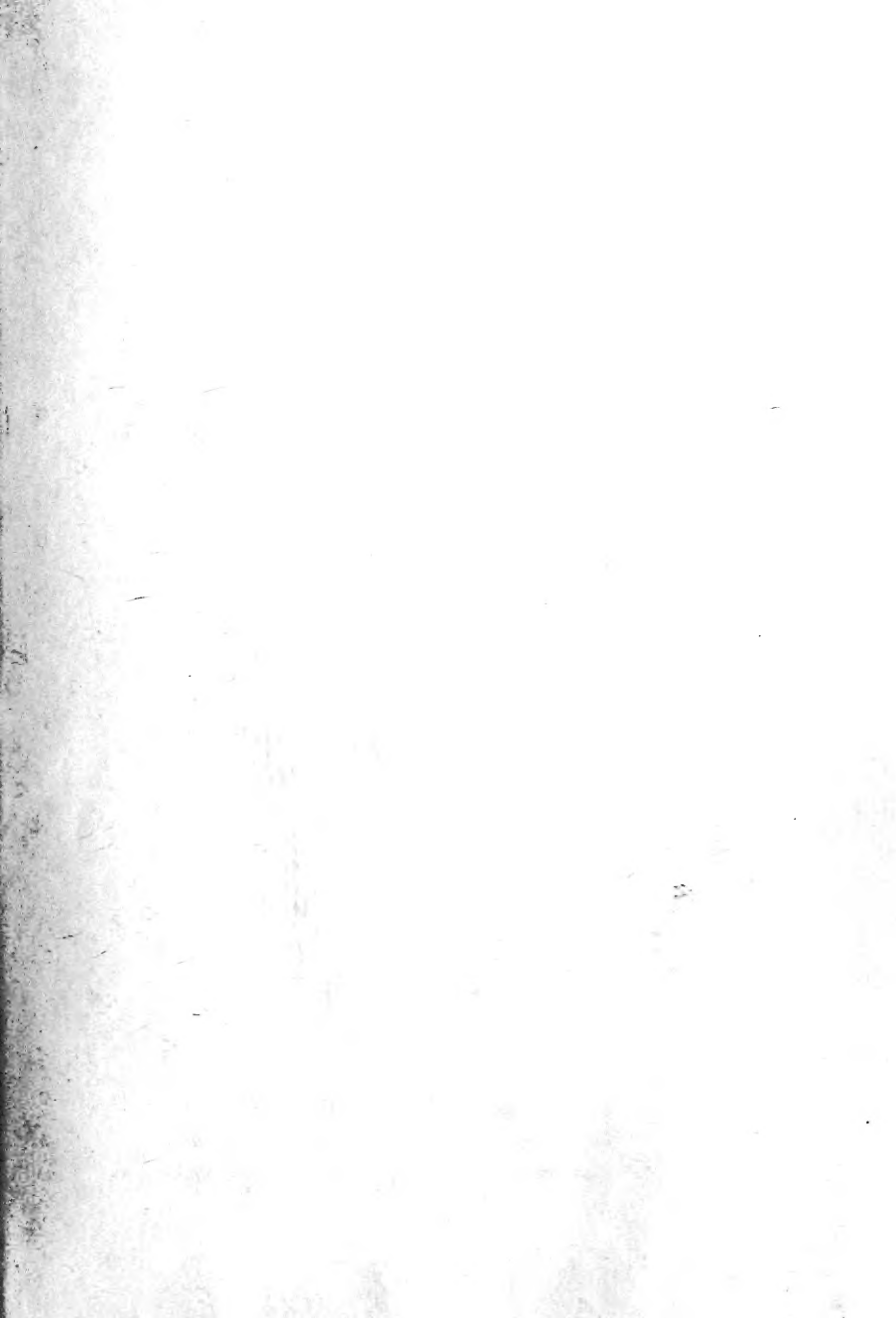


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PROCEEDINGS

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WITH ILLUSTRATIONS.



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THE SOCIETY OF...



1848

THE SOCIETY OF FRIENDS
FOR THE YEAR 1848
AND THE PROCEEDINGS OF THE YEARLY MEETING
HELD AT NEW-YORK, IN THE MONTH OF SEPT. 1848

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ERRATA.

- Page 140, line 13, for *Rachedian* read *Rachidian*.
" 140, " 15, " *Rachal* read *Rachial*.
" 141, " 25, " *Llama* read *Bisulca*.

PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 11, 1848.

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

The following communications were read:—

1. ON THE REMAINS OF THE GIGANTIC AND PRESUMED EXTINCT WINGLESS OR TERRESTRIAL BIRDS OF NEW ZEALAND (*DINORNIS* AND *PALAPTERYX*), WITH INDICATIONS OF TWO OTHER GENERA (*NOTORNIS* AND *NESTOR*). BY PROFESSOR OWEN, F.R.S. ETC. ETC.

In this memoir (No. III.) Professor Owen confined himself to the description and comparison of the bones of the head and beak, forming part of a very extensive and valuable series collected by Mr. Walter Mantell in a deposit of volcanic sand at Waingongoro, North Island of New Zealand. After enumerating the principal bones, now in the possession of Dr. Gideon Mantell, F.R.S., by whom Prof. Owen had been kindly invited to determine and describe them, and stating the species to which the majority were referable, viz. *Dinornis giganteus*, *D. cusuarinus*, *D. didiformis*, *D. curtus*, *Palapteryx ingens*, *P. dromioides*, *P. geranoides*, the author alluded to a form of tarso-metatarsal bone, which had supported a strong back-toe, and resembled the metatarsus of the Dodo, but was shorter and thicker, as apparently belonging to the tibia of the species described in a former memoir (Zool. Trans. iii. 1843, p. 247), to the *Dinornis otidiformis*, but which must belong to a genus (*Apterornis*) distinct from both *Dinornis* and *Palapteryx*. He also stated that the collection contained many bones of seals of the genus *Arctocephalus*, F. Cuv., with a few bones of a dog and of the human subject: the latter had been calcined, and were probably the remains of some cannibal feast of the natives. The uncalcined bones of the seal were in the same state, brittle, absorbent, and of a yellowish brown colour, as the bones of the extinct birds, with which they were associated and appear to have been

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coeval. Numerous fragments of the shells of more than one kind of egg, the largest surpassing in size the egg of the ostrich, had also been discovered with the bones.

In the present memoir Prof. Owen described the bones of the head and beak. They belonged to four distinct genera of Birds. The largest skull, with a very strong, broad, subelongate and subincurved beak, like an adze, was referred to the genus *Dinornis*. The second in size, with a beak to which that of the Emeu makes the nearest approach, was referred to *Palapteryx*. The third skull, with a beak like that of the *Porphyrio* and *Brachypteryx*, was referred to the same family—'Rallidæ'—to which those genera belong; but, through the peculiarities of the cranium, formed the type of a new genus, *Notornis*. The fourth form of beak was referable to the genus *Nestor* in the family *Psittacidæ*.

The cranium of the *Dinornis* presents the family characters of great breadth, and forward inclination of the occipital region, of the vertical plane of the occipital foramen, and of the prominent and pedunculate occipital condyle; but the downward development of the basi-occipital and basisphenoid is exaggerated, as compared with the *Palapteryx*, the basis cranii, which is $2\frac{1}{2}$ inches in length, descending abruptly for the extent of 1 inch below the foramen magnum; the condyle is hemispherical as in *Otis*, not a quarter of a sphere as in *Struthio* and *Palapteryx*, nor, as in *Didus*, a transverse reniform tubercle with a median notch above. The foramen magnum is a vertical ellipse, with lateral processes encroaching upon it, as in *Didus*; but in this large extinct bird the upper half of the foramen is narrower and almost pointed above. In *Apteryx* and *Palapteryx* the foramen is widest transversely. The margin of the foramen magnum is broad and excavated in both *Dinornis*, *Otis* and *Didus*, but the upper border ends in the latter genus in a tubercle on each side.

In *Didus* there is a small middle supraoccipital foramen and two lateral ones, but these do not exist in *Dinornis*, *Otis*, or *Palapteryx*: the lateral foramina are present in *Apteryx*.

In the extinct genera and in *Otis* the supraoccipital ridge is well-marked, but defined rather by the subsidence of the occipital surface than the elevation of the ridge above the parietal one.

In no bird is the extent of surface for muscular attachment so great at the back part of the head, or so strongly marked by depressions and ridges, as in the *Dinornis*.

The extension of the surface by the downward thick wedge-shaped development of the basi-occipito-sphenoidal surface, and by its lateral strong backwardly produced ridges, is quite peculiar to the *Dinornis*. An approach to this structure is made by *Otis* in the ridges that connect the sides of the flat basisphenoid* with the paroccipital* processes. In *Palapteryx* the basi-sphenoid is square and flat below, in *Didus* it presents a longitudinal channel bounded by parallel lateral ridges; the sides of the basisphenoid, which incline to these ridges,

* For the definition of these and other anatomical terms the author referred to his 'Report on the Homologies of the Vertebrate Skeleton' in "Report of British Association, 1846."

are slightly concave, have two perforations posteriorly, one above and a little in advance of the other, and form the anterior and internal boundary of the tympanic cavity.

In *Palapteryx*, as in *Didus*, the basioccipital descends and expands into two thick obtuse processes, from which muscles pass to the inwardly-bent angles of the jaw. Internal to these processes are two short tubercles. On each side the base of the occipital condyle in *Dinornis* are three small foramina; in *Didus* two, the outer one the largest.

In *Dinornis*, *Otis* and *Didus*, two foramina, the upper one for the hypoglossal nerve, the lower one for the entocarotid artery, open externally in a deep elliptic depression. The paroccipital is enormously developed in *Dinornis*, and sends a rough thick process from its under part to abut against the lateral basioccipital ridge, where it articulates and sometimes ankyloses with the stylohyal: in *Palapteryx* and *Didus* the paroccipital carries the posterior surface of the skull downwards and outwards in a minor degree than in *Dinornis*, and terminates in a curved convex thick border: its internal surface next the tympanic cavity is cellular in *Didus*. The eustachian outlets open, in both *Dinornis* and *Otis*, above a transverse ridge terminating the basisphenoid anteriorly: this ridge is not present in *Apteryx* or *Palapteryx*. The *Palapteryx* also differs from *Dinornis* in the higher position of the precondyloid holes and their greater separation from the carotid holes, in the minor development of the paroccipitals, the major development of the mastoids, and by the large and single oblong depression, beneath the mastoid, for the single superior condyle of the tympanic bone. In *Dinornis* the temporal fossa is wide and deep, in *Didus* narrow and deep; the alisphenoid is concave where it ascends to coalesce with the mastoid, parietal and post-frontal to form the temporal fossa: the limits of the orbitosphenoid are also obliterated by a similar confluence: in this region of the skull the 'foramen ovale' is preceded in *Dinornis* as in *Didus* by two smaller foramina, and in front of these is the great 'foramen opticum.' The parietals are very broad and short in both extinct genera; but in *Dinornis* there is a median rising where the sagittal suture originally ran, whilst *Didus* shows a depression and foramen here. The mastoid in *Dinornis*, as in *Otis*, sends down two processes, one, the tympanic process, short,—the other, or proper mastoid process, long; this coalesces with the postfrontal in *Dinornis*, not in *Otis*: the base of the mastoid has two articular cavities for the upper condyles of the tympanic bone. In *Didus* the outer side of the mastoid is convex, smooth, but with a slight oblique ridge; it overhangs the tympanic cavity, bending inwards, and sends a short compressed pointed mastoid process in front of the anterior articular cavity for the anterior and upper condyle of the tympanic.

The presphenoid is a deep compressed plate, thickened and rounded below; the palatines abut against it, as in *Didus*, where the fore-part of the pterygoids also rest in part upon the presphenoid. The frontals of *Dinornis* form together a broad hexagonal plate moderately convex, with the cerebral hemispheres indicated by very

slight risings : the postfrontals form the depressed lateral angles ; the anterior border is emarginate and coalesces with the nasals and premaxillary, without being elevated above them. In *Palapteryx* the frontals are more produced anteriorly before coalescing with the base of the beak. In *Otis* the interorbital part of the frontals is deeply and widely excavated. In *Didus* the frontals are broad and convex, rising singularly above the cranial ends of the nasals and premaxillary, with which they also coalesce. The supraorbital plate presents a rough notch near the fore-part, where in *Dinornis* there is a shallow emargination. In *Dinornis* there is a shallow depression with vascular grooves at the outside of the base of the postfrontal distinct from the temporal fossa : in *Didus* the temporal fossa extends forwards above the postfrontal and forms there a reniform depression, either for a gland, or what is less likely, for a co-extension of the origin of the temporal muscle. The postfrontal is a strong triangular obtuse process, ending freely as in *Palapteryx*, not joined to the mastoid as in *Dinornis*. The orbitosphenoids, indicated by the optic foramina, continue the roof and septum of the orbits by coalescence with the alisphenoids behind, the frontals above, the prefrontals in front, and the presphenoid below : they send a ridge upwards and outwards to the under part of the postfrontals, but do not present that singularly swollen character which is so peculiar in *Didus* ; in which also the prefrontals form a large smooth protuberance, like a tumour, at the fore-part of the orbits, and appear on the upper surface of the cranium in front of the antorbital process of the true frontal and external to the lachrymal. The interorbital bony septum is entire in both *Dinornis* and *Didus* ; but in the latter it is more than an inch in thickness and cellular, and in this respect more resembles the singular structure of the part in *Apteryx*. The orbits are smaller in *Dinornis* than in the large existing *Struthionidæ* or in *Otis*, but are larger than in *Apteryx*. The olfactory chambers in *Dinornis* are less developed than in *Palapteryx* and *Apteryx*.

The nasal bones in *Dinornis* and *Otis* converge where they overlap the prefrontal (*ethmoide*, Cuv.) in order to join the frontal and include that end of the nasal process of the premaxillary, which is on a lower plane ; and, as they advance, they pass beneath that process, coalesce with it and with each other, and terminate in *Dinornis* in a point. In *Didus* the nasals also anchylose with the frontal, where they are separated by the nasal process of the premaxillary, as indicated by the two longitudinal fissures, which, commencing behind at 2 lines distance from the outer border of the anchylosed base of the beak, gain that border at 1 inch 9 lines distance from the frontal, and thus indicate the proportions of the base formed by the anchylosed nasals : the fissure can also be traced as in *Dinornis*, bending inwards upon the under surface of the nasal process of premaxillary, to about 3 inches from the frontal, when the fissure returns back, inclining to the median line, and meets its fellow there. All the outer part of the median stem or base of the beak defined by these linear furrows I regard as the nasals, which thus support the nasal process of the premaxillary.

This process is a broad transversely arched plate, where it joins the maxillary processes to form the anterior or rostral part of the premaxillary; the extent of which, anterior to the external nostrils, is $2\frac{1}{2}$ inches, the whole length of the premaxillary being $4\frac{1}{2}$ inches. Its breadth at the middle is rather more than an inch; the depth of the upper bony beak gradually decreases from its base where it is 1 inch 9 lines, to its apex where it is less than 1 line, but retains a breadth of 8 lines, the edge appearing to have been truncate or very slightly rounded off: the whole upper beak being gently arched to this terminal edge resembles the cooper's adze (*doloire*, Fr.). The palatal surface is broad, very slightly excavated, and bounded laterally by well-defined alveolar ridges: the palatal nostril commences anteriorly 1 inch 10 lines from the anterior border of the premaxillary. In *Didus* the nasal process of the premaxillary presents an elliptic transverse section where it quits the maxillary processes, and diminishes in depth as it retrogrades, becoming depressed and broad where it rests upon and divides the nasals to ankylose with the frontal. Where the nasal and maxillary processes diverge, there is a deep groove externally terminating in a canal directed forwards into the rostral part or body of the premaxillary; this part is subincurved, pointed, rough and with irregular vascular perforations, with a sharp inferior border on each side, and a more concave palatal surface than in *Dinornis*. The long and slender palatines of *Dinornis* coalesce behind with the vomer and in front with the maxillaries; they are concave below, particularly at their back part, by the downward extension there of their inner border. In *Didus* the palatines arch outwards from their posterior attachments, are broad and smooth mesially with a sharp crenate edge above; a thin, outwardly smooth, convex ridge is directed outwards and downwards, and a more angular ridge is directed downwards with an obtuse apex: a groove divides this from the outer ridge: the upper and outer ridge extends to the maxillary; the lower ridge subsides before it reaches the maxillary. The palatines form the boundaries of the naso-palatine aperture, and approximate each other at both their ends, but do not meet. There is a fossa at the outer and near the back part of each palatine, where there is a rough concavity; the rest of the outer surface is convex lengthwise, concave vertically. The boundaries of the maxillary are more readily traceable in *Didus* than in *Dinornis*; but they have coalesced in both, with the palatine, malar and lachrymal behind, and with the maxillary process of the premaxillary in front: the maxillary in *Didus* forms a compressed longitudinal plate of bone with thick rounded borders above and below, and almost touches its fellow, leaving a deep narrow chink between the nasal fossa above and the palate below, closed by the palatal membrane.

The tympanic bone of the *Dinornis* has more a triangular than a quadrate form by reason of the unusually large size of its inferior condyle, which forms its base: the orbital process is a compressed subrhomboidal plate: the lower condyle is not so extended inferiorly in the Bustard (*Otis*); its upper condyle is bifid, as in *Dinornis*. In

Palapteryx it is single, as in *Apteryx*. In *Didus* the tympanic bone is subquadrate with the four angles produced, and the upper and hinder one bifurcate, forming the bifid condyle for the mastoid articulation: in *Dinornis* the mastoid condyle is also double, with a linear strip of bone between; and behind this the pneumatic foramen, where also similar foramina are situated in *Didus*: in this extinct bird, the orbital process, forming the anterior angle, is compressed and truncate: the outer surface of the bone is smooth and convex vertically; the inner surface is traversed by a sharp concave ridge extending from the inner division of the upper condyle to the anterior part of the inner and lower angle: the anterior division of the inner surface is concave, the posterior one is concave vertically, convex transversely. The antero-posterior extent of the condyle for the lower jaw is little, but greatest at its outer part, where it rests upon the shallow reniform outer division of the concave articular part of the lower jaw: the inner, more ridge-like part of the condyle sinks into a deeper transversely extended depression of the same articular concavity. The tympanic of the *Dinornis* chiefly differs in the great extension, upwards and backwards, of the broad and undivided inferior condyle: there is also an articular surface, on its outer side, for the mastoid process (not present in *Otis*) and another small one on the inner side for the pterygoid; besides the lower and outer cup for the end of the slender zygoma (squamosal).

The inner angle of the expanded articular end of the lower jaw of *Dinornis* ends by a short obtuse process. In *Otis* and *Didus* it forms a strong trihedral process, the anterior and posterior facets meeting a transverse ridge below, which is continued into a compressed plate forming the posterior angle of the jaw. The posterior surface is smooth and slightly concave, semioval in *Dinornis*, deeper and subtriangular in *Didus*.

The outer part of the articular end of the mandible is smooth and convex in *Dinornis*: in *Didus* a masseteric ridge is continued downwards and forwards from the outer overhanging border of the articular cavity to the back and lower angle of the dentary piece, defining, with the posterior border of the dentary, a concave, slightly pitted surface. The surangular in *Dinornis* has a short and low thick coronoid ridge, external to which there is a rough oval surface. In *Didus* the surangular develops a very small coronoid process, and its fore-part is deeply notched: a deeper and more angular notch divides the surangular from the angular piece. This notch receives the lower fork of the dentary on the outside, and the end of the splenial at the inner side. These notches do not exist in *Dinornis*: the surangular, angular and articular pieces have coalesced together in both the extinct birds. Where they join the posterior forks of the dentary piece, a long narrow vacuity is left, which in *Dinornis* is almost divided by a broad bar of bone extending upwards from the angular, but which does not quite touch the surangular. In *Didus* the upper fork of the dentary joins the upper and fore part of the surangular; the notch between the hinder forks of the dentary bounds anteriorly the narrow elliptic vacuity, 15 millimeters long by 3 milli-

meters deep. A notch also extends forwards, and divides outwardly the symphyseal from the ramal part of the dentary: this notch or hole does not exist in *Dinornis*.

The parts of the bones of the beak referred to *Palapteryx* consist of the anterior end of the premaxillary and of the symphysis and part of both rami of the mandible. The premaxillary, by the proximity of the external nostrils to its apex, and by the nasal grooves continued thither on each side from the anterior boundary of the nostrils, resembles that of the large existing *Struthionidae*, and the premaxillary and the angle at which it rises from the broad and flat maxillary processes. The end of the beak was, however, more obtuse than in the Emeu, and the short symphysis of the lower jaw is more deeply excavated above: it presents, however, the two parallel longitudinal grooves on its under part, as in the Emeu and Ostrich. The lower jaw appears from the remains of one ramus to have been 5 inches or $5\frac{1}{2}$ inches in length, and to have been broader and deeper than in the Ostrich or Emeu: and the cranium by its greater breadth behind, its less depth, its vertical foramen magnum and prominent occipital condyle, the lower position of the basisphenoidal platform, and the marked angle which it forms with the almost vertical basioccipital, concurs with the beak in establishing the generic distinction of the great bird to which it belonged. As the characters which were adduced in a former memoir (*Zool. Trans.* iii. p. 327) to separate those bones of the extremities that by their more slender proportions approximated the *Struthionidae* and, by the indication of a small back-toe, the *Apteryx* more particularly, from other bones of corresponding size but more robust proportions and devoid of a back-toe,—led to the former being assigned to the genus *Palapteryx*, and the latter to *Dinornis* proper;—so the characters which, in the first of the skulls described in the present memoir, show a departure from the struthious type, and in the second skull an approach thereto, clearly indicate the propriety of assigning the one to the genus *Dinornis* and the other to the genus *Palapteryx*. The total length of the skull referred to *Palapteryx geranoïdes* is 6 inches at least; the breadth of the cranium $2\frac{1}{2}$ inches: the bird probably equalled the Emeu in size.

The skull which indicates the third genus of apparently extinct bird (*Notornis*) measures $4\frac{1}{2}$ inches in length, and the cranium is 1 inch 8 lines in breadth. The bones of the beak closely resemble in form and structure those of the Purple Coot (*Porphyrio*), but the occiput is relatively broader, and more inclined forwards as it ascends: the plane of the occipital condyle is vertical, and the basioccipital extends further below the occipital condyle, though less so than in *Palapteryx*. In these characters the *Brachypteryx* or Short-winged Rail of New Zealand more resembles *Notornis*. The articular surface of the tympanic is divided, as in *Dinornis* and *Otis*, into two subcircular cups. The parietal region is singularly flat, the temporal fossæ unusually long, well-defined by ridges extending from the paroccipital to the postfrontal. In the comparatively small *Porphyrio* and *Bra-*

chrypteryx, in which, as in all small birds, the cerebral hemispheres, as requiring a certain bulk for their functions, do not decrease in the ratio of the size of the body, the upper surface of the cranium is raised by the hemispheres beneath into a smooth convexity.

The *Notornis* is a large modified form of the same natural family of the *Grallæ* as the *Porphyrio* and *Brachypteryx*, and from the form of its sternum it must have been, like the latter peculiar bird of New Zealand, deprived of the power of flight.

The fourth genus of bird indicated by portions of the skull in Mr. Walter Mantell's collection was referable to the family of Parrots (*Psittacidae*), and amongst these to the genus *Nestor*. The bony portion of the upper beak—the only part of the skull preserved—by its deep, subcompressed, curved and pointed form, its seeming solidity, pierced by small subcircular nostrils close to its base, attested the family character; whilst the proportional length as compared with the depth, the narrow upper surface to where it suddenly expands above the nostrils to join the cranium, the absence of the notch on the under border, the very narrow elongated triangular palatal surface, with the median linear notch at its base,—all demonstrate that in this characteristic part of the skull the New Zealand bird represented by it most resembled the genus *Nestor*,—a singular nocturnal Parrot at present only known as a denizen of that island.

Thus then it appears that the indications of two genera, with several species of terrestrial birds of large or gigantic size, deduced in the Author's former Memoir (Part II.) from bones of the legs, are most fully and satisfactorily confirmed by the evidence of the subsequently received bones of the head and beak.

The form and structure of these characteristic parts in one of the genera (*Dinornis*) are so peculiar, that the author does not refer the genus to any known natural family of birds. Its location in the order *Struthionidæ* implies little more than an arrested development of wings, and an exaggerated development of legs, organized for progression on dry land.

As, however, there are strictly aquatic forms of birds deprived, by a low development and special modification of the wings, of the power of flight, so also there are, in other natural groups of birds, aberrant forms similarly debarred from the privilege and enjoyment of the characteristic kind and field of locomotion of their class. Apart from the true *Struthionidæ*, we have an instance of this in the *Brachypteryx* or modified Rail of New Zealand; the Dodo is a second instance, whether it be regarded as an aberrant Vulture or a modified Pigeon, according to the views entertained by Mr. Gould and supported, with new arguments, by Mr. Strickland, before the British Association at Oxford, and which will be fully elucidated in the forthcoming work on the extinct flightless birds of the Mauritius and neighbouring isles, which Mr. Strickland is about to publish in conjunction with Dr. Melville.

With regard to the natural group or family of birds to which the *Dinornis*, with its adze-like bill and crocodiloid cranium, may be referable, the author pointed out several marks of resemblance in the

skeleton of the Bustard to the *Dinornis*, which are not presented by the skeletons of the true *Struthionidæ*. But he also dwelt upon the peculiar characters of the *Dinornis*, distinguishing it from the *Otidæ*, and indicating it to form a distinct family-type in the order of *Grallæ*.

With regard to the peculiar form of beak in *Dinornis*, reference was made to the deductions in the former memoirs, "from the unusual strength of the neck," that the *Dinornis* would be found to have a beak applicable "to a more laborious task than the mere plucking of seeds, fruits or herbage;" and that "the robust proportions of the cervical vertebræ, especially of their spinous processes, may have been the foundation of those forces by which the beak was associated with the feet in the labour of dislodging the farinaceous roots of the ferns that grow in characteristic abundance in New Zealand."

For this labour the beak of the *Dinornis*, formed after the model of the adze or pick-axe, seems peculiarly adapted, and the singular development in both breadth and depth of the occipital part of the cranium, with its strongly marked ridges, processes and muscular depressions, is precisely calculated for the adequate attachment of the muscular masses arising from the cervical vertebræ.

The second form of cranium and beak, referred to the genus *Palapteryx*, indicates that genus to be a member of the true *Struthionidæ*, and by its affinities to have been intermediate between *Dromaius* and *Apteryx*.

The *Notornis* is a struthious or brevipennate form of the *Rallidæ*, intermediate between *Porphyrio* and *Brachypteryx*. The remains of the beaks of the Psittaceous bird are not distinguishable generically from those of the genus *Nestor* of New Zealand.

Thus, observed Prof. Owen, "those concordances in the geographical distribution of existing and recently extinct forms of the warm-blooded vertebrate classes which are illustrated by the remains of Elephants, Rhinoceroses, Hippopotamuses, Hyænas, large Bovines and Cervines, in the pleistocene deposits of Asia and Europe,—by the absence of these and the presence of gigantic extinct Sloths, Armadillos and Anteaters, in the coeval deposits of South America, and of huge fossil Kangaroos, Wombats and Dasyures in the bone-caves and freshwater deposits of Australia,—have received new and striking elucidations from the repeated discovery, in the cavernous fissures, turbaries, and river-beds of New Zealand, of the remains of gigantic forms of birds allied to those small species, *Apteryx* and *Brachypteryx*, which constituted the highest representatives of the warm-blooded classes in the island, until the advent of Man led to the introduction of its present terrestrial mammals."

The author in conclusion repeated his acknowledgments to Dr. Mantell for the prompt accordance of the privilege of examining and describing these rare and interesting remains and expressed his high sense of the scientific value of the labours by which that eminent geologist's intelligent and enterprising son, Mr. Walter Man-

tell, had made so great an addition to the materials for developing the natural history of New Zealand.

The memoir was accompanied with numerous drawings of the specimens described, which will form plates 52—56 of the third volume of the 'Transactions.'

On the conclusion of Professor Owen's communication, Dr. Mantell expressed his opinion, that although the specimens formerly sent to this country were obtained from the beds of rivers and mountain-streams, and were regarded by the gentlemen who collected them as of very recent date, in reality they belonged to a period of as high antiquity, in relation to the surface-soil of New Zealand, as the diluvium containing bones of the Irish Elk, Mammoth, &c. to that of England. He observed that Mr. Colenso, Mr. Taylor, and Mr. Williams, who sent to England the bones figured and described by Professor Owen in the 'Zoological Transactions,' vol. iii., agree in this remarkable fact, that in some places, where the loamy marl in which their specimens were found was observed *in situ*, it was covered by several feet of strata of marine and freshwater sand, gravel and silt. The bones collected by Mr. Walter Mantell, among which were the crania and mandibles that formed the subject of Professor Owen's present communication, were all found imbedded in a loose pure sand, formed in a great measure of magnetic iron and minute crystals of augite and hornblende, the detritus of volcanic rocks. This sand has filled all the cavities and cancelli of the bones, but is not in any instance consolidated together: hence the bones are in the most beautiful state of preservation, and the most delicate processes entire. Dr. Mantell conceives that this bed of volcanic sand is a continuation of the deposit of sandy loam which occurs at the embouchures of the rivers along the west and east coasts of the North Island, in the localities that yielded the bones sent over by Mr. Williams and Mr. Taylor; and that in the higher regions of the same river-valleys, the detritus brought down by the mountain-streams from the volcanic chain whence they originate, is unmixed with the clay and silt of the lower alluvial tracts; for all the streams in these parts of the North Island rise from the lofty ridges of Mount Egmont and Tongariro. Dr. Mantell alluded to the fact, that along the sea-coasts and on the banks of the rivers Eritonga, Waibo, &c., there are horizontal terraces of boulders of trap-rocks fifty feet high; and that the small rocky islands of trachyte off the coast bear marks of wave-action to the height of 100 feet above the present sea-level. He mentioned other facts of a like nature in confirmation of his opinion, that since the Moas existed the surface of the country has been elevated many feet above the level of the sea, and that the present rivers and mountain-streams are flowing through channels cut into the ossiferous deposits; in like manner as the rivers of Auvergne flow through the newer tertiary marls and limestones containing bones of Mammalia, and those of England through the diluvial clay and loam in which





are imbedded the remains of the large extinct Pachyderms, the Rhinoceros, Mammoth, &c. He deemed it probable that the last of the race of Moas were destroyed by the earliest inhabitants of New Zealand, as the Dodo was finally extirpated by the Dutch colonists of the Mauritius, and the Irish Elk by the early British or Celtic tribes; but he considered it evident that the bone-deposit was in the progress of accumulation ages ere man inhabited the country.

2. DRAFTS FOR A NEW ARRANGEMENT OF THE TROCHILIDÆ. BY JOHN GOULD, F.R.S. L.S. Z.S. ETC. (CONTINUED FROM PART XV.).

Genus HELIANTHEA.

Gen. char.—*Rostrum* longum, rectum vel sursum aliquantò tendens, cylindraceum. *Nares* basales, et plumis a rostri basi porrectis, obtectæ. *Alæ* mediocres, et validæ. *Cauda* mediocris, et oclusa, paululùm furcata. *Pedes* perparvi. *Tarsi* admodùm breves, et plumis induti. *Hallux* brevissimus.

Bill long, straight or inclining upwards, and cylindrical; nostrils basal and covered with the feathers advancing from the base of the bill; wings moderately long and powerful; tail of medium size and slightly forked when closed; feet very small; tarsi extremely short, and clothed with feathers; hind-toe the shortest.

Types, *Trochilus helianthea* and *Bonapartii*.

Remark.—Plumage of the males rich and beautiful in the extreme.

Hab. So far as is yet known, the Cordillerian Andes.

HELIANTHEA EOS (n. sp.), Aves, t. i. *Hel.* mas, *summo capite nigro, apud frontem notâ metallicè aureo-viridi; collo anteriore et pectore splendide aureo-viridibus; gutture centrali notam intensè cæruleam ferente.*

Male.—Crown of the head black, with a shining spot of metallic golden green on the forehead; fore-part of the neck and chest lustrous golden green, the golden green predominating on the lower part of the chest; on the centre of the throat a patch of rich deep blue; abdomen rich shining flame-colour; back, wing and upper tail-coverts bronzy orange; tail cinnamon-brown, the apical half of the two middle feathers and the tips of the remainder with a bronzy lustre; primaries chocolate-brown; secondaries reddish buff, forming a conspicuous mark on the wing.

Female.—Similar in colour, but much less resplendent, and entirely destitute of the spot of green on the forehead and the patch of blue on the throat.

Total length $5\frac{1}{4}$ inches; bill $1\frac{1}{2}$; wing $2\frac{3}{4}$; tail 2; tarsi $\frac{3}{16}$.

Hab. The highlands of New Grenada and Venezuela.

Remark.—Nearly allied to *H. Bonapartii*.

Genus AGLÆACTIS.

Gen. char.—*Rostrum* sub-breve, paululùm apud basin depressum, rectum. *Nares* basales. *Alæ* elongatæ, validæ; remigibus primariis falciformibus hæc formâ præcipuè apud primam pennam

notandâ. *Cauda* mediocris, et occlusa, paululùm furcata. *Pedes* validi et robusti. *Tarsi* in partem plumis induti. *Hallux* cum ungue, digito medio cum ungue longior.

Gen. char.—Bill rather short, a little depressed at the base and straight; nostrils basal; wings long and powerful; primaries, particularly the outer one, sickle-shaped; tail moderately large and slightly forked when closed; feet strong and powerful; tarsi partially clothed with feathers; hind-toe and nail longer than the middle toe and nail.

Types, *Trochilus cupripennis* and *T. Pamela*.

AGLÆACTIS CAUMATONOTUS (n. sp.). *Ag. vertice et collo fuscis, loris, pectore, et partibus inferioribus cinnamomeis; guld fasciâ nigro-fuscâ trans-notatâ; lateribus nigro-fusco tinctis; plumarum penicillo elongato, et intensè fusco, sed ad apicem fulvo, apud pectus imum; alis aëno-olivaceis; caudâ cinnamomeâ, supernè aëno-olivaceâ; dorso caudæque tectricibus purpurascenti-liliaceis si plumæ contra lucem modo contrario in conspectu sint.*

Crown of the head brown; lores, chest and under-surface cinnamon-brown; throat crossed by a bar of blackish brown; flanks clouded with blackish brown; from the lower part of the chest springs a tuft of lengthened feathers, which are dark brown at the base and buff at the tip; wings bronzy olive; tail cinnamon-brown, except on the upper or exposed portion, which is rich bronzy olive; back and upper tail-coverts shining purplish lilac, which colour is only seen when the feathers are looked at in the reverse direction.

Total length $4\frac{1}{2}$ inches; bill $\frac{7}{8}$; wing $3\frac{1}{4}$; tail $1\frac{3}{4}$; tarsi $\frac{3}{8}$.

Hab. Peru.

Remark.—Closely allied to *T. cupripennis*.

Genus HELIANGELUS.

Gen. char.—*Rostrum* rectum, æquè ac caput longum, cylindraceum, et ad basin aliquantò depressum. *Plumæ frontales* rostri basin non obtegentes. *Alæ* mediocriter validæ primariâ externâ falci-formi. *Pedes* mediocriter validi, halluce digitum intermedium æquante. *Cauda* mediocris, subrotundata.

Gen. char.—Bill straight, about as long as the head, cylindrical, and slightly depressed at the base; feathers of the forehead not advancing upon the bill; wings somewhat powerful, outer primary sickle-shaped; feet moderately strong; hind-toe and nail the same length as the middle toe and nail; tail rather round in form and of medium size.

All the species of this genus are from the Andes, and distinguished by the extreme lustre of the throat, which in most of the species is bounded below by a gorget of white or buff.

Types, *Trochilus Clarisse*, *Spencei*, *amethysticollis*, and *strophianus*.

HELIANGELUS MAVORS (n. sp.), Aves, t. ii. *Hel. mas, fronte notam angustam intensè flammeam ferente, vertice corporeque superiore aëno-viridibus; guld intensè flammèd, lunulâ latâ fulvâ, subtù*





H. C. Fischer del. et lith.

TROCHILUS (HELIANGELUS) MAVORS. Gould

circumscrip̄td, abdomine intensius fulvo, lateribus viridi lavatis; crisso griseo-fulvo; alis purpurascenti-fuscis; caudæ rectricibus intermediis duabus æneo-viridibus reliquis æneo-fuscis, externis duabus ad apicem obscurè albis; tarsis intensè fuscis; rostro nigro-fusco.

Male.—Crown of the head and all the upper surface bronzy green, except the forehead, on which is a narrow mark of deep fiery red; throat deep fiery red, bounded below by a broad crescent-shaped mark of buff, which colour, but of a somewhat deeper tint, pervades the whole of the abdomen, except the flanks, which are washed with green; under tail-coverts greyish buff; wings purplish brown; two middle tail-feathers bronzy green, the remainder bronzy brown, the two outer ones on each side obscurely tipped with white; tarsi dark brown; bill blackish brown.

Total length $3\frac{1}{4}$ inches; bill $\frac{3}{4}$; wing $2\frac{1}{2}$; tail $1\frac{5}{8}$; tarsi $\frac{1}{4}$.

Hab. The Cordilleras of Venezuela and New Grenada.

GENUS THALURANIA.

Gen. char.—*Rostrum* capite longius, deorsum curvatum, et paululum apud basin depressum. *Alæ* breves, debiles. *Cauda* mediocris, furcata. *Tarsi* plumis induti, parvis, mollibus. *Hallux* cum ungue, digito intermedio cum ungue brevior.

Gen. char.—Bill longer than the head, curved downwards, and rather depressed at the base; wings short and feeble; tail moderately large and forked; tarsi clothed with feathers, small and delicate; hind-toe and nail shorter than the middle toe and nail.

Types, *Trochilus furcatus*, *nigro-fasciatus*, *Watertonii*, &c.

THALURANIA VIRIDIPECTUS (n. sp.). *Thal. corpore superiore æneo-viridi, hoc colore in viridissimum vergente apud uropygium; rectricibus caudæ crissoque necnon caudæ metallicè cæruleo-nigrescentibus; alis purpurascenti-nigris; gutture et pectore splendide viridibus; abdomine fulgentè cæruleo; tarsis plumis albis indutis; rostro nigro.*

All the upper surface bronzy green, passing into bright grass-green on the lower part of the back; upper and under tail-coverts and tail steel bluish black; wings purplish black; throat and chest resplendent grass-green; abdomen bright blue; tarsi clothed with white feathers; bill black.

Total length $4\frac{1}{4}$ inches; bill 1; wing, $2\frac{1}{4}$; tail $1\frac{3}{4}$.

Hab. The Columbian Andes.

Remark.—Nearly allied to *Trochilus nigrofasciatus*.

CAMPYLOPTERUS OBSCURUS (n. sp.). *Camp. vertice, corpore superiore, rectricibusque caudæ quatuor intermediis viridibus; guld, partibusque inferioribus intensè griseis; lateribus crissoque viridi lavatis; rectricibus caudæ externis utrinque nigris, duabus externis ad apicem griseis.*

Crown of the head, all the upper surface and the four middle tail-feathers green; throat and under surface dark grey; flanks and under

tail-coverts washed with green; the three lateral tail-feathers on each side black, the two outer ones tipped with grey.

Total length $5\frac{1}{4}$ inches; bill $1\frac{1}{8}$; wing 3; tail 2.

Hab. River Amazon.

Remark.—Nearly allied to, but quite distinct from, *Campylopterus latipennis*.

TROCHILUS (—?) **CALIGATUS**. *Troch. vertice, et corpore superiore viridibus, gula et corpore inferiore splendide viridissimis; alis purpurascenti-nigris; caudæ tectricibus et caudâ nitide metallico-cæruleis; crissi plumis eodem coloratis, albo fimbriatis; femoribus tarsisque plumis niveis indutis.*

Crown of the head and upper surface green; throat and all the under surface resplendent grass-green; wings purplish black; upper tail-coverts and tail bright steel-blue; under tail-coverts the same, fringed with white; thighs and tarsi clothed with snow-white feathers.

Total length $3\frac{1}{2}$ inches; bill $\frac{7}{8}$; wing $2\frac{1}{8}$; tail $1\frac{3}{8}$.

Hab. New Granada.

Remark.—Nearly allied to *Trochilus Saucerotii* and *T. erythronotus*.

GENUS OXYPOGON.

Gen. char.—*Rostrum* capite brevius, debile et rectum. *Genæ* supra subtusque rostrum plumis elongatis ornatæ; illis supra erectis, his subtus pendentibus. *Alæ* paululò longæ. *Cauda* ampla et occlusa, furcata. *Pedes* ampli et validi. *Tarsi* nudi. *Hallux* cum ungue longior digito, cum ungue intermedio.

Gen. char.—Bill shorter than the head, feeble and straight; face both above and below the bill ornamented with lengthened plumes, the former erect, the latter pendent; wings rather long; tail large, and forked when closed; feet large and strong; tarsi bare of feathers; hind-toe and nail longer than the middle toe and nail.

Types, *Trochilus Guerinii* and *T. Lindenii*.

3. ON FASTIGIELLA, A NEW GENUS OF SHELLS OF THE LAMARCKIAN FAMILY CANALIFERA. BY LOVELL REEVE, Esq.

The shell which I am about to describe, from the collection of Hugh Cuming, Esq., is of an entirely new form, differing generically as well as specifically from any of the class to which it belongs. It is of an elongated turreted growth, and may be said to partake in almost equal proportions of the characters of two genera somewhat removed from each other in the system, *Turritella* and *Cerithium*. As in *Turritella*, the shell is of a solid spirally-ribbed structure, without any indication of varices, a condition not to be found in *Cerithium*; whilst it possesses a character which excludes it from the family *Turbinacea*, in having a short umbilicated twisted canal, different from that of *Cerithium*, for the passage of an elevated fold of the mantle. At the base the shell is not much unlike some species of *Buccinum*, but it is remarkable for its elongated *Turritella*-like growth.

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It is, moreover, to all appearance the production of a carnivorous gasteropod, and more strictly referable to the Canaliferous tribe than the *Cerithia*, which, according to Deshayes, are vegetable-feeders, and partake in many instances of the freshwater habits of the *Melania*.

Unfortunately Mr. Cuming is not in possession of any information respecting the shell, either as touching the animal or its place of habitation, and it only remains to add the following description, with the hope that the attention of conchologists will be directed to a form which appears new and of much interest.

Class GASTEROPODA.

Order PECTINIBRANCHIATA.

Family CANALIFERA.

Genus FASTIGIELLA.

Testa elongato-turrita, basi contracta et umbilicata, aperturâ parvâ, canaliculatâ, canali brevissimo, subcontorto.

FASTIGIELLA CARINATA. *Fast. testâ lanceolatâ, anfractibus rotundatis, carinis tribus, earum interstitiis nitidè excavatis, spiraliter cingulatis; extus intusque albâ.*

Hab. — ? Long. $1\frac{3}{4}$ in.; lat. $\frac{5}{8}$ in.

On the characters of this species it may be remarked that there are ten forcibly developed keels to a whorl, all of which are concealed from the observer by the superposition of one whorl upon another excepting three, these being the most distant from each other.



January 25, 1848.

Dr. Gamble in the Chair.

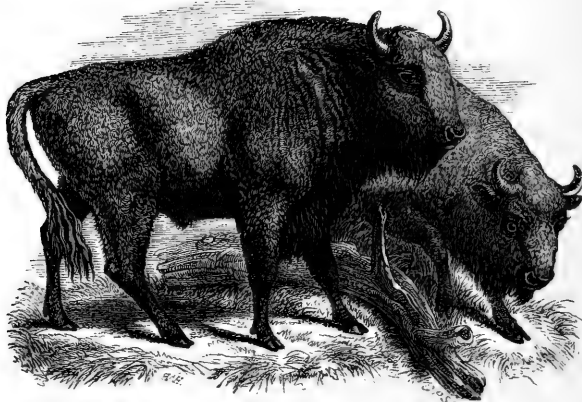
The following papers were read :—

1. NOTE ON THE CAPTURE OF THE AUROCHS (*Bos Urus*, Bodd). By M. DIMITRI DE DOLMATOFF, MASTER OF THE IMPERIAL FORESTS IN THE GOVERNMENT OF GRODNO.

(Communicated by Sir Roderick Murchison.)

Après avoir été nommé en 1842, maître des forêts du Gouvernement de Grodno, je me suis empressé, autant par devoir que par goût pour ma vacation, de porter une attention particulière sur la forêt de Bialowieza, ce dernier asile du Bison de l'Europe, et j'ai fait la description de cette forêt primitive et de son hôte intéressant, dignes tous les deux d'être cités au nombre des curiosités, qu'offre notre belle et immense patrie. Mon ouvrage fut accueilli favorablement par notre Gouvernement, mais depuis cinq années d'observations et de recherches assidus m'ont convaincu que cet ouvrage est incomplet ; et ont fait naître en moi le désir de rédiger un traité sur le Bison ; car mes propres expériences, renferment des faits curieux, et exempt de toute erreur.

Je me suis attaché particulièrement à combattre par des expériences l'opinion erronée, accréditée par tous les écrivains qui ont traité cette matière, nommément comme quoi le veau du bison ne pouvait être



alaité par nos vaches domestiques. Cette fable se trouve répété même dans l'ouvrage d'un écrivain estimé de notre tems, le Baron de Brinvers, qui s'étayant du récit d'un autre écrivain, le savant Gilbert, prétend que deux veaux femelles de Bison attrapées dans la forêt de Bialowieza et âgés de sept semaines, refusèrent constamment la mammelle d'une vache domestique; qu'ils consentirent il est vrai, de teter une chèvre, mais aussitôt rassasiées repoussaient leur nourrice avec mépris, et devenaient furieuses toutes les fois que l'on voulait les approcher d'une vache domestique. M. de Brinvers n'a pas eu la possibilité de vérifier par lui-même ce fait: et s'en est rapporté avec traditions, qui lui sont parvenus par les anciens des environs; parceque si quelqu'un des gardes forestières ou des paysans qui habitent la forêt, avait même rencontré un veau de Bison, isolé par quelque accident de sa mère, il l'aurait plutôt laissé, que de s'en emparer et de l'alaiter en contravention de la loi sévère, qui défende de se saisir d'un Bison ou de le tuer. Ce n'est donc que l'ordre suprême de sa Majesté l'Empereur, émané en suite du desir de sa Majesté la Reine Victoire de posséder dans son Parc Zoologique deux bisons vivans, qui m'a mis à même de rectifier l'erreur ci-dessus mentionnée. Car comme plusieurs essais constataient déjà, que des Bisons saisis dans l'âge mûre et leur état sauvage, ne pouvaient jamais supporter la captivité et surtout le transport, et périssaient infailliblement, j'ai proposé d'attraper deux jeunes veaux, et de les alaiter près des maisons des gardes forestières. Son Excellence M. le Ministre des Domaines de l'Empire Comte de Kisseleff ayant approuvé cet projet et ordonné de la mettre en exécution, je me rendis sans délai à la forêt de Bialowieza. Ce fut le 20 Juillet 1846 à l'aube du jour et assisté par 300 traqueurs et 80 chasseurs de cette forêt, armés de fusils, chargés simplement de poudre, que nous nous mîmes sur la trace d'un troupeau de Bisons exploré pendant la nuit.

La journée était superbe, le ciel serein, il n'y avait pas un souffle de vent, et rien n'interrompait le calme de la nature si imposant sous le dôme majestueux de la forêt primitive. Les 300 Traqueurs, soutenus par 50 Chasseurs, avaient cerné dans la plus profonde silence la vallée solitaire où se trouvait le troupeau des Bisons. Quant à moi, accompagné de 30 Chasseurs de plus déterminés et de la mérite, nous pénétrâmes à pas de loup dans l'enceinte cernée, avançant avec la plus grande précaution, et retenant, pour ainsi dire, notre haleine. Arrivés à la lisière qui bordait la vallée, nous jouîmes d'un tableau des plus intéressants! Le troupeau des Bisons était couché ruminant sur la pente d'un côteau, dans la plus parfaite sécurité, tandis que les veaux fôlâtraient autour du troupeau, s'amusaient à s'entr'attaquer, à frapper la terre de leurs pieds agiles, et à faire voler le sable en l'air, puis ils s'enfuyaient vers leurs mères respectives, se frottaient contre elles, les léchaient et revenaient en suite à leurs jeux. Mais au premier son du cor le tableau changea en un clin-d'œil! Le troupeau, comme frappé d'un baguette magique, bondit sur ses pieds et sembla concentrer toutes ses facultés en deux sens, celui de l'ouïe et de la vue. Les veaux se pressèrent timidement contre leurs mères. Puis quand retentirent les hurlemens de la meute les Bisons

hâtèrent de se mettre en l'ordre qu'ils prennent ordinairement dans des pareilles circonstances, c'est qu'en plaçant leurs veaux en avant ils forment l'arrière-garde pour les garantir de la poursuite des chiens, et se portèrent en avant. Arrivés à la ligne occupée par les Traqueurs et les Chasseurs, ils furent réçus par des cris perçans et des détonations de fusil. Alors se changea l'ordre de défense ; les vieux Bisons se jetèrent avec furie à côté, y rompirent la ligne de chasse, et victorieux ils continuèrent leur course, en bondissant, et en dédaignant de s'occuper de leurs ennemis qui étaient blottis contre les arbres énormes. Cependant les Chasseurs avaient réussi à détacher deux veaux de Bison. L'un d'eux âgé de 3 mois fut prit d'un coup ; l'autre de 15 mois, quoique saisi par 8 traqueurs, les renversa et s'enfuit. On mit la meute à ses trousses, et forcé dans un marais, le Bison fut lié et transporté dans le cour du forestier. Quatre veaux de Bisons, 1 mâle et 3 femelles, furent pris dans d'autres endroits de la forêt. Une de ces femelles âgée seulement de quelques jours, fut alaitée d'abord par une vache domestique de couleur fauve semblable à celle du bison, et, ce qui surprit tout le monde, la vache témoigna un tendre attachement à cet enfant adoptif, sauvage et barbu. Malheureusement, le jeune animal mourut 6 jours plus tard, suffoqué par une enflure à la gorge, qu'il avait déjà quand on l'eût pris, et qui allait toujours en grossissant. Les autres veaux ne prirent aucune nourriture le premier jour de leur captivité ; mais le lendemain celui qui était 3 mois, se mit à teter une vache et paraissait gai. Ses compagnons de captivité excepté celui qui avait 15 mois commencèrent d'abord à prendre le lait de la main de l'homme, puis ils se mirent à boire de seau avec beaucoup d'avidité, et une fois le seau vide, ils se léchaient mutuellement le museau. En peu de tems ils perdirent leur regard sauvage, et leur timidité se changea en une vivacité et une pétulance extrême. Quand on les faisait sortir de leur étable, dans la cour assez vaste de la métairie, la rapidité de leurs mouvemens, leur agilité et la légèreté de leurs sauts, semblables à ceux du chevreuil ou du cerf, étonnaient tout le monde. Ils jouaient volontiers avec les veaux des vaches domestiques, luttaient avec eux, et quoique plus forts, ils paraissaient leur céder par générosité. Le Bison mâle de 15 mois conserva long-tems son regard morne et sauvage ; il s'irritait à l'approche de l'homme, branlait la tête, brandissait la queue, et présentait les cornes. Après deux mois de captivité il finit par l'apprivoiser, et s'attachait au paysan qui le nourrissait ; et alors on lui donna plus de liberté. Les Bisons aiment en général à frapper de leurs pieds la terre, de la jeter en l'air, et puis de s'y vouter comme le font les chevaux. Ils témoignent beaucoup d'attachement à celui qui les soigne et les nourrit, viennent se frotter contre lui, léchant ses mains, et obéissans à sa voix, ils accourent en bondissant, quand il les appelle. Toutes les fois qu'on les fait faire sortir de l'étable, ils s'animaient, levaient la tête avec fierté, dilataient leurs narines, ébrouaient avec force, et s'abandonnaient à toute sorte de jeux ; mais bientôt apercevant qu'ils sont enfermés, ils tournaient leurs regards tantôt vers la forêt immense, tantôt vers le tapis de verdure qui se déployait devant eux dans le lointain, ils semblaient

se souvenir de leur liberté sauvage, et tête baissée et avec une inexplicable tristesse ils rentraient dans leur étable.

