflexo, integro, basi dente simplici magno terminatá; labro intus lirato.*

Hab. Sibonga, island of Zebu, under stones (*H. C.*).

32. *CLANCULUS ALBINUS*, A. Adams. *C. testá conoideá, albidá, cingulis granorum confertis ornata, granis nonnullis fusco punctatis; anfractibus convexis, ultimo rotundato; margine umbilici plicato-dentato; columellá callosá, plicis duabus transversis, basi dente triplicato terminatá; labro supernè inflexo, intus lirato; tuberculo magno trisulcato prope marginem superiorem.*

Hab. —?

33. *CLANCULUS TURBINOIDES*, A. Adams. *C. testá turbinato-conoideá, fuscá, cingulis subdistantibus granorum ornata; interstitiis lineis transversis prominulis; anfractibus rotundatis, suturá canaliculatá; basi cingulis concentricis granorum instructá;*

umbilico dentato; columellá sulcatá, margine reflexá, tuberculis quatuor; labro intus lirato.

Hab. —?

34. CLANCULUS STIGMATARIUS, A. Adams. *C. testá elevato-conicá, cingulis confertis granorum ornatá, lutescenti cingulo tertio et septimo granis albis et roseis subdistantibus, basi granis roseis ornatá; umbilici margine subnodoso; columellá crassá, transversim subplicatá, basi dente magno triplicato terminatá; labro supra inflexo, intus lirato, tuberculo magno bisulcato prope marginem superiorem.*

Hab. Island of Corigidor, bay of Manila, coarse sand, 9 fathoms (H. C.).

35. CLANCULUS TEXTILOSUS, A. Adams. *C. testá conoideá; spirá acuminatá, cingulis granorum inæqualibus ornatá, primo, tertio et sexto coccineá, secundo, quarto, quinto et septimo granis albis nigris alternantibus ornatá; margine umbilici dentato; columellá biplicatá, margine acutá, basi dente triplicato terminatá; labro intus lirato, prope marginem superiorem tuberculo magno.*

Hab. Island of Ticao, sandy mud, 6 fathoms (H. C.).

36. CLANCULUS MINOR, A. Adams. *C. testá parvá, conicá, albidá, fasciis rufo-fuscis radiatim ornatá; anfractibus planis, cingulis transversis granosis sculptá, anfractu ultimo angulato, basi planiusculá, margine umbilici crenulatá; columellá tuberculo decurvato terminatá; labro intus lirato.*

Hab. Island of Masbate, sandy mud, 7 fathoms (H. C.).

1571 1953 37. CLANCULUS BRUNNEUS, A. Adams. *C. testá depresso-conicá, fuscá, cingulis granorum subdistantibus ornatá; interstitiis longitudinaliter elevatè striatis; anfractibus planiusculis, ultimo acutè angulato, umbilici margine planá; columellá transversim plicatá, margine fimbriatá, basi dente biplicato terminatá; labro intus lirato, lirá supremá majore.*

Hab. —?

38. CLANCULUS UNEDO, A. Adams. *C. testá elevato-conoideá; spirá prominulá, apice roseo, cingulis granorum confertis (in anf. ultim. quinque) ornatá, coccineá, cingulo secundo, quarto et quinto granis albis et nigris ornatis; umbilici margine plicato-crenulatá; columellá obliquá, crassá, margine reflexá, basi dente magno triplicato terminatá; labro intus lirato, supra tuberculo magno.*

Hab. —?

39. CLANCULUS ZEBRIDES, A. Adams. *C. testá conoideá, fusciscenti, nigro-fusco radiatim pictá, cingulis granorum sculptá; interstitiis lineolis transversis elevatis; anfractibus rotundatis; umbilici margine crenulatá; columellá supra tuberculo, margine callosá, basi tuberculo magno terminatá; labro intus dentibus linearibus instructo.*

Hab. —?

40. CLANCULUS EDENTULUS, A. Adams. *C. testá orbiculato-conoided, sordidè rufá, albo variegatá, cingulis transversis granosis sculptá; anfractibus parum convexis; umbilici margine subcrenulatá; columellá supra plicatá, infra edentulá, margine infra tuberculis tribus; labro intus subsulcato.*

Hab. —?

41. CLANCULUS NIGRICANS, A. Adams. *C. testá depresso-conicá, umbilicatá, nigricante; anfractibus planis cingulis quinque granulatis ornatá, ultimo angulatá, carinis planis duabus in parte inferiore, cingulis 5-6 articulatis sulcisque intermediis sculptá; umbilici margine crenulato; columellá rectá, supernè solutá, in parte superiore tuberculatá, extus tuberculis tribus instructá; labro intus laevi.*

Hab. —?

42. CLANCULUS CARINATUS, A. Adams. *C. testá conicá, albídá, flammulis rubris pictá, anfractibus planis, cingulis inæqualibus confertis granorum ornatá, supra suturam angulatá, anfractu ultimo margine carinato, carinâ albo rufoque articulatá; umbilici margine plano; columellá rectá, supra subcallosá, basi dente simplici acuto terminatá; labro intus sulcato.*

Hab. —?

43. CLANCULUS MICRODON, A. Adams. *C. testá orbiculato-conicá, fuscá, nigro-fusco maculatá, cingulis granorum ornatá; interstitiis lineis elevatis transversis; anfractibus rotundatis, basi cingulis subnodosis, rufo- et nigro-fusco articulatá; umbilici margine dentato, dente superiore majore; columellá supra flexuosa, plicatá, margine reflexo, sulcato-crenulato, basi dente parvo terminatá; labro intus lírato.*

Hab. —?

44. CLANCULUS OMALOMPHALUS, A. Adams. *C. testá depresso-conicá, pallidá, fusco maculatá, anfractibus paulum rotundatis, cingulis granorum ornatá; interstitiis striis longitudinalibus, anfractu ultimo acutè carinato, carinâ albo rufoque articulatá, basi planá; umbilici margine plano; columellá transversim plicatá, margine reflexo dentato, basi dente buplicato terminatá; labro intus lírato.*

Hab. Sydney (*Strange*).

45. CLANCULUS GIBBOSUS, A. Adams. *C. testá depresso-conicá, pallidá, fasciis fuscis radiatim dispositis ornatá, cingulis transversis æqualibus granosis sculptá; anfractibus rotundatis, suturá profundá, canaliculatá, anfractu ultimo gibboso, infra subangulato; umbilici margine crenulato; columellá plicatá, margine reflexo supra dentato, basi dente magno buplicato terminatá; labro intus corrugato-crenulato, supra inflexo, tuberculo magno instructo.*

Hab. New Ireland (*Jukes*).

46. CLANCULUS CONSPERSUS, A. Adams. *C. testá orbiculato-conicá, rufescente, albo rubroque variegatá, cingulis moniliformibus transversis ornatá, cingulo infra suturam majore, anfractu ultimo angulato; columellá postice subcanaliculatá vix tortuosá, anticè plicá magná transversá terminatá; labro intus valdè dentato-lirato.*

Hab. —?

47. CLANCULUS NODILIRATUS, A. Adams. *C. testá depresso-turbinatá, carneolá, liris transversis nodulosis subdistantibus ornatá; interstitiis longitudinaliter tenuissimè striatis; anfractibus subquadratis, margine umbilici dentato; columellá rectá, anticè tuberculo parvo terminatá; labro intus lirato.*

Hab. —?

Genus 9. ZIZIPHINUS, Leach.

Calliostoma, Swains.—*Labio*, sp. Oken.—*Trochilus*, sp. Humph.

1. ZIZIPHINUS VULGARIS, Gray; Mrs. Gray, Fig. of Moll. An. p. 89.

Trochus ziziphinus, Linn. Syst. Nat. ed. 12. p. 1231.—*Trochus conulus*, Penn.—*Trochus zyziphinus*, Born.—*Trochus zezyphinus*, Chemn.—*Trochus discrepans*, Brown.—*Trochus Lyonsii*, Leach.—*Trochus albidus*, Wood.—*Trochus Sisyphinus*, Macgill.—*Trochus Sedgwickii*, Sow.—*Trochus conuloides*, Lamk.

Hab. British islands; Mediterranean; Norway, &c.

2. ZIZIPHINUS CONULUS, Linn.

Trochus conulus, Linn. Syst. Nat. ed. 12. p. 1230.—*Trochus violaceus*, Risso.

Hab. British islands.

3. ZIZIPHINUS ALABASTRUM, Beck.

Margarita alabastrum, Beck; Lovén, Ind. Moll. Scandin. p. 20.—*Trochus occidentalis*, Mighels & Ad.—*Trochus formosus*, Forbes.

Hab. British islands.

4. ZIZIPHINUS GRANULATUS, Born.

Trochus granulatus, Born, Test. Mus. Cæs. Vind. p. 337. pl. 12. f. 9, 10.—*Trochus papillosus*, Da Costa.—*Trochus fragilis*, Pultney.—*Trochus tenuis*, Montague.

Hab. British islands.

5. ZIZIPHINUS SELECTUS, Chemn.

Trochus selectus, Chemn. Conch. xi. t. 196. f. 1896-97.—*Ziziphinus tigris*, Gray.

Hab. New Zealand.

6. ZIZIPHINUS DOLIARIUS, Chemn.

Trochus doliarius, Chemn. Conch. x. t. 165. f. 1579-80.—*Ziziphinus canaliculatus*, Gray.

Hab. Australia; New Zealand.

7. ZIZIPHINUS CUNNINGHAMI, Gray.
Ziziphinus Cunninghamsi, Gray, Brit. Mus.
Hab. —?
8. ZIZIPHINUS ANNULATUS, Martyn.
Trochus annulatus, Martyn, Conch. i. t. 33.—*Trochus virgineus*,
 Gmel.
Hab. Monterey, California (*Hartweg*).
9. ZIZIPHINUS GRANATUM, Gmel.
Trochus granatum, Gmel.; Chemn. Conch. v. t. 170. f. 1654–55.
Hab. Australia, Port Essington (*Jukes*).
10. ZIZIPHINUS ORNATUS, Lamk.
Trochus ornatus, Lamk. Hist. An. s. Vert. t. vii. p. 27.
Hab. —?
11. ZIZIPHINUS ARMILLATUS, Wood.
Trochus armillatus, Wood, Ind. Test. Suppl. pl. 5. f. 5.
Hab. —?
12. ZIZIPHINUS INTERRUPTUS, Wood.
Trochus interruptus, Wood, Ind. Test. Suppl. pl. 6. f. 42.
Hab. —?
13. ZIZIPHINUS TRANQUEBARICUS, Chemn.
Trochus Tranquebaricus, Chemn. Conch. v. t. 166. f. 1595–96.
Hab. —?
14. ZIZIPHINUS PYRAMIS, Gmel.
Trochus Pyramis, Gmel.; Chemn. Conch. v. pl. 170. f. 1652–53.
 —*Trochus crenulatus*, Brocc.—*Trochus Matonii*, Payr.—*Trochus punctatus*, Ren.—*Trochus conulus*, Donovan.—*Trochus tricolor*, Risso.
Hab. —?
15. ZIZIPHINUS MONTAGUI, Gray.
Trochus Montagui, Gray; Wood, Ind. Test. Suppl. pl. 6. f. 43.—
Trochus striatus, Forbes.
Hab. British islands.
16. ZIZIPHINUS INDISTINCTUS, Wood.
Trochus indistinctus, Wood, Ind. Test. Suppl. pl. 6. f. 41.
Hab. —?
17. ZIZIPHINUS PYRAMIDATUS, Lamk.
Trochus pyramidatus, Lamk. Hist. An. s. Vert. t. vii. p. 30.
Hab. —?
18. ZIZIPHINUS LANGIERI, Payraud.
Trochus Langieri, Payraud. Cat.
Hab. —?

19. ZIZIPHINUS JUJUBINUS, Gmel.
Trochus jujubinus, Gmel.; Chemn. Conch. v. pl. . f. .
 Hab. Java.
20. ZIZIPHINUS FILOSUS, Wood.
Trochus filusus, Wood, Ind. Test. Suppl. pl. 5. f. 23.—*Trochus castaneus*, Nuttall?—*Trochus ligatus*, Gould.
 Hab. Straits of Juan de Fuco, Upper California.
21. ZIZIPHINUS DUBIUS, Philippi.
Trochus dubius, Phil. En. Moll. Sicil. ii. p. 149. t. 25. f. 7.
 Hab. Sicily.
22. ZIZIPHINUS GEMMOSUS, Reeve.
Trochus gemmosus, Reeve, Proc. Zool. Soc. 1842; Conch. Syst. pl. 218. f. 9.
 Hab. Puerto Galero, island of Mindanao, sandy mud, 6 fathoms.
23. ZIZIPHINUS EXIMIUS, Reeve.
Trochus eximius, Reeve, Proc. Zool. Soc. 1842; Conch. Syst. pl. 218. f. 12.
 Hab. —?
24. ZIZIPHINUS ANTONII, Koch.
Trochus Antonii, Koch; Phil. Abbild. Trochus, p. 2. t. 1. f. 4.
 Hab. —?
25. ZIZIPHINUS EXIGUUS, Pultney.
Trochus exiguus, Pultney Hutchins, Hist. Dorset, p. 44.—*Trochus erythroleucus*, Gmel.; Lamk.—*Trochus exasperatus*, Penn.—*Trochus erythroleucus*, Hanley.—*Trochus conulus*, Da Costa.—*Trochus minutus*, Chemn.; Dillw.
 Hab. Mediterranean; British islands.
26. ZIZIPHINUS STRIATUS, Linn.
Trochus striatus, Linn. Syst. Nat. ed. 12. p. 1230.—*Trochus parvus*, Da Costa.—*Trochus conicus*, Donovan.—*Trochus erythroleucus*, Maton & Rack.—*Trochus depictus*, Deshayes.—*Trochus Sartorii*, Arad & Magg.—*Trochus vittatus*, Lamk.
 Hab. British islands.
27. ZIZIPHINUS CILIARIS, Menke.
Trochus ciliaris, Menke, Moll. Nov. Holl. p. 17; Phil. Abbild. Trochus, t. 7. f. 11.
 Hab. —?
28. ZIZIPHINUS DECORATUS, Phil.
Trochus decoratus, Phil. Zeit. f. Malac. 1846, July, p. 102.
 Hab. —?
29. ZIZIPHINUS LÆVIGATUS, Phil.
Trochus laevigatus, Phil. En. Moll. Sicil. v. 1. t. 11. f. 2.
 Hab. Naples, rocky shores.

30. ZIZIPHINUS STRIGOSUS, Gmel.
Trochus strigosus, Gmel.; Chemn. Conch. v. t. 170. f. 1651.—
Trochus callichrous, Phil.
 Hab. Morocco.
31. ZIZIPHINUS LURIDUS, Nuttall.
Trochus luridus, Nuttall.
 Hab. Fayal.
32. ZIZIPHINUS BICINGULATUS, Lamk.
Trochus bicingulatus, Lamk. Hist. An. s. Vert. tom. vii. p. 27.—
Trochus vinctus, Phil.
 Hab. Rains, Island (*Ince*).
33. ZIZIPHINUS MILLEGRANUS, Phil.
Trochus millegranus, Phil. En. Moll. Sicil. v. 1. p. 183. pl. 10. f. 25.
 —? *Trochus Clelandi*, Wood.—*Trochus Martini*, Smith.—*Trochus miliaris*, Scacc.
 Hab. —?
34. ZIZIPHINUS AGRESTIS, Phil.
Trochus agrestis, Phil. Abbild. p. 33, *Trochus*, t. 1. f. 6.
 Hab. Singapore, fine sand, 6 fathoms (*H. C.*).
35. ZIZIPHINUS CHLOROSTOMUS, Menke.
Trochus chlorostomus, Menke, Spec. Moll. Nov. Holl. p. 17; Phil. Abbild. *Trochus*, t. 2. f. 8.
 Hab. New Holland.
36. ZIZIPHINUS PERSPECTIVUS, Koch.
Trochus perspectivus, Koch; Phil. Abbild. *Trochus*, p. 2. t. 1. f. 5.
 Hab. —?
37. ZIZIPHINUS MINIATUS, Anton.
Trochus miniatus, Anton, Verzeich. p. 58; Phil. Abbild. *Trochus*, t. 1. f. 7.
 Hab. —?
38. ZIZIPHINUS GILVUS, Phil.
Trochus gilvus, Phil.
 Hab. —?
39. ZIZIPHINUS METAFORMIS, Phil.
Trochus metaformis, Phil.; Kust. Conch. Cab. t. 43. f. 13.
 Hab. —?
40. ZIZIPHINUS ZONAMESTUS, A. Adams. *Z. testa obliquè pyramidalis, umbilicatà, carneà, cingulis transversis granosis permultis ornatà; interstitiis purpurascensibus, striis obliquis longitudinalibus; anfractibus planis, supra suturas angulatis, ultimo acutè angulato, basi plano-concavà, cingulis granulatis insculptà; umbi-*

lico magno, infundibuliformi, intus albo; aperturá rhomboideá, intus albá; columellá rectá, basi truncatá.

Hab. Honduras (Dyson).

0521.1953 41. ZIZIPHINUS TICAONICUS, A. Adams. *Z. testá elevato-conicá, perforatá, luteá vel carneá, liris transversis rufo articulatis prope suturas ornatá; anfractibus paulum rotundatis, longitudinaliter striatis, apice atro-purpureo; anfractu ultimo subangulato, basi convexiusculá, cingulis rufo-articulatis insculptá; aperturá subquadratá; columellá rectá, anticè subtruncatá; aperturá intus albá.*

Hab. Island of Ticao, sandy mud, 6 fathoms (H. C.).

42. ZIZIPHINUS JAPONICUS, A. Adams. *Z. testá turrito-conicá, lævi, nitidá, imperforatá; anfractibus planis, basi lineis duabus impressis, ultimo angulato, rubrá flammulis fuscis et albidis ornatá, basi convexá, cingulis articulatis insculptá; aperturá subquadratá, intus viride iridescenti.*

Hab. Japan.

43. ZIZIPHINUS ELEGANTULUS, A. Adams. *Z. testá conicá, imperforatá, lutescenti; anfractibus planis, lineis elevatis distantibus granulatis moniliformibus violaceis alternis minoribus cinctá; interstitiis longitudinaliter striatis; basi planiusculá, cingulis quatuor violaceis ornatá; aperturá subquadratá, intus albá; columellá basi subtruncatá.*

Hab. Malacca, coral sand, 10 fathoms (H. C.).

44. ZIZIPHINUS DECUSSATUS, A. Adams. *Z. testá elevato-conicá, subperforatá, albidá, maculis viridibus longitudinalibus ornatá; anfractibus planis, basi marginatis, prominulis; cingulis transversis granulatis lineisque elevatis longitudinalibus decussatè insculptá; anfractu ultimo angulato, basi convexiusculá, cingulis granulatis ornatá; aperturá subquadratá; columellá rectá, basi truncatá.*

Hab. Calipan, Mindoro, coarse gravel, 12 fathoms (H. C.).

45. ZIZIPHINUS RUBROPUNCTATUS, A. Adams. *Z. testá parvá, orbiculato-conicá, lutescenti; cingulis transversis spinulosis ornatá (in anfractu ultimo quatuor), interstitiis clathratis pulcherrimè rubro-punctulatis.*

Hab. — ?

46. ZIZIPHINUS UNICINCTUS, A. Adams. *Z. testá turrito-conicá, imperforatá, luteolá; anfractibus planis, subimbricatis, basi cingulis prominulis rubro-articulatis lineisque transversis confertis ornatís; anfractu ultimo angulato, basi productá, lineis concentricis et cingulá elevatá articulatá sculptá; aperturá subtrigoná; columellá rectá, basi subcanaliculatá.*

Hab. Lord Hood's Island, on pearl oysters, 8 to 10 fathoms (H. C.).

47. *ZIZIPHINUS NEBULOSUS*, A. Adams. *Z. testá conoideá, imperforatá, rufo-fuscá albo variegatá; anfractibus planiusculis, cingulis inæqualibus granorum ornatá, ultimo subangulato, basi convexiusculá, cingulis subgranulosis rufo alboque articulatis ornatá; aperturá subtetragoná; columellá albá, incurvatá, basi subtruncatá; labro intus lirato.*

Hab. Rains Island (*Ince*).

48. *ZIZIPHINUS PICTURATUS*, A. Adams. *Z. testá turrito-conicá, imperforatá, viridi aut violaceá, fasciis undulatis lineisque ziczaciformibus ornatá; anfractibus planis, basi marginatis crenulatis, lineis impressis transversis sculptá; anfractu ultimo angulato, basi convexiusculá; aperturá subquadratá, intus albá; columellá incurvá, basi truncatá.*

Hab. Delaguete, island of Negros, sandy mud, 7 fathoms (*H. C.*).

49. *ZIZIPHINUS ASPERULATUS*, A. Adams. *Z. testá conicá, imperforatá, albidá, maculis purpureis radiatim ornatá; anfractibus planiusculis, in medio carinatis, cingulis inæqualibus ornatá, superioribus granulatis, inferioribus subplanis; anfractu ultimo subangulato, basi planá, cingulis planis insculptá; regione umbilicali depressá, callo obtectá; aperturá subrotundá; columellá rectá, basi truncatá; labro intus lirato.*

Hab. — ?

50. *ZIZIPHINUS POLYCHROMA*, A. Adams. *Z. testá turrito-conicá, perforatá, viridi, fasciis albidis undulatis, lineis luteis angulatis variè pictá; anfractibus planis, subimbricatis; basi marginatis articulatis prominulis, lineis transversis subdistansibus impressis ornatá, longitudinaliter substriatá; anfractu ultimo angulato, basi convexiusculá, cingulis luteo articulatis insculptá; aperturá subquadratá, intus viridi; columellá rectá, basi subtruncatá.*

Hab. Island of Masbate, sandy mud, 7 fathoms (*H. C.*).

51. *ZIZIPHINUS DUPLICATUS*, A. Adams. *Z. testá turrito-conicá, imperforatá; anfractibus convexis cingulis granorum ornatá; basi cingulis duabus majoribus prominentibus instructis; interstitiis longitudinaliter striatis; anfractu ultimo subrotundato, basi convexiusculá, cingulis granorum insculptá; aperturá subrotundatá; labro intus lirato; columellá basi tuberculo terminatá.*

Hab. — ?

52. *ZIZIPHINUS CALIFORNICUS*, A. Adams. *Z. testá elevato-conicá, imperforatá, rufescenti; anfractibus subrotundatis, supra excavatis, liris transversis granulosis, duabus, supra suturam, majoribus; anfractu ultimo subrotundato, basi convexiusculá; aperturá subquadratá; columellá rectá, anticè subtuberculatá.*

Hab. California. (*Mus. Cuming.*)

Genus 10. CANTHIRIDUS, Montfort.

Eleuchus, sp. Humph.; Swains.—*Phasianella*, c., Menke.—*Trochus*, sp. Philippi.

1. CANTHIRIDUS IRIDIS, Chemn.

Trochus iridis, Chemn. Conch. v. t. 161. f. 1522-23.—*Trochus iris*, Gmel.

Hab. — ?

2. CANTHIRIDUS PURPURATUS, Martyn.

Trochus purpuratus, Martyn; Chemn. v. t. 161. f. 1524-25.—*Trochus notatus*, Gmel.—? *Trochus elegans*, Gmel.—? *Phasianella rubella*.

Hab. — ?

3. CANTHIRIDUS NITIDULUS, Phil.

Trochus nitidulus, Phil.; Kust. Conch. Cab. pl. 43. f. 10.

Hab. — ?

4. CANTHIRIDUS CINGULIGER, A. Adams. *C. testá elevato-conicá, cinereá, punctis fuscis in lineis flammulatis dispositis, transversim sulcatá; anfractibus planis, cingulá prominenti supra suturam, anfractu ultimo angulato, cingulo plano cincto; umbilicó subobtecto; columellá rectá; labro intus albo, lævi.*

Hab. — ?

5. CANTHIRIDUS PUNCTULOSUS, A. Adams. *C. testá elevato-conicá, imperforatá, lævi, nitidá, cinereá, transversim sulcatá; cingulis transversis, luteo alboque punctatis nigro-maculatis ornatá; anfractibus planis, ultimo acutè angulato; regione umbilicali roseá; aperturá subquadratá; columellá albá, rectá, anticè subtruncatá; labro intus lævi, limbo punctulato.*

Hab. Swan River, 4 fathoms (Jukes).

6. CANTHIRIDUS ZEALANDICUS, A. Adams. *C. testá obliquè conicá, subturritá, imperforatá, lævi, nitidá; atro-purpureá, lineis pallidis transversis, ubique cinctá; anfractibus paulum convexis; aperturá obliquá, subrotundatá; labio albo, simplici, arcuato; labro intus sulcato, margaritaceo, vividè iridescenti.*

Hab. New Zealand.

7. CANTHIRIDUS MONILIGER, A. Adams. *C. testá elevato-conicá, imperforatá, cinereá, cingulis moniliformibus transversis ornatá; interstitiis longitudinaliter elevatè striatis; anfractibus planis, apice purpureo, suturá canaliculatá; anfractu ultimo angulato; aperturá subquadratá; columellá anticè subtruncatá; labro intus sulcato.*

Hab. Swan River, 8 fathoms (Jukes).

8. CANTHIRIDUS ARTICULARIS, A. Adams. *C. testá elevato-conicá, lævi, nitidá, cinereá; cingulis confertis, nigro alboque*

articulatis ornatá; interstitiis longitudinaliter striatis; anfractibus planis, ultimo angulato, basi planiusculá, cingulis articulatis sculptá; aperturá subquadratá; columellá anticè subtruncatá; labro intus lævi, limbo articulado.

Hab. —?

9. *CANTHIRIDUS ARTIZONA*, A. Adams. *C. testá elevatè conoideá, pallidá; cingulis carneolis angustis elevatis transversis ornatá; interstitiis transversim striatis; anfractu ultimo angulato; aperturá intus viridescenti; labro intus lirato, limbo rufo articulado.*

Hab. —?

10. *CANTHIRIDUS RUFOZONA*, A. Adams. *C. testá conoideá, pallidá, cingulis rubris transversis interstitiis planis ornatá; anfractu ultimo rotundato; labro intus albo, lævi, limbo rufo-articulado; columellá albá.*

Hab. —?

11. *CANTHIRIDUS TENEBROSUS*, A. Adams. *C. testá parvá, elevato-conicá, imperforatá, subnigrá, transversim sulcatá, sulcis albicantibus planis; anfractibus paulum convexis, ultimo subangulato, basi convexá; aperturá subrotundatá, intus albá, margaritaceá; labro intus sulcato.*

Hab. —?

12. *CANTHIRIDUS NIGRICANS*, A. Adams. *C. testá depresso-conicá, atro-purpureá, cingulis elevatis transversis ornatá; interstitiis longitudinaliter obliquè striatis; anfractu ultimo subangulato; labro intus albo, sublævi, limbo nigro.*

Hab. —?

13. *CANTHIRIDUS PALLIDULUS*, A. Adams. *C. testá elevato-conicá, imperforatá, pallidá; cingulis transversis elevatis luteo-articulatis ornatá; interstitiis concinnè longitudinaliter striatis; columellá subrectá, in medio tumidá; labro intus lirato.*

Hab. Australia.

Genus 11. *ELEŦCHUS*, Swains.

Phasianella, d., Menke.—*Canthiridus*, sp. Gray.

1. *ELEŦCHUS BADIUS*, Wood.

Trochus badius, Wood, Ind. Test. Suppl. pl. 6. fig. 46.

Hab. —?

2. *ELEŦCHUS ROSEÛS*, Lamk.

Monodonta rosea, Lamk. Hist. An. s. Vert. t. vii. p. 37.

Hab. —?

3. *ELEŦCHUS LINEATUS*, Lamk.

Monodonta lineata, Lamk. Hist. An. s. Vert. t. vii. p. 38.

Hab. —?

4. *ELEÜCHUS IRISODONTES*, Quoy & Gaim.
Trochus irisodontes, Quoy & Gaim. Voy. de l'Astr. iii. p. 246.
 t. 63. f. 7-12.—*Monodonta virgata*, Menke.
Hab. —?
5. *ELEÜCHUS BELLULUS*, Dunker.
Trochus bellulus, Dunker; Phil. Abbild. t. 7. f. 6.
Hab. —?
6. *ELEÜCHUS APICINUS*, Menke.
Monodonta apicina, Menke, Moll. Nov. Holl. sp. p. 15.
Hab. —?
7. *ELEÜCHUS LEUCOSTIGMA*, Menke.
Trochus leucostigma, Menke; Phil. Abbild. t. 7. f. 7.—*Phasi-
 nella leucostigma*, Menke.—*Canthiridus variegatus*, Gray.
Hab. —?
8. *ELEÜCHUS AUSTRALIS*, Quoy & Gaim.
Trochus australis, Quoy & Gaim. Voy. de l'Astr. pl. 63. f. 13, 14.
Hab. —?
9. *ELEÜCHUS SPLENDIDULUS*, Swains.
Eleuchus splendidulus, Swains. Treatise on Malacol. p. .
Hab. —?
10. *ELEÜCHUS VULGARIS*, A. Adams. *E. testá ovato-conoideá,
 subturritá, imperforatá, lævigatá, virenti, transversim tenuis-
 simè striatá; lineis undulatis viridis pictá, basi convexá; aper-
 turá ovatá; columellá basi dente acuto terminatá; labro posticè
 subangulato.*
Hab. Swan River.
11. *ELEÜCHUS RUTILUS*, A. Adams. *E. testá turrítico-conicá,
 imperforatá; spirá acuminatá, virido-fuscá, lineis longitudina-
 libus rufescentibus ornatá, transversim striatá; anfractu ul-
 timo vix angulato; aperturá intus vividè iridescente; labro
 viridí marginato.*
Hab. Australia.

Genus 12. *BANKIVIA*, Deshayes.

1. *BANKIVIA PURPURASCENS*, Beck.
Bankivia purpurascens, Beck; Deshayes, Manuel de Conchylio-
 logie.—*Bankivia varians*, Gray, MS. Mus. Brit.
Hab. Australia.
2. *BANKIVIA MAJOR*, A. Adams. *B. testá ovato-turritá, nigro-
 fuscá albo variegatá, lævigatá, longitudinaliter obliquè striatá;
 anfractu ultimo ventricosó, transversim sulcato; columellá albá,
 tortuosá.*
Hab. Australia. Mus. Cuming.

3. *BANKIVIA NITIDA*, A. Adams. *B. testá turritá, acuminatá, carneolá, suturis nigricantibus, lævi, nitidá, transversim tenuissimè striatá; columellá anticè tortuosá; labro ad marginem nigricante.*

Hab. Australia. Mus. Cuming.

Genus 13. *THALOTIA*, Gray.

Elenchus, sp. Humph.—*Helenchus*, Herman.

1. *THALOTIA PICTA*, Wood.

Trochus pictus, Wood, Ind. Test. Suppl. pl. 5. f. 28.—*Thalotia picta*, Gray.—*Monodonta turrita*, Menke.

Hab. New Holland.

2. *THALOTIA PULCHERRIMA*, Wood.

Trochus pulcherrimus, Wood, Ind. Test. Suppl. pl. 6. f. 45.—*Trochus Preissii*, Menke.—*Trochus porcatus*, Philippi.

Hab. New Zealand.

3. *THALOTIA AUSTRALIS*, Quoy et Gaim.

Trochus australis, Quoy et Gaim. Voy. de l'Astrol. pl. 63. f. 13, 14.

Hab. Australia.

4. *THALOTIA LEHMANNI*, Menke.

Trochus Lehmanni, Menke, Moll. Nov. Holl. sp. p. 18.—? *Phasianella elegans*, Lamarck.

Hab. New Holland.

5. *THALOTIA ELONGATA*, Wood.

Trochus elongatus, Wood, Ind. Test. Suppl. pl. 5. f. 19.—*Trochus attenuatus*, Jonas.

Hab. —?

6. *THALOTIA OBSCURA*, Wood.

Trochus obscurus, Wood, Ind. Test. Suppl. pl. 5. f. 26.—*Trochus signatus*, Jonas.

Hab. —?

7. *THALOTIA PYRGOS*, Phil.

Trochus pyrgos, Phil. Kust. Conch. Cab. pl. 43. f. 14.

Hab. —?

8. *THALOTIA ZEBUENSIS*, A. Adams. *Th. testá elevato-conoided, perforatá, atro-fuscá, fasciis longitudinalibus ornatá, transversim sulcatá; anfractibus planulatis, ultimo rotundato, basi convexá; labio subrecto, anticè reflexo, dilatato; aperturá sub-circulari, intus albá; labro intus lævi, atro-marginato.*

Hab. San Nicholas, island of Zebu, sandy mud, 6 fathoms (H.C.).

9. *THALOTIA STRIGATA*, A. Adams. *Th. testá turrito-conicá, perforatá, albidá, fasciis latis rufo-fuscis radiatá; anfractibus in*

medio angulatis porcis transversis subgranulosis, interstitiis longitudinaliter striatis ornatá, basi convexá, concentricè porcatá; umbilico aperto; aperturá subrotundatá; columellá subflexuosá, basi truncatá; labro intus lirato, margine crenulato.

Hab. Swan Point, N. Australia (*Dring*).

10. *THALOTIA ZEBRIDES*, A. Adams. *Th. testá turrítico-conicá, subperforatá, virescenti, lineis atro-purpureis longitudinalibus ornatá, porcis transversis confertis sculptá, longitudinaliter striatá, basi convexá; umbilico subobtecto; columellá sinuatá, callo terminatá; labro intus lirato, margine atro-purpureo articulatá.*

Hab. —?

11. *THALOTIA SUTURALIS*, A. Adams. *Th. testá conicá, subperforatá, virescenti, lineis purpureis longitudinalibus undulatis ornatá, transversim liratá, longitudinaliter striatá; anfractibus planis, supra suturam elevatis; suturá canaliculatá, basi planiusculá; columellá brevi, basi tuberculo terminatá; labro intus lævi, viridi.*

Hab. Cape Upstart, Torres Straits, Australia, under stones, low water (*Dring*).

12. *THALOTIA TRICINGULATA*, A. Adams. *Th. testá conicá, imperforatá, nigrá, lineis albis longitudinalibus ornatá; anfractibus angulatis, ultimo cingulis tribus transversis prominentibus instructo, basi convexá, cingulis concentricis nigro alboque articulatis ornatá; labio ad basin tuberculato; aperturá subrotundatá, intus albá; labro intus liris elevatis, atro-marginato.*

Hab. —?

13. *THALOTIA CRENELLIFERA*, A. Adams. *Th. testá elevato-conicá, imperforatá, rufescente, rubro maculosá; spirá acuminatá, apice rubro; anfractibus planulatis, liris confertis, crenellatis, transversis, interstitiis obliquè longitudinaliter striatis; anfractu ultimo subangulato, basi convexiusculá; aperturá subquadratá, intus albá; columellá albá, incurvatá, anticè truncatá.*

Hab. Australia. Mus. Cuming.

Genus 14. MONODONTA, Lamarck.

Monodon, Schweiger.—*Monodontes*, Montfort.—*Odontis*, Sow.—*Trochidon*, Swains.—*Diloma*, Phil.—*Trochulus*, sp. Humph.

1. MONODONTA LABIO, Linn.

Trochus Labio, Linn. Syst. Nat. ed. 12. no. 595. p. 1230; Chemn. Conch. pl. 166. fig. 1579–81. v. p. 60.

Hab. —?

2. MONODONTA TURBINATA, Gmel.

Trochus turbinatus, Gmel. t. 63. f. D. E.

Hab. —?

3. MONODONTA ASPERA, Chemn.

Trochus asper, Chemn. v. pl. 166. f. 3582.

Hab. —?

4. MONODONTA CANALIFERA, Lamck.

Monodonta canalifera, Lamck. Hist. An. s. Vert. tom. vii. p. 35.

Hab. —?

5. MONODONTA AUSTRALIS, Lamck.

Monodonta australis, Lamck. Hist. An. s. Vert. tom. vii. p. 35;

Chemn. Conch. ii. t. 196. f. 1890, 1891.

Hab. —?

6. MONODONTA ATRATA, Gmel.

Turbo atratus, Gmel. 3601; Chemn. Conch. pl. 177. f. 1754, 1755.—*Monodonta canaliculata*, Lamck.—*Monodonta Fermoni*, Payr.

Hab. Island of Ticao, on stones on the reefs, low water (H. C.).

7. MONODONTA VIRIDIS, Lamck.

Monodonta viridis, Lamck. Hist. An. s. Vert. tom. vii. p. 35.Hab. Port Essington (*Jukes*).

8. MONODONTA TRICARINATA, Lamck.

Monodonta tricarinata, Lamck. Hist. An. s. Vert. vii. p. 36.

Hab. —?

9. MONODONTA BACCATA, Menke.

Monodonta baccata, Menke, Moll. Nov. Holl. sp. p. 14. no. 51.

Hab. New Holland.

10. MONODONTA DUNKERI, Koch.

Monodonta Dunkeri, Koch, Phil. Abbild. Trochus, tab. 2. f. 5.

Hab. —?

11. MONODONTA PHILIPPII, Koch.

Monodonta Philippii, Koch, Phil. Abbild. Trochus, tab. 2. f. 6.

Hab. —?

12. MONODONTA CRENULATA, Menke.

Monodonta crenulata, Menke, Moll. Nov. Holl. sp. p. .

Hab. —?

13. MONODONTA ASPERSA, Koch.

Trochus aspersus, Koch, Zeit. fur Malac. 1846, July, p. 103.

Hab. —?

14. MONODONTA INDECORA, Phil.

Trochus indecorus, Phil. Zeit. fur Malac. 1846, July, p. 104.

Hab. —?

15. MONODONTA GEMMATA, Gould.

Trochus (Monodonta) gemmatus, Gould, Exp. Shells, p. .

Hab. Sandwich Islands.

16. MONODONTA INCONSPICUA, Phil.

Trochus (Monodonta) inconspicuus, Phil. Kust. Conch. Cab. t. 43.
f. 12.

Hab. — ?

17. MONODONTA RUGULOSA, A. Adams. *M. testá ovato-conoideá, depressá, atro-fuscá, fasciis latis luteo-albis irregulariter pictá, cingulis rotundatis interruptis ornatá; columellá basi bituberculatá, canali parallelo instructá, dente magno acuto terminatá; labro duplicato, intus lirato.*

Hab. — ?

18. MONODONTA CIRCUMCINCTA, A. Adams. *M. testá ovato-conoideá, imperforatá, lævi, nitidá, crassá, cingulis rubris albo viridí maculatis alternantibus pictá; anfractibus convexis; columellá basi tuberculatá, dente magno acuto terminatá; labro duplicato, intus lirato.*

Hab. Island of Ticao, on the stones on reefs at low water (H. C.).

19. MONODONTA TUBERCVLATA, A. Adams. *M. testá ovato-conoideá, imperforatá, crassá, viridescenti, cingulis tuberculorum oblongorum violaceorum ornatá; anfractibus convexis; columellá basi trituberculatá, canali parallelo instructá, dente prominente acuto terminatá; labro duplicato, intus lirato.*

Hab. — ?

Subgenus ARADASIA, Gray.

Operculum suborbicular, paucispiral.

Aradasia, Gray, in Mrs. Gray's Figures of Molluscos Animals, p. 90.
—? *Otavia*, Cantr.

20. MONODONTA SULCIFERA, A. Adams. *M. testá globoso-conicá, umbilicatá, fuscá, cingulis granorum distantium moniliformibus, interstitiis profundè sulcatis, sulcis sublævibus longitudinaliter striatis ornatá; columellá ad basin trisulcatá, dente parvo acuto instructá; labro tenui, intus sulcato.*

Hab. Roebuck Bay, North Australia (*Dring*).

21. MONODONTA CLATHRATA, A. Adams. *M. testá ovato-conoideá, albá, imperforatá, cingulis subgranosis distantibus ornatá, in anfractu ultimo septem, interstitiis costulis longitudinalibus eleganter clathratis; columellá tuberculo parvo terminatá; labro intus sulcato.*

Hab. Guidulman, island of Bohol, rocky ground, 60 fathoms (H. C.).

22. MONODONTA TRICINGULATA, A. Adams. *M. testá globoso-conoideá, umbilicatá, rubente, albo et fusco variegatá, cingulis parvulis granorum ornatá; suturá canaliculatá; anfractibus convexis, carinis tribus transversis prominentibus cinctis; umbilico profundo; columellá ad basin tuberculo parvo terminatá; labro expanso, tenui, intus lævi.*

Hab. Malacca; Singapore, fine sand, 6 fathoms (H. C.).

23. **MONODONTA PHILIPPINA**, A. Adams. *M. testá globoso-conicá, perforatá, fuscá nigro punctatá; cingulis granulatis inæqualibus ornatá, interstitiis clathratulis; umbilico parvo; columellá tuberculo parvo terminatá; labro intus sulcato.*
Hab. Puerto Galero, island of Mindoro, in coarse sand, 9 fathoms; Bolinao, province of Zambales, island of Luzon, sandy mud, 10 fathoms (*H. C.*).
24. **MONODONTA EDENTULA**, A. Adams. *M. testá ovato-conoideá, umbilicatá, fuscá, costellis transversis imbricatis, interstitiis clathratis sculptá; anfractibus valde rotundatis; umbilico infundibuliformi; columellá subrectá, basi tuberculo terminatá; labro margine crenulato.*
Hab. Catbalonga, island of Samar, sandy mud, 6 fathoms (*H. C.*).
 Mus. Cuming.
25. **MONODONTA FOVEOLATA**, A. Adams. *M. testá globoso-conoideá, subperforatá, crassá, albá, cingulis transversis nodulosis subdistantibus (in anfractu ultimo septem), interstitiis costellis longitudinalibus foveolatis ornatá; columellá dente minuto terminatá; labro intus crasso et lirato.*
Hab. Lord Hood's Island, on pearl oysters, 8 to 10 fathoms (*H. C.*).
 Mus. Cuming.
26. **MONODONTA EXIGUA**, A. Adams. *M. testá parvá, conoideá, umbilicatá, albidá fusco variegatá, cingulis transversis granulosis interstitiis longitudinaliter liratis ornatá; anfractibus parum convexis, ultimo subangulato; umbilico recto, dente valido acuto terminatá; labro intus sulcato.*
Hab. Japan (*Siebold*).
27. **MONODONTA RUBRA**, A. Adams. *M. testá globoso-conoideá, umbilicatá, rubrá, cingulis transversis granorum moniliformibus æquantibus interstitiis lineis longitudinalibus impressis ornatá; anfractibus rotundatis, suturá canaliculatá, umbilico magno; columellá rectá, dente prominente terminatá; labro intus crasso, sulcato.*
Hab. — ?
28. **MONODONTA ALVEOLATA**, A. Adams. *M. testá globoso-conoideá, umbilicatá, albidá, fasciis fuscis longitudinalibus undulatis pictá, cingulis transversis granorum acutorum interstitiis costis longitudinalibus alveolatis ornatá; suturá canaliculatá; umbilico angusto; columellá rectá, dente valido terminatá; labro intus valde lirato.*
Hab. Guidulman, island of Bohol, rocky ground, 60 fathoms; Baclayon, island of Bohol, under stones, low water; island of Capul, on the reefs at low water (*H. C.*). Mus. Cuming.
29. **MONODONTA ANGULIFERA**, A. Adams. *M. testá elevato-conoideá, imperforatá; anfractibus planiusculis, imbricatis, inferrè angulatis, longitudinaliter nodoso-costatis, cingulis trans-*

versis tuberculorum subdistantium interstitiis alveolatis ornatá; anfractu ultimo subangulato; columellá rectá, brevi, dente parvo terminatá; labro subduplicato, intus sulcato.