Six veaux de Bisons, pris l'année dernière pendant la chasse que je viens de décrire, furent élevés en deux endroits, assez distans l'un de l'autre. Les deux mâles attrapés pendant la première chasse ne souffraient aucunement de la nouvelle nourriture que l'on leur offrait ; les autres, qui buvaient le lait au lieu de le teter, eurent la diarrhée pendant une semaine. Mais il est probable que ce mal ne provenait de ce que le lait, dont ils se nourrissaient, était apporté d'assez loin et aigrissait pendant le transport ; car aussitôt que l'on eut fait l'acquisition de deux vaches pour chaque Bison, et qu'ils reçurent du lait tiède et fraîchement trait, la maladie cessa. Les deux premiers s'habituerent aussi à lécher le sel, tandis que les autres n'y touchaient jamais. Quant au jeune Bison, âgé de 15 mois, il ne voulut pas de lait et commença dès le premier jour à manger de l'avoine mêlé de paille hachée, du foin de la forêt et des prairies, de l'écorce et des feuilles du frêne, du poirier sauvage, du charme, du tremble, du tilleul et d'autres jeunes arbrisseaux. La même nourriture servit aux autres jeunes Bisons, quand on cessa de leur donner du lait. Ils s'abreuvent d'eau de puits et de rivière sans distinction, et boivent d'avantage et à plusieurs reprises par jour pendant l'été. Les jeunes veaux refusaient de prime abord se désaltérer avec de l'eau pure, et l'on fut obligé de blanchir l'eau avec un peu de lait. La faim et la soif leur font pousser une espèce de grognement semblable à celui du porc. Une nourriture abondante et diversifiée, une étable qui pendant l'hiver les garantit contre le froid et en été contre les insectes, exercèrent une influence remarquable sur la croissance du jeune Bison, à tel point, qu'une jeune femelle, saisie au mois de Janvier de cette année et destinée à remplacer une pièce, qui périt, fut trouvée de moitié plus petite que ses compagnons du même âge pris de l'année passée et soignés de la main de l'homme. Et comme l'histoire nous apprend, qu'il arrivait de tuer des Bisons d'une grandeur énorme, et que dans leur état sauvage ils sont de tailles différentes, il serait intéressant de connaître à quelles dimensions pourrait atteindre un Bison apprivoisé, nourri, et soigné par la main de l'homme ; surtout en Angleterre, où l'art d'élever les animaux domestiques est porté au plus haut degré de perfection. Une autre expérience plus importante encore, serait celle d'essayer d'accoupler un taureau Bison avec une vache domestique, et je suis porté à croire la chose possible après les vellétés d'accouplement manifestées par le jeune taureau Bison pris l'année passée et âgé maintenant de 2 ans et 3 mois, qui se rue volontiers sur le veau femelle avec l'intention d'accouplement. Peut-être parviendrait on ainsi à obtenir une nouvelle race bovine croisée, qui, joignant une force et une agilité extraordinaires à la docilité et l'attachement à l'homme, pourrait lui devenir d'une grande utilité. Enfin prenant en considération qu'une paire de jeunes Bisons apprivoisés est destinée pour Londres, la seconde pour St. Pétersbourg, et la troisième à rester ici, sur leur sol natal, il serait non moins intéressant de se communiquer réciproquement et en son tems les observations comparatives qui auront été

faites sur l'influence climatique exercée sur ces animaux dans les différentes régions, où ils se trouveront transplantés.

Les Bisons apprivoisés transportés de Bialowieza à Grodno, viennent de faire par terre un trajet de 140 verstes (20 lieux d'Allemagne). La paire destinée pour St. Pétersbourg a été enfermée dans une cage couverte paillassée et oblongue, partagée en deux compartiments de manière que les Bisons pouvaient se coucher, sans se détourner l'un de l'autre. Cette nouvelle prison et les cahots du char firent une impression pénible sur l'humeur des Bisons, et quoique tranquilles et résignés, ils ne prirent pas de nourriture, ni voulurent se coucher pendant les premières 24 heures; mais le second jour ils se calmèrent et revinrent à leurs anciennes habitudes. Le voyage dura 3 jours.

Le mâle et la femelle destinés pour Londres firent le trajet dans une cage beaucoup spacieuse et découverte. Le mâle fut fort inquiet pendant tout le voyage, se débattait sans cesse, poussait des rugissements semblables au beuglement du taureau, et se blessa à l'œil en essayant de sauter par-dessus la barrière de la cage, haute de deux toises. Agés maintenant de 15 mois le mâle a 4 pieds 1 pouce de hauteur et 5 pieds 6 pouces de longueur; la femelle 4 pieds de hauteur et 5 pieds 3 pouces de longueur.

A Grodno les Bisons sont placés dans une étable spacieuse, et chaque paire est séparée de l'autre. Au commencement, quand on essaya de les réunir, ils se livraient à des combats acharnés à tel point, qu'ils étaient parvenus à abattre la cloison solide qui les séparait; ils ont commencés par s'entr'attaquer, et puis, ce qui est un fait singulier, les trois Bisons mâles se sont jetés sur la seule femelle qui se trouvait à leur portée, et l'auraient tuée infailliblement, si les gardiens n'avaient pas pris sa défense. Plus tard ils s'habituerent l'un à l'autre, et les combats cessèrent.

Il faudrait selon mon avis tenir les Bisons dans un parc spacieux, où ils auraient la faculté de vivre à leur aise; et comme ils détestaient les couleurs tranchantes, et que surtout la couleur rouge les met en fureur, leurs gardiens devraient être tenus à porter des habits d'une couleur foncée. Je crois devoir encore mentionner que les Bisons n'aiment pas les chiens et s'acharnent à leur poursuite.

DIMITRI DE DOLMATOFF,

Maître des forêts du Gouvernement de Grodno.

Grodno,
le 24 Juillet 1847.
6 Août

2. ON A NEW SPECIES OF PARROT. BY G. R. GRAY, Esq., F.L.S.
ETC. ETC.

(Aves, pl. 3.)

I have compared the drawing of a Parrot now living in Lord Derby's collection at Knowsley with all the descriptions and figures of the different known species, but have not succeeded in meeting with one to which it can be referred. I am however somewhat doubtful whether the bird represented belongs to the genus *Platy-cercus*, or to *Coracopsis*; I have given the preference to the latter,



E. Waterhouse Hawkins lith.

Printed by Hallmandel & Walter

CORACOPSIS ♀ PERSONATA. G. R. Gray

N







Waterhouse Hawkins del.

GALIBICTIS VITTATA Gray.

Printed by Hullmandel & Co.

leaving it to those who may have a better opportunity of examining the specimen than I had, while it was in London in the summer of 1847, to decide this question; and I feel that it is even possible that it may prove to be the type of a new form altogether. I propose to characterize it provisionally as

CORACOPSIS? PERSONATA.

Sp. Ch.—*Smaragdina*; *fronte, periophthalmis mandibularumque basi atris*; *pectore abdomineque medio aurantiacis, hoc saturatiore*; *remigibus reetricibusque cyaneo-nigris.*

The habitat of this fine bird is supposed to be New Guinea. It appears to be about fifteen inches in length.

February 8, 1848.

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

Three communications were made to the Meeting:—

1. DESCRIPTION OF A NEW SPECIES OF GALIDICTIS FROM MADAGASCAR. BY JOHN EDWARD GRAY, ESQ., F.R.S. ETC. ETC.

(Mamm. pl. 1.)

Geoffroy St. Hilaire, in the manuscript catalogue of the Mammalia in the Paris collections, notices a specimen from Madagascar which had been collected by M. Sonnerat, which he described in the following manner, under the name of *Mustela striata*: “Supra saturatè fusca; striis quinque longitudinalibus angustis parallelis albis; gastræo pallidè canescente, caudâ basi fuscâ, reliquâ albâ; statura *Mustelæ vulgaris*.”—*Fischer, Syn.* 224.

M. Cuvier in the ‘Règne Animal’ (ed. 2^de. 144) described the same specimen under the name of “La Belette rayée de Madagascar, *Putorius striatus*, Cuvier, de la taille de la belette d’Europe, d’un brun roussâtre avec cinq lignes longitudinales blanchâtres; de dessous et presque toute la queue blanchâtre.”

M. Isidore Geoffroy St. Hilaire, in the notes to a paper on some Madagascar animals in M. Guerin’s *Magasin de Zoologie* for 1839, p. 32, informs us that the specimen above described then existed in the collection, and that he had convinced himself that it was a young specimen of an animal rather more than two feet long, which had been sent to the Museum in 1834 by M. Goudot, under the name of *Vonsire blanc*, and called *Vonsira foutche* by the Medecasses; and he gives a description and figures of the animal and its skull, t. 18, 19, forming for it a genus which he names *Galidictis*.

A few months ago the Museum purchased of Mr. Tucker of the Quadrant an animal from Madagascar, which is evidently nearly allied to the *Galidictis striata*, but differs from it in some particulars, which

induce me to regard it as a second species of that genus. I may remark that it agrees with all the characters assigned to that genus by M. Isidore Geoffroy, except that the soles of the hind-feet are more naked than he described those of his genus *Galidia* to be, though he observes that *Galidictis* has the feet "presque entièrement semblable" to that genus; for the naked part is nearly as broad as the foot, almost to the top of the heel. The chief difference between the Museum specimen and that described and figured by the two Geoffroys and Cuvier is in the colour of the tail, and I might think this depended on age, if the elder Geoffroy and Cuvier did not describe the young animal as being of the size of a weasel, and the younger Geoffroy the adult as having the same peculiarity, viz. a white tail; while our specimen has the tail the same colour as the back, and even more distinctly variegated with black and white. The stripes are narrower, rather differently placed, and more equal in width than in the description and figure above quoted, and they do not extend so far up the neck towards the head. I propose to designate the species

GALIDICTIS VITTATA.

Grey, black and white grizzled; back and sides eight nearly equal, parallel, narrow, black-brown streaks; chin and beneath pale brown; hind-feet and outer sides of fore-legs reddish brown. Tail subcylindrical, bushy, black and grey grizzled, white towards the ends; hairs elongate, brownish white, with two (rarely three) broad black rings.

Hab. Madagascar. British Museum.

Length of body and head (when stuffed) 14 inches; tail 12 inches.

The skull, which shows that the animal was not quite full-grown, agrees in all the particulars with that figured by M. I. Geoffroy, t. 19, but is about one-fourth smaller in all its parts, and it has one more very small roundish false grinder on each side in front of the other (between it and the canines) in the upper jaw, which is not noticed in M. Geoffroy's figure nor description, and which probably falls out when the animal arrives at adult age.

Dr. T. R. H. Thomson, Surgeon R.N., who had one of these animals for six months on board ship, says it was procured at Tulyah Bay, Madagascar. It was at first extremely timid, but soon became tame and acquainted with the different parts of the vessel, and very partial to those who bestowed any attentions on it. It was remarkably agile, keeping its long bushy tail somewhat erect in running about, and uttering a sort of chirp not unlike a rat. Its chief food was uncooked meat, but it preferred raw eggs above all other articles when they could be procured. Its method of breaking them was not a little amusing: on receiving one it would roll it towards a projecting timber or gun-slide; then, lying down on its side, the little creature would grasp the egg with all its feet and throw it by a sudden jerk, repeating the attempt until the contents were obtained. Turtles' eggs being so soft and rich were always eagerly sought by it. It was very irascible while feeding, and would attack those who interfered with it at such a time, although at others it delighted in being fondled, and would play like a kitten with those it knew. The





habits of this interesting animal were not nocturnal. It died from convulsions, under which it had suffered for five weeks.

Its mode of breaking the egg is somewhat different from that of *Herpestes fasciatus*, which Dr. Thomson had also under observation for some time. This latter, after getting the egg close to a projecting object, seizes it with the two anterior feet, and then jerks it through between the hinder legs, which are raised somewhat to let the egg pass.

2. DESCRIPTION OF A NEW GENUS OF INSECTIVOROUS MAMMALIA,
OR TALPIDÆ, FROM BORNEO: BY JOHN EDWARD GRAY, ESQ.,
F.R.S. ETC.

(Mamm. pl. 2.)

Mr. Low brought with him from Borneo some mammalia and reptiles in spirits; amongst them, he informed me, was "a rat-like animal with a pennated tail, which he caught in the Rajah's house at Sarawak." On examining the collection, I was much pleased at discovering in the animal so characteristically described, a new genus of Insectivora, nearly related to *Tupaia*, but differing from it both in the conformation of its tail and the form of the skull, and adding another genus to the subfamily of *Tupaina*, the geographic range of which appears to be confined to the Asiatic islands. Borneo may be regarded their more proper home, as possessing all the genera, viz. *Tupaia*, *Hylomys*, and the one under consideration, which, from the form of its tail, may be called *Ptilocercus*.

The true *Tupaia* have a broad hairy tail like the squirrels; the *Hylomys* have a very short, slender, cylindrical tail, covered with short close adpressed hair; and the *Ptilocercus*, on the other hand, have an elongated cylindrical tail, covered with rings of square broad scales like the long-tailed rats, but the end of the tail is furnished with a series of rigid hairs on each side, like the barb of an arrow. I may remark, that besides the genera here noticed, the Dutch naturalists have described an animal under the name of *Hylogale murina*, 'Verhand. Mamm.' t. 26, f. 3, t. 27, f. 17-18, also from Borneo, which differs from the *Tupaia* (or *Hylogale*) in having a cylindrical tail covered with short hair, but furnished with a pencil of longer hair of the tip, which I propose to separate from the other under the name of *Dendrogale*. Each of these genera have a peculiar livery: the *Tupaia* are grised yellow and brown, with a yellow streak across the shoulders; the *Hylomys* are uniform dark-coloured; the *Dendrogale* and *Ptilocercus* have no shoulder-streak, but a dark streak on the side of the face inclosing the eyes; the former having a white spot on the forehead not observable in the latter.

At first sight *Ptilocercus* has much the appearance of a marsupial animal allied to *Cuscus*, but this resemblance proves to be only in the mere external form, when the characters are examined, as for example, it wants the large great-toe of that group.

The skulls of *Tupaia* and *Ptilocercus* have a considerable resemblance to that of the *Lemuridæ*, and particularly in having the orbits entire. The *Tupaia* are peculiar in having a large elongated aperture

on the hinder part of the middle of the zygomatic arch, while the *Ptilocercus* has only a small round perforation in the front part of the middle of the same part, which is probably the analogue of the hole in the former genus.

PTILOCERCUS, n. g.

Head moderately tapering; whiskers elongated, rather rigid. Ears moderate, naked, exposed. Body slender, fur soft. Limbs moderately elongated, nearly equal. Toes 5.5, rather compressed, free. Thumb moderate, like the toes, but shorter. Claws short, compressed, triangular, acute. Tail elongate, cylindrical, hairy quite at the base, then naked, covered with rings of square, broad, adpressed scales and short scattered hairs, and the hinder third with a series of elongate hairs, forming a barb on each side. Skull conical; face rather short.

Cutting teeth $\frac{1.1.1.1}{3.3}$: upper elongate, far apart, rather curved; lower shelving, front pair conical, small, shorter than the middle pair, which are elongate, curved, acute; the hinder smallest and shortest.

Canines none. Grinders $\frac{7-7}{7.7}$, the front 3.3 in each jaw, small; the hinder 4.4 large, square, acutely tubercular.

The skull is shorter, broader, and the face less elongated than that of the different species of *Tupaia*, and it differs from them in the two front teeth of the lower jaw being smaller and shorter than the succeeding one, while in all the species of *Tupaia* (including the genus *Dendrogale*) figured by Temminck, the four front teeth of the lower jaw are equally elongated.

The hinder cutting tooth in the upper jaw is placed on the suture of the intermaxillary (and hence may be a true canine) and not in front of the suture of the intermaxillary, as is the case with the skull of *Tupaia tana* and *T. ferruginea* in the British Museum collection.

PTILOCERCUS LOWII.

Blackish-brown, very minutely grizzled with the yellowish tips of the hairs; lips, lower part of cheeks, chin, and beneath yellowish: sides of the face inclosing the eyes black. Tail black; barbs white, except a few hairs near the scaly part, which are black.

Length, $5\frac{1}{2}$ inches; tail, $6\frac{1}{2}$; hind-foot, 1. Skull: length, $1'' 4'''$; tooth line, $7\frac{1}{2}'''$; of face, $5'''$; of zygomatic arch, $7\frac{3}{4}'''$; width at zygomatic arch, $9\frac{1}{2}'''$; at temples, $6\frac{1}{2}'''$; between orbits, $3\frac{3}{4}'''$.

Inhab. Borneo, Sarawak.

I have named this species after my friend Mr. Hugh Low, who has much enriched our knowledge of the natural productions of Borneo.

3. ON THE HABITS OF *AMEIVA DORSALIS*. BY P. H. GOSSE.

This species is one of the most common of the reptiles of Jamaica, and is as beautiful as abundant. Its colours are striking, but not showy; its countenance has a very meek expression, not altogether unlike that of a deer or antelope. All its motions are elegant and sprightly; when it is proceeding deliberately, its body is thrown into

lateral curves the most graceful imaginable; but when alarmed, its swiftness is so excessive that it appears as if it literally *flew* over the ground, and the observer can scarcely persuade himself that it is not a bird.

The Ground Lizard (as it is provincially termed) is generally diffused, as far as my knowledge of the island extends, but chiefly affects sandy places. Near the sea-side it is particularly abundant, beneath the shore-grasses, nickers, and black-withes that form an almost impenetrable belt of thicket a few yards above high-water mark. Here the dry leaves and twigs are rustled all day long by the fleet-footed Ameiva, as it shoots hither and thither among them, or walks at leisure, picking up little atoms of food. Though excessively timid, so that it is almost impossible to approach them, I have found that by sitting down in their haunts, and remaining for some time perfectly still, one and another will come forth from their coverts and pursue their avocations without fear. They pick among the sand exactly in the manner of a bird, and scratch it away with the long and flexible fore-feet, using them alternately as the common fowl does, now and then stopping and raising the hind-foot to scratch the head.

I am told (and have no doubt of the fact) that it digs for itself the burrow in which it resides. It is accused too of digging still deeper, to get at the seed-corn when just sprouting, and of eating the germinating grain to such an extent as to be mischievous. Of such as I dissected, however, I found the food to consist principally of insects. Thus on one occasion the stomach was occupied with a whole cockroach, and the intestines were filled with fragments of another. In the stomach of one shot in November I found many dipterous maggots, fragments of beetles, and one or two seeds of berries. A third contained cockroaches, a caterpillar, some maggots and small beetles.

On one or two occasions, as when one has been suddenly alarmed, I have noticed a singular action in this animal, which then carries its body the whole height of the legs above the ground, and runs as it were on tiptoe in a very ludicrous manner.

While speaking of its progression, I may observe, that though the toes are not formed like those of the Geckos and Anoles, for holding on against gravity, I have seen a large Ameiva run with facility on the side of a dry wall, along the perpendicular surfaces of the large stones.

A gravid female was brought me early in May, in whose dilated abdomen I found four eggs, two on each side, disposed longitudinally, each lateral pair connected by membrane, or rather by the oviduct. They were in form long-oval, $\frac{7}{10}$ inch long by $\frac{4}{10}$ wide, of a dull white, but covered with a fine membrane, over which spread a few blood-vessels. On making an incision into one I found no glaire, but the whole interior filled with a yellow yolk, exactly resembling in colour and consistence that of a pale hen's egg.

Two eggs were brought me about the middle of the same month, taken from a Ground Lizard's burrow; their form was a perfect oval, measuring $\frac{9}{10}$ inch by $\frac{7}{10}$; their colour white, except that the surface

was a little stained by contact with the moist earth; they were covered with a calcareous shell, which however appeared very thin, and even flexible.

The Ground Lizard is exclusively terrestrial; it never climbs trees, nor does it voluntarily take to the water. A large male which was brought me one day was said indeed to have been taken in the river, but upon inquiry I found that the little lad who obtained it had discovered it by suddenly lifting a large stone at the very margin of the water, and that the lizard in its alarm had leaped into the stream. In order to ascertain its powers, I carried it to a deep pool of the river and put it in: it instantly began to swim with much rapidity, and in a peculiarly elegant manner, throwing the body into horizontal serpentine curves, while both the fore- and hind-feet were stretched out behind, and remained quite motionless. It was thus able to cross a small stream with ease, but if prevented from landing it soon became weary, and abandoned all effort, resigning itself to the current, and became in a short time much exhausted.

On the inner surface of the thigh there is in this genus (as in many other of the Lizards) a series of scales, each of which is perforated with a conspicuous pore. From these pores exude during life minute cylindrical bodies like amber or hard yellow gum. On removing the integuments we find lying immediately beneath this range of pores, adhering to the skin but not to the muscle, a compound body, apparently glandular, composed of yellow threads, lying parallel to each other, but twisted exactly like the strands of a rope, in a regular spiral. Undoubtedly this gland secretes the yellow gummy matter that exudes, but of what use this is I do not know; perhaps it is a sexual attraction.

The variations of surface, which take the form of broad plates on the head, throat, breast, legs and vent; of minute tubercles on the body generally, and of transverse rows of square plates on the belly and tail, are not really plates or scales, but are produced merely by *lineal depressions* of various forms in one continuous surface; as is distinctly seen when the integument is sloughed off in large irregular pieces, bearing all these characters.

The tongue is protrusible to the length of nearly an inch and a half from the muzzle; it is slender, flat, fleshy, and covered with shining papillæ. The extremity is cleft to the extent of half an inch, and the two tips run out to attenuated round points, which are horny, but very flexible.

As the colours of reptiles in spirits are fleeting, and as published descriptions of this species convey little notion of its beauty, I sub-join the following notes made from living specimens.

Adult male.—Length $17\frac{1}{2}$ inches, of which the tail was 12. Head and sides of neck pale reddish brown; outer surface of fore-legs and sides a deeper tint of the same hue; medial portion of back light green, brightest in front, where it runs up to a point; posteriorly it merges into a dusky hue. Upper part of tail and outer surface of hind-legs dark brown. Throat, breast and under part of fore-legs white; belly and under surface of hind-legs pale blue; under surface

of tail pale blue, medially white. On each shoulder two black spots. The sides of the body and tail, and the front of the hind-legs and feet, are studded with round spots of brilliant azure-blue.

The female differs from the male only in inferior size. The young has no green point on the back, but two rows of bright dots on each side: the tail brilliant azure, metallic-green at the base.

February 22, 1848.

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

The following papers were read:—

1. ON A NEW SPECIES OF CHIMPANZEE. BY PROFESSOR OWEN, F.R.S. ETC. ETC.

This communication contained a description of the skulls of adult and aged male and female Chimpanzees from the Gaboon river, west coast of Africa, much exceeding in size and specifically distinct from the previously known *Troglodytes niger*. The author proposed to call the new species *Troglodytes Savagei*, after Dr. Thos. S. Savage, by whom it had been discovered and its existence made known to Professor Owen, in a letter dated April 24th, 1847, and of which the following extract was read:—

“Protestant Mission-House,
Gaboon River, West Africa,
April 24, 1847.

“My dear Sir,

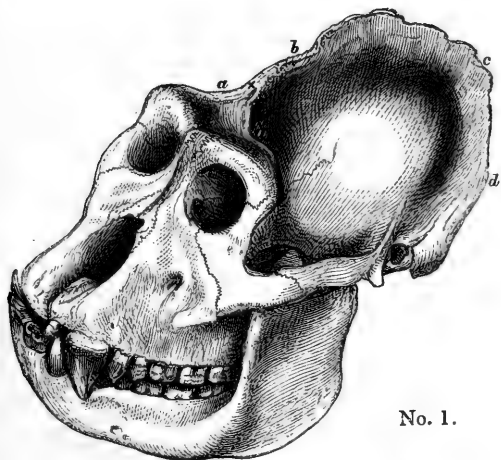
“Your known interest in the Zoology of Africa will find a ready excuse I trust for the following communication, and lead you, in the midst of various engagements, to give me a few moments in reply. I am on my way to the United States in a vessel which, to complete its voyage, had to touch at this point. I find it a region rich and untried in all the departments of Natural History, besides being full of interest in a far more important point of view, that of a missionary field. I have found the existence of an animal of an extraordinary character in this locality, and which I have reason to believe is unknown to the naturalist. As yet I have been unable to obtain more than a part of a skeleton. It belongs to the *Simiadae*, and is closely allied to the Orangs proper. It reaches nearly if not quite the height of five feet in the adult state and is of a large size. I am considerably in doubt in regard to its identity with an animal said to have been known to Buffon as a large species of orang-outan, under the name of Pongo. It is referred to in a note on the 58th page of the first volume of the American edition of Cuvier's ‘Règne Animal,’ where he asserts that Pongo is a corruption of Boggo, which is given in Africa to the chimpanzee or to the mandrill, and

was applied by Buffon to a pretended large species of orang-outan, the mere imaginary product of his combinations. Then he says that Wurmb, a naturalist of Batavia, transferred the name (Pongo) to a monkey in Borneo, which he thinks identical with *Pithecus Satyrus* (the real orang-outan, a red orang of Asia).

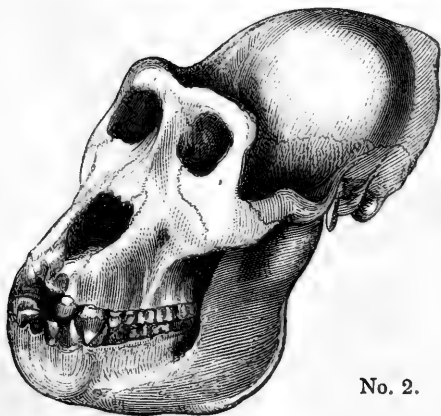
“My excellent friend, the Rev. J. L. Wilson, missionary of the Am. Bd. of Comm. For. Missions to this part of Africa, thinks that Pongo comes from ‘Mpongive,’ the name of the tribe, and consequently the region, on the banks of the Gaboon river near its mouth, among which tribe he has resided for about five years. The tribe once extended a great distance on the coast above and below the river Gaboon, and the languages spoken for a great distance both above and below are evidently but dialects, with the Mpongive, of one language. Whence Buffon professed to receive his specimen of ‘large species of orang-outan’ I know not; but this region and its vicinity indefinitely are the only points at which, so far as I can ascertain, ‘a large species of orang-outan’ has been heard of except the chimpanzee, which is now well-known. I have seen it mentioned that the skeleton of the Pongo of Borneo is in the Royal College of Surgeons, of which Institution you are a Professor. Now may I solicit your aid in this matter? I will send you outlines of the skull of the male and female (adults), and ask the favour of a reply to my letter, stating whether you can identify them with that of any animal you know of under the name of Pongo, or any other cognomen. I have no correspondent in Paris; if you feel sufficient interest in the subject, will you do me the favour to ascertain from that city the fact whether such skulls exist in any cabinet there? The natives state that a young one was caught many years ago and sold to a French captain who never returned, and that it was the only individual taken out of the river. From what I know, the young skull would very much resemble that of the chimpanzee. I have four crania (two male and two female), with many bones, though not a perfect skeleton; but I hope to complete one before I leave the river, and to procure a dead subject, which I shall preserve in spirits. Great uncertainty however attends my success, as they are indescribably fierce and dangerous, and are found only far in the interior; they are killed by elephant-hunters only in self-defence.

“Below you have a sketch of the cranium of the male (No. 1) and female (No. 2), executed for me by Mrs. Prince, the wife of Dr. Prince, the English Baptist Missionary at Fernando Po, who is here for a short time in search of health. *a, a* are two low ridges converging as seen in the sketch, and uniting at *x*, and forming a strong prominent ridge in the course of the sagittal suture, which comes into a junction with a lateral ridge, *d*, sent back from the petrous portion of such temporal bone; *e* is a strong fossa of triangular shape between the ridges *a, a*. The space between the zygoma and temporal bone in a transverse direction is $1\frac{3}{4}$ inch deep; the diameter from before backwards 3 inches; at *b* is a sinus about half an inch in depth and an inch in length, with foramina

for the passage of blood-vessels and nerves. The two upper middle incisor teeth are absent, but their sockets show their size to have been nearly if not quite double the two outer ones. The two lower middle incisor teeth are narrower than the two outer.



No. 1.



No. 2.

The female cranium is a full-grown one, but differing from the male in the prominence of the ridges, the two anterior corresponding to *a*, *a* in the male, and the central are rudimental only, except at the ex-

tremes of the latter where it joins the posterior transverse ridge, lettered *d* in the male. It has lost the two middle upper incisors, which bear the same relation in respect to size to the two outer that those of the male do. All the incisors both in the upper and lower jaw are larger than they are in the male. The canines in the female are shorter than in the male. These points are all that I need specify to enable you to identify the crania with any in your possession. You will greatly oblige me by a comparison, and communicating the result at your earliest convenience."

Professor Owen having, at the time when he received this information, observed in the cranium of a young but nearly adult *Troglodytes niger* that the canine teeth presented the same sexual superiority of development* as in the orang's (*Pithecus*), believed it possible that the marks of distinction mentioned by Dr. Savage might prove to be the fully developed characteristics of old and powerful males of the *Troglodytes niger*; and in the absence of means of making comparisons of other characters, besides superior size, longer and larger canine teeth, and concomitant strong sagittal and lambdoidal cristæ, he had deemed it better to communicate these doubts to Dr. Savage, than to hazard a premature indication of a species, which might prove a sexual, or a local and stronger, variety of chimpanzee.

Mr. Samuel Stutchbury of Bristol, who had likewise received from Dr. Savage a similar announcement of the existence of a large and formidable species of chimpanzee in the Gaboon district, had requested some of the captains of vessels trading from Bristol to the Gaboon river to make inquiries respecting the species and endeavour to obtain specimens of it; and the result was that Captain George Wagstaff had succeeded in procuring at the Gaboon river, and had presented to Mr. Stutchbury, three skulls of the large species and one of the smaller species of chimpanzee, all adult: and these skulls Mr. Stutchbury had transmitted for description and exhibition at the Zoological Society.

One of the skulls of the large species (*Troglodytes Savagei*) was of a very old male: the length of the skull was $11\frac{1}{2}$ inches (0.29), with the molars worn nearly to the stumps, and the crown of the canine reduced, partly by fracture, partly by attrition, to its basal portion: its pulp had been inflamed and had produced ulceration of the alveolus.

A second skull was also of a male, of equal size, with the full dentition of maturity, but with merely the summits of the cusps of the molars and the margins of the incisors slightly worn. The third skull of the *Troglodytes Savagei* was of a female, 9 inches (0.23) long, with the mature dentition, and with the molars not more worn than in the younger male. The fourth skull was of a female adult chimpanzee, $7\frac{1}{4}$ inches (0.185) in length, of the known species (*Troglodytes niger*), with the complete permanent dentition, and the teeth more abraded than in the two preceding skulls.

* Odontography, pl. 118, 119, fig. 1.

The lower jaw was wanting in each of the foregoing specimens, and the occipital or basal part of the skull had been more or less fractured in each; the skull of the young but full-grown male of the *Troglodytes Savagei* being the most perfect.

Captain Wagstaff reached Bristol in a broken state of health, and died soon after his arrival. The only information which Mr. Stutchbury was able to obtain from him was, that the natives, when they succeed in killing one of these chimpanzees, make a 'fetish' of the cranium. The specimens bore indications of the sacred marks in broad red stripes crossed by a white stripe, of some pigment which could be washed off. Their superstitious reverence of these hideous remains of their formidable and dreaded enemy adds to the difficulty of obtaining specimens.

Besides the young but mature skull of the male *Troglodytes niger*, of which the permanent dentition was figured in the author's 'Odontography,' he had compared with Mr. Stutchbury's specimens of *Troglodytes Savagei*, a skull of a more aged male *Troglodytes niger* with the permanent dentition more worn than in the younger adult male of the *Troglodytes Savagei*. The results of a detailed comparison between the skulls of the adult males of the two species were then given. Besides the differences of size, as indicated in the subjoined 'Table of Dimensions,' the following were among the characters establishing the specific distinction of the two chimpanzees. With regard to the dentition, the author observed that, as in the smaller species of the Orangs of Borneo (*Pithecus Morio*), the incisive teeth of the smaller species of chimpanzee (*Troglodytes niger*) equalled in size those of the larger species (*Troglodytes Savagei*); but that the canines and the molars were considerably larger in the *Troglodytes Savagei*: the series of the five molar teeth in this species occupy an extent of 2 inches $7\frac{1}{2}$ lines (0·068), whilst in *Troglodytes niger* their extent is only 1 inch $10\frac{1}{2}$ lines (0·048). The crown of the canine inclines more outwards in *Troglodytes Savagei*; the longitudinal convex ridge on its inner surface is more prominent, the anterior groove bounding that ridge being deeper in *Troglodytes Savagei* than in *Troglodytes niger*: the posterior inner groove is continued upon the root of the tooth in *Troglodytes Savagei*. The last molar is more nearly equal in size to the penultimate one, and is more complex in structure, than in *Troglodytes niger*; it has the posterior outer cusp and particularly the posterior inner cusp more developed, and it has distinctly the connecting cross ridge between the posterior outer and the anterior inner cusp, which ridge is not developed in the last molar of *Troglodytes niger*. The bony palate is longer in proportion to its breadth than in *Troglodytes niger*, in which the breadth of the palate between the canines is absolutely greater than in *Troglodytes Savagei*.

The external sutures between the premaxillary and maxillary bones, which disappear so early in the *Troglodytes niger*, are more or less persistent and traceable in all but the oldest male skull of the *Troglodytes Savagei*; these sutures show that after the premaxillary bone has entered the nose, of which it forms the lateral

boundary of the external opening, it again appears upon the exterior surface of the face above the nostril, where its upper extremity forms a triangular or wedge-shaped flattened piece, interposed between the lower half of the *os nasi* and the *os maxillare superius*, thus excluding the latter bone from the boundary of the external nostril. One skull of a young *Troglodytes niger* with deciduous teeth in place, shows by the still persistent upper half of its facial suture, that it terminates in a point a little above the middle of the border of the external nostril, and that a portion of the superior maxillary is interposed between it and the nasal: in two other skulls of young *Troglodytes niger*, the slender pointed summits of the premaxillaries reach the nasals and exclude the maxillaries from the boundary of the nostril, but do not expand into triangular plates as in *Troglodytes Savagei*: in not any of the skulls of *Troglodytes niger* with the permanent dentition does any trace of the suture between the premaxillaries and maxillaries remain*.

The nasal bones of the *Troglodytes Savagei* also afforded a remarkable specific character: although the traces of their primary median division were obvious at their lower part, they had coalesced with each other as in the smaller species; but instead of being flat, or slightly and equably convex on the anterior surface, as in *Troglodytes niger*, they are produced forwards as they incline towards each other, along their upper half, and project there in the form of a slight bony longitudinal ridge, equally dividing the lower half of the interorbital space. This character—the nearest approach to the prominent nasal bones of Man made by any known species of ape—is as well-marked in the female *Troglodytes Savagei* as in the male. The lower half of the coalesced nasals in *Troglodytes Savagei* is expanded and nearly flat, of an oval form, with the border forming the upper part of the nostril emarginate on each side of a median, sometimes bifid, point. Thus the lateral border of the nasal bone describes a strong sigmoid curve, convex outwards in its lower two-thirds, in *Troglodytes Savagei*; in the less expanded nasal bone of *Troglodytes niger* the same border is usually concave outwards, or very slightly convex outwards at the lower third; and the outer surface of the bone is flat or equably and very slightly convex. The greater breadth of the lower end of the nasal with the expansion of the upper ends of the premaxillaries, gives a different form to the external nostril in the *Troglodytes Savagei* to that which it presents in *Troglodytes niger*: in this it is ovate or cordate with the narrow end upwards; in the larger species it is a wide ellipsoid, almost as broad above as below.

The alveolar portion of the premaxillaries in *Troglodytes Savagei* was absolutely shorter than in *Troglodytes niger*, and therefore much shorter relatively, and to that extent the skull of the larger species is less 'prognathic.' The zygomatic processes were not

* M. de Blainville, describing the osteology of the chimpanzee from a young specimen of the *Troglodytes niger*, says, "Mais les prémaxillaires, qui offrent la particularité de toucher à peine les os du nez et de souder de fort bon heure avec les maxillaires," &c. *Ostéographie*, fasc. i. p. 33.

only absolutely as well as relatively stronger and deeper than in *Troglodytes niger*, but differently shaped; the squamosal portion rising in an angular form in *Troglodytes Savagei*, and being as deep as the malar portion. The temporal fossæ are relatively as well as absolutely wider; for whilst the zygomatic arches are more expanded, the diameter of the intervening postorbital part of the cranium is the same in the male *Trogl. Savagei* as in the *Trogl. niger*. There is a distinct hemispheric mastoid process in the male *Troglodytes Savagei*. The sphenomaxillary fissure is narrower and less bent in *Troglodytes Savagei* than in *Troglodytes niger*, in which it more nearly resembles that of Man. The supraorbital ridges were even proportionally more developed in the larger than in the smaller species of chimpanzee, and send down a vertical prominence to the root of the nasal bones. The outer and lower borders of the orbits, and the whole malar bones are more prominent and tumid, and, with the enormous sagittal and lambdoidal crests and zygomatic arches, give a scowling and diabolical physiognomy even to dry bones of the head of this most formidable of the great Anthropoid apes.

In the skull of the female of the *Troglodytes Savagei* in which the canine teeth show the same sexual inferiority of size as in the female *Troglodytes niger*, the molar teeth present the same superior degree of development and complexity, especially the last molar, as in the male of the larger species, and have demanded a concomitant increase of bulk of the temporal muscles; and consequently not only are the zygomatic arches relatively stronger, but the temporal ridges, instead of being separated as shown in an aged skull of the female *Troglodytes niger* in the museum of the College of Surgeons, by a smooth tract of more than an inch in breadth, come into contact at the beginning of the sagittal suture, and are so continued backwards with a narrow groove between them, to the lambdoidal crest. The development of this crest also renders the supraoccipital surface almost flat in the female *Troglodytes Savagei*, and it is even concave in the great males; whilst in both adult males and females of the *Troglodytes niger* it is convex.

There are specific distinctions in the interior of the cranium of the two species: the olfactory (rhinencephalic) fossa closed by the cribriform plate, though very little wider, is considerably deeper in *Troglodytes Savagei* than in *Troglodytes niger*; and the 'crista galli,' which is small in *Troglodytes niger*, is absent in *Troglodytes Savagei*, nor is there any ridge continued from the fossa upon the inner surface of the frontal in the line of the frontal suture.

In *Troglodytes niger* there is a short *ala minor sphenoidi* continued outwards from the anterior clinoid process, and the upper and outer angle of the foramen lacerum anterius is produced into a short cleft: in *Troglodytes Savagei* the rudiment of the *ala minor* terminates at the upper border of the foramen lacerum anterius, which has a subquadrate form, and is not extended outwards into an angular fissure. The *sella turcica* is relatively shallower in *Troglodytes Savagei* than in *Troglodytes niger*, in which it is shallower than in Man.

Many other minor differences were noted, but these would be No. CLXXXII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

better understood by the aid of the figures in the memoir. Some scepticism, the author observed, might be expected as to the alleged specific distinction of the large and small chimpanzees by naturalists who had not been able to realise the differences by actual comparison of the specimens; but Professor Owen felt no doubt that, as in the case of the *Pithecus Morio*, more extended knowledge of the new species would confirm the validity of its distinction from the *Troglodytes niger*.

The stronger zygomatic arches and the more developed sagittal and lambdoidal crests might be viewed as adaptive developments concomitant on the larger canines, and indicative of a larger and more powerful variety of chimpanzee; but the larger proportional molars and the smaller proportional incisors, the more equal and complex last molar tooth, together with the prominence—slight as it is—of the nasal bones at their median coalescence, their inferior expansion, and, above all, the reappearance of the premaxillaries by their expanded superior extremities upon the face above the nostril, are more than mere differences of size and proportion, and being repeated in both male and female adults of the great chimpanzee of Gaboon, leave no alternative, according to the value assigned to such characters in other Quadrumanous genera, than to pronounce the *Troglodytes Savagei* to be specifically distinct from the *Troglodytes niger*, and this to be, as the *Pithecus Morio* is to the *Pithecus Wurmbii* in Borneo, a smaller, feebler and more anthropoid species of the genus *Troglodytes* in Africa.

In conclusion, Prof. Owen remarked that he had proposed the name of the new species of Chimpanzee provisionally, for the convenience of its description and comparison; and that, should he be able to learn that its discoverer had given a name to it, he should adopt that name, of which *Troglodytes Savagei* would then be a synonym.

	<i>Troglodytes Savagei.</i>		<i>Troglodytes niger.</i>		<i>Simia Wurmbii.</i>	
	Adult Male.	Adult Female.	Adult Female.	Adult Male.	Adult Orang. Female.	Male.
	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.
Length of the head from the <i>inion</i> , or posterior plane of the occiput, to the margin of the incisors	11 4	9 0*	7 6	8 0	8 6	10 6
Length of the head from the <i>inion</i> to the fronto-nasal suture	7 5	6 3	5 2	5 4	5 7	6 3
Length of the head from the fronto-nasal suture to the margin of the incisors ...	5 3	4 4	3 8	3 10	4 4	5 3
Transverse diameter of the <i>cranium</i> at the post-auditory ridges	6 10	5 6	4 9	5 1	4 8	5 8
Length of the smallest lateral diameter of the <i>cranium</i> behind the orbits	2 9	2 5	2 8	2 9	2 6	2 9
Length of the <i>os frontis</i>	4 3	3 7	2 9	2 10	3 0	3 6
Length of the sagittal suture	3 9	3 0	2 6	2 8	2 7	3 6
Distance between the temporal ridges.....	nil	nil	1 0	nil	0 6	nil
Diameter of the face at the zygomata	6 9	5 3	4 8	5 0	5 0	6 9
Length of the zygomatic <i>fossa</i>	2 10	2 0	1 9	1 11	2 0	2 6
Breadth of the zygomatic <i>fossa</i>	1 11	1 5	1 1 $\frac{1}{2}$	1 4	1 5	1 10
Diameter of the face taken from the outside of the middle of the orbits	5 6	4 8	4 3	4 4	3 9	4 8
Interorbital space	1 3	1 1	0 7 $\frac{1}{2}$	0 10	0 5	0 7
Lateral diameter of the orbit	1 9	1 6	1 4	1 5	1 4	1 6
Perpendicular diameter of the orbit.....	1 7	1 7	1 3	1 3	1 6 $\frac{1}{2}$	1 7
Transverse diameter of the nasal aperture	1 2	1 2	1 0	1 0	1 1	1 0
Perpendicular diameter of the nasal aperture	1 5	1 3	1 1 $\frac{1}{2}$	1 2	1 6	1 6
Distance between the infraorbital <i>foramina</i>	2 7	2 5	2 1	2 2	1 8	2 0
Breadth of the alveolar portion of the <i>maxilla superior</i>	3 1	2 7	2 4	2 6	2 8	3 2
Distance from the inferior margin of the nasal bone to the inferior margin of the intermaxillary bones.....	2 6	2 3	2 3	2 7	2 7	3 3
Length of the bony palate	4 1	3 4	2 10	3 1	3 3	4 0
Distance from the anterior margin of the intermaxillary bones to the anterior palatal foramen	1 1	0 10	0 10	1 0	1 3	1 3
Antero-posterior extent of the palatal process of the palate bone	1 1	0 7	0 6	0 7	0 8	||
Breadth of the crown of the first incisor...	0 6	0 5 $\frac{1}{2}$	0 5	0 6	0 5	0 7
Breadth of the crown of the second incisor...	0 4 $\frac{1}{2}$	0 4 $\frac{1}{2}$	0 4	0 5	0 3 $\frac{1}{2}$	0 4
Breadth of the four incisors (upper jaw) ...	1 7	1 6 $\frac{1}{2}$	1 6	1 6 $\frac{1}{2}$	1 6	1 9
Length of the grinding surface of all the <i>molars</i> , the <i>bicuspides</i> included	2 8	2 7	1 9	1 9 $\frac{1}{2}$	2 1	2 2
Length of the crown of the canine tooth...	1 4	‡	0 6	0 10	1 2	1 0
Breadth of the enameled crown of the canine tooth	0 10	‡	0 5 $\frac{2}{3}$	0 7	0 6	0 9
Interspace between the canine and incisor teeth, upper jaw.....	0 2	0 1 $\frac{1}{2}$	0 3	0 4	0 3 $\frac{1}{2}$	0 3
Distance from the anterior margin of the occipital <i>foramen</i> to the posterior margin of the bony palate	3 0	§	2 4 $\frac{1}{2}$	2 5	2 9	2 10

* To front border of premaxillaries.

† This varies according to the outswelling of the æthmoidal cells: in one female skull of *Trogl. niger* the interorbital space was an inch across.

‡ Of the alveolus.

§ Base mutilated.

|| Suture obliterated.

2. ADDITIONAL MEASUREMENTS OF THE RED CORPUSCLES OF THE BLOOD OF VERTEBRATA. No. 4. BY GEORGE GULLIVER, F.R.S.

A reference to the preceding numbers of these papers will be found in the Proceedings of the Zoological Society, October 14, 1845, p. 93, where are also tables of my measurements of the blood-corpuscles up to that date, with summary notices of the most remarkable results as to the size of those corpuscles in vertebrate animals. A note concerning the size of the blood-corpuscles of Birds is given in the same Proceedings for March 24, 1846: and numerous observations on the size, shape, and structure of the blood-corpuscles of Vertebrata are contained in my Notes to the edition of Hewson's Works, lately printed for the Sydenham Society.

The following measurements, like all my former ones, are expressed in vulgar fractions of an English inch, and for the sake of brevity, on this occasion the average sizes only are given: L.D. denotes the long diameter and S.D. the short diameter of the corpuscles. A few remarks may be now added to illustrate the bare figures.

After my observation (see Dublin Medical Press for November 1839, and Proceedings of the Zoological Society, No. CXV. p. 107) of the remarkable minuteness of the red corpuscles of the blood of the Napu Musk Deer, it was to be expected that the corresponding corpuscles in the other species of *Moschus* would have a similar character. Accordingly, in Stanley's Musk Deer I found those corpuscles almost as small; and in my late measurements, the average of which is now given, of the blood-corpuscles of the Meminna Deer, I could perceive no difference between them and those of the Napu Musk Deer.

In the books of physiology, before the observations just mentioned, the blood-corpuscles of the Goat used to be described as the smallest in the Mammalia (see Prevost and Dumas; and Müller, Physiology, tr. by Dr. Baly, 1838, vol. i. p. 101; Mandl, Anatomie Générale, 1843, p. 248); but to the list of animals in which I have already found those corpuscles still smaller, are now to be added the Meminna and two species of Brocket Deer.

In the Red Brocket Deer (a female) the majority of the blood-corpuscles were of the spear-shaped, lunated, and sigmoidal forms, described and figured from the blood of some other *Cervidæ* in the Lond. and Edin. Philosophical Magazine, November 1840, p. 329, and noticed in my Appendix to Gerber's Anatomy, p. 11 to 12: there were also many of the common circular corpuscles. The blood-corpuscles of a new species of Brocket Deer (a male, from Brazil) were of the usual circular shape. In the magazine above-cited it is suggested that those irregular forms may result from changes in the common circular discs; and this now appears more probable from the facts just mentioned. The cause of these curious changes in the shape of the blood-discs is well-deserving of further inquiry.

The blood-corpuscles of the Aurochs are scarcely distinguishable in any respect from those of its congener the Bison and of some other large ruminants.

Of the *Edentata*, as far as can be inferred from the few yet examined, the mean size of the blood-corpuscles is larger than in mammals generally. And in the genus *Bradypus*, as fully explained in the Proceedings of the Zoological Society, June 11, 1844, I found those corpuscles larger than any yet observed in Mammalia, with the single exception of those of the Elephant. This large size of the blood-corpuscles of the Sloth is confirmed by the measurement now given of them, from a younger animal than that which afforded me the blood for the former observations.

Judging from the facts at present ascertained, the marsupial animals appear to agree in the size and form of the blood-corpuscles with the corresponding placental Mammalia, as mentioned in my notice in the Dublin Medical Press, November 1839, and in the Proceedings of the Zoological Society, June 8, 1841. But in the Marsupials further observations are required. The measurement now given of the blood-corpuscles of the Crab-eating Opossum accords with the view just stated.

The following measurements of the blood-corpuscles of Birds tend to confirm the result which I have before published, that in this entire class the law for the size of the corpuscles is the same as in a single family of Mammalia; and that the short diameter of the oval blood-corpuscles of Birds has a general correspondence with the diameter of the circular blood-corpuscles of mammals.