Hab. Puerto Galero, island of Mindoro, sandy mud, 6 fathoms (H. C.). Mus. Cuming.

30. MONODONTA STRANGEI, A. Adams. *M. testá conoideá, perforatá, fuscá, cingulis granorum æqualibus confertis ornatá; anfractibus parum convexis, ultimo subangulato; columellá curvatá, dente obtuso terminatá; labro intus sulcato, tuberculo propè basin columellæ.*

Hab. Sydney, under stones (Strange).

31. MONODONTA PUNCTIGERA, A. Adams. *M. testá globoso-conoideá, umbilicatá, albá fusco punctatá, cingulis granulosis inæqualibus rufo-punctatis ornatá; suturá canaliculatá; anfractibus rotundatis; umbilico aperto, infundibuliformi; columellá rectá, brevi, basi bituberculatá, dente parvo acuto terminatá; labro expanso, intus sulcato.*

Hab. Singapore, fine sand, 6 fathoms (H. C.). Mus. Cuming.

32. MONODONTA EXASPERATA, A. Adams. *M. testá globoso-conoideá, umbilicatá, subdepressá, albidá nigro-variegatá, cingulis spino-granulatis exasperatá; columellá sinuatá, dente prominenti terminatá; labro incrassato, duplicato, intus valde lirato.*

Hab. Sibonga, island of Zebu, at low water (H. C.); island of Siquijor, under stones. Mus. Cuming.

33. MONODONTA SPILOTA, A. Adams. *M. testá parvâ, ovato-depressâ, conoideá, imperforatâ, lævi, nitidâ, viridí, maculis pallidis triangularibus; columellá planâ, albâ, canali parallelo instructâ, dente obtuso terminatá; labro duplicato, intus lirato.*

Hab. — ?

34. MONODONTA LIROSTOMA, A. Adams. *M. testá elevato-conicâ, imperforatâ, albidâ; anfractibus planis, cingulis tribus granulatis, interstitiis valde clathratis; suturá canaliculatá; anfractu ultimo angulato; columellá tuberculatá; labro intus valde lirato.*

Hab. Lord Hood's Island, on pearl oysters, 8 to 10 fathoms (H. C.). Mus. Cuming.

Genus 15. LABIO, Oken.

Osilimus, Philippi.—*Trochius*, Leach.—*Gibbium*, Gray.—*Monodonta*, sp. Lamck.—*Melagraphia*, Stentz.

1. LABIO CONSTRICTA, Lamck.

Monodonta constricta, Lamck. Hist. An. s. Vert. tom. vii. p. 36.—*Monodonta interrupta*, Menke (olim).—*L'Oslin*, Adanson.

Hab. Australia.

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2. LABIO TESSELLATA, Chemn.

Trochus tessellatus, Chemn. Conch. t. 166. f. 1583-87.—*Trochus tessellatus*, Born.—*Monodonta fragarioides*, Lamck.—*Monodonta Olivieri*, Payr.

Hab. New Zealand.

3. LABIO ZEBRA, Wood.

Trochus zebra, Wood, Ind. Test. Suppl. pl. 5. f. 18.—*Trochus atratus*, Wood.

Hab. ———?

4. LABIO RETICULARIS, Wood.

Trochus reticularis, Wood, Ind. Test. Suppl. pl. 5. f. 35.—*Turbo lunaris*, &c., Chemn. Conch. pl. 185. f. 1849.—*Tr. concameratus*, Wood.

Hab. New Zealand and Australia.

5. LABIO ARTICULATA, Lamck.

Monodonta articulata, Lamck. Hist. An. s. Vert. tom. vii. p. 36.—*Monodonta Draparnaudii*, Payr.

Hab. Malta.

6. LABIO SULCATA, Wood.

Trochus sulcatus, Wood, Ind. Test. Suppl. pl. 6. f. 40.

Hab. New Zealand (*Earl*).

7. LABIO TENIATA, Quoy et Gaim.

Trochus tæniatus, Quoy et Gaim. Voy. de l'Astrol. p. 249. pl. 63. f. 15-17.

Hab. New Zealand.

8. LABIO STRIOLATA, Quoy et Gaim.

Trochus striolatus, Quoy et Gaim. Voy. de l'Astr. p. 253. pl. 63. f. 18-22.

Hab. Australia.

9. LABIO ZEALANDICA, Quoy et Gaim.

Trochus Zealandicus, Quoy et Gaim. Voy. de l'Astr. p. 237. pl. 64. f. 12-15.

Hab. New Zealand.

10. LABIO CINGULATA, Quoy et Gaimard.

Trochus cingulatus, Quoy et Gaim. Voy. de l'Astr. p. 259. pl. 64. f. 16-20.—*Trochus radula*, Philippi.

Hab. New Zealand.

11. LABIO NIGERRIMA, Gmel.

Turbo nigerrimus, Gmel. Chemn. v. pl. 185. f. 1848.

Hab. New Zealand (*Earl*).

12. LABIO SUBROSTRATA, Gray.

Monodonta subrostrata, Gray.

Hab. Australia.

13. LABIO MELANOLOMA, Menke.
Monodonta melanoloma, Menke, Moll. Nov. Holl. specim. p. 14.
 no. 50.—*Trochus melanonoma*, Phil. Abbild. p. 22.
Hab. New Zealand.
14. LABIO TAMSII, Dunker.
Trochus Tamsii, Dunker, Phil. Abbild. Trochus, t. 5. f. 3.
Hab. South Africa; Guinea; Cape of Good Hope.
15. LABIO SCORPIO, Gray.
Monodonta scorpio, Gray.
Hab. New Zealand.
16. LABIO PICA, Chemn.
Turbo pica, Chemn. Conch. v. pl. 175. f. 1850.—*Trochus zebri-*
nus, Philippi.
Hab. New Zealand.
17. LABIO LINEATA, Da Costa.
Turbo lineatus, Da Costa, Brit. Conch. p. 100. pl. 6. f. 7.—*Trochus*
crassus, Pultney.—*Monodonta lugubris*, Lamk.—*Trochus punctula-*
tus, Blainv.—*Monodonta crassa*, MacGill.—*Trochus lineatus*, Forbes
 & Hanley.
Hab. British Islands.
18. LABIO TURGESTINA, Phil.
Trochus turgestinus, Phil. Kust. Conch. Cab.
19. LABIO INDECORA, Phil.
Trochus indecorus, Phil. Kust. Conch. Cab.
20. LABIO FULGURATA, Phil.
Trochus fulguratus, Phil. Kust. Conch. Cab.
21. LABIO CRINITUS, Phil.
Trochus crinitus, Phil. Kust. Conch. Cab.
22. LABIO PORCATA, A. Adams. *L. testá ovato-conoideá, imper-*
foratá, fuscá albo reticulatá; anfractibus convexis, transversim
carinatis, carinis numerosis, elevatis, distantibus; labio albo,
inferne subcalloso; labro intus sulcato.
Hab. Australia.
23. LABIO PORCIFERA, A. Adams. *L. testá orbiculato-conicá,*
imperforatá, fulvescente, liris transversis æquidistantibus nigro-
articulatis ornatá; longitudinaliter obliquè striatá; labio plano,
regione umbilicali impresso; columellá tuberculis duobus, infe-
riore majore; labro intus duplicato, margine luteo nigro-articu-
lato.
Hab. —?
24. LABIO RUDIS, A. Adams. *L. testá orbiculato-conicá, imper-*
foratá; spirá obtusá, lutescente, lineis transversis nigris ornatá,

longitudinaliter obliquè striatá, transversim subexaratá; labio complanato; columellá anticè subtuberculatá; labro nigro luteoque intus marginato.

Hab. Australia.

25. LABIO FULIGINEA, A. Adams. *L. testá orbiculato-conicá, imperforatá, nigrá, liris transversis æquidistantibus luteo-articulatis ornatá; regione umbilicali impressá; columellá tuberculis duobus, antico majore; labro duplicato, nigro-marginato.*

Hab. — ?

26. LABIO CORROSA, A. Adams. *L. testá turbinatá, imperforatá, spirá elevatiusculá, anfractibus rotundatis, rugosá, cinereo-lutescente; anfractu ultimo subangulato; labio complanato; columellá simplici; labro luteo marginato.*

Hab. New Zealand (*Hart*).

27. LABIO CONCOLOR, A. Adams. *L. testá turbinato-conicá, imperforatá; spirá acutá, brunneá, longitudinaliter obliquè striatá, transversim subliratá; labio complanato, regione umbilicali impresso; columellá arcuatá, anticè tuberculo terminatá; labro nigro-fusco marginato.*

Hab. New Zealand (*Hart*).

Genus 16. CHLOROSTOMA, Swainson.—*Oxystele*, Philippi.

1. CHLOROSTOMA ARGYROSTOMA, Chemn.

Trochus argyrostomus, Chemn. v. pl. 165. f. 1562, 1563.

Hab. Cape of Good Hope.

2. CHLOROSTOMA AGRESTE, Chemn.

Trochus agrestis, Chemn. v. pl. . f. 1645, 1646.—*Trochus rusticus*, Gmel.

Hab. South Seas.

3. CHLOROSTOMA NIGERRIMUM, Gmel.

Trochus nigerrimus, Gmel.; Chemn. v. pl. . f. 1647.

Hab. New Zealand.

4. CHLOROSTOMA ATRUM, Lesson.

Trochus ater, Lesson, Voy. de la Coquille, Moll. pl. 16. f. 2.—*Trochus atropurpureus*, Jonas.

Hab. Valparaiso, under stones (*H. C.*).

5. CHLOROSTOMA MÆSTUM, Jonas.

Trochus mæstus, Jonas, Zeit. f. Malac. 1844, August, p. 113.

Hab. Chili.

6. CHLOROSTOMA TIGRINUM, Chemn.

Trochus tigrinus, Chemn. v. pl. 165. f. 1566.

Hab. Algoa Bay.

7. **CHLOROSTOMA CARINATUM**, Koch.
Trochus carinatus, Koch, Phil. Abbild. Troch. t. 2. f. 3.
Hab. Valparaiso, 6 fathoms, coarse sand (*H. C.*).
8. **CHLOROSTOMA EURYOMPHALUS**, Jonas.
Trochus euryomphalus, Jonas, Zeit. f. Malac. 1844, August, p. 113.
Hab. West coast of America.
9. **CHLOROSTOMA STENOMPHALUS**, Jonas.
Trochus stenomphalus, Jonas, Zeit. f. Malac. 1844, August, p. 114.
 —*Trochus tridens*, Jonas, olim.—*Trochus microstomus*, D'Orbigny.
Hab. Valparaiso.
10. **CHLOROSTOMA MERULA**, Chemn.
Trochus merula, Chemn. v. pl. 165. f. 1564, 1565.—*Trochus Sinen-*
sis, Gmel.—*Trochus lugubris*, Lamk.
Hab. Cape of Good Hope.
11. **CHLOROSTOMA MARGINATUM**, Nuttall.
Trochus marginatus, Nuttall, MSS.
Hab. Upper California.
12. **CHLOROSTOMA CICER**, Menke.
Trochus cicer, Menke, Phil. Abbild. Troch. t. 3. f. 5.
Hab. —?
13. **CHLOROSTOMA SAGITTIFERUM**, Lamk.
Trochus sagittiferus, Lamck. Hist. An. s. Vert. tom. vii. p. .
Hab. —?
14. **CHLOROSTOMA TABULARE**, Krauss.
Trochus tabularis, Krauss, Sudafrik. Mollusk. p. 97. t. 5. f. 30.
Hab. Cape of Good Hope.
15. **CHLOROSTOMA LÆVE**, Chemn.
Trochus lævis, Chemn. Conch. v. p. 171. f. 1670.—*Trochus lævi-*
gatus, Gmel.—*Trochus Richardi*, Payraud.
Hab. —?
16. **CHLOROSTOMA SAUCIATUM**, Koch.
Trochus sauciatum, Koch, Phil. Abbild. Trochus, t. 5. f. 7.
Hab. —?
17. **CHLOROSTOMA BICANALICULATUM**, Dunker.
Trochus bicanaliculatus, Dunker, Phil. Abbild. Troch. t. 5. f. 4.
Hab. —?
18. **CHLOROSTOMA PFEIFFERI**, Philippi.
Trochus Pfeifferi, Phil. Zeit. f. Malac. 1846, July, p. 104.
Hab. —?

19. CHLOROSTOMA G ALLINA, Forbes.
Trochus gallina, Forbes, Moll.-Kellett's Voy. 7, 2, 3, 1856. 271
 Hab. —?
20. CHLOROSTOMA PULLIGO, Martyn.
Trochus pulligo, Martyn.
 Hab. —?
21. CHLOROSTOMA IMPERVIUM, Menke.
Trochus impervius, Menke, Spec. Moll. Nov. Holland.—*Trochus suavis*, Phil. Kust. Conch. Cab. pl. 42. f. 1.
 Hab. New Holland.
22. CHLOROSTOMA ODONTIS, Wood.
Trochus odontis, Wood, Ind. Test. Suppl. pl. 6. f. 37.
 Hab. Port Philip, on the rocks at low water (Jukes).
23. CHLOROSTOMA CASTANEUM, A. Adams. *C. testá obliquè conicá, umbilicatá, castaneá; anfractibus planis, longitudinaliter obsolete nodoso-plicatis et obliquè striatis, penultimo infra marginato, ultimo acutangulo, basi concavo pallidè fuscá, lineis viridi-fuscis radiatim pictá; umbilico infundibuliformi, perspectivo, intus albo, peromphalo albo lined elevatá cincto; apertura subrhomboidé; columellá supra sinuatá, basi dente terminatá.*
 Hab. —?
24. CHLOROSTOMA UNDULOSUM, A. Adams. *C. testá globoso-conicá, imperforatá; spirá depressá, virescenti lineis undulatis atro-purpureis longitudinalibus ornatá, longitudinaliter substriatá; labio complanato, margine columellari subtuberculato; labro intus sulcato, margine luteo, atro-purpureo articulado.*
 Hab. New Zealand (Earl).
25. CHLOROSTOMA TURBINATUM, A. Adams. *C. testá turbinatá, profundè umbilicatá, nigrá; spirá obtusá, longitudinaliter subplicatá, transversim sulcosá; anfractu ultimo rotundato, regione umbilicali partim callo lutescente obtectá; columellá anticè bituberculatá; labro nigro marginato.*
 Hab. —?
26. CHLOROSTOMA RUGOSUM, A. Adams. *C. testá turbinato-conoidali, profundè umbilicatá, luteo-fuscá, nigro variegatá, longitudinaliter nodoso-plicatá, transversim sulcatá; anfractu ultimo rotundato, infra suturam angustato; columellá incurvatá, anticè bituberculatá, tuberculo supremo magno, prominente; labro fusco marginato.*
 Hab. —?
27. CHLOROSTOMA CORRUGATUM, A. Adams. *C. testá orbiculato-conoidali, profundè umbilicatá; spirá subacutá, longitudi-*

naliter corrugato-plicatá et obliquè striatá; anfractu ultimo subrotundato, basi plano convexo, regione umbilicali albedo subcalloso; columellá tuberculis duobus, supremo magno.

Hab. —?

28. *CHLOROSTOMA TROPIDOPHORUM*, A. Adams. *C. testá orbiculato-depressá, profundè umbilicatá; spirá brevi, nigrá, transversim sulcatá, cingulis transversis prominentibus ornatá; anfractu ultimo carinato, basi concentricè exarato, regione umbilicali albo sulco circulari circumdato; columellá tuberculis duobus, supremo acuto, prominente.*

Hab. Valparaiso.

29. *CHLOROSTOMA MACULOSUM*, A. Adams. *C. testá conicá, profundè umbilicatá, viridi-fuscá, maculis nigro-fuscis ornatá; anfractibus planulatis, longitudinaliter substriatis, transversim striatis; anfractu ultimo angulato, basi concavo; columellá anticè tuberculo acuto terminatá.*

Hab. —?

30. *CHLOROSTOMA SEMINODOSUM*, A. Adams. *C. testá depresso-conicá, profundè umbilicatá, fuscá; anfractibus planulatis, supernè subnodosis, longitudinaliter obliquè striatis; anfractu ultimo angulato, supra angulum cingulá transversá elevatá ornato, basi planiusculá; columellá tuberculis duobus, supremo acuto, prominente.*

Hab. —?

31. *CHLOROSTOMA ARTICULATUM*, A. Adams. *C. testá orbiculato-conicá, umbilicatá, nigro-fuscá, cingulis transversis elevatis albo-articulatis ornatá; anfractu ultimo subangulato, basi cingulis albo-articulatis instructo, regione umbilicali viridí; columellá tuberculo parvo terminatá.*

Hab. —?

32. *CHLOROSTOMA XANTHOSTIGMA*, A. Adams. *C. testá conoidé, imperforatá, glabrá, nigrá, longitudinaliter obliquè substriatá; anfractibus parum rotundatis, basi concentricè lirato, luteo-carneolo; regione umbilicali callo luteo obtectá; columellá arcuatá, basi dente terminatá et infra tuberculo instructá.*

Hab. —?

33. *CHLOROSTOMA TURBINATUM*, A. Adams. *C. testá ovato-conoidé, imperforatá, castaneá, lævi, longitudinaliter obliquè striatá, striis transversis indistinctis insculptá; anfractibus rotundatis, suturá angustè canaliculatá, regione umbilicali impressá; labio curvato, basi dente et tuberculo terminatá; labro intus sulcato.*

Hab. —?

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Genus 17. GIBBULA, Leach.

Trochus, sp. Linn.—*Steromphala*, Leach.—*Monodonta*, sp. Lam.

1. GIBBULA MAGUS, Linn.

Trochus magus, Linn. Syst. Nat. ed. 12. p. 1228.—*Trochus tuberculatus*, Da Costa.

Hab. British Islands.

2. GIBBULA FANULUM, Gmel.

Trochus Fanulum, Gmel., Petiver, Gazoph. t. 156. f. 15.

Hab. Malta.

3. GIBBULA DECLIVIS, Forskal.

Turbo declivis, Forsk. Descr. Anim. p. 126; Chemn. Conch. pl. 171. f. 1663, 1664.—*Trochus Ægyptiacus*, Gmel.

Hab. Suez.

4. GIBBULA CINERARIA, Linn.

Trochus cinerarius, Linn. Syst. Nat. ed. 12. p. 1229.—*Trochus lineatus*, Da Costa.—*Trochus perforatus*, Smith.—*Trochus inflatus*, Blainv.—*Trochus versicolor*, Andrg.—*Trochus lineolatus*, Potiez and Mich.—*Trochus littoralis*, Brown.—*Trochus electissimus*, Bean.

Hab. British Islands.

5. GIBBULA SCABRA, Linn.

Trochus scaber, Linn. Syst. Nat. ed. 10. no. 510. p. 785; Chemn. Conch. t. 171. f. 1667.

Hab. European Seas.

6. GIBBULA QUADRATA, Gmel.

Trochus quadratus, Gmel., Wood, Ind. Test. pl. 29. f. 45; Chemn. Conch. pl. 171. f. 1683.—*Trochus Biasoletti*, Philippi.—*Trochus magulus*, Deshayes.

Hab. Mediterranean.

7. GIBBULA FUSCATA, Born.

Trochus fuscatus, Born, Test. Mus. Cæsar. t. 12. f. 1, 2.—*Trochus umbilicaris*, Lamk. (not Linn.)

Hab. —?

8. GIBBULA CINEREA, Montague.

Trochus cinereus, Mont., Donov. Nat. Hist. Brit. Sh. v. t. 155. f. 3.

Hab. Britain.

9. GIBBULA DIVARICATA, Linn.

Trochus divaricatus, Linn. Syst. Nat. ed. 12. p. 1229.—*Trochus rarilineatus*, Michaud.—? *Turbo sanguineus*, Gmel.

Hab. Mediterranean.

10. GIBBULA TUMIDA, Montague.

Trochus tumidus, Mont. Test. Brit. t. 10. f. 4.—*Trochus Rackettii*,

Payr.—*Trochus patholatus*, Dillw.—? *Trochus nassaviensis*, Chemn.
—*Trochus nitens*, Woodward.—*Margarita undulata*, var. *trochiformis*, Forbes.—Fry, *Skenea serpuloides*, Macgillivray.

Hab. British Islands, Mediterranean.

11. GIBBULA ADANSONII, Payraud.

Trochus Adansonii, Payr. Cat.—*Trochus radiatus*, Phil.—*Trochus turbinoides*, Desh.—*Trochus euzinicus*, Andrg.

Hab. Corsica, France.

12. GIBBULA AGATHENSIS, Recluz.

Trochus Agathensis, Recluz.

Hab. —?

13. GIBBULA VARIA, Gmel.

Trochus varius, Gmel.—*Trochus varians*, Desh.—*Trochus Gabal-dianus* (quibusd.).—*Trochus lævigatus*, Gmel.?

Hab. —?

14. GIBBULA MULTICOLOR, Krauss.

Trochus multicolor, Krauss, Sudafrik. Moll. t. 5. f. 31.

Hab. Cape of Good Hope.

15. GIBBULA PHILBERTI, Recluz.

Trochus Philberti, Recl.

Hab. —?

16. GIBBULA JUCUNDA, Gould.

Trochus jucundus, Gould, Expedition, Shells, p. 56.

Hab. —?

17. GIBBULA CAPENSIS, Gmel.

Trochus Capensis, Gmel. Syst. Nat. no. 40; Chemn. Couch. v. t. 171. f. 1661, 1662.

Hab. Cape of Good Hope.

18. GIBBULA VULNERATA, Philippi.

Trochus vulneratus, Phil. Zeit. f. Malac. 1846.

Hab. —?

19. GIBBULA FASCIATA, Born.

Trochus fasciatus, Born.—*Trochus canaliculatus*, Phil.—*Monodonta Feronii*, Payr.

Hab. —?

20. GIBBULA UMBILICATA, Montague.

Trochus umbilicatus, Mont. Test. Brit. p. 286.—*Trochus umbilicaris*, Pennant.—*Trochus umbilicalis*, Da Costa.—*Trochus obliquoradiatus*, Chemn.—*Trochus cinerarius*, Pultney.

Hab. British Islands.

21. GIBBULA ROTELLIFORMIS, Philippi.

Trochus rotelliformis, Phil. Zeit. f. Malac. 1846.

Hab. —?

22. GIBBULA ADELAIDÆ, Philippi.

Trochus Adelaideæ, Phil. Zeit. f. Malac. 1846.

Hab. —?

23. GIBBULA OBLIQUATA, Gmel.

Trochus obliquatus, Gmel. Syst. Nat.; Wood, Suppl.

Hab. —?

24. GIBBULA FUMOSA, Philippi.

Trochus fumosus, Phil. Zeit. f. Malac. 1846.

Hab. —?

25. GIBBULA SULCOSA, A. Adams. *G. testá conoideá, umbilicatá, maculis roseis flammulis albo-punctatis variegatá, anfractibus paulum convexis, longitudinaliter substriatá, transversim sulcatá, sulcis subdistantibus, anfractu ultimo subangulato, basi convexiusculá, lineis impressis concentricis sculptá; aperturá suborbiculari; columellá supernè sinuatá, basi subtruncatá.*

Hab. Sir C. Hardy's Island, North Australia, 8 fathoms, coarse sand (Mr. Jukes).

26. GIBBULA MINDORENSIS, A. Adams. *G. testá elevato-conoideá, perforatá, viridi-fuscá, fasciis pallidis longitudinalibus ornatá; anfractibus rotundatis, liris transversis subgranulosis cinctis, ultimo subangulato, basi convexá; columellá subrectá, basi tuberculo terminatá; labro intus sulcato.*

Hab. Puerto Galero, island of Mindoro, in coarse sand, 9 fathoms (H. C.).

27. GIBBULA UNDOSEA, A. Adams. *G. testá orbiculato-conoideá, umbilicatá, virescenti, lineis fusco-viridibus undatis longitudinalibus pictá; anfractibus rotundatis, transversim tenuè liris, ultimo subangulato, basi convexá; aperturá expansá, intus iridescenti; columellá supernè sinuatá, basi rotundatá.*

Hab. —?

28. GIBBULA PORCELLANA, A. Adams. *G. testá depresso-conicá, latè umbilicatá, glabrá, solidá, nitidá, lacteá, lineis radiantibus undulatis pulcherrimè pictá; anfractibus planis cingulis prominentibus, duabus maculis albis et rufo-fuscis vividè pictis ornatá; interstitiis transversim sulcatis, basi convexiusculá, cingulis concentricis lineis maculisque rufo-fuscis ornatá; umbilico perspective, intus concentricè lirato, margine lineá elevatá cincto; columellá subrectá, basi rotundatá.*

Hab. New Holland.

29. GIBBULA PULCHRA, A. Adams. *G. testá orbiculato-conicá, umbilicatá, roseá, ad suturam albo luteo fuscoque radiatim pulcherrimè pictá; anfractibus planis, biangulatis, transversim sulcatis, sulcis rubro-articulatis, anfractu ultimo angulato, cingulá albo luteo nigro fuscoque eleganter pictá, basi convexá, concentricè sulcatá; umbilico intus albo, basi rotundatá.*

Hab. Australia.

30. GIBBULA KALINOTA, A. Adams. *G. testá orbiculato-conoidéá, perforatá, virescenti, carneo cinereo variegatá; anfractibus rotundatis, lineis elevatis albo-articulatis, supernè gibbosis; suturá profundá, anfractu ultimo rotundato, basi convexá, cingulis articulatis concentricis ornatá, margine umbilici angulato, lined elevatá cincto; columellá supernè sinuatá, basi subtruncatá; labro intus lævi.*

Hab. —?

31. GIBBULA VENUSTA, A. Adams. *G. testá orbiculato-conoidéá, umbilicatá, viridi-fuscá, maculis albis prope suturas, cingulis subdistantibus fusco rubroque articulatis, interstitiis liratis, longitudinaliter obliquè striatá; anfractibus supernè gibbosis, rubro pictis; suturá canaliculatá, anfractu ultimo rotundato, basi convexiusculá, cingulis fusco alboque articulatis, regione umbilicali roseo pictá; columellá sinuatá, basi truncatá.*

Hab. Australia. Sicily

32. GIBBULA PUNCTO-COSTATA, A. Adams. *G. testá turrito-conicá, lutescenti, umbilicatá; anfractibus supernè cingulis tribus nodulosis, rubro-articulatis nodulis punctatis, infernè liris transversis nodulosis rubro-articulatis, infra, cingulá punctonodosá basi planá, cingulis concentricis subnodosis rubro-articulatis ornatá, margine umbilici lined elevatá cinctá; columellá subrectá, basi truncatá; labro intus lirato.*

Hab. Island of Capul, on the reefs at low water (H. C.).

33. GIBBULA LEUCOSTICTA, A. Adams. *G. testá conoidéá, perforatá, nigrá, punctis lacteis pictá, anfractibus convexiusculis, transversim lirátá, longitudinaliter striatá, liris subdistantibus albo-punctatis, interstitiis lineis elevatis transversis ornatá; anfractu ultimo angulato, basi convexiusculá, cingulis nigro alboque articulátá; aperturá subrotundatá; columellá supernè sinuatá, basi rotundatá.*

Hab. Gindulman, island of Bohol, rocky ground (H. C.).

34. GIBBULA NIVOSA, A. Adams. *G. testá orbiculato-conoidéá, umbilicatá, cinereá, maculis nivosis subrotundatis pictá, transversim sulcatá, longitudinaliter substriatá; aperturá subrotundatá; columellá flexuosá, basi rotundatá.*

Hab. —?

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Genus 18. MONILEA, Swainson.—*Talopia*, Gray.

1. MONILEA CALLIFERA, Lamk.

Trochus calliferus, Lamk. Hist. An. s. Vert. t. vii. p. 27.—*Trochus callosus*, Wood.

Hab. Philippines.

2. MONILEA CALYCVLUS, Wood.

Trochus calyculus, Wood, Ind. Test. Suppl. pl. 2. f. 44.—*Trochus Belcheri*, Philippi.

Hab. Eastern Seas.

3. MONILEA BENZI, Krauss.

Trochus Benzi, Krauss, Sudafr. Moll. p. 99. t. 5. f. 32.

Hab. South Africa.

4. MONILEA NUCLEUS, Phil.

Trochus nucleus, Phil. Zeit. f. Malac. 1846.

Hab. —?

5. MONILEA LENTIGINOSA, A. Adams. *M. testá orbiculato-conicá, umbilicatá, albidá, luteo fuscoque variegatá; anfractibus rotundatis, cingulis subgranulosis confertis ornatis, ultimo rotundato, basi convexiusculá, regione umbilicali excavatá; columellá supernè callosá, basi dente terminatá; labro intus lirato.*

Hab. Ilo Ilo, island of Panay, 7 fathoms (H. C.).

6. MONILEA KALISOMA, A. Adams. *M. testá orbiculato-conoideá, umbilicatá, lutescenti, cingulis purpureo-articulatis ornatá, cingulis subdistantibus, supremis granulatis, infimis planis; anfractibus planiusculis, ultimo subangulato, basi paulum convexá, cingulis purpureo-maculatis insculptá; columellá supernè sinuatá, basi dente terminatá; labro intus lirato.*

Hab. —?

7. MONILEA PLUMBEA, A. Adams. *M. testá orbiculato-conoideá, umbilicatá, plumbeá; anfractibus rotundis, cingulis granorum transversis in paribus dispositis ornatá, basi convexá; umbilico mediocri, intus albo; columellá brevi, supernè sinuatá, basi dente terminatá; labro intus lirato.*

Hab. —?

8. MONILEA LIRATA, A. Adams. *M. testá orbiculato-conicá, umbilicatá, pallidá; anfractibus paulum convexis, liris transversis elevatis distantibus, interstitiis decussatè striatis ornatis; anfractu ultimo angulato, basi convexá, margine umbilici sulco cincto.*

Hab. —?

9. MONILEA PUSILLA, A. Adams. *M. testá orbiculato-conicá, umbilicatá, rubescenti, fusco variegatá; anfractibus planiusculis, cingulis granorum transversum distantibus (circa quatuor)*

ornatis, interstitiis transversim striatis; columellâ in medio sinuatâ.

Hab. — ?

10. *MONILEA SWAINSONII*, A. Adams. *M. testâ conoideâ, umbilicatâ, albidâ, nigro variegatâ; anfractibus planis, cingulis subgranosis, albo nigroque articulatis ornatis, ultimo subangulato, basi planiusculâ, cingulis rufo-articulatis ornatâ; columellâ basi tuberculatâ; labro intus lirato.*

Hab. — ?

Genus 19. *MARGARITA*, Leach.—*Trochus*, sp. Auct.

1. *MARGARITA HELICINA*, O. Fabricius.

Turbo helycinus, O. Fabr. Faun. Grœnland. p. 393.—*Trochus neritoides*, Gmel.—*Turbo margarita*, Montag.—*Helix margarita*, Lasky.—*Phorcus margarita*, Risso.—*Trochus margaritus*, Gray.—*Margarita vulgaris*, Leach.—*Margarita arctica*, Gould.—*Margarita helicina*, Möller.—*Margarita margarita*, Brown.—*Margarita helicoides*, Beck.—*Turbo inflatus*, Totten.—*Paludina inflata*, Menke.

Hab. British Islands.

2. *MARGARITA GRÆNLANDICA*, Beck.

Margarita Grœnlandica, Beck; Sow. Conch. Illustr. f. 10.

Hab. Greenland.

3. *MARGARITA UMBILICALIS*, Brod. and Sow.

Margarita umbilicalis, Brod. and Sow. Zool. Journ. iv.; Conch. Illustr. f. 5.

4. *MARGARITA STRIATA*, Leach.

Margarita striata, Leach, Append. Ross's Voy. to North Pole; Gray, Zool. Journ. vol. ii. p. 567.—*Turbo carneus*, Lowe.—*Margarita carnea*, Sow.

Hab. — ?

5. *MARGARITA GLAUCA*, Möller.

Margarita glauca, Möller, Ind. Moll. Grœnland. p.

Hab. Greenland.

6. *MARGARITA UNDULATA*, Sowerby.

Margarita undulata, Sow. Conch. Illustr. f. 4.—*Turbo incarnatus*, Couthouy.

Hab. Casco Bay.

7. *MARGARITA OBSCURA*, Couthouy.

Turbo obscurus, Couthouy, Bost. Journ. Nat. Hist. ii. 100. pl. 3. f. 2.

Hab. — ?

8. *MARGARITA VAHLII*, Möller.

Margarita Vahlîi, Möll. Ind. Moll. Grœnland. p. 81.

Hab. Greenland.

9. MARGARITA ACUMINATA, Sowerby.

Margarita acuminata, Sow. Conch. Illustr. f. 7.*Hab.* — ?

10. MARGARITA COSTELLATA, Sowerby.

Margarita costellata, Sow. Conch. Illustr. f. 15.*Hab.* — ?

11. MARGARITA ARGENTEA, Gould.

Margarita argentea, Gould, Invert. Massachus. p. 256. f. 164.*Hab.* Casco Bay.

12. MARGARITA NITILIGINEUS, Menke.

Trochus nitiligineus, Menke, Spec. Moll. Nov. Holl. p.*Hab.* Misamis, island of Mindanao, sandy mud (*H. C.*).

13. MARGARITA CINEREA, Couthouy.

Turbo cinereus, Couthouy, Bost. Journ. Nat. Hist. ii. 99. pl. 3. f. 9.—*Trochus costalis*, Lovén.*Hab.* — ?

14. MARGARITA SULCATA, Sow.

Margarita sulcata, Sowerby, Conch. Illustr. f. 1.*Hab.* Greenland.

15. MARGARITA SOLARIIFORMIS, Sowerby.

Margarita solariiformis, Sow. Conch. Illustr. f.*Hab.* San Nicholas, island of Zebu, sandy mud, 6 fathoms (*H. C.*).

16. MARGARITA BICARINATA, Adams and Reeve.

M. bicarinata, Adams and Reeve, Moll. Voy. Samarang, pl. 11. f. 11.*Hab.* Eastern Seas.

17. MARGARITA CARINATA, A. Adams. *M. testá elevato-conicá, perforatá, fuscá, liris transversis ornatá, superioribus duabus costellis longitudinalibus decussatis, inferioribus planis, interstitiis longitudinaliter tenuissimè striatis; basi planiusculá, cingulis concentricis, interstitiis radiatim striatis insculptá; margine umbilici crenulato.*

Hab. Catbalonga, coarse sand, 8 fathoms (*H. C.*).

18. MARGARITA ANGULATA, A. Adams. *M. testá orbiculato-conicá, latè umbilicatá, albidá, fusco variegatá; anfractibus supra angulatis, transversim omnino striatis; basi convexá, concentricè striatá; umbilico magno, perspectivo.*

Hab. Sandwich Islands.

19. MARGARITA CALOSTOMA, A. Adams. *M. testá conoideá, crassá, perforatá, transversim valdè sulcatá, albidá; anfractibus subrotundatis, ultimo subangulato; aperturá rotundá, intus vividè violascenti iridescenti; umbilico callo, columellari subobtecto; labri margine argenteo.*

Hab. Juan de Fuco, Upper California.

20. MARGARITA CUMINGII, A. Adams. *M. testá elevato-conicá, cinereá, lineis fuscis undulatis pictá, latè umblicatá; anfractibus costellis transversis ornatis, ultimo tribus liris intermediis cincto, longitudinaliter elevatè striato; umbilico magno, cingulá crenulatá cinctá, intus lineis radiantibus et transversis eleganter decussato.*

Hab. Philippines.

21. MARGARITA VARIABILIS, A. Adams. *M. testá orbiculato-conicá, subdepressá, latè umblicatá, pallidá, fusco griseo alboque variè pictá; anfractibus rotundatis, transversim valdè sulcatis; umbilico perspectivo, margine crenulato; basi planiusculá; labio margine subrenulato.*

Hab. — ?

22. MARGARITA BALTEATA, A. Adams. *M. testá orbiculato-conicá, víx umblicatá, griseá, fusco tessellatá; anfractibus gibbosis, transversim valdè sulcatis; anfractu ultimo subangulato; basi planiusculá, concentricè sulcatá; columellá curvatá, víx truncatá.*

Hab. — ?

23. MARGARITA TESSELLATA, A. Adams. *M. testá depresso-conicá, latè umblicatá, lævi, cinereá, regulariter griseo tessellatá; anfractibus planiusculis, ultimo subangulato; basi convexá; umbilico intus albido; aperturá rotundá, intus viridi-iridescenti.*

Hab. — ?

Subgenus PHOTINA, H. and A. Adams.

Shell smooth, subconical; spire depressed; axis covered by a smooth callus; columella ending in a simple point.

This section includes all the species of *Margarita* that are not umbilicated.

1. PHOTINA TÆNIATA, Wood.

Trochus tæniatus, Wood, Ind. Test. Suppl. pl. 5. f. 12.—*Trochus bicolor*, Lesson, Voy. de la Coquille.—*Margarita tæniata*, Sow.

Hab. East Falkland (*Don*).

2. PHOTINA CÆRULESCENS, King.

Margarita cærulescens, King, Zool. Journ. vol. v.

Hab. — ?

3. PHOTINA EXPANSA, Sow.

Margarita expansa, Sow. Conch. Illustr. f. .

Hab. — ?

4. PHOTINA SIGARETINA, Sow.

Margarita sigaretina, Sow. Conch. Illustr. f. 14.

Hab. — ?

5. PHOTINA VIOLACEA, King.

Margarita violacea, King, Zool. Journ. vol. v. p. 346.

Hab. — ?

6. PHOTINA LINEATA, Sow.

Margarita lineata, Sow. Proc. Zool. Soc.

Hab. — ?

1874-1875

7. PHOTINA NIGRA, A. Adams. *P. testá depresso-conicá, imperforatá, solidá, nigrá, lævi; anfractibus subrotundatis, transversim sulcatis; longitudinaliter obliquè substriatá; anfractu ultimo subangulato; regione umbilicali impressá; callo albo obtecto.*

Hab. — ?

8. PHOTINA FUSCA, A. Adams. *P. testá obliquá, subconicá, nitidá, fusco variegatá; anfractibus parum convexis, transversim sulcatis, ultimo subangulato; aperturá subrotundatá, intus viridi iridescenti.*

Hab. — ?

B. 2, 1453

9. PHOTINA SANDWICHIANA, A. Adams. *P. testá orbiculato-conicá, imperforatá, lævi, albidá, viridi fuscoque maculatá; anfractibus rotundatis, ultimo subangulato, apice roseo; aperturá apertá, orbiculatá, intus viridi margaritacéa; labio albo; umbilico callo albo obtecto.*

Hab. Mataineka, Sandwich Islands.

Mr. Oswald then communicated the following remarks by Mr. Mack, on the fact of black eggs being laid by a white duck of the ordinary domestic breed:—

“The egg (observes Mr. Mack) which is herewith sent was laid by a white duck, one of two belonging to Mr. Dickinson of Mitcham, which stray during the day on the common, but are confined at night. The drake was lost about a month since, and then one of the ducks commenced laying black eggs, the other still continuing to lay white ones,—she laid ten or twelve and then ceased for some days; she has again commenced laying black eggs. The ducks are fed once a day with barley, at the time the other poultry are fed.

“Mr. Dickinson, showing the egg this morning to one of the guards on temporary duty on the Brighton rail at Croydon, he said he had a duck which laid the same colour, or even blacker, and that he had raised (at East Bourne) two broods of ducks from black eggs.”

Haling Cottage, Croydon, May 24, 1851.



J. Wood lith

M & N Hanhart In.

TÆNIOPTERA ERYTHROPYGIA. *Sclater*





J Wolf, lith.

M & N Hanhart

TENIOPTERA STRIATICOLLIS. *Sclater*

June 10, 1851.

John Gould, Esq., F.R.S., in the Chair.

The following papers were read:—

I. ON TWO NEW SPECIES OF BIRDS OF THE GENUS TÆNIOPTERA.
 BY PHILIP LUTLEY SCLATER, B.A., F.Z.S. ETC.

(Aves, Pl. XLI. XLII.)

TÆNIOPTERA ERYTHROPYGIA, Sclater. *T. nigrescens*; vertice fronte gulâque canescente-griseis; maculâ secundariorum alba; uropygio, abdomine toto crissoque, cum tectricibus caudæ superioribus et alarum inferioribus leviter brunneo-rufis; reetricibus brunneo-rufis nigro terminatis; rostro pedibusque nigris.

Long. tot. 9 unc. 5 lin.; alæ, 5 unc. 7 lin.; caudæ, 4 unc. 4 lin.; rostri à rictû, 1 unc.; à fronte, 6 lin.

Hab. in republicâ Equatorianâ.

Wings and interscapulars black, growing lighter towards the crown, and greyish white on front and throat; breast darkish grey; outer web of the last four or five secondaries broadly edged with white, forming a white mark on the wing; lower back and tail-coverts and whole body beneath below the breast, as also under wing-coverts, light brownish rufous; tail-feathers the same, but broadly tipped with black. For the loan of this and the following species I have to thank Mr. Edward Wilson, who received them from M. Verreaux of Paris. I was at first inclined to refer both species to the genus *Agriornis* of Mr. Gould, but having had through Mr. G. Gray's kindness an opportunity of examining the type of that form, *Agriornis lividus** (Kittlitz), I now consider them better placed in the present genus *Tænioptera*, with which they agree in all their distinctive characters.

TÆNIOPTERA STRIATICOLLIS, Sclater. *T. suprâ saturatè fumoso-brunnea*; uropygio paululùm rufescente tincto; superciliis rufescente-albidis; pennis caudâque nigris; secundariis tertiariisque leviter brunnescente marginatis; infrâ leviter brunneo-rufa; gutture toto colloque albis nigro striatis; reetricibus remigibusque brunneo-rufis nigro terminatis; rostro pedibusque nigris.

Long. tot. 9 unc. 5 lin.; alæ, 5 unc. 3 lin.; caudæ, 4 unc.; rostri à rictu, 1 unc. $\frac{1}{2}$ lin.; à fronte, $7\frac{1}{2}$ lin.

Hab. in republicâ Equatorianâ.

Above dark smoke-brown; an obscure whitish line from the bill to the top of the eye; quill-feathers brown-rufous, outer margins and ends black; secondaries, tertials, and wing-coverts nearly black, margined with light brown; beneath brown-rufous; chin, throat and neck white, with longitudinal striæ of black; tail-feathers brown-rufous, the two outer broadly tipped with black; the rest have also the outer web black, except the two medial, which are wholly black.

* *Tyrannus gutturalis*, Voy. de la Favorite, Ois. t. 11.

This species is of the same form as the former, from which it may be distinguished by its shorter and weaker beak, and the want of the rufous colouring on the rump and upper tail-coverts, as also by the conspicuous stræ on the neck and throat.

2. NOTES ON AN UNDESCRIBED SPECIES OF TAILOR-BIRD. BY DR. NICHOLSON.

It may appear irregular to use what has been meant and applied as a specific name, as a generic one, but then that name appears to me to include, and to be indiscriminately applied to, two or three distinct birds, as we may gather by looking at the accompanying sketch, by the examination of the species described by Colonel Sykes as inhabiting the Dukhun, and by reading the following description, taken from Forbes, 'Oriental Memoirs,' p. 34. vol. i., under the name of *Motacilla sutoria* :—"The Tailor-bird resembles some of the humming-birds at the Brazils in shape and colour; the hen is clothed in brown, but the plumage of the cock displays the varied tints of azure-purple, green and gold, so common in those American beauties." Often have I watched the progress of an industrious pair of Tailor-birds, in my garden, from their first choice of a plant, until the completion of the nest, and the enlargement of their young.

Now, it is evident either that Mr. Forbes alludes to a distinct and an uncommon species, which I have never met with, or else he must have mistaken the common *Cinnyris* or Sun-bird representing the Humming-birds, and both sexes of which he has generally described above. But then the *Cinnyris* builds a common-shaped nest in the fork of a branch, in fashion resembling that of the humming-birds.

This is a resident bird, not very conspicuous, as it keeps hopping about among the brushwood and plants. It has a loud, short, and not unmelodious song; its general cry is 'wheet, wheet, wheet,' often repeated; but its alarm-cry is like 'cheertah, cheertah, cheertah.'

I have found its singular sewn nest containing eggs or young at all seasons of the year, in May and in November; and this may be owing to the vegetation of gardens being always kept up by means of artificial irrigation; for cultivated spots seem its favourite, if not exclusive resort at least in the north of India. Though no doubt it haunts suitable jungles, I never observed it there, nor ever discovered its nest so situated; but I have found many nests in my gardens, both at Surat and at Raghote, as well as in Cutch. It seems to prefer the leaf of the Bringal (*Solanum esculentum*), or that of the *Cucurbita octangularis*, for the purposes of nidification; and it lays four small white eggs, marked with faint dark spots at the larger end. After selecting a fitting leaf, it proceeds by means of its feet and beak to draw the edges together, perforating holes therein, and securing their proximity by threads of cotton, with bunches at the end to prevent their giving way. Then the nest is constructed inside the leaf, now forming a sort of corve, with cotton; the entrance is at the top, and the nest seems small in proportion to the bird. If this





PLATE 100

M & N. Hanhart, L.

ARTWANKEN, *SCULLATIENSIS*, *Mich.* *son.*

bird should prove a distinct species, I would suggest the name of *Sutoria agilis* for it.

Weight of the male $2\frac{1}{2}$ drachms.

Length from bill to tail $5\frac{1}{4}$ inches. Alar extent $6\frac{1}{2}$ inches.

Head: bill long, slender and curved towards the point. Culmen slightly divides the frontal feathers, and is nearly on a line with the top of the head: there is an almost obsolete notch at the end of the upper mandible. Tongue short, slightly extensible, and divided into several filaments at the point. Gape wide, commissure under the eye; a small denuded spot above the commissure. Nostrils basal, pyriform, under a tegument; some small bristles and feathers reflexed from the canthus of the eye towards the bill and over the nares. Eyes small. Iris greenish yellow. Eyelashes edged with small feathers. Eyelids bare. Four remarkable (but inconspicuous) bristles, like feathers, project from the back part of the occiput.

Wings short and perfectly rounded; first quill only half as long as the second; fourth and fifth quills are longest; the second, third and fourth graduated; the first, third, fourth, fifth, sixth and seventh quills are emarginate on the outer web.

Tail of twelve graduated feathers, the two outer being the shortest; under-coverts are long.

Legs long, the tarsus $\frac{7}{8}$ ths of an inch; the outer toe longer than the inner. Hallux very strong, and as long as the outer toe, with a large pad beneath the base, its claw the largest; the tarsus is covered with seven scales in front and one entire behind; two large scales lie across the front of the foot; the claws are curved and sharp.

Contents of stomach a mass of insect exuvæ.

Colours: all above dull green, tinged with ash, light brown towards the end of the tail and quills, which are lighter on the edges. Two-thirds of the front breadth of the neck, round the eye, the breast, belly and thighs (except a chestnut spot on the hallux) are silver-white; there is, besides, a remarkable spot on the neck, of a brown colour, as if the white feathers had been deranged, showing the roots of a different colour. Bill ash-brown or horn-colour, the lower jaw lighter, and both lighter on the edges, as also are the legs and claws of the same colour; forehead of a fine chestnut; crown of olive-brown.

3. NOTES ON A NEW SPECIES OF ARTAMUS, FROM INDIA.

By DR. NICHOLSON.

(Aves, Pl. XLIII.)

These birds are only found in very thick jungles among the brush-wood, where they are always moving about, and are shot with great difficulty, and even then, if not killed outright, they are so tenacious of life, that they creep into the first hole or crevice they come to. The only note I ever heard was like 'chick, chick.' I think they

are residents, but the few I have seen just appear and are lost again in a moment, so that I know little of their habits; the one figured here had one leg and both wings broken, and still crept into the hole of a jerboa-rat, from which I dug it out dead.

Male: weight $6\frac{1}{2}$ oz.

Length from bill to tip of tail $7\frac{2}{3}$ inches. Alar extent 10 inches.

Head large. Bill strong, narrow and sharp, gently arched on the culmen; a distinct notch near the tip of upper mandible; gape wide. Tongue horny and divided at the point. Nostrils basal, small. Eye rather small. Iris of a silvery colour, tinged with yellow.

Wings rounded; first quill very short; third longest; second, third and fourth quills emarginate on outer web.

Tail short, and nearly even at the end, of twelve feathers, $2\frac{3}{4}$ inches long.

Tarsus strong. Hallux and claw stronger than the other toes, and as long as the inner toe, and has a large pad at its base; the outer toe is shortest; the claws are much hooked.

Contents of stomach were a few grains of *Holcus spicatus* and the exuviae of insects.

Plumage is soft and loose.

Colours: the whole top of the head is covered with a cap of black. Bill lead-colour at base and black at the point. The chin, the breast, and all underneath white; the body all above of a leaden colour. Quills and tail of a light black, edged with light on both webs; the outer web of the outer tail-feather is white, as well as the tips of the first five on each side. Feet and legs black.

I propose for this species the name of *Artamus cucullatus*.

4. OBSERVATIONS ON THE BREEDING OF THE NIGHTINGALE IN CAPTIVITY.

BY H. HANLEY, SERGEANT-MAJOR 1ST LIFE GUARDS.

Being of opinion that any bird which breeds in this country in a wild state, might, by studying its habits, be brought to do so in a state of captivity, I made preparations during the winter of 1844 for trying the Nightingale, which I considered to be the most retired in its habits of any of our summer visitants. I had a cage made, 4 feet long by 3 feet high, the back, ends and top solid, with a wire front, in which I placed a small Scotch fir-tree, planted in a flower-pot; to each end of the cage I attached a common-sized canary's breeding-cage, communicating with the large cage by a hole about 4 inches square. I broke a new birch-broom, and filled up the cages at each end, to make them resemble as near as possible the bottom of a thick hedge, and then put in a plentiful supply of withered oak-leaves and moss, of which the nightingale forms its nest, covering the fronts of the two small cages with green glazed calico: I placed the cages high up against a wall facing a landing-window. The following spring, that is, about the latter end of April 1845, I directed a bird-catcher (Blake, of John-street, Tottenham-court-road), who goes to Watford

every season to catch nightingales, to bring me a cock and hen bird which had paired naturally; he did so, and, fortunately, they meated off very readily. By "meating off," I mean that such birds as live on insect food will not peck at dead food until taught to do so, which is effected by enclosing meal-worms in a small glass tube, corked up at each end, and then placing the tube in their food; on pecking at the worm the beak slips off the glass amidst the food, which they swallow, and will afterwards go to it without the aid of a tube. On finding my birds feed freely in the small cage, in which until then I had confined them, I turned them into the place I had fitted up for them, and was much gratified, about a week afterwards, to observe the hen bird flying about with an oak-leaf in her beak. She made her nest in one of the small cages at the end of the large one; laid four eggs, of which she hatched and brought up three young ones. During the time she was sitting, the cock sang as well and as loud as I ever heard one in a wild state: when the young were excluded he left off singing, and was most assiduous in assisting to feed and rear them.

June 24, 1851.

J. E. Gray, Esq., F.R.S., Vice-President, in the Chair.

The following communications were made:—

1. ON A NEW GENUS OF ANOMIADÆ, IN THE COLLECTION
OF MR. CUMING.

By J. E. GRAY, Esq., F.R.S., V.P.Z.S., P.B.S. ETC.

TEDINIA.

Shell irregular, loosely lamellar; upper or right valve with a broad cardinal groove, and with three muscular scars, the upper small, oblong near the cartilage, the other two large, subcentral, upper sub-trigonal, lower oblong, transverse, united by a nearly straight medial cross line; left or attached valve with an elongated, triangular, convex cardinal ridge, with a deep groove on each side, having the cartilage on its inner edge, with two muscular scars, one small, half oblong near the cardinal ridge, the other large, subcentral, subcircular, and with a roundish circular hole near the upper edge, with a slight impression showing the grooves to the margin some distance from the cardinal ridge; the plug shelly, fixed into and exactly fitting the hole, with a triangular base sunk into the surface, commencing from the apex of the shell on the outer surface, and formed of erect shelly longitudinal plates within.

The shell has the plug and much the external appearance of the subgenus *Pododesmus*, but differs from it and all the other *Anomia-*

dæ in the following particulars: 1. That the line which indicates the junction of the two edges of the sinus which forms the perforation, instead of being placed on the side of the ridge which supports the cartilage, is placed at a considerable distance from it; 2. The sides of the sinus are firmly soldered together, leaving only a circular hole; 3. The support of the cartilage, instead of being merely a ridge or process, here forms a large elongated subtriangular talus, like that found in the genus *Ostrea*; 4. It differs greatly in the number and form of the muscular scars; the two large ones in the free valves are placed as in the genus *Placunanomia*, and there is a third anterior one in each valve not found in any genus of the family, and very unlike the third scar of the genus *Anomia*. I know only of a single specimen of the genus, which is in the collection of Mr. Cuming, who believes that it came from California. It may be called *Tedinia pernoides*; subquadrangular, reddish, subsquamose, obscurely radiated, internally reddish brown.

2. DESCRIPTION OF A NEW SPECIES OF BULIMUS FROM AUSTRALIA. BY LOVELL REEVE, F.L.S. ETC.

(Mollusca, Pl. XII.)

BULIMUS MACONELLI. *Bul. testâ acuminato-oblongâ, tenuiculâ, subobliquè convolutâ, spirâ brevî, suturis rudibus, anfractibus quatuor ad quinque, minutè et creberrimè spiraliter undulato-striatis, ultimo valdè inflato, columellâ subcontortâ, aperturâ subamplâ, labro simplici; brunned, maculis parvis punctisque nigris undique pictâ et seriatim fasciatâ, maculis infra suturas regularibus, aperturæ fauce fusciscente.*

Hab. Brisbane, Moreton Bay, Australia.

This fine species has been forwarded to me from the Manchester Museum of Natural History, with the above name attached to it in manuscript, by Captain Brown. It is chiefly remarkable on account of its absolute similarity in texture, in colour, and in pattern, to *Helix Falconari* of the same locality. It appears to differ in nothing but in that difference of convolution which characterizes the respective genera. Mr. Cuming possesses an exactly similar un-umbilicated specimen; and none of several examples of *H. Falconari*, with which it has been compared and which are all largely umbilicated, present any indication of an intermediate form. It is the first instance on record of a strictly typical richly painted *Bulimus* and *Helix* agreeing in colour, in pattern, and in all respects save that of form.

3. OBSERVATIONS ON THE DENTITION OF THE TIGER BEETLES. BY J. O. WESTWOOD, PRES. E.S., F.L.S. ETC.

Mr. Westwood directed the attention of the meeting to the necessity which existed of a more precise examination and description of the diversity in the dentition of the mandibles of insects, especially



W.H. Baile

Printed by Ballma and J. Walter.

BULIMUS MACONELLI. Reeve

Hymenoptera and Coleoptera, than had hitherto been bestowed thereon. In the higher orders of animals so much importance had been given to this character, that it was remarkable that, in general, entomologists contented themselves with examining, describing, and figuring a single mandible as affording a sufficient diagnosis of the structure of both of the mandibles, overlooking the necessary result which arose from the circumstance of the horizontal instead of perpendicular action of these organs in insects, and the variation in the position of the teeth which such action must necessarily induce. In general, indeed, the teeth of the mandibles were not greatly developed, and there was a general similarity between the two jaws; but when these organs are of an increased size, and especially when the extremity of one jaw laps over that of the opposite one, a diversity in the dentition will necessarily exist. It was likewise necessary to examine the mandibles of both sexes of a species, as it occasionally happened that there was considerable difference in their dentition. These observations were illustrated by the case of the Tiger Beetles (*Cicindelidæ*), which offered a much greater range of diversity in their dentition than had hitherto been supposed. It was chiefly to the genus *Megacephala* that Mr. Westwood directed the attention of the members.

In the type of that genus (*Megacephala senegalensis*, Latr., Dej., *Cic. megalcephala*, Fabr.), an apterous species from Senegal, the right mandible of the male has two large, nearly equal-sized, acute teeth in the middle of the inner margin, the extremity being hooked and very acute; there is also a small tooth at the base of the large, broad, compound basal tooth. The left mandible is nearly similar, except that the two teeth in the middle of the inner margin are unequal in size, the upper one being the smaller of the two. The figure of the jaws of this species, given in the Crochard edition of the Animal Kingdom (Ins. pl. 16. f. 2 a), is very incorrect, being apparently reversed. The dentition of the female is almost identical with that of the male. In the allied bat-winged African species, *Megacephala 4-signata*, Dej., from Senegal, the toothing of the mandibles is similarly arranged, but the two teeth in the middle of the inner margin, in both sexes, are broad and obliquely truncate. In the male of *M. euphratica* (which has recently been observed to extend from Spain to India), the teeth are nearly as in *M. senegalensis*, except that the subapical tooth of the left mandible is considerably smaller. But in the species lately received from the north-west of Australasia (*M. Australasica*, Hope), we find a different arrangement as well as number in the teeth, the right mandible having three teeth in the middle of the inner margin (exclusive of the small tooth* at the base of the upper side of the large compound basal tooth), the upper one small, the middle one very small, and lower one large, all being acute. The left mandible has also three teeth in the same position,—the

* This small tooth exists in all the species, and in both sexes; and as it appears to form part of the great basal tooth, I have omitted noticing it in the descriptions given in this paper.

upper one very small, and the middle and lower one large and nearly equal in size.

On turning to the New-World species of the genus, we find four variations in the dentition of the mandibles; the group of pale species typified by *M. æquinoctialis*, Dej. (*bifasciata*, Brullé), corresponds almost identically in the dentition of both sexes with the old type (*M. senegalensis*), as described above, the right mandible having two equal-sized large acute teeth in the middle of the inner margin, and the left one also two, the upper one being very small. For this group I have proposed the subgeneric name of *Ammosia*, in allusion to their habits, which differ materially from those of the other species.

A black-coloured species from South America (*M. sepulchralis*, Fabr., *M. variolosa*, Dej.) differs from the *Ammosia* in the left mandible, while the inner margin has only one tooth in the middle, of considerable size, and exhibiting on its *under* side a minute tooth, being all that remains of the large middle tooth of the left mandible of the *Ammosia*. This species is the type of Mr. Hope's subgenus *Anaira*.

Another very fine Brazilian species (*M. testudinea*, Klug) differs in the dentition of the sexes in a more striking manner than any of the preceding. The right mandible of the male is long and sickle-shaped, with a small tooth obliquely truncated below the middle of the inner margin, and between this and the tip of the jaw is a minute acute tooth. The left mandible has two teeth on the inner margin above the middle, the lower one broad and acute, but rather obliquely truncate, whilst the upper one is very small. The right mandible of the female, on the contrary, has two very large equal-sized teeth in the middle of the inner margin, whereas the left jaw in this sex is quite similar to that of the male.

There still remains a numerous group of American species (the type of which is *Cic. Carolina*, Linn.), which differ from the rest of their continental brethren in possessing three teeth in the middle of the inner margin of each jaw, thus resembling the Australian species above noticed, and hence I proposed the name of *Tetracha*, or four-toothed, for this group, counting the acute apical portion of the mandible as a fourth tooth. In general, in both sexes, the tooth next below the apex of the jaw is equal in size to, or even larger than, the apical part or tooth itself (thus differing from the Australasian species), and the middle of the three teeth is smaller than the rest; but in the left mandible in the males the tooth below the apical tooth is even still larger, whilst the middle tooth is much smaller, and the lower tooth is quite minute. In the female, on the contrary, the middle one of the three teeth of the inner margin is rather larger than the upper one (which is only of a moderate size), and the lower one is small.

From these particulars (united with the peculiarities of colouring, geographical range and habits of the species) we are enabled to propose well-founded subgenera, a task which has hitherto been considered hopeless in the genera of *Cicindelidæ*. The Old-World spe-





M. & N. Hanhart. Sc.

SARGATA PERNITA. MELANOP. P.

cies thus seem to form only one group, divisible however into still smaller sections from the presence or absence of wings, and form and colouring of the elytra; the Australian species stands alone; and the New-World species constitute the four following subgenera:—

AMMOSIA, Westw. Type, *M. bifasciata*, Brullé.

————, Westw. Type, *M. testudinea*, Klug.

ANAIRA, Hope. Type, *M. sepulchralis*, Fabr.

TETRACHA, Westw. Type, *M. Carolina*, Linn.

July 8, 1851.

In consequence of the death of the President, no meeting was held on this day.

July 22, 1851.

John Edward Gray, Esq., F.R.S. &c., Vice-President, in the Chair.

The following papers were read:—

1. ON THE LARGEST KNOWN SPECIES OF PHALERIDINE BIRD.
BY CHARLES LUCIEN, PRINCE BONAPARTE.

(Aves, Pl. XLIV.)

Among the new additions lately made to the British Museum I was struck by one of the *Alcidae*, which I had never seen before, and which was very properly placed close by two beautiful specimens of my singular *Ceratorrhina*, also lately added to the zoological treasures of the English nation. The bird which is the subject of the present note is evidently the *Labrador Awk* of Latham, so miscalled from the erroneous impression that it came from those eastern shores of America, but too well described not to be recognized. Gmelin compiled his *Alca labradora* from the description of Latham, and all those who did not follow him blindly, have referred that indication to an immature state of the Razor-bill (*Mormon arctica*), a course in which they were led by geographical consideration only. Although our bird belongs to the family of the *Alcidae*, it is not even an *Alcine*, as the Razor-bill, but, as is shown by the nakedness of the cere, it belongs to the other subfamily, or *Phaleridine*, of which it is at present the largest known.

In its family it is certainly allied to *Ceratorrhina*, but well deserving to constitute a genus by itself. The bill still more compressed, is in fact much more angulated beneath, and covered at the base, not by a bony process or *horn*, but by a soft membrane or *saddle*, which leaves a simple slit along the margins for the imperious nostrils.

GENUS NOVUM PHALERIDINARUM.

SAGMATORRHINA, Bp. Saddle-Bill.

Rostrum duplo longius quam altum; maxilla ad basin recta cerâ maximâ induta, apice incurva; mandibula ultra medium statim ascendens, angulum obtusum constituens; nares lineares, marginales.

As the bird has been so well described by Latham, Mr. G. R. Gray very properly suggests that its specific name should be taken from that author.

SAGMATORRHINA LATHAMI, Bp. *Maxima; nigricans; subtus albido-fuliginosa: rostro pedibusque rubris; cerâ palmisque nigris.*

Long. 16 poll.; rostr. 2 poll. long., 1 altum, $\frac{5}{8}$ latum ad basin, $\frac{3}{8}$ ad med.; alæ $7\frac{1}{2}$ poll.; cauda $3\frac{1}{2}$; tars. $1\frac{1}{4}$; digitorum longissimus $2\frac{3}{8}$.

This species is the largest of the subfamily, which is well known to contain the dwarfs of the Water birds; it is one-third larger than *Ceratorrhina monocerota*, of which it has precisely the colouring, wanting only (at least in the state we have it) the little white feathers above the eye and at the corners of the mouth. The proportions of wings, tail, feet and toes are the same: the bill and toes must have been reddish; the cere and membranes black. Like the *Ceratorrhina*, it seems to be confined to the North-western Arctic regions of America; and we are led to believe it does not extend to the Siberian shores, from the circumstance of its not having been noticed by Russian naturalists.

The well-marked family of *Alcidæ* forms, with the *Colymbidæ*, *Podicipidæ* and *Spheniscidæ*, the great section of the *Urinatores*, which, with the *Lamellirostres*, constitutes alone the Order *Anseres*, as it must be restricted to the *web-footed Præcoces* of Prof. Owen. The other two sections, *Longipennes* and *Totipalmi*, constitute now the Order *Gaviæ* of my *Conspectus*, being, in fact, *web-footed Altrices*, which have no more right to remain in *Anseres* than the *Pigeons* among the *Gallinæ*,—than the *Herodiones* among the *Grallæ*. The passage between my *Gaviæ* or *web-footed Altrices*, and my *Herodiones* or *grallatorial Altrices*, is beautifully exemplified by that most remarkable bird the *Balaniceps*, whose affinity with *Pelecanidæ* has so well been pointed out, and even exaggerated, by Mr. Gould. On the other hand, it is no less obvious that the *Longipennes*, some of which, with tumid bills, have been considered as *Sea-Pigeons*, connect them (the *Gaviæ*) with the *Columbæ*; whilst between the two subclasses the connections and correspondence (affinity and analogy) take place

in different degrees and by different means and sides, chiefly as exemplified in the following table:—

AVES.

- | | |
|---------------------------|----------------------------|
| 1. ALTRICES (Insessores). | 2. PRÆCOCES (Grallatores). |
| 1. PSITTACI. | |
| 2. ACCIPITRES. | |
| 3. PASSERES. | |
| <i>a.</i> OSCINES. | |
| <i>b.</i> VOLUCRES. | |
| 4. COLUMBÆ. | |
| <i>a.</i> INEPTI. | 8. STRUTHIONES. |
| <i>b.</i> GYRANTES. | 9. GALLINÆ. |
| 5. GAVIÆ. | 10. ANSERES. |
| <i>a.</i> TOTIPALMI. | <i>a.</i> LAMELLIROSTRES. |
| <i>b.</i> LONGIPENNES. | <i>b.</i> URINATORES. |
| 6. HERODIONES. | 7. GRALLÆ. |
| | <i>a.</i> ALECTRIDES. |
| | <i>b.</i> CURSORES. |

2. ON THE CHANGE OF COLOUR IN A CHAMÆLEON (*CHAMÆLEO VULGARIS*). By H. N. TURNER, JUN.

Notwithstanding that the peculiarity of the Chamæleon in changing its colour is so universally known, and that an illustrated work on the subject was published by Van der Höven, I have thought that a careful record of the varieties of tint, presented by the specimen which has lived for some time in my possession, might prove serviceable to the naturalist if compared with similar observations upon other species and upon the same one under different circumstances, and might also assist in the determination of the means by which it is effected, the influences by which it is regulated, and the objects which it serves in the œconomy of the animal.

Its general tints vary between different shades of brown, olive, yellow, and light green, the last-named being the most rarely observed, and the yellow being the tint usually assumed when the animal has been hidden from the light. This is the colour it always presents if taken for inspection at night, and when brought into the influence of lamp-light it appears at first almost white, but may soon be seen to darken and some of the markings to appear. The side that is next the light will change rather sooner than the other, the changes being always gradual. It has three distinct sets of markings, the first to appear being two ranges of irregular distant elongated spots, which may appear either as a dark tint upon the ground-colour when that is light, or a light one if it be dark. These marks are never entirely absent when either of the other sets is present, although sometimes but faintly discernible.

The other two sets of markings consist of an irregular marbling, and a number of full round spots; the latter never appear otherwise than as dark upon the ground-colour, and the marbling, which is generally also dark, only occasionally appears a little lighter than the ground-colour, and then of a different tone; either may be visible without the other, or both may be distinctly traceable. Sometimes the marbling will be apparent together with such of the spots as are placed within its intervals, those upon the surface occupied by the marbling being amalgamated with it.

When the general colour is light yellow or pale greenish, which is the case if the animal be suddenly brought into the light, the elongated spots, which form two rows on each side, will begin to appear of a very delicate purple tint. After that the marbling gradually shows itself, and the general tint begins to darken; when some time has elapsed a brown colour is assumed, and the elongate spots, at first purple of a darker tint than the yellow ground-work, are seen to be brown, of a lighter and rather richer tint than that which now pervades the whole. These distinctions may go on increasing, may then decrease and again increase; the spots may appear, may come and go with different degrees of intensity, so that the variety of appearances presented is almost indefinite. When visited in the day-time, the colour is generally brown, sometimes without markings, generally with the elongate spots of a lighter tint, and the marbling or the round spots, or both, more or less apparent. Occasionally it presents a uniform dull olive, and then has no markings. Sometimes it is of a light drab colour, with the different marks faintly indicated. The ventral series of prominent scales remains constantly white, as stated by Van der Höven, not participating in the changes of the surrounding parts.

This author does not in any of his plates represent the longitudinal rows of markings as a decided dark upon the ground-colour, nor is the marbling anywhere clearly shown as pervading the whole body; neither does he give the deep brown tint with the marbling as a dark, and the longitudinal rows of spots definitively marked as a light.

I have never seen my specimen present anything like the appearances delineated in his plates 4 and 5, probably because I have not irritated it.

It has generally been imagined that the purpose of this singular faculty accorded to the Chamæleon is to enable it to accommodate its appearance to that of surrounding objects, but the observations of Van der Höven seem to negative that idea, and the few experiments I have made with that view have not led to any such results. The box in which it is kept is of deal, with a glass at the top and a piece of flannel laid at the bottom; a small branching stick being introduced by way of a perch. I have introduced at various times pieces of coloured paper, covering the bottom of the box, of blue, yellow and scarlet, but without the slightest effect upon the appearance of the animal. Considering that these primary colours were not such as it would be likely to be placed in contact with in a state of nature, I next tried a piece of green calico, but equally without result. The animal went through all its usual changes, without their

being in any way modified by the colours placed underneath it. The general tints approximate, as may readily be observed, to those of the branches of trees, just as those of most animals do to the places in which they dwell; but I have never seen the faculty of changing called into play with any apparent object. It is only when the light is removed that the animal assumes a colour which absorbs but little of it.

Regretting that I have not been able to attain any more definite conclusions, I offer these few remarks, hoping that to some naturalist, who may undertake the investigation of these singular phænomena, they may prove not to have been thrown away.

Pimlico, July 1851.

3. ON THE ARRANGEMENT OF THE EDENTATE MAMMALIA.

BY H. N. TURNER, JUN.

In offering to the Society a summary of my observations on the craniology of the Edentate order, I have not so great a number of hitherto unrecorded facts to bring forward as in some of my former communications. The very remarkable modifications which this order is seen to present, not only in comparison with the rest of the Mammalian class, but also among its own members, and the wonderful variety of extinct gigantic species which the New World has yielded to research, have caused the osteology of the group to be more minutely investigated; while the small number of species and the striking external differences which they exhibit, have left but little room for doubt in the minds of naturalists as to their true arrangement. I will therefore simply point out such of the cranial peculiarities as seem to be characteristic of the order and of its families and genera, dividing it, as appears to me necessary, into five families, since the two forms inhabiting the Old World differ so much from each other, and from the three groups into which those of the New World naturally divide themselves, that although each consists of a single genus, and one of but a single species, it seems requisite that both should stand distinct. It will also be necessary to remodel the genera of the Armadilloes, and to define them anew by their external characters as well as by those of the skull, since the presence of a tooth in each of the intermaxillary bones of a single species of the family has prevented the essential similarities and differences from being duly appreciated.

Although some few naturalists may still associate this order with the true Ungulata, for the sake of keeping the divisions of the class within the predetermined number five, I think that most of those who have given particular attention to the subject will agree, that so natural and strongly-marked a group is well worthy of isolation, which was the opinion of Linnæus and Cuvier, although the former wrongly associated with it a few genera belonging properly to other groups.

The characters possessed in common by the members of so diver-

sified an order, must be expected to be comparatively few; those which I have observed in the skull are as follows:—

The tuberosity of the maxillary bone is articulated by the whole of its upper surface to the frontal and orbitosphenoid bones.

The zygoma is flat and straight, projecting at once outwards and forwards, its articulating surface being more or less confluent with a concavity at the inner side of it which forms a portion of a more or less elongated cone, whose apex would point backwards. In such forms as have the articulation longitudinal, the glenoid surface is distinguishable from that of Rodents by its posterior termination, which is *not* a thin free edge like the anterior.

The alisphenoid bone never extends high, so that the pterygoid ridge forms its upper boundary, or even extends above it.

The absence of enamel in the teeth, when they exist, must also be named among the cranial characters.

Fam. 1. BRADYPODIDÆ.

The intermaxillary bones confined to the lower part of the nasal opening; the maxillary bones provided with simple teeth, shortened, their malar processes much pushed forwards upon them, and the molar series converging behind; the posterior palatine foramina replaced by a series of minute openings extending the whole length of the palate; the malar bone having a descending masseteric process transversely compressed, longitudinally extended, and with a distinct superadded process arising between its frontal and zygomatic processes; the foramen rotundum distinct, and opening exteriorly at the base of the pterygoid process some distance below the sphenoorbital foramen and anterior to the foramen ovale; the zygoma straight and trigonal, its origin thick and extensive, reaching back quite to the posterior part of the squamous bone; the mastoid bone with a wide digastric fossa, and a strong thick styloid process, terminating in a circular concavity for the reception of the stylohyal bone; the lower jaw widened anteriorly with an extended symphysis.

It must be observed that the superadded process of the malar bone is peculiarly characteristic of this family, and is quite distinct from any of the processes of that bone to which special names have been assigned. It is situated between the frontal or postorbital and zygomatic processes, both of which seem also to exist in a more or less rudimental form in most of the known species; and when the latter is wanting as in the genus *Cholæpus*, the fact that the new process stands aloof, above the zygoma, is enough to prevent its being taken for the zygomatic process, which in all mammalia possessing a complete zygomatic arch either abuts simply against the extremity of the zygoma, or more generally seems to support it from beneath.

The zygomatic process is well developed in the *Megatherium*, and completes the arch, leaving the other, which might be called the supratemporal process, projecting above it. In *Myiodon robustus* the frontal process is reduced to a slight angle upon the base of the supratemporal process. In the *Scelidotherium* the process existing

above the zygomatic process appears to be broken off, but the obliquity of its base renders it improbable that it would be the true frontal process so largely developed.

The circular pit for the attachment of the stylohyal bone is precisely similar in the Sloths to that in the large fossil genera, and it is somewhat remarkable that Prof. Owen, while describing the character in these extinct forms, should have made no allusion to its existence in the recent Sloths, even though Cuvier expressly points it out. The tongue is largely developed in this family, and the living sloth may be seen to make great use of it in taking food into its mouth, as was observed by Mr. Ball, in a short communication published in the 'Proceedings' some years back. On the other hand, it is long and slender in the insect-feeding tribes, so that the maximum degree to which it was developed in the *Glossotherium* is certainly no indication that such was the food of that remarkable genus.

CHOLÆPUS, Illiger.

Intermaxillary bones small, produced anteriorly; postorbital process well-developed; malar bone with a well-marked frontal process, but no zygomatic process, the supratemporal process projecting backwards or bent a little upwards; pterygoid bones inflated; crotaphite impression approaching near to the occipital ridge; tympanic bone reduced to a simple ring; lower jaw produced anteriorly, straight below, its condyle depressed; teeth $\frac{5-5}{4-4}$, simple, rounded, the anterior ones in each jaw enlarged, trigonal.

C. didactylus.

BRADYPUS, Gray.

Intermaxillary bones reduced or wanting; postorbital process slightly developed; malar bone with the frontal and zygomatic processes slightly marked, the supratemporal process rising obliquely; pterygoid bones inflated; crotaphite impression terminating at a considerable distance from the occiput; tympanic bone well-developed, forming a bulla; lower jaw with a flattened square process in front, deep posteriorly, the lower outline convex, the condyle elevated; teeth $\frac{5-5}{4-4}$, simple, rounded, the anterior ones similar, small in the upper jaw.

B. crinitus.

In addition to the character of the pterygoids, which, in the absence of actual knowledge, might possibly have belonged to age or sex, I find this species to be clearly distinguishable from those of the next genus by the great distance that intervenes between the posterior termination of the temporal fossæ and the occiput, which is much greater in the old specimens even than in the young of the genus *Arctopithecus*. The occiput also differs from them in being proportionally smaller, of a rounder form; the digastric fossæ converging a little superiorly, instead of diverging as in the other genus. The lower jaw also presents a character more decided than the anterior pro-

duction which Mr. Gray points out in his paper on the genus *Bradypus*: it is much deepened behind, rendering the lower outline very convex. And further, there are certain characters pointed out by Cuvier in the 'Ossemens Fossiles' which appear to be constant, so far as I have been able to observe, as it is only in young specimens that the sutures are discernible. They are, first, that in this species, the *Ai à collier*, the nasal bones are bevelled towards the middle posteriorly, so that they form a point between the frontals, while in the other species they are bevelled in the opposite direction, the frontals descending between their extreme points. Secondly, that the palatine bone forms but a narrow slip within the orbit, and the alisphenoid bone occupies a much larger portion of the temporal fossa than in the other species.

The skull spoken of by Mr. Gray as being taken from a skin, presents characters intermediate between the other one and that upon which the *B. affinis* is founded, therefore I refrain from inserting the latter as a species until further evidences are obtained.

ARCTOPITHECUS, Gray.

Intermaxillary bones short and small; postorbital process slightly developed; malar bone with the frontal and zygomatic processes slightly marked, or the former wanting, the supratemporal process rising obliquely; pterygoid bones compressed and simple; crotaphite impression extending to very near the occipital ridge; tympanic bone well-developed, inflated; lower jaw with its inferior outline concave posteriorly, its condyle elevated; teeth $\frac{5-5}{4-4}$, simple, rounded, the anterior ones similar, small in the upper jaw.

A. GULARIS. *Ai à dos brûlé.*

A broad patch of soft yellow hair between the shoulders, and a black line running through it down the back; the upper anterior molars proportionally larger, and the second less, than in the following species; the occiput again affords us a very good distinction, as it is much wider and not so deep as in the following species, and the foramen magnum not so large. Two skulls in the British Museum present these characters, and evidently belong to adult, probably aged, individuals; that of the skeleton, also from Bolivia, seems referable to the other species.

A. MARMORATUS.

Fur everywhere more or less lengthened, no yellow spots, dorsal line grey brown; anterior upper molars very small, the next rather larger than those which follow; occiput deeper and narrower than in the preceding species, its foramen larger.

The *A. Blainvillii* is not distinguishable by external markings, and the skulls bearing that name in the Museum collection all present a general robustness, such as age and sex might very probably occasion. One of them, which, from retaining some of the sutures, seems to be younger than the others, has the frontal bones less swollen, and the

lower jaw with its angular process as much produced as in those labelled *marmoratus*, though deeper, but not so deep as in the others.

The *A. flaccidus* may be only a local variety, the skulls not being very clearly distinguishable, for there are not two between which some individual peculiarities may not be traced.

The skull to which the name *problematicus* is given is evidently young, having all its sutures well-marked, and in the absence of the fur cannot be safely looked upon as the type of a species. It agrees with the others in the character of the occiput, which distinguishes them all from the *A. gularis*, as well as from the *Bradypus crinitus*. The palæontologist is well aware of the uncertainty of establishing species upon trivial details of form, although slight distinctions are in some cases known to afford a true indication: the skulls of the Three-toed Sloths vary greatly, and all present a coarse, rough-hewn appearance which must detract from our confidence in little differences of detail. With regard to the lower jaw, they certainly do not present differences so strikingly characteristic as those upon which the species of *Mylodon* are established.

MEGATHERIUM, Cuvier.

Intermaxillary bones lengthened and prominent; postorbital process lengthened and drawn out, but not inflated; malar bone with its frontal and zygomatic processes well-developed, the latter attached firmly to the zygoma; the supratemporal process rising obliquely; pterygoid bones compressed, and not inflated; crotaphite impression approaching near to the occipital ridge; tympanic bone attached, small, and not inflated; (immediately in front of the circular facet for the stylohyal bone there descends a strong process, which may probably belong to the tympanic bone and form a portion of a vaginal process;) lower jaw produced in front, deepened in the middle by the extensive implantation of the molars, the condyle much elevated; teeth $\frac{5-5}{4-4}$, quadrate, grooved transversely on the crown when worn, the cæmentum being thickened on the anterior and posterior surfaces; the posterior upper one small.

M. CUVIERI.

Dr. Lund figures a tooth having the characters of this well-known genus, but of smaller size, under the name of *Megatherium Laurillardii*.

MEGALONYX, Jefferson.

General cranial characters unknown; teeth $\frac{?}{4-4}$, subelliptical, with a ridge on the inner side.

M. Jeffersonii.

MYLODON, Owen.

Intermaxillary bones small (lost in the skeleton); postorbital process but little developed, thick; malar bone with the frontal process indicated by a slight angle, the zygomatic well-developed, touching

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the zygoma, the supratemporal process rising obliquely; pterygoid bones thin and compressed; crotaphite impression approaching near to the occipital ridge; tympanic bone reduced and separate; (the foregoing characters can of course apply only to the *Myiodon robustus*, it being the only species of which the cranium is known;) lower jaw broad and more or less prolonged in front, the lower outline straight, the condyle depressed; teeth $\frac{5-5}{4-4}$, the anterior ones rounded or trigonal, the posterior ones larger, trigonal in the upper jaw, gradually becoming bilobed in the lower. The species can only be characterized by the lower jaw, as it is the only part that is known in all of them. The characters are taken chiefly from Prof. Owen's works.

M. DARWINII.

Lower jaw much produced anteriorly, with a double mammelliform tuberosity upon the symphysis below. The first tooth rounded or subtrigonal, the second subelliptical, with a slight depression on the inner side; the third subquadrate, grooved on the inner side; the posterior internal angle produced; the fourth bilobed, sharply grooved on the inner side.

M. HARLANI.

Lower jaw with the symphysis short; the second tooth subquadrate, grooved on the inner side, with the posterior internal angle produced; the third trapezoid, obliquely placed, with the inner side rounded; the fourth bilobed, the inner groove biangular, and a small shallow one anterior to it.

M. ROBUSTUS.

Lower jaw produced and very broad anteriorly, the first tooth round, the second subtrigonal, grooved internally, the third subquadrate, oblique, the fourth bilobed, with a deep scallop on the inner side and a smaller one anterior to it.

GLOSSOTHERIUM, Owen.

Crotaphite impression approaching near to the occipital ridge; tympanic bone reduced and separate. The general cranial characters are unknown, but the fragment is recognizable by the great size of the surface for the stylohyal bone, and of the precondyloid foramen.

SCELIDOTHERIUM, Owen.

Malar bone with a well-developed zygomatic process; the character of its frontal process cannot be determined through mutilation of the specimen; crotaphite impression approaching near to the occipital ridge; tympanic bone reduced and separate; lower jaw greatly curved below, its condyle depressed; teeth $\frac{5-5}{4-4}$, transversely extended, the anterior ones fully as large as the others, the first in each jaw elongate trigonal, the others gradually becoming bilobed, the last upper one trigonal.

S. leptcephalum.

PLATONYX, Lund.

This genus is proposed by Dr. Lund, to include a series of species discovered by him, the first three of which he had previously referred to the genus *Megalonyx*, and Prof. Owen, in the conspectus at the end of his memoir on the *Myiodon*, has placed them in his genus *Scelidotherium*; but I prefer to adopt, for the present, Dr. Lund's latest arrangement, since in the lower jaws figured, the last lower molar has a deep groove on its posterior side, and the fourth species, of which an entire skull is figured (tab. 38), agrees in this character, and shows a marked distinction from the *S. leptocephalum* in the zygomatic arch being incomplete; the malar bone has no frontal process, and but a slight angular indication of the zygomatic process.

P. Cuvieri.

P. minutus.

P. Bucklandi.

P. Brongniartii.

In addition to these, Dr. Lund represents a metacarpal bone of a species which he calls *P. Owenii*, and an os scaphoides of the foot of another, which he names *P. Agassizii*.

The genera *Cœlodon* and *Sphenodon* of Dr. Lund seem open to the objection suggested by Prof. Owen, namely that the teeth would be first developed in the form of hollow obtuse cones, not assuming the cylindrical form until worn down to the part which has acquired in process of growth the normal thickness; but while I feel naturally cautious of introducing into my category any genera or species, the establishment of which is not made fully satisfactory to my mind, I must not be considered as rejecting any of those of Dr. Lund, when his illustrations and lists of names are the only evidences I can attain; since his original specimens are far beyond my reach, and my ignorance of the Danish language prevents my comprehending his descriptive memoirs.

Fam. 2. DASYPODIDÆ.

The nasal bones long, of nearly uniform width, their extremities projecting forwards beyond the intermaxillaries; the intermaxillaries are portions of cylinders, reaching further especially on their palatal surface than in the other families; the maxillary bone swollen and provided with simple teeth; its zygomatic process projecting boldly outwards, and a ridge continued from it for the masseter, the molar series diverging behind; the posterior palatine foramina are replaced by a row of minute openings extending the whole length of the palate; the malar bone, when there is a descending masseteric process, or a rudiment of one, has it compressed longitudinally, extended transversely; the foramen rotundum is included in the foramen sphenno-orbitarium; the zygoma is flat, gently twisted upwards towards its extremity; the mastoid bone with a deep narrow groove, containing one or more mastoid foramina; the basi-occipital bone with a transverse depression just anteriorly to the edge of the foramen magnum, and (excepting in the genera *Tolypeutes* and *Glyptodon*) with an articular surface upon the lower edge of that foramen receiving the odontoid process of the axis when the head is deflexed;

the occipital condyles are portions of cylinders, placed horizontally, each in a line with the paroccipital process; the precondyloid foramen is placed close to the condyle; the supra-occipital bone is broad above, forming on each side a strong thickened ridge; the lower jaw is narrowed and slenderly produced anteriorly.

The true affinities existing among the various Armadilloes have been rightly perceived by the Baron Cuvier, and are well pointed out in the 'Ossemens Fossiles'; but he did not designate the subgenera by any particular names, and naturalists, for the most part, have adopted the arrangement of Mons. F. Cuvier, which limits the genus *Dasypus* to the single species that has teeth in the intermaxillary bone, and unites all the rest, excepting the Giant Armadillo, under the generic name *Tatusia*. Mr. Gray, in the 'List of Specimens of Mammalia in the British Museum,' has adopted in addition the genus *Xenurus* of Wagler, and it will be further necessary to make use of Illiger's genus *Tolypeutes* for the Apra or Three-banded Armadillo. The species *villosus* and *minutus* must be associated, as Baron Cuvier has done with the *Encoubert* in the genus *Dasypus*.

The groups recognized in the 'Ossemens Fossiles' being thus restored and the names proposed by other authors applied to them, I shall proceed to characterize them by their external armour, by which they may very easily be distinguished, and to add the characters of the cranium, in which my observations have been assisted by the immortal work alluded to.

TATUSIA.

Ears thrown backwards and approximated; plates of the head of irregular shape and smooth; those of the scapular and pelvic shields much smaller than those of the bands, and surrounded with others smaller still; fore-feet with four toes, the claws straight, the index and medius nearly equal, the pollex and annularis small; maxillary bone terminating in a pointed process behind; teeth rather small, none of them being further back than the root of the malar process; this process concave anteriorly, projecting outwards and backwards; the infra-orbital canal entirely below it; malar bone simply a portion of an inverted arch, hollowed on the outer side for nearly its whole length by the masseteric impression, merely abutting against the zygoma; palatine bone reduced in vertical extent, being encroached on above by a large thickened portion of the ethmoid bone which appears in the orbit, the sphenopalatine foramen being a narrow fissure between them; pterygoid bone simply bordering the termination of the palatine, without hamular process; zygoma compressed and elevated, its glenoid surface circular; tympanic bone reduced to a ring; mastoid narrowed; lower jaw slender, its condyle but little elevated, transverse and flat, coronoid process elevated.