Through the kindness of Dr. Andrew Smith, I am enabled to add measurements of the blood-corpuscles of such reptiles as were alive some time since in his very interesting and valuable collection.

Laland's Megalotis (<i>Otocyon Lalandii</i> , [Desm.])	1-3600
Meminna Deer (<i>Moschus Meminna</i> , Erxl.)	1-12325
Red Brocket Deer (<i>Cervus nemorivagus</i> , Cuv.)	1-7060
A Brocket Deer (<i>Cervus</i> —a new species)	1-7125
Aurochs (<i>Bos Urus</i> , Bodd.)	1-4074
A young Sloth (<i>Bradypus didactylus</i> , Linn.)	1-2778
Anteater (<i>Echidna hystrix</i> , Cuv.)	1-3300
Crab-eating Opossum (<i>Didelphis cancrivora</i> , Temm.) . .	1-3436
Red-legged Falcon (<i>Falco rufipes</i> , Bechst.)	{ L.D. 1-2000 S.D. 1-3790
Long-eared Owl (<i>Otus vulgaris</i> , Flem.)	{ L.D. 1-1830 S.D. 1-3400
Little Owl (<i>Strix passerina</i> , Temm.)	{ L.D. 1-1885 S.D. 1-3555
Red-backed Shrike (<i>Lanius collurio</i> , Linn.) . .	{ L.D. 1-2230 S.D. 1-3878
Cassowary (<i>Casuarus emu</i> , Lath.)	{ L.D. 1-1455 S.D. 1-2800
Great Bustard (<i>Otis tarda</i> , Linn.)	{ L.D. 1-1811 S.D. 1-3200
Houbara Bustard (<i>Otis houbara</i> , Gmel.)	{ L.D. 1-1814 S.D. 1-3200
Three-keeled Emys (<i>Emys trijuga</i> , Schw.) . .	{ L.D. 1-1333 S.D. 1-1909

Caspian Emys (<i>Emys Caspica</i> , Schweig.)	}	L.D. 1-1103
		S.D. 1-2000
<i>Testudo mauritanica</i> , Dum. & Bib.	}	L.D. 1-1280
		S.D. 1-2000
<i>Testudo tabulata</i> , Walbaum	}	L.D. 1-1143
		S.D. 1-2000
<i>Gymnopus Ægyptiacus</i> , Geoff.; <i>labiatus</i> , Bell	}	L.D. 1-1143
		S.D. 1-2000
<i>Morelia Argus</i> , Dum. & Bib.	}	L.D. 1-1371
		S.D. 1-1685
Proteus (<i>Proteus anguinus</i> , Laur.)	}	L.D. 1-400
		S.D. 1-727
Common Trout (<i>Salmo fario</i> , Linn.)	}	L.D. 1-1524
		S.D. 1-2900
Grayling (<i>Thymallus vulgaris</i> , Nilss.)	}	L.D. 1-1684
		S.D. 1-2900

3. ON SEVEN NEW SPECIES OF AUSTRALIAN BIRDS.
BY JOHN GOULD, F.R.S. ETC.

GRAUCALUS HYPOLEUCUS.

Lores black; crown of the head and all the upper surface dark grey; wings and tail black; chin, under surface of the wings, abdomen and under tail-coverts white; breast pale greyish white; irides brownish black; bill blackish brown; legs and feet black; insides of the feet and spaces between the scales of the tarsi mealy grey.

Total length 9 inches; bill $1\frac{1}{8}$; wing $5\frac{3}{4}$; tail $4\frac{3}{4}$; tarsi 1.

Hab. Port Essington.

Remark.—Distinguished from all the other Australian members of the genus by the whiteness of the under surface.

LIMOSA UROPYGIALIS.

All the upper surface brownish grey, becoming dark brown in the centre and nearly white on the edges of the feathers; primaries brown, with white shafts; rump and upper tail-coverts conspicuously barred with brown and white; tail alternately barred with brown and white; throat and abdomen white; neck and breast brownish grey; under wing-coverts and flanks barred with brown and white; bill white at the base, becoming brown at the tip; irides dark brown; legs brownish black.

Total length 15 inches; bill $3\frac{1}{4}$; wing $8\frac{3}{4}$; tail $3\frac{1}{4}$; tarsi $2\frac{1}{8}$.

Hab. Australia.

Remark.—Distinguished from *Limosa rufa* by the rump being barred instead of white as in that species. The female is about a third larger in all her admeasurements than the male.

CHARADRIUS VEREDUS.

Crown of the head and all the upper surface brown, each feather narrowly fringed with buff; primaries blackish brown, the shaft of the first white; tail brown, narrowly edged with white, the brown colour gradually fading as the feathers recede from the centre; face,

a broad stripe over the eye, and the chin, buffy white; sides and back of the neck, and the breast, buffy brown; abdomen and under surface white; irides very dark brown; legs and feet brownish flesh-colour; bill dark brown.

Total length $8\frac{1}{2}$ inches; bill $1\frac{1}{8}$; wing $6\frac{1}{2}$; tail $2\frac{1}{8}$; tarsi 2.

Hab. Northern Australia.

Remark.—This species exhibits characters pertaining both to the true Plovers and to the Coursers, and would seem therefore to have just claims to be made the type of a new genus; but before separating it, it will be necessary to know something of its habits, and also if it undergoes any periodical change of plumage.

TOTANUS GRISEOPYGIUS.

Head, all the upper surface, rump and tail, greyish brown; primaries dark brown; line over the eye and all the under surface white; the neck, breast and flanks strongly freckled with brown; irides reddish brown; bill blackish brown, except the base of the under mandible, which is scarlet; legs and feet hyacinth-red.

In winter the upper surface is of a much lighter hue, and the under surface is of a greyish white and destitute of the brown freckles.

Total length $8\frac{3}{4}$ inches; bill $1\frac{3}{4}$; wing $6\frac{3}{4}$; tail $2\frac{7}{8}$; tarsi $1\frac{1}{4}$.

Hab. Port Essington.

Remark.—Distinguished by the uniform grey colouring of the rump and upper tail-coverts.

SCHÆNICLUS MAGNUS.

Crown of the head, and the neck, brownish grey, each feather with a stripe of brown down the centre; back and wings brown, broadly margined with brownish grey; primaries blackish brown; rump white, each feather tipped with brown; tail brownish grey; feathers of the breast dark brown, with a crescent of white at the extremity; abdomen and under tail-coverts white; flanks mottled with brown; bill, feet, and irides, olive.

Total length $9\frac{1}{2}$ inches; bill $1\frac{3}{4}$; wing 7; tail $2\frac{1}{4}$; tarsi $1\frac{3}{8}$.

Hab. Australia.

Remark.—Of this species of *Schœniclus*, which is distinguished by its large size, the only examples that have come under my notice are in the British Museum, and a second in the possession of the Hon. Charles Neville, to whom I am indebted for the loan of it for illustration in my 'Birds of Australia.'

ARDETTA MACRORHYNCHA.

Crown of the head and occipital crest black, with green reflexions; neck, all the upper surface and wing-coverts greenish olive; wing-coverts narrowly margined with deep rufous; primaries and tail slate-grey; spurious wing, secondaries and all but the three or four external primaries with an irregular triangular-shaped spot at the tip; down the centre of the throat a series of oblong marks of dark brown and white, forming a conspicuous mottled stripe, continued into the breast, where it is lost in the mingled grey and buffy brown of the abdomen; upper mandible dark reddish brown; basal portion of the

lower one oil-green; tibiæ and hinder part of the tarsi bright yellow; remainder of the legs and feet yellowish brown.

Total length 17 inches; bill $3\frac{3}{4}$; wing $7\frac{3}{4}$; tail 3; tarsi $2\frac{1}{4}$.

Hab. East coast of Australia.

Remark.—Differs from the *Ardetta Javanica* in being considerably larger in size and in the great size of its head and bill.

CRACTICUS PICATUS.

Collar at the back of the neck, centre and edge of the wing, rump, abdomen, under tail-coverts and tips of all but the centre tail-feathers white; remainder of the plumage deep black; irides dark reddish brown; bill ash-grey, the tip black; legs and feet dark greenish grey.

Total length 10 inches; bill $1\frac{3}{4}$; wing 6; tail $4\frac{3}{4}$; tarsi $1\frac{1}{4}$.

Hab. Northern Australia.

Remark.—A miniature representative of, and nearly allied to, but distinct from, *Cracticus nigrogularis*.

March 14, 1848.

Dr. Gamble in the Chair.

The following papers were read:—

1. DIAGNOSES SPECIERUM NOVARUM GENERIS PLANORBIS COLLECTIONIS CUMINGIANÆ. AUCTORE GUIL. DUNKER, DRE.

- ✓ 1. PLANORBIS INFLATUS, Dkr. *Pl. testâ magnâ, inflatâ, fusco-olivaceo- et cinereo-corned, nitidâ, striatâ, suprâ profundè umbilicatâ, infrâ concavâ, anfractibus 4 inflatis celerrimè crescentibus; aperturâ reniformi; fauce fuscâ.*

Diam. max. $1'' 1'''$; alt. aperturæ $8'''$.

Species tum colore, tum habitu varietatibus quibusdam *Pl. cornei*, simillima. Anfractus primordiales striis spiralibus insignes.

Patria cochleæ eximiæ ignota est.

- ✓ 2. PLANORBIS NITIDULUS, Dkr. *Pl. testâ parvulâ, pallidè corneo-fulvescente, nitidulâ, pellucidâ, suprâ profundè umbilicatâ, basi planâ; anfractibus $3\frac{1}{2}$ rotundatis; aperturâ obliquè ovatâ.*

Diam. max. $1\frac{3}{4}'''$; alt. $\frac{1}{2}'''$.

Species hæc parvula basi planâ et latere superiore umbilicato noscenda, in Chersoneso aureâ (pæninsula Malacca) plantis aquaticis insidens reperta est. (H. Cuming.)

- ✓ 3. PLANORBIS GILBERTI, Dkr. *Pl. testâ depressâ, sublenticulari, pallidè corned, nitidâ, pellucidâ, superâ paginâ planiusculâ, infernè umbilicatâ; anfractibus tribus utrinque obtusè angulatis;*

infrà medium acutè carinatis; aperturà obliquà, subcordatà; margine superiore producto.

Diam. max. $2\frac{1}{2}'''$; alt. $\frac{3}{4}'''$.

Species *Planorbis exacuto*, Say., similis, differt vero umbilico latiore, foveolâ lateris superioris medianâ, et carinâ obtusâ in superâ et inferâ anfractuum paginâ. Reportata est e Novâ Hollandiâ à cl. Gilbert.

4. *PLANORBIS CHINENSIS*, Dkr. *Pl. testâ parvâ, corneâ, subtiliter striatâ, subdiaphanâ, paginâ superâ convexiusculâ, medio impressâ, paginâ inferâ latè umbilicatâ; anfractibus $3\frac{1}{2}$ ovatis medio subcarinatis; aperturâ obliquâ, subcordatâ.*

Diam. max. $2\frac{1}{4}'''$; alt. $\frac{2}{3}'''$.

Species hæc à cl. H. Cuming in rivulo ad Hong Kong in China detecta, *Pl. deformi*, Lam., similis, sed carinâ obsoletâ et latere superiore minus convexo diversa.

5. *PLANORBIS PANAMENSIS*, Dkr. *Pl. testâ parvulâ, albidâ vel pallidè corneâ, diaphanâ, haud nitente, striis tenuissimis confertis lineisque spiralibus remotis et obsoletis subdecussatâ, suprâ planoconvexâ, medio impressâ, infrâ umbilicatâ; anfractibus $2\frac{1}{2}$ —3 ovatis; aperturâ obliquâ.*

Diam. max. $1\frac{1}{2}'''$; alt. $\frac{1}{2}'''$.

Hab. in rivulis ad Panama (H. Cuming). Magnam affinitatem præbet cum *Pl. elevato*, Adams.

- ✓ 6. *PLANORBIS HINDSIANUS*, Dkr. *Pl. testâ parvulâ, corneâ, subviridescente, tenuissimè confertimque striatâ, diaphanâ, subnitidâ, suprâ planiusculâ, medio impressâ, infrâ umbilicatâ; anfractibus tribus ovatis; aperturâ obliquâ.*

Species magnitudine ferè præcedentis, sed colore et striis spirali-bus deficientibus satis diversa.

Hab. in insulâ Puna in sinu ad Guayaquil (R. B. Hinds).

- ✓ 7. *PLANORBIS OBESUS*, Dkr. *Pl. testâ solidâ, tenuiter densèque striatâ, nitidâ, subsericâ, fusco- seu luteo-cornèâ, utrinque concavâ; anfractibus $3\frac{1}{2}$ —4 tumidis celeriter crescentibus, aperturâ subreniformi, labro intus subincrassato.*

Diam. max. $7'''$; alt. $3\frac{1}{4}'''$.

Pl. trivolvii, Say., affinis, sed striis subtilioribus, aperturâ minore, testâ crassiore et carinâ in latere basali deficiente distincta.

Patria ignota.

- ✓ 8. *PLANORBIS CUMINGIANUS*, Dkr. *Pl. testâ magnâ, discoideâ, crassiusculâ, suprâ corneâ subrufâ, infrâ olivacâ, nitidâ, obsoletissimè striatâ, ferè glabrâtâ, utrinque concavâ; anfractibus senis ovatis, suturâ profundâ divisâ; aperturâ obliquâ, ovato-sublunatâ.*

Diam. max. $1''\frac{1}{3}'''$; alt. $3'''$.

Planorbis olivaceo simillimus, sed colore, testâ crassiore, splendidiore ferè glabrâtâ, umbilico latiore, anfractibus convexioribus minus involutis aliisque notis bene distinguendus.

Patria ignota.

- ✓ 9. *PLANORBIS SIBIRICUS*, Dkr. *Pl. testá parvá, tenui, pallidè corned, subtilissimè striatá, suprà planiusculá, medio impressá, infrà concavá; anfractibus 3½ ovatis, modicè crescentibus, suturá distinctá divisís; aperturá obliquá, ovatá.*
 Diam. max. 2^{'''}; alt. ½^{'''}.
Pl. albo affinis, sed colore et capillis deficientibus diversus.
Hab. in Sibiríâ.
- ✓ 10. *PLANORBIS FOKKESII*, Dkr. *Pl. testá parvá, albidd, subcorned, nitidd, diaphand, suprà plano-convexá seu planá, medio profundè impressá, infrà umbilicatá; anfractibus tribus subtumidis, celeriter ferè crescentibus tenuiterque striatis, ultimo declinato; aperturá subrotundá, perobliquá, margine superiore producto.*
 Diam. max. 2½^{'''}; alt. 1^{'''}.
Patria ignota.
- ✓ 11. *PLANORBIS FUSCUS*, Dkr. *Pl. testá tenui, fuscá, subtilissimè longitudinaliter transversimque striatá, suprà convexiusculá, infrà concavá, latere utroque umbilicatá; anfractibus 2½ teretibus, subceleriter crescentibus, ultimo paullò descendente; aperturá rotundatá.*
 Diam. max. 3½^{'''}; alt. 1¼^{'''}.
Tria hujus speciei exemplaria plane congruentia exstant, quæ cl. Cuming in paludibus ad Valparaiso invenit.
- ✓ 12. *PLANORBIS SERICEUS*, Dkr. *Pl. testá majusculá, tenuissimè decussatá, fusco-corned, interdum luteo-albidd, nitore sericeo insigni, superá et inferá paginá concavá; anfractibus quinís albis utrinque carinatis; aperturá obliquá, ferè semilunatá, infrà et suprà angulatá.*
 Diam. max. 7^{'''}; alt. 3^{'''}.
Testa Pl. tenagophilo, Orb., affinis, sed magis involuta et regularis.
Patria ignota.
- ✓ 13. *PLANORBIS STRAMINEUS*, Dkr. *Pl. testá tenuistriatá, nitidá, parùm diaphaná, stramineá, subcorned, suprà plano-concavá, medio impressá, infrà umbilicatá; anfractibus 4 subrotundis; aperturá dilatatá, ferè rotundatá.*
 Diam. max. 5^{'''}; alt. ferè 2^{'''}.
Primo adspectu Helicibus quibusdam similis, ex. gr. Helici erice-torum.
Patria America australis (H. Cuming).
14. *PLANORBIS RUPPELLII*, Dkr. *Pl. testá opacá, tenuiter striatá, pallidè corned, subcinereá, suprà umbilicatá, infernè concavá, anfractibus 4 ovatis modicè crescentibus; aperturá ovatá, obliquá.*
 Diam. max. 6^{'''} ferè; alt. 2^{'''}.
Patria Habessinia (Rüppell).
- ✓ 15. *PLANORBIS LIMOSUS*, Dkr. *Pl. testá cinereo-corned, opacá, striatá, subcarinatá, suprà convexiusculá, medio impressá, infrà umbilicatá; anfractibus tribus ovatis; aperturá obliquá, subovalí; faucibus subflavis.*

Diam. max. 3''' ; alt. 1'''.

Hæc species *Pl. deflectum* Sayi in mentem vocat.

Hab. in Asiâ minore (H. Spratt).

- ✓ 16. PLANORBIS PHILIPPIANUS, Dkr. *Pl. testâ discoided, subnitidâ, tenuissimè obsoletèque striatâ, pallidè corned, diaphanâ, suprâ planatâ, medio impressâ, infrâ parùm concavâ; anfractibus senis rotundatis sensim crescentibus; aperturâ subrotundâ, subobliquâ.*

Diam. max. 5½''' ; alt. 1¼'''.

Patria Cochabamba in Boliviâ.

2. SOME OBSERVATIONS ON MYODES HUDSONICUS AND THE OTHER SPECIES OF THE GENUS MYODES. BY J. E. GRAY, ESQ., F.R.S. ETC.

The Governor of the Hudson's Bay Company having kindly sent to the British Museum the extensive series of Mammalia, Birds and Fish collected by Dr. J. Rae in his late very interesting journey, I have been induced to lay before the Society some remarks on the species of the genus *Myodes*, which I hope will tend to elucidate the history of these interesting animals.

Myodes Hudsonicus has been distinguished as a species by the large size and peculiar form of the claws on the front feet; but the specimen contained in this collection appears to prove that these large claws are only found in some individuals, or more likely in only one sex, and that the other individuals or sex have small, curved, sharp claws, like the typical species of the genus; and this also appears to be the case with *Myodes helvolus*, Richardson, for one specimen in the collection has the small typical claws which Sir John Richardson assigns to the species, and the other has very large, thick, rounded, bluntly truncated claws on the fore-feet, which is probably the character of the males.

The species of the genus in the British Museum may be thus divided:—

I. The upper cutting teeth narrow, smooth, without any longitudinal grooves. Thumb with a compressed, curved, acute claw.

a. Claws of fore-feet simple, curved.

M. Lemmus, two specimens; Sweden. m

M. helvolus, Richardson, one specimen.

b. Claws of fore-feet of some (males?) specimens compressed above, with a round, dilated, expanded pad beneath.

M. Grænlædicus. Fur with a dorsal streak.

c. Claws of fore-feet of some (males?) specimens very large, compressed, strap-shaped, and with a deep triangular notch at the end.

M. Hudsonicus.

II. The upper cutting teeth broader, with a central longitudinal groove; claws of the thumb strap-shaped, truncated, and notched at the tip.

M. helvolus, Rich. Claws of some specimens (males?) thick, subcylindrical, curved, truncate.

M. trimucronatus, Rich., two specimens. Claws of both specimens similar, acute, curved.

3. DESCRIPTION OF A NEW SPECIES OF ANATIFA. BY J. E. GRAY, Esq., F.R.S. ETC. ETC.

(See Annulosa, pl. 3. figs. 5, 6.)

In the collection of my friend Mr. Joseph Fryer, of Whitley House, Northumberland, I have observed a very interesting new species of this genus, which was given him by Mr. Hewitson, who found it attached to a *Gorgonia* in Madeira.

It is interesting as having the solid, thick, ventricose valves of Mr. Hinds's genus *Trilasmis*, and it also resembles that genus in the anterior basal and the upper opercular valves being very small, so that it forms the passage between *Pentalasmis* and that genus.

There are in Mr. Fryer's collection two specimens, which differ considerably from one another. One is pale red and elongate-ovate, smooth, rather compressed, and the larger opercular valves have a rather distinct line towards the extremity. The anterior basal valve is much-compressed. The second is yellowish white, pink at the base, ovate, swollen, slightly radiately and concentrically striated; the left larger opercular valve is larger than the right one, more convex, and partly inclosing it; the anterior valve and upper opercular valve are very narrow.

I propose to call the species *Anatifa crassa*. Peduncle short; valves thick, opaque, convex, large, the anterior basal valve and upper opercular valves very narrow.

Inhab. Madeira, on *Gorgonia*.

4. ON THALIELLA, A NEW GENUS OF CIRRIPEDES ALLIED TO SCALPELLUM. BY J. E. GRAY, Esq., F.R.S. ETC.

THALIELLA.

Valves 11; opercular valves subtriangular; dorsal elongate, curved; lower dorsal and anterior compressed, with two pairs of lateral valves in the middle of the body above the base. Peduncle with rings of imbricate horny scales.

This genus chiefly differs from *Scalpellum* in the front and hinder lateral pair of valves being each united into a single compressed valve, and in having no middle basal lateral valve.

This genus was shown to me by Mr. J. S. Bowerbank, who received it from Algoa Bay attached to some species of *Plumaria*.

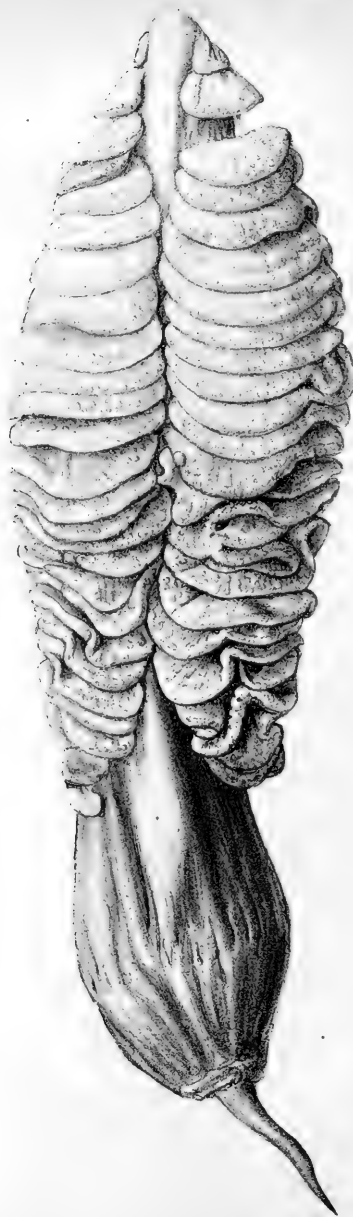
THALIELLA ORNATA.

Pale horn-coloured, varied with red spots, or with a single red band on each side; valves horny, subpellucid, radiately striated.

On *Plumaria*, Algoa Bay, Cape of Good Hope. Presented to the British Museum by J. S. Bowerbank, Esq.

Stroem (*Nym. Saml. Danske*, 1788, 295, n. 111, f. 20) described a *Lepas testá compressá 7-valvis stipite lamellosá*, found on *Gorgonia placomus* in the North Sea, which is probably allied to this genus.





William Wing del et lith.

Printed by Halkema and Walen.

SARCOPTILUS GRANDIS.

5. DESCRIPTION OF SARCOPTILUS, A NEW GENUS OF PENNATULIDÆ.
 BY J. E. GRAY, ESQ., F.R.S. ETC.

(Radiata, pl. 1.)

Sir William Jackson Hooker lately sent to the British Museum some bottles containing animals in spirits, some from New Zealand, others from South America, and some without any habitats : amongst the latter there is a fine specimen of a Sea Pen, resembling the true genus *Pennatula* in general form, but differing from it most essentially in the form of the *pinna* and their substance, and presenting a most interesting new form in the family.

Each of the *pinna* resemble the frond of *Renilla*, Lam. ; they are placed in two crowded rows, one on each side of the upper part of the axis, and, like that genus, they have the polypes scattered over the upper surface of the *pinna*, which, as well as the surface of the stem, do not exhibit any spicula, but are smooth and fleshy.

This genus may be considered as the passage between *Pennatula* and *Renilla*.

SARCOPTILUS.

Coral pen-shaped ; *shaft* thick, fleshy, attenuated towards the tip, smooth, slightly striated longitudinally, and granulose on the surface ; *axis* subquadrangular, rather thick, flexible when moist, formed of concentric coats and longitudinal fibres. *Pinna* placed in two crowded rows, one on each side of one of the faces of the upper part of the shaft, kidney-shaped, crumpled, with the polypes scattered on the edge and upper surfaces, especially near the edge. *Polypes* small, when contracted leaving very small papillæ on the surface.

SARCOPTILUS GRANDIS.

Shaft very thick at the base, longitudinally striated. *Pinna* 25 on each side, the lower one smallest.

Hab. — ? Brit. Mus.

Length 8 inches.

March 28, 1848.

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

The following papers were communicated to the Meeting :—

1. DESCRIPTION OF A NEW SPECIES OF BUTTERFLY, OF THE GENUS
 AGRIAS. BY W. C. HEWITSON, M.E.S. ETC.

(Annulosa, pl. 1.)

Genus AGRIAS, Boisd. MSS.

Head rather broad, clothed with hair ; eyes nearly round or slightly

oval, prominent; maxillæ rather longer than the thorax; labial palpi rather widely separated, ascending, thickly clothed with scales, which in front are long; basal joint curved, very short, second more than twice the length of the first; third short, pointed. Antennæ elongate, about three-fourths the length of the body, gradually thickening from the base to the apex.

Thorax large, elongate-ovate, truncate posteriorly, hairy. Anterior wings subtriangular, the anterior margin rounded, about one-half longer than the outer, which is nearly straight or slightly sinuate; the inner margin rather longer than the outer, straight. Costal nervure stout, extending beyond the middle of the costa; subcostal nervure throwing off its first nervule about the middle, the second a short distance before the end of the cell, the third at some distance beyond the cell, the fourth rather more remote from the third than that is from the fourth. Third subcostal nervule terminating at the apex; fourth running close to the third until near the apex, then bent downwards and reaching the outer margin about half-way between the apex and the termination of the fifth subcostal nervule; upper disco-cellular nervule very short, middle above twice the length of the upper, lower nearly twice the length of the two other combined; third median nervule considerably curved. Posterior wings obovate; the fold for the reception of the body ample, anterior margin rounded, outer slightly dentate, sinuate; precostal nervure simple; cell closed by a slight disco-cellular nervule.

Anterior feet of the female small, the femur and tibia about of equal length, the tarsus short, four-jointed, the basal joint longer than the rest combined, which are all short, transverse, and nearly equal. Middle and posterior feet stout, rather short; the tibiæ spiny within, the spurs very short; the tarsi spiny at the sides, the first joint spiny below also, equal in length to the rest combined; claws small, curved; pulvillus large.

Abdomen short, tapering.

AGRIAS ÆDON. *Ag. alis anticis suprâ latè chermesinis, apice marginæque interno nigro, posticis suprâ nigris plagâ magnâ, cyaned, subtis fuscescentibus, ocellis septem submarginalibus nigris, albo pupillatis.*

Exp. alar. 3 unc. 9 lin., vel 95 millim.

Hab. Nueva Granada.

Above, anterior wings rich crimson, the costal nervure and the inner margin fuscous black, the apex broadly and triangularly black, the black colour commencing on the costa opposite the end of the cell, becoming narrower towards the outer angle, where it unites with the fuscous black of the inner margin. Posterior wings black, marked with a large blue discoidal patch, extending nearly to the anal angle. Below, anterior wings with the part corresponding to the crimson of the upper surface much paler than above, the cell with two round black spots; the black of the apex and inner margin replaced by pale fuscous; the disco-cellular nervules marked with a fuscous black dash, and the apex crossed by two oblique bands of the same colour.



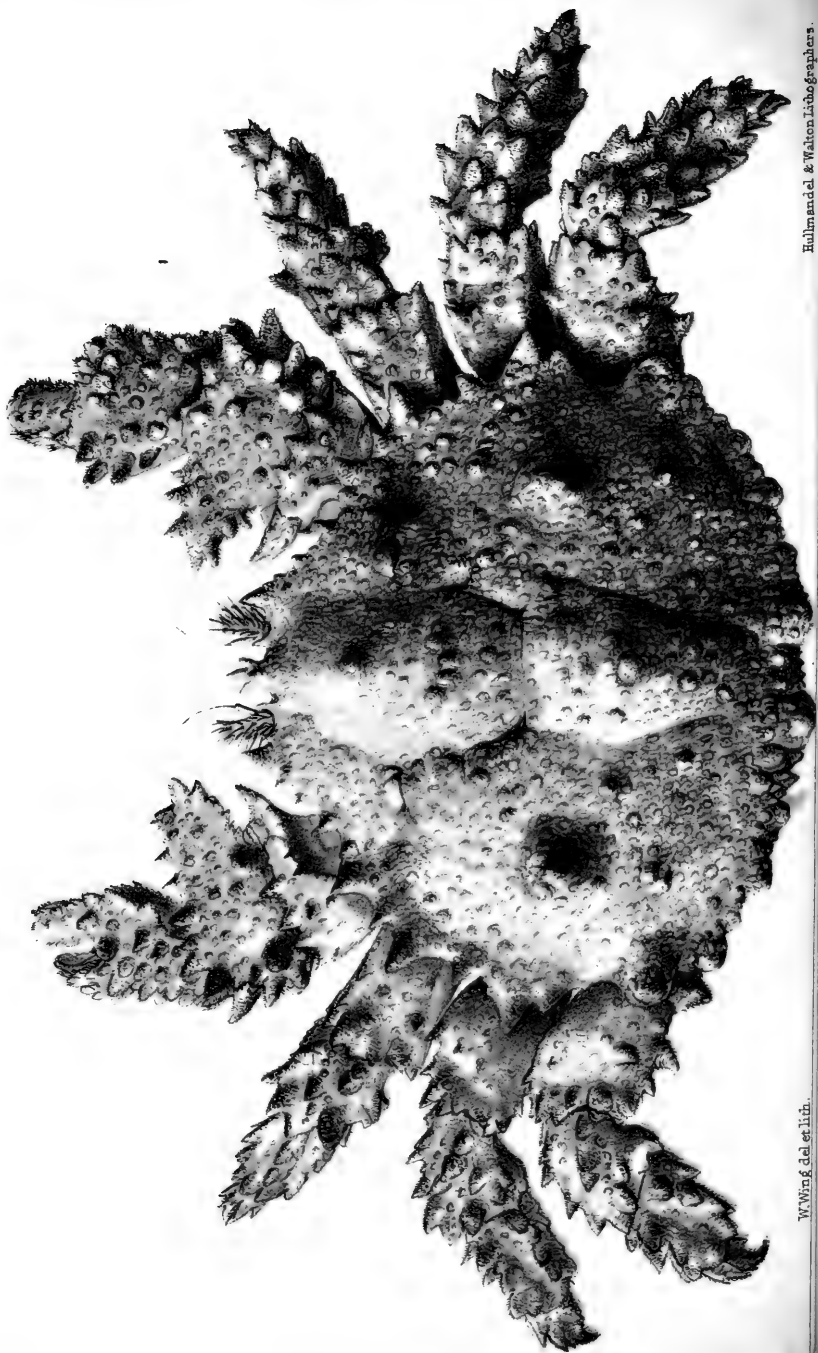
W.C. Hewitson del et lith

Printed by Holmnaudri & Walton

AGRIAS ÆDON. Hewitson



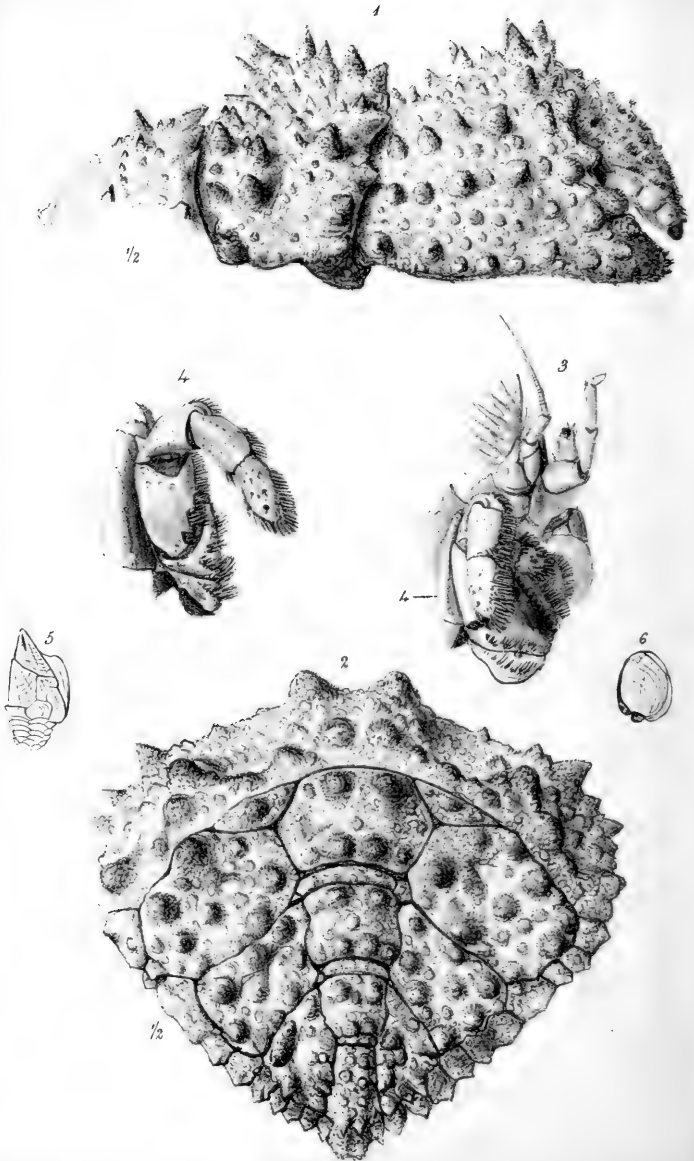




W. Wring del et lith.

Hullmandel & Walton Lithographers.





William Verrill del et lith.

Printed by Hallmandel & Walton.

1 to 4. Details of *ECHIDNOCERUS CIBARIUS*. White.
5 *SCALPELLUM ORNATUM*. 6. *ANATIFA OVALIS*.

Posterior wings pale fuscous, with two rounded fuscous spots in the cell; several scattered lituræ of the same colour before the middle of the wing, then two transverse bands also fuscous, followed by a series of seven black spots pupilled with white, the last bipupillate, the second spot the largest: between these spots and the margin a third fuscous band.

Head, thorax and abdomen black.

The beautiful butterfly which I have drawn is I believe unique in my own collection. It was taken by my friend Mr. Empson many years ago in South America, and was one of a very few things—all at that time very rare—which were saved from the shipwreck of a large collection.

Mr. E. Doubleday, whose experience gives him great facility, has kindly supplied me with the generic characters.

2. DESCRIPTION OF *ECHINOGERUS CIBARIUS*, A NEW SPECIES AND SUBGENUS OF CRUSTACEA. BY ADAM WHITE, F.L.S. ETC.

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M. A. C. W.

(Annulosa, pl. 2, 3.)

Amongst the Decapod Crustacea there are several genera of doubtful situation which belong to neither of the great divisions *Brachyura* and *Macroura*. Professor Milne-Edwards first brought them together as a section, under the name of *Anomoura*; but, as he remarks, they do not form a very natural group, the principal advantage derived from its formation being the opportunity which it gives the systematist to withdraw all the aberrant species from the two very natural sections specified above. Not a year passes but new species are added to this group, and occasionally a new form is found; in course of time these discoveries will serve to link genera which seem at present to be distant from each other, if at all related. The species described below is close to the genus *Lithodes*, some of the species of which have considerable resemblance to it. The generic name describes the peculiarity of the spined appendage to the outer antennæ, while the specific name is given in allusion to its excellence as an article of food.

In one of the two specimens in the British Museum, the legs, carapace and abdomen are covered with numerous barnacles, and on taking off the old carapace, which had commenced to split, the still coriaceous envelope, which would have formed the new carapace, may be found beneath it. On this are very plainly indicated the crowded warts, the scattered knobs, and lateral projecting spines, which are so prominent on the outer surface of the old carapace. The different regions of the carapace are also clearly distinguished: the body of this new carapace is coriaceous; the warts are more calcareous, and consist for the most part of small irregularly-shaped plates, arranged circularly round a small group of calcareous scales. These groups are of different sizes, from that of the head of a small pin to the space occupied by the top of a tolerably large nail. On a small portion of the carapace, on each side of the middle knob, and

in two lines directed towards the front, there are distinct portions of calcareous matter already formed, while on the abdominal plates there are still more extensive calcareous portions formed in the corium; the various groups of plates are distinctly visible, most of the scales are perforated, and through the holes in many cases a short hair or bristle protrudes. This new skin is only visible on the carapace and on the abdominal plates.

ECHINOCERUS (LITHODES) CIBARIUS.

Carapace considerably wider than long, subtriangular, very irregular above; the front sinuated, with a large projecting pointed beak springing from the middle, and armed above with three or four spines arising from one knob; the sinus on each side has three spines, the outer one very large and projecting; edge of the carapace more or less spined all round, the spines on the latero-anterior ridges being sharp, those on the latero-posterior and posterior edges being blunt; the latero-anterior and latero-posterior edges separated by a deep notch; general surface of carapace closely covered with tubercles, which are perforated, and furnished with bristles springing from the holes; on the stomachal region there is a high conical projection, the sides of which are comparatively smooth; near the base of this on each side is a smooth somewhat oval wart, with an impressed line behind it; on each branchial region a high conical projection, and another behind the middle of a straight line drawn between the branchial tubercles; the posterior edge of the carapace with two rather large tubercles separated by a slight sinus.

Chelæ with the end of the fingers hollowed out somewhat like a spoon, the edges granulated, the hands with numerous large bristly pointed tubercles on the outside, three of these being on the upper edge; the wrist with a large triangular expansion on the inside, which is spined and tubercled above; second, third and fourth pairs of legs nearly as long as the first pair, and very similar in appearance, but not so thick; the third joint from the tarsus flat on the sides; the upper surface of the legs with large conical bristly tubercles or spines; the spines on the tibial joint arranged in three longitudinal lines; the tarsus spined, particularly on the lower edge; fifth pair of legs quite concealed within the branchial cavities.

Outer antennæ with a large appendage at the base; this appendage is smooth below, and has four longitudinal rows of spines on its upper portion, the lateral rows having the longest spines.

Inner antennæ situated beneath and to the outside of the eyes; the first joint very thick, particularly at the base, subcylindrical; second and third joints cylindrical, nearly equal in length, thickest at the tips.

Eyes close together, placed under the frontal spine; the peduncle is much shorter than, and not nearly so thick as, the basal joint of inner antennæ; the upper side covered with small spines.

Outer jaw-feet resemble those of *Lithodes*, especially in *L. brevipes*.

Abdomen very wide, rounded at the base, triangular at the end, formed of many plates of different sizes, which are close together;

the basal segment is crescent-shaped, and within its sinus are included the other plates, which are arranged in four longitudinal series; the outer series narrow, the other three wide; the plates of different sizes and shapes, with two supplemental plates, one on each side of the central row, and at its base; the plates with rough and bristly tubercles; the first joint of abdomen with two round depressions, the base of each being coriaceous-like, and furnished with only a few small scattered calcareous tubercles; the middle of the hind-edge with four tubercles placed in pairs.

Hab. North America, mouth of the Columbia River; Sir George Simpson. In Mus. Brit.

3. DESCRIPTIONS OF NEW SPECIES OF TURBO, CHIEFLY FROM THE COLLECTION OF HUGH CUMING, ESQ., F.L.S. BY LOVELL REEVE, F.L.S. ETC.

TURBO NATALENSIS. *Turb. testâ vix imperforatâ, orbiculari, depressiusculâ, anfractibus spiraliter sulcatis, sulcis regulariter concavis latiusculis; olivaceo-viridescente, rufo radiatim maculatâ et punctatâ, intus argenteâ; operculo testaceo, cristato.*

Hab. Port Natal; Wahlberg.

The operculum of this beautiful species is a tufted mass, like that of the *T. sarmaticus*.

TURBO SAXOSUS. *Turb. testâ imperforatâ, ovatâ, spiræ suturis subprofundè impressis; anfractibus supernè concavo-declivibus, medio angulatis, transversim obscure liralibus, tuberculis juxta suturas coronatis, infrâ nunc muticis, nunc tuberculis bi-tri-seriatim armatis, laminis subtilibus, longitudinaliter obliquis, peculiariter exsculptis; viridi albimaculatâ, intus argenteâ; operculo testaceo, crasso.*

Hab. West Columbia; Cuming.

Having observed this species in a private collection, under the name *saxosus*, in manuscript, I adopt it, though not a very appropriate one, lest it may have been published and escaped my observation. The rows of tubercles are extremely variable, being even more prominently developed in specimens of smaller growth than is here represented.

TURBO LAMINIFERUS. *Turb. testâ umbilicatâ, ovatâ, spiræ suturis canaliculatis; anfractibus subtubulosis, spiraliter costatis, costis distantibus, et, cum interstitiis, pulcherrimè concentricè laminatis, aperturâ rotundâ; viridi, nigro longitudinaliter undatâ, intus argenteâ.*

Hab. Mouth of the Victoria river, New Holland.

A very beautifully sculptured species, allied to the *T. Ticaonicus*, but perfectly distinguished from it, in being of uniformly smaller size, more distinctly and remotely ribbed, and in being concentrically frilled throughout with a close succession of delicate laminae.

TURBO MURREUS. *Turb. testâ minutâ, suborbiculari, vix umbilicatâ, levigatâ, politâ, albâ, roseo nitidè maculatâ.*

Hab. — ?

A minute, delicately coloured, porcelain shell.

TURBO CORALLINUS. *Turb. testá parvá, suborbiculari-ovatá, imperforatá, conspicuè spiraliter sulcatá; roseo-purpureá, intùs margaritacéa.*

Hab. — ?

Another interesting small species, of a dull livid rose-purple hue, strongly spirally grooved.

TURBO TROCHOIDES. *Turb. testá subpyramidali-ovatá, perforatá; anfractibus spiraliter sulcatis, supernè concavis, deinde obsolete nodosis; luteo-albicante, olivaceo radiatim maculatá, lineolis minutissimis aurantio-fuscis, obliquè reticulatis.*

Hab. — ?

A species of peculiar sculpture and marking, partaking very much of the generic character of *Trochus*.

TURBO PUSTULATUS. *Turb. testá ovatá, subventricosá, imperforatá, nodis grandibus papillosis undique notatá, aperturae fauce argentéa; albida, olivaceo-fusco luteoque maculatá.*

Hab. — ?

An interesting species covered with swollen nodules; collected by Sir Edward Belcher during the voyage of the 'Sulphur.'

TURBO TURCICUS. *Turb. testá subpyramidali-ovatá, imperforatá, spiræ suturis excavatis, anfractibus spiraliter squamato-liratis, supernè declivibus, acutè angulatis, ad angulum erecto-squamatis, apertura parvá, lutescente, coccineo rufo pulcherrimè radiatá.*

Hab. Philippine Islands; Cuming.

A prettily painted species encircled by a diadem of erect scales.

TURBO PYROPUS. *Turb. testá subdepresso-ovatá, imperforatá, spiræ suturis simplicibus, anfractibus lævibus, striisve spiraliter cingulatis; albida, striis vividè rubris, intùs argentéa.*

Hab. — ?

Of a deep blood-red colour, with the margins of the aperture united beyond the columella.

TURBO GEMMATUS. *Turb. testá subdepresso-ovatá, imperforatá, spiræ suturis subprofundè canaliculatis, anfractibus nodulis parvis undique gemmatis; corallo-rufescente, intùs argentéa.*

Hab. — ?

Very similar in form to the preceding species, and partaking in some measure of the colour; the spire differs in having the sutures deeply channeled, and the entire surface in being beaded with small papillose nodules. In the former species the margins of the aperture are entire, and it is the striæ that are coloured upon a white ground.

TURBO LUGUBRIS. *Turb. testá suborbiculari-ovatá, spirá depressá, anfractibus supernè declivibus, deinde nodulis papillosis cingulatis, columellá concavá; albida, epidermide crassá nigricante indutá, columellá et apertura argentéis.*

Hab. — ?

Another species collected by Captain Belcher in the 'Sulphur,' not hitherto described.

TURBO NIVOSUS. *Turb. testá oblongo-turbinatá, imperforatá, spirá subexsertá, anfractibus spiraliter liratis, liris obtusis, irregularibus, duabus prominentibus subsquamosis; vividè virescente, fusco hic illic maculatá, liris prominentibus et inferioribus fusco niveoque articulatis, intùs argenteá.*

Hab. Philippine Islands; Cuming.

A prettily painted species, apparently not described before.

TURBO TUMIDULUS. *Turb. testá ovatá, imperforatá, spirá subacuminatá, anfractu ultimo amplo, tumidiusculo; anfractibus undique spiraliter liratis, liris angustis, confertis, valdè irregularibus, obliquè serratis; lutescente, intensè castaneo-nebulatá.*

Hab. — ?

This species merges into the *T. spinosus*, but is very remotely connected with it.

TURBO CIRCULARIS. *Turb. testá suborbiculari, imperforatá, spirá breviusculá, anfractibus supernè depressis, liris obtusè nodiferis, alternatim majoribus, cingulatis; rosaceo-fusco alhoque marmoratá, columellá plano-concavá, albá, intùs margaritacéa.*

Hab. — ?

Very nearly allied in form and general aspect to the *T. Natalensis*, but readily distinguished on comparison.

TURBO PORCATUS. *Turb. testá orbiculari, spirá depressiusculá, suturis excavatis, subtùs concavá, profundè umbilicatá, anfractibus fortiter spiraliter costatis, costis rotundatis, lirá minutá interveniente; viridi, rufo-olivaceo nitidè marmoratá, intùs argenteá.*

Hab. Point Swan, North Australia; Dring.

Allied in form to the *T. versicolor* and *porphyrites*, from both of which species it is sufficiently distinguished by its strongly-ribbed growth.

TURBO ARTICULATUS. *Turb. testá ovatá, vix umbilicatá, spirá acuminatá, anfractibus subtubulosis, spiraliter obtusè costatis, costis irregularibus longitudinaliter creberrimè serrato-striatis; viridi purpureo-nigricante marmoratá et variegatá, intùs argenteá.*

Hab. — ?

Allied to the *T. radiatus* in form, but peculiar in its articulated style of painting.

TURBO JAPONICUS. *Turb. testá ovatá, imperforatá, tenuiculá, subinflatá, anfractibus lævibus, spiraliter costatis, costis nunc prominentibus, regularibus, nunc planiusculis, valdè irregularibus; spadicæo-luteá, rufo variè tinctá et maculatá, intùs argenteá.*

Hab. Japan.

Like most shells from the Japanese islands, this is of very peculiar character, and very different from any of the tropical species of the genus.

TURBO MILITARIS. *Turb. testá ovatá, imperforatá, tenuiculá, subventricosá, anfractibus lævibus, supernè declivibus; rufescenti*

albida, maculis lineisque rufis nitide picta; columellæ margine livido-cinereo, intus argenteo.

Hab. Isle of Annaa (on the reefs); Cuming.

An interesting species of rather light growth, exhibiting a very distinct and characteristic style of painting.

TURBO HISTRIO. *Turb. testâ subglobosâ, tumidâ, imperforatâ, spiræ suturis excavato-caniculatis, spiraliter liratis, liris subtilissimè laminiferis, squamatis, squamis fortibus, erectis; nived, aurantio-ferrugineo latè radiatâ, intus argenteâ.*

Hab. — ?

A shell of ventricose growth, strongly scaled, whilst the entire surface is very minutely laminated.

TURBO FLUCTUATUS. *Turb. testâ transversè ovatâ, crassiusculâ, subventricosâ, imperforatâ; anfractibus levibus, supernè rudè angulatis, ad angulum obsolete nodosis, infrâ liris plano-obtusis, hic illic ferè evanidis ciagulatis; columellâ concavâ; olivaced, lineis niveis viridi-umbratis, acutè undatis conspicuè longitudinaliter pictâ, intus argenteâ; operculo testaceo, spiraliter sulcato, medio subtilissimè granuloso, marginem versus multiserrato.*

Hab. Punta, St. Elena, West Columbia; Cuming.

An extremely interesting species, which, though of rare occurrence, has long been known to me by the above name: from whom it received that appellation, which is very characteristic, I cannot, however, learn. It is a shell of solid growth, somewhat rudely noded, and obscurely flatly ridged. The ground-colour is that of a livid olive, very conspicuously marked with numerous zigzag lightning-like streaks of bright body-white, shaded with dark green.

The operculum is remarkable: testaceous and strongly spirally grooved, the innermost groove is broadly excavated, and the central mass is solid and minutely granulated, whilst the portion without the broad groove is arranged in numerous concentric, finely-serrated laminae.

Mr. H. N. Turner communicated to the Meeting the result of his observations on the motions of flexion and extension in the wings of Birds.

Mr. Griffith communicated a notice of the habits of a Beaver which had lived in confinement for the long period of fourteen years, most probably in consequence of its being placed in a dry and warm habitation, with occasional access to water.

April 11, 1848.

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

The following paper was read to the meeting:—

SUPPLEMENTARY NOTE ON THE GREAT CHIMPANZEE (*TROGLODYTES GORILLA*, *Savage*, *TROGL. SAVAGEI*, *Owen*). BY PROFESSOR OWEN, F.R.S. ETC.

Since the communication of my description of the skulls of the great Chimpanzee of the Gaboon district, I have received from an esteemed correspondent, Dr. Wyman, Professor of Anatomy in Harvard University, United States, and a most accomplished anatomist and physiologist, a copy of his description of the parts of the skeleton of the great Chimpanzee which Dr. Savage had taken with him on his return to America, together with a preliminary and highly interesting sketch of the natural history of the species by its discoverer, who proposes to call it *Troglodytes Gorilla*, adopting the term used by Hanno in describing the wild men which he discovered on the coast of Africa during his famous voyage*.