T. SEPTEMCINCTA.

Ears about one-third of the length of the head; plates smooth; tail as long as the body.

T. affinis of Dr. Lund may possibly be identical.

T. HYBRIDA.

Ears about one-fourth of the length of the head; plates of the pelvic shield convex and elevated; tail about two-thirds of the length of the body. The characters of this species, which was named by M. Desmarest, are carefully pointed out by Mr. Martin in the 'Proceedings' of the Society, January 1837.

Cuvier speaks of a third species brought from Brazil by M. de Saint-Hilaire, under the name of *Tatou verdadeiro*, differing from the mule Armadillo in having the tail terminated by a horny sheath of one piece, the bands broader, and the plates of the pelvic shield larger.

Dr. Lund figures two ossicles of a *Tatusia*, indicating dimensions much greater than those usually attained by specimens belonging to the genus, and applies the name *Dasyppus punctatus*. I find in the Museum of the College of Surgeons a recent carapace, denuded of its horny epidermal scutes, and wanting the scapular shield; it is as large as Dr. Lund's figures would imply, and has the same punctate depressions in the grooves which mark the surfaces of the component ossicles. It differs from a smaller one, still a large specimen, also denuded of the epidermal scutes, in the latter having the central area of each ossicle a little elevated at its posterior margin, and the punctate depressions fewer and smaller behind this area than in front of it; while in the larger specimen they are all about equal in size.

It is difficult to compare these specimens with those which retain their natural covering; but the punctate character seems to belong to the genus rather than to the species, it not being perceptible until the horny scutes are removed: and whether the *Tatusia punctata* be a species, or merely a large variety of one of the others, it would appear not to be extinct.

CHLAMYPHORUS, Harlan.

Plates of the head, the scapular shield and the body forming an uninterrupted series, each a parallelogram, those of the neck smaller, and those of the muzzle irregular; pelvic shield small, flat, or slightly convex, placed vertically, at right angles to the dorsal armour, and composed of concentric semioval rows of trapezoid plates; fore-feet with five toes, the medius being the longest, the two inner claws the smallest, and the three outer ones very deep and compressed; frontal bone with a large thickened process above the eye; malar bone thin, deep anteriorly, with a rudiment of a descending masseteric process assuming a transverse position; auditory process bending forwards round the base of the zygoma; lower jaw with the ascending ramus much elevated, the condyle higher than the coronoid process.

C. truncatus.

DASYPPUS.

Head broad behind, ears wide apart, its plates irregular, marked like those of the body; those of the scapular and pelvic shields oblong parallelograms, like those of the bands, but becoming pentagonal or hexagonal towards the neck and croup—all the plates

marked with an indented pattern ; bands about six or seven ; fore-feet with five toes, the index nearly as thick as the medius, which is the longest, the claws a little twisted outwards ; maxillary bone terminating behind in a strong vertical column formed by the alveolus of the last tooth, and concealing the sphenopalatine and pterygopalatine foramina ; teeth rather large ; malar process compressed in the antero-posterior direction, suddenly projecting, concave anteriorly ; infra-orbital canal short, pierced through the base of the process ; malar bone angular, with a rudiment of a descending process, compressed in the antero-posterior direction ; its zygomatic process deep, extending beneath the zygoma ; palatine bone ascending into the orbit ; no appearance of the ethmoid within the orbit ; pterygoid bones with well-defined hamular processes, bent outwards ; zygoma well-developed, flat ; its glenoid surface slightly convex, reniform ; tympanic bone well-ossified, forming a bulla ; auditory process largely developed ; mastoid bone very broad, placed entirely in the occipital region ; lower jaw deep and thick, its ascending ramus high ; coronoid process largely developed, condyle broad.

D. SEXCINCTUS.

Muzzle broad ; plates large, distinct, but slightly indented ; bands six or seven, *no* separate band on the anterior edge of the scapular shield ; terminal plates of the bands and pelvic shield small ; hairs few, white ; teeth $\frac{9-9}{10-10}$, the first upper one on each side being in the intermaxillary bone.

D. VILLOSUS.

Muzzle broad ; plates closely united, roughly tubercular, those of the bands closely united and small ; bands eight ; a separate band on the anterior edge of the scapular shield, behind the row of nuchal plates ; terminal plates of the bands and pelvic shield large and falcate ; hairs profuse, brown.

D. MINUTUS.

Muzzle tapering, narrow at the end ; plates of the head smooth, those of the shield and bands closely united, and flatly tubercular ; terminal plates of the bands and pelvic shield large and falcate ; bands six or seven ; a separate band on the anterior edge of the scapular shield, behind the row of nuchal plates ; upper parts with black hairs ; sides of the head and limbs with brownish hairs ; under parts with whitish hairs ; teeth $\frac{8-8}{9-9}$, none in the intermaxillary bones, nasal and intermaxillary bones lengthened.

XENURUS, Wagler.

Head broad behind, ears wide apart, its plates irregular, smooth ; those of the scapular shield irregular in the middle, hexagonal towards the sides ; bands twelve, composed of short and square plates ; pelvic shield with square plates in the middle, becoming hexagonal towards the sides ; tail almost naked ; fore-feet with five toes, the index longest, but very slender, the three outer toes rapidly diminishing in

length, but furnished with large claws, twisted outwards; maxillary bones articulated posteriorly by suture to the palatine, its malar process thick, rounded anteriorly; malar bone but slightly angular, its zygomatic process extending beneath the zygoma; palatine bone ascending into the orbit, and pushing up the sphenopalatine foramen into a fossa which contains the foramina of the orbit; pterygoid bones with their hamular processes styliform, projecting backwards; zygoma small, rounded above; tympanic incompletely ossified; mastoid bone broad, placed obliquely; lower jaw slender, its condyle elevated, reniform; coronoid process feebly developed, lower than the condyle.

X. UNICINCTUS.

Cuvier mentions a species with a shorter and more entirely naked tail; it is probably the same that has been called *nudicaudis* by Dr. Lund. *X. antiquus* of the same distinguished author may possibly be identical.

PRIODONTES, Frederick Cuvier.

Head broad behind, ears wide apart; plates of the head and body as in *Xenurus*; tail closely covered with quadrangular scales, placed in a quincuncial arrangement; fore-feet as in *Xenurus*, the outer toe much reduced; maxillary bone articulated posteriorly by suture to the palatine; teeth numerous and minute; infra-orbital canal long, commencing below the malar process, and terminating nearly on the middle of the bone; malar bone forming simply a portion of an inverted arch, round, and devoid of processes; palatine bone ascending into the orbit; pterygoid bone strongly developed, with an angular termination; zygoma rather small, the glenoid surface lengthened, the lower part of the squamous and the alisphenoid bone forming a longitudinal swelling within it; tympanic bone small, and loose; mastoid bone broad, forming the sides of the occiput which are rounded; lower jaw thin and compressed, condyle longitudinal, but little elevated; coronoid process much reduced.

P. gigas.

TOLYPEUTES, Illiger.

Head broad behind, ears wide apart; plates very closely articulated to each other, their surface divided by impressed marks, and studded with blunt tubercles, those of the scapular and pelvic shields varying from a square to a pentagonal or hexagonal form; bands three, composed of oblong parallelograms, equally subcircular, and closely articulated; fore-feet four-toed, the outer being absent; the medius slightly longer than the index, with a much larger claw, both having an outward twist; maxillary bone articulated posteriorly to the palatine, its malar process standing suddenly outwards, compressed; infra-orbital canal commencing below and behind its root, rather lengthened, rising a little in its course; teeth rather large; malar bone slender, and simply abutting by an oblique suture against the zygoma; palatine bone ascending into the orbit, pterygoids with blunt hamular

processes, a little bent outwards; zygoma rather narrowed, glenoid surface flat, reniform; tympanic bone reduced to an annular form; lower jaw slender, condyle moderately elevated, reniform, coronoid process elevated.

T. TRICINCTUS.

Cuvier cites the *Cheloniscus* of Fabricius Columna as being this species, but represented with four bands instead of three; the last row of plates of the scapular shield is composed of oblong parallelograms like those of the bands, which may have given rise to such an error.

CHLAMYDOTHERIUM, Lund.

Judging by the plates that accompany Dr. Lund's Memoir, this appears to be a genus of extinct gigantic Armadilloes, having the body provided with moveable bands like the recent ones, and teeth of a compressed form, and irregularly fluted; two species are distinguished.

C. Humboldtii.

C. giganteum.

HETERODON, Lund.

Distinguished by the unequal sizes of the teeth: the fragment of the lower jaw figured contains six teeth, of which two are much larger than the others.

H. diversidens.

EURYODON, Lund.

Dr. Lund figures a tooth resembling those of the Armadilloes, but apparently broader in proportion to its antero-posterior diameter.

E. latidens.

GLYPTODON, Owen.

Carapace ovoid, without distinction of shields or bands, composed of small hexagonal pieces with sculptured surfaces; teeth divided into narrow transverse lobes; malar bone with a lengthened descending process, placed transversely; zygoma flat, its glenoid surface elevated, transversely elongate, looking a little backwards; mastoid proportionally small, placed laterally.

G. CLAVIPES.

The central tubercle upon each ossicle large, round, or subhexagonal, conspicuous above the surrounding ones, which are small, and more cut up by reticulate depressions.

G. ORNATUS.

The central tubercle of each ossicle not conspicuously marked above the rest; all more finely granular.

This may possibly be the young of that to which the name *reticulatus* has been applied, and which, therefore, I will at present omit.

G. TUBERCULATUS.

Ossicles approaching to a square or rhomboidal form, their surface divided into numerous irregular elevations.

The genus *Hoplophorus* of Dr. Lund appears to be identical with *Glyptodon*; he figures two teeth in which the characters of that genus are clearly shown, and several detached ossicles and portions of carapace bearing a general resemblance to the species of *Glyptodon*, principally to the *G. ornatus*. He distinguishes two species, the *H. Euphractus* and *H. Selloi*. Prof. Owen refers to the *H. Euphractus* a portion of carapace brought home by Mr. Darwin, and figured in the 'Voyage of the Beagle,' which very closely resembles those afterwards figured in the 'Catalogue of Fossil Mammalia and Aves in the Museum of the Royal College of Surgeons' under the name *G. ornatus*.

I am not as yet acquainted with the *Pachytherium magnum* of Dr. Lund's catalogues.

Fam. 3. MYRMECOPHAGIDÆ.

The nasal bones simple, of uniform width, emarginated at the ends; the intermaxillary bones much reduced; the maxillary bones much lengthened, toothless, the malar process projecting backwards, outwards and downwards; the posterior palatine foramen single, or wanting; the malar bone reduced to a slender stylet free at the posterior end; the foramen rotundum included in the foramen sphenoorbitarium; the zygoma very small, and pushed quite to the anterior superior angle of the squamous portion; the supra-occipital bone encroaches upon the upper surface of the skull, and has a median protuberance; the lower jaw much lengthened and slender at the end, without coronoid process.

Not having seen the skull of the little Two-toed Ant-eater, I have used a little caution in characterizing this family. For example, I have avoided alluding to the peculiar character of the pterygoids, as Cuvier informs us that they do not enclose a long canal as in the larger species. I therefore limit the diagnoses of the genera to the few points, in which, in the absence of a skull of the small species, they are known to differ*.

MYRMECOPHAGA, Linnæus.

Fore-feet with four toes; hind-feet with five toes; palatine and pterygoid bones united beneath the nasal canal for their whole length.

M. JUBATA, Linn.

Varied with black and grey, the latter predominating on the head, back, sides, fore-limbs and tail; throat, a mark running obliquely from the shoulder upwards and backwards, and hind-limbs black; fur very coarse; tail but little longer than the body, very bushy.

* I have since seen the cranial portion of the skull of the Little Ant-eater, and find that although the pterygoid bones do not enclose the nasal canal below, they resemble those of the larger species in their great extent backwards.

M. TAMANDUA.

Head, shoulders, fore-limbs, outside of the hind-limbs, and middle third of the tail white ; a stripe from each side of the neck over the shoulder and remaining parts black ; tail but little longer than the body, its terminal third scaly. Varies chiefly by the diminution of the intensity of the black.

I have found that the Yellow Ant-eater, hitherto considered to be one of the varieties of this species, differs remarkably in the length and size of the tail ; the ears also appear to be larger, but this latter character is less decisive, owing to the different degrees to which they may shrink when dry. A specimen in the British Museum, and one in that of this Society, resemble each other exactly, while a young pale specimen of *M. Tamandua* has a tail proportionally of the same length as the larger and darker individuals. Under these circumstances I have been induced to propose a name for the Yellow Ant-eater, deeming it probable that the species may be distinct.

M. LONGICAUDATA.

General colour uniform light ochraceous, a paler line runs down the middle of the back ; tail nearly double the length of the body, its terminal half covered with small scales and a few scattered black hairs ; ears large, round, about one-third the length of the head.

Although the flanks show a slightly darker reflection in certain directions of the light, there is no trace of the mark which runs across the shoulder.

On referring to the figure, in Krusenstern's Voyage (tab. 6 *e*), on which M. Desmarest founded his *Myrmecophaga annulata*, I find it to be a very excellent representation of a Coati-mondi, probably the brown species. The head is bent downwards, the tongue protruded, and curved beneath the left fore-foot ; from under the further side of the foot there comes a small twig of a tree, which, if it were not branched, would look like a continuation of the tongue. But the figure published in Griffith's translation of the 'Règne Animal' is not so easy to interpret. The general form of the body is more like that of an Ant-eater, though rather too long and slender ; the tapering head and the dark stripe from the end of the muzzle to the eye remind one of the *Myrmecobius*, which was not known until several years afterwards ; the tail is just such as a Coati-mondi might have supplied. The figure is said to have been drawn from a stuffed specimen, but the authors do not state where the specimen existed, and possibly may never have seen it.

Cuvier asserts, with much probability, that the animal from which Buffon took his figure of the *Tamandua* was made up of the skin of a Coati-mondi, to which striped markings had been artificially applied.

CYCLOTHURUS, Gray.

Fore-feet with two toes, the outer one much the larger ; "the palatines only meet below for two-thirds of their length, and the bony canal of the nares there terminates, the pterygoids not meeting, but presenting only two long parallel and little prominent crests."

C. DIDACTYLUS.

Dr. Lund inserts in his lists of fossil species one which he has named *Myrmecophaga gigantea*, but I have seen no representation of any portion of the animal among the figures published.

Fam. 4. MANIDÆ.

The intermaxillary bones small, having ascending processes running upwards and backwards; each encloses a separate incisive foramen; the maxillary bones short, toothless, their malar processes projecting backwards, outwards and downwards; the palatine bones much spread out in front, and with distinct posterior palatine foramina; the malar and lacrymal bones wanting, but a large lacrymal opening; the alisphenoid bone much reduced; the zygoma deep, thin, concave exteriorly, and pushed downwards to the anterior and inferior angle of the squamous portion; the occipital condyles prominent, oblique, the precondyloid foramina at some distance anterior to them.

This family consists of but one genus, containing several well-marked species.

MANIS, Linnæus.

In characterizing the species of this genus, I give the number of scales in each transverse row, instead of the number of longitudinal rows, which has been the usual method adopted. The number in each case will appear much less, but it will be recollected that this is owing to the scales of one row being alternate with those of the next one.

M. PENTADACTYLA, Linn. (*macroua*, Desm.)

Each transverse row of scales composed of three on each side of the median one; scales striated at the base, smooth at the end, the striated part distinctly separated from the smooth portion; ends of the scales simple; under parts naked; tail very broad at the base, about equal to the body in length; fore-feet five-toed, the claw of the medius much the largest, that of the annularis next, that of the index much less, the other two very small; hind-feet with lengthened claws; limbs scaled to the bases of the claws.

M. JAVANICA, Desm.

Four scales on each side of the median one in each transverse row, the lower ones on each side, and the lateral ones beneath the tail, keeled and pointed at the ends; tail broad at the base, equalling the head and body in length; under parts with short white hairs; limbs scaled to the bases of the claws; fore-feet with the middle claw largest, the index a little less than the annularis, the others very small; hind-feet with lengthened claws.

M. TEMMINCKII, Smutz.

Body altogether very broad; scales broad, three on each side in every transverse row, striated to the tips which are rounded, none of them carinate; under parts naked; tail about the length of the body, broad and rounded at the end; limbs scaled to the bases of the claws;

fore-feet with the middle claw largest, the two next less, the remaining two much less; those of the hind-feet vertical, truncated.

M. TETRADACTYLA, Linn. (*Africana*, Desm.)

Scales large, three on each side in every transverse row, striated to the tip, which is square, with a point projecting from the middle, the lower ones at the sides and the lateral ones beneath the tail carinate; tail double the length of the body, a little narrowed at the base, soon becoming broad; limbs only scaled at the base, then covered with black hairs like the under parts; fore-feet with the middle claw very long and compressed, the index and annularis much less and nearly equal, the minimus less still, the inner toe very small; hind-feet with lengthened claws, nearly equal.

M. MULTISCUTATA, Gray, Proc. Z. S. Feb. 1843.

Five scales on each side of the median one in every transverse row; scales striated to the tip, which is square, with a median point; those on the sides of the trunk and limbs, and the lateral ones beneath the tail, carinate; tail nearly double the length of the body, of moderate width; under parts with short whitish brown hairs; fore-limbs scaled to the carpus; toes all well-developed, except the thumb, which is small, the medius longest; hind-feet scaled nearly to the base of the claws, which are all lengthened and well-developed, except the thumb, which is small; the annularis nearly as long as the medius.

M. aurita, Hodgson.

Fam. 5. ORYCTEROPODIDÆ.

The nasal bones long and much spread out behind, narrowed and not projecting anteriorly; the intermaxillaries well-developed, prominent below, not enclosing foramina; the maxillary bones lengthened and deep, provided with compound teeth; the palate terminating soon with a strong transverse ridge, having a pair of large posterior palatine foramina; the lacrymal bone large, extending much upon the face; the malar bone large, extending much upon the face, but its zygomatic process small and slender; the frontal bone large and swollen, with a small and contracted post-orbital process; the parietals extended downwards at their anterior inferior angles to articulate with the alisphenoids; the zygoma slender, twisted as in the Armadilloes; a strong post-articular and a post-auditory process, and just within the latter a short truncate styloid process, not enclosed by any vaginal process, as the tympanic bone is much reduced and separate; the occipital condyles hemicylindrical, but with a portion of articular surface continued from them upon the lower edge of the foramen magnum; the paroccipital processes in a line with them, but distinctly separated.

As this family consists, so far as is yet satisfactorily known, of a single species, its characters might be multiplied to almost any extent; should another form be discovered, they will of course need revision.

This communication having extended far beyond the length that I at first contemplated, notwithstanding that I have limited myself in most cases to the distinctive peculiarities of the skull, it will readily be seen that, had I entered upon the whole osteology of the order, or even introduced in every instance the characters by which the genus or species may be known externally, I should have swelled this little monograph to such a degree as almost to preclude its insertion in the 'Proceedings' of the Society, and entailed upon myself an amount of labour from which I would by no means shrink, but fear I shall be compelled to defer until more favourable opportunities present themselves; but I trust that the little I have as yet accomplished may afford the naturalist a clearer insight into the relations of the living Edentata among themselves, and with those that formerly peopled the portion of the world which was then, as now, the principal abode of this remarkable group.

Pimlico, July 1851.

4. A MONOGRAPH OF SCUTUS, A GENUS OF GASTEROPODOUS
MOLLUSCA, BELONGING TO THE FAMILY FISSURELLIDÆ.
BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus SCUTUS, De Montfort.

Animal with the head probosciform; tentacles thick and subulate, with the eyes on tubercles at their outer bases; mantle reflexed over the sides of, and nearly covering, the shell; sides of foot with a series of short cirrhi.

Shell oblong, scutiform, flattened; apex dorsal, oblique, posteriorly inclined; margin of aperture sinuated in front; muscular impression horse-shoe shaped, open anteriorly.

Parmophorus, Blainv.—*Dascinus*, Rafin.—*Scutellites*, Auct.—*Scutum*, Sow. jun.—*Parmophora*, Desh.—*Emarginula*, sp. Sow.—*Patella*, sp. Lamk.

1. SCUTUS UNGUIS, Linn.

Patella unguis, Linn. Mus. Ludovic. Ulric. Regin. p. 69. no. 419.
—*Patella ambigua*, Chemn.—*Scutus antipodis*, Montf.—*Parmophorus australis*, Lamk.—*Parm. elongatus*, Blainv.

Hab. New Zealand. Mus. Cuming.

2. SCUTUS ELONGATUS, Lamarck.

Patella elongata, Lamk. Ann. du Mus. i. p. 310.—*Parmophorus elongatus*, Lamk. Hist.—*Emarginula elongata*, Sow. Gen.

Hab. East Australia. Mus. Cuming. Also occurs fossil.

3. SCUTUS GRANULATUS, Blainv.

Parmophorus granulatus, Blainv. Bullet. des Scienc. 1817; Lamk. Hist. An. s. Vert. vol. vii. pt. ii. p. 5; Reeve, Conch. Syst. pl. 139. f. 4.

Hab. Port Essington, on the rocks, low water. Mus. Cuming.

4. SCUTUS CORRUGATUS, Reeve.

Parmophorus corrugatus, Reeve, Proc. Zool. Soc. 1842; Conch. Syst. pl. 139. f. 1.

Hab. —? Mus. Cuming.

5. SCUTUS TUMIDUS, Quoy et Gaimard.

Parmophorus tumidus, Quoy et Gaim. Voy. de l'Astrol. pl. 69. f. 6.
—*Parm. gibbosus*, Anton.—? *Parm. breviculus*, Blainv. Bull. des Sci. 1817; Sowerby's Gen. (Emarg.) fig. 2.

Hab. Madagascar. Mus. Cuming.

6. SCUTUS IMBRICATUS, Quoy et Gaimard.

Parmophorus imbricatus, Quoy et Gaim. Voy. de l'Astrol. pl. 69. f. 17, 18.

Hab. Island of Burias. Mus. Cuming.

7. SCUTUS ANGUSTATUS, A. Adams. *S. testá elongatá, subquadrangulari, lateribus angustatis, coarctatis; dorso plano, concentricè striato, vertice subcentrali, postice declinato; extremitate anticá sinuatá, posticá excurvátá, subelevatá.*

Hab. Eastern Seas. Mus. Cuming.

5. A MONOGRAPH OF THE GENUS MONOPTYGMA OF LEA.

BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus MONOPTYGMA, J. Lea. (? *Menestho*, Müll.)

Animal unknown.

Shell subulately turreted, transversely striated, apex simple, acute; aperture oval, longer than wide, rounded and entire in front; columella with a single oblique fold.

This genus differs from *Actæon* in being elongated, and in having an oblique fold, instead of a transverse plait on the columella.

1. MONOPTYGMA STRIATA, Gray. *M. testá turrítico-subulatá, solidá, olivaceá, anfractibus planis, transversim sulcatis, sulcis profundis, distantibus; aperturá oblongá, intus albá.*

This species, which is typical, is a very thick and strong shell, with a somewhat convex lateral outline, and strongly transversely grooved across the flattened whorls. Mus. Cuming.

2. MONOPTYGMA FULVA, A. Adams. *M. testá turrítico-subulatá, graciliori, solidá, fulvá, anfractibus planis, transversim sulcatis, sulcis profundis, distantibus; aperturá oblongá, intus fuscá.*

This elegantly-formed shell is more slender than *M. striata*, and of a different colour; the transverse grooves are also much closer together, and their edges are rounded; the twist of the columella is not so distinct, and the aperture is brown internally. Mus. Cuming.

3. MONOPTYGMA GRANULATA, A. Adams. *M. testá ovato-turrítá, albá, solidá, anfractibus planiusculis, gradatis, longitudi-*

naliter corrugato-plicatis, transversim sulcatis, sulcis profundis, valde distantibus; interstitiis lævibus; aperturá oblongá, columellá plicá subproductá.

This is a rather short and obtuse white and solid species, very strongly grooved transversely, and with the whorls longitudinally corrugately plicated. Mus. Cuming.

4. MONOPTYGMA LAUTA, A. Adams. *M. testá turrito-subulatá, albidá, tenui, subpellucidá, anfractibus planiusculis, longitudinaliter eleganter striatis, transversim sulcatis, sulcis distantibus, interstitiis crenulatis; aperturá oblongá, columellá obliquá et curvatá.*

A very beautifully-sculptured species, dredged from 10 fathoms, at Bolinao, by Mr. Cuming; the outline is subulated, and the whorls rather flattened and longitudinally striated. Mus. Cuming.

5. MONOPTYGMA AMÆNA, A. Adams. *M. testá ovato-acuminatá, tenui, subpellucidá, albidá, longitudinaliter substriatá, anfractibus convexiusculis, transversim sulcatis, sulcis valdè distantibus, interstitiis eleganter punctatis; aperturá oblongá, antice dilatatá, columellá rectá.*

This is a most exquisite species, both in form and sculpture; the whorls are rounded and punctate-striate, and the shell is nearly pellucid; it is from Bolinao, 10 fathoms water. Mus. Cuming.

6. MONOPTYGMA CASTA, A. Adams. *M. testá ovato-turritá, albá, tenui, semipellucidá, anfractibus convexiusculis, transversim sulcatis, sulcis subconfertis, interstitiis pulcherrimè striatis; aperturá oblongá, antice productá, columellá obliquá, subtortuosá.*

This pure white ovate form is from the China Seas, being collected by the writer during the Voyage of H.M.S. Samarang. The whorls are grooved, with the interstices striated. Mus. Cuming.

7. MONOPTYGMA SPECIOSA, A. Adams. *M. testá turritá, subulatá, albidá, tenui, semipellucidá, anfractibus octo, convexiusculis, suturá profundá, cingillis transversis elevatis, interstitiis concinnè cancellatis, ornatá; aperturá oblongo-ovali, columellá subrectá, supernè plicá obliquá subobsoletá instructá.*

Hab. Baclayon; Philippines. Mus. Cuming.

An elegant semipellucid species, resembling an elongated *Actæon*, with the whorls encircled with elevated cingilli, and the interstices cancellated.

8. MONOPTYGMA SPIRATA, A. Adams. *M. testá turritá, albá, epidermide fusco tectá, anfractibus octo, planiusculis, gradatis, suturá canaliculatá, plicis longitudinalibus, angustis, confertis, et sulcis transversis decussatim ornatá; aperturá oblongá, labio plicá unicá obliquá instructo.*

Hab. Camaguin; Philippines. Mus. Cuming.

A small turreted species, covered, in the living state, with a light brown epidermis, and with the surface regularly and beautifully decussated with raised lines.

9. **MONOPTYGMA TENELLA**, A. Adams. *M. testá ovato-turritá, albá, subpellucidá, anfractibus quatuor, convexiusculis, transversim tenuiter striatá; aperturá ovali, labio subreflexo, plicá obsoletá instructo; labro dilatato, margine flexuoso incrassato et subreflexo.*

Hab. Philippine Islands. Mus. Cuming.

A small *Rissoa*-like shell, with only a faint indication of a plait on the columellar lip; the aperture dilated, and the outer lip expanded and slightly thickened anteriorly.

10. **MONOPTYGMA STYLINA**, A. Adams. *M. testá subulatá, in medio incrassato, albá, subpellucidá, anfractibus 9-12, planiusculis, transversim tenuiter sulcatá, longitudinaliter substriatá; aperturá oblongá, labio superne plicá obliquá instructo; labro, in medio, subrecto.*

Hab. Catanuan; Philippines. Mus. Cuming.

A remarkable white subulate shell, with the middle whorls, especially those near the apex, enlarged.

11. **MONOPTYGMA SUTURALIS**, A. Adams. *M. testá subulato-turritá, subumbilicatá, albá, nitidá, subdiaphaná, anfractibus septem planis, suturá canaliculatá, transversim sulcatá, anfractu ultimo subsoluto, fasciis angustis, albo articulatis, ornato; aperturá oblongo-ovali, labio plicá evanidá instructo.*

Hab. Philippine Islands. Mus. Cuming.

A small white species, with the last whorl nearly free, and having the suture deeply channeled.

6. DESCRIPTIONS OF NEW SHELLS, FROM THE CUMINGIAN COLLECTION; WITH A NOTE ON THE GENUS NEMATURA.

BY ARTHUR ADAMS, R.N., F.L.S. ETC.

- PYRAMIDELLA METULA**, A. Adams. *P. testá subulatá, turritá, apice obtusiusculo, albidá anfractibus decem planulatis, longitudinaliter costatá, costis confertis æquantibus, interstitiis lineis transversis elevatis ornatá; aperturá ovali, labio incrassato, in medio plicá unicá instructo; labro margine subincrassato.*

Hab. Mizamis, Cagayan. Mus. Cuming.

A small elongated species, somewhat ressembling a *Rissoina*, with the intervals between the ribs finely cancellated, and the whorls very numerous.

- PYRAMIDELLA ACLIS**, A. Adams. *P. testá subulatá albá nitidá, anfractibus octo planiusculis longitudinaliter plicatá, plicis æqualibus subconfertis, interstitiis lævibus; aperturá semiovatá, labio subincrassato plicá unicá munito; labro subdilatato.*

Hab. Philippines. Mus. Cuming.

This is a slender subulate species, likewise resembling in appearance a *Rissoina*.

LACUNA CARINIFERA, A. Adams. *L. testá ovatá, spirá acuminatá, anfractibus quatuor, latè umbilicatá, fulvá, anfractu ultimo angulato, carinã transversã elevatá, rufo-fusco articulatá, ornato; aperturã semiovatá; labro acuto, angulato, labio recto, fissurã umbilicali elongatá.*

Hab. Borneo. Mus. Cuming.

The single prominent keel round the periphery of the last whorl is the principal feature of this species.

VELUTINA SITKENSIS, A. Adams. *V. testá nigro-fuscá, epidermide liris elevatis transversis confertis obtectá, longitudinaliter valdè sulcatá, sulcis subdistantibus; aperturã ovali, intus sulcatá; labro margine reflexo, nigro, incrassato; postice non-producto supra anfractum ultimum.*

Hab. Sitka. Mus. Cuming.

The dark brown colour and oval form distinguish this species from *V. lævigata*, which also has the outer lip arched and expanded posteriorly.

OTINA FUSCA, A. Adams. *O. testá magná, solidá, semiopacá, fuscá, sine epidermide, dorso convexá, longitudinaliter subplicatá, transversim tenuiter striatá, labio lato, plano, et excavato; labro recto, non reflexo aut expanso.*

Hab. Benguela. Mus. Cuming.

The large size of this species, and its convex form, distinguish it from *O. otis*, and its absence of bands, and the outer lip not being expanded, from *O. zonata*, Gould, the only two species at present known to me.

7. NOTE ON NEMATURA, BY A. ADAMS.

The genus *Nematura*, established by Mr. Benson, appears to have the closest affinity with *Bithynia* of Leach, but the horny operculum, with grooved margins, and the contraction of the aperture, will distinguish them. There appear to have been found at present but six species, three of them known, and three here indicated for the first time; in the rivers and streams of the East are doubtless many more; they are usually found adhering to the under surface of dead floating leaves.

1. NEMATURA DELTÆ, BENSON. *N. testá magná, pallidè fulvá, globosá, lævi; aperturã orbiculari, peritremate simplici.*

Mus. Cuming.

2. NEMATURA MINIMA, BENSON. *N. testá parvã, corned, semipellucidã, ovali, spirã subproductã; politã, fasciis rufis sub-obsoletis ornatã; aperturã orbiculari, peritremate simplici.*

Mus. Cuming.

3. NEMATURA POLITA, Sowerby. *N. testá magná, castaneo-fusca, compressá, subvaricosá; aperturá ovali, peritremate antice striatá; regione umbilicali lírá callosá circumdatá; punctato-striatá.*

Mus. Cuming.

4. NEMATURA OLIVACEA, A. Adams. *N. testá ovatá, opacá, olivacé, viridi-fusco reticulatá; aperturá ovali, spirá elevatá, apice decollatá, peritremate simplici.*

Mus. Cuming.

5. NEMATURA GLABRATA, A. Adams. *N. testá magná, ovatá, non compressá aut varicosá, subviridi-cornéa; spirá acutá, apice acuminatá, lævi, politá; aperturá orbiculari, angustatá, peritremate nigro.*

Hab. Penang. Mus. Cuming.

6. NEMATURA PUNCTICULATA, A. Adams. *N. testá mediocri, pallidè fulvá, compressá, anfractu ultimo gibboso, et subangulato ad latera, lineolis punctatis transversis ornatá, peritremate simplici.*

Hab. Eastern Islands. Mus. Cuming.

8. A MONOGRAPH OF THE RECENT SPECIES OF RIMULA, A GENUS OF MOLLUSCA, BELONGING TO THE FAMILY FISSURELLIDÆ.

By ARTHUR ADAMS, R.N., F.L.S. ETC.

The genus *Rimula* of DeFrance has been usually confounded with *Puncturella* of Lowe, or the *Cemoria* of Leach, but it is at once distinguished by the absence of the arcuated plate in the interior of the vertex. The species already known are fossil, to which we now add a few recent examples.

Genus RIMULA, DeFrance.

Shell conical, with an elevated, recurved, entire vertex, turned towards the posterior end; surface cancellated, with radiating ribs; a linear perforation in the upper part of the shell, half-way between the vertex and anterior margin; margin of aperture crenulated; interior simple, with no shelly plate; muscular impression crescentic, interrupted in front.

1. RIMULA EXQUISITA, A. Adams. *R. testá magná, ovali, semipellucidá, albá, costis longitudinalibus, radiantibus, lineisque elevatis, transversis, concentricis, cancellatá; cancelli subquadrati; costis crenulatis, inæqualibus, prominentibus, anterioribus duabus divergentibus, interstitiis costellis duabus instructis; supra perforationem concavá; perforatione elongatá subquadratá.*

Hab. Catanuan, island of Luzon and island of Burias, found on dead shells, 7 and 10 fathoms, sandy mud (H. C.). Mus. Cuming.

2. *RIMULA CUMINGII*, A. Adams. *R. testá parvá, ovatá, opacá, costellis longitudinalibus, radiantibus, lineisque transversis, crassis, concentricis, cancellatá; cancelli transversi, elongati; costis nodulosis, subæqualibus, prominentibus, distantibus, anterioribus duabus antice divergentibus, interstitiis costellis duabus instructis, perforatione elongatá, subquadratá.*
Hab. Eastern Seas. Mus. Cuming.
3. *RIMULA CARINATA*, A. Adams. *R. testá parvá, ovali, costellis simplicibus, permultis, confertis, longitudinalibus, radiantibus, ornatá; interstitiis cancellatis; cancelli punctiformes; costellis duabus anterioribus, antice convergentibus, et apud aperturæ marginem junctis; interstitiis, supra perforationem, convexis, supra verticem extendentibus, quasi cariná; perforatione ovali, angustá, antice angustatá.*
Hab. Cagayan, province of Misamis, island of Mindanao, on dead shells, 25 fathoms, sandy mud (*H. C.*). Mus. Cuming.
4. *RIMULA PROPINQUA*, A. Adams. *R. testá parvá, elongato-ovalí; costellis prominentibus, asperis, longitudinalibus, radiantibus, subdistantibus; interstitiis valde cancellatis; cancelli transversi, subquadrati; costellis duabus anterioribus, antice convergentibus, ad aperturæ marginem junctis; perforatione angustato-ovalí, antice acuminatá.*
Hab. Catapan, Philippines. Mus. Cuming.

9. A MONOGRAPH OF PUNCTURELLA, A GENUS OF GASTEROPODOUS MOLLUSCA, BELONGING TO THE FAMILY FISSURELLIDÆ.
 BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus PUNCTURELLA, Lowe.

Head probosciform, tentacles subulate, with the eyes on swellings at their outer base; sides with a range of cirrhi, interrupted behind on each side; mantle-margin simple; branchial plumes two; anal siphon prominent, forming a truncated membranous canal projecting from the subapical perforation.

Shell conical, with an elevated, slightly recurved, obliquely spiral entire vertex, turned towards the posterior end; aperture expanded, oval; surface with radiating ribs; margin entire; a linear perforation in the upper part of the shell, between the vertex and front margin, in the line of an elevated rib. Interior with a linear groove, vaulted over with a shelly plate corresponding to the perforation; muscular impression crescentic, interrupted in front.

Cemoria, Leach, MSS.—*Sipho*, Brown.—*Rimula*, Lovèn; Gould; Couthouy.—? *Diadora*, Gray.

1. PUNCTURELLA NOACHINA, Linnæus.

Patella noachina, Linn. Mantissa, p. 551; Chemn. Conch. Cab. vol. xi. p. 186. pl. 197. f. 1927, 1928.—*Patella fissurella*, Müller.—

Fissurella Noachina, Schum.—*Puncturella Noachina*, Lowe.—*Cemoria Flemingii*, Leach, MSS.—*Cemoria Noachina*, Lowe.—*Rimula Flemingii*, Macgill.—*Rimula Noachina*, Couthouy.—*Sipho Noachina*, Brown.

Hab. British Islands. Mus. Cuming.

2. PUNCTURELLA CUCULLATA, Gould.

Rimula cucullata, Gould, Expedition, Shells, p. 14.

Hab. Puget Sound.

3. PUNCTURELLA GALEATA, Gould.

Rimula galeata, Gould, Expedition, Shells, p. 14.

Hab. Puget Sound. Mus. Cuming.

4. PUNCTURELLA COGNATA, Gould.

Rimula cognata, Gould, Expedition, Shells, p. 14.

Hab. Orange Harbour.

5. PUNCTURELLA CONICA, D'Orb. Voy. Am. Mer.

6. PUNCTURELLA FASTIGIATA, A. Adams. *P. testá albidd elevato-conicá, nitidd, vertice acuminato involuto, costellis longitudinalibus æqualibus æquidistantibus, interstitiis planis lineis incrementi concentricis; fissurá lanceolatá; aperturá ovali, margine crenulato, fornice costá, costá valde arcuatá, transversali, simplici.*

Hab. Eastern Seas. Mus. Cuming.

7. PUNCTURELLA PRINCEPS, Mighels and Adams.

Cemoria princeps, Mighels and Adams, Bost. Journ. Nat. Hist. vol. iv. p. 43.

10. ON SOME GENERA OF SHELLS, ESTABLISHED IN 1807 BY THE LATE H. F. LINK. BY DR. HERRMANNSEN, OF KIEL.

In several programs, hitherto not at all taken notice of by any Conchologist, the renowned Botanist Link of Berlin, then Professor of Natural History, Chemistry and Botany at Rostock, in the course of the years 1806 to 1808, has published an account of the Collections of the Rostock University. These little treatises seem to be very rare, nor do I remember ever to have found them mentioned, before my 'Index Generum Malacozoorum' recorded them. Yet they may claim priority in many instances, which I hope will be redeemed by simply noticing their contents. The German titles of these octavo pamphlets are as follows:—

Beschreibung der Naturalien-Sammlung der Universität zu Rostock, von Dr. H. F. Link. Rostock. Gedruckt bei Adlers Erben.

Erste Abtheilung; zum Weihnachtsfest, d. 25 Dec. 1806 (p. 1–48).
 Zweite Abth.; zum Osterfest, d. 29 März 1807 (p. 49–98).
 Dritte Abth.; zum Pfingstfest, d. 17 Mai 1807 (p. 99–165).
 Vierte Abth.; zum Weihnachtsfest, d. 25 Dec. 1807 (p. 1–30).
 Fünfte Abth.; zum Osterfest, d. 7 April 1808 (p. 1–38).
 Sechste Abth.; zum Pfingstfest, d. 5 Juni 1808 (p. 1–38).

Passing over those genera which are either superfluous because formerly rightly published under other names, or unhappily contrived, I will hint at those that may deserve to be attended to.

MOLLUSCA. GASTEROPODA. SIPHONBRANCHEA.

LAMBIDIUM, Link, 1807, *l. c.* iii. p. 112.

Spire little prominent; aperture longitudinal, narrow; inner lip callous, with raised points; outer lip marginated; base truncated; shell destitute of varices or spines.

Lambidium oniscus (*Strombus*), Linn.

This genus having been indicated in 1798, by Dr. Bolten, as *Morum*, but without definition, the botanical signification of that name may have induced Link to select another, which, being correctly founded, must be preferred to *Oniscia* of Mr. Sowerby; or at least, if we should dissect the genus with Dr. Gray, into *Oniscia*, *Sconsia*, and *Morum*, to the last.

PHALIUM, Link, 1807, *l. c.* iii. p. 112.

Spire shorter than the last whorl; aperture longitudinal, wide; inner lip callous and smooth, or extended into a folded or granulated lamina; outer lip marginated; shell often varicose; base strongly recurved, notched; inner columella not folded.

A. Lamina of the inner lip folded: *Phalium glaucum* (*Buccinum*), Linn. &c.—B. Lamina of the inner lip granulated: *Phalium erinaceum* (*Bucc.*), Linn. &c.

This is *Bezoardica*, Schum., or *Cassidea*, Swains.

CASSIDEA, Link, 1807, *l. c.* iii. p. 111.

Spire little prominent; aperture longitudinal, narrow; outer lip marginated, like the inner one, with many folds; shell spineless, often varicose; base strongly reflected, notched; inner columella folded.

Cassidea rufa, *tuberosa*, *cornuta*, *testiculus*, *flammea*, *pennata*.

This has been proposed by Mr. Stutchbury as *Cypræcassis*, but must at all events retain the name of *Cassis*, Browne, 1756.

GALEODEA, Link, 1807, *l. c.* iii. p. 113.

Spire much shorter than the last tumid whorl; inner lip extended in shape of a smooth lamina; outer one slightly marginated; base rather elongated, reflected, not emarginate.

Galeodea echinophora (*Bucc.*), Linn.

Synonyms are *Morio*, Montf., and *Cassidaria*, Lamck., both of a more recent date.

THAIS, Link, 1807, *l. c.* iii. p. 114.

[*Thais* of Bolten Mus. includes some *Ricinulæ* and *Monoceros* of Lamarck, from which Link has deperated it.]

Spire shorter than the last, ventricose whorl; aperture semicircular; inner lip plane, obliquely cut off, callous, smooth; outer lip scarcely marginated; shell without varices; base short.

Thais Persica (Bucc.), Linn.—*patula*, Linn. sp.—*hæmastoma* (Chemn. fig. 964, 965).—*fucus*, Gmel. sp.—*minuta*, Link.

This genus, which is synonymous with *Microtoma*, Swainson, I should think advisable to be retained at least as a section of the hitherto confused genus *Purpura*.

MANCINELLA, Link, 1807, *l. c.* iii. p. 115.

Spire much shorter than the last whorl; aperture longitudinal, rounded; inner lip smooth and callous, outer one little or not at all marginated; shell without varices, but provided with spines and imbricate scales; base short, or scarcely elongated, twisted outwards, slightly notched.

Mancinella aculeata (Chemn. 967, 968).—*hystrix*, Linn. sp.—*castanea*, Link (Chemn. 956–958).—*armigera*, Chemn. sp.—*mutabilis*, Chemn. 951–953.—*Bezoar*, Chemn. 754, 755.

This genus, combining some *Purpuræ* with some *Pyrulæ* of Lamarck, comes near to *Rapana a*, Schum., and perhaps may be adopted.

VOLEMA, Link, 1807, *l. c.* iii. p. 115. (*Volema*, Bolt. emend.)

Spire much shorter than the last whorl, often distorted; aperture oblong, rounded; inner lip smooth and callous, outer lip simple; shell without varices; if grown old, with spines or imbricated scales; base elongated, rather turned aside.

The species are to be found in my 'Ind. Gen. Malacoz.' vol. ii. p. 699.

This genus unites *Busycum*, Bolt. (= *Fulgur*, Montf.) with *Cassidulus*, Humphr., Gray.

XANCUS, Bolten, 1798, Mus. (edit. 1819, p. 94); Link, 1807, *l. c.* iii. p. 116.

Spire shorter than the last whorl; aperture above rounded, wide, below narrow; inner lip callous, with three folds; outer lip simple; shell heavy, without varices or spines; base elongated.

Xancus pyrum, Linn. sp., and *maculatus*, Link (Chemn. f. 917, 918).

This genus, by Humphrey called *Rapum*, by Fabricius *Pyrum*, by Dr. Gray *Turbinellus*, and by M. Deshayes *Scolymus*, is here characterized for the first time, and sufficiently.

CYMATIUM, Link, 1807, *l. c.* iii. p. 119.

Spire rather long; aperture above rounded; inner lip callous, with three folds; outer one marginated; a great number of crowded and ridged varices run down the shell, to which they are firmly grown; base little elongated.

Cymatium polygonum, &c.

This is quite identical with *Latirus*, Montf., or *Polygona*, Schum.

VASUM, Link, 1807, *l. c.* iii. p. 119. (*Vasum*, Bolt. emend.)

Spire rather long; aperture longitudinal; inner lip callous, with alternately larger folds; outer lip simple; shell without distinct varices; base elongated.

Vasum Ceramicum, Linn. sp., &c.

This is *Cynodonta*, Schum., *Scolymus*, Sw.

TUDICLA, Link, 1807, *l. c.* iii. p. 120. (*Tudicla*, Bolt. emend.)

Spire very short, depressed; aperture above semicircular; inner lip callous, with a single fold; outer one simple; no varices or spines; canal straight, thin.

Tudicla spirillus, Linn. sp.

Subsequently established as *Haustellum a*, Schum., *Pyrella*, Swains., *Spirillus*, Schlut., *Spirilla*, Sow. jun.

TRITONIUM, Link, 1807, *l. c.* iii. p. 121.

Spire rather long; aperture above rounded; inner lip callous, generally with small folds; outer lip marginated; shell with varices that are commonly discontinuous; base rather elongated.

With respect to this genus I may refer to my 'Ind. Gen. Malacoz.' vol. ii. p. 609.

DISTORTRIX, Link, 1807, *l. c.* iii. p. 122.

Spire rather long; whorls distorted; inner lip callous, folded; outer lip marginated; varices indistinct; base short-tailed.

Distortrix anus, Linn. sp., and *reticulata* (Chemn. f. 405, 406).

This name then is to be substituted in the place of *Persona*, Montf.

GYRINEUM, Link, 1807, *l. c.* iii. p. 123.

Spire nearly equal to the last whorl; aperture rounded; inner lip callous, often slightly folded or granulated; outer lip marginated; shell compressed, with two opposite varices; base short or a little elongated.

Gyrineum echinatum (Chemn. f. 1274, 1275), *rana* (f. 1269, 1270), *bufonium* (f. 1240, 1241), *natator* (f. 1229, 1230), *verrucosum* (f. 1233, 1234), *caudatum* (f. 1045-1047), *scrobiculator*, = *Ranella*, Lamck.

CANRENA, Link, 1807, *l. c.* iii. p. 126.

Spire short; aperture longitudinal; inner lip folded; outer lip interiorly strongly dentated; shell crowded with spines, but without distinct varices; base short.

Canrena neritoidea (Mart. f. 972, 973, 976-979) = *Ricinula*, Lamck. &c.

ADELOBRANCHEA.

ASTRALIUM, Link, 1807, *l. c.* iii. p. 135.

Spire depressed; aperture broad, rounded, bending downwards.

Astralium deplanatum (Chemn. f. 1718-1720).—*Astralium calcar*, Gm., sp.

This genus will no doubt be acknowledged, being congruous with *Calcar*, Montf., Phil. It had been indicated before by G. Humphrey,

under the name of *Sol*, and by Bolten as *Astræa*. But I think it should be extended farther, so as to receive *Imperator* and *Hercoles*, Montf., *Stellaria*, Schmidt, *Cyclocantha*, *Canthorbis*, subg., and *Tubicanthus*, Swains., *Bolma*, Risso, *Cookia*, Less., and *Astrantium*, Phil.

UMBONIUM, Link, 1807, *l. c.* iii. p. 136.

Spire much depressed; aperture directed downwards, or to the side, simple; base showing a convex callus in the place of the umbilicus.

Umbonium vestiarius, Linn. sp., and *excisum* (Chemn. f. 1602).

That Link's name is to be adopted instead of *Globulus*, Schum., or *Rotella*, Lamck., can hardly be controverted; although his second species belongs to another tribe.

PYTHIA, Bolten, 1798, Mus. (ed. 1819, p. 74); Link, 1807, *l. c.* iii. p. 139.

Whorls, each of them composed of two pieces; aperture longitudinal, toothed on both sides.

Pythia scarabæa, Linn. sp.

This name is preferable to that of Fischer, *Polydonta*, which, although contemporary, is badly made, and wants correction.

ACEPHALA.

SUNETTA, Link, 1807, *l. c.* iii. p. 148.

Equivalve, in front rather obtuse, closed; hinge with two cardinal teeth, lateral ones indistinct; anterior slope shorter than the furrow-shaped posterior slope; ligament external.

Sunetta scripta (Chemn. f. 261-265) = *Cuneus*, Muhlf. 1811 = *Meroë*, Schum. 1817.

TIVELA, Link, 1807, *l. c.* iii. p. 152.

Equivalve, longitudinal, without epiderm, closed; hinge with two cardinal and one elongated lateral tooth; anterior and posterior slopes equally elongated; ligament external.

Tivela vulgaris (Chemn. f. 362).—*T. tripla* (*Venus*), Linn. = *Trigona*, Muhlf. 1811.

MUSCULIUM, Link, 1807, *l. c.* iii. p. 152.

Equivalve, closed; hinge with two small cardinal teeth, no lateral ones; anterior and posterior slope nearly equal.

Musculium lacustre (*Tellina*), Linn.

The genus established here, fourteen years afterwards was published as *Pisidium*.

TENTACULATA. See 'Ind. Gen. Malacoz.' ii. 541.

VERPA, Bolten, 1798, Mus. (ed. 1819, p. 49); Link, 1807, *l. c.* iii. p. 159.

Shell tubular, partly straight, partly winding, at one extremity open, at the other closed by a convex perforated blade.

Verpa penis (*Serpula*), Linn.

The oldest denomination of this genus that can be admitted; *Penicillus* (Da Costa, p.p.), Brug., being a term since the times of Rondelet consecrated to the Annulate class: all the other names, *Aquaria*, *Arytæna*, *Clepsydra*, *Aspergillum*, are of younger date, and will give way to *Verpa*, Bolt., defined by Link.

The following descriptions of new *Naticæ* were communicated by Dr. Philippi:—

11. DESCRIPTIONES NATICARUM QUARUNDAM NOVARUM EX COLLECTIONE CUMINGIANA, AUCTORE R. A. PHILIPPI.

1. NATICA CATENATA, Phil. *N. testâ subglobosâ, tenui, lividâ, zonis quatuor albis, maculas fuscas semilunatas exhibentibus pictâ; anfractibus rotundatis; spirâ breviusculâ, nigricante; sulcis radiantibus profundis superiorem anfractuum partem occupantibus; aperturâ semiorbiculari, intus purpureâ; umbilico amplo, margine acuto cincto; callo spirali satis valido medium umbilici occupante.*

Alt. $8\frac{1}{2}$, diam. $8\frac{2}{3}$ lin.

Hab. — ?

Differt a *N. tæniatâ*, Menke, anfractibus superius non horizontalibus sed declivibus, zonis longitudinaliter maculatis, callo labiali et callo umbilicali longe latioribus, etc.; a *N. depressâ* formâ globosâ, umbilico amplo, callo umbilicari mediano, etc.; a *N. maroccanâ* formâ globosâ, umbilico longe ampliore, callo ejus mediano, etc.

2. NATICA INCEI, Phil. *N. testâ depressâ, suborbiculari, solidâ, striatulâ, nitidâ, luteo-albidâ; anfractibus superius planatis; spirâ latè conicâ, acutâ; aperturâ semiorbiculari, valdè obliquâ; angulo basali columellæ incrassato; suturâ duplicatâ; callo maximo albo umbilicum magnum omninò implente.*

Alt. ab apice ad basin aperturæ $9\frac{1}{2}$, a dorso ad ventrem 6 lin.; diam. 12 lin.

Hab. ad insulam Raines, in freto Torres, ubi legit *Capt. Ince, R. N.*

Cave ne hanc speciem cum *N. Josephiniâ*, Risso (*N. Ollâ*, M. de Serr.), confundas, cui simillima est, et a quâ unice differt: ambitu paullo magis orbiculari; anfractibus minus rapide crescentibus; angulo umbilicum cingente paullo magis distincto; columellâ basi valde incrassatâ; callo umbilicari albo; colore fere albo in luteum vergente, præsertim versus basin, denique suturâ duplici. Linea superior suturæ a callo labiali, inferior a margine superiore anfractûs formatur, pariter ut in *Bullis* d. Gray.—Operculum corneum.

3. NATICA INTEMERATA, Phil. *N. testâ globoso-ovatâ, solidâ, striatulâ, nitidâ, lacteâ, ad suturam versus umbilicum et in parte ultimâ anfractûs ultimi flavâ; anfractibus superius planiusculis; spirâ conicâ, circa $\frac{1}{2}$ altitudinis æquante; aperturâ semiorbiculari; columellâ rectâ, incrassatâ; umbilico magno, pervio, lacteo, sulco profundo lato exarato; funiculo semicylindrico ejus a callo labiali distincto.*

Alt. $18\frac{1}{2}$, diam. $17\frac{1}{2}$ lin.

Hab. in sinu Californiæ; legit Rever. Steel.

Simillima videtur *N. porcellaneæ* d'Orb., sed umbilico multo ampliore et colore flavescente differt; a *N. castâ*, Phil., testâ solidiore minus depressâ, umbilico albo angustiore, funiculo umbilicali longe magis elevato, etc. distinguitur; a *N. pede elephantis* testâ haud depressâ, funiculo umbilicali minus elevato satis superque discrepat.

4. NATICA CARIBÆA, Phil. *N. testâ ovatâ, sordidè albâ, ad suturam zonâ lacteâ munitâ; anfractibus superius vix convexis; spirâ brevi, acutâ; aperturâ semiorbiculari; umbilico parvo; callo lato cum labio confluyente illum maximâ ex parte opplente.*

Alt. 8, diam. 7 lin.

Hab. in mari Caribæo ad insulam St. John.

Forma omnino accedit ad *N. mammillam* vel *N. lacteam* et umbilico pervio cum *N. lacteâ* convenit. Differt tamen umbilico longe angustiore, et callo ejus longe majore; an nihilominus mera varietas? *N. uberinâ*, d'Orb., testâ longe angustiore magis differre videtur.—Operculum tenue, corneum.

5. NATICA VESTALIS, Phil. *N. testâ ovato-oblongâ, acutâ, lacteâ, substriatâ, nitidissimâ; spirâ acutâ, conicâ, sextam vel septimam totius altitudinis partem occupante; aperturâ semiorbiculari; callo convexo, crassissimo, cum callo labiali confluyente, et sulco longitudinali ante marginem columellarem instructo, umbilicum fere omnino claudente.*

Long. $16\frac{1}{2}$, diam. 16 lin.

Hab. ad oram Mozambique dictam; legit Rev. Steel.

Forte nihil nisi varietas *N. mammillæ*, a qua unice differt callo umbilicali crassiore convexiore, sulco longitudinali ante medium marginis columellaris, parte liberâ umbilicum cingente.

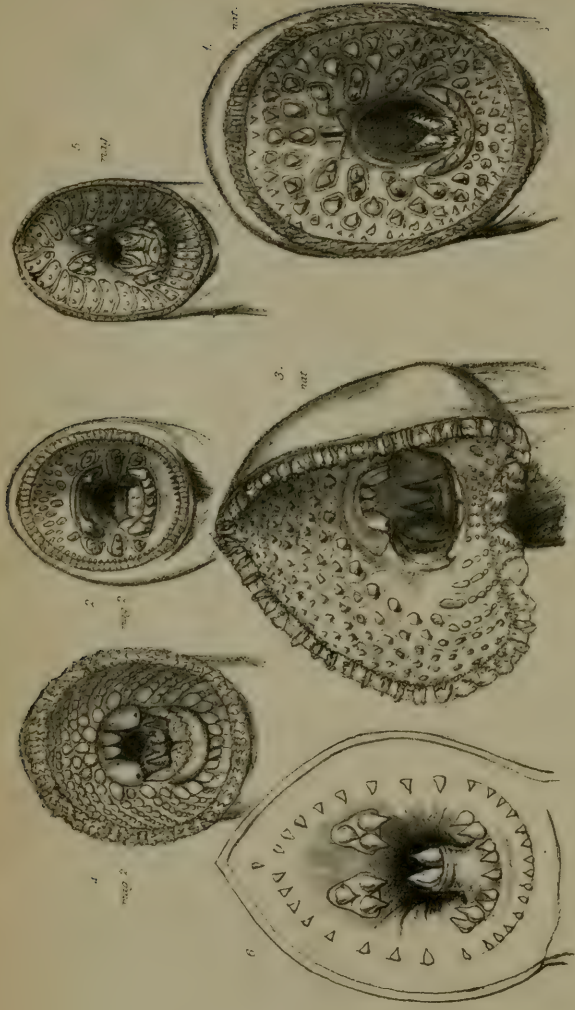
Obs.—Quæstio valde difficilis, utrum sub *N. mammillâ*, L. plures species lateant, an meræ varietates, vix examine singulorum speciminum in Musæis asservatorum decidi poterit, sed unice investigatione numerosæ gregis in ipso loco natali.

6. NATICA? POMUM, Phil. *N.? testâ ovatâ, inflatâ, tenuiusculâ, striatâ, glauco-fulvâ, basi albâ; anfractibus convexis, superioribus supernè subangulatis; spirâ quartam altitudinis partem æquante, subcontabulatâ; aperturâ ovato-oblongâ, propter anfractum penultimum prominentem fere lunatâ; umbilico angustissimo, perforato; labio parum calloso, basi supra umbilicum reflexo.*

Alt. 19, diam. $18\frac{1}{2}$ lin.

Hab. —?

Hæc species a reliquis Naticis valde aliena et forte ad genus *Ampibolam*, Schum. (*Ampullacera*, Quoy et Gaimard) mandanda est, etenim sinus latus satis profundus in parte supremâ labri hujus testæ in nullâ aliâ specie generis Naticæ observatur.



From a work by the author of the present work.

1. PETIOMYZON MARINUS 2. LAMPEIRA FLUVIATILIS. 3. GROTIRIA AUSTRALIS.
 4. VELASIA CHILENSIS. 5. CARAGOLA LAPICIDA. 6. MORDACIA MORDAX.





Fig. 1. *Monogeneus* sp. n.

Monogeneus sp. n.

W. 1888.

12. DESCRIPTION OF A NEW FORM OF LAMPREY FROM AUSTRALIA, WITH A SYNOPSIS OF THE FAMILY.

BY J. E. GRAY, ESQ., F.R.S., V.P.Z.S. ETC.

(Pisces, Pl. IV. V.)

The Lamprey which I have now to present to the attention of the Society differs in so remarkable a degree from any other known species, that, premising that I propose for it the name of *Geotria Australis* (Pisces, Pl. V.), I think it best to connect with the description a revision of the whole Family to which it belongs.

PETROMYZONIDÆ.

Nasal aperture closed, and the palate entirely covered with skin.

Lampredia, Rafin. Anal. Nat. 94, 1818.—*Petromyzonidæ* (*Petromyzonini*), Bonap. Syst. Ichth. 1838; De Kay, Nat. Hist. of New York, 379.—(*Fam.*) *Hyperoartia*, Müll. Abhandl. Akad. Berlin, 1836, 77; Mag. Zool. & Bot. i. 406.—*Petromyzidæ*, Gray, Syn. B.M. 1842, 148, 150.

Müller (*Abhandl. Akad. Berlin*) divided the genera thus:—

1. *Petromyzon*, with visible teeth.
2. *Ammocetes*, without visible teeth.

Synopsis of Genera.

A. *Petromyzonina. Teeth distinct; eyes visible.*

1. PETROMYZON. Upper inner teeth two, conical, close together; lower single, crescent-shaped; labial teeth numerous, conical; lingual teeth two, pinnate (Pl. IV. f. 1).

2. LAMPETRA. Upper and lower teeth transverse, crescent-shaped; labial teeth in two submarginal rows; inner lateral teeth larger, two- or three-lobed, lingual teeth pectinate (Pl. IV. f. 2).

3. GEOTRIA. Upper and lower teeth transverse, crescent-shaped; upper lobed; labial teeth numerous, distant, acute, innermost largest; lingual teeth elongate, conical, arched (Pl. IV. f. 3).

4. VELASIA. Upper and lower teeth transverse, crescent-shaped; upper two-lobed; labial teeth numerous, crowded, truncate; innermost largest; lingual teeth elongate, arched.

5. CARAGOLA. Upper internal teeth two, far apart, three-lobed; lower crescent-shaped, nine-lobed; labial teeth transverse, band-like, four tubercles; lingual teeth flattened (Pl. IV. f. 5).

6. MORDACIA. Upper inner teeth two; lateral three-lobed; lower nine, conical, in an arched series; labial teeth conical, in a single submarginal series; lingual teeth elongate, conical, arched (Pl. IV. f. 6).

B. *Ammocetina. Teeth none; eyes hidden.*

7. AMMOCETES.

A. Petromyzonina. *Teeth distinct.*

1. PETROMYZON. (Pisces, Pl. IV. fig. 1.)

Upper inner teeth two, triangular, close together. Lower inner tooth single, large, crescent-shaped, many-toothed. Labial teeth conical, acute, numerous, in diverging, arched series; the inner one largest, and gradually becoming smaller near the edge. Tongue with two compressed, pectinated teeth above, and a broad, lunate, dentated tooth beneath, which is strongly bent up between the upper teeth in the centre.

Yarr. Brit. Fish. fig. p. 603; De Kay, Zool. New York, t. 56, 216 (bad).—*Petromyzon*, *sp.*, Linn. Syst. Nat.; Rafin. Anal. Nat.; Müll. Abhandl. Akad. Berlin, 1834, 77 (1836).—*Petromyzon*, Gray, Proc. Zool. Soc. 1851.

1. PETROMYZON MARINUS. The LAMPREY.

Petromyzon marinus, Linn. Bloch, iii. pl. 77; Linn. (édit. de Gmelin) Faun. Suec. 292; Artedi, Ichth. gen. 64. syn. 90; Neue Schrift. der Berl. Naturf. 7. 466; Schneid. Bloch, i. 530, 1801; Penn. Brit. Zool. iii. 102. pl. 10, 1776-78; Shaw, Gen. Zool. v. 251. pt. 2. pl. 133, 1804; Don. Brit. Fish. pl. 81, 1820-21; Flem. Brit. An. 163. sp. 1, 1827; Cuv. Règ. An. ii. 404, 1829; Müll. Mém. de l'Acad. Berlin, 1834, 78. t. 4. f. 1, 5; Osteol. t. 9, 65, 67, 68. f. 9; Yarr. Brit. Fish. 2 ed. ii. 598, 1841.—*Lamproie marbrée*, Daub. Encycl. Méth.; Bonn. Planches d'Hist. Nat. de l'Enc. Méth.—*Petromyzon maculosus*, Artedi, Ichth. gen. 64. syn. 90.—*Petromyzon lamproie*, Bloch, Hist. Nat. Poiss. 31, 77. pt. 13.—*Petromyzon maximus*, Cuv. Règ. An. ii. 118, 1817.—*Petromyzon*, Klein, Misc. Pisc. iii. f. 30. n. 3.—*Mustela sive Lampetra*, Belon, Aquat. 76; Salv. Aquat. f. 62 b.—*Lampetra major*, Schwenck. Theriotr. Siles. f. 451; Charlet, Onom. f. 153. n. 3; Aldrov. 539. liv. 4. c. 13; Jouston, liv. 2. tit. 2. c. 3. pl. 24. f. 5.—*Lamproie*, Coms. Hist. Nat. v. 284; Fermin, Surin. 85; Rond. 310. pt. 1. liv. 13; Valmont de Bomare, Dict. Hist. Nat.—*Lampetra Rondeletii*, *Lamprey* or *Lamprey-Eel*, Will. Ichth. 105. pl. 2. f. 2, 1685; Ray, Syn. f. 35. n. 3.—*Ioatzma unagi*, Kæmpfer, Voy. au Japan, i. pl. 12. f. 2.—*Il mustilla*, Forsk. Desc. Anim. f. 18.—*Plota fluta*, Authors.—*Lampetra*, *Lampreda kentmanni*, *lampreda marina*, *mustela*, Gesn. (germ.) 180 b. et paralip. 22.—*Le Pétromyzon Lamproie*, Lacépède, Hist. Nat. Poiss. i. 2, 3. pl. 1, 1798.—*La Grande Lamproye*, Cuv. Règ. An. ii. 404, 1819.

Hab. European Seas.

2. PETROMYZON JURÆ. MACCULLOCH'S LAMPREY.

Petromyzon Juræ, MacCull. West. Isles, ii. 186, 187. t. 29. f. 1; Jen. B. V. A. 522.—*Petromyzon fluviatilis*, *var.*, Flem. Brit. An. 162.

Hab. Coast of Scotland, east shore; island of Jura.

Probably a variety of *P. marinus*: the drawing of the teeth shows it has no relation to *P. fluviatilis*.

3. ?PETROMYZON AMERICANUS. AMERICAN SEA LAMPREY.

Petromyzon marinus, Schæpff. Beobachtungen, &c. viii. 184; Mitch. Trans. Lit. & Phil. Soc. i. 461.—*Petromyzon americanus*, Lesueur, Amer. Phil. Soc. (N. S.) i. 382; Hist. N. A. Fish. ined. plate; Storer, Rep. on the Fishes of Massachusetts; De Kay, Nat. Hist. of New York, 379. pl. 66. f. 216. pt. 1; Zool. 1842.

Hab. N. America.

4. PETROMYZON NIGRICANS. BLUISH SEA LAMPREY.

Petromyzon nigricans, Lesueur, Amer. Phil. Soc. (N. S.) i. 385; Storer, Rep. on the Fishes of Massachusetts; De Kay, Nat. Hist. of New York, 381. pl. 79. f. 247 (teeth indistinct), pt. 1; Zool. 1842.

Hab. N. America.

5. PETROMYZON ARGENTEUS. SILVERY LAMPREY.

Petromyzon argenteus, Kirtland, Boston Journ. iii. 342. pl. 4. f. 3; De Kay, Nat. Hist. of New York, 382. pt. 1; Zool. 1842.

Hab. N. America, river Ohio.

2. LAMPETRA. (Pisces, Pl. IV. fig. 2.)

Upper inner tooth single, transverse, lunate, entire, with a conical prominence at each end. Lower inner tooth single, transverse, lunate, many-toothed, outer lobe largest. Labial teeth unequal, the outer numerous, small, subequal, conical, in a single, submarginal series, the inner larger, unequal; of the upper part small, in series; of the sides in a single series, larger, with two or three conical tubercles. Tongue with two compressed, pectinated teeth above, and a large, crescent-shaped, transverse tooth below, crenated on the edge, and with a larger, conical projection in the centre.

Yarr. Brit. Fish. fig. p. 604; De Kay, Nat. Hist. of New York, t. 79, 249 (bad).—*Petromyzon*, *sp.*, Linn., Cuv., Müll.—*Lampetra*, *sp.*, Ray.—*Lampetra*, Gray, Proc. Zool. Soc. 1851.

* *Dorsal fins separate.*

1. LAMPETRA FLUVIATILIS. LAMPERN OR RIVER LAMPREY.

Petromyzon fluviatilis, Linn. Bloch, pt. 3. pl. 78. f. 1; Linn. (edit. de Gmel.); Müll. Prod. 37. n. 307; Aldrov. 587; Penn. Brit. Zool. v. pt. 106. pl. 10, 1776-78; Schneid. Bloch, 530, 2, 1801; Shaw, Gen. Zool. 257. pt. 2, 1804; Don. Brit. Fish. pl. 80, 1820-28; Flem. Brit. An. 404, 1827; Cuv. Règ. An. ii. 404, 1829; Mém. de l'Acad. Berlin, 78, 1834; Jen. Man. Brit. Vert. 521. sp. 210, 1835; Yarr. Brit. Fish. 2 ed. ii. 598, 1841; Parnell; Rich. Faun. Bor. 294, 1836.—*Petromyzon fluviatilis*, Cuv. Règ. An. ii. 118, 1817.—*Lamproie prycka*, Daub. Encycl. Méth.—*Nein-oga natting*, Faun. Suec. 106.—*Petromyzon*, &c., Artedi, gen. 64. syn. 89. sp. 99.—*La petite Lamproie*, Bloch, 34. pt. 3. pl. 78. f. 1.—*La Lamproie branchiale*, Bonn. Planches de l'Encycl. Méth.—*Petromyzon*, *Prick* (*negen-oog*), Gro-

nov. Mus. i. 64. n. 114; Zooph. 38.—*Mustela*, Pliny, liv. 9. c. 17.—*Mustela fluviatilis*, Belon, Aquat. 75.—*Lampetra subcinerea, maculis carens*, Salv. Aquat. 62.—*Lampetra, alterum genus*, Gesn. Aquat. 597.—*Lampreda*, Icon. Anim. 326.—*Lampetra, medium genus*, Will. Ichth. 106. tab. g. 2, 3. f. 1, 2; Ray, Syn. Pisc. 25. n. 1.—*Lampetra fluviatilis*, Aldrov. 587; Jonston, 104. pl. 28. f. 11; Schone, 41; Charlet, 159. n. 7; Marseli, Dan. Pann. iv. 2. t. 1, 1726.—*Lampetra fluviatilis, media*, Schwenck. Theriotr. Siles. 532.—*Jaatz me unagi*, Kæmpfer, Voy. dans le Japon, i. 156. pl. 12. f. 2.—*Minog*, Rzæzynski, 134.—*Lamproie*, Fermin, Hist. Nat. de Surinam, 85.—*Petromyzon*, Kramer, Elenchus, 38. n. 1; Klein, Misc. Pisc. iii. 29. n. 1. t. 1. f. 3.—*Le Petromyzon pricka*, Lacépède, Hist. Nat. des Poiss. i. 18, 1798.

Hab. Europe.

2. LAMPETRA PLANERI. FRINGED-LIPPED LAMPERN.

Petromyzon planeri, Linn. Bloch, viii. pl. 78. f. 3; Linn. (édit. de Gmelin); Schneid. Bloch, 531, 532, 4, 1801; Shaw, Gen. Zool. v. pt. 2. p. 259, 1804; Jen. Man. Brit. Vert. 522. sp. 211, 1835; Müll. Mém. de l'Acad. Berlin, 78, 1834; Cuv. Règ. An. ii. 404, 1829; Yarr. Brit. Fish. 2 ed. ii. 607, 1841.—*Lamproiea planer*, Bonn. Planches de l'Encycl. Méth.—*Le Pétromyzon planer*, Lacépède, Hist. Nat. des Poiss. i. 30. pl. 3, 1798.

Hab. Europe.

** *Dorsal fin in contact with the second.*

3. LAMPETRA SANGUISUGA. LEECH LAMPERN.

Petromyzon Sanguisuga, Lacépède, Hist. Nat. des Poiss. ii. 99. pl. 1; Supp. to Petromyzon; Shaw, Gen. Zool. v. pt. 2. p. 261, 1804.—*Petromyzon planeri, var.*, Cuv. Règ. An. ii. 118.

Hab. Europe, Seine.

A very doubtful species; Cuvier says it is the same as the former.

4. LAMPETRA LAMOTTENII. AMERICAN LAMPERN.

Petromyzon Lamottenii, Lesueur, Hist. N. A.; De Kay, Nat. Hist. of New York, 382. pl. 79. f. 249 (mouth), pt. 1; Zool. 1842.

Hab. N. America, New York.

3. GEOTRIA, n. g. (Pisces, Pl. IV. fig. 3.)

Upper internal tooth large, transverse, crescent-like, divided into four lobes; the two inner lobes small, acute; outer truncated. The lower internal tooth transverse, narrow, slightly sinuous. The labial teeth numerous, far apart, conical, acute, in arched series, diverging from the throat; the innermost one larger, rest small; the innermost one of the lower part on each side small, elongate, transverse, with two small, rudimentary tubercles. Tongue with two elongate, conical, arched teeth, with a triangular plate on the lower side of the base. Throat with a very large dilatable pouch. Dorsal fins two,

far apart. Mouth very large, surrounded with rather large, transverse, torn leaves.

This genus chiefly differs from *Velasia* in the rudimentary state of the lower internal tooth, in the form of the labial teeth, in the large size of the oral disk, and the extraordinary development of the throat-pouch, which is found in a rudimentary state in the *Petromyzon marinus*. This development of the pouch is perhaps to adapt the animal to the long drought of the Australian rivers.

1. GEOTRIA AUSTRALIS. POUCHED LAMPREY. (Pisces, Pl. V.)

Hab. South Australia. Fresh water.

4. VELASIA. (Pisces, Pl. IV. fig. 4.)

Upper internal teeth large, transverse, crescent-like, divided into four flat, elongated lobes; the outer lobes largest. The lower internal teeth large, transverse, crescent-like, convex, denticulated on the edge. The labial teeth very numerous, truncated, in crowded, arched series, diverging from the throat; the inner ones large, and gradually diminishing in size to the edge. Tongue with two very large, long, curved teeth, with a triangular plate beneath at their base. Dorsal fins two, far apart. Mouth moderate, edged with transverse foliations.

1. VELASIA CHILENSIS. CHILIAN LAMPERN.

Hab. Chili. In fresh water.

5. CARAGOLA. (Pisces, Pl. IV. fig. 5.)

Upper inner teeth two, large, separate, lateral, submarginal, each with three acute tubercles. Lower inner teeth large, crescent-shaped, nine-lobed; the central and two lateral lobes on each side larger. The labial teeth in a subcircular, submarginal series, large, transverse, band-like, with three or four tubercles. Tongue with two flattened teeth, and a triangular, transverse plate below, with an acute process between the teeth on the upper edge. Dorsal fins two, far apart.

1. CARAGOLA LAPICIDA. CARAGOL.

Hab. West Coast of America.

6. MORDACIA. (Pisces, Pl. IV. fig. 6.)

Upper inner teeth two, separate, lateral, subtrigonal, each with three tubercles. The lower nine conical, acute, in an arched series; the five central smaller. Labial teeth small, conical, in a single, circular, submarginal series, with a single, additional, odd tooth in the centre above. Tongue with two conical, arched teeth. (Rich. Voy. Erebus & Terror, t. 38.)

Petromyzon, sp., Rich. Voy. Erebus & Terror, t. 38, 1845.

1. MORDACIA MORDAX. AUSTRALIAN LAMPERN.

Petromyzon mordax, Rich. Voy. Erebus & Terror, t. 38, 1845.—
Mordacia mordax, Gray, Proc. Zool. Soc. 1851.

Hab. Tasmania.

Species of Doubtful Situation in the Family.

1. PETROMYZON APPENDIX. SMALL LAMPREY.

Petromyzon appendix, De Kay, Nat. Hist. of New York, 381. pl. 64.
f. 211. pt. 1; Zool. 1842.

Hab. N. America, Hudson River.

“A ring of irregular-shaped corneous processes within the oral orifice, and a large isolated double tooth of the same texture on the inferior portion of the mouth.”—*De Kay*.

2. PETROMYZON TRIDENTATUS. TRIDENTATE LAMPREY.

Petromyzon tridentatus, Gairdener, Rich. Faun. Bor. Amer. 293,
1836; De Kay, Nat. Hist. of New York, 381. pt. 1; Zool. 1842.

Hab. N. America, Falls of the Walamet.

3. PETROMYZON ARGENTEUS. SILVERY LAMPREY.

Petromyzon argenteus, Bloch, t. 415. f. 2; Schneid. Bloch, 532.
t. 102. f. 1, 1801; Shaw, Gen. Zool. v. pt. 2. p. 262, 1841.

Hab. Indian Seas.

4. PETROMYZON BICOLOR. BRILLIANT LAMPREY.

Petromyzon bicolor, Shaw, Gen. Zool. v. pt. 2. p. 263, 1804.—
Petromyzon niger, Lacépède, iv. 667.

Hab. Europe, Seine.

5. PETROMYZON PLUMBEUS. LEADEN LAMPREY.

Petromyzon plumbeus, Shaw, Gen. Zool. v. pt. 2. p. 263, 1804.
—*Petromyzon Septæil*, Lacépède, iv. 667.

Hab. Europe, Seine.

B. Ammocætina. *Teeth none; eyes none.*

7. AMMOCÆTES.

Teeth none.

Ammocætes, Dum. Zool. Anal.; Cuv. Règ. An. ii. 118, 1817;
Müll. Abhandl. Akad. Berlin, 1834, 78 (1836).—?*Lampreda*, Rafin.
Anal. Nat. 94, 1815.

1. AMMOCÆTES BRANCHIALIS. PRIDE OF SANDPIPER.

Ammocætes branchialis, Dum.; Flem. Brit. An. 164. sp. 3, 1828;
Cuv. Règ. An. 406, 1829; Müll. Mém. de l'Acad. Berlin, 1834;
Jen. Man. Brit. Vert. 522. sp. 212, 1835; Yarr. Brit. Fish. 2 ed. ii.

609, 1841.—*Petromyzon branchialis*, Linn. (édit. de Gmelin) 1815; Bloch, pt. 3. pl. 78? f. 2; Linn. Faun. Suec. 292; Wulff. Ichth. Borus. 15. n. 20; Müll. Prod. Zool. Dan. 37. n. 307 b; Kramer, Elench. 483; Penn. Brit. Zool. iii. 107. pl. 10, 1776-78; Shaw, Gen. Zool. 260, 1804.—*Petromyzon corpore annuloso*, &c., Artedi, gen. 42. syn. 90.—*Lamproie branchiale*, Bonn. Planches de l'Encycl.; Daub. Encycl. Méth.—*Petromyzon*, Gronov. Zooph. 38. n. 160; Klein, Misc. Pisc. iii. 30. n. 4.—*Petromyzon cæcus*, Couch, Mag. Nat. Hist. v. 23. f. 60.—*Mustela fluviatilis*, Gesner, Aquat. 589; Icon. Anim. 286; Thierb. 159 b.—*Lampetra minima*, Aldrov. 539.—*Lampern*, or *Pride of the Isis*, Will. Ichth. 104.—*Pride*, Plot, Hist. of Oxford, 182. t. 10.—*Lampetra cæca*, Will. Ichth. tab. g. 3. f. 1; Ray, Syn. Pisc. 35. n. 2, 4; Couch, Loudon's Mag. Nat. Hist. v. 23. f. 9, 10.—*Lampreta neunange*, Jonston, t. 28. f. 10.—*Lamproyon et Lamprillon*, Rond. Hist. Poiss. ii. 202.—*Querder*, *Schlammquerder*, Schwencf. Theriotr. Siles. 423.—*Der Kieferwurm*, Müll. l. c. iii. 234.—*Lampreyon*, Valmont de Bomare, Dict. Hist. Nat.—*Le Petromyzon lampreyon*, Lacépède, Hist. Nat. des Poiss. i. 26. pl. 2. f. 1, 1798.

Hab. Europe, rivers.

2. AMMOCÆTES RUBER. RED LAMPREY.

Ammocætes ruber, Cuv. Règ. An. 406, 1829; Müll. Mém. de l'Acad. Berl. 78, 1834.—*Petromyzon ruber*, Lacépède, Hist. Nat. des Poiss. ii. 99. pl. 1; Supp. to Petromyzon; Shaw, Gen. Zool. v. pt. 2. p. 261, 1804.—*Ammocætes branchialis*, var., Cuv. Règ. An. ii. 118, 1817.

Hab. Europe, Seine.

3. AMMOCÆTES CONCOLOR. MUD EEL OR BLIND EEL.

Ammocætes concolor, Kirtland, Boston Journ. iii. 473. pl. 27. f. 1 a, b, 1841.

Hab. N. America, Mahoning and Scioto rivers.

4. AMMOCÆTES BICOLOR. COLOURED MUD LAMPREY.

Ammocætes bicolor, Lesueur, Amer. Phil. Soc. (N. S.) i. 386.—*Ammocætes bicolor*, Storer, Fishes of Massachusetts, 198; De Kay, Nat. Hist. of New York, 383, 679. f. 248. pt. 1; Zool. 1842.

Hab. N. America, Connecticut river.

5. AMMOCÆTES UNICOLOR. PLAIN MUD LAMPREY.

Ammocætes unicolor, De Kay, Nat. Hist. of New York, 383. pl. 79. f. 250. pt. 1; Zool. 1842.

Hab. N. America, Lake Champlain.

13. DESCRIPTIONS OF FORTY-THREE NEW SPECIES OF CYCLOSTOMACEA, FROM THE COLLECTION OF HUGH CUMING, ESQ.

BY DR. L. PFEIFFER.

1. *CYCLOSTOMA HIMALAYANUM*, Pfr. *C. testâ umbilicatâ, globoso-turbinatâ, solidulâ, costis spiralibus obtusis, 10-12, lineisque interjacentibus obsolete sculptâ, sub epidermide deciduâ, . . . albidâ; spirâ turbinatâ, supernè rufâ, acutiusculâ; anfractibus 5, convexiusculis, ultimo ventroso, circa umbilicum angustum, infundibuliformem vix compresso; aperturâ subverticali, circulari; peristomate simplice, continuo, breviter adnato, fusco-igneo, subincrassato, breviter expanso, supernè subangulato.—Operculum?*

Diam. maj. 48, min. 39, alt. 35 mill.

Hab. in Himalayâ.

2. *CYCLOSTOMA EUCHILUM*, Pfr. *C. testâ umbilicatâ, turbinato-subglobosâ, solidulâ, obliquè confertim striatâ, lineis impressis distantioribus obsolete clathratulâ, albidâ, violaceo-fusco et fulvo variegatâ, parum nitidâ; spirâ turbinato-elevatâ, apice acutiusculâ; anfractibus 5½, convexis, ultimo rotundato, ad suturam subdepresso, medio albo-fasciato, basi confertim et valide spirâli-ter sulcato; umbilico mediocri, infundibuliformi; aperturâ vix obliquâ, subangulato-circulari, intus purpurascenti-carneo-micante; peristomate subcontinuo, albo, marginibus supernè dilatatis, callo subemarginato junctis, dextro et basali latissimis, fornicatim revol-utis, sinistro angustato, vix reflexo.—Operculum?*

Diam. maj. 43, min. 32, alt. 28 mill.

Hab. Madagascar.

3. *CYCLOSTOMA CRASSUM*, Pfr. *C. testâ umbilicatâ, turbinato-globosâ, crassâ, striatâ et minutè malleatâ, rubello-fulvâ, fasciis et lineis interruptis castaneis ornatâ; spirâ turbinatâ, obtusiusculâ; anfractibus 5, convexis, ultimo supernè turgido, infra medium carinâ funiformi et fasciâ latiore nigricante circumdato, basi subplanulato, circa umbilicum angustum, infundibuliformem subcom-presso; aperturâ obliquâ, subangulato-rotundâ, intus rubellâ; peristomate duplici: interno continuo, externo crasso, expanso, ad anfractum penultimum breviter interrupto.—Operculum?*

Diam. maj. 27, min. 23, alt. 18 mill.

Hab. Liew Kiew, et var. minor in insulâ Ibyat (Bashee group).

4. *CYCLOSTOMA EXPANSUM*, Pfr. *C. testâ umbilicatâ, turbinato-subglobosâ, solidiusculâ, spirâliter confertim striatâ, opacâ, supernè castaneo et albido variegatâ; spirâ conoided, apice acutiusculâ; anfractibus 5, convexiusculis, ultimo convexiore, dilatato, peripherid subcarinato, basi fasciis angustis castaneis ornatâ; umbilico angusto, pervio; aperturâ subverticali, ferè circulari; peristomate subsimplice, continuo, breviter adnato, pallidè aurantiaco, undique æqualiter angulatim plano-expanso, margine subrevoluto.—Operculum?*

Diam. maj. 30, min. 22, alt. 19 mill.

Hab. —?

5. *CYCLOSTOMA UNICOLOR*, Pfr. *C. testá umbilicatá, globoso-conicá, solidá, longitudinaliter confertissime et regulariter striatá, spiraliter confertim sulcatá, opacá, fulvido-stramineá; spirá conicá, subtruncatá; anfractibus 6, convexiusculis, ultimo supernè et medio acutè carinato: cariná tertíá, validissimá, circa umbilicum angustum, infundibuliformem, intus profundè spiraliter sulcatum; aperturá parum obliquá, angulato-circulari; peristomate simplice, marginibus callo lunatim exciso junctis, dextro expansiusculo, sinistro medio dilatato, patente.—Operculum?*

Diam. maj. 20, min. 17, alt. 16 mill.

β. *Majus, striis longitudinalibus obsoletioribus, albidum.*

Diam. maj. 28, min. 22, alt. 20 mill.

Hab. —?

6. *CYCLOSTOMA PONDEROSUM*, Pfr. *C. testá latè umbilicatá, conoideo-depressá, crassá, ponderosá, subtiliter et obliquè mal-leato-rugulosá, olivaceo-fusculá; spirá breviter conoideá, obtusá; anfractibus 5, parum convexis, celeriter accrescentibus, ultimo lato, subdepresso, ad peripheriam obtusè funiculato-carinato; aperturá obliquá, angulato-ovali, intus albá, nitidá; peristomate crasso, recto, subcontinuo, supernè angulato-dilatato, margine columellari perarcuato.—Operculum membranaceum, pellucidum, fuscum, arctispirum.*

Diam. maj. 36, min. 30, alt. 20 mill.

Hab. Guatemala.

7. *CYCLOSTOMA DYSONI*, Pfr. *C. testá umbilicatá, conoideo-orbiculatá, solidá, pliculis confertis undulatis, subconfluentibus sculptá, fusco-olivaceá, pallidius strigatá et obsoletè fasciatá; spirá conoideá, obtusulá; anfractibus $4\frac{1}{2}$, convexiusculis, celeriter accrescentibus, ultimo rotundato; umbilico mediocri, conico; aperturá ferè verticali, angulato-subcirculari, intus cærulescente, nitidá; peristomate simplice, recto, supernè angulato, breviter adnato, margine dextro declivi, columellari subdilatato-patente.—Operculum?*

Diam. maj. 27, min. 22, alt. 16 mill.

Hab. Honduras (Mr. Dyson).

8. *CYCLOSTOMA DISCULUS*, Pfr. *C. testá umbilicatá, depressá, discoideá, solidiusculá, nitidá, alabastriná; spirá planissimá; anfractibus vix 4, convexiusculis, ad suturam impressam striatis, ultimo teretiusculo, subdepresso, in umbilico lato distinctius striato, anticè brevissimè soluto; aperturá subverticali, circulari; peristomate continuo, simplice, recto.—Operculum?*

Diam. maj. 14, min. 11, alt. 5 mill.