Dr. Wyman gives dimensions of the skulls of a male and female *Troglodytes Gorilla*, with comparative measurements of a characteristic skull of a negro, and those of the *Troglodytes niger* and *Simia satyrus* (Sumatran variety, or *S. Abeli*) from my Memoir in Trans. Zool. Soc. vol. i. p. 374; and he sums up the following points as showing that from the *Troglodytes niger* the *Trogl. Gorilla* "is readily distinguished—

- " 1. By its greater size;
- " 2. By the size and form of the supraciliary ridges;
- " 3. By the existence of the large occipital and interparietal crests in the males, and by rudiments of the same in the females;
- " 4. By the great strength and arched form of the zygomatic arches;
- " 5. By the form of the anterior and posterior nasal orifices;
- " 6. By the structure of the infraorbital canal;
- " 7. By the existence of an emargination on the posterior part of the hard palate;
- " 8. The incisive alveoli do not project beyond the line of the rest of the face, as in the Chimpanzee and Orang;
- " 9. The distance between the nasal orifice and the edge of the incisive alveoli is less than in the Chimpanzee;
- " 10. The ossa nasi are more narrow and compressed superiorly."

The 5th, 7th and 9th are the characters which are most decisively repeated in the Bristol specimens of the skulls of *Trogl. Gorilla*, and are those that are least ascribable to age or the operation of external

* See the passage cited at p. 13, 'Falconer's Translation of the Voyage of Hanno,' London, 1797.

circumstances tending to produce a stronger variety of Chimpanzee. The value of the character from size is established by the concurrence of the foregoing more fixed ones. The supraciliary ridges are relatively as strongly developed and as prominent in the skull of a female adult *Trogl. niger* as in that of the *Trogl. Gorilla*, and they are as angular and rough or uneven in the skull of the adult male *Trogl. niger* as in that of the adult male *Trogl. Gorilla*. The male *Trogl. niger* shows also the median prominence between the orbits above the root of the nose.

In six skulls of *Troglodytes niger* Dr. Wyman found that "the temporal ridges are generally separated from each other by a space varying from half an inch to one or two inches, according to age, but in none of them is to be seen even a rudiment of the interparietal ridge." In an adult, but by the condition of the teeth, not old male *Trogl. niger*, the temporal ridges have met above the obliterated suture, and developed the rudiment of an 'interparietal ridge,' which would probably have risen above its rudimental state had the exercise of the large temporal muscles been longer continued. Processes, ridges and crests dependent upon the stimulus of muscular action for their development, are the seats of most variety, and the least safe or satisfactory osteological marks of specific distinction. In the great males of the *Tr. Gorilla* even a certain range of variety is presented by the skulls of the four adult males, which we are now able to compare.

In the one described by Dr. Wyman the interparietal or sagittal crest is elevated about $1\frac{1}{2}$ inch above the skull, and terminates above in a thin and free edge: in the fine male skull figured, and in the older male's skull, the two temporal ridges, though touching each other at their base, do not coalesce to form a single sagittal crest, but each terminates in a free edge, inclining from its fellow, and neither of them rise to half an inch at their highest part, three inches behind their point of contact.

4. The specific character of the zygomatic arches is best shown by the depth and convex or angular upper contour of the squamosal portion of the arch.

5. Dr. Wyman has well indicated the characteristic forms of the anterior and posterior nares; and the conformity of the four skulls, two males and two females, submitted to his able and scientific scrutiny, in this important character, with the three skulls which I have described, adds to our confidence in its constancy and value. The observed range of variety does not materially affect the well-marked difference of form in the posterior nares. Dr. Wyman finds in the *Tr. niger* that "the transverse diameter of the orifice exceeds that of the vertical, but in the *Tr. Gorilla* the vertical is twice that of the transverse, a condition which results from the elongation downwards of the superior maxillary bones." In one skull of an adult female *Trogl. niger*, in the Bristol Museum, the vertical diameter equals the transverse diameter of the posterior nares, and it exceeds it by about one-half only in the three skulls of the *Tr. Gorilla* in the same museum.

6. With regard to the sixth character, which was pointed out to

Dr. Wyman by Prof. Agassiz, it is stated that "in the Chimpanzee the infraorbital canal forms a deep groove, terminating in the sphenomaxillary fissure, its depth remaining uniform to its termination; but in the Engé-ena (*Trogl. Gorilla*) the canal becomes gradually less deep from before backwards, and at the fissure is scarcely obvious." In the skull of the female *Trogl. Gorilla* (fig. 2) examined by me, the infraorbital canal is also shorter and shallower than in the skull of a female *Trogl. niger*, but the varieties observable in the condition of this canal in different individuals of the *Trogl. niger* are more marked than those above noticed in the skulls of the two species, and induce me therefore to attach less importance to this character as a specific one. In two skulls of adult males, *e. g.* in the College of Surgeons, the infraorbital groove as it passes backwards again becomes a canal by the meeting, and in one specimen by the coalescence of the two sides of the groove above the canal for an extent of from two to three lines before it enters the sphenomaxillary fissure. Dr. Wyman indeed notices a similar conformation in an adult cranium of the Chimpanzee belonging to Dr. J. C. Warren. Now this is a more decided difference from the continuous open groove at the floor of the orbit in the adult female *Tr. niger* than that groove presents in comparison with the shorter and shallower one in *Trogl. Gorilla*. I find too that the second character of *Trogl. Gorilla* pointed out by Prof. Agassiz,—“from the internal walls of the orbits which recede from each other in descending towards the floor, thus leaving a large pyramidal space for the lodgment of the os ethmoides,”—is so much less marked in the female skull of *Tr. Gorilla*, as contrasted with that of *Tr. niger*, as to induce me to view it more in the light of a sexual than a specific modification.

The seventh is a good character, and is repeated by each of the skulls of *Tr. Gorilla* examined by me. All the skulls of *Tr. niger* also show the backward projecting point, where the emargination exists in *Tr. Gorilla*.

8. The minor relative projection of the incisive alveoli beyond the line of the rest of the face is as characteristic of the three skulls of *Tr. Gorilla* now in England as of the four in the United States, and results from the same comparative shortness of the premaxillary bones, between the nasal orifice and the edge of the incisive alveoli. But the ossa nasi, besides being more narrow and compressed superiorly, are more prominent at that part in *Tr. Gorilla* than in *Tr. niger*, and they are also more expanded and broader inferiorly, and I cannot but regard the most decisive mark of the specific distinction of the *Troglodytes Gorilla* to be the longer persistence of the maxillo-premaxillary sutures, and the evidence thereby given of the peculiar form, development and connexions of the upper portions of the premaxillary bones. It is remarkable indeed, since these sutures remain so distinct in the adult female skull (fig. 2) and the younger adult male skull (fig. 1) here described, that no trace of them should have been detected in any of the four skulls taken by Dr. Savage to America, in which Dr. Wyman describes the *ossa nasi* as being “firmly co-ossified with each other and with the surrounding bones.”

The triangular expanded facial part of the upper end of each pre-maxillary intervening between the nasal and maxillary bones will always serve to distinguish the cranium of an immature *Trogl. Gorilla* from that of a *Trogl. niger*.

May 9, 1848.

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

Letters were read from Captain Hope, R.N., dated Rio Janeiro, February 23, and from Mr. Bridges, Corr. Memb., dated Valparaiso, Feb. 27, 1848.

The following communications were made to the Meeting :—

1. NOTICE OF A NEW SPECIES OF MONKEY FROM ANGOLA, LIVING IN THE GARDENS OF THE SOCIETY. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Mamm. pl. 3.)

The Society has recently procured a Monkey from Angola, which bears some resemblance to the Diadema Monkey which M. F. Cuvier erroneously described and figured as the female of *Cercopithecus Diana*, but it differs from that species in the lips being black, like the face, and only covered with very short whitish hairs; and also in being much darker coloured; and this blackness has increased since it has been in the possession of the Society and obtained a better fur. At first sight I thought that it might be a melanism of some other species; but on comparing my notes with the specimens in the British Museum collection, I am convinced that it is different from any I have before had the opportunity of examining.

It belongs to the division of the genus *Cercopithecus* with rounded whiskers formed of annulated hairs, which have no beard, a variegated fur, and black nose and lips, and is easily distinguished from the species of that division by its dark colour and broad frontal band. I propose to call it

The Pluto. *Cercopithecus Pluto*.

Sp. ch. Black; the hair of the broad frontal band, ringed with white; the large rounded whiskers, the back, the upper part of the front of the sides, and the base of the tail, ringed with varying greenish white; the distal half of the tail black; the face and lips black, with short, scattered white hairs.

Inhab. Angola.

This species is easily known at first sight by the deep black colour of the back of the head, and limbs, and the broad white frontal band: the large mantle-like patch of minute, white, grised hairs on the



CERCOPIITHECUS PLUTO. Gray



back, and the large size of the black and white ringed whiskers, giving the whole animal a very striking appearance.

The tail at this time is not in very good condition, and the end appears to have been destroyed.



2. OBSERVATIONS ON SOME BRAZILIAN BATS, WITH THE DESCRIPTION OF A NEW GENUS. BY J. E. GRAY, ESQ., F.R.S. ETC.

Having lately received from Hamburg a collection of Bats from Brazil, containing several species which I have not before seen, I beg to lay some observations on them before the Society.

I may premise that they were all named, on what authority I know not, and referred to described species, but several of them do not agree with the specimens which I have received with the same names before, nor with the original descriptions.

ARCTIBEUS LEUCOMUS, n. sp..

Grey brown, paler beneath; axilla whitish; tuft of hair on the side of the neck, near the shoulders, pure white; hair of back grey brown, with darker tips; the arms, and upper and lower surface of membranes near the sides, hairy; the interfemoral membrane rather wide, hairy above; nose-leaf ovato-lanceolate, longer than broad,
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with a thick midrib; ears rather large, rounded; tragus oblong, toothed on the outer side.

Inhab. Brazils.

I received this specimen under the name of *Phyllostoma brevicaudatum*, but it cannot be of that species, as it has no appearance of any tail. It agrees with *P. Newwied's* figure in having a rather wider interfemoral membrane than the other *Arctibei*, but it differs from it in the membranes being much more hairy, and in the absence of the peculiar white, epaulet-like spots.

Length of tarsus $7\frac{3}{4}$ ''' ; foot 5''' ; wing-bone 1" 5''' ; thumb 6'''.

NYCTIPLANUS, n. g.

Tail none; interfemoral membrane none; head short; nose-leaf lanceolate, erect; lower lip entire, with a triangular group of warts in front; cutting teeth $\frac{3}{4}$; ears lateral, separate; tragus denticulated; wings broad; index finger one-jointed, middle finger four-jointed; thumb elongate, lower joint short, inclosed, upper joint elongated, slender, free; feet moderate, toes equal, compressed.

This genus has the same kind of nose-leaf as *Phyllostoma*, but differs from all the genera with that form of nose-leaf in having no interfemoral membrane. In this character it agrees with *Diphylla* and *Stenodema*; but these genera only have a scarcely elevated nose-leaf.

NYCTIPLANUS ROTUNDATUS, n. sp.

Dark brown, beneath paler; hair yellowish brown, with dark tips; of the under side paler, with pale tips; of the sides of the body dark blackish brown; the fore-arm above and below, and the upper part of the wing-membranes near the body and on the side of the legs hairy; nose-leaf ovate, lanceolate, about as long as broad; apex acuminate; ears rather acute, naked; tragal lanceolate, acute.

Inhab. Brazils.

Length of wing-bone 1" $7\frac{1}{2}$ ''' ; tarsus $8\frac{1}{2}$ ''' ; foot 5''' ; thumb 5'''.

I received this specimen under the name of *Phyllostoma rotundatum*, which is probably the MS. name of some German zoologist.

3. DESCRIPTION OF A NEW HERON. BY JOHN GOULD, Esq., F.R.S. ETC. ETC.

ARDEA LEUCOPHÆA, n. sp.

Forehead and upper portion of the crest white; sides of the head and lower portion of the crest deep glossy black; neck white, washed with vinous, and with a series of lanceolate marks of black disposed alternately down the front; all the upper surface, wings and tail dark grey, the lanceolate feathers of the back fading into white; edge of the wings buffy white; primaries and secondaries dark slate-colour; flanks and under surface of the wing grey; chest and abdomen white, separated from the grey of the flanks by a series of black feathers; under tail-coverts and thighs white; bill yellow; tarsi olive.

The young differs in having the whole of the crown of the head

black; all the upper surface greyish brown; and the under surface striated with brown and white.

Total length 38 inches; bill 7; wing 19; tail $7\frac{1}{2}$; tarsi 5.

Hab. India and Australia.

Remark.—Having carefully compared examples of this species with the Common Heron of Europe, I find it differs from that bird in being altogether of a larger size, and that the line of the bill, instead of being straight, has an upward tendency; in other respects they are very similar.

4. ON THE HABITS OF *MABOUYA AGILIS*. BY P. H. GOSSE.

In the parts of Jamaica with which I am familiar, this pretty, active little Scink is abundant. It is most numerous in the lowlands, and on the gently-sloping hills of moderate elevation that form the characteristic feature of the southern side of that beautiful island. The fences there are largely composed of 'dry-wall,' built of rough unhewn stones, without cement. On these walls the *Mabouya* may be seen crawling, and often lying quite still in the sunshine; when alarmed it darts with lightning-like rapidity into one of the crevices which abound in all parts of such a structure. Indeed it rarely ventures far from some refuge of this kind, and I presume that the facilities for instant retreat afforded by these pervious walls are the chief cause of its preference for them. It is scarcely ever seen on the ground, except when avoiding danger; nor on the trunk or branches of trees or shrubs; but in the concavity of a pinguin leaf (*Bromelia pinguin*) it is occasionally observed to lie, basking in the sun.

The rounded form of the head and body, devoid of projections; the close-lying and glossy scales; the shortness of the legs, bringing the belly flat upon the ground; and its constant habit of resting with the chin on the ground also, give to the *Mabouya* an aspect very much unlike that of our other common lizards, and cannot fail to remind even the least observant of its affinity with the serpent-tribes. The negroes, in the recognition of this proximity, doubtless, have bestowed upon it the appellation of "Snake's waiting-boy," or more briefly, "Snake-boy." In the parishes of St. Elizabeth's and Westmoreland it is also frequently called the "Woodslave," though in other parts of the island this term seems to be applied to some of the *Geckotidæ*. From the shortness of its legs results also another resemblance to a snake, for owing to the shortness of the steps, if made only with the legs, it throws the shoulder and the hip forward at each step; and this throwing-out of the sides at different parts alternately produces a wriggling motion, somewhat serpentine in appearance.

The Woodslave is not very easily captured alive: the hair-noose so successfully used in taking our other small lizards I have always found to fail, if tried on this species; for though it is not difficult to pass the noose over the head (the reptile allowing this so long as its assailant's approaches and motions are deliberate and gentle), it is instantly slipped off again, because there is no sensible contraction

behind the occiput, and the scales lie too smoothly to afford the slightest hold. They are too wary and too swift to be caught by the hand. A smart tap with a switch, however, across the shoulders or the back disables them for awhile; but if the blow descend on the tail, that organ instantly separates, with the like brittleness, as in other lizards. Cats not unfrequently catch them.

The form of the scales and the manner of their apposition remind us of the fishes: they are convex above, concave beneath, are slightly attached to the skin, and lap over each other at the edges. The colours of the animal are produced by pigment deposited on the under surface of the scales, which in a scale recently removed is soft, and readily rubbed off: the skin beneath is black. The scales, which are subpentagonal, are marked with a series of regular lines, indented on both surfaces, connected by transverse ones, somewhat like the nervures in the wing of an insect; they lose themselves before they reach the hinder edge. The pigment is deposited in the centres of the areas formed by the lines. The scales from the back and from the belly are alike; but the postreme two-thirds of the tail are covered, both on the upper and under surfaces, by narrow transverse plates, which do not essentially differ however from the other scales, except in having a greater number of parallel depressed lines.



A scale, magnified.

The beautiful provision for protecting the eye without impeding vision, shown by the lower (and larger) eyelid having a sort of window, a transparent, glassy, circular plate in its centre, immediately opposite the pupil when the eye is closed, is well-worthy of admiration as an obvious example of creative wisdom and providential care. Habitually darting to and fro in the narrow crevices of walls and heaps of stones, the eyes of the Woodslave, if unprotected, might be continually liable to injurious contusions, while as it feeds on the insects, at least in part, that resort to such situations, undimmed vision would be essential to it while permeating them.

The Woodslave is viviparous. I first became aware of this fact by the dissection of a specimen killed on the 11th of February, in the abdomen of which were several oval sacs, about half an inch long, composed of a soft, transparent, very tender membrane, which displayed a fetus within each, far advanced to maturity. And on the 29th of April I killed another female, the abdomen of which was very much dilated: in this specimen I found four young, quite matured, and fully coloured, with a brilliancy indeed superior to that of the adult: they were enveloped in two sacs, but each fetus was inclosed in its own amnios besides, a very delicate membrane in which it lay coiled up; the vitellus not quite absorbed, but attached by the funis to the belly. There was also a portion of the tail of a fifth fetus, the body of which had probably been forced from the abdomen of the parent, through the wound which killed it. The young measured, from the muzzle to anus, $1\frac{4}{10}$ inch; thence to extremity of tail $1\frac{9}{10}$ inch. These two specimens, displaying the contents of the abdomen *in situ*, are now, with other specimens of both sexes, in the British Museum.

I afterwards found that this fact had not escaped the observation of the indefatigable Robinson; for, on consulting his manuscript volumes in Kingston, I met with the following notes, recorded nearly a century ago:—"No author that I have met with has observed that any animals of the Lizard-kind are viviparous; yet I have by accident discovered that the smooth Snake-lizard of Jamaica brings its young forth alive. Mr. Long having caught one of these alive, tied it all night upon a table with a thread, and in the morning found a young one or two lying near the other, which was a full-grown one. Being at a loss to account for this, as imagining that all the Lizard-kind were oviparous, he called upon me to know my sentiments. It appeared very plain to me that this animal was viviparous; nor does this seem strange to me, when I consider that some of the Serpent-kind are also viviparous, viz. the Viper and Rattle-snake.

"Some time in August 1760, as I was looking over a parcel of preserved lizards, finding amongst the rest one of these Snake-lizards full-grown, with the belly very much distended, in which state they may be often seen,—I took my penknife, and endeavoured to cut the abdomen open, but found it so well defended by a covering of very small hard scales, like those of a fish, that my knife would not enter till I had scraped them away, when opening the abdomen I found two beautiful young ones, about two inches long." (Rob. MSS. iv. 47.)

The stomach is a lengthened sac. In specimens that I examined I found small cockroaches, fragments of crickets, &c., insects which live in heaps of stones. In one specimen I observed a few slender, rather short, intestinal thread-worms, loose among the abdominal viscera.

Sloane's '*Lacerta minor lævis*' (tab. 273. fig. 5) is certainly the present species, and is not a bad representation. His description, however, like most of his zoological notes, is full of confusion and error. He says, "This is bigger than the former [which I think to be the female of the Purple-tailed *Anolis**], smooth, having a great many brown spots, otherwise much the same [!], laying a very small, white, hard-shelled egg (fig. 6) [which is however the egg of a common little *Spheriodactylus*], nestling in rotten-holed trees [here he confounds it with *Gecko rapicauda*], leaping from one bough to another [here with the *Anoles*]; 'tis very common among old palisades, &c." It is very evident to me that Sloane's zoological notes were but in a slight degree the result of his own observation; he trusted to the loose reports of negroes and others, generally correct of something or other, but very often misapplied, the local names and habits of widely different species being huddled and mingled together in almost inextricable confusion. That fruitful source of error, the application of the same names to different species in different (and sometimes in the same) localities, to which I have alluded in my '*Birds of Jamaica*,' p. 177, against which a naturalist should always be on his guard in a foreign country, appears to have misled our venerable naturalist. Nor does it seem to me disrespectful to the name of that great man thus to expose his mistakes, since I feel able

* I hope to describe this species in a future memoir.—P. H. G.

to speak positively, from long-continued and familiar personal observation, and because precision in the narration and application of facts is of the highest importance in natural science.

I subjoin a description, noted from the living animal. Head, neck and fore-part of back, reddish brown, bronzed; a broad band of black runs from the muzzle on each side, inclosing the eye, and passing down to the hind-leg; this band is bounded, both above and below, by a band of yellowish white, gradually becoming obsolete between the fore- and hind-leg; each of these pale bands is again bounded by a line of black, more or less interrupted or maculate, the superior of which extends along the tail; lower back and tail, greenish brown; whole under-parts greenish white, silvery; upper surface of the limbs and feet black, with pale confluent spots. The whole animal reflects a metallic gloss. There is no appreciable difference in the sexes.

Dimensions of one measured, a gravid female, of rather large size:—Length, muzzle to anus $3\frac{7}{10}$ inches; tail $5\frac{1}{4}$: total nearly 9 inches. Muzzle to eye $\frac{5}{20}$ in.; muzzle to ear $\frac{7}{20}$ in.; muzzle to front of fore-leg $1\frac{2}{10}$ in.; axilla of fore-leg to front of hind-leg 2 in.; fore-leg, from axilla to tip of claws, $\frac{9}{10}$ in.; hind-leg $1\frac{3}{10}$ in.

This is the only species of *Mabouya* that I found in Jamaica. Is *M. Sloanei* (Dum. et Bib.), which is ascribed to the same island, really distinct?

May 23, 1848.

R. C. Griffith, Esq., in the Chair.

A letter was read from the Hon. J. Thomason, dated Agra, March 21, 1848, in which he informed the Secretary that in the course of an official tour made in the previous year to Almorah in Kumaon, he had learnt that some Butias had brought down a young Kiang (*Equus hemionus*) to the fair at Bugesur, a few miles from Almorah. Having succeeded in purchasing this animal, Mr. Thomason forwarded him to Allahabad and Calcutta, made arrangements at the latter place for his transport to England by the earliest opportunity, and directed his agents to present the animal on his arrival for the acceptance of the Society, to whose collection Mr. Thomason trusted that he would form a desirable acquisition. The letter contained a clever sketch from life, and the following

“ *Principal measurements of the Kiang.*

	ft.	in.
Height to withers	3	10
Height behind	3	$11\frac{3}{4}$
Depth of chest	1	$7\frac{1}{4}$
Girth of body below chest	3	$11\frac{1}{4}$
Length of head from muzzle to top of forehead	1	8

	ft.	in.
Length from forehead to point of shoulder	1	11
Length from point of shoulder to tail	3	0
Breadth between eyes across head	0	8
Length of ear	0	8½

“He is a stallion, and has a broad dark stripe down the back, and a fainter stripe across the shoulders.

“He is said to be about a year and a half or two years old, and was caught when very young by a Hunia.

“He is not nice in his food, and is perfectly tame. He is not at all timid, but in stubbornness and obstinacy surpasses even the common ass. In order to save him from the ill-treatment and injury to which his stubbornness would expose him, a poney was provided to accompany him to Calcutta. When this poney was led in front, he followed quietly; but when alone, he could with difficulty be made to move a single step.”

After some remarks by Mr. Gray and other Fellows of the Society on the interest with which Mr. Thomason's specimen of the Kiang would be received in this country, the following paper was read.

OBSERVATIONS RELATING TO SOME OF THE FORAMINA AT THE BASE OF THE SKULL IN MAMMALIA, AND ON THE CLASSIFICATION OF THE ORDER CARNIVORA. BY H. N. TURNER, JUN.

Of all those parts of an animal frame to which the zoologist may direct his search for characters truly indicative of the affinities of the species, or of the group to which it obviously belongs, there is perhaps none in which a greater number of such characters are presented at one view than in the lower surface of the skull. Here are seen,—not only the teeth, whose differences of structure always have, and always will be, made considerable use of in assigning characters to zoological divisions, in whatever way our opinions as to the value of the characters derived from these organs may be modified by further researches,—but also the form and development of the zygomatic arch, with the capacity of the temporal fossa, and the mode in which the jaw is articulated; the form and extent of the bony palate, with its pterygoid appendages, the situation of the occipital foramen, and the structure of the condyles to which the atlas articulates, and many other characters of greater or less apparent consequence, may in the under surface of the cranium be all distinguished at a glance.

Accordingly we find that such of our more modern naturalists whose endeavour has been to fix classification upon a truly philosophical basis, instead of resting satisfied with the arbitrary subdivisions formerly in use, have directed their observations particularly to this part, so that the more obvious characters which it affords have been well observed, and turned to very useful account in determining the extent and affinities of groups; but in some cases, where, from the very close alliance existing between the genera, the differences presented in this part are necessarily very minute, their importance in a zoological point of view has not as yet been recognized. As some of the characters of which I propose to avail myself in the

classification of the order Carnivora consist of peculiarities in respect to certain of the foramina at the base of the cranium, I may perhaps be permitted, although the foramina have already been to some extent studied by those who have entered minutely into the details of mammalian osteology, to point out some instances in other orders, where, in the course of such observations as my opportunities have permitted, I have noticed relationships between the peculiarities presented by the foramina and certain natural groups already established by well-marked characters.

For example, when we see that throughout the whole series of Marsupial Mammalia—an order which, notwithstanding the widely different modifications which its forms present, is marked by many striking peculiarities of structure which quite isolate it from all other members of the class—a number of minor peculiarities are equally constant, and therefore in any species equally indicative of that particular type of structure; and among these, that the internal carotid artery does not enter the cranial cavity, as in most mammalia, by a foramen in the tympanic bone, nor—as is the case in many, and might here be well expected, from the small development of the tympanic bone—through a fissure between that bone and the basi-sphenoid, but through a special foramen, which is pierced on the side of the basi-sphenoid bone, and enters the skull in an inward and forward direction,—we are surely justified in attaching some importance to this peculiarity in a zoological point of view, and in considering it just as characteristic of the Marsupial order as the articulation of the head to the atlas by a double condyle is of the Mammalian class itself.

The remarkable differences in general structure presented by the skull throughout the Rodent order, so carefully investigated and judiciously applied to its classification in the researches of my accomplished friend Mr. Waterhouse, render it quite unnecessary to descend to such minute and comparatively unimportant characters as those which the foramina may afford; and from the frequent imperfection of bony development in these usually small and rather lowly organized mammalia, we cannot expect to find the characters presented by the foramina of so strictly definite a nature as those I shall have to point out in animals of higher types of structure; but nevertheless, when due allowance is made for these occasional imperfections of development, we shall yet find, that although the characters of the foramina in this order are not sufficiently decided to be very serviceable to the zoologist, they present a certain general accordance throughout the groups, which in connection with the present subject may perhaps give them some degree of interest.

In this order, the canal, for which I here propose the name of ali-sphenoid canal, and which serves to protect the continuation of the external carotid artery during a part of its course, seems to be of nearly constant existence, although in many species of the *Hystricidæ* it coalesces, through non-development of the separating lamina, with the fissure passing through between the walls of the pterygoid fossa into the orbit. The fissure alluded to, for which Mr. Waterhouse

suggested, though I am not aware that he has published, the name of interpterygoid canal, is a characteristic of this family. There is another remarkable canal which exists in I think I may say the greater number of the species in this order, and which I have not as yet noticed in any species of other orders: its posterior opening is near the foramen ovale, sometimes on the outside and sometimes on the inside of the cranium; it extends forwards a short and variable distance, then opens externally, and serves to transmit a nerve to the masticatory muscles: this canal, which is not unfrequently double, I will here, for convenience of reference, designate the external ali-sphenoid canal*.

The Hares present characters differing from the rest of the order, in the absence of the ali-sphenoid canal †, and in having a distinct canalis caroticus excavated in the tympanic bone; the external ali-sphenoid canal usually exists, and is double, but from imperfection of bony development is not always very clearly demonstrable.

The ali-sphenoid canal must be said to be of constant existence in the *Hystricidae* (as defined by Mr. Waterhouse), although, as I before observed, it often coalesces with the interpterygoid, through non-ossification of the lamina which separates them; for its outer wall is always distinct; and even in the Caviine subfamily, where the maxillary bone extends back to meet the temporal, the ali-sphenoid bone always lines the bridge thus formed, so that the canal no less deserves the name which I have ventured to propose for it. The external ali-sphenoid canal also exists in this family; it is not usually demonstrable in the *Caviina*, having apparently coalesced with the true ali-sphenoid; but in a large skull of the *Capybara* contained in the Society's collection it is very distinctly separated. In some of the Hystricine subfamily (*Sphiggurus*, *Erethizon*, *Chatomys*) this canal is double, and in such of them as have the true ali-sphenoid canal coalesced with the interpterygoid, the lower division of the external ali-sphenoid might perhaps be mistaken for it; but the true ali-sphenoid canal always opens anteriorly *within* the lamina which forms the external pterygoid process and the outer boundary of the coalesced foramina speno-orbitarium and rotundum, while both divisions of the *external* ali-sphenoid canal open on the outside of this lamina; in those species however which have the true ali-sphenoid canal separate, the homology is at once apparent.

Although the arrangement of foramina in the common Rat and

* This canal is alluded to by Cuvier (*Anatomie Comparée*, 2nd edition) in several cases; I will cite one of them:—"Dans le porcépic commun . . . il y a dans l'aile pterygoïde externe deux canaux, l'un inférieure, s'ouvrant en arrière à la racine de cette aile, un autre supérieure, et s'ouvrant près du temporal. C'est le premier qui paraît être l'analogue du canal vidien." That is, of the canalis ali-sphenoideus, as I shall hereafter show that it is not the homologue of the vidian canal; the second alluded to by Cuvier is the canalis ali-sphenoideus externus.

† Cuvier also observes, "Dans les lièvres . . . le canal vidien (the ali-sphenoid) n'est qu'un trou dans l'aile pterygoïde externe," and his editors add, within brackets, "et que l'on distingue dans l'orbite tout près et en dehors du précédent." The hole alluded to, however, from being situated quite in the depth of the pterygoid fossa, is much more like the interpterygoid canal in the *Hystricidae*.

the common Squirrel appear very different from each other, there is in fact but little to distinguish, so far as these peculiarities are concerned, between the families to which they respectively belong. In the latter animal, and indeed throughout the family, we find the following arrangement: the foramen ovale is a large round hole, within the edge of which open the posterior orifices both of the true ali-sphenoid canal and the canalis ali-sphenoideus externus, and also of a canal which only penetrates the substance of the basi-sphenoid bone, and meets its fellow from the opposite side. The foramina lacerum anterius and posterius are each of small size; I cannot perceive any distinct canalis caroticus. In the Rat the canalis ali-sphenoideus externus does not exist, its place being marked by a rather indistinct groove in the bone; the true ali-sphenoid canal is present, and its posterior opening is some distance anterior to the foramen ovale; the foramen entering the substance of the basi-sphenoid also exists, but is situated some distance behind the foramen ovale; from the posterior corner of the external pterygoid process there is continued a little bridge of bone, which arches completely over the foramen ovale: there is no canalis caroticus, a groove only representing it. But in specimens that I have dissected for the purpose, I have noticed that the *external* carotid artery actually enters the cranium through a canal in the posterior part of the tympanic bone, from which it emerges above, and after passing within the cranium for a short distance, passes out again through the long fissure that separates the anterior side of the tympanic bone both from the ali-sphenoid and the squamous bones; it then passes through the little bridge that crosses the foramen ovale, and then through the ali-sphenoid canal, after which it, as usual, meets with the second branch of the fifth pair of nerves, and accompanies it through the infra-orbital foramen to the upper lip. But the chief differences here pointed out between the Rat and the Squirrel seem only to consist in the extension backwards, in the latter, of the ali-sphenoid canal to the foramen ovale, and the presence or absence of the lamina that encloses the canalis ali-sphenoideus externus. Some genera of Rats (as *Cricetus*, *Cricetomys*, *Hapalotis*, *Hydromys* and others) present in these respects the same characters as the Squirrels, in some of the larger species of which we even see a very slender arch of bone just before the foramen ovale. However, in all those genera of Rats alluded to, the fissure by which the external carotid artery emerges from the cranium is very apparent, and I have not perceived it to exist in any of the *Sciuridæ*.

In the Edentate order, which, though so limited in the number of species, is far from being so in the variety of its forms, the foramina present characters which will connect together those forms which other and more important characters show to be nearly allied. In the Armadillos the optic foramen is small and distinct; the foramen rotundum has coalesced with the foramen spheno-orbitarium; the foramen ovale is a distinct, roundish aperture: there is usually a distinct canalis caroticus, but in the *Dasyypus seccinctus* it is only enclosed at the anterior part; and in one specimen that I have seen,

that of one side only is completely enclosed : the foramen lacerum posterius is very small ; there is a distinct foramen glenoideum. In the *Manis* the characters of the foramina are very similar, but there is no canalis caroticus.

In the *Orycteropus Capensis* the small optic foramen is placed back within the lamina enclosing the coalesced foramina speno-orbitarium and rotundum, so that in a side-view it is concealed : just before the foramen ovale is an opening into the substance of the bone : the foramen lacerum anterius extends all along the anterior and inner side of the bone of the ear ; the foramen lacerum posterius is of a roundish oval form ; the foramen condyloideum is very large : there is neither a distinct canalis caroticus nor a foramen glenoideum.

The Sloths have some peculiar characters of their own : in them the foramina opticum and speno-orbitarium are distinct within, but the orbito-sphenoid sends out a little process forming a canal, which serves as the external opening for both of them ; the foramen rotundum is quite separate, opening at some distance below : in the *Bradypus tridactylus* it opens just at the point where the vertical lamina of the palatine bone joins the orbito-sphenoid ; the foramen ovale is also very close to the junction with the pterygoid. There is a distinct canalis caroticus, but no foramen glenoideum ; the foramen condyloideum is large and conspicuous.

It is in the Pachydermatous and Ruminant orders, however, that I am enabled to show the clearest indications of accordance between certain characters of the foramina and the groups into which these orders are divided. In the elaborate and highly-interesting paper read not long since by Professor Owen before the Geological Society, in which he suggested the admirably-chosen names 'Artiodactyla' and 'Perissodactyla' for the two subdivisions of the Ungulate Mammalia, it is much to be regretted that he has in no way alluded to the characters which the under surface of the skull presents ; for they show three different types of structure, which, so far as those genera, of which the under surface of the skull is known, would indicate, appear very distinctly separable. Of these, two are included in the order Pachydermata, as usually adopted, while the third is that of the Ruminant. I am not at present prepared to offer any decided opinion as to the suggestion of Professor Owen, that the two orders ought to be united ; and indeed that question forms no part of the present disquisition ; but in pointing out the characters presented by the cranium in these three distinct types, I cannot but very much regret that I have not been able to meet with skulls of any of the fossil genera that afford the intermediate links by which Professor Owen proposes to unite the orders, in such a condition as to enable me to discriminate the characters of the basal portion of the cranium. Perhaps the absence of such specimens may in some measure account for the omission of any notice of these characters in the paper to which I have alluded.

In looking on the under surface of a Ruminant skull, the observer is at once struck with the great separation between the nidus of the last molar tooth and the walls of the canal of the posterior nares ;

while in both the divisions of the Pachydermatous order the connection between the palatine and maxillary bones is continued quite to the posterior termination of the latter. In the Ruminant the canal of the posterior nares is of immense depth in the vertical direction, its walls extremely thin, the true pterygoid bones reduced to thin laminae lining the posterior part of the canal, and forming the hamular processes; and although in the Camel and Llama, the external and internal processes (of which the former belongs to the sphenoid, while the latter is the true pterygoid bone) being each well-developed at the tip, there is a considerable notch between them, the outer pterygoid entirely wants that lateral expansion which in animals having a pterygoid fossa forms its outer wall.

The occipital bone has usually its basal surface flat, marked with eminences, of which different ones are more or less developed in different genera. In the Sheep there is a salient one on each side, rendering the surface of the bone between them quite concave; while in the Camel, the Ox, and the Deer, it is another pair of tubercles that are most developed, being situated close to the condyles, the articulating surfaces of which approach each other more than in the Hogs*, and in the Deer and Camel are even continued on to the tubercles. The paroccipital processes also in Ruminants take their origin more towards the outside than in the Hogs, and the space between this process and the condyle is much more deeply excavated. Each of the three separate types of Ungulata before-mentioned has likewise its distinct form of articulation for the under jaw. That of the Ruminants is a slight convexity, shelving off into a nearly semi-circular concavity behind, thus admirably adapted for the rotatory grinding motion of the under jaw; this concavity is bounded behind by a ridge, which terminates within in a small process †.

The following characters are afforded by the foramina:—The foramen ovale is large, distinct and exposed, completely enclosed by the ali-sphenoid bone; there is no trace of an ali-sphenoid canal, nor of a distinct canalis caroticus, it being represented merely by a notch in the auditory bulla, having merged into the adjacent fissures. The foramen condyloideum occupies a rather concealed situation, especially in the Deer, where it is quite hidden by the laterally expanding anterior termination of the occipital condyle: the foramen glenoidem (so named in the second edition of the '*Leçons d'Anatomie Comparée*') exists in Ruminants.

The Hogs and allied genera, constituting the artiodactyle division of the Pachydermata, are constructed upon a second type, also marked by characters seen in the under surface of the skull. The palate is flat and solid, its level much below that of the base of the cranium, extending back quite as far as the extent of the molar series, which throughout its length is closely applied to the walls of the posterior nares; therefore the large notch so remarkable in the Ruminant does

* In the Camel they are absolutely in contact below.

† This process, which is placed more outwardly in the equine type of Pachydermata, is in the Rhinoceros much elongated, and even touches the paroccipital, enclosing the meatus auditorius between them.

not exist, and the pterygoid fossa is nearly in a line with the molar series. The occipital bone presents characters strikingly different from that of the Ruminant; its surface is flat beneath, with a ridge along the middle; the condyles are rather distant from each other, their articulating surfaces terminating very abruptly in front; the paroccipital processes are straight, much prolonged in the genera *Sus* and *Babirussa*, placed less laterally than in either the Ruminants or the other division of the Pachydermata, and from each is continued inwards a ridge on about the same level with the base of the occipital bone, and on or near its summit the foramen condyloideum is seen. The space is short between the posterior nares and the auditory bullæ, and the origin of the zygomatic process, with its articulating surface, is so much pushed back, that a line drawn across from one to the other would pass right through the bases of the large udder-shaped processes of the tympanic bone; and the pterygoid processes of the sphenoid have so much lateral expansion, that when the true pterygoid bones have sufficient development to form the inner walls, the fossæ are very distinctly marked. For the articulation of the lower jaw there is a transversely elongated surface, concave transversely, slightly convex in the antero-posterior direction, which serves alone as a fulcrum for the movements of the jaw, since the space behind it is rugged and does not present the characters of an articulating surface.

But the group at present under consideration seems clearly to admit of separation into two distinct subdivisions, to the first of which, including the genera *Sus*, *Babirussa* and *Phascocharus*, the foregoing observations are intended more particularly to apply. Of the second, the Peccary and the Hippopotamus present us living examples, and to it the greater number of the extinct genera of artiodactyle Pachydermata must belong, if the difference which the two subdivisions present in the structure of the molar teeth be found constantly to accompany those of the skull*.

As so few genera of this second subdivision of the artiodactyle Pachydermata have presented their entire cranium for our examination, it will be better to content ourselves with pointing out the characters in which that of the Peccary, a convenient standard for comparison, differs from the genuine Hogs.

In this animal the pterygoid bones and processes are pushed nearer the middle, narrowing the aperture of the posterior nares; and although the adult Peccary shows no fissure between the alveoli of the

* In the very brief notice communicated to the Society last year by Mr. Hodgson, of a diminutive species of Indian Hog, on which he founds the genus "*Porcula*," it is much to be regretted, that while endeavouring to establish the zoological position of the genus between the Hogs and the Peccary, and mentioning, as approximating it to the latter, some very trivial external characters, together with the number of molars, which being six in each series, cannot indicate such an affinity, since the *Babirussa*, a true Hog, has (in the adult state at least) only five, he has omitted to acquaint us with the structure of those molars, which it might have been expected that a naturalist would have made the subject of particular observation, and which would very probably have decided the point of affinity in question.

molar series and the walls of the nasal cavity, yet in a rather young skull of *Dicotyles labiatus*, where the penultimate molar has not quite risen into its place, and the last remains still imbedded in its socket, there is on each side a narrow fissure between the posteriorly projecting nidus and the pterygoid appendages; but this character can scarcely be reckoned among some others which do seem to approximate the Peccary to the Ruminants, since the fissure is great even in the adult Ruminant, and in no adult member of the Pachydermatous order does the termination of the molar series extend back so far as to reach the anterior termination of the pterygoid appendage.

It is in the occipital bone that the Peccary departs most from the character usual in the Hog-tribe, and approaches to that structure which is presented by the Ruminants, and by the other large group of Pachydermata. The origin of the paroccipital processes and the absence of the ridges extending inwards from their bases, together with the position of the foramen condyloideum, approximate the genus to the last-mentioned groups; but the processes themselves, although they are short, approach nearer in form to those of the Hogs. The lateral expansion of the pterygoid processes, although still considerable in *Dicotyles labiatus*, is much reduced in the Tajaçu. The glenoid cavity is not pushed back to the same extent as in the Hogs, and its level is relatively much lower than either in them or in the Ruminants, so that a line drawn through the posterior terminations of the articulating surfaces would pass through the auditory bullæ near their lower surfaces; and the structure of the glenoid cavity itself is quite distinct, somewhat resembling that so characteristic of the order Carnivora. It is an oblong surface, lengthened in a direction slanting from behind forwards and outwards, and is concave in the antero-posterior direction. The Hippopotamus shows itself to be closely allied in the structure of the occipital bone and of the glenoid cavity: the pterygoid bone is not sufficiently developed to form the inner wall of a fossa*.

In both divisions of the artiodactyle Pachydermata the foramen ovale is not completed by the ali-sphenoid behind, but truly merits the name of a "foramen lacerum": there is no trace whatever of the ali-sphenoid canal, nor of the canalis caroticus, nor, in the true Hogs, of the foramen glenoideum; this however exists, but is very small in the Peccary, in which also the position of the foramen condyloideum differs from that of the true Hogs in a degree corresponding to the altered structure of the occipital bone.

The third great type of Ungulated Mammalia (the *Perissodactyla* of Professor Owen) is also marked as distinctly by the conformation of the base of the skull, as by that characteristic structure of the tarsus which enables the palæontologist, on looking only at an astragalus, to recognize "the armed Rhinoceros" as readily as if the animal complete were presented to his view. The skulls of the Horse, the Tapir, and the Rhinoceros, when we look on their under surfaces,

* In an excellent skull of this animal contained in the Society's collection, the lacrymal bone forms within the orbit a considerable osseous bulla, having thin parietes, and apparently destined for the protection of the lacrymal sac.

show at one glance so striking a similarity of plan, that if we can but divest ourselves of prejudged notions, which the great contrast in external form may have imparted, we cannot doubt their close alliance; and the little Hyrax, the only other living genus of this family, when we make allowance for those differences of proportion invariably existing between species organized upon one plan, and differing much in size, will also be found closely to resemble its more gigantic relatives. In this group the bony palate is curtailed in length, its level not much below that of the base of the cranium, and the size of the posterior nasal orifice made up chiefly by its great increase of length in the antero-posterior direction. Here also there is no fissure between the wide-spreading walls of the nasal canal and the nidus of the last molar tooth. The form of the auditory bulla presents a nearer approach to the Ruminant than the Hog, as also does the occipital bone, especially in the form and relative position of its condyles and paroccipital processes; but the under surface of its basal portion is flat, and very convex in the transverse section; the lower jaw articulates on a fulcrum similar to that described in the true Hogs, but posteriorly is a smooth concave surface, which terminates behind in a characteristic salient process. Among the characters of the foramina this division is well-distinguished from either of the others by the presence of the ali-sphenoid canal, which exists in all the living genera, and, as already pointed out, is wanting both in the Ruminants and in the Hog-tribe*.

This canal is also present in the Elephant and Mastodon, an aberrant division of the order, also possessing toes in uneven number, and still further characterized by being the only members of the Ungulate division that have a distinct *canalis caroticus*, and by their wanting the foramen condyloideum.

A sufficient number of examples have now I think been adduced, to show, that although the instances may be few in which a group could be isolated by characters drawn from the foramina alone, yet in most cases they will be found to be of some assistance in marking the limits of closely-allied divisions; and even in those cases which I have brought forward, it is far from my intention to advocate that

* Since this paper was communicated to the Society, it has struck me that the similarity of structure (which must have been observed by every naturalist who has given attention to the subject of dentition) existing between the premolars and true molars in the members of the Perissodactyle division, may prove an important addition to the zoological characters of that group. This must of course depend upon the confirmation, by further researches, of the idea, that in most Mammalia a *pre-molar* represents, in the homologies of its component parts, only the *half* of a *true molar*; but there can be no doubt that in the group alluded to the premolars each represent the *whole* of a true molar, for the resemblance in most cases is very striking. Among all the genera, the extinct *Lophiodon* is that which looks most like an exception: unfortunately, I have never had access to any specimens of this genus; but so far as I can judge of it by the figures published, I should be inclined to the belief that further researches will show, that notwithstanding the apparent dissimilarity, the premolars of the *Lophiodon*, as well as those of the other members of the group, each represent the whole of a true molar; and that in the other divisions of the Ungulata, as well as in most members of the class, the half only of a true molar is typified.

any use need be made of such characters as these, when the groups can be so well established upon characters more obvious and important in their nature.

We frequently find groups which, though very extended as to the number of species they contain, are much more limited in respect to the varieties of structure they present than other groups apparently of equal rank containing a much smaller number of species. Such groups are of course always the most easy to isolate, but the most difficult to subdivide: it is in these that we find the most confusion existing, and the greatest variety of opinion among naturalists as to the manner in which their subdivision should be effected. Excepting in the highest divisions, it is but of late years that naturalists have at all appreciated the distinction between what are usually termed "essential" and "adaptive" characters, of the former of which, as we descend to the lower groups, not only is the existence, but also the importance, much less easily recognized.

The base of the cranium, as I before observed, is, from its having less connexion than most parts of the bony framework with the peculiar wants of the species, by far the most rich in such characters; among those which the foramina may afford, I must here dwell rather particularly on the evidences of affinity afforded by the presence or absence of the ali-sphenoid canal, and also explain my reasons for assigning it a new name. As will appear from the observations I have brought forward, it exists throughout the Rodentia, excepting the aberrant family of Hares; it is wanting in the Marsupials and Edentata; and among the Ungulate division, including the Ruminants and Pachydermata, the Artiodactyle division, including the Ruminants and those Pachyderms which have the toes in even number, is constantly characterized by its absence; while in the Perissodactyla it is as constantly present. In the first edition of the '*Leçons d'Anatomie Comparée*,' the illustrious author only alludes to this canal in a very vague manner; and in the more recently published edition, in which the osteology of the cranium is much more fully elaborated, it is spoken of everywhere as being the vidian canal,—the existence of a vidian canal being denied in those animals which do not happen to possess it. From the time when I commenced the series of observations of which the present is an attempt to sum up the results, I always felt inclined to the belief that the canal in question did not correspond in situation to the vidian canal as known in Human Anatomy, since this canal commences just at the root of the internal pterygoid process, while that pointed out as such in the work alluded to is quite on the outside of the homologue of the outer one. Among the rest, the Monkeys are spoken of as wanting the vidian canal; but on removing from the skull of a small monkey in my collection the whole of the posterior portion, and the temporal bones with auditory bullæ, the posterior apertures of the vidian canals became very apparent, and fine bristles passed readily through them into the orbits; and in other skulls belonging to the Quadrumanous order, provided that those portions of the upper maxillary bone which originally constitute the alveoli of the hinder molars do not rise high enough to

conceal the vidian canals, and that the skull be sufficiently well-cleaned, their anterior openings can usually be seen without difficulty. I have succeeded in tracing it throughout the Carnivora, Ruminantia, Pachydermata* and Edentata; it is always, at least in its posterior portion, wholly or partly enclosed by the true pterygoid bone, which constitutes the inner wall of the pterygoid fossa, so that the term "pterygoid canal," which has been applied to it in Human Anatomy synonymously with that of "vidian," is very correctly applicable. Its anterior opening is always just beneath that of the foramen speno-orbitarium, so that the issuing nerve can communicate readily with the second branch of the fifth pair, soon after its exit through the foramen rotundum. It may be further remarked, that the opening of the true vidian canal is always on the inner side of the foramen rotundum, while that of the ali-sphenoid canal is always on its outside, and usually covers and conceals it. However, I think I have removed all doubt by the dissection of a sheep's head, in which I have traced the vidian nerve from its junction with that of the seventh pair to the foramen in question; the course of the nerve is usually longer and more tortuous in the lower animals than in Man.

I have also perceived in some skulls belonging to the Marsupial order, a canal which from its situation seems to be the vidian; in the Rodent order, a distinct vidian canal seems rendered needless by the constant existence of a fissure communicating between the posterior nares and the apex of the orbit, and in some skulls I can even see faint indications of a groove extending from the foramen lacerum anterius round the inner side of the base of the pterygoid bone to the margin of the fissure; but I would not at present venture to deny the existence of a vidian canal in any species, considering that, with the exception of some Edentata, as the Armadilloes, in which its calibre is proportionally very large, it is extremely difficult to perceive in any small-sized animal.

It now becomes my task to place in an intelligible light, the observations on the crania of the Carnivora, which have led me to believe that the classification of this order may be set upon a firmer basis than that afforded by the characters generally made use of. In the course of the present disquisition, I must be allowed to consider this order exclusively of the Insectivora and Marsupials, which are by many naturalists included, the former indeed most usually, as part of the order in question. When the order Carnivora is thus circumscribed, we find it to consist of a very great number of species, being exceeded in that respect among the Mammalian class only by the Rodentia; and notwithstanding the striking difference of ex-

* In the justly celebrated work by Mr. Swan, on the Comparative Anatomy of the Nervous System, it is said that the Common Hog does not possess a distinct vidian nerve running in a bony canal; and certainly, I have not very clearly succeeded in demonstrating the canal in that species, but a skull in my collection of the *Sus Indicus* shows it very well; in the Babirusa, the anterior and posterior portions of the canal each open into the sphenoidal sinus, which has great extent in that animal.

ternal appearance that may be noticed among its members, so that we should anticipate but little difficulty in subdividing the order into a number of natural groups, the confusion, and differences of opinion that have existed, not only as to the manner in which the order should be divided, but also as to the position which certain forms should occupy, show sufficiently that the task is by no means an easy one; and when the structure of the different members of the order is investigated, and those forms are known to us by which the most strikingly different genera are blended one into another, it becomes difficult to draw the lines of separation, and still more to fix the characters by which the groups can with accuracy be distinguished from each other. In the present state of zoological science, it seems scarcely worth while to allude to the distinction of plantigrade and digitigrade, which though due to no less an authority than Cuvier, can hardly be said to possess any claims to the title of a philosophic distinction. Indeed the former of these divisions, if the character be fully insisted on, will include a very incongruous assemblage of forms.