Hab. —?

9. *CYCLOSTOMA DESCISCENS*, Pfr. *C. testá latè umbilicatá, depresso-semiglobosá, supernè confertim sulcatá, albídá; spirá convexá; anfractibus $4\frac{1}{2}$, convexiusculis, ultimo terete, anticè subito deflexo, basi levigato; aperturá ferè horizontali, lunato-*

rotundatá, intus albd; peristomate incrassato, marginibus remotis, callo junctis, basali reflexo, columellari subito arcuatim ascendente.
—Operculum?

Diam. maj. 10, min. $8\frac{1}{2}$, alt. $5\frac{1}{2}$ mill.

Hab. Socotra.

10. CYCLOSTOMA MARGARITA, Pfr. *C. testá perforatá, globoso-conicá, solidulá, levigatá, nitidulá, rubello-succined; spirá conicá, apice acutiusculá, sanguined; anfractibus 5, convexiusculis, ultimo subrotundato; aperturá parum obliquá, ovali; peristomate interrupto, simplice, recto, margine columellari perarcuato, subincrassato.*—Operculum?

Diam. maj. 7, min. 6, alt. 6 mill.

Hab. in insulá Rapá Oceani pacifici.

BZ 1957

11. CYCLOSTOMA (LEPTOPOMA) LATELIMBATUM, Pfr. *C. testá perforatá, globoso-conicá, tenui, minutè spiraliter striatá et lineis obtusis elevatis, subæquidistantibus cinctá, diaphand, parum nitidá, albd, maculis et fasciis pallidè fulvis variegatá; spirá turbinatá, acutiusculá; anfractibus 5, convexiusculis, ultimo rotundato, medio lined acutè elevatá subcarinato; umbilico angusto, vix pervio; aperturá obliquá, subcirculari; peristomate duplice, albo: interno interrupto, breviter porrecto, marginibus callo tenui junctis, externo undique æqualiter dilatato, angulatim patente, supra perforationem exciso.*—Operculum?

Diam. maj. 17, min. 13, alt. 11 mill.

Hab. in insulis Philippinis.

12. CYCLOSTOMA (LEPTOPOMA) REGULARE, Pfr. *C. testá angustissimè perforatá, conicá, globosá, tenui, lineis approximatis supernè æqualibus sculptá, interstitiis spiraliter confertim striatá, diaphand, albidd, maculis fulvidis regulariter tessellatá; spirá turbinatá, apice acutá, pallidè corneá, anfractibus $5\frac{1}{2}$, convexiusculis, ultimo convexiore, infra liram periphericam inflato, obsoletius lirato; aperturá obliquá, lunato-circulari; peristomate interrupto, tenui, albo, breviter patente, margine columellari basi subangulatim dilatato.* Operculum?

Diam. maj. $12\frac{1}{2}$, min. 10, alt. 10 mill.

13. CYCLOSTOMA (LEPTOPOMA) SERICATUM, Pfr. *C. testá perforatá, globoso-conicá, tenui, pellucidá, sericed, lineis obliquis, subdistantibus sculptá, supernè lineis 4-5 elevatis, spiralibus munitá, hyalino-albidd, liris corneis (vel undique violacescentifulvâ, basi pallidiore); spirá turbinatá, acutá, apice nigricante; anfractibus 5, superis parum convexis, ultimo inflato, subcarinato, infra carinam fasciá unicá castaned ornato, basi liris spiralibus nonnullis obsoletioribus sculpto; umbilico angustissimo, non pervio; aperturá parum obliquá, submarginato-circulari; peristomate simplice, interrupto, tenui, horizontaliter patente, margine columellari medio sublingulatim dilatato.*—Operculum?

Diam. maj. 12, min. vix 10, alt. 9 mill.

Hab. in insulá Borneo (Taylor).

14. *CYCLOSTOMA PLEUROPHORUM*, Pfr. *C. testá umbilicatá, globoso-turbinatá, tenui, longitudinaliter confertè striatá et costulis filaribus, prominentioribus sculptá, diaphaná, parum nitidá, albidofulvescente; spirá turbinatá, apice acutiusculá, corned; suturá costis denticulatá; anfractibus 5, convexis, ultimo subterete, anticè breviter soluto; umbilico mediocri, profundo, angulo cariniformi cincto; aperturá subverticali, ovato-subcirculari; peristomate continuo, simplice, recto, margine columellari expansiusculo.—Operculum duplex, lamíná externá testacéá, 5-spiratá, marginibus anfractuum liberis, interná pland, cartilagineá.*

Diam. maj. 11, min. $9\frac{2}{3}$, alt. $9\frac{2}{3}$ mill.

Hab. Honduras.

15. *CYCLOSTOMA FASCICULARE*, Pfr. *C. testá perforatá, acuminato-ovatá, solidulá, confertissimè costulato-striatá, víx sericed, griseo-corned; spirá conicá, acutiusculá; suturá costularum fasciculis crenatá; anfractibus 5, convexiusculis, ultimo rotundato, basi spiraliter sulcato; aperturá víx obliquá, ovali; peristomate simplice, recto, acuto.—Operculum terminale, testaceum, planum, paucispirum, anfractibus obliquè striatis.*

Long. 12, diam. 8 mill.

Hab. —?

16. *CYCLOSTOMA GUATEMALENSE*, Pfr. *C. testá perforatá, oblongá, solidulá, subtruncatá, striatulá, olivaceo-fuscé; spirá convexiusculo-turritá; anfractibus 6, parum convexis, ultimo angustiore, anticè descendente, breviter soluto, basi, circa perforationem apertam, compresso, nec carinato; aperturá verticali, subcirculari; peristomate libero, albo, duplice: interno continuo, víx porrecto, externo dilatato, horizontaliter expanso, supra perforationem exciso.—Operculum?*

Long. 24, diam. 8 mill.

Hab. Vera Paz in Guatemalá.

17. *CYCLOSTOMA CANESCENS*, Pfr. *C. testá subperforatá, oblongo-turritá, truncatulá, solidá, lineis longitudinalibus et spiralibus elevatis regulariter clathratá, parum nitidá, griseo-albidá; spirá elongatá; suturá tuberculis confertis, albis crenatá; anfractibus superstomate 7, víx convexiusculis, ultimo basi attenuato, circa perforationem obsoletam distinctius spiraliter sulcato; aperturá verticali, angulato-ovalí, intus fusco-carned; peristomate duplice: interno víx porrecto, externo undique breviter expanso, superne angulato, anfractui penultimo breviter adnato.—Operculum?*

Long. 20, diam. 7 mill.

Hab. —?

18. *CYCLOSTOMA VIOLACEUM*, Pfr. *C. testá subobtectè perforatá, ovato-turritá, truncatá, solidulá, lineis elevatis spiralibus et confertioribus longitudinalibus oblongo-granatá, haud scabrá, non nitente, saturatè violacéá; spirá turritá, truncatá; anfractibus superstomate $4\frac{1}{2}$, convexis, ultimo rotundato; aperturá subverticali,*

ovali; peristomate simplice, albo, continuo, margine dextro subincrassato, angustè angulatim patente, columellari in laminam sinuosam, perforationem occultantem, nec claudentem, dilatato.—Operculum immersum, testaceum, planum, cinereum, paucispirum.

Long. 20, diam. 11 mill.

Hab. —?

19. *CYCLOSTOMA SHUTTLEWORTHII*, Pfr. *C. testá clausè umbilicatá, oblongá, truncatá, spiraliter confertim plicatá, lineis longitudinalibus obsolete decussatá, sericé, pallidissimè fulvidá, fasciis valde interruptis castaneis ornatá; spirá oblongá; anfractibus superstomate 3, convexiusculis, ultimo basi rotundato; aperturá verticali, angulato-ovali; peristomate duplice: interno brevi, expansiusculo, externo latè patente, concentricè striato, radiatim plicato et castaneo-radiato, ad columellam exciso, lamíná albá fornicatá umbilicum prorsus claudente.—Operculum terminale, cartilagineum, paucispirum, nucleo basali.*

Long. 22, diam. 11½ mill.

Hab. in insulâ Cubâ.

20. *CYCLOSTOMA RADULA*, Pfr. *C. testá perforatá, ovato-oblongá, truncatá, tenui, lineis elevatis spiralibus et costis acutis longitudinalibus subtiliter asperato-decussatá, pallidè corneá, fasciis angustis, rufis, interruptis ornatá, non nitente; spirá sursum attenuatá, latè truncatá; suturá profundá, subsimplice; anfractibus superstomate 4, convexis, ultimo angustiore, rotundato; aperturá verticali, circulari; peristomate duplice: interno continuo, vix porrecto, externo dilatato, horizontaliter patente, concentricè striato, ad anfractum penultimum subexciso, margine sinistro fimbriato-inciso.—Operculum planum, e duabus laminis compositum, externá subtestacé, anfractibus 3½, nucleo subcentrali.*

Long. 14, diam. 7 mill.

Hab. Almendares prope Havana.

21. *CYCLOSTOMA OVATUM*, Pfr. *C. testá obtectè perforatá, oblongo-ovatá, truncatá, tenui, longitudinaliter confertim plicatulá, sericé, fusco-corné, vel pallidissimè corneá, maculis rufis seriatim dispositis ornatá; spirá ovato-conicá, truncatá; suturá levi, irregulariter tuberculato-crenatá; anfractibus superstomate 5, convexiusculis, ultimo paulo angustiore, basi obsolete spiraliter sulcato; aperturá verticali, rotundato-ovali; peristomate fusculo, duplice: interno breviter porrecto, externo undique dilatato, campanulato-expanso, radiato-costato, supernè angulatim reflexo, anfractui penultimo longè adnato, perforationem claudente, margine sinistro subauriculato, libero.—Operculum?*

Long. 17½, diam. 8 mill.

Hab. in insulâ Cubâ.

22. *CYCLOSTOMA GRATELOUPI*, Pfr. *C. testá perforatá, oblongá, pupiformi, truncatá, tenuiusculá, spiraliter confertim sulcatá et costis longitudinalibus, confertis, non interruptis sculptá, diaphaná,*

parum nitidâ, corneo-albidâ, fasciis strigatim interruptis castaneis ornatâ; spirâ sursum parum attenuatâ, latè truncatâ; suturâ levi, crenatâ: crenis supernè minutis, confertis, in anfractibus ultimis fasciculatim dilatatis, obtusis; anfractibus superstomate 4, vix convexusculis, ultimo anticè breviter soluto, basi rotundato; aperturâ verticali, ovali; peristomate duplice: interno breviter expanso, adnato, externo campanulato-patente, rufo radiato, supernè cucullatim elevato, tum emarginato et anfractui penultimo adnato.—Operculum testaceum, planum, anfractibus 3, marginibus lamelloso-liberis.

Long. 16, diam. 7 mill.

β. *T. minor, crenulis suturæ confertis, acutis.*

Hab. Yucatan, var. β. in Indiâ occidentali.

23. *CYCLOSTOMA HISTRIO*, Pfr. *C. testâ profundè rimatâ, ovato-conicâ, solidiusculâ, longitudinaliter confertim plicatâ, parum nitidâ, albidâ, strigis latis obliquis, angulosis, fuscis pictâ; spirâ elato-conicâ, vix truncatâ; suturâ supernè minutè denticulatâ, anfractuum inferiorum subsimplice; anfractibus 4½, convexis, ultimo rotundato, basi ultra axin subproducto; aperturâ subobliquâ, subcirculari, intus nitidâ, fulvidâ, nebulosâ; peristomate lateritio, duplice: interno continuo, latè expanso, appresso, externo latiore, horizontaliter patente, supernè sinuato-angulato, ad anfractum penultimum breviter interrupto.—Operculum?*

Long. 20, diam. 11 mill.

Hab. in insulâ Jamaicâ.

24. *CYCLOSTOMA INTEGRUM*, Pfr. *C. testâ perforatâ, turrîtâ, tenuiusculâ, integrâ, lineis obsoletè elevatis spiralibus et costulis confertis longitudinalibus (tertiâ vel quartâ quâvis validiore) subdecussatâ, fulvidâ, fasciis interruptis rufis cingulatâ; spirâ regulariter turrîtâ, apice obtusiusculâ; suturâ subconfertè denticulatâ; anfractibus 7, convexis, 2 primis levigatis, ultimo rotundato, antrorsum breviter soluto, vix descendente, basi rotundato, fasciis 2-3 continuis rufis ornato; aperturâ vix obliquâ, ovali; peristomate subduplicato: interno continuo, adnato, externo patente, supernè subangulato-dilatato, tum emarginato, latere columnari undulato.—Operculum cartilagineum, planum, paucispirum.*

Long. 12, diam. 5 mill.

Hab. in Indiâ occidentali.

25. *CYCLOSTOMA HARPA*, Pfr. *C. testâ breviter rimatâ, oblongo-turrîtâ, tenuiusculâ, plicis longitudinalibus chordiformibus subdistantibus munitâ, cinnamomeo-carned, haud nitente, lineis rufis strigatim interruptis ornatâ; spirâ turrîtâ, integrâ, sursum nigro-violacèd, apice obtusâ; suturâ profundâ, plicis prominentibus subcrenatâ; anfractibus 6, convexis, ultimo rotundato; aperturâ verticali, ovali-subcirculari; peristomate rubello, duplice: interno expansiusculo, appresso, externo undique vix dilatato-patente, anfractui penultimo breviter adnato.—Operculum?*

Long. 12, diam. 6 mill.

Hab. Almendares prope Havana.

26. *CYCLOSTOMA PINGUE*, Pfr. *C. testá umbilicatá, oblongo-turritá, truncatá, solidá, liris spiralibus obtusis undulatá, striis longitudinalibus confertissimis sculptá, oleoso-micante, cinnamomeo-fuscá; suturá profundá, simplice; anfractibus superstomate 4, convexis, regulariter accrescentibus, ultimo rotundato; aperturá subverticali, ferè circulari; peristomate albo, duplice: interno expansiusculo, adnato, externo continuo, horizontaliter expanso, anfractui penultimo brevissimè adnato, supernè angulato.—Operculum?*

Long. $12\frac{1}{2}$, diam. 6 mill.

Hab. —?

27. *CYCLOSTOMA PALLIDUM*, Pfr. *C. testá perforatá, ovato-turritá, truncatá, tenui, lineis elevatis spiralibus et confertissimis longitudinalibus (hic illic irregularibus, subconfluentibus) minutè decussatá, pallidè corned, lineolis rufis interruptis obsolete pictá; suturá profundá, subsimplice; anfractibus superstomate 4, convexis, ultimo rotundato; aperturá verticali, ovali-circulari; peristomate duplice, interno albo, porrecto, expansiusculo, externo dilatato, horizontaliter patente, concentricè striato, anfractui penultimo breviter adnato, margine sinistro angustiore.—Operculum terminale, testaceum, anfractibus $3\frac{1}{2}$, obliquè striatis, marginibus subliberis.*

Long. $17\frac{1}{2}$, diam. $8\frac{1}{2}$ mill.

Hab. Almendares prope Havana.

28. *CYCLOSTOMA CUMANENSE*, Pfr. *C. testá perforatá, turrito-oblongá, truncatá, tenui, longitudinaliter confertim plicatá, sericed, pellucidá, corneo-lutescente, maculis castaneis fasciatim dispositis ornatá; suturá plicis excurrentibus confertim subcrenatá; anfractibus superstomate 5, subconvexis, ultimo basi rotundato, anticè breviter soluto, dorso carinato; aperturá subverticali, ovali, supernè subangulatá; peristomate libero, simplice, undique vix expanso.—Operculum cartilagineum, planum, paucispirum.*

Long. 15, diam. $7\frac{1}{2}$ mill.

29. *CYCLOSTOMA TURRITUM*, Pfr. *C. testá subperforatá, turritá, truncatula, lineis elevatis spiralibus et longitudinalibus regulariter clathratá, albidd, lineolis rufis interruptis cinctá; suturá subprofundá, confertim denticulatá; anfractibus superstomate 6, convexiusculis, regulariter accrescentibus, ultimo rotundato; aperturá verticali, ovali, intus fulvidá; peristomate subduplice: interno continuo, expansiusculo, externo supernè angulatim dilatato, margine dextro vix patente, columellari et sinistro exciso.—Operculum?*

Long. 16, diam. 7 mill.

Hab. Honduras (Mr. Dyson).

30. *CYCLOSTOMA DIAPHANUM*, Pfr. *C. testá subperforatá, oblongo-turritá, truncatá, tenuiuscula, lineis elevatis spiralibus confertis, costulisque illas transgredientibus filaribus confertioribus decussatá, diaphand, unicolore albidd; spirá elongatá; suturá irregulariter crenatá; anfractibus superstomate $4\frac{1}{2}$, convexis, sub-*

equalibus, ultimo anticè soluto, dorso carinato, basi rotundato, distinctius spiraliter sulcato; aperturá verticali, angulato-ovali; peristomate subsimplice, continuo, undique breviter expanso.—Operculum?

Long. 12, diam. 5 mill.

Hab. — ?

31. *CYCLOSTOMA LUGUBRE*, Pfr. *C. testá perforatá, turrító-oblongá, solidá; truncatá, liris obtusis spiralibus, costulisque submembranaceis illas transgredientibus sculptá, fuscá, violaceo-fusco latè unifasciatá; spirá parum attenuatá; suturá confertim et subacutè fasciculato-crenatá; anfractibus superstomate 5, convexiusculis, ultimo anticè breviter soluto, subdescendente, dorso compresso, basi distinctius spiraliter lirato; aperturá verticali, obliquè ovali; peristomate subsimplice, continuo, margine sinistro breviter, reliquis paulò latius expansis, subundulatis.—Operculum?*

Long. 16, diam. ferè 7 mill.

Hab. in insulá Jamaicâ.

32. *CYCLOSTOMA KUSTERI*, Pfr. *C. testá perforatá, ovato-turrítá, truncatá, tenui, sulcis spiralibus et costulis longitudinalibus confertis regulariter granulato-reticulatá, vix nitente, diaphand, fusco-corneá, lineis obsoletis rufis interruptis pictá; spirá convexo-turrítá, latè truncatá; suturá profundá, simplice; anfractibus superstomate 4, convexis, ultimo angustiore, rotundato; aperturá subverticali, subcirculari; peristomate duplice: interno breviter expanso, adnato, externo campanulato-expanso, concentricè striato, anticè concavo, rufo-radiato, supernè angulato, ad anfractum penultimum angustato.—Operculum?*

Long. 14, diam. 7 mill.

Hab. Honduras (Mr. Dyson).

33. *CYCLOSTOMA TROCHLEA*, Pfr. *C. testá perforatá, oblongo-turrítá, truncatá, costis filaribus spiralibus et longitudinalibus subregulariter clathratá, haud nitente, pallidè fuscá, punctis rufis subseriatis variegatá; spirá elongatá, trochleari, latè truncatá; suturá profundá, simplice; anfractibus superstomate 5, perconvexis; aperturá verticali, subcirculari; peristomate duplice: interno vix porrecto, externo horizontaliter expanso, supernè in rostrum recurvatum dilatato, ad anfractum penultimum breviter interrupto, latere sinistro inciso-crenulato.—Operculum?*

Long. 14, diam. 6 mill.

Hab. — ?

34. *CYCLOSTOMA ALTERNANS*, Pfr. *C. testá mediocriter umbilicatá, conoideo-depressá, tenuiusculá, acutè multiliratá, liris alternis minoribus, haud nitente, subepidermide pallidè lutescente fugace albá; spirá breviter conoideo-elevatá, obtusiusculá; suturá subcanaliculatá; anfractibus 5, convexiusculis, ultimo rotundato; aperturá parum obliquá, subcirculari; peristomate simplice, recto, fusco-limbato, subcontinuo, marginibus ad anfractum penultimum*

callo nitido junctis.—Operculum membranaceum, planum, cereum, arctispirum.

Diam. maj. 20, min. 16, alt. 10 mill.

Hab. Madagascar.

35. CYCLOSTOMA RUSTICUM, Pfr. *C. testá latè umbilicatá, depressá, subdiscoideá, solidá, spiraliter confertim lirátá, non nitente, sordidè albídá, pallidè fuscúlo irregulariter variegatá; spirá parum elevatá, vertice submucronato; anfractibus $4\frac{1}{2}$, convexiusculis, ad suturam subdepressis, ultimo terete, anticè descendente; aperturá diagonali, subcirculari, intus carnéd; peristomate simplice, breviter expanso, marginibus callo brevi junctis, supero repando.—Operculum?*

Long. maj. $17\frac{1}{2}$, min. $13\frac{1}{2}$, alt. $7\frac{1}{2}$ mill.

Hab. — ?

36. CYCLOSTOMA PSILOMITUM, Pfr. *C. testá mediocriter umbilicatá, depresso-conoideá, solidulá, virenti-luted, vix nitidulá, lineis spiralibus subtilissimis, piloso-elevatis crebris obscurioribus cinctá; spirá breviter conoideá, obtusá; suturá subcanaliculatá; anfractibus 4, convexis, ultimo terete, non descendente; aperturá ferè verticali, subcirculari, intus albídá; peristomate simplice, acuto, marginibus ferè contiguís, callo brevi junctis.—Operculum?*

Diam. maj. 15, min. 11, alt. 8 mill.

Hab. Venezuela.

37. CYCLOSTOMA ALATUM, Pfr. *C. testá latè umbilicatá, conoideo-depressá, solidulá, obliquè confertim et inæqualiter costulatá, vix diaphaná, albídá, fasciis angustis pallidissime corneís variegatá; spirá brevissime conoideá, acutiusculá; suturá simplice; anfractibus 4, modicè convexis, ultimo subterete, anticè vix descendente, lilaceo-nebuloso; aperturá diagonali, subcirculari, intus lilaceo-fusculá; peristomate subduplice, latere dextro et basali connato, expanso, externo supernè alatum dilatato, latere sinistro subreflexo.—Operculum?*

Diam. maj. 16, min. 13, alt. 8 mill.

Hab. S. Yago de Cuba.

38. CYCLOSTOMA SCALARE, Pfr. *C. testá angustè umbilicatá, conoideá, solidulá, obliquè striatulá, nitidulá, corneo-luteá; spirá elatá, scaliari, apice acutá; suturá profundá; anfractibus $4\frac{1}{2}$, perconvexis, ultimo terete, anticè subsoluto; aperturá obliquá, circulari, intus margaritacéá; peristomate simplice, continuo, undique vix expansiusculo.—Operculum?*

Diam. maj. 9, min. 7, alt. $6\frac{1}{2}$ mill.

Hab. in insulis Philippinis.

39. CYCLOSTOMA (CYCLOPHORUS) LUTESCENS, Pfr. *C. testá umbilicatá, depresso-conoideá, solidá, obliquè filoso-striatá, sericéá, fusco-lutescente; spirá breviter conoideá, apice acutiusculá; suturá profundá, simplice; anfractibus $4\frac{1}{2}$, convexis, rapide accrescentibus,*

ultimo non descendente; umbilico mediocri, profundo; aperturâ vix obliquâ, rotundato-ovali; peristomate simplice, recto, acuto, continuo, breviter adnato, supernè vix angulato.—Operculum membranaceum, pallidè corneum, rectispirum, extus profundè concavum.
 Diam. maj. 20, min. 15½, alt. 12 mill.
Hab. in Brasiliâ.

40. *CYCLOSTOMA GUTTATUM*, Pfr. *C. testâ umbilicatâ, depressâ, solidâ, glabrâ, nitidâ, læte castanèd, maculis albis subtriangularibus guttatâ; spirâ vix elevatâ, apice fuscâ, submucronatâ; anfractibus 4½, convexiusculis, celeriter crescentibus, ad suturam impressam striatulis; umbilico latiusculo, pervio; aperturâ parum obliquâ, circulari, intus albidd; peristomate subduplice: interno vix distinguendo, externo expanso, supernè in linguam brevem, anfractui penultimo adnatam, dilatato.—Operculum?*

Diam. maj. 19, min. 15, alt. 9 mill.
Hab. —?

41. *CYCLOSTOMA IGNEDESCENS*, Pfr. *C. testâ perforatâ, globoso-conicâ, tenui, lineis spiralibus subtilissimis confertim sculptâ, diaphanâ, nitidâ, ignescente; spirâ turbinatâ, obtusiusculâ; suturâ profundâ; anfractibus 4½, convexis, ultimo basi distinctius sulcato; aperturâ obliquâ, subcirculari; peristomate simplice, expanso, marginibus approximatis, non junctis.—Operculum?*

Diam. maj. 14, min. 11, alt. 11½ mill.
Hab. in Novâ Hiberniâ.

42. *CYCLOSTOMA FUSCULUM*, Pfr. *C. testâ angustissime umbilicatâ, globoso-conicâ, tenui, lineis elevatis spiralibus subconfertis, lirâque periphericâ validiore cariniformi sculptâ, vix nitidulâ, unicolore fuscâ, fasciâ unicâ angustâ rufâ infra carinam pallidam ornatâ; spirâ conicâ, obtusiusculâ; anfractibus 5, convexis, ultimo interdum carinâ, secundo superne notato, basi minute spiraliter sulcato; aperturâ parum obliquâ, rotundato-ovali; peristomate simplice, tenui, undique expansiusculo, marginibus approximatis, non junctis.—Operculum testaceum, planum, cinereum, 4-spirum, nucleo subcentrali.*

Diam. maj. 11½, min. 9½, alt. 9 mill.
Hab. —?

43. *CYCLOSTOMA CASTANEUM*, Pfr. *C. testâ angustè umbilicatâ, globoso-conicâ, tenui, obliquè striatulâ et liris subacutis multis sculptâ, nitidâ, saturatè castanèd; spirâ elevato-conicâ, apice obtusiusculâ; anfractibus 4½, angulato-convexis, ultimo liris 6 subæqualibus, pluribusque minoribus, confertioribus in umbilico munito; aperturâ parum obliquâ, subcirculari; peristomate simplice, tenui, undique expansiusculo, marginibus approximatis, non junctis.—Operculum testaceum, planum, paucispirum, nucleo subcentrali.*

Diam. maj. 11, min. 9, alt. 9 mill.
Hab. in insulâ Madagascar.

To this was added the following description of various species of *Helicea*.

14. DESCRIPTION OF FIFTY-FOUR NEW SPECIES OF HELICEA,
FROM THE COLLECTION OF HUGH CUMING, ESQ.

BY DR. L. PFEIFFER.

1. STREPTAXIS DISCUS, Pfr. *S. testá latè umbilicatá, discoïded, subregulari, lævigatá, albido-hyaliná; spirá planá, vertice promi-nulo; anfractibus 6½, vix convexiusculis, irregulariter varicosis, ultimo depresso, subtus deviante, pone aperturam rotundato, de-flexo; aperturá subhorizontali, transversè sinuato-anuriformi, plicá obliquá parietali et dentibus peristomatis coarctatá; peristomate candido, reflexo, margine supero impresso, obsolete dentato, dextro dente distinctiore munito, basi intus transversè calloso.*

Diam. maj. 14, min. 11, alt. 4½ mill.

Hab. — ?

2. HELIX RICHMONDIANA, Pfr. *H. testá imperforatá, trochi-formi, solidá, striatá et irregulariter granulatá, nitidá, castaneá; spirá castaneá, sursum pallidiore, apice obtusiusculá; anfractibus 5½, planis, sensim accrescentibus, ultimo compressè carinato, anticè vix deflexiusculo; basi plano; aperturá perobliquá, subrhombéd, ad carinam rostratá, intus livido-opaliná; peristomate nigro-fusco, subincrassato, marginibus callo tenui junctis, supero expanso, basali dilatato, reflexo.*

Diam. maj. 54, min. 47, alt. 30 mill.

Hab. ad Richmond River, Australia.

3. HELIX SEMIDECUSSATA, Pfr. *H. testá perforatá, conoïded, solidá, supernè minute decussatá, opacá, unicolore rufo-fuscá; spirá conoïded, acutiusculá; anfractibus 7, vix convexiusculis, ultimo cari-nato, non descendente, basi convexo; aperturá diagonali, angulato-lunari; peristomate simplice, recto, obtuso, margine columellari supernè brevissimè reflexiusculo.*

Diam. maj. 33, min. 30, alt. 18 mill.

Hab. in insulâ Mauritii.

4. HELIX SOULEYETIANA, Pfr. *H. testá perforatá, conoïdeodepressá, solidulá, rugoso-striatá, supernè inter strias sub lente confertissimè undulato-lineatá, pallidè fulvá; spirá breviter conoïded, obtusiusculá; anfractibus 6 subplanis, lentè accrescentibus, ultimo acutè carinato, infra carinam castaneo-fasciato, convexo, medio profundè excavato; aperturá perobliquá, angulato-lunari; peristomate simplice, marginibus subparallelis, dextro antrorsum subarcuato, columellari subincrassato, supernè brevissimè reflexo.*

Diam. maj. 52, min. 36, alt. 18 mill.

Hab. — ?

5. HELIX RADIANS, Pfr. *H. testá imperforatá, depressá, tenui, lævigatá, nitidissimá, pellucidá, corneá, strigis albidis irregulariter radiatá; spirá brevissimá, convexá; suturá impressá, submargi-natá; anfractibus 4½, planiusculis, ultimo non descendente, supernè*

angulato, basi convexo, medio subimpresso; aperturâ subverticali, angulato-lunari; peristomate simplicissimo, recto.

Diam. maj. 9, min. 8, alt. 4 mill.

Hab. in insulâ Tahiti.

6. *HELIX GARTNERIANA*, Pfr. *H. testâ umbilicatâ, coniformi, solidâ, irregulariter elevato-striatâ, opacâ, nitidulâ, lutescenti-carnedâ; spirâ conicâ, apice obtusâ; suturâ submarginatâ; anfractibus 7, convexis, ultimo peripheriâ subangulato, lined rubrâ cincto, anticè non descendente, subtus planiusculâ; umbilico angustissimo, pervio; aperturâ parum obliquâ, subtetragonâ; peristomate albo, margine supero ferè angulatim arcuato, expanso, basali substricto, columellari lilaceo, brevi, verticali, reflexo.*

Diam. maj. 22, min. 19, alt. 22 mill.

Hab. — ?

7. *HELIX LITURATA*, Pfr. *H. testâ imperforatâ, turbinato-semiglobosâ, striatâ, minutè rugoso-malleatâ, nitidulâ, roseo-carnedâ, fasciis punctatim vel lituratim interruptis rufis ornatâ; spirâ depresso-turbinatâ, apice acutiusculâ; anfractibus 5, convexiusculis, ultimo vix descendente, peripheriâ rotundato, fasciâ castanedâ, subtessellatâ circumdato, basi convexiusculâ; aperturâ diagonali, rotundato-lunari; peristomate simplice, margine dextro vix expansiusculâ, columellari subcalloso.*

Diam. maj. 23, min. 20, alt. 15 mill.

Hab. — ?

8. *HELIX BRARDIANA*, Pfr. *H. testâ umbilicatâ, subturbinato-depressâ, tenui, striatâ, fulvâ, pellucidâ, maculis luteis opacis irregulariter variegatâ; spirâ subturbinatâ, apice acutiusculâ; anfractibus 5, vix convexiusculis, ultimo non descendente, peripheriâ angulato, basi convexiore; umbilico angusto, pervio; aperturâ parum obliquâ, rotundato-lunari; peristomate simplice, tenui, undique expanso, margine columellari subdilato, patente.*

Diam. maj. 14, min. 12, alt. $8\frac{1}{2}$ mill.

Hab. in insulâ Bourbon.

9. *HELIX STURMIANA*, Pfr. *H. testâ mediocriter umbilicatâ, depresso-semiglobosâ, solidâ, supernè confertim plicatâ, parum nitidâ, unicolore fusco-lutescente; spirâ brevi, convexâ, obtusâ; anfractibus 4, planiusculis, rapidè accrescentibus, ultimo anticè descendente, subdepresso, peripheriâ rotundato, basi convexo, levigato; aperturâ parum obliquâ, lunato-ovali, intus margaritacedâ; peristomate simplice, marginibus conniventibus, callo tenui junctis, supero recto, basali subreflexo.*

Diam. maj. 22, min. $18\frac{1}{2}$, alt. 12 mill.

Hab. — ?

10. *HELIX LAYARDI*, Pfr. *H. testâ perforatâ, turbinatâ, tenuiusculâ, ruguloso-striatâ, parum nitente, pellucidâ, pallidè cornedâ; spirâ conoidâ, apice acutiusculâ; anfractibus $5\frac{1}{2}$, convexiusculis, ultimo carinato, non descendente, basi convexo; aperturâ parum*

obliquâ, rotundato-lunari, vix angulatâ; peristomate recto, tenui, acuto, margine columellari supernè brevissimè reflexiusculo.
 Diam. maj. 13, min. ferè 12, alt. 9 mill.
Hab. in insulâ Ceylon (*Mr. Layard*).

11. *HELIX WOODIANA*, Pfr. *H. testâ umbilicatâ, depressâ, tenui, lævigatâ, nitidissimâ, corneo-fuscâ; spirâ parum elevatâ, vertice subtili; suturâ impressâ; anfractibus 5, vix convexiusculis, lentè accrescentibus, ultimo depresso, obsoletè angulato, non descendente, basi planiusculo; umbilico angusto, pervio; aperturâ subverticali, lunari; peristomate simplice, recto, acuto, margine columellari vix reflexiusculo.*
 Diam. maj. 10, min. 9, alt. $4\frac{1}{2}$ mill.
Hab. in insulâ Ceylon (*Mr. Layard*).

12. *HELIX FORSTERIANA*, Pfr. *H. testâ umbilicatâ, globoso-depressâ, tenuiusculâ, undique minutè granulatâ, diaphanâ, corneo-isabellinâ, fasciis 2 angustis rufis supernè ornatâ; spirâ parum elevatâ, convexo-conoideâ, vertice acutiusculo; anfractibus 6, convexiusculis, ultimo anticè vix descendente, basi subplanulato; umbilico mediocri, pervio; aperturâ obliquâ, rotundato-lunari; peristomate simplice, marginibus remotis, dextro recto, basali reflexo, columellari in laminam triangularem, violaceo-fuscam, fornicatim dilatato.*
 Diam. maj. $20\frac{1}{2}$, min. 18, alt. 12 mill.
Hab. in Australiâ boreali.

13. *HELIX PTYCHOMPHALA*, Pfr. *H. testâ umbilicatâ, depresso-globosâ, tenui, supernè confertim costulatâ, lineis concentricis paucis obsoletè decussatâ, nitidâ, castaneo-corned; spirâ vix convexâ; anfractibus 4, vix convexiusculis, ultimo non descendente, obsoletissimè angulato, basi convexo, lævigato, corneo-virente, circa umbilicum mediocrem, pervium confertim plicato; aperturâ parum obliquâ, irregulariter truncato-ovali, multo altiore quam latâ; peristomate simplice, obtuso, margine columellari elongato, substrictè descendente, supernè fornicatim reflexo.*
 Diam. maj. 22, min. 20, alt. 13 mill.
Hab. ad Portum Essington.

14. *HELIX POIRETIANA*, Pfr. *H. testâ perforatâ, conicâ, solidâ, striatulâ, nitidâ, carneo-albidâ, strigis pallidè fuscis irregulariter pictâ; spirâ conicâ, obtusiusculâ; suturâ impressâ, subtilissimè crenulatâ; anfractibus 7, vix convexiusculis, ultimo subrotundato, fasciâ und fuscâ signato, anticè breviter descendente; aperturâ diagonali, lunato-rotundatâ; peristomate acuto, margine dextro repando, basali subincrassato, columellari fornicatim reflexo, perforationem ferè tegente.*
 Diam. maj. $19\frac{1}{2}$, min. $18\frac{1}{2}$, alt. 23 mill.
Hab. ad Portum Essington.

15. *HELIX DILLWYNIANA*, Pfr. *H. testâ umbilicatâ, depressâ, solidâ, irregulariter rugosâ et subtilissimè malleatâ, nitidâ, cre-*

tacéd; spirá subplaná, vertice papillatim prominulo, castaneo; anfractibus $4\frac{1}{2}$, planiusculis, ultimo rotundato, anticè breviter deflexo, basi inflato; umbilico angusto, non pervio; aperturá perobliquá, latè lunari, intus albá; peristomate acuto, intus incrasato, margine supéro subhorizontali et dextro arcuato expansis, basali substricto, reflexo, columellari brevissimo, angusto, patente.

Diam. maj. 31, min. 25, alt. 14 mill.

Hab. — ?

16. *BULIMUS GLAUCOPHTHALMUS*, Pfr. *B. testá imperforatá, ovato-oblongá, solidá, striatá, nigro-castaneá, epidermide hydrophaná fusco-cinereá strigatá; spirá convexo-conicá, apice saturatè cæruleá, obtusá; suturá impressá; anfractibus 5, convexiusculis, ultimo spirá breviorè, basi obsolete angulato; columellá subdeclivi, dilatátá, planá, albá, basi subdentatá; aperturá obliquá, truncato-ovalí, intus lividá; peristomate simplice, brevissimè expanso, margine dextro repando.*

Long. 36, diam. 25 mill.

Hab. in insulis Philippinis.

17. *BULIMUS SUTURALIS*, Pfr. *B. testá imperforatá, oblongo-conicá, tenui, striatá, nitidá, alabastrino-albí; spirá conicá, apice obtusá; suturá parum impressá, candidá, confertissimè noduloso-crenatá; anfractibus 7, planiusculis, ultimo $\frac{3}{4}$ longitudinis subæquante, infra medium obtusè angulato et fasciis 2 nigricantibus ornato; columellá supernè fusco-callosá, subortá; aperturá obliquá, truncato-oblongá; peristomate simplice, vix expansiusculo.*

Long. 43, diam. 23 mill.

Hab. in Africá occidentali.

18. *BULIMUS LUCTUOSUS*, Pfr. *B. testá perforatá, oblongo-acuminatá, solidá, obsolete decussatá, vix nitidá, atro-castaneá; spirá elongatá, apice obtusá; suturá impressá, submarginatá; anfractibus 7, convexiusculis, ultimo $\frac{1}{3}$ longitudinis paulo superante, basi circa perforationem angustam subcarinato; columellá verticali, levissimè arcuatá; aperturá parum obliquá, subsemiovali, ad columellam angulatá, intus lividá; peristomate simplice, recto, margine columellari fornicato, breviter reflexo.*

Long. 39, diam. 17 mill.

Hab. in Africá occidentali.

19. *BULIMUS INFUNDIBULUM*, Pfr. *B. testá umbilicatá, ovato-conicá, subfusiformi, confertim striatá, opacá, albá; spirá convexo-conicá, apice attenuatá, rosé, acutiusculá; suturá lineari; anfractibus 9, ferè planis, ultimo $\frac{3}{7}$ longitudinis subæquante, basi attenuato, circa umbilicum latum, pervium, infundibuliformem compresso; aperturá subverticali, angustá, oblongá; peristomate simplice, marginibus supernè approximatis, dextro breviter expanso, columellari subdilato, patente.*

Long. 18, diam. 7 mill.

Hab. in Andibus Peruvianis.

Nearly allied to *Bul. umbilicaris*, Souleyet.

20. *BULIMUS SUBINTERRUPTUS*, Pfr. *B. testá perforatá, subfusiformi-oblongá, tenuiusculá, lævigatá, sub lente spiráliter striatá, nitiduld, albidd, fasciis 5 latis, subinterruptis, spadiceis ornatá; spirá elongato-conicá, acutá; suturá parum impressá; anfractibus 6, planiusculis, ultimo spiram paulo superante, basi attenuato; columellá substrictá, recedente; aperturá obliquá, angustá, acuminato-semiovali; peristomate simplice, tenui, lutescente, margine dextro latè expanso, columellari triangulatim e basi dilatato, supernè latè reflexo.*

Long. 37, diam. $13\frac{1}{2}$ mill.

Hab. in Andibus Bolivæ.

21. *BULIMUS VARICOSUS*, Pfr. *B. testá perforatá, oblongo-acuminatá, tenui, striatá, sub lente obsolete decussatuld, parum nitente, albidd, strigis castaneis sparsis irregulariter variegatá; suturá irregulariter crenulatá; spirá elongato-conicá, acutiusculá; anfractibus 6, convexiusculis, varicosis (varicibus prioribus obtusis, ultimo acutè prominente), ultimo spirá vix brevioré, basi subcompresso; columellá supernè subtortá; aperturá parum obliquá, oblongo-ovali; peristomate simplice, tenui, margine dextro latè expanso, columellari dilatato, applanato, patente.*

Long. 35, diam. 14 mill.

Hab. in republicâ Mexicanâ.

22. *BULIMUS ATTENUATUS*, Pfr. *B. testá subperforatá, fusiformi-oblongá, solidiusculá, sublævigatá, nitidd, alba, strigis latis, maculatim subinterruptis, spadiceis, ornatá; spirá conicá, acutiusculá; anfractibus ferè 6, convexiusculis, ultimo spiram paulo superante, anticè striato, basi attenuato; columellá intrante, tortá, funali; aperturá vix obliquá, ovali-oblongá; peristomate simplice, tenui, margine dextro breviter expanso, columellari breviter reflexo, supernè adnato.*

Long. 34, diam. 13 mill.

Hab. Vera Cruz.

23. *BULIMUS ELEODES*, Pfr. *B. testá imperforatá, ovatá, tenuiusculá, rugoso-striatá, transversè submalleatá, diaphaná, nitidd, castaneo-olivaced; spirá conoidé, apice obtusá; anfractibus 4, convexiusculis, ultimo $\frac{1}{4}$ longitudinis subæquante, anticè descendente, basi subrotundato; columellá intrante, subtortá, roseá; aperturá subverticali, ovali, intus margaritaced; peristomate roseo, subincrassato, breviter reflexo, marginibus callo supra regionem umbilici dilatato junctis.*

Long. 36, diam. 18 mill.

Hab. in Andibus Novæ Granadæ.

24. *BULIMUS SCYTODES*, Pfr. *B. testá imperforatá, ovato-conicá, tenui, remotè striatá, undique minutè granulatá (granulis non seriatis), haud nitente, fuscá, maculis rufis majoribusque nigricantibus irregulariter adpersá, lineis longitudinalibus flexuosis, angulatis, luteis, sæpe geminatis vel anastomosantibus pictá; spirá brevi, convexo-conicá, obtusiusculá; anfractibus 4, convexiusculis,*

ultimo magno, $\frac{4}{5}$ longitudinis æquante, anticè deflexo, basi rotundato; columellâ filari, intrante, leviter arcuatâ; aperturâ parum obliquâ, ovali, intus concolore, nitidâ; peristomate simplice, tenui, rubello, undique breviter expanso.

Long. 35, diam. $17\frac{1}{2}$ mill.

Hab. in Andibus Novæ Granadæ.

25. *BULIMUS MELEAGRIS*, Pfr. *B. testâ imperforatâ, acuminato-ovatâ, tenuiusculâ, striis incrementi confertis et lineis spiralibus granulatâ, parum nitente, fulvâ, fusco-strigatâ et irregulariter guttatâ; spirâ conicâ, acutâ; suturâ subrenulatâ; anfractibus $5\frac{1}{2}$, planiusculis, ultimo spiram paulo superante, convexiore, anticè descendente, basi rotundato; columellâ filari, leviter arcuatâ; aperturâ obliquâ, oblongo-ovalî, intus submargaritaced; peristomate simplice, recto.*

Long. 31, diam. 14 mill.

Hab. in Andibus Novæ Granadæ.