It is upon the differences of the teeth that the subdivision of this order has been made chiefly to depend; but, although it does so happen that in most cases the affinities of a species may be truly predicated by the inspection of these organs, there are some in which naturalists have been led into error by too rigidly depending on them; it must be recollected that, especially in an order like this, where we find among the different species, every gradation between a purely carnivorous diet, and the capability of subsisting entirely on vegetables, the teeth, by the various degrees to which the different cusps are developed, and also by the point at which the normal development of true molars from behind may be arrested, present a very great variety in the amount of tubercular surfaces, or of trenchant edges, to suit the regimen of the species, without any necessary connection with its true affinities. For instance, the remarkable variation in the number of true molars presented by the different genera of the Dog-tribe is known to naturalists; and my own collection possesses the skull of a small dog in which, such is the arrest of development resulting from the shortening of the jaws, that although the individual was very old, it had never developed more than one true molar above and two below, or one behind the carnassial tooth in each jaw, being one less than is usual in the species.

If we except the aberrant family of Seals, we find that this order does not present so many of those very striking extremes of adaptive modification as are to be met with in some others, the generally lithe and active form prevailing through the order rendering a very moderate amount of adaptive modification necessary to fit the animal for almost any situation and mode of life, and from this cause it also happens that since the fallacious nature of the old division into plantigrade and digitigrade has been generally perceived, the classifications of this order most usually adopted by naturalists have approached much nearer to those natural divisions, which, the essential

characters point out, than in many other orders; but at the same time, the general similarity of structure, to which I have before alluded, pervading the different modifications of form, has rendered it more than usually difficult to find characters truly essential, and independent of adaptive differences, on which to found truly natural subdivisions. These characters, when found in such an order as the Carnivora, we may fairly presuppose to be minute, and such of them as I have been able to discover, and which I have found to be constant so far as my opportunities of observation have extended, it is my object here to point out; with regard to the foramina, there is one which seems to be very characteristic of the order itself, since even in the true Bears, in which it does not exist as a canal, it is represented by a very well-marked groove. In other Carnivora it consists of a canal situated on the inner surface of the exoccipital bone usually running from before backwards and downwards; it gives passage to a vein; and if a special name should at any time be deemed requisite, perhaps that of exoccipital canal may be found suitable. The characters of which I purpose to make more or less use in the subdivision of the order, are the structure of the pterygoid bones and processes, the presence or absence of the ali-sphenoid canal, the form of the auditory bulla, and the course of the internal carotid artery through its canal, the structure of the mastoid and paroccipital processes, the situation of the foramen condyloideum, and to some extent, the structure of the lower jaw. It is by the fortunate circumstance of possessing in my own collection, crania representing all the leading divisions of the order, that I have been enabled, in the first instance, to remark the differences presented by the characters alluded to; but excepting a few genera, which I have been enabled to examine in the museums of the College of Surgeons and of this Society, it is only in the excellent series of skulls contained in our National Museum that I have been able to collect evidences of their constancy. Such being the limits of my opportunities of observation, it cannot be expected that I should give an opinion as to the precise zoological station of every one of the numerous genera; I will therefore take as a standard system the classification made use of in the List of Mammalia published by Mr. Gray, by order of the Trustees, since in the principal divisions it accords pretty nearly with my own ideas; simply pointing out where I find any genus whose cranium I have examined which I think requires to be altered in its position, and at the same time assigning to the divisions characters of my own, and expressing my opinion as to their rank.

Although in that classification the Bears are placed near the termination of the series, yet I believe it to be most usual to reverse the order and to begin with them; therefore I will first point out the characters which they present, and in so doing will confine myself to the genus *Ursus*, the subfamily *Ursina* of Mr. Gray. We here find no trace of a pterygoid fossa, the outer pterygoid process being closely pressed against the inner one, or true pterygoid bone, and sending off a strong lamina of bone to enclose the ali-sphenoid

canal, and, almost from its apex, a strong column of bone which runs backwards extending behind the foramen ovale, which it quite converts into a canal.

The auditory bulla, although, from the rough flat surface which it presents, it scarcely merits that name, yet may be perceived to show the same essential character as in the Weasels, which is, that it rises suddenly on the inner side at once to its greatest prominence, and is then flattened off towards the meatus, which is rather prolonged. The course of the internal carotid artery, as indicated by the canal excavated for it in the bone, is as follows:—it enters by a true *canalis caroticus* excavated in the bone of the ear, commencing quite behind, in the same fissure in which open the foramen jugulare and the aperture through which the *nervus vagus* issues from the skull, and extending forwards in a slightly arched direction again emerges anteriorly, and curving round, enters the cranium in a backward direction through a round foramen between the sphenoid bone and that of the ear, close to the aperture from which the Eustachian tube would issue, and corresponding to the foramen lacerum anterius; there is a distinct foramen glenoideum, although opening rather more inwardly than usual; the mastoid and paroccipital processes are both largely developed, and, owing to the very slight projection of the auditory bulla, stand out very distinct and prominent; the foramen condyloideum anterius occupies an exposed situation; the foramen condyloideum posterius I have never seen in any skull but the human, and there it is said to be sometimes wanting. The characters presented by the lower jaw in the Bears are essentially those most usual, though not quite constant, among the Weasel group; the angular process is pushed up very near to the condyle, and much flattened beneath; the form of the coronoid process is somewhat that of the true Weasels, but owing to the jaws being in the Bear more pushed forwards relatively to the situation of the cranial cavity than in the Weasels, this process is more pushed backward to meet the temporal muscle, which is spread over the sides of the cranium. With regard to the little process projecting beneath and anterior to the angle of the jaw, it is a mere superaddition, which appears again in the *Cercoleptes caudivolvulus* among the subursine group, and also in the *Otocyon Lalandii* and the *Nyctereutes procyonoides* among the Dogs, in these having the form of a large vertical lamina, projecting from the lower surface of the jaw; it is also seen like a second angular process in the Seal, so that I should not feel inclined to assign to it more than a generic value.

The small group of plantigrade Carnivora known to naturalists as the "Subursine group," I will reserve for consideration by and by, and proceed to characterize the Weasel group, the subfamily *Mustelina* of Mr. Gray.

In this group the pterygoid appendages very seldom manifest any tendency to form a fossa, although in many species the outer surface is rough and marked with ridges for muscular attachment; from behind is continued most usually a ridge which runs backwards and

outwards along the lower and posterior margin of the foramen ovale. This group is constantly marked by the entire absence of the ali-sphenoid canal. In the remaining characters this group presents no essential difference from the Bears; the commencement of the canalis caroticus is usually near the middle of the inner side of the auditory bullæ, and anteriorly the vessel does not again quite reach the outside of the cranium, simply showing itself at the point where it doubles, through the cartilage covering the foramen lacerum anterius. The characteristic form of the auditory bulla has been alluded to, and may be traced through the different modifications which it presents; these mostly depend simply on the size of the species, it being much more swollen in the smaller ones, and in the small species of true Weasel much elongated: the mastoid and paroccipital processes also are developed in relation to the dimensions of the species, or even the age of the individual; in the smallest species they have scarcely any projection, while in the larger ones they show the same essential structure as in the Bears, and different from that to be described in other groups. The peculiarities usually exhibited in this group by the lower jaw deserve some mention, even though not sufficiently constant to characterize the group, because some similar characters are seen in certain genera of the Viverrine section, which also show some approach to the Weasels in the characters of the base of the cranium, and therefore seem to be entitled in their own group to the place nearest the adjoining one. The characters in question are, that the coronoid process is rather more upright, and has less curvature than usual in the order, and the angular process is placed closer to the condyle, and is flattened beneath. The straightness of the lower margin of the jaw, alluded to by Mr. Waterhouse in a short communication published a few years ago in the Proceedings of the Society, I will consider by and by.

In the *Viverrine* group there is always a distinct indication of a true pterygoid fossa; the ridge by which it is bounded externally is, in the true Civets, cut off suddenly behind: in the *Paradoxuri* and allied genera it extends further, being blended with the walls of the ali-sphenoid canal, and in some species terminating laterally in a minute process. In the *Herpestine* genera, which are those most approaching to the Weasels, the true pterygoid bones are more extended backwards (which is most usually the case in that group, and also in the Bears), and the outer margin of the fossa is very suddenly cut off, as in the true Civets. With very few exceptions, the ali-sphenoid canal is present in this group: in the second edition of the 'Leçons d'Anatomie Comparée,' the *Genets* are spoken of as wanting it; it exists however in the skulls that I have seen; the only exceptions that I have as yet met with are in the skulls of the *Rasse* (*Viverra malaccensis*) and of the small species of *Galictis*, recently described by Mr. Gray. In all the other characters, however, these crania indicate clearly the natural affinities. Had these exceptions been of the opposite kind, that is, had the ali-sphenoid canal been present in some species of a group in which it is usually absent, they might have been serious obstacles to the use of this character; but

since they seem to be merely instances of non-development of the bony lamina which should enclose the canal, I think we need not deprive ourselves of the assistance the character affords in the discrimination of groups; and further, I believe it will be found that by taking the aggregate of the characters I am here attempting to describe, the true affinities of any member of the order may without much difficulty be ascertained. The foramen glenoideum, when existing in this family, is of very small dimensions; the auditory bulla has very distinctly the appearance of being divided into two portions, of which the posterior is much the larger, and elongated in form: the more anterior division, which encloses the meatus auditorius externus, is much smaller, and partly overlapped by the other. In *Herpestes* and the genera allied to it the separation is rather less distinct, and the general form of the bulla partakes a little of that of the Weasels. The canalis caroticus is most frequently represented simply by a groove in the inner side of the auditory bulla, to give protection to the artery before it enters the cranium by the foramen lacerum anterius; but in most of the Herpestine genera it is protected by a closed canal, as in the Weasels. These genera, however, have a slight peculiarity of their own in respect to the entrance of the internal carotid artery, and that is, that after emerging from its canal it runs exposed for a short distance before finally entering the cranium. One of the most striking of the essential characters in this family is the structure of the paroccipital process; it is spread out, widened, and closely applied to the posterior surface of the auditory bulla, and the foramen condyloideum is by this means more or less concealed within the aperture of the foramen jugulare: these characters are very distinct in the Civets and Paradoxuri; in the Herpestine genera they are manifested a little less in degree, and the mastoid process is a little more extended, also spread over the auditory bulla, and blended with the paroccipital, so that the bony plate clothing, as it were, the posterior part of the bulla, has the appearance of being pushed a little towards the side.

The characters of the lower jaw, I before remarked, although not sufficiently constant in all cases to separate the groups, sometimes show interesting marks of affinity. In most of the genera of this group the coronoid process curves gently backwards as it rises, which is also its character in the Dogs, the Cats, the subursine group, and even in a few of the Weasels; but in the *Herpestes*, of whose approximation to the Weasels I have already mentioned so many indications, it presents that form of the coronoid process which characterizes most of the members of that group; and the angular process, although it is a salient process, as usual among the Civets, instead of being pushed up towards the condyle, yet shows that flatness on its lower margin which is more distinctly manifested in the Weasels and Bears than in any other sections of the order. The lower outline of the jaw has considerable curvature, both in *Viverra* and *Herpestes*.

Being of opinion that of the two remaining groups, the *Cats* approach the more nearly to the Civets, I will point out their characters

next. In them we still see more or less clearly the indication of a pterygoid fossa, but there is never any trace whatever of the ali-sphenoid canal, nor of the foramen glenoideum. The auditory bulla is always full and round, even in the largest species, in which however, as may be expected, it is proportionally less in size: in some species slight traces may still be discerned of the separation noticed in the *Viverræ*; the canalis caroticus is very minute: in this group the internal carotid artery itself is very small; the canal commences towards the posterior part of the auditory bulla, and never again appears at the outside, the foramen lacerum anterius being quite wanting. The characters of the paroccipital process are precisely those of *Viverra*, but its extent is much less, and the mastoid is rather more developed; the foramen condyloideum is concealed, just as in the Civets.

In a brief communication published by Mr. Gray in the 'Annals and Magazine of Natural History,' in which he describes a new genus of Dogs under the name *Cynalicus*, he very justly remarks, "the tubercular grinders are very variable in this tribe." I will now endeavour to point out some characters that can rather more safely be depended on. The pterygoid appendages have usually a deeper projection than in most other members of the order, and though marked with ridges on the outer side, these are scarcely sufficiently extended to form a fossa: the ali-sphenoid canal is a constant characteristic of the tribe; to this I have seen no exceptions, and should consider such a non-development as we have seen occasionally to occur in some of the smaller and more delicately constructed Civets less likely to happen among the Dog-tribe. The foramen glenoideum is always present and of large size. The auditory bulla is rather similar to that of the Cats, but usually a little flatter and not divided, and, like that of the Cats, is a little excavated towards the hinder and inner part, to form a considerable foramen lacerum posterius, in which open not only the foramina for the jugular vein and the nervus vagus, but the commencement of the canalis caroticus, which is of considerable size, and takes a course precisely similar to that of the Bear. The mastoid process is but moderately developed, but the paroccipital is very characteristic; its anterior edge is applied to the auditory bulla, but instead of being at all spread out, the process is laterally compressed and very salient, both in the vertical and backward direction. The foramen condyloideum occupies a very exposed situation, being upon the middle of a flat ridge which extends between the basi-occipital and the paroccipital process.

With the addition of the *Phocidæ* or Seal-tribe, the divisions which I have here attempted to characterize will correspond exactly to the six families proposed by Mr. Waterhouse in the paper before alluded to. It may however be very fairly questioned, whether a group whose members are so closely connected among themselves, and differ so little in essential characters, will justly admit of being divided into six sections, of so high a rank as the term 'family' is usually understood to imply. Mr. Gray, on the other hand, makes use of only two families, the *Felidæ* and the *Ursidæ*, including among the latter,

besides the true Bears, only the genera *Procyon*, *Nasua*, *Cercoleptes*, and *Ailurus*. I must confess that I cannot concur with him in including the subfamily *Mustelina* among the feline family, and at the same time separating the Bears from them as a separate family; for the course of my observations has convinced me that the Weasels are decidedly more closely allied to the Bears than to any other members of the order. Numerous genera have at various times been one after another abstracted from the Bear-tribe, and added to that of the Weasels, until at length only the four that I have mentioned have remained associated with the Bears. Some remarks in Mr. Waterhouse's paper seem to imply considerable affinity between the Weasels and the Cats. He observes, "The Cats appear to bear the same relation to the *Mustelidæ* as the Dogs to the *Viverridæ*." This may be, but I should not consider that relation a very close one. He alludes particularly to the straightness of the lower jaw as a common character of the two groups: in the first place, I would remark, that this character is by no means constant among the Weasels; and secondly, that it is merely a circumstance of form, resulting from other adaptive modifications of the form of the entire cranium, such as the relative length of the jaws, and the development, both in size and number, of the molar teeth. As the posterior termination of the molar series is always on a rather lower level than the glenoid cavity, and as the line of the dental series inclines regularly upwards and forwards, it follows, that for the incisors of the lower jaw to close with those of the upper, the lower jaw must be curved in proportion as the jaws are lengthened.

Among the characters which I have pointed out in the base of the cranium, it will be seen that the only tangible distinction between the Bears and the Weasels is the presence of the ali-sphenoid canal in the former, and its constant absence in the latter. Much as I have insisted upon the importance of this character as assisting to distinguish groups, I do not consider it sufficient alone to entitle the groups which it separates to the rank of *families*; neither am I prepared to admit the difference of the teeth sufficient for that purpose, these being, as I before observed, merely adaptive modifications. In the true Bears the number of true molars is on each side *two* above, and *three*, the full normal number, below. In the Weasels it is only *one* above and *two* below. In the subursine group, to which I must add the *Bassaris astuta* of North America, it is *two* above and *two* below; and among these it is only the *Ailurus fulgens*, an Indian species, which possesses the ali-sphenoid canal; while the other four genera, namely *Procyon*, *Nasua*, *Cercoleptes*, and *Bassaris*, all American forms, agree among themselves in possessing the general characters common to the Bears and the Weasels, and in having no ali-sphenoid canal, and two true molars on each side in each jaw. The *Bassaris astuta* has most usually been placed among the Viverine section, in which it also appears in the list published by Mr. Gray; but doubts have at various times been entertained as to that being its true station. Mr. Waterhouse remarks, in a note appended to the paper from which I have before quoted, "From an examination

of the external characters of *Bassaris astuta*, it appears to me that it belongs to this (the subursine) group;" and Mr. Blyth, in the translation of Cuvier's Animal Kingdom, mentions the *Bassaris* immediately after the *Cercoleptes*, and in a note very justly observes, "Strong presumptive evidence that the Basset (*Bassaris*) does not appertain to the Viverrine group is afforded by the restriction of the geographic range of the latter to the eastern hemisphere in every other instance. The presence or absence of a cæcum would decide the question." I am not aware whether this last-mentioned point has ever been ascertained, but from the characters presented by the cranium, I do not feel the slightest hesitation in referring this animal to the subursine group. It is true that the teeth have some resemblance to those of the *Viverræ*, but this only results from the greater or less development of different cusps, being an adaptation to a more carnivorous diet. The bony palate terminates more anteriorly than is usual in the Weasels, but this circumstance only depends upon the greater or less extension of a bony lamina, and I think is of but little moment: the pterygoid appendages are rather feebly developed.

If then we constitute the Bears and Weasels one family, *Ursidæ*, which I think the essential characters, however small they may appear, will readily warrant us in doing, we can then avail ourselves of the ali-sphenoid canal and the adaptive modifications of dentition to subdivide it into four subfamilies, namely *Ursina*, including only the true Bears, and characterized by the presence of the ali-sphenoid canal, and of two true molars on each side above and three below; the very remarkable genus *Ailurus*, of India, will of itself constitute a second subfamily *Ailurina*, having also the ali-sphenoid canal, but only two true molars below. In the third subfamily, *Procyonina*, I would include *Procyon*, *Nasua*, *Cercoleptes*, and *Bassaris*, an entirely American group, distinguished by the absence of the ali-sphenoid canal and the same number of true molars as *Ailurus*; and lastly, the extensive group of *Mustelina*, characterized also by the absence of the ali-sphenoid canal, and having only one true molar on each side above and two below.

Of the remaining groups, I have already expressed my opinion that the Cats and the Civets are the most nearly allied to each other. Among the characters which I have assigned to them will be found differences by which they may be distinguished from each other; but in the most remarkable and the greatest number of characters they differ chiefly in degree. To each of these has been referred in turn the group of Hyænas, usually considered as allied to the Cats; but Mr. Waterhouse urges that the *Viverræ* have the stronger claim to this aberrant genus. From the characters of the cranium, I should consider it as rather more approaching to the Cats. In all skulls of the Hyæna that I have seen, the ali-sphenoid canal is wanting, although in the second edition of Cuvier's 'Leçons d'Anatomie Comparée' it is affirmed that this canal (there called the vidian canal) is present, and that the author possessed a skull in which it existed on one side but not on the other. The roundness and want of division of the auditory bulla and the minuteness of the canalis caroticus approximate the Hyæna

to the Cats; in all the characters common to the Cats and Civets the Hyænas also agree. However, if these three groups be united, as I think would be justified by the characters, the difficulty in a great measure will be overcome. Three subfamilies will then constitute the family *Felidæ*; the *Felina* are characterized by the absence of the ali-sphenoid canal, the very minute size of the canalis caroticus, the absence of the foramen glenoideum, the auditory bulla having but little or no trace of division, and the molar series consisting of only three premolars and one true molar on each side above, and two premolars, with one true molar, below. The next subfamily, *Hyænina*, presents, as I have just before pointed out, the same cranial characters as the Cats, but it differs, as is well known, in the dentition. The largest subfamily of the *Felidæ*, the *Viverrina*, possess in general the ali-sphenoid canal, and sometimes a minute foramen glenoideum; the auditory bulla is more or less distinctly divided into two portions; the canalis caroticus is of average dimensions, although not always completely enclosed, and is placed towards the anterior part of the bulla, and the artery, after having passed through the canal, shows itself externally before finally entering the cranium: the dentition is on each side usually four premolars and two true molars, both above and below. The very singular genus *Proteles* has the cranial characters common to the Cats and Hyænas: from the dentition, so singularly modified by arrest of development, but little evidence of zoological affinity can be adduced; I should therefore be rather inclined to consider it a modified Hyæna, since in the external characters it so closely resembles the animals of that genus.

The Dogs, or the subfamily *Canina* of Mr. Gray, remain, and I think must constitute a separate family *Canidæ*; they all agree precisely in those cranial characters which I have pointed out, and notwithstanding the variation in the number of the true molars, do not seem to admit of division into subfamilies. It is rather remarkable that in the different genera of this family we find precisely the same variation in the number of the true molars as in the subfamilies of the *Ursidæ*; as, setting aside the genus *Otocyon*, in which they are developed, we may almost say, beyond their normal number, there are *two* above and *three* below in the genera *Canis*, *Vulpes*, *Nyctereutes*, and *Lycan*, as in the *Ursina*, *two* above and *two* below in the genus *Cyon*, as in the subfamilies *Ailurina* and *Procyonina*, and only *one* above and *two* below in *Cynalicus*, which is the number found in the Musteline group. This being the case, on first looking at the imperfect skull of the *Cynalicus* in the British Museum, which unfortunately exhibits only the anterior portion, I was led for a moment to suspect that the true place of this remarkable genus might be among the Weasels, and was the more led to this idea from the circumstance that the animal, in proportions and in colouring, bears a remarkable resemblance to the *Galera barbara*, also an inhabitant of South America; but on more attentive examination I perceived, that not only did the last molar resemble precisely the penultimate in the Dog, but sufficient remained of the skull to show, in the form of the pterygoid appendage, and the presence of the ali-sphenoid canal,

characters decisive against the musteline, and in favour of the canine group. And subsequently Mr. Waterhouse kindly pointed out to me, in that department of the Museum which is entrusted to his care, a fossil cranium from Brazil, which, from being found associated with jaws evidently belonging to that species, is most probably referable to the same, and in this I found that all the characters of the base of the cranium were precisely those of the Dogs.

Although I have not had sufficient opportunities to enable me to offer anything original on the other parts of the anatomy of the Carnivora as bearing upon their classification, perhaps I may be allowed to mention a few known circumstances, which, as they co-exist (so far as is yet known) with the characters which I have pointed out in the three families *Ursidæ*, *Felidæ*, and *Canidæ*, may serve to indicate that the importance I have assigned to those characters is not altogether undeserved. The presence or absence, and the structure of the cæcum have frequently been made use of in determining the limits of groups; and I need but to remind my readers, that in the Weasels, as well as in the Bears and the subursine animals, the cæcum is wanting, and there is little or no distinction between small and large intestine; also that it is in the Cats, in the Hyæna, and the Viverrine section, that this separation is well-marked, and a small or but moderate-sized cæcum is appended. In the Dog, the large intestine is but very little larger than the small intestine, but the separation is marked by a constriction, and by the addition of a cæcum remarkable for the curious manner in which it is several times folded upon itself. There are two other portions of the organization to which I will also allude, as affording characters serving to distinguish the three leading families; and in so doing I take the facts as I find them in the 'Leçons d'Anatomie Comparée,' stated simply, and evidently without any intention of assigning to them any zoological importance. First, with regard to the accessory glands connected with the generative organs of the male: the vesiculæ seminales are wanting throughout the order, unless it be in the Coati-mondi, which Cuvier mentions among the animals possessing them: this solitary exception, if so it be, seems to require confirmation; unfortunately the only two Coati-mondis it ever fell to my lot to examine were both young females. The prostate is spoken of as forming in the Bear, and in the Otter, the Weasel and other "vermiformes," only a layer more or less thick around the commencement of the urethra, while in the Ichneumon, the Cats, the Dogs, the Hyæna, and the Civets, it is salient, differing however in size and the number of its lobes; and Cowper's glands are wanting in the Bear, the Racoon, the Otter, and other "vermiformes," and also in the Dogs, but exist in the Ichneumon, the Civet, the Hyæna, and in the Cats.

The larynx is an organ whose differences of structure are very likely to afford useful zoological characters when studied with that view. Cuvier, after describing the structure it presents in the Dogs, where the most striking characters seem to be the considerable development of the cuneiform cartilages, their S-like shape, and

their continuity with the borders of the epiglottis, proceeds to point out the differences presented by that of the Cats, and briefly observes, "Le Mangouste et la Civette ont la glotte comme les Chats." He then describes a third variety of structure presented by the Bears, and mentions differences in the Racoon, the Badger, the Marten, the Otter, and the Coati, consisting merely of variations presented by the chordæ vocales, and in some the superaddition of sinuses, doubtless only adaptive modifications to the different kinds of voice.

In the foregoing observations nothing has been remarked with reference to the Seals, nor indeed is it absolutely necessary; for the limits of a group, so distinctly marked and peculiarly modified, are never at all likely to be mistaken; but as this singular family is truly and essentially a portion of the order whose arrangement it is here my endeavour to elucidate, a few observations upon them may seem a little called for. Naturalists have long been accustomed to separate from the rest those which are distinguished externally by the presence of the small external ear, and the long riband-like processes of skin projecting from the toes of the hind-feet. These genera, *Otaria* and *Arctocephalus*, are also in their cranial characters the most distinctly separable from the rest, through which, with the exception of the Walrus, a great uniformity prevails, so that a mention of the characters in which the common Seal differs from those having external ears may perhaps suffice. Here there is no trace of a postorbital process, nor of an ali-sphenoid canal; the mastoid can scarcely be said to constitute a process; it is swollen, and appears to form a portion of the auditory bulla, more or less connected with the tympanic portion, from which it is separated by a depressed groove running from the stylo-mastoid foramen backwards and a little inwards. The paroccipital process is never large in any of the family, but it is always distinctly developed, and salient backwards. The Arctocephaline group are distinguished at once by their having a distinct postorbital process and an ali-sphenoid canal; the mastoid projects as a strong process, and seems, as it were, to stand aloof from the auditory bulla, which is small and rounded. The carotid canal has precisely the same course as that pointed out in the Bears and Dogs, while in the common Seal it enters rather more forward, and does not show itself again externally. The *Arctocephalina* have the orbito-sphenoids much compressed together anteriorly to the optic foramina, which almost appear to have coalesced into one: they are also remarkable for the strong development of a process on the anterior part of the rim of the orbit; this however will not well serve as a character, since it is apparent, though in a much less degree, in some of the larger species of the ordinary type, as the *Stenorynchus leptonyx*. The Walrus is a peculiar form which I should deem it advisable to constitute a distinct subfamily, since I cannot concur with Mr. Gray in associating with it the *Halichærus gryphus*, whose skull presents all the characters of the true Seals, the elevation in the nasal portion having no relation whatever with the immensely swollen upper jaw of the Walrus, which is necessitated by the enormous size of the canine teeth: in this animal there is no postorbital

process, but that on the anterior rim of the orbit is very strongly developed; there is also an ali-sphenoid canal whose outer wall is very thick; the mastoid is a large thick process, projecting very much as in *Arctocephalus*, but its surface is for the most part continuous with that of the flattened auditory bulla.

If we adopt all the five subfamilies into which this family is divided in the list published by Mr. Gray, the Walrus, and the Arctocephaline group, which differ so decidedly from the other Seals, would almost seem entitled to the rank of families; but rather than so completely dismember such a well-marked group as that of the Seals, I should feel disposed to assign to the differences of the teeth no more than a generic value, and to restrict the number of subfamilies to three,—the *Phocina*, *Trichecina*, and *Arctocephalina*, including in the latter the genera *Otaria* and *Arctocephalus*, the Walrus alone constituting the *Trichecina*, and all the other Seals falling under the first-named section.

I cannot conclude without offering some apology for the length of my communication, more particularly as the number of minute details of form alluded to may render it a little tedious, and among the facts enumerated the number is so small that possess any claim to be considered new; but if I have to any extent succeeded in placing in a clearer light the mutual affinities of the different genera of Carnivora, a subject of which I think all will admit the difficulty, or if I have but brought into its due importance any character, however small, which may render the determination of a fragment more easy to the palæontologist,—if I have achieved but a very small share in the important task of elucidating those real affinities existing throughout nature, which must, when completely made out, render classification not a mere alphabet of reference for the determination of species, but a key to higher generalizations, I trust that my labours have not been thrown away, and that my apparent prolixity may be overlooked.

In offering the annexed synopsis with a view to render the arrangement I would propose more readily comprehensible, I must observe, first, that the lists of genera include only those whose crania I have examined, and therefore I must not be considered as rejecting any that I have omitted, nor do I pledge myself to adopt all that are inserted. Secondly, that the difficulty of expressing in a manner sufficiently decided, and at the same time sufficiently brief for a synoptical form, the characters I have made use of, has compelled me to omit some of them. In order to place the Herpestine genera of the Viverrine subfamily in juxtaposition with the Weasel group, it is advisable that the series of terrestrial Carnivora should either commence with the Bears and terminate with the Dogs, or *vice versa*; and as I have not seen in the Seals anything which, in my opinion, warrants their approximation to any of the other families more than to another, it matters little which mode be followed.

Fam. URSIDÆ.

Auditory bulla rising suddenly on its inner side, and more or less flattened off towards the meatus.

Paroccipital process prominent, and neither flattened on the surface of the auditory bulla, nor laterally compressed.

Foramen condyloideum exposed. A considerable foramen glenoideum.

No cæcum. No Cowper's glands.

Prostate gland not salient, being contained in the thickened walls of the urethra.

Subfam. URSINA. (Of general geographical distribution.)

A distinct ali-sphenoid canal.

Internal carotid artery reappearing externally after passing through its canal, and doubling back to enter the cranium.

True molars on each side $\frac{2}{3}$.

Ursus (including the subgenera).

Subfam. AILURINA. (Confined to India.)

A distinct ali-sphenoid canal.

True molars on each side $\frac{2}{2}$.

Ailurus.

Subfam. PROCYONINA. (Confined to America.)

No ali-sphenoid canal.

True molars on each side $\frac{2}{2}$.

Procyon.

Nasua.

Cercoleptes.

Bassaris.

Subfam. MUSTELINA. (Of general geographical distribution.)

No ali-sphenoid canal.

True molars on each side $\frac{1}{2}$.

Arctonyx.

Meles.

Taxidea.

Mydaus.

Mephitis.

Gulo.

Helictis.

Mellivora.

Grisonia.

Galera.

Vison.

Mustela.

Martes.

—

Lutra.

Fam. FELIDÆ.

Auditory bulla rounded, frequently showing indications of being divided into two parts.

Paroccipital process flattened, and applied to the back-part of the auditory bulla.

Foramen condyloideum more or less concealed. Foramen glenoideum very small or wanting.

Cæcum small or moderate, simple. Cowper's glands present. Prostate gland salient.

Subfam. VIVERRINA. (Confined to the old world.)

A distinct ali-sphenoid canal (with very few exceptions*).

Auditory bulla distinctly subdivided.

Canalis caroticus distinct, though sometimes only as a groove.

True molars on each side $\frac{2}{2}$.

Galictis.

Ryzaena.

Cynictis.

Herpestes.

Arctictis.

Cynogale.

Paradoxurus.

Prionodon.

Genetta.

Viverra.

Subfam. HYÆNINA. (Confined to the old world.)

No ali-sphenoid canal.

Division of auditory bulla scarcely perceptible.

Canalis caroticus indistinct, or very small.

True molars on each side $\frac{1 \text{ or } 0}{1}$; premolars on each side $\frac{4}{3}$.

Proteles.

Hyæna.

Subfam. FELINA. (Of general geographical distribution.)

No ali-sphenoid canal.

Division of auditory bulla slightly, or scarcely perceptible.

Canalis caroticus indistinct, or not perceptible.

True molars on each side $\frac{1}{1}$; premolars on each side $\frac{3}{2}$.

Felis.

Fam. CANIDÆ.

A distinct ali-sphenoid canal. A considerable foramen glenoideum. Auditory bulla rounded, not divided.

Internal carotid artery reappearing externally after passing through its canal, and doubling back to enter the cranium.

Paroccipital process laterally compressed, foramen condyloideum exposed.

Cæcum folded upon itself. No Cowper's glands. Prostate gland salient.

Cynalicus.

Cyon.

Lycaon.

Canis.

Vulpes.

Nyctereutes.

Otocyon.

* The exceptions that I have seen are the Rasse (*Viverra malaccensis*) and a species of *Galictis*.

Fam. PHOCIDÆ.

Molars all similar in structure. (The general characters need not here be enumerated, being universally known.)

Subfam. ARCTOCEPHALINA.

A postorbital process. An ali-sphenoid canal.

Mastoid process strong and salient, standing aloof from the auditory bulla.

Otaria.

Arctocephalus.

Subfam. TRICHECINA.

No postorbital process. A distinct ali-sphenoid canal.

Mastoid process strong and salient, its surface continuous with the auditory bulla.

Trichecus.

Subfam. PHOCINA.

No postorbital process. No ali-sphenoid canal.

Mastoid process swollen, and seeming to form part of the auditory bulla.

Morunga.

Cystophora.

Halichærus.

Ommatophora.

Lobodon.

Leptonyx.

Stenorhynchus.

Phoca.

June 13, 1848.

Harpur Gamble, Esq., M.D., in the Chair.

The Secretary exhibited the skull of an Antelope closely allied to *A. euryceros*, Ogilby, and read the following extract from a letter which he had received in reference to it from Capt. William Allen, R.N. :—

“ I am sorry I cannot give you any satisfactory reminiscences of the Antelope. It was, I should think, about three feet high, or rather more, of a darkish brown colour, but I do not remember any white band across the forehead. The place where I saw it was called Kokki, on a small tributary, the Abo, of the Cameroons river, or Mâdibama Dualla, in the Bight of Biafra. It was a pestiferous locality and a foggy morning, so that I was anxious to get away as soon as possible, but left one of my black men to skin it, and he only brought the skull and horns. I have no doubt the forests at the foot of the Cameroons mountain would furnish you with some valuable additions to zoology. I cannot say anything about the sex of the Antelope.”









The other communications were :—

1. DESCRIPTION OF TRAGELAPHUS ANGASII, GRAY, WITH SOME ACCOUNT OF ITS HABITS. BY GEORGE FRENCH ANGAS.

(Mammalia, pl. 4, 5.)

This new and brilliant Antelope, the *Inyala* of the *Amazulu*, appears to be a link between the Koodoo and Boshbok, uniting in itself the markings and characteristic features of both these animals.

The adult male is about 7 ft. 6 in. in total length, and 3 ft. 4 in. high at the shoulder. Though elegant in form, and with much of the grace of the solitary Koodoo, the robust and shaggy aspect of the male bears considerable resemblance to that of the Goat. Legs clean; hoofs pointed and black, with two oval cream-coloured spots in front of each fetlock, immediately above the hoof. Horns 1 ft. 10 in. long, twisted and sublyrate, very similar to those of the Boshbok, but rather more spiral; have sharp polished extremities, of a pale straw-colour; rest of horns brownish black, deeply ridged from the forehead to about half the length of the horn. Prevailing colour greyish black, tinged with purplish brown and ochre; on the neck, flanks, and cheeks, marked with several white stripes like the Koodoo; forehead brilliant sienna-brown, almost approaching to orange; mane black down the neck, and white from the withers to the insertion of the tail. Ears 8 in. long, oval, rufous, tipped with black and fringed inside with white hairs; a pale ochreous circle round the eyes, which are connected by two white spots forming an arrow-shaped mark on a black ground; nose black; a white spot on each side of the upper lip; chin and gullet white; and three white marks under each eye; neck covered with long shaggy hair, extending also under the belly and fringing the haunches to the knees; two white spots on the flanks, and a patch of long white hair on the anterior portion of the thigh; a white tuft under the belly, and another on the dewlap; on the outer side of the fore-legs is a black patch above the knee surrounded by three white spots; legs below the knee bright rufous colour; tail 1 ft. 8 in. long, black above, with tip and inside white.

Female smaller and without horns; total length 6 ft.; nose to insertion of ear 10 in.; length of ear $6\frac{1}{2}$ in.; height from fore-foot to shoulder 2 ft. 9 in.; tail 1 ft. 3 in. in length. Colour a bright rufous, inclining to orange, becoming very pale on the belly and lower parts, and white inside the thighs; a black dorsal ridge of bristly hair extends from the back of the crown to the tail; nose black; the white spots on various parts of the body nearly resemble those of the male, only the white stripes on both sides are more numerous and clearly defined, amounting to twelve or thirteen in number; tail rufous above and white below, tipped with black.

The young resembles the female, but is rather paler in colour, and has more white spots on the flank and sides.

Inhabits the lower undulating hills scattered with *Mimosa* bushes, that border upon the northern shores of St. Lucia Bay, in the Zulu No. CLXXXVI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

country, lat. 28° south. Found in small troops of eight or ten together, feeding amongst the thickets.

Mr. Gray has named this species after my father, George Fife Angas, Esq., of South Australia, who has always taken a lively interest in my travels and researches in natural history. I may add, that the preceding notes were drawn up from recently-killed specimens, which I in vain attempted to purchase from the Boers who possessed them.

2. DESCRIPTION OF A NEW SPECIES OF *PODICA*.

By G. R. GRAY, ESQ., F.L.S. ETC.

(Aves, pl. 4.)

The bird now laid before the Meeting forms a second species of the genus *Podica*, Less., the type of which, *P. senegalensis*, is peculiar to Western Africa. It was obtained from Malacca, and thus extends the range of this singular group, *Heliorninæ*, to a third quarter of the globe. The only species known until of late years, which is the type of the subfamily (*Heliornis surinamensis*), exists in the warmer parts of the American continent.

PODICA PERSONATA, n. sp.

Sp. ch.—Upper parts olive-brown; top of the head, lores, cheeks and jugulum, deep black; back of neck bluish olive; a short white streak borders the black from the posterior angle of the eye; the lower surface white; breast tinged with brown; the side-feathers faintly, and the under tail-coverts deeply, barred with brown; the quills and tail deep brown; bill yellow; the feet lead-colour, and the membrane that borders the toes yellow.

Total length, 20 inches; bill, 2 inches and 2 lines; wing, 10 inches; tarsi, 1 inch and 10 lines.

It differs from the typical *Podica* in having a portion of the lores naked, in the greater breadth of the tail-feathers, and in their being rather rigid.

The only specimen I have seen, from which this description and the drawing have been made, was presented to the British Museum by the Right Hon. the Earl of Ellenborough.

3. DESCRIPTION OF NEW SPECIES OF THE GENUS *CYPRÆA*.

By J. S. GASKOIN, ESQ.

1. *CYPRÆA THERSITES* (High-backed Cowrie). *Cyp. testâ ovatâ, gibbosâ, dorso elevato, basi latâ planâque, saturatè rufescente-fuscâ; anticè posticèque depressiusculâ, aperturâ angustatâ, posticè recurvâ; dentibus albis, distinctis, labiî externi validis, columellari minùs prominentibus; sulco columellari anticè profundo, lato; extremitatibus valdè productis, canali antico pleno.*

Shell ovate, very gibbous and high-backed, of a very dark, reddish-brown colour, not uniformly equal in intensity; a curved whitish mark exists over both the anterior and the posterior extremities, at which places there is a depression, as though the mantle had not deposited any substance there after it had begun to secrete the





colouring-matter, particularly that at the last whorl of the spire; aperture narrow, much curved at the posterior third of its length, the other two-thirds nearly straight; teeth white, distinct, even, about twenty-seven on the outer side, extending but slightly over the lip; on the columellar side about twenty-four, broader at the anterior end, while along the continued edge of the aperture to its posterior extremity are mere indications of teeth; columellar sulcus deep and broad, not extending beyond the more prominent teeth; base broad and flat, its entire circumference of an uniform dark, reddish-brown colour, or spots of a similar colour, the colour lessening in intensity towards the middle portion of the base, which is white, as is also the interior of the shell; margins project, especially that of the lip: extremities produced, the posterior forming sharp or thin edges, and extending much upwards; that on the columellar side terminating at the apex of the spire; the anterior extremities also thin, and the channel upright.

I have seen this shell only in the adult state. It has no general characteristic in common with any known species; the extremities however have much similitude to *Cypræa Scottii*; but it is a much shorter, more gibbous, heavier and thicker shell.

Long, $2\frac{7}{100}$ inches; high, $1\frac{5}{100}$; wide, 2.

Hab. — ?

Cabinets of British Museum, Saul, Cuming, &c.

2. *CYPRÆA MARGINATA* (Broad-margined Cowrie). *Cyp. testâ ovatâ, anticè subacuminatâ, posticè et medianè valdè gibbosâ; colore floris lactis, maculis fulvis, paucis irregulariter sparsis; basi valdè planâ et latâ; marginibus externis medianè fulvo-brunneo punctatis, punctis discretis; aperturâ latâ, subspirali; columellâ posticè gibbosâ, sulco parvo antico; dentibus lateris columellaris circa viginti, latè distinctis; lateris externi aequalibus paululùm extensis, anticè minoribus, circa viginti novem; extremitatibus, posticâ productâ, planâ, canalem latam sursum formante, anticâ minùs productâ, convergente, canalem brevem sursum formante; spirâ valdè conspicuâ; marginibus planis, tenuibus, valdè extensis.*

Shell ovate, anterior end rather pointed, the posterior and middle very gibbous; of a cream-colour, a few fulvous spots are irregularly scattered over the entire back and sides of the shell, apparently the commencement of the deposition of colouring-matter; base flat and very broad, on the outer edges are discrete fulvous brown spots, the rest of the base, the teeth, and the interior of the shell are of a clear cream-colour; aperture wide, spiral; columella gibbous posteriorly, a slight sulcus at the anterior end; teeth form, on the columellar side, a single angular serrated edge, about twenty in number, wide apart and not very prominent; on the other side they are more regular and even, extending, slightly prominent, half across the lip; they are smaller and more perfect towards the anterior extremity, and about twenty-nine in number; the extremities are produced, flat, form a broad channel, passing upwards at the posterior end of the shell, and terminate at the outer side of the apex of the spire; the

anterior extremities are much less produced, and converge, forming a short channel running upwards; spire very prominent; margins flat and thin, extending much outwards; the angle formed by the attachment of the outer margin to the shell is of a light brown colour, from which anteriorly radiate lines of the same colour over the upper surface of the margin.

Differs from *Cyp. Scottii* in its short and gibbous form, in the remarkable flat and broad cream-coloured base, in the very extended, flat and thin margins: the posterior channel has much the form of that of *Scottii*, but terminates at the apex, and not, as in *Scottii*, at the base of the spire.

Length, $2\frac{2}{100}$ inches; altitude, $1\frac{2}{100}$; breadth, $1\frac{5}{100}$.

Hab. —?

The only specimen I have seen of this peculiar shell is in the British Museum, and may not be an adult.

3. *CYPRÆA BICOLOR* (Two-coloured Cowrie). *Cyp. testd pyriformi, colore floris lactis; fasciis latis, interruptis, brunneis, centrali latiori; basi latiusculd, rotundatâ; aperturd subspirali, latiusculd; dentibus numerosis, prominentiusculis, columellaribus crassis, supra sulcum columellarem extensis; margine externo crasso, punctato, punctis brunneis discretis; extremitatibus brevibus, obtusis; canali antico pallidè rufescente-flavo.*

Shell pyriform, when young more ovate, smooth and shining; of a light cream-colour, having three broad, irregularly interrupted bands of a brown or fawn colour, extending entirely across the shell, the middle one being the broadest, the posterior the next so; base broad, rather convex, pale cream-colour; aperture subspiral, rather wide; teeth numerous, rather prominent, on the lip about thirty curving round its edge, and extending about one-third over the lip; on the columellar side teeth about seventeen, extending from the edge of the aperture over the columellar groove to end on its inner ridge, diminishing on that ridge in prominence towards the posterior extremity, where the denticulation is scarcely observable; the columellar groove of equal width the whole length; margin, external very thick and prominent (not crenulated), somewhat angular at its outer edge, along which are many small brown distinct spots; similarly coloured spots, but a little larger, are also on the columellar side, where a slight margin exists, and which becomes prominent only to form the anterior extremity; extremities short, obtuse; the anterior channel has a very faint orange tinge.

Long, $\frac{9}{100}$ ths of an inch; high, $\frac{5}{100}$ ths; wide, $\frac{5}{100}$ ths.

Hab. Australia, New Holland.

Cabinets of Metcalfe, Saul, Gaskoin.

Differs from the *Cyp. piperita* of Gray in not being cylindrical, but of a pyriform shape; in being very gibbous, and a much heavier and thicker shell; in having only three bands, which are very broad and conspicuous; *Cyp. piperita* having four, which are generally narrow and obscurely visible in the adult shell, and on the later-formed part of the shell uninterrupted.

4. *CYPRÆA GRACILIS* (Slender Cowrie). *Cyp. testâ oblongo-ovatâ, anticè gradatim acuminatâ, pallidè flavescente-brunneâ, maculis dorsalibus irregularibus pallidè brunneis, lateribus basalibus brunneo punctatis, punctis paucis distinctis; basi pallescente; latere postico columellari subgibboso; aperturâ latiusculâ, subspirali; dentibus labii externi prominentibus æqualibus, circa octodecim, labii columellaris æqualibus, anticis paululum majoribus, pariter circa octodecim; sulco columellari antico depresso, postico inconspicuo depresso; extremitatibus canalibus latisque prominentibus; spirâ conspicuâ, profundè umbilicatâ.*

Shell oblongo-ovate, gradually tapering towards the anterior end, smooth and shining, of a light fawn-colour, with very light brown irregular markings about the back, and a few distinct dark brown dots on the edges of the base of the shell on both sides, bands indistinct; inside of shell milk-white; base somewhat lighter in colour than the back; posterior half of the columellar side rather gibbous, outer side of base somewhat depressed in the centre portion; aperture subspiral, rather wide; teeth of the lip prominent and even, extending in no degree on to the lip (only denticulating its edge), about eighteen in number, and about as many also on the columellar side, which are larger anteriorly, even, terminating externally in a line at the edge of, or rather just within the aperture, and internally, proceeding straight across the columellar groove to terminate at its inner edge the anterior half of the shell, and on the columella in points, the posterior half, there being mere small projections indicating the continuance of the inner edge of the columellar groove, which extends the whole length of the columella, diminishing in depth in the middle of the shell, and deepening at the posterior end to form a part of the channel; margins slightly prominent, thick on the outer side only, not crenulated; extremities of a light brown colour externally, much produced and thick; both the anterior are margined and flattened externally; channels wide and protrude beyond the body of the shell; spire visible, deeply umbilicated.

Long, $\frac{86}{100}$ ths of an inch; wide, $\frac{50}{100}$ ths; high, $\frac{40}{100}$ ths.

Hab. — ?

The only specimen I have seen of this elegant shell is in my collection, and was brought to this country by Sir E. Belcher in the ‘Samarang.’

The only species with which this shell has any affinity is the *Cyp. Sauli* of Gaskoin; and differs from it in the teeth being finer, and in being rather within the aperture, in having a columellar groove, in the absence of colour between the teeth, in being more ventricose, the wanting the characteristic dark blotch on the dorsum of *Sauli*, and difference of general coloration.

I have thought it proper to add to this description the following note:—

“My dear Sir,—I have carefully examined the little *Cypræa* which you left with me yesterday, and which you proposed to name *Cyp. gracilis*. It appears to me to be in perfect condition, and to

possess several characters by which it is most easily distinguished from all other described species with which I am acquainted.

"In its teeth, which are not elongated over the columellar side, in the internal columellar groove, in its apical umbilicus, and in the much-produced posterior extremities, as well as in other characters, it differs essentially from *Cyp. Walkeri* of Gray; and it has not the slightest appearance of malformation or monstrosity of form. I am therefore of opinion it is a perfectly distinct species, and ought to be described as such.

"Yours, &c.,

"G. B. SOWERBY."

"30th March, 1848."

"To J. S. Gaskoin, Esq."

5. *CYPRÆA* *OBSCURA* (Dusky Cowrie). *Cyp. testá ovatá, albicante, maculis duabus dorsalibus nigricantibus inconspicuis; costellis rudibus, prominentibus, ad dorsum concoloribus, ad margines et ad basin albis; dentibus labii externi circa viginti, labii interni distantibus circa duodecim; sulco columellari lato, margine interno dentibus serrato; extremitatibus albis, crassis, productiusculis.*

Shell ovate, of a dingy white colour, having two remarkable small, blackish, undefined spots or markings on the dorsum, one a little less than a third the length of the shell from each extremity; ribs coarse and prominent, on the back of the same colour as the shell, but on the margins and base of a pure white; they traverse the shell from one side of the aperture to the other, having a slight curving at the centre of the dorsum; on the outer side several terminate on the side of the shell, fewer terminate on the columellar side, where some float; base white, rather round; aperture straightish, curved at the posterior end, rather narrow; teeth even, formed by the costæ, about twenty on the lip and about twelve on the columellar side, where they are distant and extend over a broad columellar groove to serrate its inner ridge; margin on the outer side thick and white, none on the columellar side; extremities white, thick, and somewhat produced. No dorsal impression.

Length, $\frac{3.6}{100}$ ths of an inch; altitude, $\frac{2.0}{100}$ ths; breadth, $\frac{2.5}{100}$ ths.

Hab. North-west Australia; Dupuch's Island (under stones, low water), collected by J. E. Dring, Esq., R.N. Abrolhos Island (under coral), by ditto.

Cabinets of Gaskoin, Saul, &c.

This shell is perhaps nearest in form to *Cypræa pulex*, Gray, but cannot be confounded with any known species. I have had for several years specimens of this shell, and the locality given me with them was Senegal; but as Mr. Dring has lately brought others to this country, I have thought it right to give so authenticated a habitat as we have received from him.

This manuscript description having been written for a few years, I send it for insertion in the 'Proceedings,' although Kiener appears to have described it in his work, 'Species Général,' &c., under the name of *Cyp. Napolina*, a name ascribed to Duclos; but Kiener does not say by what authority, yet I conclude that that appellation should stand. Kiener's figures, pl. 53, figs. 3 and 3, are no repre-

sentations of his description. I was not aware until lately that this shell had already been described, but my English characters of the species may not be unacceptable, as they are more minute.