26. *BULIMUS NIGROLIMBATUS*, Pfr. *B. testâ imperforatâ, ovatâ, tenui, rugosâ, striis confertis spiralibus subgranulatâ, parum nitidâ, olivaceo-fulvâ, strigis angustis castaneis variegatâ; spirâ conicâ, apice obtusâ; anfractibus 5, convexiusculis, ultimo spiram paulo superante, convexiore, basi rotundato; columellâ tenui, subcallosâ, subrecedente; aperturâ obliquâ, angulato-ovalî, intus plicatâ, margaritaced; peristomate simplice, recto, obtuso, nigrolimbato.*

Long. 28, diam. 14 mill.

Hab. in Andibus Novæ Granadæ.

27. *BULIMUS DUBIUS*, Pfr. *B. testâ subperforatâ, oblongo-fusiformi, tenui, striatâ, nitidâ, albo-lutescente, strigis spadiceis subundulatis ornatâ; spirâ gracili, elongato-conicâ, apice obtusâ; suturâ submarginatâ; anfractibus 6, vix convexiusculis, ultimo spirâ paulo breviorè, basi attenuato, subcompresso; columellâ subverticali, fere ad basin aperturæ elongatâ; aperturâ vix obliquâ, oblongâ, utrinque angustatâ, intus concolore; peristomate simplice, recto, margine dextro levissime arcuato, columellari breviter fornicatim reflexo, subappresso.*

Long. 28, diam. 10 mill.

Hab. in Andibus Novæ Granadæ.

28. *BULIMUS NUBECULATUS*, Pfr. *B. testâ umbilicatâ, ovato-oblongâ, solidâ, sublævigatâ, nitidâ, pallidè cornè, saturatius nubeculatâ; spirâ conicâ, apice obtusâ; suturâ profundâ; anfractibus $5\frac{1}{2}$, convexis, ultimo $\frac{3}{5}$ longitudinis æquante, basi rotundato; columellâ verticali, ad basin aperturæ porrigente; aperturâ parum obliquâ, subellipticâ, basi subangulatâ, intus albidâ; peristomate simplice, recto, margine dextro perarcuato, columellari dilatato, fornicatim reflexo, libero.*

Long. 16, diam. $8\frac{1}{2}$ mill.

Hab. in Americâ centrali (Morelet.)

29. *BULIMUS EGANUS*, Pfr. *B. testâ perforatâ, conico-ovatâ, tenui, lineis longitudinalibus et spiralibus sub lente obsolete decussatâ, vix nitidulâ, quasi pruinosa, fusco-corneâ; spirâ conicâ, apice obtusâ; suturâ mediocri; anfractibus 5, modice convexis, ultimo spiram paulo superante, medio obsolete angulato, basi vix compressiusculo; aperturâ obliquâ, subellipticâ, basi subangulatâ; peristomate simplice, tenui, margine dextro repando, columellari sursum dilatato, reflexo, subappresso.*

Long. 13, diam. $6\frac{1}{2}$ mill.

Hab. Ega Brasilie.

30. *BULIMUS ACALLES*, Pfr. *B. testâ subperforatâ, ovato-conicâ, tenui, longitudinaliter confertim striatâ et distantius plicatâ, haud nitente, fulvo-griseâ; spirâ conicâ, obtusiusculâ, fulvescente; anfractibus $4\frac{1}{2}$, vix convexiusculis, ultimo spiram superante, basi rotundato; columellâ vix arcuatâ, subecedente; aperturâ obliquâ, ovali, intus fulvo-carned; peristomate simplice, recto, margine dextro arcuato, columellari supernè reflexo, subadnato.*

Long. 10, diam. 6 mill.

Hab. in Andibus Peruvianis.

31. *BULIMUS DILLWYNIANUS*, Pfr. *B. testâ perforatâ, ovato-oblongâ, solidâ, ruditer striatâ et irregulariter malleatâ, vix nitidulâ, carneâ, fusculo punctatâ et variegatâ; spirâ convexo-conicâ, apice obtusulâ; suturâ impressâ, marginatâ; anfractibus 5, convexiusculis, ultimo spiram paulo superante, basi attenuato, subcompresso; columellâ valide torto-plicatâ; aperturâ vix obliquâ, sinuoso-oblongâ; peristomate albo, expanso-reflexo, margine dextro leviter arcuato, columellari supernè dilatato, perforationem fere claudente.*

Long. 39, diam. $16\frac{1}{2}$ mill.

Hab. in Andibus Novæ Granadæ.

32. *ACHATINA FULGURATA*, Pfr. *A. testâ conico-ovatâ, tenui, striis longitudinalibus supernè confertis, in anfractu ultimo obsolete, lineisque spiralibus granulatâ, corneo-luteâ, strigis latis fulguratis nigricantibus ornatâ; spirâ conicâ, obtusâ; anfractibus $6\frac{1}{2}$, superis parum convexis, ultimo ventricoso, lineis paucis spiralibus infra suturam granulato, infra medium sublevigato; columellâ carulescente, vix arcuatâ, supra basin aperturæ elliptico-semiovali abruptè truncatâ; peristomate simplice, recto.*

Long. 67, diam. 36 mill.

Hab. in Africâ occidentali.

33. *ACHATINA PLICATULA*, Pfr. *A. testâ oblongo-fusififormi, tenui, longitudinaliter confertim plicatâ, lineis spiralibus obsolete decussatâ, diaphanâ, parum nitente, fusco-carned; spirâ elongato-conicâ, apice obtusâ; suturâ marginatâ, minutè crenulatâ; anfractibus 7, vix convexiusculis, ultimo spiram æquante, paulo convexiore, basi attenuato; columellâ callosâ, vix arcuatâ, ad basin aperturæ*

semiovali, intus nitidissimæ, abruptè truncatâ; peristomate simplice, tenui.

Long. 60, diam. 25 mill.

Hab. in Andibus Novæ Granadæ.

34. *ACHATINA ALBICANS*, Pfr. *A. testâ ovato-conicâ, tenui, longitudinaliter striatâ, lineis spiralibus infra medium anfractu ultimi obsoletis decussatâ, diaphanâ, vix nitidâ, albicante; spirâ pyramidatâ, obtusiusculâ; suturâ submarginatâ; anfractibus 6½, vix convexiusculis, ultimo spirâ paulo longiore, basi vix attenuato; columellâ verticali, substrictâ, supra basin aperturae rhombo-semiovalis horizontaliter et breviter truncatâ; peristomate simplice, recto, margine basali leviter arcuato.*

Long. 46, diam. 23 mill.

Hab. in Africâ occidentali.

35. *ACHATINA INORNATA*, Pfr. *A. testâ turrato-oblongâ, solidâ, confertim striatâ, pallide fulvâ, strigis saturatoribus variegatâ; spirâ turratâ, apice obtusiusculâ; suturâ lævi, confertissime crenulatâ; anfractibus 7½, planiusculis, ultimo ⅔ longitudinis subæquante, basi vix compresso, læviore; columellâ perarcuatâ, albo-callosâ, obliquè abruptè truncatâ; apertura sinuoso-semiovali, intus albâ; peristomate simplice, obtuso, margine dextro repando.*

Long. 28, diam. 11 mill.

Hab. in insulâ Ceylon.

36. *ACHATINA VIOLACEA*, Pfr. *A. testâ oblongo-conicâ, solidâ, striatâ, parum nitente, violacè; spirâ elongato-conicâ, sursum rubellâ, apice obtusâ; suturâ lævi, marginatâ; anfractibus 7, convexiusculis, ultimo ⅔ longitudinis subæquante, infra medium angulato; columellâ subarcuatâ, tenuiter callosâ, supra basin aperturae obliquæ, angulato-ovalis breviter truncatâ; peristomate simplice, recto.*

Long. 38, diam. 18 mill.

Hab. in Africâ occidentali.

37. *ACHATINA (GLANDINA) ATTENUATA*, Pfr. *A. testâ oblongo-fusififormi, gracili, tenui, lævigatâ, nitidissimâ, fulvâ, strigis arcuatis saturatoribus pictâ; spirâ elongato-conicâ; apice obtusiusculâ; suturâ lævi, subsimplice; anfractibus 7, planiusculis, ultimo ⅔ longitudinis subæquante, basi attenuato; columellâ subcallosâ, leviter arcuatâ, subtortâ, basi obliquè truncatâ; apertura angustissimâ, oblongâ, supernè acutâ, prope basin sinistrorsum dilatatâ; peristomate simplice, margine dextro repando.*

Long. 31, diam. 11 mill.

Hab. in Americâ centrali.

38. *HELIX SUBRUGATA*, Pfr. *H. testâ subperforatâ, depresso-turbinatâ, distanter subrugatâ, pellucidâ, pallide cornè; spirâ breviter conoideâ, acutiusculâ; anfractibus 5½-6, planiusculis, ultimo carinato, basi convexiusculo, lævigato; apertura diagonali,*

subangulato-lunari; peristomate recto, acuto, margine columellari supernè vix reflexiusculo.

Diam. maj. 13, min. $11\frac{1}{2}$, alt. $6\frac{1}{2}$ mill.

Hab. ad Clarence River, New-South Wales.

39. *HELIX OTOSTOMA*, Pfr. *H. testâ angustè umbilicatâ, sublentiformi, solidâ, acutè carinatâ, striatâ et subtiliter granulatâ, olivaceo-nigricante vel castaneâ; spirâ subconoideo-convexâ, obtusâ; anfractibus 5, planiusculis, ultimo utrinque convexo, anticè subito deflexo, supra et infra carinam ascendentem profundè scrobiculato; aperturâ perobliquâ, subrhombéo-ensiformi, ringente; peristomate continuo, ad anfractum penultimum sinuoso, medio laminam longe intrantem emittente, margine supero dente conico obtusulo munito, basali medio subangulatim descendente, parte sinistrâ dentem validum, compressum, parte dextrâ dentem leviter et irregulariter bifurcatum gerente.*

Diam. maj. 31, min. 26, alt. 13 mill.

Hab. in Ândibus Novæ Granadæ.

40. *HELIX ANNULIFERA*, Pfr. *H. testâ umbilicatâ, depressâ, lentiformi, carinatâ, solidâ, striatâ et minutè granulatâ, saturate castaneâ, ad carinam acutam latè albo-fasciatâ; spirâ breviter conoideâ, obtusâ; anfractibus 5, planiusculis, ultimo anticè breviter deflexo, basi convexo, anticè strangulato et scrobiculato; umbilico mediocri; aperturâ subhorizontali, irregulari, ringente; peristomate subincrassato, albo, continuo, margine parietali perarcuato, laminam elongatam intrantem emittente, in umbilicum descendente et cum basali parallelo juncto; margine basali usque ad medium substricto, acutè dentato, tum angulatim descendente, latè reflexo, lamina linguæformi latâ munito, ad carinam ascendente, a dextro expanso canali angusto, supernè in anulum apertum desinente separato.*

Diam. maj. 34, min. 29, alt. 13 mill.

Hab. Panama.

This is the shell figured by Prof. E. Forbes in Trans. Zool. Soc. 1850, p. 53. Moll. t. 9. f. 4, under the name of *H. labyrinthus* var. *sipunculata*.

41. *HELIX GASKOINI*, Pfr. *H. testâ umbilicatâ, turbinato-depressâ, solidâ, obliquè rugato-plicatâ, nitidâ, albâ; spirâ conoideo-convexâ, obtusâ; anfractibus $5\frac{1}{2}$, convexis, ultimo anticè deflexo, medio carinato, basi convexiusculo, sublevigato; aperturâ perobliquâ, lanceolato-ovali; peristomate subincrassato, marginibus callo umbilicum mediocrem, pervium semioccultante junctis, supero breviter expanso, basali reflexo.*

Diam. maj. 31, min. 27, alt. 15 mill.

Hab. in insulâ Haiti (Sallé).

42. *BULIMUS TASMANICUS*, Pfr. *B. testâ imperforatâ, ovato-conicâ, solidulâ, rugoso-striatâ, vix nitidâ, albidâ; spirâ conicâ, acutiusculâ, apice suberubescente; anfractibus 5, vix convexiusculis, ultimo*

spiram paulo superante, basi rotundato; columellâ filari, subrecedente; aperturâ obliquâ, ovali, intus pallide fulvescente; peristomate simplice, recto, margine dextro leviter arcuato, columellari vix reflexiusculo, adnato.

Long. 25, diam. 11 mill.

Hab. Van Diemen's Land.

43. *BULIMUS BELCHERI*, Pfr. *B. testâ imperforatâ, ovato-oblongâ, solidâ, glabriusculâ, fulvido-albidâ, castaneo-fasciatâ; spirâ convexo-conicâ, obtusâ; anfractibus 5, convexiusculis, ultimo spirâ vix breviorè, ad suturam et basin latè, medio angustè fasciato; columellâ planâ, substrictâ, supra basin recedente; aperturâ obliquâ, truncato-oblongâ; peristomate subincrassato, nigricante, reflexiusculo.*

Long. 40, diam. $23\frac{1}{2}$ mill.

Hab. in insulis Philippinis.

44. *BULIMUS NEWCOMBIANUS*, Pfr. *B. testâ sinistrorsâ vix subperforatâ, ovato-turritâ, tenuiusculâ, plicis validis longitudinalibus sulcisque spiralibus sculptâ, olivaceo-fuscâ; spirâ turritâ, gracili, obtusulâ; anfractibus $5\frac{1}{2}$, summis planis, sequentibus convexiusculis, ultimo $\frac{3}{4}$ longitudinis subæquante, medio inflato; columellâ callosâ, substrictè recedente; peristomate recto, acuto, margine externo leviter arcuato, subrepando, columellari reflexo, subappresso.*

Long. $14\frac{1}{2}$, diam. $5\frac{1}{2}$ mill.

Hab. in insulis Sandwich.

This species is nearly allied to *Achatinella plicata*, Gould, which must be rather referred to the genus *Bulimus*, in which there being already a *Bulimus plicatus*, I have marked it in Mr. Cuming's Museum with the name of *Bulimus liratus*.

45. *BULIMUS PORPHYROSTOMUS*, Pfr. *B. testâ imperforatâ, ovato-conicâ, solidâ, rugoso-plicatâ, pallide carneâ, epidermide deciduâ fusco-olivaceâ indutâ; spirâ conicâ, obtusiusculâ; anfractibus 6, vix convexiusculis, ultimo spiram æquante, basi subattenuato; columellâ oblongè plicatâ, albâ; aperturâ verticali, angustâ, oblongâ, obliquè recedente, intus saturatè purpureo-castaneâ, nitidâ; peristomate incrassato, recto, albo, marginibus callo crasso, albo, medio tuberculifero junctis.*

Long. 62, diam. 28 mill.

Locality unknown.

46. *BULIMUS MICRODON*, Pfr. *B. testâ breviter rimatâ, subfusiformi-turritâ, obliquè costulato-striatâ, albidâ, strigis sparsis corneis, lacteo-marginatis ornatâ; spirâ elongatâ, apice acutiusculâ; anfractibus 12, vix convexiusculis, ultimo $\frac{2}{3}$ longitudinis subæquante, infra medium filoso-unicarinato; columellâ supernè plicâ dentiformi munitâ; aperturâ vix obliquâ, truncato-ovalî; peristomate simplice, margine dextro breviter expanso, columellari dilatato, angulatim reflexo.*

Long. 15, diam. 4 mill.

Hab. in insulâ Jamaica.

47. *ACHATINA NEWCOMBI*, Pfr. *A. testá turritá, solidá, longitudinaliter rugoso-striatá, cingulis obtusè elevatis sculptá, castaneá; spirá elongatá, sursum in conum convexiusculum, acuminatum attenuatá; anfractibus 9, planiusculis, ultimo $\frac{2}{3}$ longitudinis subæquante, infra medium angulato, fasciá pallide cincto, basi nigro; columellá lamellá angustá, tortá, albá munitá, basi subtruncatá; aperturá obliquá, subrhombéd; peristomate simplice, recto.*

Long. 71, diam. 19 mill.

Hab. in insulis Sandwich (*Newcomb*).

48. *ACHATINELLA MELAMPOIDES*, Pfr. *A. testá oblongá, solidá, ruguloso-striatá, vix nitidulá, saturatè fuscá; spirá convexo-conicá, acutiusculá; suturá impressá, submarginatá; anfractibus 6, vix convexiusculis, ultimo spirá paulo brevioré, basi rotundato; columellá medio acutè tuberculatá; aperturá verticali, sinuato-ovali; peristomate recto, acuto, intus labiato, margine columellari calloso, albo, appressè reflexo.*

Long. 13, diam. $5\frac{2}{3}$ mill.

Hab. in insulis Sandwich.

49. *PARTULA NODOSA*, Pfr. *P. testá perforatá, conico-ovatá, solidulá, obsoletè decussatulá, castaneá, ad suturam fasciá latá albá et interdum nonnullis pallidis ornatá; spirá conicá, acutá; anfractibus $5\frac{1}{2}$, planiusculis, ultimo spiram subæquante; columellá supernè profundè plicatá, tum subnodosá; aperturá subverticali, oblongá, angustá; peristomate extus vix expanso, intus callo acutè prominente munito, marginibus subparallelis, dextro strictiusculo.*

Long. 16, diam. 8 mill.

Hab. in insulis Tahiti et Navigatorum.

50. *PARTULA FILOSA*, Pfr. *P. testá perforatá, conico-ovatá, solidá, lineis impressis spiralibus, confertis sculptá, haud nitente, castaneá, strigis filaribus cinereis ornatá; spirá conicá, obtusiusculá; anfractibus 5, planiusculis, ultimo spiram æquante, convexiore; columellá supernè vix plicatá; aperturá parum obliquá, subtriangulari-semiovali; peristomate expansiusculo, intus callo crasso prominente munito.*

Long. 16, diam. $8\frac{1}{2}$ mill.

Hab. in insulis Navigatorum.

51. *HELIX GLABRIUSCULA*, Pfr. *H. testá perforatá, conoideo-semiglobosá, tenui, lævigatá, pellucidá, nitente, lutescente, rufo angulato-lineatá; spirá convexo-conoideá, acutiusculá; anfractibus $5\frac{1}{2}$, convexiusculis, ultimo non descendente, basi planiusculo; aperturá obliquá, subdepressá, lunari; peristomate simplice, recto, margine columellari declivi, supernè vix reflexiusculo.*

Diam. maj. $3\frac{1}{2}$, min. 3, alt. 2 mill.

Hab. in Nová Seelandiá (*Strange*).

52. *HELIX SOLIDA*, Pfr. *H. testá imperforatá, conoideo-semiglobosá, crassá, striatá, fulvescente, epidermide tenui, fuscá, non nitente obductá; spirá convexá, obtusá, apice rubellá; anfractibus 5, convexiusculis, ultimo convexiore, dimidium altitudinis formante, medio obsolete angulatá, anticè vix descendente; columellá strictá, declivi, latá, albidá; aperturá obliquá, subtetragono-lunari, intus albá; peristomate subincrassato, vix expansiusculo, fusco-limbato.*

Diam. maj. 37, min. 33, alt. 27 mill.

Hab. prope Nanjan, insulæ Mindoro.

53. *HELIX OBLITA*, Pfr. *H. testá perforatá, sublenticulari, tenuissimá, supernè confertim arcuato-plicatá, pellucidè, pallidè corneá; spirá depresso-turbinatá, acutiusculá; anfractibus 6, vix convexiusculis, ultimo non descendente, medio obtusè denticulato-carinato, basi convexiore, radiatim striato; aperturá parum obliquá, lunari; peristomate simplice, tenui, recto, margine basali leviter arcuato, ad perforationem breviter reflexo.*

Diam. maj. 23, min. 20, alt. 11½ mill.

Hab. in Indiâ.

54. *HELIX VILIS*, Pfr. *H. testá umbilicatá, depresso-globosá, tenuiusculá, granulato-striatá, corneá; spirá breviter conoideá, acutiusculá; anfractibus 5, vix convexiusculis, celeriter accrescentibus, ultimo anticè deflexo, peripheriá obsolete subangulato, basi convexo; umbilico angusto, non pervio; aperturá diagonali, fere circulari; peristomate intus valide labiato, marginibus approximatis, columellari supernè dilatato, patente.*

Diam. maj. 11, min. 9, alt. 6 mill.

Hab. —?

September 9, 1851.

Sir Roderick Impey Murchison, G.C. St.S., F.R.S. &c.,
in the Chair.

Professor OWEN read an elaborate paper "On the Skeleton of *Trogodytes Gorilla*," which will be published in the Transactions of the Society.

November 11, 1851.

W. J. Broderip, Esq., Vice-President, in the Chair.

Professor OWEN read a paper "On the Capacity of the Cranium in the Negro, the Orang, and the Gorilla," which will be published in the Transactions of the Society for the present year.

The following papers were also read:—

1. DESCRIPTIONS OF SIXTEEN NEW SPECIES OF RISSOINA, A GENUS OF MARINE GASTEROPODOUS MOLLUSKS, FROM THE CUMINGIAN COLLECTION. BY ARTHUR ADAMS, SURGEON R.N., F.L.S. ETC.

RISSOINA, D'Orbigny.

About eighteen species of this genus, as restricted by M. d'Orbigny, have been already described, inhabiting various countries. Those here named are a portion of the discoveries made by Mr. Cuming among the islands of the Philippine Archipelago, and are many of them of considerable size; and it is in these that the peculiarity of operculum is best seen.

The process of the semioval, horny, subspiral operculum, first pointed out by D'Orbigny, is sometimes very long and slender, and very much resembles in appearance the analogous appendage of the operculum of *Nerita* and *Neritina*. The genus *Jeffreysia* of Alder, or *Rissoella* of Gray, has a similar appendage, but the position of the eyes, and the peculiar structure of the fore part of the head, place the latter genus in a different family, viz. *Pyramidellidæ*. The *Rissoina* may also readily be known from the neighbouring genus *Rissoa*, by the aperture being somewhat channeled anteriorly, whereas in *Rissoa* it is continuous and entire. The nature of the animal resembles *Rissoa*, according to D'Orbigny, who places the genus among the *Melaniadæ*.

1. RISSOINA PLICATA, A. Adams. *R. testâ turrîto-subulatâ, subpyramidalî, albâ, sordidâ, anfractibus octo, planis, longitudinaliter valdè plicatâ, transversim striatâ, plicis elevatis, posticè subangulatîs, interstitiis transversim striatis; aperturâ semiovatâ, anticè subcanaliculatâ; labro anticè subdilatato, margine incrassato.*

Hab. Isle of Masbate. Mus. Cuming.

2. RISSOINA FASCIATA, A. Adams. *R. testâ subulato-turrîtâ, solidâ, sordidè albâ, rufo-fusco fasciatâ, anfractibus octo, convexiusculis, transversim tenuissimè (sub lente) striatâ, longitudinaliter plicatâ, plicis obliquis, æqualibus, subdistantibus; aperturâ semiovatâ, anticè subcanaliculatâ; labro subdilatato.*

Hab. Sydney, under stones, low water (Mr. Strange). Mus. Cuming.

3. *RISSOINA SCALARIANA*, A. Adams. *R. testá subulato-turritá, albá, solidá, anfractibus octo, convexiusculis, transversim tenuissimè striatá, longitudinaliter costatá, costis elevatis, æqualibus, subdistantibus, anfractu ultimo anticè callo circumdato; aperturá semiovali, anticè subcanaliculatá; labio anticè callo desinente; labro flexuoso, anticè subproducto.*

Hab. Isle of Burias, Philippines. Mus. Cuming.

4. *RISSOINA PYRAMIDALIS*, A. Adams. *R. testá turrito-pyramidali, sordidè albá, solidá, anfractibus octo, planiusculis, transversim tenuiter striatá, longitudinaliter plicatá, plicis obliquis, confertis, subelevatis, interstitiis transversim striatis; aperturá semiovatá, anticè subcanaliculatá; labio anticè callo desinente; labro subdilatato, incrassato.*

Hab. Isle of Baclayon. Mus. Cuming.

5. *RISSOINA D'ORBIGNYI*, A. Adams. *R. testá subulato-turritá, albidd, subpellucidá; anfractibus decem, convexiusculis, supremis costellatis, lineolis elevatis, transversis, et longitudinalibus, decussatá; aperturá semiovatá, anticè subcanaliculatá; labio anticè subcalloso; labro dilatato, subreflexo, margine flexuoso, subacuto.*

Hab. Isle of Luzon. Mus. Cuming.

6. *RISSOINA CLATHRATA*, A. Adams. *R. testá subulato-turritá, albá, solidá, anfractibus convexiusculis, lineis elevatis, longitudinalibus et transversis decussatis, valde clathratá, anfractu ultimo anticè sulco transverso instructo; aperturá semiovatá, anticè subcanaliculatá; labro flexuoso, anticè producto, margine extus varicoso.*

Hab. Isle of Bohol. Mus. Cuming.

7. *RISSOINA MICANS*, A. Adams. *R. testá turrito-subulatá, albá, solidá, nitidd, anfractibus convexis, novem, longitudinaliter plicatá, plicis elevatis, subdistantibus, æqualibus, interstitiis transversim striatis, anfractu ultimo anticè valde sulcato; aperturá semiovatá, anticè subcanaliculatá; labro flexuoso, anticè subproducto, extus varicoso.*

Hab. Island of Mindanao. Mus. Cuming.

8. *RISSOINA NIVEA*, A. Adams. *R. testá parvâ, subulato-turritá, subpellucidá, nived, subnitidd, anfractibus convexiusculis, longitudinaliter plicatá, plicis obliquis, anticè subobsoletis; aperturá semiovatá, anticè subcanaliculatá; labro subdilatato, extus incrassato.*

Hab. Port Lincoln, Australia. Mus. Cuming.

9. *RISSOINA MONILIS*, A. Adams. *R. testá turrito-subulatá, solidá, fulvâ, anfractibus septem, planis, granulis moniliformibus ad suturas, longitudinaliter plicatá, plicis confertis, angustis, æqualibus, interstitiis punctato-clathratis; aperturá*

semiovatá, anticè subcanaliculatá; labio subincrassato; labro extus valde varicoso, margine transversim striato.

Hab. Philippine islands. Mus. Cuming.

10. *RISSOINA BELLULA*, A. Adams. *R. testá subulato-turritá, albá, semipellucidá; anfractibus octo, convexiusculis, cingillis transversis, elevatis, granulosis, interstitiis longitudinaliter concinnè clathratis, ornatá; anfractu ultimo sulco profundo instructo; aperturá semiovatá, anticè subcanaliculatá; labio anticè callo terminato; labro flexuoso, margine extus valde varicoso.*

Hab. Isle of Calapan. Mus. Cuming.

11. *RISSOINA STRIOLATA*, A. Adams. *R. testá subulato-turritá, albá, tenui, pellucidá; anfractibus undecim, supremis longitudinaliter plicatis, planulatis, prope suturas subangulatis; transversim striatá, striolis confertis concentricis; aperturá semiovatá, anticè subcanaliculatá; labio posticè incrassato, anticè callo desinente; labro dilatato, margine incrassato, sub-reflexo.*

Hab. Baclayon island, Philippines. Mus. Cuming.

12. *RISSOINA COSTATA*, A. Adams. *R. testá subulato-turritá, albá, opacá, solidá, anfractibus septem, convexiusculis, longitudinaliter costatá, costis crassis, elevatis, posticè subangulatis, anfractu ultimo anticè sulco transverso valido instructo; aperturá semiovatá, anticè subcanaliculatá; labio anticè tuberculo terminato; labro subdilato, margine varicoso, flexuoso.*

Hab. Cobiga, Peru. Mus. Cuming.

13. *RISSOINA NITIDA*, A. Adams. *R. testá turrito-subulatá, albá, solidá, nitidá, anfractibus novem, convexiusculis, longitudinaliter costatá, transversim liratá, liris ad costas nodulosis; aperturá semiovatá, anticè subcanaliculatá; labio anticè callo desinente; labro extus incrassato, margine subacuto, anticè diaphano producto.*

Hab. Isle of Camaguing. Mus. Cuming.

14. *RISSOINA CONCINNA*, A. Adams. *R. testá subulato-turritá, albá, solidá, nitidá, anfractibus septem, planiusculis, longitudinaliter plicatá, plicis anticè evanidis, transversim striatá, striis creberrimis, confertis; aperturá semiovatá, anticè subcanaliculatá; labio calloso; labro margine valde incrassato et rotundato.*

Hab. Cagayan, Philippines. Mus. Cuming.

15. *RISSOINA NODICINCTA*, A. Adams. *R. testá subulato-turritá, albá, solidá, anfractibus 10-12, convexis, longitudinaliter plicatá, plicis angustis, distantibus, transversim tenuissimè striatá, in medio anfractuum cingulá elevatá ad plicas nodosá, ornatá, suturá nodulis moniliformibus cinctá; aperturá semiovatá,*

anticè subcanaliculatá; labio anticè callo terminato; labro dilatato, extus incrassato, margine flexuoso.

Hab. Isle of Capul, Philippines. Mus. Cuming.

16. *RISSOINA CÆLATA*, A. Adams. *R. testá subulato-turritá, albidá, solidá; anfractibus octo, convexiusculis, supremis clathratis, ultimo cingulis elevatis, æqualibus, subdistantibus, transversis, interstitiis lineis elevatis, longitudinalibus et transversis, decussatim ornato; aperturá semiellipticá, anticè subcanaliculatá; labio calloso; labro anticè dilatato, margine incrassato, subreflexo.*

Hab. Siquijor. Mus. Cuming.

The two following species are true *Rissoæ*, characterized by the simple aperture, which is not channeled in front, and by the absence of the calcareous appendage to the operculum. Many species of small shells have been inaccurately referred to *Rissoa*, some of which belong, however, to entirely different families.

*RISSOA*¹⁴ *BELLA*, A. Adams. *R. testá turrito-subulatá, albá, solidá; anfractibus quinque, planiusculis; spirá apice obtuso, lineis transversis, elevatis, concentricis, confertis, ornatá; aperturá ovali, anticè integrá; labio subcalloso; labro subdilatato, extus marginato, margine flexuoso.*

Hab. Philippine islands. Mus. Cuming.

RISSOA ELEGANS, A. Adams. *R. testá subulato-turritá, albá, semipellucidá; anfractibus 7, convexiusculis; suturá canaliculatá, lineis elevatis transversis concentricis et longitudinalibus concinnè decussatá; aperturá ovali, subproductá, anticè integrá; labio calloso; labro anticè dilatato, extus varicoso, margine acuto, subreflexo.*

Hab. Philippines. Mus. Cuming.

2. DESCRIPTIONS OF SEVERAL NEW SPECIES OF MUREX, RISSOINA, PLANAXIS, AND EULIMA, FROM THE CUMINGIAN COLLECTION. BY ARTHUR ADAMS, F.L.S. ETC.

1. *MUREX IOSTOMUS*, A. Adams. *M. testá ovato-fusiforimi; spirá acuminatá; anfractibus planulatis, squamulosis, spinis acutis, in serie elevato disposito ornatis, cinereá; anfractu ultimo spinis elevatis, bifidis, in seriebus quatuor dispositis instructo, varicibus sex, longitudinalibus; aperturá ovato-oblongá, intus violaceá; labio subtuberculari; labro fimbriato.*

Hab. Philippines. Mus. Cuming.

2. *MUREX SOLIDUS*, A. Adams. *M. testá solidá, profundè umbilicatá, albá; spirá brevi, obtusá; anfractibus planulatis, longitudinaliter plicato-varicosis (varicibus in anfractu ultimo 7), transversim liratis; liris, ad plicas, incrassatis, interstitiis lon-*

gitudinaliter cancellatis; aperturá subrotundatá; canali recto, aperturam æquante; labro simplici, intus lævi.

Hab. Ichiboe, West Africa. Mus. Cuming.

3. MUREX EURACANTHUS, A. Adams. *M. testá ovato-fusifor-
mi, umbilicatá; spirá acuminatá; anfractibus planis, serie tuber-
culorum spiniformium in medio dorsi, albá, spinis et parte an-
ticá rubro tinctis; anfractu ultimo liris squamulosis, et spinis
tubulosis, longis, in seriebus duobus dispositis, ornato; aper-
turá ovatá, oblongá; labio anticè producto et tuberculato; ca-
nali brevi, subrecurvâ.*

Hab. —? Mus. Cuming.

Figured by Mr. Reeve as *M. noduliferus*, which is very different from the present species.

4. MUREX EXASPERATUS, A. Adams. *M. testá ovato-fusifor-
mi, umbilicatá, albá, nitidá; spirá acuminatá; anfractibus angu-
latis, in medio longitudinaliter plicato-varicosá, transversim
liratá; liris subspinulosis ad plicas; aperturá ovatá; canali
mediocri, subincurvato; labro intus sulcato.*

Hab. —? Mus. Cuming.

5. MUREX LIGNARIUS, A. Adams. *M. testá ovato-fusifor-
mi, subumbilicatá; spirá acuminatá, rufo-fuscá; anfractibus su-
perne excavatis, in medio liris duabus, elevatis, nodulosis; trans-
versim lirátá, liris elevatis rugulosis, inæqualibus, longitudi-
naliter trivaricosá, varicibus, in medio, spinis duabus, elevatis,
fimbriatis; aperturá ovato-rotundatá, intus albá; canali aper-
turam æquante, subrecurvato.*

Hab. West Africa. Mus. Cuming.

6. MUREX FUSIFORMIS, A. Adams. *M. testá fusiformi, cinered,
fulvo variegatá; spirá productá; anfractibus rotundis; vari-
cibus longitudinalibus, subelevatis, nodospinosis, et lineis ele-
vatis, transversis, latè clathratá; aperturá oblongo-ovatá; ca-
nali aperturam æquante, recto; labro extus varicoso, intus sul-
cato.*

Hab. Africa. Mus. Cuming.

7. MUREX SPINOSUS, A. Adams. *M. testá ovatá, umbilicatá,
albá, lineis rufo-fuscis transversis ornátá; anfractibus rotundis,
transversim lirátá; varicibus longitudinalibus regularibus (6 in
anfractu ultimo), spinis longis, rectis, acutis, armatis; canali
subrecurvato, aperturam æquante; aperturá ovato-rotundatá.*

Hab. —? Mus. Cuming.

8. MUREX SEROTINUS, A. Adams. *M. testá ovato-fusifor-
mi; spirá peracutá, serotiná, longitudinaliter plicatá, transversim
liratá; liris, ad plicas, nodulosis; aperturá ovatá, oblongá;
labio anticè bituberculato; labro extus incrassato, margine den-
tato, intus lirato; canali mediocri, subrecurvato.*

Hab. —? Mus. Cuming.

9. MUREX BIFASCIATUS, A. Adams. *M. testá ventricosá, profundè umbilicatá; spirá brevi; anfractibus rotundatis; albá; anfractu ultimo fasciis duabus, latis, rufo-fuscis ornato, transversim elevatè lirátá, liris rugosis; longitudinaliter varicibus æqualibus (in anfractu ultimo 9) subelevatis, rotundatis, fimbriatis; aperturá ovato-rotundatá; labio subproducto, fulvo; canali aperturá breviorè, valde recurvato.*

Hab. Senegal. Mus. Cuming.

10. MUREX CRASSUS, A. Adams. *M. testá ovato-fusiformi, umbilicatá, solidá, fulvá; spirá mediocri; anfractibus rotundatis, supernè angulatis, obsoletè transversim lirátá, varicibus crassis, distantibus, irregularibus (4 in ultimo anfractu), ornatá; aperturá ovatá, intus violacèd; labro extus incrassato, intus dentato.*

Hab. China. Mus. Cuming.

11. MUREX PAGODUS, A. Adams. *M. testá ovato-fusiformi; spirá acuminatá, lævi, albá, anticè maculis fuscis sparsim pictá; anfractibus septem, concavis, seriebus spinarum ornatis, spinis regularibus, tubulosis, recurvatis, marginibus fimbriatis; aperturá subrotundatá; columellá lævi; canali recurvato, ad dextram inclinato, aperturam æquante.*

Hab. —? Mus. Cuming.

12. MUREX EXCAVATUS, A. Adams. *M. testá ovato-fusiformi, subumbilicatá, albá, solidá; spirá acuminatá; anfractibus concavis (quasi excavatis) ad partem anticam; in medio angulatis, longitudinaliter plicatá, transversim lirátá, liris ad plicas nodulosi; anfractu ultimo liris duabus elevatis ornato; aperturá semiovali; canali mediocri, vic recto; labro intus sulcato.*

Hab. —? Mus. Cuming.

13. MUREX INORNATUS, A. Adams. *M. testá fusiformi, valde umbilicatá; spirá acuminatá; anfractibus rotundis, albidá, liris transversis, elevatis, squamulosis, et varicibus longitudinalibus, rotundatis (in anfractu ultimo 7), ornatá; aperturá ovali; canali subrecurvato, aperturam æquante; labro extus fimbriato, intus lirato.*

Hab. —? Mus. Cuming.

14. MUREX OBELISCUS, A. Adams. *M. testá ovato-pyramidali, subtrigonalis; spirá elevatá; anfractibus planis, apice obtuso, albá, seriebus transversis macularum rufo-fuscarum ornatá, transversim lirátá, liris subgranosis, varicibus tribus, longitudinalibus, varice intermedio, brevi, triangulari, ad partem posticam instructá; aperturá ovatá; canali valde recurvato.*

Hab. —? Mus. Cuming.

15. MUREX LYRATUS, A. Adams. *M. testá ovato-fusiformi, subumbilicatá; spirá acuminatá; anfractibus planiusculis, albá, varicibus rufo-fuscis ornatá, transversim lirátá; liris trans-*

versis, angustis, asperulatis, varicibus longitudinalibus, rotundatis, subfimbriatis (7 in ultimo anfractu); aperturá subrotundatá, intus albá; columellá posticè callosá; canali brevi, recto, vix clauso; labro intus lirato.

Hab. —? Mus. Cuming.

16. MUREX PULCHER, A. Adams. *M. testá ovato-fusifor-
mi, subtrigonalí; spirá acuminatá; anfractibus rotundatis, nodu-
losis, varicibus tribus subspinosis; liris transversis, elevatis,
anfractu ultimo varicibus prominentibus, subspinosis, ornato;
varicibus anticè fimbriatis et spinosis; aperturá ovato-rotundá;
labio tuberculato; labro intus crenato-lirato, canali perlongo,
subrecurvo, vix clauso.*

Hab. St. Croix, 60 fathoms; *M. Sueuson.* Mus. Cuming.

17. MUREX SINGAPORENSIS, A. Adams. *M. testá ovato-fusi-
formi; spirá acuminatá; anfractibus rotundatis; fulvá, longi-
tudinaliter plicatá, plicis rotundis, transversim liratá, liris
asperulatis, squamulis aculeatis obsitis; aperturá ovatá, oblongá,
intus lividá; canali aperturam æquante, subreflexo; labro intus
dentato.*

Hab. Singapore. Mus. Cuming.

18. MUREX NIVEUS, A. Adams. *M. testá ovatá, umbilicatá,
niveá; spirá brevi, acuminatá; anfractibus rotundatis; longi-
tudinaliter plicatá, plicis rotundis, prominentibus, crassis
(8-10 in anfractu ultimo), transversim liratá, liris squamulis,
confertis, longitudinalibus, obsitis; aperturá ovatá, oblongá;
canali brevi, subrectá; labro intus lirato.*

Hab. —? Mus. Cuming.

19. MUREX CUMINGII, A. Adams. *M. testá oblongo-fusifor-
mi, trivariicosá; spirá subproductá, anfractibus rotundatis, pallidè
rufo-fuscá, fasciis tribus, transversis, rufo-fuscis, ornatá; vari-
cibus longitudinalibus, tribus, continuis, obtusis, liris intermediis
nodosis, liris transversis inæqualibus, rufo-fusco articulatis, in-
structá; aperturá ovali, labro intus crenato-lirato extus fimbriato,
fimbriis non squamulosis, canali clauso, anticè recurvato.*

Hab. Philippines. Mus. Cuming.

Somewhat closely allied to *M. triquetra* of Born.

20. MITRA MARQUESANA, A. Adams. *M. testá ovato-fusifor-
mi, anfractibus planis, spirá acutá, carneold, maculis albis et lineis un-
dulatis, longitudinalibus rufo-fuscis, eleganter pictá, longitudinaliter
substriatá, transversim liratá, interstitiis valde punctatis;
aperturá spiram majorem æquante, columellá plicis quinque in-
structá, labro margine crenato.*

Hab. Marquesas. Mus. Cuming.

Markings very similar to those of *M. serpentina*, Lamk. The *Mitra* figured in Mr. Reeve's Monograph, as *M. nebulosa* of Swainson, is quite different from that species, and requires therefore a change of name; I have called it *M. propinqua*.

21. *ANCILLARIA LINEOLATA*, A. Adams. *A. testá ovato-fusi-formi; spirá brevi, subacutá, suturis albis, pallidè fulvá, lineis longitudinalibus, confertis, fuscis, ornatá; anfractu ultimo cingulá elevatá transversá, ad marginem labri, in dente acuto desinente; aperturá oblongá; columellá tortuosá, albá, anticè plicis obliquis instructá.*

Hab. —? Mus. Cuming.

A very pretty species, distinguished by the fine longitudinal brown lines.

22. *PLANAXIS OBSCURA*, A. Adams. *P. testá ovato-conicá, epidermide fusco obtectá, fusco-rufescente; anfractibus planis, suturá distinctá, transversim valde sulcatá, interstitiis longitudinaliter striatis; aperturá ovato-oblongá, columellá longitudinaliter sulcatá; labro subdilatato, margine acuto, intus valde lirato.*

Hab. —? Mus. Cuming.

23. *PLANAXIS FULVA*, A. Adams. *P. testá ovato-conicá, fulvá; spirá acuminatá, apice acuto, anfractibus planis, ultimo angulato, transversim tenuiter striatá; aperturá ovato-oblongá; columellá incurvatá, anticè callosá; labro margine subdilatato, extus incrassato, intus lirato.*

Hab. Swan River. Mus. Cuming.

Allied to *P. mollis*, Sowerby, but the last whorl is angulated.

24. *PLANAXIS ZONATA*, A. Adams. *P. testá ovato-conicá, rimatá, glabrá, nitidá; spirá acuminatá; anfractibus convexiusculis, pallidè lutescente, zonulá transversá rufo-fuscá cinctá ad suturas, et, in anfractu ultimo, fasciis duabus transversis ornatá, transversim tenuissimè striatá; aperturá ovatá; columellá incurvatá; labro subdilatato, intus lirato.*

Hab. Calapan, Philippines. Mus. Cuming.

25. *PLANAXIS CINGULATA*, A. Adams. *P. testá ovato-conicá, solidá, rimatá; spirá acutá; anfractibus convexiusculis, fulvá, zonulis rufo-fuscis transversis, prope suturas, duplicatis, ornatá, longitudinaliter tenuissimè striatá, transversim valde sulcatá; aperturá ovato-oblongá, coarctatá; columellá incurvatá; labro extus incrassato, intus dentato-lirato.*

Hab. China Seas. Mus. Cuming.

Species collected by me during the voyage of H.M.S. Samarang.

26. *PLANAXIS SUCCINCTA*, A. Adams. *P. testá ovato-conicá, spirá acuminatá, apice acuto, anfractibus convexiusculis, pallidè fuscá, fasciis linearibus, transversis, multis, rufo-fuscis, ornatá, longitudinaliter substriatá; anfractu ultimo transversim sulcato; aperturá ovato-oblongá; columellá fuscá; labro intus sulcato.*

Hab. Peru, and the West Indies. Mus. Cuming.

Allied to *P. lineata* of Montagu, but of larger growth and different form.

27. *PLANAXIS BUCCINEA*, A. Adams. *P. testâ ovatâ; spirâ brevi, acutâ, apice obtuso, rubro; anfractibus planis, plicato-granulosis; nigro-fuscâ, cingillis articulatis, transversis, ornatâ; longitudinaliter substriatâ, transversim valde sulcatâ; aperturâ ovato-oblongâ; columellâ excavatâ; labro intus crenoplicato, extus incrassato, varicoso.*

Hab. West Indies. Mus. Cuming.

28. *PLANAXIS LABIOSA*, A. Adams. *P. testâ ovato-conicâ, spirâ acutâ, anfractibus convexiusculis, atro-purpureâ, fasciis pallidis (5-6) transversis, in anfractu ultimo; transversim striatâ; aperturâ ovato-oblongâ; columellâ incurvatâ et dilatâ; labro dilatato, margine reflexo et incrassato, intus lirato.*

Hab. Sandwich Islands. Mus. Cuming.

29. *LAGENA CALIFORNICA*, A. Adams. *L. testâ solidâ, ovato-fusiformi; spirâ, in medio, tumidâ, anfractibus planiusculis, infernè nodospinosis, albâ, cingulis transversis, elevatis, rufo-fuscis articulatis ornatâ, interstitiis obscuris, fuscis; anfractu ultimo longitudinaliter plicato, seriebus duobus tuberculorum subspinoso-rum instructo; aperturâ ovato-oblongâ; columellâ carneâ, plicis quatuor, albis, obliquis; labro intus lirato.*

Hab. California. Mus. Cuming.

Allied to *L. picta*, Lamk., but of different form and markings.

30. *NASSA AUSTRALIS*, A. Adams. *N. testâ ovato-fusiformi; spirâ acuminatâ, pallidè olivacè, fasciis tribus, transversis, fuscis, ornatâ, longitudinaliter valde plicatâ, interstitiis valde transversim sulcatis; anfractu ultimo anticè liris transversis subgranosis, posticè, prope suturam, tuberculis moniliformibus ornato; aperturâ ovato-rotundatâ, intus fuscâ, et dentato-liratâ; labro margine albo, posticè valde inflexo et dentato.*

Hab. Australia. Mus. Cuming.

November 25, 1851.

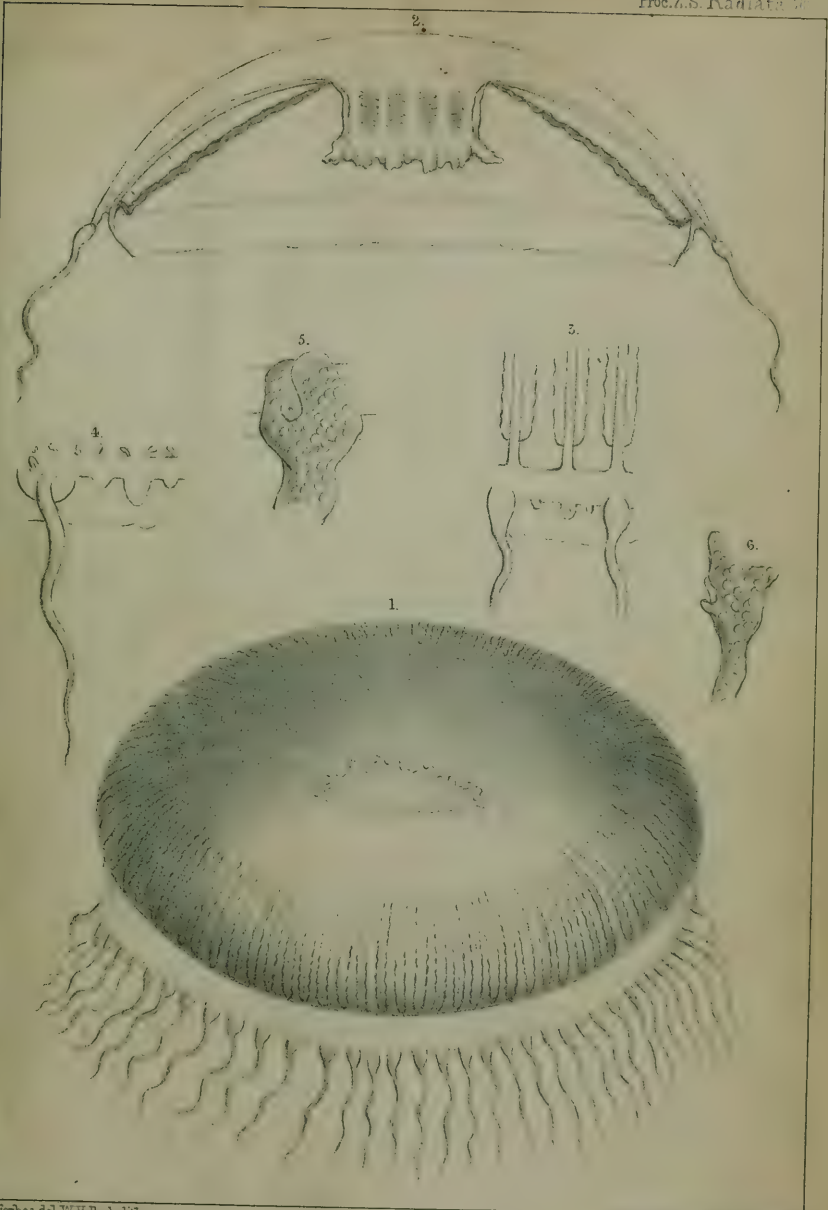
W. J. Broderip, Esq., F.R.S., Vice-President, in the Chair.

The following papers were read:—

- I. ON A SPECIES OF *ÆQUOREA* INHABITING THE BRITISH SEAS.
BY PROF. EDWARD FORBES, F.R.S.

(Radiata, Pl. IV.)

In the first volume of the 'Wernerian Memoirs' a "*Medusa æquorea*" is mentioned by Prof. Jameson as an inhabitant of the seas of the north of Scotland, and in the 'History of British Animals' by Dr. Fleming, the name "*Geryonia æquorea*" is used to designate it. As no



E. Forbes, del. W.H. Baile, lith.

Printed by Hollman & Wilson.

EQUOREA FORSKALEA Peron.



description or figure was ever published of this creature, and as the diagnosis of the "*Medusa*" to which Linnæus applied the name of "*æquorea*" was too brief for identification, it is possible that some one out of several *Acalephæ* inhabiting our seas might have been intended.

It is also possible, however, that a true *Æquorea* had been seen, for there is a most beautiful species of this genus an inhabitant of the Scottish seas. I met with it for the first time in August 1850, when exploring the Minch (the channel between the outer Hebrides and Skye) in company with Mr. MacAndrew and Prof. Goodsir, with the advantages of the appliances for natural-history research with which Mr. MacAndrew has furnished his yacht, the *Naiad*. As there is neither figure nor description of any British *Æquorea* to be found, and as considerable obscurity hangs around the Atlantic species of the genus, I have drawn up the following notice.

A number of individuals were observed: they were swimming near the surface of the sea on a very calm and hot day: they varied in size, from three inches in diameter to as much as half a foot or more: they resembled broad shield-shaped discs of glass, slightly prominent above, incurved at their sides and concave beneath: through the discs were seen shining the pendent brown-tinged stomach, and around it, like so many equal stripes or rays proceeding to the margin, the linear violet genital glands: from the margin depended highly-contractile violet tentacles.

The umbrella is broad, shallow, and disc-shaped, its outline describing a gentle curve. It is hyaline, not very thick, and quite smooth. The central portion of its interior, occupying about one-fourth of its diameter, has dependent from it the membranous veil-like walls of the stomach; these hang not quite so low as on a line with the margins of the umbrella. The stomach, although equal in width throughout, may be divided into two regions, an upper and a lower. The latter has a furbelowed and somewhat scalloped, but not ciliated margin, and may be regarded as the mouth. The former is marked internally by eight bands of transverse fibres, separated by as many longitudinal ones; these appear to be muscular. The whole of the membrane of the stomach and lips is tinged with pale foxy brown, partly disposed in streaks. Around the upper and inner margin of the cavity are the orifices of the gastro-vascular canals; these run, without dividing or anastomosing, to the circular marginal canal of the umbrella. In a specimen five inches across, they were 136 in number. From the lower side of each canal depend two narrow, rather wavy membranes of a violet colour, causing the ray-like streaks that shine so conspicuously through the disc; each of these arises gradually near the superior extremity of a gastro-vascular canal, and ceases abruptly at about one-eighth of the entire length of the canal from the margin: they are the genital glands. At the junction of each alternate gastro-vascular canal with the circular marginal one is the bulb-like base of a marginal tentacle: these tentacles arise from ovate bulbs and gradually taper to a fine point. The bulbs are pale,

but the tentacle is tinged with violet. Opposite the intermediate canal there is a smaller bulb with a tentacle, hollow and containing corpuscles in its centre, and on each side, between it and the neighbouring tentacle, is a still smaller lobe-like body. Along the upper margin of the circular canal are very minute pedunculated organs that move to and fro. On the bulb at the base of the tentacula is a minute tongue-shaped process at the base of a depression; at its own base the ocellus or rudimentary eye is lodged. When seen laterally, the peculiar tissue of the base of the tentacles is observed to be set obliquely. Within the umbrella, from a line just opposite the tentacular circle, a short but rather broad veil with a simple edge is seen to depend; this veil is tinged with pale brown. A band of motor tissue, forming a sphincter to the umbrella, accompanies the circular vessel.

According to the size of the example, the number of genital glands and of tentacula varied: they increase with age. The smallest number of tentacula seen was sixteen, and there is reason to believe that they are never fewer.

To ascertain whether this beautiful animal be the *Medusa æquorea* of Linnæus and the naturalists who wrote during his time, it is necessary to inquire into the history of that species. The name just mentioned occurs first in the 'Iter Hispanicum' of Peter Loeffling, published in 1758. In his journal of observations on the 18th of April, at Cumana, he notices, along with *Medusa* (i. e. *Aurelia*) *aurita*, *Medusa pelagica* (*Pelagia cyanella*?), and *Veella*, another *Medusa*, which he styles *Æquorea*, and describes as "orbicularis, planiuscula, tentaculis plurimis ex margine inflexo, branchiis nullis." This notice, which occurs at page 105 of the Swedish edition of his 'Travels,' is the entire original foundation for numerous references in after-authors. Linnæus, in the first instance, adopted Loeffling's name and brief record, which, when read with our present knowledge of *Acalephæ*, barely indicates the genus to which the animal observed probably belonged. In 1775, the descriptions and figures of animals observed during his journey to the East by the lamented Forskäl were published under the superintendence of Carsten Niebuhr. Among them was a representation and description of a *Medusa*, referred to the *æquorea* of Linnæus, both excellent, as indeed may be said of all that Forskäl did. In 1776 a *Medusa æquorea* was noticed, scarcely more than by name, in the 'Zoologiæ Danicæ Prodomus' of Otho Frederic Müller. In 1780, Otho Fabricius, in his excellent 'Fauna Groenlandica,' gives a shorter account than usual with him of a *Medusa*, which he refers to the *æquorea* of Linnæus. He speaks of it as a very simple animal, smaller and softer than *Medusa aurita*, convex above, concave beneath, with very much inflected margins and white marginal cilia. The two last-mentioned characters are opposed to the notion of *Medusa æquorea*, as represented and described by Forskäl, and the first of them to the slight idea of its shape that we gather from Loeffling. In 1791 Adolph Modeer commenced the work of hair-splitting by separating the animal of Forskäl, under the name of *Medusa patina*, from that of Loeffling, for which he reserved the

name *Medusa æquorea*. In 1809 Peron and Lesueur published in the 'Annales du Muséum d'Histoire Naturelle,' vol. xiv., their important classification and synopsis of all known Medusæ. In that paper, excellent though it be, they increase the confusion, by giving the name of *Æquorea atlantica* to Loeffling's animal, *Æq. danica* to Müller's, *Æq. grœnlandica* to that of Fabricius, *Æq. Forskalea* to that of Forskål, and *Æq. stauroglypha* to a new species of their own, probably identical with all the others. In 1829 Eschscholtz, in his 'System der Acalephen,' attempted to rectify this confusion, by rejecting all these names excepting *Æq. Forskalina*, that alone having been sufficiently described. In 1843 Lesson published his History of Acalephæ in the 'Nouvelles Suites à Buffon,' and, to make confusion worse confounded, rejected all rectifications and restored all the names and imperfectly noticed individuals to full specific rank.

After attentively considering the notices more or less perfect that the various older observers have given, of what they call *Medusa æquorea*, I am led to the belief that in most instances one species, not several, was met with, and that the creature I now describe and figure as British is identical with the *Medusa æquorea* of Loeffling, Forskål and Müller. Since Forskål alone described and figured it in a comprehensible manner, the name *Æquorea Forskalea*, proposed by Peron, is peculiarly appropriate, the more so since that of *Medusa patina* of Modeer was proposed under a mistake. Forskål expressly states that his species is common to the North Atlantic and the Mediterranean, and that it inhabits the Danish seas, where it is called "Vandmand," that is, Waterman.

It remains to be seen whether our species is related to the *Æquorea violacea* of Milne-Edwards, well described and beautifully figured in the 16th volume of the 2nd series of the 'Annales des Sciences Naturelles,' and observed by that eminent naturalist in the Mediterranean. From an examination of its anatomy he first showed the serious error committed by Eschscholtz in considering the *Æquoridae* as cryptocarpous. I am inclined to agree with Milne-Edwards in considering his species distinct from that of Forskål. The genital glands are not prolonged nearly so close to the margin; the lips of the stomach are not furlbelowed; the bases of the tentacles are not bulbous, and originate regularly *between* the gastro-vascular canals.

There were no eyes observed by the distinguished zoologist just quoted in the species he examined. In ours the eyes are evident, and a determination of their position and appearance is of consequence, since they confirm the affinity of *Æquorea* with the Naked-eyed Medusæ, whilst at the same time, in the little appendage or rudimentary lid projecting above them, they indicate an approach to the *Steganophthalmatous* type, such as is consistent with the general high organization and aspect of the *Æquorea* when compared with other *Gymnophthalmatous* forms.

It is interesting to remark that the *Æquorea ciliata* of Eschscholtz is a North Pacific species, beautifully representing, yet quite distinct from, *Æquorea Forskalea*.

2. DESCRIPTIONS OF NEW SPECIES OF EULIMA, TRIPHORIS, ETC.,
FROM THE COLLECTION OF HUGH CUMING, ESQ.

BY ARTHUR ADAMS, F.L.S. ETC.

1. EULIMA MODICELLA, A. Adams. *E. testá subulato-pyramidali, albá, subpellucidá, flexuosá; anfractibus 11, planulatis, varicibus lateralibus continuis impressis, instructis; anfractu ultimo, in medio, vix angulato; aperturá ovali; columellá anticè subrectá; labro anticè producto.*

Hab. Island of Zebu, sandy mud, 7 fathoms. Mus. Cuming.

2. EULIMA GRANDIS, A. Adams. *E. testá subulato-pyramidali, albá, solidá, flexuosá, opacá; anfractibus 15, planulatis, varicibus lateribus continuis instructis; anfractu ultimo angulato; aperturá obliquá, oblongo-ovali, labio anticè calloso; labro margine flexuoso, anticè subreflexo.*

Hab. Island of Burias, coral sand, 7 fathoms. Mus. Cuming.

3. EULIMA PORCELLANA, A. Adams. *E. testá subulatá, albá, solidá, opacá, apice subflexuoso; anfractibus 13-14, planulatis, varicibus impressis irregularibus lateralibus; aperturá oblongo-ovali, labio anticè calloso, vix reflexo; labro margine, in medio, dilatato.*

Hab. —? Mus. Cuming.

4. EULIMA ACUTA, A. Adams. *E. testá aciculato-turritá, albidá, rectá, subopacá; anfractibus duodecim, planiusculis, ultimo rotundato; aperturá oblongá, anticè subreflexá, labio subincrassato; labro margine recto.*

Hab. Sual, province of Cangisanan, island of Luzon, sandy mud, 7 fathoms. Mus. Cuming.

5. EULIMA CUSPIDATA, A. Adams. *E. testá subulato-pyramidali, albidá, solidá, rectá; anfractibus 12, convexiusculis, anfractu ultimo rotundato; aperturá oblongo-ovali, labio anticè calloso, subrecto; labro acuto.*

Hab. Sibonga, island of Zebu, in loose coral under stones, low water. Mus. Cuming.

6. EULIMA OBESULA, A. Adams. *E. testá pyramidali-ovatá, albá, solidá, nitidá, opacá; anfractibus sex, convexis, ultimo rotundato; aperturá oblongo-ovali; labro margine incrassato, nec limbato vel reflexo.*

Hab. Gindulman, isle of Bohol, in soft mud, 8 fathoms. Mus. Cuming.

7. EULIMA TEINOSTOMA, A. Adams. *E. testá subulato-turritá, rectá, albidá, nitidá, subpellucidá; anfractibus 12, planulatis, lined impressá infra suturas; anfractu ultimo rotundato; aperturá oblongo-ovali, anticè producto, labio subrecto, anticè reflexo; labro margine, in medio, dilatato.*

Hab. Feejee Islands, on coral reefs, in sand, low water. Mus. Cuming.

8. *EULIMA FLEXUOSA*, A. Adams. *E. testá subulato-turritá, alba, flexuosa, solida, subopaca; anfractibus 15, planulatis, lined impressá subpellucida ad suturas; anfractu ultimo rotundato; apertura oblonga; labro margine flexuoso, in medio producto.*
Hab. —? Mus. Cuming.
9. *EULIMA ACLIS*, A. Adams. *E. testá subulato-turritá, albidá, solida, subopaca; anfractibus 11, planulatis, ultimo rotundato, anticè subproducto; apertura oblonga, labio anticè subreflexo.*
Hab. Singapore, coarse gravel and sand, 12 fathoms. Mus. Cuming.
10. *EULIMA PYRAMIDALIS*, A. Adams. *E. testá subulato-pyramidalis, alba, nitida, subpellucida; anfractibus decem, planulatis, lined impressá prope suturas, anfractu ultimo subangulato; apertura oblongo-ovali; labro margine, in medio, subproducto.*
Hab. Isle of Capul, on the reefs in sand, low water. Mus. Cuming.
11. *EULIMA POLYGYRA*, A. Adams. *E. testá subulato-pyramidalis, alba, subopaca, apice tortuoso; anfractibus permultis, planulatis, ultimo angulato; apertura obliqua, subtetragonali, labio anticè reflexo; labro, in medio, valde dilatato.*
Hab. Cagayan, province of Misamis, isle of Mindanao, sandy mud, 50 fathoms. Mus. Cuming.
12. *EULIMA VITREA*, A. Adams. *E. testá subulata, acuta, recta, albidá, vitrea, pellucida; anfractibus planulatis, lined impressá prope suturas; anfractu ultimo rotundato; apertura oblongo-ovali, labio anticè recto, in medio subtortuoso; labro anticè subreflexo.*
Hab. Feejee Islands; from the stomach of a *Holothuria* (Captain Swain). Mus. Cuming.
13. *EULIMA GUILDINGII*, A. Adams. *E. testá subulata, recta, nitidissima, alba, pellucida; anfractibus planulatis, ultimo subrotundato, elongato; apertura oblongo-ovali, labio vix tortuoso; labro margine flexuoso.*
Hab. St. Vincents, West Indies, sandy mud, deep water. (Rev. L. Guilding.) Mus. Cuming.
14. *EULIMA CUMINGII*, A. Adams. *E. testá subulato-turritá, alba, recta, solida, opaca; anfractibus 13, convexiusculis, varicibus irregularibus impressis instructis; anfractu ultimo rotundato; apertura oblongo-ovali, labio anticè calloso, incrassato; labro margine recto.*
Hab. Lord Hood's Island, South Seas, on the *Avicula margaritifera*. Mus. Cuming.
15. *TRIPHORIS VARIEGATUS*, A. Adams. *T. testá subulato-pyramidalis, in medio tumida, alba, maculis triangularibus rufo-fuscis variegata; anfractibus planulatis, triseriatim granulatis, granis æqualibus, interstitiis punctatis, suturis impressis; canali brevi, aperta.*

Hab. St. John's. Mus. Cuming.

A large variegated species, somewhat resembling in general appearance *T. ornatus*, Desh.

16. *TRIPHORIS PULCHELLUS*, A. Adams. *T. testá subulato-pyramidalí, in medio tumidá, fuscá, serie moniliformi albo ornatá; anfractibus convexiusculis, triseriatim granuloso-carinatis, granorum serie inferiore prominulá, superiore multo minore; aperturá rotundatá, constrictá; canali brevi, recurvo.*

Hab. —? Mus. Cuming.

A handsome brown species, with a white series of bead-like granules at the lower part of each whorl.

17. *TRIPHORIS NIGRO-FUSCUS*, A. Adams. *T. testá pyramidalí, nigro-fuscá; anfractibus planis, triseriatim granulatis, granulis æqualibus, confertis, anfractuum suturis impressis, basi convexá.*

Hab. Sydney, low water, under stones (*Mr. Strange*).

A black-brown species, with three rows of regular, equal-sized granules on each whorl. Mus. Cuming.

18. *TRIPHORIS FESTIVUS*, A. Adams. *T. testá pyramidalí, basi planá fuscá, albidá, fasciis fuscis interruptis, transversis, ornatá; anfractibus planis, cingulis duabus granorum instructis; interstitiis valde punctatis.*

Hab. Port Lincoln. Mus. Cuming.

A small prettily-marked species, with two rows of granules on each whorl, and the interstices deeply punctured.

19. *TRIPHORIS SCITULUS*, A. Adams. *T. testá subulato-pyramidalí, albidá, nitidá, subpellucidá, suturis rufo-tinctis; anfractibus convexiusculis, cingulis tribus nodorum ornatis, cingulá medianá majore moniliformi, nodorum interstitiis fuscis, anfractu ultimo basi fusco; canali brevi, aperto.*

Hab. Port Lincoln. Mus. Cuming.

A semipellucid, white and brown species, with the middle row of nodules very prominent.

20. *TRIPHORIS ALBIDUS*, A. Adams. *T. testá subulato-pyramidalí, albidá, nitidá; anfractibus planulatis, subimbricatis, granoso-clathratis, granis oblongis, serie granorum inferiore prominulá, anfractu ultimo basi fulvo; canali brevi, subrecurvo.*

Hab. Honduras (*Dyson*). Mus. Cuming.

A solid, white, shining, pyramidal species, with oblong granules disposed in three series on each whorl.

21. *TRIPHORIS VESTALIS*, A. Adams. *T. testá turríto-subulatá, dextrorsá, albá, subnitidá; anfractibus 13, convexis, suturis impressis, triseriatim granulatis, interstitiis alveolatis.*

Hab. Honduras. Mus. Cuming.

A delicate and chaste right-handed species, with convex whorls, and pits between the granules.

22. *TRIPHORIS CINGULATUS*, A. Adams. *T. testá elongato-pyramidalí, cinerá; anfractibus sexdecim ad octodecim, spiráliter tricingulatis, cingulá medianá minore, interstitiis carinarum longitudinalíter valde striatis.*

Hab. Red Sea (Rüppell). Mus. Cuming.

An ashy-grey species, with three smooth keels on each whorl, and the interstices strongly striated: somewhat similar to the *T. corrugatus* of Hinds.

23. *TRIPHORIS LABIATUS*, A. Adams. *T. testá subulato-pyramidalí, nigro-fuscá, in medio tumidá, spirá apice obtuso; anfractibus 10, planulatis, triseriatim granuloso-carinatis, suturis concavo-impressis; labro reflexo, dilatato, albido; canali brevi, subrecurvo.*

Hab. Sydney, under stones, low water (Mr. Strange). Mus. Cuming.

A small, nearly black shell, with the outer lip dirty white or pale fuscous.

✓ 24. *MESALIA STRIATA*, A. Adams. *M. testá subulato-turrítá, fulvá; anfractibus 10-12, planulatis, superioribus longitudinalíter plicatis, inferioribus lævibus, transversim striatis, striis impressis, subdistantibus; anfractu ultimo subangulato; aperturá ovali, labio subplanulato, anticè subreflexo; labro acuto, integro.*

Hab. Philippines. Mus. Cuming.

✓ 25. *MESALIA DECUSSATA*, A. Adams. *M. testá subulato-turrítá, in medio subcylindraceá, pallidè rubro-fuscá; anfractibus novem, convexiusculis, plicis longitudinalibus confertis, et sulcis impressis, transversis, decussatim ornatis; aperturá semiovali, labio subcalloso, anticè subreflexo, integro; labro incrassato, margine integro.*

Hab. Masbate, Philippines. Mus. Cuming.

26. *RISSOINA SEMIGLABRATA*, A. Adams. *R. testá subulato-pyramidalí, albá, solidá, nitidá; anfractibus convexiusculis, supremis transversim striatis, inferioribus glabratis; aperturá semiovali, anticè subcanaliculatá, labio incrassato; labro dilatato, crasso, intus tuberculis parvis instructo, margine subreflexo.*

Hab. Deleguete, isle of Zebu, found under stones, low water. Mus. Cuming.

A species having very much the aspect of a *Eulima*. In this species there are two tubercles on the inner surface of the outer lip.

27. *RISSOINA EULIMOIDES*, A. Adams. *R. testá subulato-pyramidalí, albá, solidá, nitidá; anfractibus planiusculis, suturis impressis; aperturá semiovali, anticè subcanaliculatá, labio lævigato, subincrassato; labro margine crasso, in medio dilatato, intus tuberculo minuto instructo.*

Hab. Island of Capul, on coral reefs in sand, at low water. Mus. Cuming.

A small polished *Eulima*-like species, with a single small tubercle on the inner surface of the outer lip.

December 9, 1851.

W. Yarrell, Esq., in the Chair.

The following papers were read :—

1. ON SOME BONES OF DIDUS. BY A. D. BARTLETT.

(Aves, Pl. XLV.)

The history of the Dodo having been recently the subject of so much inquiry, and the exertions made by Mr. Strickland, Dr. Melville and others, having succeeded in bringing together so many important facts, it might appear that there was little more to be said upon the subject; this, however, I believe is far from being the case. A few facts established upon a subject which was before obscured in doubt and error will, I trust, always act as a charm, and induce us at every opportunity to investigate that subject still further, in the hope of learning the truth. On the present occasion I am desirous of calling attention to a few bones upon the table. In so doing I beg to say, that in the year 1830 a collection of bones arrived in Paris, which attracted the attention of the scientific world. These bones came from the island of Rodriguez, but on account of their being incrustated with stalagmite, little has been done with them; they were, however, the cause of search being made for more in the same locality, and two collections were made in the year 1831 by the late Mr. Telfair. One of these collections was forwarded to the Andersonian Museum in Glasgow, the other to the collection of this Society, and at the evening meeting, March 12, 1833, the bones sent by Mr. Telfair were laid upon the table.

I will here read an extract from the Society's Proceedings :—“ Dr. Grant pointed out that they were the bones of the hinder extremity of a large bird, and the head of a humerus. With reference to the metatarsal bone, which was long and strong, Dr. Grant pointed out that it possessed the articulating surfaces for four toes, three directed forwards and one backwards, as in the foot of the Dodo preserved in the British Museum, to which it was also proportioned in magnitude and form.”

I beg now to read a paragraph from Mr. Strickland's book. At page 52 we find: “The bones sent by Mr. Telfair in 1833 to the Zoological Society have met with some unfortunate fate. Three or four years ago, Mr. Fraser, the late Curator of that Society, made, at my request, a diligent search for these specimens, but all his endeavours to find them were fruitless: he found the identical box sent by Mr. Telfair, but, alas! the bones of the Solitaire, apterous as it was, had flown away, and the only bones that remained belonged to tortoises.”

In the month of July last an opportunity was afforded me by the Secretary of renewing this search, and I had the good fortune to



Metatarsal bone of *Didus Nazareus*. 2. of *Didus solitarius* 3. of *Didus ineptus*



find what I believe to be all the specimens sent to the Society by Mr. Telfair.

Upon my informing Mr. Mitchell of my success, that gentleman, knowing the trouble and interest I had taken to recover them, granted me permission to examine, compare, and describe them, and to bring the subject before the Society.

In the first place, we are led to believe (and I think without the slightest doubt) that these bones came originally from the island of Rodriguez. There cannot be any doubt, also, that Rodriguez and the neighbouring islands were at one period inhabited by several species of large birds. Whether any of the same species of these birds inhabited different islands, or whether each island was inhabited by distinct species, is a question to which I beg most particularly to call your attention: the most recent publication by Mr. Strickland and Dr. Melville would lead us to believe that the true Dodo (*Didus ineptus*) was solely confined to the island of Mauritius, and another species, known as the Solitaire, was said to be its representative on the island of Rodriguez. If this be true, I should have the pleasure of introducing to your notice the bones of at least two new species of birds from that island: I do not however myself feel justified in so doing, but believe some of the bones sent here by Mr. Telfair belong to the true Dodo (*Didus ineptus*). There are also in the collection (I think without doubt) bones of two other species, one of these of much larger size than the Dodo, the other considerably smaller. The bones in question having all the usual and well-known characteristics of those of adult birds, we cannot therefore suppose the differences which they present to be such as might arise from age; and on the other hand, you will perceive that the proportions are too dissimilar to allow of our regarding them as having belonged to different sexes of the same species. There often exists great difference of size in the bones of the opposite sex, but I have never noticed any very evident difference of proportion. These are to me satisfactory reasons for considering them specifically distinct. But to return to the question,—Was the Dodo found on the island of Rodriguez? Sir Thomas Herbert says *it was*; and his evidence appears to me of much importance, considering the number of years he spent travelling about, visiting these islands, and collecting rare and curious things; having also repeatedly described the Dodo, and very probably brought one to England. I am therefore inclined to regard the assertions made by Sir Thomas Herbert with more respect than they have elsewhere received. It may appear at first sight impossible that the same species of birds which were destitute of the power of *swimming* or *flying* could inhabit islands so far from each other; but, were these islands always in the state in which we find them? may they not at some distant period have been united and formed part of the same land? In endeavouring in this manner to account for the existence of the Dodo upon the island of Rodriguez as well as at Mauritius, it has been remarked that this argument would not hold good, as the islands in question were of volcanic origin: if this be the case, to account for its existence at either place appears to me equally difficult. I am

fully aware it has been the practice of late to consider the animals obtained from localities remote from each other specifically distinct; they may be so; but unless we have some certain means of distinguishing them, I do not think we ought to regard them as such.

I now venture to introduce to your notice what I believe to be the *tibia* of the Dodo (*Didus ineptus*): its agreement with the foot in the British Museum struck me as being exceedingly remarkable and conclusive: its size and proportions, as compared with the metatarsal in question, are exactly what I should have expected upon the supposition of their belonging to the same species: they fit each other so perfectly, that one might think they belonged to the same individual. With this evidence before me, I cannot for one moment hesitate in considering the *Dodo of the Mauritius to be identical with the Dodo of Rodriguez*. There are also in this collection two other bones, which, from their size and form, I believe to belong to this species: the most remarkable is the head of the *humerus*, which would indicate by its magnitude and broad attachments that it belonged to a bird of large bulk, while the sudden reduction in the size of its shaft clearly indicates a bird with small wings. The great thickness and consequent weight is sufficient to cause us to suppose that this bird had not the power of flight.

The next bone to which I will call your attention is a right metatarsal, which appears to me to have belonged to a bird known to Leguat as the Solitaire, and described by him during his residence on the island of Rodriguez. I beg to read Leguat's description, in order to point out to you its near agreement in point of size and form with the Turkey, with which bird Leguat compared the bird he called the Solitaire:—

“Of all the birds in the island, the most remarkable is that which goes by the name of the *Solitary*, because it is very seldom seen in company, though there are abundance of them. The feathers of the male are of a brown-grey colour: the feet and beak are like a Turkey's, but a little more crooked. They have scarce any tail, but their hind part covered with feathers is roundish, like the crupper of a Horse; they are taller than Turkeys. Their neck is straight, and a little longer in proportion than a Turkey's when it lifts up its head. Its eye is black and lively, and its head without comb or cop. They never fly, their wings are too little to support the weight of their bodies; they serve only to beat themselves, and flutter when they call one another. They will whirl about for twenty or thirty times together on the same side, during the space of four or five minutes. The motion of their wings makes then a noise very like that of a rattle, and one may hear it two hundred paces off. The bone of their wing grows greater towards the extremity, and forms a little round mass under the feathers, as big as a musket-ball. That and its beak are the chief defence of this bird. 'Tis very hard to catch it in the woods, but easie in open places, because we run faster than they, and sometimes we approach them without much trouble. From March to September they are extremely fat, and taste admirably well,

especially while they are young ; some of the males weigh forty-five pounds.

“The females are wonderfully beautiful, some fair, some brown ; I call them fair, because they are of the colour of fair hair. They have a sort of peak, like a widow’s, upon their breasts (*lege* beaks), which is of a dun colour. No one feather is straggling from the other all over their bodies, they being very careful to adjust themselves, and make them all even with their beaks. The feathers on their thighs are round like shells at the end, and being there very thick have an agreeable effect. They have two risings on their *craws*, and the feathers are whiter there than the rest, which livelily represents the fine neck of a beautiful woman. They walk with so much stateliness and good grace, that one cannot help admiring and loving them ; by which means their fine mien often saves their lives.”—*Leguat’s Voyage to the East Indies*, 1708, p. 71.

You will perceive this bird was said to be larger and taller than a Turkey. A comparison of this metatarsal bone with the metatarsal bone of the Turkey I think will satisfactorily show the accuracy of Leguat’s description, and at the same time justify our conclusion that this metatarsal bone belonged to the Solitaire of Rodriguez, to which the name of *Didus solitarius* has been applied. I trust I shall be pardoned for avoiding the use of the new generic term adopted by the authors of ‘The Dodo and its kindred,’ for in a group so little known, and at present so limited in species, it seems to me so much to increase the trouble and difficulty of those who endeavour to study such subjects, that I cannot help expressing my belief that many of the new names so often introduced serve only to impede and embarrass us, and I therefore regard them as much worse than useless.

I have now remaining the bone of a bird which when alive was much *larger, heavier*, and more *powerful* than the *Dodo*. For further examples of this bird’s bones, I must refer to the plates in the work before alluded to, by Mr. Strickland and Dr. Melville : plate xv. fig. 2, the metatarsal bone of the large species in the Andersonian Museum, Glasgow ; fig. 3, a metatarsal bone in the Parisian collection. A glance at these specimens will, I imagine, convince any one that this bird was of gigantic size, and probably double the weight of the *Dodo*. I am sure it cannot be supposed (after what has been said) that Leguat was describing this great bird when he wrote his beautiful description of the Solitaire. Another important fact will, I think, set this question at rest. Leguat states, that some of the males of the Solitaire weigh *forty-five pounds*. Now we know the weight of the largest Turkeys to be considerably less, rarely reaching *thirty pounds*, while the weight of the *Dodo* is stated to have been at least *fifty pounds*. It cannot, therefore, be supposed, had Leguat seen birds nearly double the size of the *Dodo*, he could have made the statements or comparison he has made between the Solitaire and Turkey.

I have before expressed my great dislike to an unnecessary increase of names : I feel, however, the necessity of finding an appropriate

name for this large bird, and therefore propose one somewhat familiar to all who have paid any attention to the subject, and apply the name of *Didus Nazareus* to this the largest species of the genus. In doing this, I may remark that Mr. Strickland, in his work before alluded to, has considered the *Didus Nazareus* to be a phantom species, which he says has haunted our systems of ornithology from the days of Gmelin downwards.

The conclusions which I have arrived at from the examination of the bones to which I have just called your attention are these:—That there existed formerly three distinct species of Apterous birds in the island of Rodriguez; namely, one which is apparently identical with the *Dodo* (*Didus ineptus*) of the Mauritius; a second, which was well described under the name of *Solitaire*; and a third, which was much larger than either of the above.

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2. DESCRIPTION OF TWO NEW SPECIES OF MAMMALIA OF THE GENUS ANTECHINUS. BY JOHN GOULD, F.R.S. ETC.

One of these species is remarkable for being spotted on the under instead of on the upper surface, and the other for its very diminutive size: both rank among the smallest members of the genus. For the former I propose the specific appellation of *maculatus*; it may be thus described:—

ANTECHINUS MACULATUS.

Fur short, dense, and closely applied to the skin; general tint of the upper surface dark blackish brown, minutely grizzled with yellowish brown; lower part of the flanks and under surface of the body dark brownish slate-grey, ornamented with oblong spots of greyish white arranged in irregular rows in the direction of the body; down the centre of the throat a streak of white.

	inches.
Length from the tip of the nose to the base of the tail	$3\frac{1}{2}$
—— of the tail	$2\frac{1}{4}$
—— from the tip of the nose to the base of the ear	$\frac{1}{2}$
—— of the ear	$\frac{1}{4}$
—— of the tarsi and toes	$\frac{1}{16}$

Hab. Brushes of the river Clarence, on the east coast of Australia.

The other species I propose to name

ANTECHINUS MINUTISSIMUS.

Fur short, dense, and closely applied to the skin; upper surface and flanks brown, slightly grizzled with black; under surface pale buff, approaching to white on the throat; tail brown above, lighter beneath; feet buffy brown, toes covered with hairs of a somewhat lighter hue.

	inches.
Length from the tip of the nose to the base of the tail	$2\frac{3}{4}$
—— of the tail	$2\frac{1}{4}$
—— from the tip of the nose to the base of the ear	$\frac{7}{16}$
—— of the ear	$\frac{1}{4}$
—— of the tarsi and toes	$\frac{5}{8}$

Hab. Brushes of the east coasts of Australia.

3. DESCRIPTIONS OF A NEW SPECIES OF PTILOTIS AND A NEW SPECIES OF EÖPSALTRIA. BY JOHN GOULD, F.R.S.

Mr. Gould also exhibited two new species of birds of the genera *Ptilotis* and *Eöpsaltria*, which he characterized as follows:—

PTILOTIS FASCIOGULARIS.

All the upper surface, wings and tail olive-brown, the feathers of the head and back with darker centres, and the primaries and tail-feathers narrowly margined externally with greenish wax-yellow; lores and a streak down the side of the head from the posterior angle of the eye blackish brown; ear-coverts pale yellow; on each side of the neck a patch of yellowish white; feathers of the throat brownish black, each bordered with pale yellow, presenting a fasciated appearance; breast blackish brown; under surface striated with brown and buffy, becoming paler towards the vent; irides lead-colour; bill and feet black.

Total length, $7\frac{1}{2}$ inches; bill, $\frac{7}{8}$; wing, $3\frac{3}{4}$; tail, $3\frac{1}{2}$; tarsi, $1\frac{1}{8}$.

Hab. Mangrove Island, Moreton Bay.

Female.—Similar in colour, but of smaller size.

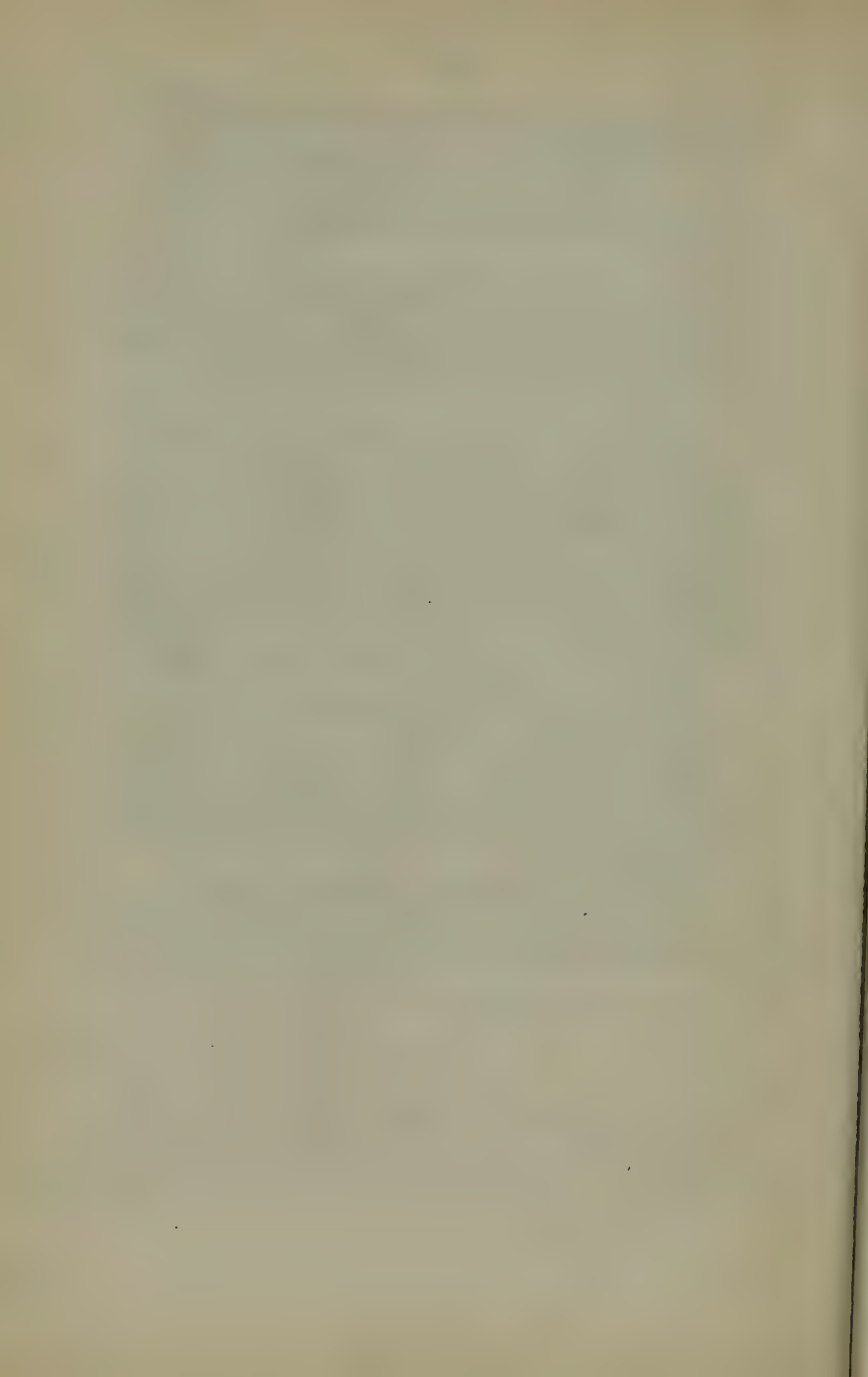
EÖPSALTRIA CAPITO.

Upper surface olive-green, inclining to brown on the head; wings and tail slaty brown, faintly margined with olive-green; ear-coverts grey; lores and a line descending in front of the eye and the throat greyish white; under surface yellow; irides hazel; bill black; feet brownish flesh-colour.

Total length, 5 inches; bill, $\frac{5}{8}$; wing, $3\frac{1}{8}$; tail, $2\frac{1}{4}$; tarsi, $\frac{7}{8}$.

Hab. Brushes of the River Brisbane, New South Wales.

Remarks.—Shorter and less elegantly formed than *E. Australis*, with a stout broad bill and a proportionately large and heavy head.



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ERRATA.

Page 125, Art. 3, for VANGANELLA read RESANIA.

“ “ for VANGANELLA TAYLORII read RESANIA TAYLORII.

Page 183, line 38, for CHLOROSTOMA TURBINATUM read C. FUSCUM.