6. *CYPRÆA SULCATA* (Grooved Cowry). *Cyp. testâ ovato-globosâ, ventricosâ, albâ; basi rotundatâ, aperturâ latiusculâ, posticè incurvâ, canalibus profundis et latis; dentibus æqualibus, labii externi circa triginta, lateris columellaris viginti, supra columellam continuis marginem internam serratam formantibus; costellis prominentibus plerumque ad impressionem dorsalem terminantibus, pseudo-costellis ad utramque extremitatem circa decem; sulco columellari lato, profundo, margine externo prominente, acuto; extremitatibus obtusis, crassis; spirâ conspicuâ; impressione dorsali conspicuâ.*

Shell globoso-ovate, ventricose; entirely of a clear white colour; base convex, aperture rather wide, curved inwards at the posterior end, channels deep and broad; teeth numerous and even, about thirty on the lip and twenty on the columellar side, which traverse the columellar groove to terminate at an inner serrated edge; the ribs are continuations of the teeth, are prominent, and almost all terminate at the dorsal impression, a few only on the sides of the shell; false ribs at each end about ten, interstices between the ribs minutely striated longitudinally; columellar sulcus broad and deep, the outer edge, sharp and prominent, occupies the anterior third of the length of the columella, the other portion of the inner part of the columella flat (not grooved); extremities obtuse, thick, those of the lip longer than the body of the shell, the posterior one in a marked degree, which, passing round to form the channel, ends somewhat abruptly in a prominent sharp edge on the columella, which sharp edge constitutes the inner extremity; spire perceptible, the false ribs pass over it; dorsal impression well-pronounced, extends the length of the back to the false ribs at each end; margins none.

It is nearest in general form to *Cyp. formosa* of Gaskoin, but differs from it in having a dorsal impression, much coarser ribs, in the sharp outer edge of the columellar sulcus, the peculiar position and form of the inner and projection of the outer posterior extremities, in its pure white colour, &c.

Hab. Manilla.

Length, $\frac{4.5}{100}$ ths of an inch; width, $\frac{3.2}{100}$ ths; height, $\frac{3.0}{100}$ ths.
Cabinets of Gaskoin, Cuming.

7. *CYPRÆA VITREA* (Glass-like Cowry). *Cyp. testâ ovato-globosâ, albâ, nitidâ, semivitrâ; basi rotundatâ, aperturâ angustiori paululùm incurvâ, marginibus crassis; dentibus æqualibus, numerosis, prominentibus, labii externi circa triginta, columellaris viginti supra sulco columellarem continuis; sulco columellari lato, longitudinem aperturæ æquante, margine interno subrecto, serrato; costis magnis, æqualibus, prominentibus, cum dentibus continuis ad dorsum terminantibus; lineâ dorsali impressâ; extremitatibus obtusis, crassis brevibus; margine externo crasso; spirâ inconspicuâ.*

Shell ovato-globose, almost round, of an uniform, semivitreous, shining, white appearance; base convex, aperture rather narrow, slightly curved inwards its whole length, edges thick; teeth even, rather thick, prominent, about thirty on the lip and twenty on the columellar side, where they traverse the columellar groove and serrate its nearly straight inner edge; the groove is broad and very shallow, and nearly equal in width and depth the whole length of the aperture; the teeth continue to form the ribs, which are large, even and prominent, and terminate at the dorsal impression, with the exception of two or three on each side; the false ribs all form denticulations; dorsal line impressed, extending from the apices formed by the joining of the false ribs; extremities obtuse, thick and short; margin very thick, none on the inner side; spire not perceptible in the adult shell, being thickly covered by the false ribs.

Hab. Philippines.

Length, $\frac{2.5}{100}$ ths of an inch; width, $\frac{2.1}{100}$ ths; height, $\frac{2.0}{100}$ ths.

Differs from *Cypræa globosa* of Gray in the anterior extremities being of an equal length, aperture much narrower and less curved, base rounder, its semivitreous shining appearance, &c.

Cabinet of Gaskoin.

8. *CYPRÆA GRANDO* (Hail-stone Cowry). *Cyp. testâ ovato-globosâ, nitidâ, nivedâ; basi rotundatâ, sine varice; aperturâ latiusculâ anticè latiori, subspirali; sulco columellari longitudinem columellæ æquante, lato et profundo; dentibus minimis, æqualibus, labiî circa quadraginta-octo, columellæ circa triginta-quatour; costellis tenuibus et æqualibus, e dentibus continuis; interstitiis longitudinaliter tenuiterque crenulatis; lined dorsali impressâ; extremitate posticâ valdè productâ; spirâ prominente et flavescente.*

Shell ovato-globose, shining, of a clear snow-white colour; base round, being a continued convexity with the body of the shell, there being no margin on either side; aperture widest at its anterior half, rather wide generally; the columellar side spiral, edge of the lip but very slightly so; columellar groove extends the entire length of the columella, and is continuous at both ends with the channels; it is broad and deep, particularly at the anterior half; its outer and inner edges spiral, the outer edge angular and somewhat projecting; teeth very minute, numerous and even, about forty-eight on the lip, and about thirty-four on the columellar side, which traverse the columellar groove to notch its inner edge; the ribs delicate and even, and are continuations from the teeth; many terminate on the sides of the shell (the teeth being so numerous, the outer portion could not contain their prolongation), the rest end mostly in fine points at the dorsal impression, alternately from either side; a few are united with those of the opposite side; interstices between the ribs finely crenulated longitudinally; dorsal line impressed; extremities, the anterior very slightly, the posterior much produced; spire prominent and tinged with a light yellow colour; margins none.

This shell differs from the *Cypræa vitrea*, just described, in the minuteness and number of the teeth and delicacy of the ribs; in the

unequal width of the aperture, and the spiral form of its inner side ; in the broad, deep and unequally wide columellar groove, prominent apex, absence of margin, &c.

Length, $\frac{2.6}{100}$ ths of an inch ; width, $\frac{2.0}{100}$ ths ; height, $\frac{1.9}{100}$ ths.

Hab. Manilla.

Cabinet of Gaskoin.

9. *CYPRÆE FLAVEOLÆ, varietas labro-lineata.* *Cyprææ flaveolæ varietas, lineis brunneis e dentibus labii externi supra basin continuis.*

Shell same form and size as *Cyp. flaveola* : differs from it in being much paler in colour, and the white dottings are therefore less conspicuous ; in the teeth being smaller and more numerous, and in there being elevated lines of a brown colour on the lip, continued from each tooth, and at the anterior end projecting beyond the margin ; in the anterior teeth of the columellar side being bifurcated, and in the dark brown dottings of the margins being more numerous, and extending a little on to the base.

Cabinets of Cuming, Saul.

Hab. — ?

10. *CYPRÆE QUADRIMACULATÆ, Gray—varietas pallidula* (Palish Cowry). *Cyp. sine maculis nigris ; dentibus lateris columellari majoribus, prominentioribus et paucioribus ; labii minoribus et numerosioribus ; basi nitente.*

This shell possesses characters, especially in colouring and general form, much in common with the former shell, but is destitute of the large black spots on the outsides of the extremities and on the spire ; there is in some individuals a thin dark line across the outer surface of the anterior channel ; the teeth on the columellar side are larger, more prominent, more even, and fewer in number ; while those on the lip are smaller and more numerous ; it never attains the size of *quadrimalculata*, the teeth and base of which are always dull, while those of the variety are always polished (shining).

11. *CYPRÆA PULLA.*—The small "*Trivia*" I described under that appellation (Proc. Zool. Soc., March 10, 1846), I am enabled now to state the *habitat* of ;—the Galapagos Islands, and the Bay of Guayaquil ; Cuming. When I named this shell "*pulla*," I was not aware it was a synonym of *Cypræa adusta* of Chemnitz and Lamarck, by Gmelin,—*Cyp. onyx* of Gray ; but as Chemnitz's name "*adusta*" was the prior, and therefore the proper one, I do not consider it necessary to alter mine.

12. *CYPRÆA PULICARIA.*—Reeve, in his description of this shell (Proc. Zool. Soc., March 10, 1846), remarks, that it differs from *Cyp. piperita* of Gray in *not being banded* ; but most of the specimens that I have seen have four distinct, narrow, interrupted, light brown bands, nearly equidistant. Nine individuals, of thirteen in my collection, have these four very conspicuous bands ; that described by Reeve was one of the remaining four shells whose bands are covered. I will take the liberty to add to the distinctions from *Cyp. piperita*,

the broad and projecting sulcus at the anterior portion of the columellar groove; and the convergence of the anterior extremities, rendering the channel so much narrower than in *piperita*.

13. *CYPRÆA NIVEA*.—The shell described under that appellation by Gray, the original type of which, pierced with its two holes, is now before me, is a white variety of *Cypræa turdus*:—vide Gray's Monograph (Zool. Jour. i. 511). The figures, however, of *Cypræa nivea* of Gray, in Sowerby's Conch. Illus. and in Reeve's Conch. Iconica, are representations of the *Cypræa oryza* of Gray (Zool. Jour. iii. 369); this same error seems to pervade in the arrangement of most of the collections I have seen. The *Cypræa nivea* figured in Wood's Supplement to the Index Testaceol. is a young *Cyp. Humphreysii* of Gray.

14. *CYPRÆA PRODUCTA*.—I am able at length to refer conchologists to other specimens of this species than that described by me December 22, 1836, in these 'Proceedings,' which have been brought to this country by Capt. Sir Edward Belcher, and collected during the voyage of H.M.S. the Samarang. They are distributed into the cabinets of Miss Saul, Messrs. Cuming, Gaskoin, &c. The original shell, the type of this species, is well-represented in Sowerby's Conchological Illustrations, fig. 155; in Reeve's Conchologia Iconica, pl. 24, fig. 137; and in Kiener's Species général, et Iconographie des Coquilles vivantes, fol. 53, figs. 5 and 5:—this last is copied from Sowerby.

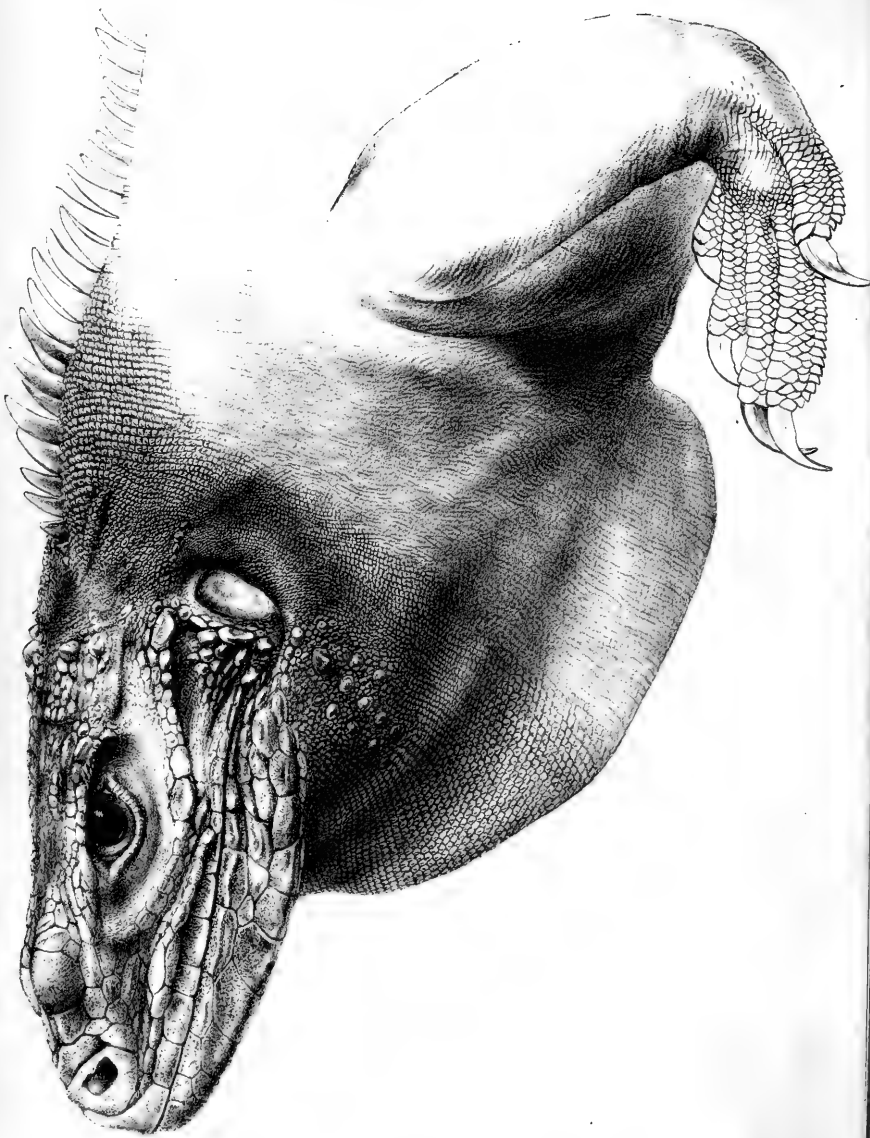
June 27, 1848.

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

Lord Auckland communicated through the Secretary a letter which he had received from Lieut.-Col. Butterworth, the Governor of Singapore, announcing his desire to present to the Society a Black Leopard and a Tree Kangaroo (*Dendrolagus inustus*, Müller), which he intended to transmit to England by the first opportunity.

A letter was read from T. S. Boileau, Esq., H.E.I.C. Civil Service, in which he informed the Secretary of the safe arrival of a living pair of the Indian Wild Hog and an Owl (*Bubo bengalensis*), which he had brought from Madras expressly for the Society's acceptance.





The following papers were read :—

1. ON THE HABITS OF *CYCLURA LOPHOMA*, AN IGUANIFORM LIZARD.
 BY P. H. GOSSE.
 (Reptilia, Pl. 1.)

The subject of the present paper seems to be as yet unknown to science ; it may be thus described :—

CYCLURA LOPHOMA, mihi—(λόφος, a crest, and ὤμος, the shoulder). Shields on the muzzle separated by small scales ; muzzle with four many-sided, convex, unkeeled plates on each side, the anterior and posterior very large, the intervening two smaller, short, but wide. General head-shields irregular in size, a largish one near the middle of the head ; lower jaw with one (posteriorly two) series of large, rhomboidal, keeled plates, with none between them and the labial plates. Dorsal crest high, continuous over the shoulders, interrupted over the loins.

Length about 3 feet, of which the tail measures 21 inches. Colour (in a dried state) greenish-grey, with obscure blackish spots, confluent, so as to form a rude reticulation.

This very distinct species may be at once recognised by the number, form and arrangement of the plates of the muzzle, and particularly by the serrated crest not being interrupted over the shoulders. I have never met with it alive in Jamaica ; the specimen from which the above description is taken, now in the British Museum, was one of many zoological treasures presented to me by my kind and valued friend, Richard Hill, Esq., of Spanish-town. It is to the same gentleman that I am indebted for the whole information, concerning the economy of this Saurian, which I now submit to the Zoological Society.

The following memoir from the pen of my friend was communicated to me in the beginning of the year 1846 ; the animal, though spoken of by the name *Iguana*, is the identical specimen above described, and which Mr. Hill had noticed to differ from *I. tuberculata* by its lacking the dentelations on the gular pouch.

“ Our Iguana is considered to be entirely herbivorous. It is found only in particular parts of the island. The low limestone chain of hills, along the shore from Kingston Harbour and Goat Island, on to its continuation in Vere, is its ordinary haunt ; and it is not unfrequently taken in the plains between those sea-coast hills and the more inland mountains, being found in hollow trees in the pastures, where they congregate, several of them together.

“ The labourers in clearing and burning off some of the savannas between Spanish-town and Passage-fort the other day (March 1844), surprised in a hollow bastard-cedar tree (*Guazuma ulmifolia*) some five Iguanas of the largest size. The one I sketched measured forty-five inches long, and it was said not to have been the largest. It was extremely fat and muscular. A russet-green, here and there graduating into slaty-blue, is the general colour of the body and limbs ; some oblique lines of dark olive-green are traceable on the shoulders, and three broad dark triangular patches descend from the

dentelations of the back down to the belly, with zigzag spots of dark olive-brown dispersed about. At very regular intervals, the tail is alternately of a lighter and darker olive-green. A bluish-green colour, more decided than on the body, prevails in the dentelations of the back, and on the legs.

“ Succulent herbs, growing in the forests of the limestone hills I have referred to, supply food for the Iguana. These hills, however, are so little suited for this sort of vegetation, that hardly anything more than aromatic and resinous trees and balsamic plants grow there. The *lignum-vitæ* (*Guaiaecum*), the *Acacia nilotica*, and cactoid plants,—particularly the torch and melon thistles (*Cactus repandus* et *peruvianus*, et *Cactus melocactus*),—the *lantana*, and the *varronia*, with many balmy mallows (*Sida althæifolia*, *urens*, *capillaris*, et *viscosa*), and the vervain (*Stachytarpheta*), seem to comprise almost the whole catalogue of trees, shrubs and herbs. These hills are, however, inhabited by several domestic animals, which have run wild. Goats and hogs, derived from the common domestic breeds, have become feral; and even the common domestic poultry, cocks and hens, have taken to the woods as jungle-fowl, with the pintado. Quails and doves find here a safe breeding-place. These hills are also the special resort of the musteline thrush, the wood-thrush of the North Americans, which more than divides with the mocking-bird the credit of a songster. It has a louder and more brilliant note, though its song be greatly less varied and melodious. The fruit of the torch-thistle seems the great attraction of the wood-thrush, but it is not easy to perceive the resource of the granivorous birds. The aromatic herbs suit the wild goats; but the hogs can find but few edible roots among rocks, but very thinly interspersed with soil. In the occasional hollows a little mould has been collected from decayed leaves, mingled with marl, extremely stony and sterile; and here a little more succulent herbage may prevail, and a few of the edible roots of the country may be found growing. The rocks have numerous caverns, and the springs that break out at the foot of the cliffs are an impure brackish water, though extremely transparent. Yet this district is almost exclusively the haunt of the Iguana. The occasional ones taken in the savannas are considered to be stray visitants from the neighbouring hills; they are not permanently established in the plains in which they are found.

“ I have noticed the particular kind of locality which the Iguana inhabits in this part of the country, because it presents very different features from the haunts usually assigned to this lizard elsewhere. Forests on the banks of rivers, and woods around springs, where it passes its time in the trees and in the water, living on fruits, grains and leaves, are said to be the places in which the hunters find it on the American continent.”

After referring to some notes of Sir R. Schomburgk made in Guiana, and to Goldsmith's graphic picture of noosing the Iguana, probably derived from Labat, which I do not here quote, because they refer to an animal *generically* distinct from ours,—my friend reverts to his own observations:—

“The gular pouch which hangs like the dewlap of a bull beneath its throat can be inflated*, but it is not exactly known under what circumstances, ordinarily, it has recourse to this power of inflation. When filled with air it would give breadth and buoyancy to the body, and if its habits are as aquatic as some accounts make them [those of *Iguana* proper] to be, it would afford to an herbivorous animal no unimportant aid while swimming and cropping ‘its flowery food.’ When excited it assumes a menacing attitude, and directs its eye to the object of attack with a peculiarly sinister look. At this time it inflates the throat, erects the crest and dentelations on the back, and opens the mouth, showing the line of those peculiarly-set white teeth, with serrated edges, so excellently made to illustrate the remains of the gigantic fossil *Iguanodon*. The principle of their construction is so precisely similar, as to leave no doubt of the genuine connexion of the extinct with the existing herbivorous lizard. The adaptation of both is for the cropping and cutting of vegetable food.

“In defending itself from attack, the *Iguana* converts its long flexible tail into no unimportant weapon. The dentelated upper edge, drawn rapidly over the body and limbs of an enemy, cuts like a saw. The twisted attitude which it assumes when approached is converted into a quick turn, in which movement the tail is nimbly struck by an overblow from one side to another, and then jerked round. I have observed the same application of the tail to purposes of defence in the crocodile, and there can be little doubt that the dentelated crest upon this part of the body of lizards is for the infliction of serrated wounds. The lacerations which dogs suffer in attacking the *Iguana* are remarkably severe.

“There can be no doubt that the *Iguana* voluntarily takes to the water; but whether it delights to refresh itself in that element, as we should be led to suppose by the observation that it sports in it, I cannot learn from any of our people here. The one kept in the Zoological Gardens in the Regent’s Park was seen to enter and cross a small pond, the fore-feet being motionless during the animal’s progress through the water. It is curious, however, that whilst the dry, sterile hills near us abound with *Iguanas*, the banks of the Rio Cobre, a river so near its haunts, are scarcely ever visited by them.”

After my arrival in England, the above notes coming under review, in my study of the Saurians I had brought home, I was induced to make further inquiry of Mr. Hill, whether in describing the inflation of the pouch, and the defensive action of the tail, he spoke from his own observation. From his reply I extract the following remarks:—

“.....The purposes of defence, to which I represented it as applying its long tail with its armature of pointed and triple-edged scuta, were suggested to me by the negroes, who were present when I was examining the specimen I mentioned as forty-five inches in

* I believe my friend has fallen into a common error here. If I may judge from analogy in the genera *Anolis* and *Dactyloa*, the gular pouch in the *Iguanidæ* is *extensible* but not *inflatable*, as I hope to show in a future paper on the habits of these genera.—P.H.G.

length. They warned me to stand out of the reach of its tail, for they saw it was going to turn itself rapidly round to strike. I observed a peculiar sinister look it had, derived not from the eye being turned within the socket, so as to indicate the object it was regarding, but from the peculiar turn of the head, as if listening and observing. The negroes remarked that in the position in which its tail then lay, it was preparing to strike at me, and that dogs generally in setting upon them received desperate punishment, from the gashes and lacerations that were made into the thick muscles of the legs by the rapid flinging round of the Iguana in defending itself. The sudden jerk with which it drew back its tail was said to enable it to rasp the very flesh off the bone. The notion expressed about the inflation of the gular pouch was the consequence of seeing two very large Iguanas from Cuba, which distended this appendage, and let it collapse again. The skin of these animals hung about them, as if they had been fat, and were, at the time I saw them, emaciated

“ An acquaintance has promised to supply me with notes of a pair of *Cyclurus* that inhabited a hollow acacia-tree in his fields (*Prosopis juliflora*) for some sixteen months. He supposed them male and female. They differed in size and in tint; and were never, during the whole period of his acquaintance with them, seen on the outer tree both together. Like the pair of weather-indicators in the Dutchman’s hygrometer, if one was out, the other was in. For a certain time every morning, one or other would be seen on some extreme eastern branch of the tree sunning itself, by basking at its length in the slant sunbeams that shot within the foliage. Their size and the nimble movement of the tail gave them so much the appearance of the ring-tailed monkey, when climbing, that a near-sighted observer, like myself, would mistake them for some Sapajou scrambling up the bark.”

The intelligence thus promised has just been communicated to me, contained in the following letter from Stephen Minot, Esq., of Worcester Lodge, to Richard Hill, Esq.

“ February 1848.

“ Dear Sir,—In accordance with your request, I send you a few particulars relative to the two Guanas that were seen during a period of nearly two years, at Worcester Lodge, in the parish of St. Catherine.

“ About the beginning of September 1844, a friend of mine, riding into the property, observed, as he thought, a large green lizard basking in the sun on a hollow cashaw-tree (*Prosopis juliflora*), close by the road. He struck at it with his riding-whip, and immediately the animal disappeared with great swiftness into the tree. For several weeks after this it was occasionally seen, but was extremely shy, always disappearing the moment any one approached the tree. I gave orders that no one should, under any pretence, frighten it again, as a servant who had seen it informed me it was a Guana. By degrees it got tamer; and when I first saw it, it was, I should think, from 10 to 11 inches long, including the tail. About a year after this period it was always visible as soon as the sun became a

little warm, clinging to the bark of the tree, or crouching (if I may use the term) along a small dry branch. I never saw it attempt to catch flies, or ants, or any insects; and the only time I ever detected it feeding was about this period. One day after heavy rain, the sun having broken through the clouds, shining very bright, it was then eating the guinea-hen-weed (*Petiveria*), growing about ten yards from the root of the cashaw. I watched it a few moments, unperceived, and observed it walk very slowly, moving one leg at a time, —cropping, and apparently swallowing without any further process, a mouthful of leaf; and leaving an indenture on the plant of the size of his mouth. Immediately on seeing me, by a succession of rapid springs, neither running nor walking, nor was it like the hopping of the frog, it regained the tree, and in a second was out of sight. The hollow part of the tree is about seven feet from the ground. It evidently did not object to the water, as there was a small lodgment of water close by where it was feeding, through which it bounded without a moment's hesitation, though it might have regained the tree, if it had disliked the water, by going round the small swamp, which was only say three or four yards in diameter. I mention this circumstance of the water, as we had previously had dreadful dry weather, and I often wondered how the animals of this description lived for want of it; and it was never visible during or immediately after rain.

“It was, as you are aware, foolishly shot, in my absence, by young N——, under the false impression that it ate chickens. I have spoken of it in the singular number, as we were not aware there were two, until Mr. N—— shot a second one on the same tree about two or three hours after he killed the first. This discovery, that there were two instead of only one, accounted for what had previously often surprised me, namely that sometimes the animal was of a brownish-green hue, and when of that colour always appeared larger than when it looked blackish. It therefore appears plain that they must have been male and female; and, if that is correct, the male was by far the largest and handsomest.

“The male, as I consider it, was the one I saw dead after it was shot. It was about from 22 to 24 inches long, but the tail did not appear so long in proportion, as it grew older, as it seemed when first discovered. I opened the animal, and found it full of pieces of guinea-hen-weed, some digested, some half-digested, and a large quantity quite fresh, which is accounted for by its being early in the morning, say nine o'clock, when it was shot. I may mention that I put the carcass into three or four different sorts of ants' nests,—the common, the stinging black, and the large red ant,—not one of which would touch it; and when I forced them into the carcass, and put part of their nests in it, they ran away from it as quickly as possible. I did this under the hope of getting his skeleton.”

To this last observation Mr. Hill has appended the following note :—“This dislike for the flesh of the lizard may have resulted from the odour of the guinea-hen-weed, on which it had recently fed.

The whole flesh would be imbued with the intolerable garlic-like scent."

2. DESCRIPTIONS OF TWENTY-THREE NEW SPECIES OF VITRINA, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. VITRINA CUMINGII, Beck MSS. *Vitr. testá depresso-globosá, tenuissimá, subtiliter striatá, nitidá, albido-cornedá; spirá brevissimá, obtusá; suturá levi, lined impressá marginatá; anfractibus 4 vix convexiusculis, ultimo inflato, subdepresso, medio lined rufá cingulato; aperturá parùm obliquá, lunato-rotundatá; peristomate simplice, marginibus remotis, columellari subverticali, leviter arcuato, supernè reflexiusculo, perforationem punctiformem simulante, supero antrorsum vix arcuato.*

Diam. 20, altit. 12 mill.

Hab. The island of Bohol; collected by Mr. Cuming.

2. VITRINA MARGARITA, Beck MSS. *Vitr. testá depresso-globosá, tenuissimá, striatulá, nitidá, pellucidá, carneo-hyaliná; spirá parvulá, planiusculá; suturá lineari; anfractibus 3½ subplanis, rapidè accrescentibus, ultimo magno, inflato; aperturá obliquá, lunato-subcirculari; peristomate tenuissimo, margine supero antrorsum dilatato, columellari leviter arcuato.*

Diam. 14, altit. 8 mill.

Hab. The island of Guimaras; collected by Mr. Cuming.

3. VITRINA SMARAGDULUS, Beck MSS. *Vitr. testá depressiusculá, tenui, vix striatulá, non nitente, diaphaná, aureo-virente; spirá parvulá, planiusculá; suturá leviter impressá, angustissimè marginatá; anfractibus 3½ planiusculis, rapidè accrescentibus, ultimo utrinque planiusculo, basi lato; aperturá parùm obliquá, rotundato-lunari, latiore quam altá; peristomate tenui, subinflexo, margine supero antrorsum dilatato, columellari vix recedente, leviter arcuato.*

Diam. 12, altit. 7 mill.

Hab. The island of Negros; collected by Mr. Cuming.

4. VITRINA BICOLOR, Beck MSS. *Vitr. testá subglobosá, tenui, sublævigatá, nitidissimá, carneo-albidá; spirá brevi, convexá, obtusá; suturá impressá; anfractibus 3½ rapidè accrescentibus, ultimo inflato, anticè hyalino, basi angustiusculo, membranaceo-marginato; aperturá vix obliquá, lunato-rotundatá; peristomate tenuissimo, margine dextro regulariter rotundato, columellari recedente, perarcuato.*

Diam. 18, altit. 10 mill.

(Body of the animal white, apex black.)

Hab. Isle of Guimaras; collected by Mr. Cuming.

5. VITRINA GUIMARASENSIS, Pfr. *Vitr. testá depresso-semiglobosá, tenui, striatulá, subdiaphaná, virenti-carnedá; spirá parvulá, parùm elevatá; suturá marginatá; anfractibus vix 4 subplanis,*

rapidissimè accrescentibus, ultimo inflato, subdepresso; aperturá obliquá, lunato-subcirculari, æquè altá ac latá, intus submargari-tacéd; peristomate tenuissimo, margine dextro regulariter arcuato, columellari recedente, perarcuato.

Diam. 15, altit. 8 mill.

Hab. Isle of Guimaras; collected by Mr. Cuming.

6. *VITRINA BECKIANA*, Pfr. (*Vitr. peraffinis*, Beck MSS.) *Vitr. testá depresso-globosá, circuitu ovali, tenuissimá, striatuld, pellucidá, nitidá, pallidissimè rubello-corned; spirá mediocri, brevi, obtusá; anfractibus ferè 4 vix convexiusculis, celeriter accrescentibus, ultimo subdepresso, basi lato; aperturá parùm obliquá, lunato-rotundatá, latiore quam altá; peristomate simplice, marginibus remotis, supero regulariter arcuato, columellari supernè reflexiusculo, basi recedente, perarcuato.*

Diam. 16, altit. 8 mill.

Hab. The Philippine islands of Negros, Siquijor and Guimaras; collected by Mr. Cuming.

7. *VITRINA POLITISSIMA*, Beck MSS. *Vitr. testá globoso-depressá, soliduld, lævigatá, politissimá, diaphand, corned, saturatius radiatá; spirá mediocri, convexá; suturá impressá, submarginatá; anfractibus 4 convexiusculis, celeriter accrescentibus, ultimo depresso-rotundato, basi lato; aperturá obliquá, lunato-rotundatá, æquè altá ac latá; peristomate simplice, margine superiore antrosum arcuato, columellari leviter arcuato.*

Diam. 14, altit. $7\frac{1}{2}$ mill.

From the island of Zebu; collected by Mr. Cuming on the leaves of small trees. The entire animal is black.

8. *VITRINA LEYTENSIS*, Beck MSS. *Vitr. testá depressá, circuitu ovali, tenuissimá, lævigatá, nitidissimá, lutescenti-carned; spirá planiusculá, vix elevatá; suturá leviter impressá; anfractibus 3 rapidè accrescentibus, ultimo supernè subplano, basi conveziore, latiusculo; aperturá parùm obliquá, rotundato-lunari, latiore quam altá; peristomate tenuissimo, margine supero parùm arcuato, columellari supernè reflexiusculo, basi cum inferiore angulum obtusum formante.*

Diam. 13, altit. 7 mill.

From the island of Leyte. A larger variety, more opaque, yellowish-whitish, from Siquijor. Collected by Mr. Cuming.

9. *VITRINA GUTTA*, Pfr. *Vitr. testá depresso-globosá, tenuissimá, glaberrimá, nitidissimá, hyalind; spirá vix elevatiusculá; suturá lineari, angustè marginatá; anfractibus $3\frac{1}{2}$ planiusculis, rapidè accrescentibus, ultimo magno, depresso-rotundato, basi latiusculo; aperturá parùm obliquá, lunato-circulari; peristomate simplice, undique regulariter arcuato, margine columellari intrante, supernè reflexiusculo.*

Diam. 11, altit. 6 mill.

From Sorsogon, isle of Luzon; collected by Mr. Cuming.

10. *VITRINA RUFESCENS*, Pfr. *Vitr. testá depresso-globosá, tenuissimá, plicatulá, nitidá, pellucidá, rufescente; spirá breviter conoïdedá, obtusiusculá; suturá impressá; anfractibus ferè 4 convexiusculis, celeriter accrescentibus, ultimo ventroso; aperturá vix obliquá, lunato-subcirculari; peristomate tenui, subinflexo, marginibus remotis, supero regulariter, columellari leviter arcuato.*

Diam. 13, altit. 8 mill.

From the isle of Mindoro; collected by Mr. Cuming.

11. *VITRINA CRENULARIS*, Beck MSS. *Vitr. testá-depressá, tenuissimá, glabrá, nitidá, pellucidá, aured; spirá planá; suturá leviter impressá; anfractibus $3\frac{1}{2}$ planiusculis, juxta suturam plicato-crenulatis, rapidè accrescentibus, ultimo depresso, basi lato; aperturá obliquá, rotundato-lunari, latiore quam altá; peristomate tenui, subinflexo, margine supero antrorsum dilatato, columellari leviter arcuato, basali strictiusculo.*

Diam. 13, altit. 7 mill.

From the Philippine islands of Negros and Zebu; collected by Mr. Cuming.

12. *VITRINA RESILIENS*, Beck MSS. *Vitr. testá depressá, tenuissimá, subtilissimè et confertim plicatulá, nitidá, pellucidá, virenti-straminè; spirá planiusculá; suturá leviter impressá; anfractibus $3\frac{1}{2}$ subplanis, ultimo lato, depresso, basi ferè omninò membranaceo; aperturá obliquá, lunato-ovali; peristomate simplicissimo, margine columellari statim procedente, leviter arcuato.*

Diam. 11, altit. $6\frac{1}{2}$ mill.

From Sibonga, island of Zebu. Found on leaves of small palms in dark woods. The body of the animal is white, the apex black (H. Cuming).

13. *VITRINA PAPILLATA*, Pfr. *Vitr. testá depressá, tenui, læviusculá, nitidá, pellucidá, pallidè corné; spirá planiusculá, medio papillatá; suturá profundè impressá, marginatá; anfractibus $3\frac{1}{2}$ convexiusculis, prope suturam striatulis, ultimo depresso, lineis obsolete spiralibus interdum sculpto, peripheriá rotundato, basi latiusculo; aperturá perobliquá, amplá, rotundato-lunari, latiore quam altá; peristomate tenui, margine supero antrorsum dilatato, columellari recedente, perarcuato.*

Diam. 10, altit. 5 mill.

From Calauang, isle of Luzon; collected by Mr. Cuming.

14. *VITRINA PLANULATA*, Pfr. *Vitr. testá depressissimá, subdiscoïdedá, læviusculá, nitidá, carnè; spirá planiusculá; suturá impressá; anfractibus 3 vix convexiusculis, rapidissimè accrescentibus, ultimo depresso, basi angusto; aperturá amplissimá, perobliquá, lunari, transversè dilatatá; peristomate tenui, margine supero antrorsum dilatato, columellari valdè recedente, arcuato.*

Diam. 11, altit. $4\frac{1}{2}$ mill.

From Calauang, isle of Luzon; collected by Mr. Cuming.

15. *VITRINA APERTA*, Beck MSS. *Vitr. testâ depressissimâ, superne convexiusculâ, basi apertâ, levigatâ, subopacâ, virenti-albidâ; spirâ minutâ, laterali; suturâ levi; anfractibus 2½ convexiusculis, basi angustissimis, apertis, ultimo permagno, planè fornicato; aperturâ horizontali, auriformi, usque in verticem apertâ; peristomate simplicissimo.*

Diam. 11, altit. 3 mill.

From San Juan, isle of Luzon; collected by Mr. Cuming.

16. *VITRINA MONTICOLA*, Benson MSS.? *Vitr. testâ depressâ, tenui, striatâ, nitidâ, pellucidâ, lutescenti-cornâ; spirâ planâ, medio vix prominulâ; suturâ leviter impressâ; anfractibus 4 celeriter accrescentibus, planiusculis, ultimo depresso, non descendente; aperturâ obliquâ, rotundato-lunari; peristomate simplice, marginibus conniventibus, callo tenuissimo junctis, supero antrorsum arcuato-dilatato, columellari cum basali angulum obtusum formante.*

Diam. 18, altit. 7½ mill.

From Bengal, Landour, Himalayah, Almorah.

17. *VITRINA BENSONI*, Pfr. *Vitr. testâ depressiusculâ, tenui, striatâ, nitidâ, pellucidâ, pallidè cornâ; spirâ vix elevatâ, obtusâ; suturâ impressâ, submarginatâ; anfractibus 3½ convexiusculis, ultimo subdepresso, peripheriâ rotundato, basi lato; aperturâ obliquâ, lunato-subcirculari; peristomate simplice, subinflexo, marginibus conniventibus, supero antrorsum subdilatato, columellari recedente, perarcurato.*

Diam. 12, altit. vix 6 mill.

In the Botanic Garden of Calcutta; collected by Mr. Benson.

18. *VITRINA HANSI*, Rüppell MSS. *Vitr. testâ depresso-globosâ, tenui, striatâ, pellucidâ, nitidulâ, pallidè cornâ, strigis saturatoribus radiatâ; spirâ parvulâ, conoideo-convexâ; suturâ impressâ, marginatâ; anfractibus 4 convexiusculis, rapidè accrescentibus, ultimo rotundato, basi latiusculo; aperturâ obliquâ, lunato-subcirculari; peristomate simplice, marginibus convergentibus, columellari subrecedente, leviter arcuato.*

Diam. 24, altit. 12 mill.

From Abyssinia; collected by Dr. Rüppell.

19. *VITRINA RÜPPELLIANA*, Pfr. *Vitr. testâ subsemiglobosâ, tenui, arcuato-striatâ, pellucidâ, parùm nitidâ, fulvâ; spirâ brevi, obtusiusculâ; suturâ impressâ; anfractibus 3 convexiusculis, rapidè accrescentibus, ultimo ventroso, basi latiusculo; aperturâ obliquâ, lunato-rotundatâ; peristomate simplice, margine supero ferè angulatim antrorsum dilatato, columellari substrictè recedente, basi leviter arcuato; margine interno anfractuum inconspicuo.*

Diam. 18, altit. 10 mill.

From Abyssinia; found by Dr. Rüppell.

20. *VITRINA SOWERBYANA*, Pfr. *Vitr. testâ depressâ, subauriformi, arcuatim plicatâ, tenuissimâ, nitidâ, pellucidâ, brunneo-*

fulvâ; spirâ vix emersâ; suturâ profundè impressâ; anfractibus 3, primis convexiusculis, ultimo depresso, peripheriâ angulato, basi conveziore; aperturâ amplâ, perobliquâ, lunato-ovali, marginibus conniventibus, supero vix dilatato, columellari perarcuato, angustè membranaceo-marginato; margine interno anfractuum inconspicuo.

Diam. 22, altit. 11 mill.

From West Africa.

21. *VITRINA GRANDIS*, Beck MSS. *Vitr. testâ depressâ, tenuiusculâ, radiatim subtiliter plicatâ, diaphandâ, non nitente, albidostramined; spirâ brevissimâ, vix emersâ, subpapillatâ; suturâ impressâ; anfractibus 3½ rapidè accrescentibus, subplanatis, ultimo depresso, peripheriâ obsoletè angulato, basi lato, striatulo, nitido; aperturâ parùm obliquâ, latâ, lunari; peristomate simplice, margine supero antrorsum subdilatato, columellari subverticaliter descendente, arcuatim in basalem abiente.*

Diam. 18, alt. 8 mill.

From West Africa, Guinea.

22. *VITRINA ABYSSINICA*, Rüppell MSS. *Vitr. testâ depresso-ovatâ, sublevigatâ, diaphandâ, vix nitidâ, sordidè virenti-corned; spirâ brevi, convexiusculâ; suturâ leviter impressâ; anfractibus 2½ convexiusculis, celeriter accrescentibus, ultimo peripheriâ rotundato, basi latiusculo; aperturâ obliquâ, rotundato-lunari, transversè dilatatâ; peristomate simplice, margine supero subrepanando, columellari recedente, arcuato.*

Diam. 10, altit. 5½ mill.

From Abyssinia; collected by Dr. Rüppell.

23. *VITRINA VIRENS*, Pfr. *Vitr. testâ depressiusculâ, subsemiovali, subtilissimè striatâ, nitidâ, corneo-virente; spirâ planiusculâ; suturâ vix impressâ; anfractibus 3 vix convexiusculis, rapidè accrescentibus, ultimo subdepresso-rotundato, basi angustè membranaceo-marginato; aperturâ obliquâ, lunato-subcirculari; peristomate tenui, subinflexo, undique regulariter arcuato.*

Diam. 16, altit. 8 mill.

Locality unknown.

3. DESCRIPTION OF A NEW HELIX AND STREPTAXIS, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. *HELIX STRANGEI*, Pfr. *H. testâ latè umbilicatâ, depressâ, solidiusculâ, supernè confertim costulato-striatâ, nitidâ, castaneo-corneâ, subpellucidâ; spirâ parùm elevatâ, obtusiusculâ; anfractibus 5 vix convexiusculis, ultimo subdepresso, basi sublevigato; aperturâ subobliquâ, lunato-ovali; peristomate simplice, recto, tenui, marginibus conniventibus.*

Diam. 24, altit. 10—11 mill.

From Brisbane Water, New South Wales (Mr. Strange).

2. *STREPTAXIS UBERIFORMIS*, Pfr. *Str. testâ profundè rimato-*

perforatâ, subsemiglobosâ, basi ferè circulari, supernè obliquè et confertim costulato-striatâ, striis subtilissimis subdecussatâ, tenui, diaphanâ, pallidè virenti-cornèâ; spirâ subconoideâ, obtusâ; anfractibus $6\frac{1}{2}$ convexiusculis, ultimo deviante, basi subplanulato, lævigato; aperturâ parùm obliquâ, lunato-ovali, edentulâ; peristomate simplice, breviter expanso-reflexo, marginibus remotis, supernè subconvergentibus.

Diam. 18, altit. 12 mill.

From the Brazils.

4. DESCRIPTION OF FOURTEEN NEW SPECIES OF HELICEA, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. *HELIX VITELLINA*, Pfr. *Hel. testâ angustissimè umbilicatâ, depresso-globosâ, supernè minutissimè decussatâ, vix nitidâ, fuscè-centi-vitellinâ; spirâ breviter conoideâ, obtusiusculâ; anfractibus $5\frac{1}{2}$ convexiusculis, ultimo anticè subdescendente, infra peripheriam vix striato, juxta umbilicum contractum albo; aperturâ obliquâ, lunato-rotundatâ; peristomate simplice, marginibus remotis, columellari albo, incrassato-reflexo, supernè subdilato.*

Diam. 29, altit. 18 mill.

Locality unknown.

2. *HELIX GEMMA*, Pfr. (*Vitrina suturalis*, Beck MSS.) *Hel. testâ subperforatâ, conoideo-orbiculatâ, tenui, lævigatâ, nitidâ, pellucidâ, virenti-hyalinâ; spirâ depresso-conoideâ; suturâ submarginatâ; anfractibus 4 vix convexiusculis, sensim accrescentibus, ultimo non descendente; aperturâ parùm obliquâ, rotundato-lunari; peristomate simplice, recto, margine columellari brevi, arcuato, supernè reflexiusculo.*

Diam. 9, altit. 5 mill.

From the islands of Luzon and Camiguing; collected by Mr. Cuming.

3. *HELIX SUBFUSCA*, Pfr. (*Vitrina subfusca*, Beck MSS.) *Hel. testâ subperforatâ, depressâ, tenui, subtiliter striatulâ, pellucidâ, corneo-fuscâ; spirâ vix elevatâ; suturâ levi, submarginatâ; anfractibus $4\frac{1}{2}$ vix convexiusculis, celeriter accrescentibus, ultimo peripheriâ rotundato, anticè non descendente; aperturâ subobliquâ, latè lunari; peristomate simplice, tenui, recto, marginibus conniventibus, dextro subsinuato, columellari subverticali, supernè vix reflexiusculo.*

Diam. $11\frac{1}{2}$, altit. $6\frac{1}{3}$ mill.

From Sorsogon, isle of Luzon; collected by Mr. Cuming.

4. *HELIX VARGASIANA*, Pfr. *Hel. testâ subobtectè perforatâ, conico-globosâ, costulatâ, opacâ, cretacèâ, fasciis nonnullis obsoleteis grisèis notatâ; spirâ conicâ, obtusâ; anfractibus $5\frac{1}{2}$ convexis, ultimo inflato, anticè descendente; aperturâ lunato-rotundatâ; peristomate simplice, margine supero et dextro rectis, basali breviter, columellari latissimè reflexo, subverticali, perforationem ferè tegente.*

Diam. 13, altit. $8\frac{1}{2}$ mill.

From the island of Porto Sancto; collected by Count Vargas.

5. *HELIX CALCAREA*, Pfr. *Hel. testá perforatá, depresso-globosá, striatúlá, lineis impressis obsolete reticulatá, opacá, calcared; spirá breviter conoideá, acutiusculá; anfractibus 5 convexiusculis, ultimo peripheriá subcarinato, anticè vix descendente; aperturá subverticali, latè lunari; peristomate simplice, margine supero leviter arcuato, basali breviter, columellari paulò latius reflexo, declivi.*

Diam. 15, altit. 10 mill.

From Porto Sancto; collected by Count Vargas.

6. *HELIX CASTA*, Pfr. *Hel. testá imperforatá, depressá, utrinque subæqualiter convexá, carinatá, striatúlá, nitidá, sub epidermide deciduá pallidè lutescente albá; suturá lineari, cretaceá; anfractibus 4 subplanis, ultimo juxta suturam et infra carinam obsolete angulato; columellá brevi, declivi, excavatá, basi subtortá; aperturá subtrapeziá; peristomate expanso, albo, margine basali leviter arcuato, cum columellá angulum formante.*

Diam. 47, altit. 23 mill.

Locality unknown.

7. *HELIX ANOMALA*, Pfr. *Hel. testá umbilicatá, depressá, carinatá, solidá, utrinque convexiusculá, granulatá, violaceo-fuscá; anfractibus 5 convexiusculis, ultimo undique soluto, anticè subitò descendente, basi constricto, profundè 4-scröbiculo; umbilico cylindrico, aperto; aperturá horizontali, transversè pyriformi; peristomate crasso, continuo, hepatico, undique latè expanso, margine basali profundè quadridentato.*

Diam. 24, altit. 11 mill.

From Jamaica. Nearly allied to *H. sinuata*, but differing in the umbilicus and the form of the mouth. Nevertheless it may possibly be a monstrous variety of that shell.

8. *BULIMUS IMPERATOR*, Pfr. *Bul. testá imperforatá, ovato-conicá, solidá, striatúlá, strigis nigris, fulvis et albidis alternantibus, interdum interruptis elegantissimè pictá; spirá elongato-conicá, acutiusculá; anfractibus 6, superioribus planiusculis, 2 ultimis convexis, ultimo spirá multò breviorè; columellá subverticali, basi extrorsum subdentatá, carneo-lividá; aperturá truncato-ovali, intus cerulescente; peristomate latè expanso, nigro-marginato, margine dextro vix arcuato.*

Long. 68, diam. 38 mill.

From the Philippine Islands.

9. *BULIMUS MONOZONUS*, Pfr. *Bul. testá imperforatá, conoideo-ovatá, solidulá, longitudinaliter obliquè plicatá, saturatè castaned; spirá conoidè, obtusá; anfractibus $5\frac{1}{2}$ convexis, ultimo spirá paulò breviorè, ad peripheriam cingulo lato albo ornato; columellá subverticali, basi extrorsum subtuberculatá; aperturá lunato-ovali, intus margaritacé; peristomate obtuso, vix expansiusculo, margine basali cum columellá angulum obtusum formante.*

Long. 52, diam. 32 mill.
From the Philippine Islands.

10. *BULIMUS LEPTOCHILUS*, Pfr. *Bul. testá imperforatá, oblongo-ovatá, solidulá, striatá et malleatá, sub epidermide olivacescente castaneo-marmoratá; spirá elongato-conicá, obtusá; anfractibus 6 vix convexiusculis, ultimo spiram vix superante; columellá recedente, obsoletissimè plicatá; aperturá oblongá, angustá; peristomate breviter expanso, simplice, tenui, pallidè carneo, marginibus callo tenuissimo junctis.*

Long. 98, diam. 40 mill.

From La Baja, province of Pamplona, New Granada (Funck).
Nearly allied to *Bul. Moritzianus*, Pfr.

11. *BULIMUS COSTATUS*, Pfr. *Bul. testá vix perforatá, solidá, cylindraceo-turritá, longitudinaliter subconfertim costatá, nitidá, cinerascens-carneá; spirá elongatá, obtusá; anfractibus 8½ planiusculis, ultimo ⅓ longitudinis vix æquante; columellá supernè dentato-plicatá; aperturá oblongá, intus fuscá; peristomate breviter expanso, margine dextro supernè arcuato, tum strictiusculo, columellari dilatato, reflexo, perforationem ferè tegente.*

Long. 18, diam. 5½ mill.

From the Brazils.

12. *ACHATINA REEVEANA*, Pfr. *Ach. testá oblongo-turritá, tenui, sublævigatá, sub lente spiraliter subtilissimè striatá, nitidulá, sub epidermide fugace, lutescente albidá, luteo-bifasciatá; spirá sub-turritá, obtusá; suturá regulariter crenulatá; anfractibus 7½, omnibus convexiusculis, ultimo ¾ longitudinis subæquante; columellá tenui, strictiusculá, brevissimè truncatá; aperturá truncato-ovali; peristomate tenuissimo.*

Long. 48, diam. 22 mill.

From West Africa. Very similar to *Ach. alabaster*, Rang.

13. *ACHATINA PORTORICENSIS*, Pfr. *Achat. testá turrito-oblongá, lævigatá, lineis longitudinalibus impressis irregulariter sculptá, nitidá, pallidè corneá, strigis saturatoribus ornatá; spirá elongatá, obtusiusculá; anfractibus 8 planiusculis, ultimo ⅓ longitudinis paulò superante; columellá antrorsum arcuatá, prope basin aperturæ abruptè truncatá; aperturá elliptico-semiovali; peristomate simplice.*

Long. 20, diam. 7 mill.

From St. John's, Portorico (under stones).

14. *CLAUSILIA SIEBOLDTI*, Pfr. *Claus. testá arcuato-rimatá, fusi-formi, solidá, confertim costulatá, vix nitidulá, corneo-fuscá; spirá sensim attenuatá, acutá; anfractibus 10 convexis, ultimo penultimum non superante, basi rotundato, obsoletè gibbo; aperturá magná, pyriformi; lamellis mediocribus, convergentibus; lunellá profundá, arcuatá, extus conspicuá; plicá palatali 1 mediocri,*

subcolumellari inconspicud; peristomate continuo, libero, albo, expanso, reflexiusculo.

Long. 18, diam. 4 mill.

From Japan (Sieboldt).

July 11, 1848.

R. C. Griffith, Esq., in the Chair.

A letter was read from the Right Hon. Sir George Clerk, Bart., V.P., in which he informed the Secretary of Lord Hardinge's intention of placing under the care of the Society a living specimen of the Monaul (*Lophophorus impeyanus*), which he had brought with him from India.

A letter was read from Admiral Bowles, V.P., announcing the presentation of three living specimens of *Haliaetus aguia* (Temm.), and a male Condor, by Rear-Admiral Sir George Seymour.

The following papers were communicated to the Meeting:—

1. ON THE OCCURRENCE AND HABITS OF *VESPERTILIO EMARGINATUS*.
BY R. F. TOMES.

The specimen of a Bat, the habits of which I am about to describe, was taken in Warwickshire, near Stratford-on-Avon, whilst flitting around the tops of some high elms by the Avon-side on the 20th of June, 1847. It was in company with several others when I succeeded in shooting it, which I found very difficult on account of their exceedingly crooked, irregular mode of flight.

I believe I have never seen one of these flying in open places in a straightforward manner, as the commoner species, the Noctule and Pipistrelle, usually do; but they follow intimately and exactly the extremities of the top branches of high elm or ash trees, always in the most sheltered and quiet spots, never appearing on the windward side of a tree, even on the calmest evening. They seem of a much more social disposition than any other kind of Bat, being usually in parties of about half-a-dozen, and all of them most commonly hawking round the same tree for a few minutes, then moving off to the next, and so on till all the trees of the group have been searched; and then a re-examination of the same trees takes place.

As above stated, their flight is never straight, even for a moment, but is excessively vacillating and butterfly-like, though rather slow,—performed, as I believe, with the head directed towards the centre of the tree, so that they in fact fly in a sideward direction. From this circumstance I conclude that they take their food, which consists of

very minute gnats, while resting on the outer leaves, or when about to settle on them.

If watched very closely for a little time, they move on to some other tree, appearing to shun observation very carefully.

Gilbert White, I think, remarked of the Noctule, that it usually came abroad later than the Pipistrelle, which I can from personal experience affirm to be the case. The species now under consideration is even later than the Noctule, seldom being seen until the latter has been abroad for an hour; so late that, excepting on very clear evenings, there is little chance of either observing or obtaining specimens.

It is probable that they may be seen during the greater part of the summer months, for I remember to have seen and particularly noticed them for a long time before I thought of shooting one, and also for a considerable length of time afterwards. They may at any time be known by a person at all conversant with the method of flight of the different species of Bats, by their unsubstantial, butterfly-like appearance.

Both the specimens which came into my possession in the way alluded to were females, and on dissection contained a single fetus, about half an inch in length; yet even at this early age the membranes were considerably developed, and all the parts bore nearly the same relative proportion to each other as in the adult.

The auricle of the ear appeared to be nearly, if not quite fully formed, and folded forward over the eyes, reaching almost to the end of the nose.

When skinned and dissected this Bat was quite free from all unpleasant smell.

DIMENSIONS.

	in.	lin.
Length of the head and body	1	7½
Length of head	0	7½
Length of tail	1	6½
Length of the auricle	0	6
Width of ditto	0	3½
Length of the tragus	0	4
Width of ditto	$\frac{1}{10}$	0
Extent of wings	9	2½
Length of the humerus	0	9
Length of the thumb	0	2
Length from the point of the under jaw to the angle of the mouth, being the gape-line	0	3

DENTITION.

$$i. \frac{4}{6}; c. \frac{2}{2}; f. m. \frac{6}{6}; m. \frac{6}{6}; \text{total } \frac{18}{20}.$$

Since the specimen obtained by Brongniart in the neighbourhood of Dover, none are recorded as having occurred till the present time, with the exception of a single specimen mentioned by Professor MacGillivray, from Winchester, and described by him in the 'Naturalists' Library,' vol. xvii. He there states that the ears have "a semi-

circular lobe at the base of their outer side, and a wide and deep sinus in their upper half," which certainly is not the case with my specimens, the notch being neither wide nor deep, nor the lobe at the base at all distinctly marked. Neither is there any great resemblance to Mr. Bell's figure, taken from Brongniart's; the ears in that being much narrower in proportion to their length, with the sinus near the top of the outer side. It agrees however very nearly with the description and figure given by the latter naturalist from the specimen found by him near Dover, and there can be no doubt of its identity with his specimen of *Vespertilio emarginatus*.

2. ON THE SPECIES OF THE GENUS PLACENTA OF RETZIUS.

BY J. E. GRAY, ESQ., F.R.S. ETC. ETC.

(Mollusca, pl. 1. fig. 1.)

Lamarck describes three species of this genus, depending on the general outline and the waved or flat form of the shell, characters which are liable to considerable variations, as may be found on the mere inspection of any considerable number of specimens.

I have observed that the hinge forms a more permanent character, and affords the means of dividing the species into two sections, and furnishes characters which separate them from each other. In both subgenera the right valve is the flattest, and bears the ridges of the hinge.

Sect. I. *Placuna*, sp. Lamk. = *Ephippium*, Chemn.; *Placenta* β , Schum. Shell purplish, subopaque; hinge-ridges rapidly diverging from one another at about the angle of 45 degrees. Muscular scar under the centre of the hinge. The ridges of nearly equal length.

1. *Placenta Sella*.—Shell flexuous, outline rather rhombic, being straight in front and rather notched behind; the ridges of the hinge not longer than they are separate from each other at the base.

Anomia Sella, Gmelin, S. N. 3345, 1788.

Placuna Sella, Lamk. Hist. N. 2.

Ephippium anglicanum maximum, Chemn. C. viii. t. 79. f. 714. cop. E. M. t. 174. f. 1.

Placenta Ephippium, Retz. 1788.

Inhab. China, India.

β . Shell nearly flat, subquadrangular.

Inhab. Australia. Brit. Mus.

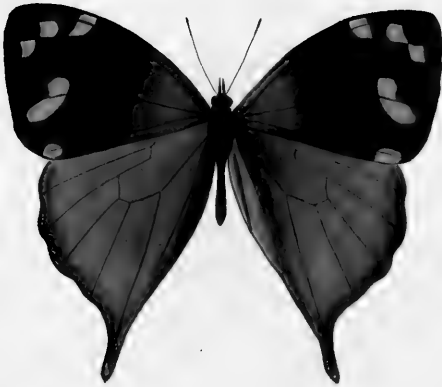
2. *Placenta papyracea*; *Placuna papyracea*, Lamk. Hist. N. 2 = *Ephippium parvum*, Chemn. Conch. viii. t. 79. f. 719. cop. E. M. t. 174. f. 2.

3. *Placenta Lincolnii*.—Shell flat, outline suborbicular, rounder before and behind; ridges of the hinge elongate, longer than they are separate from each other at the base.

Inhab. Australia; Mr. W. Davison. British Museum.

I wish to name this species after my excellent friend Mr. Abraham Lincoln, who kindly presented me with the specimen here described, and who is well known for his fondness for conchology and the liberality with which he allows persons to use his extensive collection.





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CORADES ENYO. Hewitson.

Sect. II. *Placenta*; *Placenta*, Schum. *Shell semitransparent, flat, outline suborbicular; ridges of the hinge very gradually diverging from each other, the hinder ridge much the longest. Muscular scar rather in front of the middle of the hinge.*

1. *Placenta orbicularis*, Retz.; *Placuna placenta*, Lamk. Hist. N. 3; *Anomia placenta*, Linn. S. N. 1154; Chemn. Conch. viii. t. 79. f. 176. cop. E. M. t. 173. f. 2.

Shell colourless, semitransparent; when young, pale purplish. Inhab. China. N.W. Coast of Australia; *Earl of Derby*. Port Essington.

The shells vary a little in the inequality of the hinge-ridges, but the hinder is always the longest.

I may remark that Chemnitz gives the best character for the species, and has observed the character furnished by the hinge, which has been overlooked by Lamarck, and, as far as I am aware, by all recent authors.

July 25, 1848.

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

The following papers were read:—

1. DESCRIPTION OF A NEW GENUS AND SPECIES OF SATYRIDÆ.

BY W. HEWITSON, ESQ.

(Annulosa, pl. 4.)

The genus *Corades*, which Mr. E. Doubleday has named and kindly characterized for me, comprises but few species of butterflies, most of which are of recent occurrence. They are from the mountainous districts of Columbia and Venezuela, where, like our European *Hipparchias* of the same family, they delight in the alpine districts. They are remarkable for having the anal angle of the lower wings more or less produced into a tail.

GENUS CORADES, Boisd. MSS.

Head of moderate width, hairy; maxillæ about two-thirds the length of the body, rather slender. Labial palpi porrect, ascending, longer than the head, clothed with hairs and scales, the scales at the back of the second joint forming a tuft before the apex. First joint short, subcylindric, curved, stoutest at the base. Second joint three times the length of the first, subcylindric, slightly curved at the base, incrassated towards the apex, which is truncate. Third joint slender than the second, about half its length, nearly cylindric, obtuse at the apex. Eyes nearly round, not very prominent, smooth. An-

tennæ less than two-thirds the length of the body, slender, grooved below, thickening gradually into a slender obtuse club.

Thorax moderately stout. Anterior wings subtriangular; the anterior margin slightly arched, the outer nearly straight, three-fifths the length of the anterior; inner margin nearly straight, four-fifths the length of the anterior. Costal nervule swollen at its origin, terminating beyond the middle of the anterior margin; subcostal nervure rather slender, throwing off its first nervule at a short distance before, its second immediately before the end of the cell, the third at a point about as far beyond the end of the cell as the origin of the first is before it, its fourth about as far beyond the third as the origin of this last is distant from the origin of the second. Fourth subcostal nervule terminating at the apex of the wing; upper disco-cellular nervule very short; middle and lower disco-cellular nervules about equal, the former curved inwards, the latter outwards; a rudimentary discoidal nervule extending inwards from the middle disco-cellular nervule: median nervure swollen at its base, its third nervule bent at a considerable angle where it is joined by the lower disco-cellular: submedian nervure stout, curved near the base: internal nervure wanting. Posterior wings obovate, produced into a short tail at the anal angle; the anterior margin nearly straight, the outer much curved; the abdominal fold ample. Precostal nervule stout, curved inwards: costal nervure rather stout, curved at its origin: subcostal nervure rather stout, bent at a considerable angle where the costal separates from it; its second nervule angular where the straight upper disco-cellular nervule anastomoses with it. Discoidal nervule extending into the cell: lower disco-cellular nervule straight, longer than the upper, anastomosing with the discoidal nervure a long way beyond the anastomosis of the upper disco-cellular. Third median nervule bent at nearly a right angle where the lower disco-cellular anastomoses with it. Anterior legs of the male slender, thinly clothed with scales and long delicate hairs; the femur rather shorter than the tibia; the tarsus little more than two-thirds the length of the tibia, one-jointed, nearly cylindrical. Anterior legs of the female rather slender, clothed with scales and a few long fine hairs. Femur and tibia of about equal length, the latter nearly cylindrical; the apex slightly stoutest, thinly spiny both within and without. Tarsus shorter than the tibia, five-jointed, the first joint more than twice the length of the rest combined; these all transverse: first to fourth bispinose at the apex; second and fifth with a tuft of hair on each side at the base. Middle and posterior feet with the femora rather stout; the tibiæ very spiny all round, their spurs stout; the tarsi densely spiny above, and, except the fifth joint, spiny below; the spines below arranged somewhat in two series, the first joint longer than the rest combined, second about one-third the length of the first, third three-fourths the length of the second, fourth rather more than half the length of the third, fifth not quite so long as the third. Claws curved, acute, grooved below; paronychial bilacinate; the outer lacinia slender, pointed, not so long as the claw; the inner lancet-shaped, much broader than and nearly as long as the outer,





W. Wang del et lith

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HYLEORA EUCALYPTI

very hairy; pulvillus jointed, broad, not so long as the claws. Abdomen rather short, not robust.

This interesting genus, as remarked above, appears to be almost confined to the eastern slopes of the Andes and to the great branch of that mountain-range which runs along the northern parts of South America. Nearly all the specimens of the five or six species belonging to it existing in British collections were sent home by Mr. Bridges from the eastern parts of Bolivia, and by Mr. Dyson from Caraccas. The peculiar sexual scales on the disc of the anterior wings of the males resemble those of the males of most species of this family in being long, tapering to a delicate hair-like point, at the end of which is a little plumelet.

In form this genus resembles the *P. Actorion* of Linnæus, which is the type of the genus *Napho* of Boisduval, but that insect belongs to the preceding family of *Morphidæ*.

CORADES ENYO. *Cor. alis omnibus, supra, chocoladinis, anticarum apice obscuriore, fulvo-maculatâ; subtus, anticis fuscescentibus apice pallidiori, maculis tribus albidis notatâ, posticis fusco-gri-sescentibus, lineis duabus transversis obscurioribus.*

Exp. $2\frac{1}{2}$ unc. vel 65 mill. *Hab.* Caraccas.

Anterior wings, above chocolate-brown at the base, darker at the apex and along the outer margin; between the cell and the apex is a transverse band composed of three fulvous spots, the first of which is divided by the subcostal nervure; midway between the cell and the outer margin a curved spot of the same colour, divided by the first median nervule, and a rounded spot of the same colour near the anal angle. Posterior wings with the anal angle considerably produced into a tail, entirely chocolate-brown. Below, the anterior wings are fuscous, the base rather paler, the apex ashy; the subapical spots nearly white, the others as above; the posterior wings clouded and freckled with ashy-grey and fuscous, having a slight silvery reflection; a transverse band, commencing on the costa, crosses the middle of the cell, and terminates before it reaches the inner margin; a second similar band commences on the costa, and running along the lower disco-cellular nervule, terminates at the tail.

Head, thorax and abdomen fuscous above, the two latter greyish below; antennæ fuscous; palpi fuscous above, pale below.

This insect was taken by Mr. Dyson in the mountains of Caraccas, where it seems to be rather rare.

2. DESCRIPTION OF A NEW GENUS OF NOTODONTIDÆ.

BY E. DOUBLEDAY, F.Z.S.

(Annulosa, pl. 5.)

GENUS HYLÆORA.

Head small, densely clothed with long hair-like scales, those at the base of the antennæ very long, forming two tufts, which meet over the vertex. Eyes round, prominent. Maxillæ slender, short, scarcely so long as the thorax. Labial palpi short, the first and second joints densely scaly, the scales hair-like, the third joint clothed with short

scales : first joint much curved, broadest at the apex ; second joint one-half longer than the first, subcylindric, stoutest in the middle, truncate at the apex ; third joint small, oval, about one-third the length of the second joint. Antennæ of the male elongate, densely bipectinate, each pectination beautifully fringed with hairs : of the female long, setaceous, the inside set with short stiff hairs.

Thorax stout, crested, the crest much highest in front. Anterior wings elongate, the anterior margin but little curved until near the apex ; outer margin rather more than half the length of the anterior, slightly dentate ; inner margin nearly straight, rather longer than the outer. Costal nervure extending about three-fourths the length of the costa. First subcostal nervure thrown off beyond the middle of the cell, terminating not far from the extremity of the costal nervure ; second subcostal nervure thrown off shortly before the end of the cell, curved so as to cross the subcostal nervure at some distance beyond the end of the cell, terminating on the outer margin midway between the fifth subcostal and the first discoidal nervule ; third subcostal nervule arising rather nearer to the end of the cell than to the apex of the wing ; the fourth nearer to the third than to the apex, this nervule terminating at the apex. First discoidal nervule appearing at first sight to be a continuation of the subcostal nervure, the upper disco-cellular nervule being wanting. Lower about the same length as the middle disco-cellular nervule, united to the third median nervule shortly after its origin. Posterior wings with the anterior margin nearly straight, longer than the outer, which is rounded. Inner margin about two-thirds the length of the outer. Cell closed. Upper and lower disco-cellular nervule of about equal length. Discoidal nervure very slender ; the basal portion, as far as the end of the cell, atrophied. Legs with the femora and tibiæ densely hairy. The anterior tibiæ with a broad spur, nearly as long as the tibia itself, composed of a flat, slightly curved lancet-shaped lamina, fringed anteriorly. Tibiæ of the middle pair with two unequal spines at the apex, those of the third pair with two before the apex, two at the apex. Tarsi scaly, the first joint much the longest ; claws small, curved ; paronychia broad, very hairy, especially at the apex, shorter than the claw ; pulvillus jointed, the second joint very broad. Abdomen clothed with long hairs, elongate, longer in the male than in the female.

Larva stout, tapering towards the tail, the back flat, with a crenated ridge on each side.

HYLÆORA EUCALYPTI. *Hyl. alis anticis brunneis, nigro pallidoque variis, maculâ basali, alterâque geminatâ marginis anterioris, vittâ pone medium valdè angulatâ, fasciâque marginis exterioris fuscis ; posticis rufo-brunneis.*

Exp. alar. $3\frac{1}{2}$ unc.— $4\frac{1}{4}$ unc. vel 90–108 millim.

Hab. Australia.

I have not thought it necessary to enter into a detailed specific character of this insect, as the accompanying figure will give a far better idea of the species than the longest description. The noc-

turnal Lepidoptera are often almost impossible to describe, and it is only by the most accurate figures, or by comparison of specimens, that we can arrive at the determination of species.

I am indebted to Mr. Alfred Lambert of Sydney for the specimens figured and for the drawing of the larva. The following note accompanies the specimen:—

“The larva is figured in drawing No. 2. When I first found it I concluded that it was a *Cerura*, as in its habits it resembles the larva of that genus. It forms a strong cocoon, which is slightly attached to the trunk of the tree just below the surface of the ground. In form this cocoon is much like that of our common *Saturnia*, only exteriorly it is covered with points of sticks, grass, &c. The larva feeds on the *Eucalypti*, is found in January; the imago appears in July.”

From this it will be seen that it is a winter insect.

3. DESCRIPTION OF TWENTY-NINE NEW SPECIES OF HELICINA, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. HELICINA ACUTA, Pfr. *Hel. testâ depresso-conicâ, solidulâ, obliquè confertim striatâ et subgranulatâ, opacâ, luteâ, supernè rubro-unifasciatâ; spirâ conoidâ, acutâ, mucronatâ; anfractibus ferè 6 planiusculis, acutè carinatis, ultimo basi planiusculo; aperturâ perobliquâ, subtriangulârî; columellâ subverticali, brevissimâ, basi angulatâ, supernè in callum basalem tenuissimum abiente; peristomate simplice, aurantiaco, margine supero subrecto, basali subincrassato.*

Diam. 15, altit. $7\frac{1}{2}$ mill.

From Sibonga, isle of Zebu; collected by Mr. Cuming.

2. HELICINA ADAMSIANA, Pfr. *Hel. testâ depressâ, tenuiusculâ, sub lente seriebus confertis concentricis pustularum exiguarum subasperatâ, nitidulâ, diaphanâ, rubellâ; spirâ brevissimè conoidâ; anfractibus $5\frac{1}{2}$ planiusculis, ultimo depresso, peripheriâ rotundato, anticè non scrobiculato; aperturâ obliquâ, subtriangulârî; columellâ verticali, brevissimâ, basi subangulatâ, supernè in callum tenuem, circumscriptum dilatâ; peristomate angulatim expanso, reflexiusculo, margine supero breviter soluto, stricto, basali prope columellam subdentato.*

Diam. 8, altit. $4\frac{1}{3}$ mill.

From Jamaica.

3. HELICINA AMÆNA, Pfr. *Hel. testâ subsemiglobosâ, solidiusculâ, obliquè striatulâ lineisque impressis concentricis distantibus sculptâ, nitidulâ, roseo et luteo vel albo variegatâ; spirâ convexâ, mucronulatâ; anfractibus $5\frac{1}{2}$ vix convexiusculis, ultimo infra medium carinato, basi subplano; aperturâ obliquâ, subtriangulârî, intus flavâ; columellâ brevi, verticaliter subrimatâ, basi angulosâ, retrorsum in callum tenuem, diffusum abiente; peristomate simplice, margine supero latè expanso, basali reflexo.*

Diam. 15, altit. $9\frac{1}{2}$ mill.

From Honduras.

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4. *HELICINA BESCKEI*, Pfr. *Hel. testá subsemiglobosá, solidá, subtilissimè striatulá, sublævigatá, opacá, citriná unicolore vel fasciá 1 sanguinè juxta suturam ornatá, vel omnino rubicundá; spirá brevi, convexo-conoideá, submucronatá; anfractibus 5 subplanis, ultimo ad peripheriam cariná 1 acutá, pluribusque obtusioribus munito; aperturá obliquá, subtriangulári; columellá breviter recedente, basi obsoletè angulatá; peristomate expanso, subincrassato, margine supero strictiusculo, basali subarcuato; callo basali tenuissimo.*

Diam. 17, altit. 10 mill.

From Brazil (Bescke).

5. *HELICINA CAMPANULA*, Pfr. *Hel. testá campanulato-conicá, solidulá, lævigatá, nitidá, citriná; spirá elevatá, convexá, acuminatá; anfractibus 6 planiusculis, ultimo pone aperturam subconstricto, basi planulato; aperturá obliquá, semilunari-subtriangulári; columellá breviter recedente, basi subtruncatá, callum nitidum, semicircularem emittente; peristomate simplice, tenui, breviter expanso, margine basali strictiusculo.*

Diam. $8\frac{1}{3}$, altit. 7 mill.

From the island of Cuba.

6. *HELICINA CONCENTRICA*, Pfr. *Hel. testá depressè trochiformi, tenuiusculá, striis longitudinalibus et obliquis sub lente subtilissimè sculptá, lineis concentricis elevatis utrinque munitá, acutè carinatá, nitidulá, carneo-fusca, albido variegatá; spirá conoideá, subpapillatá; anfractibus $4\frac{1}{2}$ vix convexiusculis, ultimo utrinque convexiore; aperturá obliquá, subsecuriformi, latiore quam altá; columellá subrimatá, breviter arcuatá, basi incrassatá in callum album subcircumscriptum retrorsum dilatatá; peristomate simplice, breviter expanso, margine basali immediatè in columellam continuato.*

Diam. 10, altit. vix 6 mill.

From Venezuela and New Granada (De Lattre); a larger variety from Mirador, Mexico (Galeotti).

637, 14⁵³ 7. *HELICINA CONSTRICTA*, Pfr. *Hel. testá parvâ, lenticulari, crassâ, sublævigatá, non nitidâ, opacâ, albidâ, lineis undulatis rubris pictâ; spirá vix elevatâ, obtusâ; anfractibus $4\frac{1}{2}$ planulatis, ultimo angulato, basi subturgido, pone aperturam constricto; aperturá obliquá, subtriangulári, intus rubrá; columellá simplice, callum crassiusculum albidum vel igneum retrorsum emittente; peristomate simplice, obtuso, latere dextro rotundato.*

Diam. 6, altit. $3\frac{1}{2}$ mill.

From Otaheite and the Sandwich Islands.

8. *HELICINA CONVEXA*, Pfr. *Hel. testá convexo-orbiculatá, solidâ, lævigatá, nitidâ, albâ; spirá fornicatá, mucronulatá; anfractibus $4\frac{1}{2}$, ultimis 2 convexiusculis, ultimo obsoletissimè angulato; aperturá integrá, obliquá, semilunari; columellá breviter arcuatá, retrorsum in callum crassum, concolorem abiente; peristomate incrassato, breviter expanso, margine basali à callo columellari incisurâ levissimâ separato.*

Diam. $6\frac{1}{2}$, altit. $4\frac{1}{2}$ mill.

Locality unknown.

9. *HELICINA CUMINGIANA*, Pfr. *Hel. testâ subglobosâ, tenuiusculâ, longitudinaliter et confertim plicatulâ, carneâ, rubro punctatâ et variegatâ; spirâ brevi, conoidâ, obtusiusculâ; anfractibus $5\frac{1}{2}$ planiusculis, ultimo inflato, obsolete angulato; aperturâ subverticali, semiovali; columellâ basi dilatâ, antrorsum arcuatâ, subtruncatâ, retrorsum in callum basi crassum, supernè diffusum abiente; peristomate subincrassato, breviter expanso, albo.*

Diam. 21, altit. $16\frac{1}{2}$ mill.

Locality unknown.

10. *HELICINA DYSONI*, Pfr. *Hel. testâ orbiculato-conoidâ, solidiusculâ, striatulâ, nitidulâ, carnâ, supernè fasciis 2 angustis, saturatoribus ornatâ; spirâ elatâ, obtusiusculâ; anfractibus 5 convexiusculis, lente accrescentibus, ultimo basi subplanato; aperturâ obliquâ, semiovali, altiore quam latâ; columellâ brevi, basi subtruncatâ, callum albidum, lined subimpressâ circumscriptum emittente; peristomate simplice, brevissimè reflexiusculo, margine utroque leviter arcuato.*

Diam. 8, altit. $5\frac{1}{2}$ mill.

β. *Minor, testâ saturatè carnâ, supernè fasciis 2 angustis rubris et ad peripheriam 1 albâ.*

γ. *Testâ fulvo-rubellâ, supernè fasciis 2 angustis saturatoribus.*

δ. *Minor, testâ flavâ, supernè fasciis 2 angustis fulvis, ad peripheriam 1 albâ ornatâ.*

From Cumana, Honduras (Dyson).

11. *HELICINA EXIGUA*, Pfr. *Hel. testâ minutissimâ, conicâ, tenui, subtilissimè punctato-striatulâ, pellucidâ, pallidè carnâ; spirâ conicâ, obtusiusculâ; anfractibus 5 perconvexis, ultimo obsolete angulato, basi planiusculo; aperturâ obliquâ, lunari; columellâ breviter recedente, callum exiguum emittente; peristomate simplice, tenui.*

Diam. $2\frac{1}{2}$, altit. 2 mill.

From Honduras (Dyson).

12. *HELICINA FUNCKI*, Pfr. *Hel. testâ conico-subglobosâ, tenuiusculâ, sub lente tenuissimè obliquè striatulâ, vix nitidulâ, flavidd, roseo-nebulosâ; spirâ conoidâ, obtusiusculâ; anfractibus $5\frac{1}{2}$ planiusculis, ultimo utrinque convexiore, obsolete angulato; aperturâ obliquâ, semiovali; columellâ subarcuatâ, lined impressâ verticali notatâ, basi subnodosâ, in callum sensim tenuiorem retrorsum abiente; peristomate latè expanso, margine supero subrependo.*

Diam. $13\frac{1}{2}$, altit. 9 mill.

From San Yago, New Granada (Funck).

13. *HELICINA GONCHILA*, Pfr. *Hel. testâ conoideo-subglobosâ, tenuiusculâ, supernè striis spiralibus obsolete sculptâ et punctatâ, nitidulâ, fulvo-carnâ; spirâ brevi, conoidâ, subacutâ; anfractibus*

tibus $4\frac{1}{2}$ *vix convexiusculis, ultimo medio subcarinato, luteo-cingulato, basi convexiore, distinctius concentricè striato; aperturà subobliquá, trianguláři-semiovali, altiore quam latá; columellá subrecedente, supernè lineam impressam, brevem, curvatam emittente, basi acutè dentatá; peristomate albo, rectangulè latè patente, margine basali substricto, cum columellá angulum acutiusculum formante.*

Diam. 10, altit. $6\frac{1}{2}$ mill.

From Venezuela.

14. *HELICINA GOSSEI*, Pfr. *Hel. testá depresso-globosá, solidá, pustulis seriatis subasperatá, nitidulá, fuscidulo-rubrá; spirá convexá; anfractibus* $4\frac{1}{2}$ *parum convexis, ultimo rotundato; aperturá trianguláři-semiovali, intus carneá, nitidá; columellá basi truncatá, retrorsum in callum crassum carneum abiente; peristomate subincrassato, expanso, juxta columellam vix emarginato.*

Diam. 19, altit. $13\frac{1}{2}$ mill.

From Jamaica (Gosse).

15. *HELICINA GUILDINGIANA*, Pfr. *Hel. testá depressá, tenuiusculá, sub lente subtilissimè granulatá, diaphaná, stramineá vel albidá, infra suturam fulvo-unifasciatá; spirá brevi, convexá; anfractibus* 4 *vix convexiusculis, ultimo subdepresso, basi vix convexiore; aperturá obliquá, subtrianguláři-semiovali; columellá brevi, excavatá, antrorsum in denticulum desinente, retrorsum in callum tenuem, semicircularem, flavescensem expansá; peristomate tenui, breviter reflexo, margine supero repando, basali incisurá levi à columellá separato.*

Diam. 8, altit. $4\frac{1}{2}$ mill.

Locality unknown.

16. *HELICINA HANLEYANA*, Pfr. *Hel. testá globoso-conicá, solidá, lineis concentricis, impressis, subdistantibus sculptá, vix diaphaná, nitidá, fulvo-carneá; spirá breviter conoidéa, obtusiusculá; anfractibus* 5 *vix convexiusculis, ultimo rotundato, anticè subdescendente; aperturá parum obliquá, subsemicirculari; columellá brevissimá, extrorsum denticulatá, callum tenuem, albidum, diffusum emittente; peristomate albo, vix expansiusculo, intus subincrassato, basi in denticulum columellæ abiente.*

Diam. $7\frac{1}{2}$, altit. $5\frac{1}{3}$ mill.

From New Orleans (Mr. Salle).

17. *HELICINA KIENERI*, Pfr. *Hel. testá conoidéa, tenuiusculá, obliquè striatá, lineis concentricis confertis subtilissimè decussatá, albidá, fusco-violaceo marmoratá; spirá convexo-conoidéa, acutá; anfractibus* $5\frac{1}{2}$ *vix convexiusculis, ultimo compressè carinato, basi convexiore; columellá recedente, planatá, supernè impressá, basi incrassatá in callum basalem tenuem abiente; aperturá obliquá, integrá, semiovali, altiore quam latá; peristomate simplice, tenui, latè expanso.*

Diam. 16, altit. $11\frac{1}{2}$ mill.

Locality unknown.

18. *HELICINA LINDENI*, Pfr. *Hel. testá globoso-conicá, tenuiusculá, subtilissimè striolatá et punctatá, subdiaphaná, pallidè stramineá vel carnéa; spirá conicá, acutiusculá; anfractibus 6 vix convexiusculis, ultimo inflato, obsoletè angulato; aperturá integrá, parum obliquá, semiovali, altiore quam latá; columellá leviter arcuatá, extrorsum in denticulum desinente, callum emittente exiguum, tenuem; peristomate breviter expanso, reflexiusculo.*

Diam. $11\frac{1}{2}$, altit. $8\frac{1}{3}$ mill.

From Tapinaba, Mexico (Linden).

19. *HELICINA ORBIGNYI*, Pfr. *Hel. testá depressá, sublenticulari, solidá, striatúla, vix nitidá, fusco-carnéa; spirá vix elatá; anfractibus $4\frac{1}{2}$ planiusculis, ultimo depresso, subangulato; aperturá obliquá, semiovali, altiore quam latá; columellá brevi, basi antrorsum dentatá, callum albidum, semicircularem retrorsum emittente; peristomate recto, subincrassato, juxta dentem columellæ non emarginato.*

Diam. $7\frac{1}{3}$, altit. 4 mill.

From the island of Cuba.

20. *HELICINA OWENIANA*, Pfr. *Hel. testá conicá, tenui, lævigatá, sub lente lineolis impressis, antrorsum obliquis subtilissimè sculptá, nitidá, pellucidá, stramineá, sursum saturatiore; spirá conicá, vertice obtusiusculo, castaneo; suturá lineari, albo-marginatá; anfractibus 6 planis, ultimo basi planiusculo; aperturá subobliquá, semiovali; columellá brevi, verticaliter rimatá, callum tenuissimum retrorsum emittente; peristomate aurantiaco, angulatim patente, reflexiusculo, margine utroque levissimè curvato.*

Diam. 9, altit. $7\frac{1}{2}$ mill.

From Chiapas, México (Ghiesbreght).

21. *HELICINA PLICATULA*, Pfr. *Hel. testá depressè conoidéa, solidá, obliquè regulariter et elegantissimè plicatá, nitidá, cornéa; spirá brevi, conoidéa, acutiusculá; anfractibus ferè 5 convexiusculis, ultimo supernè impresso, peripheriá obsoletissimè angulato; aperturá obliquá, semilunari; columellá brevissimá, simplice, in callum tenuissimum diffusá; peristomate subincrassato, carneo, margine supero sinuato, basali juxta columellam subdentato.*

Diam. 5, altit. 3 mill.

From the island of Martinique.

22. *HELICINA REEVEANA*, Pfr. *Hel. testá conicá, solidá, striis incrementi distinctis et lineolis obliquis impressis confertissimis sub lente clathratá, nitidá, albida, rufo nebulosá et taniatá; spirá elevatá, acutiusculá; suturá impressá; anfractibus 6 convexiusculis, ultimo angulato, basi vix convexiore; aperturá subsemiovali, intus castanéa; columellá brevissimá, horizontaliter in callum parvulum, album, expansá; peristomate albo, angulatim patente, margine basali leviter arcuato, cum columellá extus subangulatim juncto.*

Diam. $8\frac{1}{2}$, altit. 6 mill.

From Cuba.

23. *HELICINA ROHRI*, Pfr. *Hel. testá conoideá, crassá, striatá et submalleatá, opacá, vix nitidá, stramineo-albíá vel purpureá, albo-fasciatá; spirá conoideá, acutiusculá; anfractibus 4½—5 planiusculis, ultimo supernè turgido, ad peripheriam cariná acutá, compressá, prominente munito, anticè deflexo, basi vix convexo; aperturá obliquá, parvulá, semiovali, altiore quam latá; columellá subsimplice, basi obsoletè tuberculatá, callum semicircularem album retrorsum emittente; peristomate recto, acuto, intus crassè albo-labiato, margine supero emarginato.*

Diam. 10, altit. 7 mill.

From the Marquesas Islands (Rohr).

24. *HELICINA SANGUINEA*, Pfr. *Hel. testá conoideo-orbiculatá, crassá, punctato-striatá, opacá, sanguineá; spirá brevi, conoideá, acutiusculá; anfractibus 4½ planis, ultimo utrinque convexiusculo, medio subangulato; aperturá obliquá, subtriangulári, altiore quam latá; columellá basi antrorsum dentatá, callum tenuem, semicircularem retrorsum emittente; peristomate recto, intus sublabiato, margine basali strictiusculo.*

Diam. 10½, altit. 6 mill.

Locality unknown.

25. *HELICINA (TROCHATELLA) SEMILIRATA*, Pfr. *Hel. testá conicoglobosá, solidá, opacá, flavidá, supernè confertim albo-liratá; spirá conicá, acutiusculá; anfractibus 5½ planiusculis, ultimo convexiusculo, carinato, basi subtilissimè concentricè striato; aperturá perobliquá, subtriangulári; columellá simplice, immediatè in marginem basalem abiente; peristomate incrassato, angulatim expanso, marginibus callo tenuissimo junctis, supero sinuato.*

Diam. 10½, altit. 7½ mill.

From Venezuela (Linden).

26. *HELICINA SOWERBIANA*, Pfr. *Hel. testá depressè trochiformi, tenuiusculá, lineis impressis spiraliter sulcatá, albá; spirá conicá, acutiusculá; anfractibus 6 planiusculis, ultimo subcarinato, basi convexiusculo; aperturá parum obliquá, subtriangulári; columellá tenui, basi nodiferá; peristomate simplice, angulatim expanso, margine supero sinuato; callo basali tenuissimo.*

Diam. 21, altit. 14 mill.

From Guatemala (De Lattre).

27. *HELICINA TENUILABRIS*, Pfr. *Hel. testá subglobosá, solidiusculá, sublævigatá, albo et cinnamomeo variegatá et subfasciatá; spirá breviter conoideá, acutiusculá; anfractibus ferè 5 planiusculis, ultimo utrinque convexo, anticè vix descendente; aperturá obliquá, semiovali, intus cerasiná, pallido-fasciatá; columellá recedente, angustá, retrorsum in callum tenuem dilatatá, basi immediatè in peristoma tenue, expansiusculum, abiente.*

Diam. 10, altit. 7 mill.

Locality unknown.

28. *HELICINA TENUIS*, Pfr. *Hel. testá turbinatá, tenuissimá, vix*





Printed by Hüllmandel & Walton.

PSITTACUS RÜPPELLII.

striatula, pellucida, corneo-albida, rubro obsolete trifasciata; spirula conica, acuta; anfractibus 6 vix convexiusculis, ultimo basi planiusculo; apertura ferè verticali, triangulari-semiovali; columella brevi, basi retrorsum subdentata, supernè in callum nitidum, circumscriptum, dilatata; peristomate tenui, angulatum expanso, margine basali cum columellæ basi angulum formante.

Diam. 11, altit. $8\frac{1}{2}$ mill.

From Yucatan.

29. *HELICINA UNIDENTATA*, Pfr. *Hel. testâ depressâ, tenuiusculâ, 127-1953*
liris concentricis alternatim validis, obtusis et minoribus cinctâ, diaphanâ, nitidâ, rubellâ; spirula vix elevata; anfractibus $4\frac{1}{2}$ depressis, ultimo anticè descendente, basi medio profundè excavato; apertura perobliquâ, latè lunari; columellâ simplice, retrorsum in callum albidum circumscriptum dilatata; peristomate expanso, intus albo-labiato, margine basali prope columellam dente magno, prominente, instructo.

Diam. 5, altit. $2\frac{1}{2}$ mill.

From Honduras (Dyson).

4. DESCRIPTION OF A NEW SPECIES OF PARROT.

BY G. R. GRAY, ESQ., F.L.S. ETC.

(Aves, pl. 5.)

PSITTACUS RÜPPELLII.

Uniform dark bronze colour, with the lesser and under wing-coverts bright yellow; the feathers of the thighs orange-yellow.

Total length 9 inches 6 lines; bill, from gape, 10 lines; wings 5 inches 6 lines; tail 3 inches 3 lines; tarsi 6 lines.

The greater uniformity of colour at once distinguishes it from the allied species, *Psittacus Meyeri* and *P. rufiventris* of Dr. Rüppell.

The specimen from which this description is taken lived for upwards of twelve months in the Society's collection, and is believed to have been brought to this country from the river Nunez. I have named it in honour of my distinguished friend, whose labours have contributed so largely to our knowledge of African zoology.

The Meeting was adjourned by the Chairman until Tuesday, November 14th.

November 14, 1848.

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

The following papers were read:—

1. NOTES ON THE ANATOMY OF THE MALE AUROCHS (*Bison europæus*).
BY PROF. OWEN, F.R.S., F.Z.S. ETC. ETC.

It was with much concern that I received notice at the latter part of September last of the sudden failing of health of the male Aurochs; the male of the pair munificently presented to the Zoological Society by His Imperial Majesty the Emperor of Russia, at the instance of our distinguished scientific countryman Sir Roderick Impey Murchison, G.C.S.S. The animal had refused its food; it was prostrated by impeded and frequent respiration and a general oppressive feverish state, and died about a week after the first attack.

The morbid appearances, on dissection, were simple and conclusive. The whole right lung had been the seat of active inflammation and congestion; most of the air-cells were filled with a bloody serum, which was infiltrated throughout the connecting tissue. A mass of coagulable lymph had been exuded from the whole exterior surface of the organ, cementing its lobes to each other and to the surrounding parts, especially the pericardium. The mucous lining of the bronchial tubes was of a deep livid red colour, and the same evidence of inflammation extended throughout the trachea, and a little way down the bronchi of the sound lung. Both the liver and spleen broke down more easily under pressure than in the healthy common Ox; the texture of the kidney also was softer, and of a more fuscous colour. The vessels of the pia mater were unusually gorged; but these were probably the secondary consequences of the influence upon the circulation, and the quality of the blood induced by the primary and active disorganization of the respiratory system. The exciting cause of the disease I take to be the influence of the raw cold and heavy fogs, consequent on the undrained extent of clay-ground in which the menagerie of the Society is placed, and by which it is extensively surrounded. The effects of an atmosphere so loaded on the mucous tract of the respiratory organs to which it is applied, has long been manifested in various species of the exotic animals attempted to be preserved in the Zoological Gardens; and the records of medicine bear testimony to similar ill effects upon those human inhabitants of the Regent's Park, whose habits and strength of constitution do not enable them to control and overcome this pregnant but happily remediable source of ill-health.

The male Aurochs, at the period of its death, was two years and five months old. The following was the state of its dentition:—
 $i\ 3-3, c\ 1-1, m\ \frac{5-5}{5-5} = 28$; of which $i\ 1$ was permanent, $i\ 2, i\ 3,$

and *c* were deciduous; the molars were *d* 2, 3 and 4, *m* 1 and 2. I here use the formula explained in my communication to the British Association at Swansea, the notation used conveying in the space of one line the following facts: viz. that the animal had shed and replaced the median incisors of the lower jaw. but retained all the rest of its deciduous dentition, having gained in addition the first and second true molars of the permanent series.

The tongue presented that deep leaden-bluish colour which Gilbert describes*, but is rough, as in the common Ox, and the inner surface of the sides of the mouth is beset with the same kind of papillæ. The scrotum and testes were much smaller than in the young domestic Bull of the same age: the scrotum is rugous, sessile, not pendulous with a constricted neck, as in the *Bos Taurus*.

As in most Ruminants, the principal viscus which presents itself on opening the abdomen, is the capacious paunch covered by the great omental sac: besides the paunch, some of the small intestines appeared in the right iliac and in the pubic regions.

The paunch is firmly supported by its attachments on the dorsal aspect to the crura of the diaphragm and part of the expanded concavity of that muscle. The part of the serous membrane which answers to the aperture or mouth of the great omental sac in Man is attached to the upper and fore-part of the paunch, not to the lower or greater curvature, so that a free fold of the omentum is spread over the paunch between it and the abdominal muscles: the posterior fold of the omentum is attached to the left side or contour of the paunch, whence it is continued upon the fourth cavity, the duodenum and pancreas, and so on to the right crus of the diaphragm, forming one of the strong suspensory ligaments: the left lumbar attachment is continued more immediately from the long intra-abdominal œsophagus and back part of the paunch and reticulum.

The paunch is sub-bifid, or divided into two principal chambers. The villi of its inner surface are intermediate in character between those of the common Ox and those of the American Bison. The villi of the rumen of the Ox are comparatively large, coarse, flattened, but pointed, except near the reticulum, where they assume the form of laminæ with irregular jagged margins. In the American Bison they are longer, and for the most part filiform, and consequently more numerous. In the Aurochs the villi are shorter than in the Bison, and broader, being compressed and clavate, terminating in an even rounded margin: they are smaller and more numerous than in the common Ox. The relative position, size, and mode of intercommunication of the four divisions of the ruminating stomach offer no noticeable differences from that of the common Ox: but the disposition of the lining membrane of the second cavity (reticulum or honeycomb-bag) offers as marked a difference as that noticed on the inner surface of the paunch. In the common Ox the cells of the reticulum are deeper than in any Ruminant excepting the Camel-tribe, and they are of two kinds in respect of their size: the larger

* Gilbert, Indagatores Naturæ in Lituania, *De Bisonte Lituamico*, pp. 30—49; Vilnæ, 1781.

cells are disposed between broad parallel septa, and are formed by narrower septa at right angles to these: the smaller cells are subdivisions of the larger or primary cells.

In the Bison only one kind of hexagonal cells can properly be recognized, and their walls are of equal depth as a general rule: the folds developed from the bottom of these cells are much narrower, shorter, and more irregular than those that mark out the secondary cells in the common Ox. The laminae of the third cavity (*psalterium*) are of two kinds, large and small; the larger kind presenting two sizes which alternate with one another; but between each of the broader or larger kind of laminae one of the smaller kind intervenes: their surfaces are papillose, but the papillae are shorter than in the common Ox, which presents a similar arrangement of the laminae. A thick epithelium lines the whole of the three cavities above-described, as in other Ruminants. The lining membrane of the fourth or true digesting cavity was rather more vascular than usual: the almost smooth mucous membrane is produced into subparallel oblique folds $1\frac{1}{2}$ inch in breadth at its cardiac half: these subside towards the pyloric half, where the chief object is the valvular protuberance which overhangs the aperture leading into the duodenum. The duodenum bends backwards and turns down abruptly before gaining the left lumbar region; then bends upwards and towards the left side, where it becomes free and carries out a complete investment from the mesentery: in the previous part of its course it is closely attached to the adjoining intestines. The principal mass of the small intestines lies dorsal and sacral of the enormous stomach, disposed in short coils upon the mesentery; they measured 132 feet in length.

The ilium terminates in the caecum in the right lumbar region. The caecum is a simple, cylindrical, non-sacculated gut, about twice the diameter of the ilium; it is bent upon the beginning of the colon, to which it is attached.

The colon describes an arch at its commencement, ascending from the right side, and curving over to the left behind the paunch, then winding to the right again, and describing the series of subspiral folds characteristic of this gut in the Ruminants. The rectum descends nearly along the bodies of the lumbar and sacral vertebrae to the anus. The total length of the large intestines was twenty-one feet. The liver was proportionally small, and consisted chiefly of one lobe, as in other Ruminants; not extending into the left epigastrium. There is a small *lobulus Spigelii* on the right and posterior border.

The gall-bladder, large and full, protruded from a fissure in the right side of the liver: its duct receives four or five tributary ducts before it unites with the proper hepatic duct, which brings the bile from the left part of the liver. The *ductus communis choledochus* enters the duodenum where it forms its first bend.

The pancreas lies below the liver, with its larger end across the last dorsal vertebra, and its narrower prolongation accompanying the duodenum; the duct terminates in that intestine about eight inches beyond the biliary inlet. The kidneys consisted each of about twenty

distinct lobes or renules. The more compact suprarenal bodies also manifested a subdivided outer surface.

The above portions of the notes of the dissection of the male Aurochs include all that appeared to be in any degree characteristic of the species, or affording any discriminative characters, as compared with its nearest congeners. The thoracic viscera, as far as their morbid condition permitted the comparison, were like those of the common Ox. I do not remember to have been so much impressed in former dissections of Ruminants with the beautiful adaptation of the parts exterior to the large and complex stomach, to its support and the facilitating its movements. Much of what is ordinary inelastic aponeurotic tissue in the abdominal parietes of many other quadrupeds, *e. g.* the larger Carnivora, is metamorphosed into the yellow elastic tissue—*tissu jaune*—in the Aurochs, as in the common Ox, and in a still greater degree in the Rhinoceros and Elephant. By this change the abdominal muscles are proportionally relieved or aided in the sustentation of the capacious and heavily-laden digestive reservoirs.

In the Aurochs, as in the other Ruminants, the disposition of the omental sac upon the sternal aspect of the paunch, interposed between it and the abdominal walls, makes it perform the office of a serous articular sac, two smooth and lubricated surfaces—the inner ones of the sac—being apposed to each other, and easily and freely gliding on each other; it is like a kind of great ‘*tunica vaginalis*’—facilitating the spiral peristaltic movements of the paunch, and by the layer of fat tending to preserve the warmth of the paunch.

The skeleton of the Aurochs has been well delineated by Bojanus, in connection with an outline of the entire animal, and by Mr. George Landseer separately. The general characters of the framework of this rare species are very accurately rendered in both these figures. The skeleton of the young male Aurochs showed the same characteristic elevation of the spinous processes of the anterior dorsal vertebræ, and the same characteristic number of ribs—fourteen pairs—which are shown in the above-cited figures, and which repeated examination has established as constant peculiarities of the species. With regard to the lengthened spines, I shall only remark on this interesting morphological peculiarity, that it contributes to illustrate the artificial nature of that view of the part commonly called rib, or vertebral rib, as a bone or element of the skeleton, apart from or belonging to a distinct genus from the other vertebral elements. This view originally arose from the contemplation of the proportions of the ribs or pleurapophyses and spinous processes as they exist in Man. A long and slender form is associated with the idea of a rib as an essential character. In the Aurochs we see that the vertebral element called neural spine is longer than the pleurapophysis in the second and third dorsal vertebræ. But it is ankylosed to the other vertebral elements, whilst the pleurapophyses retain their primitive freedom, and the dorsal vertebræ are characterized as ‘articulating with the ribs.’ This, however, is a periodic, not an essential character. At an early period of life the cervical vertebræ also articulate with

ribs, *i. e.* pleurapophyses; but these become broad and remain short, and coalesce with the centrums and diapophyses of their respective vertebræ; and the anthropotomist then calls them 'transverse processes,' and distinguishes them as being perforated, the foramen being the space included between the centrum, the diapophysis, and the pleurapophysis.

Another remark is suggested by the skeleton of the Aurochs, touching the true value of the character of its fourteenth pair of free pleurapophyses. In the genus *Bos* proper there are only thirteen pairs. In the American Bison there are *fifteen* pairs. According to the artificial character in anatomy of the 'dorsal vertebræ,' the above-cited *Bovida* have been supposed to differ actually in the number of their vertebræ, whereas this is absolutely the same in each of them; after the seven cervical vertebræ there are nineteen true vertebræ, *i. e.* nineteen vertebræ between the last cervical and the sacral vertebræ. In the embryos of many Ungulates, rudiments of ribs (pleurapophyses) are found moveably attached to vertebræ, to which they afterwards become anchylosed, and accordingly are called lumbar vertebræ. In the Aurochs these elements retain their freedom and growth in one more vertebra than in the common Ox; in the Bison two more vertebræ have moveable pleurapophyses. Accordingly we find that if the common Ox has but thirteen dorsal vertebræ, it has six lumbar vertebræ; if the Aurochs has fourteen dorsal, it has five lumbar; and if the Bison has fifteen dorsal vertebræ, it has but four lumbar. But the unity of the numerical character of the true vertebræ does not stop here; for when we find, *e. g.* in the Dromedary, the Camel, the Llama, and the Vicugna, only twelve dorsal vertebræ, the typical nineteen is completed by seven lumbar vertebræ; and this number is never surpassed in the Ruminants. Most of the species agree with the common Ox in the number of the true vertebræ that retain their pleurapophyses in moveable connection. The Reindeer and the Giraffe resemble the Aurochs in having fourteen dorsal vertebræ. But what perhaps is still more interesting and usefully instructive as to the true affinities of the hoofed quadrupeds with toes in even number, is the fact, that besides their common possession of a complex stomach and simple cæcum, of a peculiar form of astragalus, of a femur with two trochanters, and of a symmetrical pattern of the grinding surface of the molar teeth, they also agree, as I have shown in my paper on the genus *Hypotamus*, in having nineteen natural segments of the skeleton, neither more nor less, between the neck and the pelvis. The Babiroussa, the African Wart-hogs (*Phacochoerus*), and the extinct *Anoplotherium*, resemble the majority of Ruminants in having thirteen dorsals and six lumbar; the Wild Boar and the Peccari resemble the Aurochs in having fourteen dorsals and five lumbar; the Hippopotamus resembles the Bison in having fifteen dorsals and four lumbar.

This constancy in the number of the true vertebræ in the Artiodactyle Ungulates is the more remarkable, and demonstrative of their natural co-affinity, by contrast with the variable number of those vertebræ in the odd-toed or Perissodactyle group, in which we find

twenty-two dorso-lumbar vertebræ in the Rhinoceros, twenty-three in the Tapir and Palæotherium, and as many as twenty-nine in the little Hyrax.

With regard to the vertebræ of the trunk of the Aurochs, I may remark, that the only accessory process in addition to the ordinary zygapophyses and diapophyses is the metapophysis, which appears as a stout tubercle above the diapophysis in the middle dorsals, and gradually advances and rises upon the anterior zygapophyses in the posterior dorsal and lumbar vertebræ. This process is developed to an equality of length with the spinous processes in the Armadillos. It is commonly associated with another accessory exogenous process, to which I have given the name 'anapophysis' in the Catalogue of the Osteological Series in the Royal College of Surgeons. This process, which in most of the Rodentia rises, at first, in common with the metapophysis, as a tubercle above the diapophysis, separates from the metapophysis as the vertebræ approach the pelvis, and in the lumbar series the anapophysis is seen projecting backwards from the base, or a little above the base of the diapophysis, its office being usually that of underlapping the anterior zygapophysis of the succeeding vertebræ, and strengthening the articulation, whence Cuvier has alluded to it as an accessory articular process; but its relation to the zygapophysial joint is an occasional and not a constant character. The tenth dorsal vertebra of the Saw-toothed Seal, *Stenorrhynchus serridens*, affords a good example of well-developed metapophyses; they are also large in most of the trunk vertebræ of the Tapir. The anapophyses are well-developed in the anterior lumbar vertebræ of the Hare and Rabbit.

I have been induced to make this digression at the request of some of my anatomical friends, who have desired me to publish definitions of the terms, or rather of the processes so termed.

Returning to the Aurochs, I shall conclude with some remarks, which the opportunity of dissecting the recent animal enables me to offer, respecting the true structure of the bones of the fore-foot (fig. 1) and hind-foot (fig. 2).

The carpus (fig. 1) consists, as in other Ruminants, of six bones, four in the proximal row, viz. scaphoides (*s*), lunare (*l*), cuneiforme (*c*), pisiforme (*p*); and two in the second row, the magnum (*m*) and the unciforme (*u*).

The os magnum supports that half of the cannon-bone which answers to the metacarpal of the digitus medius (III). The unciforme supports the other moiety which answers to the metacarpus of the digitus annularis (IV). The rudiment of the proximal end of the metacarpus of the digitus index (I) articulates with a part of the os magnum, which may therefore be regarded as a connate trapezoides. The rudiment of the proximal end of the metacarpal of the digitus minimus (V) articulates with the cuneiforme, and is applied to the ulnar end of the unciforme.

The distal rudiments of the two abortive digits (II) and (V) are represented by a middle phalanx (2) and unguis phalanx (3), supported by fasciæ extending from the proximal rudiments of their metacarpals,

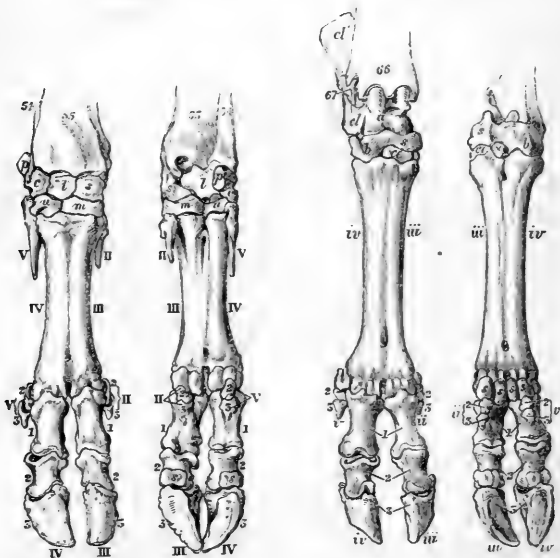
and also by ligaments attaching them to the large trochlear sesamoids behind the metacarpo-phalangeal joints of the two normal digits (III and IV). These have each three phalanges (1, 2, 3) forming almost symmetrical pairs, with a large sesamoid (*s*) behind the distal joint.

The hind-feet (fig. 2) are longer and more slender than the fore-feet, the greater length being chiefly due to the coalesced metatarsals.

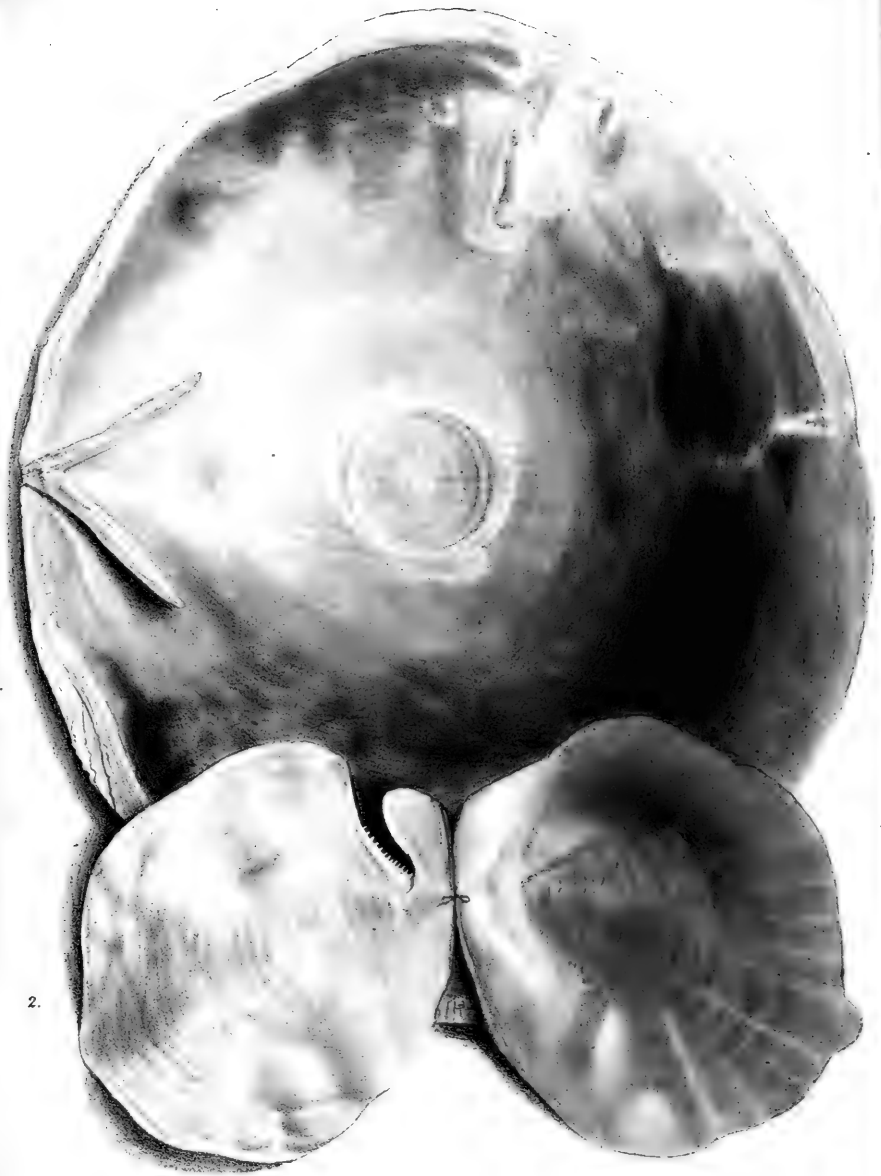
The tarsus includes five bones; it seems to consist of six, but the ossicle (67) wedged between the tibia (66), calcaneum (*cl*), and astragalus (*a*), is the distal epiphysis of the fibula, and the sole representative of that bone. The astragalus and calcaneum conform to the ordinary Ruminant type; according to which, also, the navicular (*s*) and cuboid (*b*) are confluent. The ectocuneiform (*ce*) is a broad flat bone supporting the moiety of the cannon-bone which answers to the digitus medius (*iii*): a small round sesamoid (*s*) at the back of this joint has not sufficiently distinctive characters to carry conviction as to its special homology. The outer half of the cannon-bone, or metatarsal of the fourth toe (*iv*), articulates with the cuboid part of the scapho-cuboid bone. The second digit (*ii*) and fifth digit (*v*) are represented solely by the rudiments of their middle and ungual phalanges (2 & 3). There are two large trochlear sesamoids (*s*) behind the metatarso-phalangeal joints of the two fully-developed

Fig. 1.

Fig. 2.

Bones of fore-foot (*Bison europæus*).Bones of hind-foot (*Bison europæus*).





1. PLACENTA LINCOLNII Gray

2. HEMIPecten FORBESIANUS, Adams & Reeve.

toes (*iii* & *iv*), and one sesamoid behind the last joint of the same toes.

In most artificially-prepared skeletons of Ruminants, more or less of the small bones, often regarded as accessory, are lost; but they are really for the most part beautifully indicative of traces of adherence to the archetype, and I have on that account particularized them in this notice of the anatomy of the Aurochs.

Measurements of the Trunk of the Aurochs.

	Inches.
Length of vertebral column from the atlas to the sixth caudal vertebra, measured across the diapophyses	81
Length of vertebral column over the neural spines	88
Length of cervical region over the diapophyses	17
Length of dorsal region ditto	30
Length of lumbar region ditto	13
Length of sacral and six caudal ditto	21
Depth of spine of seventh cervical	8
Depth of spine of first, second and third dorsal, being the three longest, each	11
Length of first rib	9
Length of ninth, or the longest	18½
Seven ribs articulate by separate hæmapophyses to the sternum.	
Length of diapophysis of fourth lumbar, or the longest	4½
Breadth of atlas across the neural arch	7
Extreme breadth across the spines of the ilia	14
Extreme breadth across the pubis, from the inner edge of each acetabulum	6

2. DESCRIPTION OF A NEW GENUS OF ACEPHALOUS MOLLUSCA, OF THE FAMILY PECTINACEA, COLLECTED BY CAPT. SIR EDWARD BELCHER DURING THE VOYAGE OF H.M.S. SAMARANG. BY ARTHUR ADAMS AND LOVELL REEVE, FF.L.S.

(Mollusca, pl. 1. fig. 2.)

[Enlarged to twice its natural diameter.]

Genus HEMIPECTEN.

HEMIPECTEN FORBESIANUS. *Hem. testâ orbiculari, Anomieformi, tenuissimâ, hyalinâ, concentricè lineatâ, linearum interstitiis eximie reticulatis; valvâ inferiore planulatâ, posticè auriculatâ, auriculâ longitudinaliter radiatâ, sinu infra profundo, margine opposito subtiliter denticulato; valvâ superiore convexâ, extus interdum decussatim rugosâ, vix auriculatâ; cardine edentulo, ligamento angusto, marginali, cartilagine parvo solido in cavitatem centralem superficiariam valvis ambabus ligamentum intersecante; pellucido-albâ, valvâ superiore interdum rufo-aurantio radiatâ.*

Hab. Sooloo Archipelago, Eastern Seas.

The subject of the foregoing description, which constitutes an extremely interesting discovery in the acephalous family *Pectinacea*, is an inequivalve shell, partaking of the characters of *Pecten* and *Ano-*

mia. Like *Anomia*, it is a thin, hyaline substance, of which the upper valve is a rude convex plate, distorted according to its situation of growth, but slightly notched on one side. Like *Pecten*, the under valve is characterised by a prominent auricle on the left side, the sinus beneath being very deeply cut in the direction of the hinge-margin, and furnished along the edge with a row of fine erect denticles. The hinge, similar to that of *Pecten*, consists of a slight marginal ligament intersected in the middle by a solid triangular cartilage, situated in the hollow of a superficial depression in each valve. Apparently the nearest approximation to this shell may be found in some of the fossil *Pectens* of the carboniferous limestone, distinguished by a nearer relation with *Anomia*, of which it presents a reversed condition of growth.

From the circumstance of one of the valves being perforated by a deep sinus, of which there is no corresponding growth in the other, it may be compared with *Pedum*, but there is no indication of the umbonal area which characterises the hinge of that genus, and it does not appear to be the production of an animal of the same peculiar habits.

In texture and composition the valves consist of a transparent, semipearlaceous lamina, exhibiting a series of closely-arranged concentric lines, the interstices between which are minutely rayed with much finer lines. If any importance can be attached to the variations in the microscopic structure of shells for the purposes of classification, the observations with which we have been kindly favoured by Dr. Carpenter on the genus, tend rather to show its affinity with *Pedum*. There is some uncertainty in the result. "The flat valve," says Dr. Carpenter, "in both specimens is permeated by copious tubuli, a character in which the species agrees with *Pedum* and with certain species of *Lima*, and differs from *Pecten*. This tubularity exists also in the convex valve of the colourless specimen, but is absent in the other (at least in the portion of it which the Bryozoon covering its surface allows me to examine), and I would direct your attention to the fact that the coloured shell possesses a rudimental sculpturing over the whole of its visible external surface, which is totally wanting in the other. Is not this sufficient as a specific difference?"

The two specimens here spoken of, collected during the voyage of the Samarang, were dredged by Captain Sir Edward Belcher in the Sooloo Sea, from a coral and stony bottom, at a depth of about fourteen fathoms. The under valve of each is smooth, showing it to have been attached; the upper valve, covered in part in both specimens with particles of coral and parasitic shells, is in one individual smooth and colourless, in the other decussately corrugated, delicately rayed with reddish-orange. The two shells so entirely agree in all other respects that we have not ventured to describe them as distinct species.

Trusting that this interesting subject may assist the developmental views of Professor Edward Forbes, we have the pleasure of distinguishing the species by his name.

November 28, 1848.

Professor Owen, Vice-President, in the Chair.

The following papers were read:—

1. DESCRIPTIONS OF SOME NEW SPECIES OF OVULUM IN THE COLLECTION OF MR. CUMING. BY G. B. SOWERBY, JUN.

1. OVULUM UMBILICATUM (Thes. Conch. pl. 101. f. 88, 89). *Ovul. testâ globosâ, subpyriforme, albâ, roseo pallidè tincto, dorso ad extremitates rubro lineato, ad terminum posticum umbilicato; aperturâ subapertâ; labio externo angustato umbilicato; aperturâ subapertâ; labio externo angustato intùs crenulato posticè labium internum superante; labio interno posticè tumorem elevatum denticulatum ferente, ad canalem lineari, anticè bicostellatâ, ad canalem uniplicato.*

Agreeing with *O. margarita* in general appearance, but the outer lip is thinner, the mouth wider, the upper callosity elevated and denticulated. There is also a small umbilicus behind the posterior termination of the outer lip.

Hab. Ticao, Philippines; by Mr. Cuming.

2. OVULUM LANCEOLATUM (Thes. Conch. pl. 100. f. 35, 36). *Ovul. testâ elongatâ, angustatâ, minutissimè striatâ, aurantio-rubescente, seu albâ, canalibus subproductis, emarginatis; aperturâ angustatâ; labio externo planulato crasso, breviusculo, anticè angulatim flexuoso; labio interno tumido rubro longitudinaliter marginato, posticè ad canalem producto, subtortuoso, anticè intùs longitudinaliter sulcato, uniplicato, ad canalem angusto, rectiusculo, acuminato.*

A remarkable shell, presenting the appearance of *O. aciculare* very much lengthened. The aperture is narrow, excepting towards the anterior, where the outer lip is bent out: the under surface is flat, the inner lip edged with a reddish line. Collected by Mr. Cuming.

Hab. Sorsogon, Isle of Luzon, Philippines.

There is a white variety of this species (?) from Molucca.

3. OVULUM UNIPLICATUM (Thes. Conch. pl. 100. f. 30, 31, 32). *Ovul. testâ elongatâ, subcylindricâ, pellucidâ, minutissimè striatâ, aurantâ, seu violacè, anticè subacuminatâ, posticè subrotundatâ; dorso margine distincto; aperturâ subapertâ; labio externo paululùm incrassato, ad extremitates recedente, anticè subangulato, ad canalem emarginato; labio interno intùs subdepresso, posticè spiraliter uniplicato, ad canalem tortuo, versus labium externum deflecto, anticè subtortuo acuminato.*

Specimens of the pale violet variety were obtained by Mr. Cuming from near Charleston, South Carolina; a darker one from Rio Janeiro.

This species resembles *O. aciculare*, but is more acuminate at the anterior extremity; it is rather more ventricose, and finely striated. The spiral fold near the anterior canal is more decided and less oblique, and the edge of the canal above it invariably leans towards the outer lip.

4. OVULUM DEFLEXUM (Thes. Conch. pl. 100. f. 37, 38). *Ovul. testá ovali-elongatá, lævigatá, albidá, extremitatibus deflexis; aperturá angustatá; labio externo crasso, lato, complanato, anticè arcuato, breviusculo; labio interno longitudinaliter tumido, complanato, posticè uniplicato, anticè ad canalem acuminato.*

Resembling *O. aciculare*, but with a broad, flattened outer lip, and the extremities turned downwards. Brought from Ticao, Philippines, by Mr. Cuming.

5. OVULUM PHILIPPINARUM (Thes. Conch. pl. 100. f. 57, 58). *Ovul. testá elongatá, gradatim rostratá lævigatá, fulvá, subtùs albidá; aperturá angustatá, ad canales truncatá; labio externo lævi, albo, rectiusculo, anticè angulatim contracto; labio interno lævi, intùs anticè subemarginato.*

The contraction towards the extremities is more gradual, and the outer lip straighter, than *O. birostre*, and the canals are truncated at the extremities. The colour is pale fawn, darkened in the aperture, and nearly white at the lips.

Several specimens were brought by Mr. Cuming from the island of Capul, Philippines.

6. OVULUM SUBROSTRATUM (Thes. Conch. pl. 100. f. 39, 40). *Ovul. testá oblongá, lævi, rubro-violascente, ad extremitates subproductá, acuminatá; dorso margine distincto; aperturá angustatá, anticè subangulatá; labio externo lævi, ad extremitates recedente; labio interno tumido, intùs unicarinato, posticè spiraliter uniplicato, ad canales rectiusculo, producto.*

Resembling *O. secale*, but with the extremities more produced and straightened.

From Honduras Bay; collected by Mr. Dyson.

7. OVULUM SIMILE (Thes. Conch. pl. 100. f. 28, 29). *Ovul. testá oblongá, ovali, spiraliter striatá, fulvá; canalibus subproductis, emarginatis; labio externo crasso, lævi, anticè subarcuato, utrinque breviusculo; labio interno tumido, posticè spiraliter uniplicato, ad canalem subtortuo, acuminato, anticè subdepresso, intùs longitudinaliter unicarinato, ad canalem rectiusculo, acuminato.*

Mr. Cuming's collection; locality unknown.

Resembling *O. secale*, but spirally striated.

2. DESCRIPTIONS OF SOME NEW SPECIES OF CANCELLARIA IN THE COLLECTION OF MR. H. CUMING. BY G. B. SOWERBY, JUN.

1. CANCELLARIA UNDULATA (Thes. Conch. pl. 92. f. 12; pl. 95. f. 79). *Canc. testá ovali, lineis undulatis paululùm elevatis cinctá; costis crassiusculis subnoduliferis; anfractibus subangulatis; aperturá internè striatá; columellá crassá, granulosa; colore*

fulvo, fusco (præcipuè ad angulum anfractuum) interruptim fasciato.

Hab. Van Diemen's Land. Var. *truncata*, Philippines; H. Cuming.

This species was originally included in the *C. granosa*, Sowerby, Conch. Illustr., but the general aspect of the shell, especially the banded variety, is so different, owing to the greater fineness of the striæ, that on examining a number of specimens I think they may well be separated.

2. CANCELLARIA TÆNIATA (Thes. Conch. pl. 95. f. 75, 76). *Canc. testâ elongatâ, turrîtâ; costis numerosis, transversè striatis, ad angulum anfractuum acutè angulatis; spirâ acuminatâ, apice mammelliferâ; aperturâ internè lævigatâ; margine acuto; columellâ lævi, bicipitatâ; colore pallidè fulvo, fusco tæniato.*

Hab. —? Mus. H. Cuming.

3. CANCELLARIA MELANOSTOMA (Thes. Conch. pl. 95. f. 78). *Canc. testâ ovali, longitudinaliter striis noduliferis et transversè striis alternatis minutè decussatâ; spirâ acuminatâ, anfractibus paucis, rotundatis; aperturâ ovali, magnâ, internè costatâ; labio externo denticulato; columellâ expansâ, anticè granulatâ, triplicatâ; colore pallidè fulvo, fusco latè fasciato; labio externo bimaculato, columellâ fuscâ nigricante.*

The smoothness of the decussating striæ, the more oval form, the peculiar dark colour and granulation of the columella, serve to distinguish this species from the preceding.

Mr. Cuming possesses the only specimen which we have seen. Its locality is unknown.

4. CANCELLARIA EXCAVATA (Thes. Conch. pl. 93. f. 18). *Canc. testâ ovatâ, lævi; spirâ acuminatâ, turrîtâ; anfractibus ad suturam profundè excavatis; aperturâ breviusculâ, angulatâ, labio externo lævi, internè costato; columellâ triplicatâ, umbilicatâ; colore nullo.*

Hab. South Australia.

It resembles *C. spirata*, but the aperture is shorter in proportion to the spire, and the upper part of the whorls more deeply excavated. The shell is umbilicated behind the columella, and of a white colour.

5. CANCELLARIA FOVEOLATA (Thes. Conch. pl. 103. f. 30, 31). *Canc. testâ oblongo-ovali, turrîtâ, lævigatâ, obsolete striatâ; spirâ productâ, anfractibus angulatis, ad suturam excavatis, ad angulum subcoronatis; aperturâ triangulari, lævi; columellâ triplicatâ; umbilico mediocri; colore fusco, vel fulvo tæniato.*

From the sands in Algoa Bay. One specimen is of a uniform brown colour, and the other beautifully lined.

6. CANCELLARIA SEMIDISJUNCTA (Thes. Conch. pl. 95. f. 62, 63). *Canc. testâ ovali, ventricosâ, turrîtâ, spiraliter sulcatâ; anfractibus angulatis, ad suturam profundè excavatis, ultimo disjuncto; umbilico maximo, costato; aperturâ triangulari, columellâ triplicatâ; colore fulvo, fusco longitudinaliter fasciato.*

Collected by Mr. Cuming in sandy mud, at twenty-five fathoms' depth, at Cagayan, Isle of Mindanao.

3. DESCRIPTION OF TWO SPECIES OF MAMMALIA FROM CARACCAS.
BY J.-E. GRAY, ESQ., F.R.S. ETC.

The British Museum have lately purchased from M. Sallé, through Mr. Cuming, a Monkey and a Squirrel, which appear to have been hitherto unnoticed in the catalogues; I have therefore sent a short description of them to the Society.

MYCETES PALLIATUS (Mantled Howler).

(Mammalia, pl. 6.)

Black brown; hair of the middle of the back and upper part of the sides yellow brown, with black tips; of the lower part of the sides elongate brownish yellow, forming a kind of mantle on each side.

Hab. Caraccas.

The hair of the forehead short, reflexed, forming a slight crest across the middle of the head; of the back of the head rather longer; of the cheeks few, scattered, short and greyish; of the hinder part of these rather longer than those on the rest of the head, and forming a slight beard, which is more distinct in the males; the lower part of the hairs on the shoulders is sometimes yellowish.

SCIURUS DORSALIS (Black-backed Squirrel).

(Mammalia, pl. 7.)

White, hairs black, with, more or less, long white tips; the eyebrows, back of the head, nape and middle of the back brownish black, forming a very broad, well-defined dorsal streak.

Hab. Caraccas.

The black of the hairs of the sides of the body and tail show through the general white colour; the black occupies all except the tip of the hairs. The hairs of the lower part of the legs and feet are white to the base; ears rounded, not bearded, and with scattered hairs.

This may be only a variety of some other American species, but the two specimens which were sent home were exactly alike.

4. DESCRIPTION OF A NEW SPECIES OF HERPESTES, FROM ABYSSINIA.
BY J. E. GRAY, ESQ., F.R.S. ETC.

Mr. F. H. Hora having kindly presented to the Museum a specimen of a male *Herpestes* which he lately caught in Abyssinia, and as it is different from any of the species of the genus described by Dr. Rüppell in his Fauna of that country, original specimens of which are in the British Museum collection, I have the pleasure of laying a short description of it before the Society for publication in the Proceedings.

HERPESTES OCHRACEUS (Ochraceous *Herpestes*).

(Mammalia, pl. 8.)

Pale brownish yellow, very minutely mixed or punctated with a



MYCETUS PALLIATUS Gray.



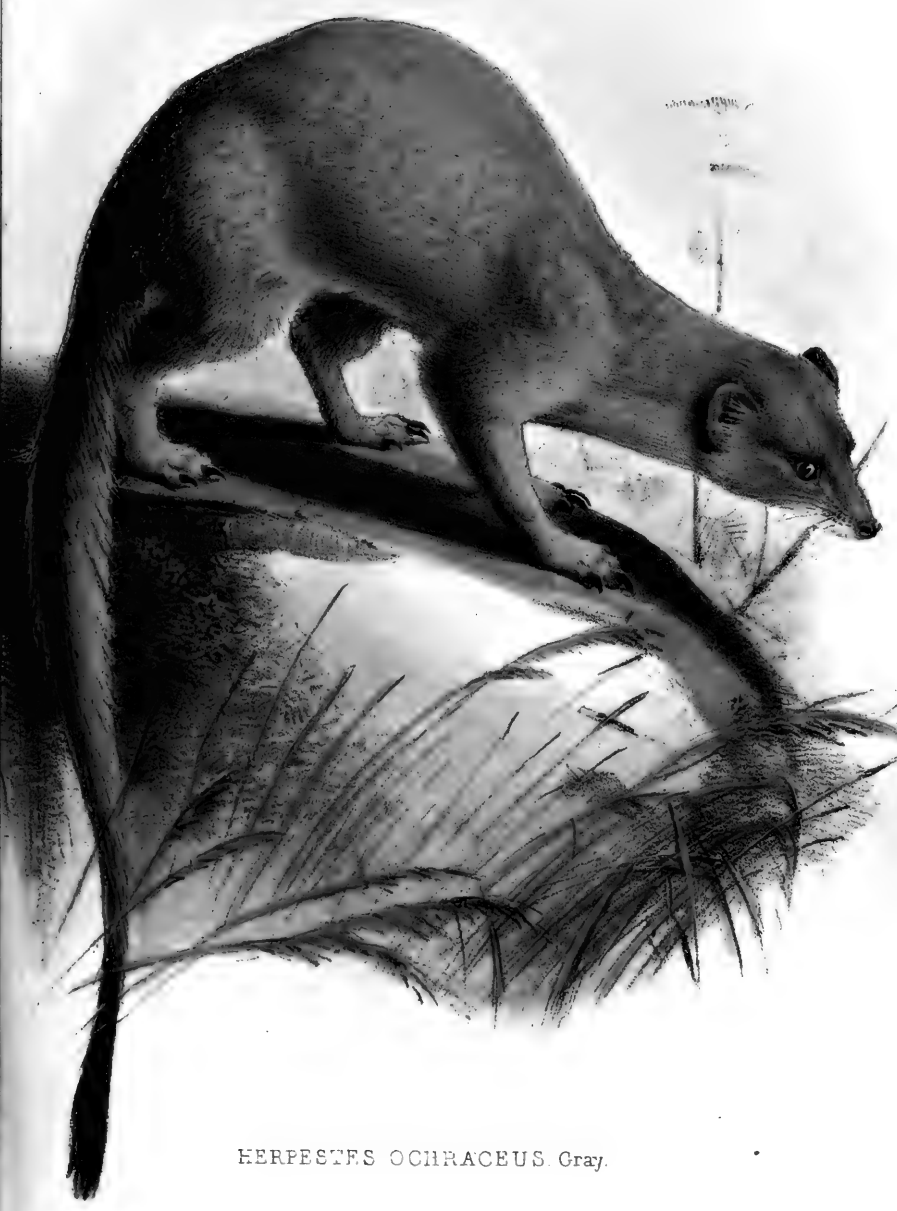


E. W. Hawley del et lith

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SCIURUS DORSALIS Gray





HERPESTES OCHRACEUS. Gray.







PLATE 100

PLATE 100

CINCLOSOMA CASTANEOTHORAX GUNN.

darker tint; chin, throat and under part paler, not punctated; end of tail bright yellow, with an elongated black tip.

Hab. Abyssinia.

The hair of the back short, yellow, with a short blackish base and a narrow dark brown subterminal band; of the throat and under part of the body longer uniform pale yellow, with a short dark band at the base; of the lower half of the tail longer pale yellow, with three or four rather narrow, equidistant darker bands; of the end of the tail uniform bright yellow, and of the hinder end all black, forming a terminal tuft. Ears rather large, rounded, covered with short close-pressed hairs. The soles of the hind-feet bald to the heels.

The skull is rather elongate and narrow; the false grinders are 3-3, the first being very small and conical; the third are subtriangular, with a slight tubercle on the inner side: the orbit not quite complete, but with a short interruption in the middle of the hinder side.

Length of skull $2\frac{1}{2}$ inches, width $\frac{1}{1\frac{1}{2}}$; length of palate $1\frac{1}{5}$ inch; of face from front of orbit $5\frac{1}{2}$ lines; of lower jaw 1 inch $3\frac{1}{2}$ lines.

5. DESCRIPTION OF A NEW SPECIES OF CINCLOSOMA.

BY J. GOULD, ESQ., F.R.S. ETC.

(Aves, pl. 6.)

CINCLOSOMA CASTANEOTHORAX, n. sp.

Sp. Ch.—Crown of the head, ear-coverts, back of the neck and upper tail-coverts brown; stripe over the eye and another from the base of the lower mandible, down the side of the neck, white; shoulders and wing-coverts black, each feather with a spot of white at the tip; all the upper surface, the outer margins of the scapularies, and a broad longitudinal stripe on their inner webs next the shaft, deep rust-red; primaries, secondaries, and the central portion of the scapularies dark brown; tail black, all but the two central feathers largely tipped with white; chin and throat black; chest crossed by a band of rich rust-red; sides of the chest and flanks brownish grey, the latter blotched with black; centre of the abdomen white; under tail-coverts brown, deepening into black near the tip, and margined with white; bill and feet black.

Total length, $8\frac{1}{2}$ inches; bill, 1; wing, 4; tail, $4\frac{1}{4}$; tarsi, 1.

Hab. Darling Downs, New South Wales.

Remark.—Nearly allied to *C. castanotus* and *C. cinnamomeum*, from which it is however easily distinguished by the colour of the chest and back.

DR. MACDONALD communicated orally his ideas on the Vertebral Homologies as applicable to Zoology, of which observations he has furnished the following abstract:—

“Dr. Macdonald gave a short sketch of the characters of the typical vertebra, as proposed by Professor Owen and several continental zoologists and comparative anatomists, and then contrasted it with one which had been the result of many years’ study, and which he considered more in accordance with the vertebra and its auto-genous and exogenous elements as traceable in the endoskeleton of

the Vertebrate classes, and also as showing its analogy in the Annu-lose animals. The table which he exhibited points out these, from which it would appear that Dr. Macdonald considers the bodies of the vertebræ, as described by anthropotomists,—continued downwards through the sacrum and coccyx to the top of the tail, and the basilar process upwards to the sella turcica,—as so many portions or segments of a central axis formed around a centrochord,—and not a notochord as usually described,—from which the autogenous elements spring and radiate to the periphery, and, converging mesially along the dorsal aspect, enclose within the tunnel of the *Neuro-Camera* the whole cerebro-spinal axis, of varying dimensions in the different regions, and another set of radii meeting sternally, and forming the three thoracic regions, having a costal region interposed. The Rachedian development from the sella turcica to the tail, with its mesothorax and metathorax, is the longest, and forms the Rachal type; the anterior towards the nose—the facial or proboscidian—is the shorter, and has only one thorax, the cephalothorax, formed by the mandibular costæ and palatine sternum.

“This framework, like a large trunk, is enclosed by three cycloid or segmental zones:—

1. The *Temporal*, formed by the squamo-temporal, zygoma and malar bones, and supporting its membral or epicycloid *ramus*, formed by the maxilla.

2. The *Humeral* or scapular clavicle and manubrium sterni, with its *epicycloid ramus*, the brachium, cubit and carpodactyle portions.

3. The *Coxal* or ilio-pubic, with its epicycloid ramus, femur, crus and tarso-digital portions.

“In so extensive a subject Dr. Macdonald restricted his present communication to the consideration of a portion of the epicycloid ramus of the metathoracic or coxal zone, and pointed out the strong analogy which might be traced between the tarsus and the bones of the arm in the human skeleton, in order to facilitate the examination of the same organs in the lower classes, and more especially in the osseous fishes, where, from an early prejudice, resulting from what appears to Dr. Macdonald as the hasty observation of preceding observers, it has long been overlooked and considered as the homologue of the pectoral limb. This great error has rendered the whole subject confused and complicated, and has given rise to many of what Dr. Macdonald considers the extravagances of Geoffroy St. Hilaire and his followers in the French school, and constrained them to mistake the true respiratory or humeral epicycloid ramus, and superadd to this class the additional zone and membral ramus, under the vague idea of its being greatly developed tympanic bones; whereas, had they seen the analogy of the human tarsus and carpus, they never would have mistaken the tibia for the scapula or brachia, or the calcis for the ulna, and the scaphoid for the radius; and had they even examined the higher or cartilaginous fishes, they would have seen the opercular bones removed somewhat further down the trunk, and the pelvic or coxal zone and epicycloid ramus more distant. This would have led Professor Owen not to have considered the posterior extre-

mity or coxal zone and limb as the divergent appendages of the occipital vertebra. As to the homologies of these parts, the Doctor postponed the consideration of them till another opportunity, and proceeded simply with the tarsus. This consists in Man and many mammals of seven bones, which are arranged in two rows; each row has developed from it one or more digital phalanges when most developed; with the first row the thumb or great toe is developed, while the other toes having metatarsal and digital phalanges are connected with the anterior row or distal end of the tarsus, where the tarsal bones are fused or developed in a single bone. This is beautifully seen in many of the birds, especially the *Cursores* and *Grallatores*: in the *Apteryx*, as figured in the 'Zoological Transactions' by Prof. Owen, vol. iii. pl. 49, the tarsus is seen to consist of a single bone, terminating in three distinct knuckles, for the articulation with the metatarsal phalanges; while the thumb is seen with its different joints on the posterior and inner aspect, and in its natural position. This part of the leg has long been mistaken by ornithologists: Prof. Owen calls it tarso-metatarsal, and Dr. Melville views it as the metatarsal, which Dr. Macdonald asserts is surely more erroneous than even Prof. Owen's view.

"The thumb or great toe very often disappears in the endoskeleton, but may sometimes be seen in the exoskeleton, as in the leg of the Horse and some other mammals, where the metatarsus is fused into a single or shank-bone, terminating in a single phalanx as in the Horse, or double phalanx as in the Llama.

"Dr. Macdonald also briefly alluded to the nomenclature adopted by entomologists and other annulose zoologists, and maintained, that if the nomenclature of the anatomist was to be appropriated by them, they were bound to use the terms anatomically; and then submitted the following sketch of the homologies of the posterior leg:—

Coxa = Cotylon.

Trochanter = Femur.

Femur = Tibia.

Tibia = Tarsus and great toe.

Tarsus = Metatarsus and phalanges.

"These homologies are easily traceable in all the six legs of the Entomoid classes, and also in the thoracic legs of the Crustacea, and are particularly well marked in the large claw of the Crab, where the lines and markings point out the metatarsal and digital phalanges, terminating in the large claw; where the thumb or opposable claw is jointed to what may be viewed as homologous to the tarsus, while the rest is the fused terminal phalanges."

The communication was also accompanied with a verbal explanation of the several diagrams exhibited.

December 12, 1848.

R. C. Griffith, Esq., F.G.S., in the Chair.

The following papers were read to the Meeting :—

1. ON THE HABITS OF A LIVING SPECIMEN OF *NANINA VITRINOIDES* (DESH.). BY H. E. STRICKLAND, F.G.S.

(Mollusca, pl. 2.)

On the 2nd of December, 1847, Capt. W. J. E. Boys presented me with three specimens of a terrestrial mollusk, named *Nanina vitrinoides*, by Mr. Gray (P. Z. S. pt. 2. p. 58; *Helix vitrinoides*, Desh.). Capt. Boys had procured them a considerable time before, certainly not less than a year, in the district of Ajmeer in Upper India. The animals still remained within the shells, but from the length of time during which they had been kept dry they were greatly reduced in bulk, and had almost wholly retired from the outer volution, as was easily seen from the transparency of the shell. Like many of the *Helicidæ* of hot climates, especially those which are exposed to long intervals of drought, the *Nanina vitrinoides* secretes a calcareous *poma*, or deciduous operculum, every time that it retires into a state of torpor. The specimens in question had formed two or three successive *pomata*, one within the other, during the process of their desiccation.

In hopes of restoring their animation, I placed them upon some wet moss in a warm room. Two of them proved to be past recovery, but the animal of the third was seen through the transparent shell to be gradually enlarging in bulk by the absorption of moisture, and at the end of a week it finally reached the door of its dwelling, threw off the *poma*, and began to crawl. A morsel of boiled carrot was presented to it, which it greedily devoured, and speedily increased in health and vigour. I have now kept this interesting creature a twelvemonth, and have often been tempted to exclaim with Oken, "What majesty is in a creeping snail; what reflection, what earnestness, what timidity, and yet at the same time what confidence! Surely a snail is an exalted symbol of mind slumbering deeply within itself."

Since its revival my *Nanina* has greatly increased in size, and has added half a volution to its shell, which now measures $\frac{7}{10}$ inch in diameter. Its favourite food is boiled carrots and raw lettuce-leaves. It generally remains quiet during the day, but crawls forth and shows considerable activity in the evening, and has never shown any inclination to hibernate or become torpid for a lengthened period.

The shell of *Nanina vitrinoides* is brown, glossy and pellucid, and in shape and colour closely resembles the shells of the European genus *Zonites*, from which, without examination of the animal, it seems to be generically undistinguishable. The animal however is

very different, and is more allied to, though quite distinct from, that of the genus *Vitrina*. The foot, when contracted, is too large to be withdrawn into the shell, except after a considerable period of desiccation. When expanded, and at full stretch, the foot is remarkably long and narrow, measuring about two inches in length and $\frac{1}{2}$ inch in breadth (see figs. 1, 2). The hinder extremity is abruptly truncate, surmounted by a short horn-like appendage, similar to that in the larvæ of certain Lepidopterous genera. But the most peculiar character in the animal of *Nanina* is that of the two elongate pointed lobes or flaps which project from the margin of the mantle, one on each side of the mouth of the shell. These lobes possess a certain amount of lateral motion, and a considerable power of retraction and expansion, but are always kept in close contact with the surface of the shell (see fig. 1. *a*, *b*).

The animal is in the frequent habit of performing the following singular operation, which, as far as I am aware, has not before been noticed in any terrestrial mollusk. Crawling to the top of its prison (which consists of an inverted tumbler, with a small aperture for air), it suspends itself to the glass by the hinder half of the foot, and twists the anterior part round, so as to bring its lower surface into contact with the shell. By the great length and flexibility of the anterior half of the foot, it is enabled to twist in a variety of directions, and thus to crawl as it were over every part of its own shell in succession, the hind-part of the animal remaining all the while firmly attached to the surface of the glass (see fig. 2). During this operation the horns are partially contracted, and the mouth of the animal is applied closely to the shell, and is seen to be alternately expanded and contracted, as if in the act of suction. In fact the whole process closely resembles the action of a cat when licking its feet and body, and is performed with just the same appearance of systematic determination. The object of this operation is no doubt the same in both animals,—that of clearing their persons from extraneous matter, and producing that aspect of cleanliness and beauty which is one of the laws of organic nature in its normal state. Hence that brilliant gloss which distinguishes the shell of the mollusk here referred to.

It would be desirable to ascertain whether any analogous habit is possessed by the allied genera *Vitrina* and *Zonites*. The shells of the British species of *Zonites* (*Z. nitens*, *alliacea*, *cellaria*, &c.) closely resemble *Nanina vitrinoides* in form, colour, and glossiness of surface, and their brilliancy must apparently be due to some polishing action similar to that here described. On the other hand, it is difficult to understand how the animals of *Zonites* and *Vitrina*, whose foot is much broader and shorter than in *Nanina*, should be able to reach every part of their shell and to purify its surface.

The animal of *Nanina vitrinoides* is of a deep cinereous, the mantle yellowish, its lateral projecting lobes darker, the under surface of the foot pale grey, with a yellowish stripe along each side.

Fig. 1 is a lateral view of the animal crawling; *a* and *b*, the lobes of the mantle.

Fig. 2 is a side-view of the animal when in the act of cleaning its

shell; *a b*, the portion of the foot attached to the glass; *c*, the medial portion of the foot, twisted from a vertical to a prone position.

Fig. 3 the *poma*, or deciduous operculum.

2. DESCRIPTION OF TWO NEW SPECIES OF CRUSTACEA. BY ADAM WHITE, F.L.S., ASSISTANT ZOOL. DEPT. BRIT. MUS.

(Annulosa, pl. 6.)

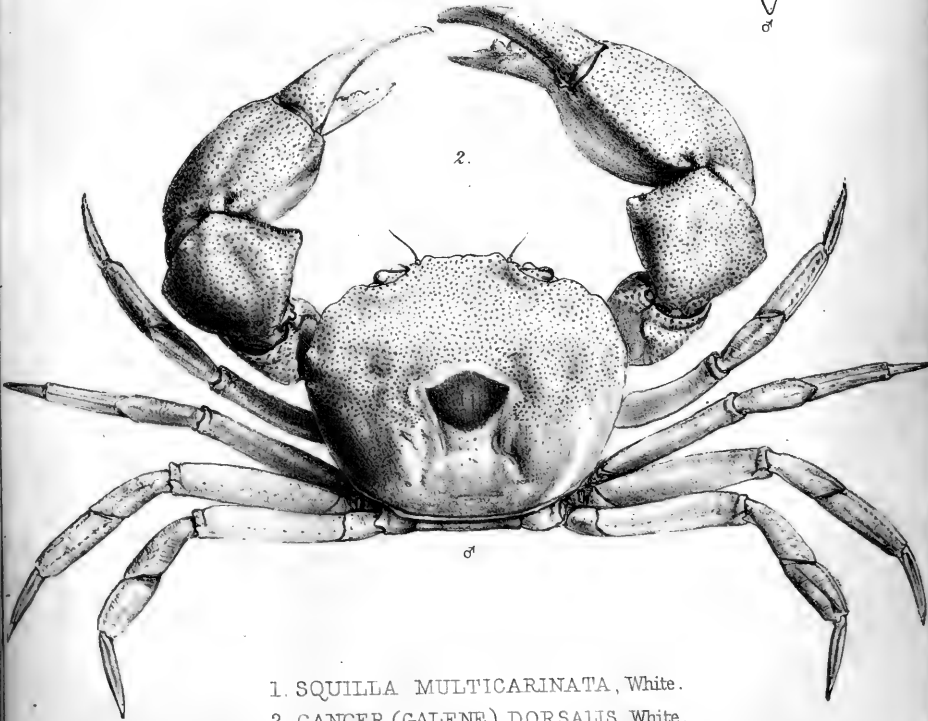
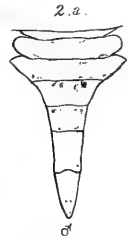
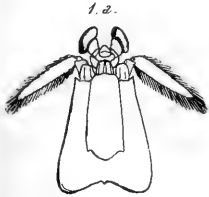
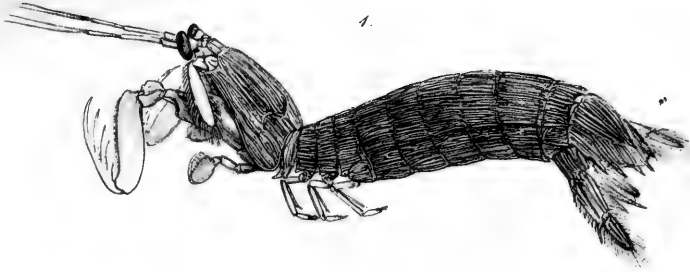
CANCER (GALENE) DORSALIS, White, n. s. *C. pallidè carneus hepatico-rubris punctulis confertim sparsus, thorace maculâ magnâ hepaticâ dorsali, medid, anticè angulatâ, posticè rotundatâ; thorace parte posticâ dimidiatâ immaculatâ; pedibus carneolo-suaviter variegatis; pedibus penultimis longissimis; chelis magnis, pallidis, supernè punctulis hepaticæ sparsis, subtus et infra immaculatis; fronte planâ, medio duobus tuberculis, thorace, lateribus anterioribus, tuberculis quatuor minime elevatis.*

This singularly pretty species was sent home by Mr. John MacGillivray, the naturalist attached to Capt. Stanley's expedition: its beautiful dotted surface, the large liver-coloured mark on the middle of its carapace, and the great length of the penultimate pair of legs, as well as its semi-nodose, semi-crenate, latero-anterior edge, well determine it.

SQUILLA MULTICARINATA, White, List of Crustacea Brit. Mus.

S. thorace, et segmentis abdominalibus, multis carinis, sæpè parallelis, carinâ singulâ, posticè productâ in spinam brevem; ordinibus duobus carinarum utriusque lateris, paulò majoribus.

This species comes in the second section of M. Edwards, and in his first subsection of it, in which the rostral plate does not cover the ophthalmic ring: the very numerous nearly parallel crests on each segment of carapace and abdomen, each crest produced slightly behind into a spine, at once indicate its distinctness from all *Squille* with the description of which I am familiar. Two specimens were found in the Philippine Isles by Mr. Cuming (an indefatigable Fellow of this Society), and one, but a very small and badly-preserved one, was obtained on the voyage of H.M.S. Samarang, in Nangasaki Bay in the Eastern Seas.



1. SQUILLA MULTICARINATA, White.
2. CANCER (GALENE) DORSALIS, White.



Dr. Melville then communicated orally the first part of his paper "On the Ideal Vertebra." He commenced by defining this as "the most complete possible segment of the endo-skeleton," or in the words of his friend Mr. MacIise, "the plus vertebral quantity;" and it was illustrated by a diagram showing the body, neural arch and spine, and two concentric arches or circles below, the inner one consisting of three elements, to which he gave the names *hæmapophyses* and *hæmal spine*, and the outer one formed by the ribs and sternum.

He had arrived, he said, at this idea by observing the inner or true hæmal arch coexisting with the costo-sternal arch in many animals, and referred especially to the skeleton of a lizard in the British Museum as illustrating his discovery; and regretting that the laws of that Institution prevented his exhibiting it at the Meeting, he showed the hæmapophyses in enlarged diagrams of the cervical and dorsal vertebræ, and contrasted his ideal vertebra with diagrams of those given by Geoffroy St. Hilaire and Professor Owen. The bones, which Dr. Melville stated Sir P. Egerton had rediscovered in the *Ichthyosaurus*, and called 'wedge-bones,' were the true hæmapophyses, and he referred to a work by Camper, in which the cervical hæmapophyses had been previously described.

The bone which had been called the body of the atlas was the hæmapophysis of the occipital vertebra; and the 'odontoid process' was the true body of the atlas. The bones which Professor Müller had defined as the inferior transverse processes in fishes, and which Professor Owen had called 'parapophyses,' were the true hæmapophyses, and the term 'parapophyses' ought to be abolished, as it had been applied to several distinct elements. True hæmapophyses were sometimes autogenous, sometimes exogenous.

Adverting to the pleurapophyses or pleural elements of the vertebræ, Dr. Melville alluded to Müller and Thirles' discovery of these in the lumbar and sacral region, where they had been called 'transverse processes,' and he exhibited the sacral vertebra of an 'iguano-don,' showing the articular cavity for the sacral rib.

With regard to the exogenous processes of the vertebræ, which Professor Owen had called 'diapophyses,' Dr. Melville exhibited the vertebral columns of some quadrupeds, showing that they sent off a process backwards in the dorsal vertebræ, and were continued into the lumbar region by such posterior processes, and not by the processes which Professor Owen had called diapophyses in the lumbar region. Understanding that Professor Owen had proposed names for these mere subdivisions of the diapophyses, Dr. Melville strongly deprecated the overloading this difficult part of anatomy with unnecessary names. He also animadverted on Cuvier and M. De Blainville for having neglected to describe these modifications of the transverse processes. Dr. Melville pointed out in the vertebræ of an ant-eater and armadillo the processes which project forwards from the anterior zygapophyses, and which he believed Professor Owen called the 'epizygapophyses'—(the Professor here stated that he had given that name to the superior articular processes in serpents, which were not homologous with the processes alluded to by Dr. Melville,

and to which Professor Owen had assigned a distinct name). Dr. Melville went on to demonstrate these anteriorly projecting processes, and stated that the Edentata had no posterior or backwardly projecting processes from the diapophyses. With regard to the parts called 'parapophyses' by Professor Owen in the cranial vertebræ, Dr. Melville totally dissented from that author, and with regard to the 'paroccipital,' he stated that Rathké had proved it by tracing the development of the bones of the skull to be a mere dismemberment of the petrosal. After eulogising the labours of Müller, Rathké, Geoffroy, and other foreign authors, by whom the truths of that science—sneered at in this country as 'Philosophical Anatomy'—had been discovered and established, Dr. Melville awarded praise to Professor Owen for having first introduced them in a systematic form in an English work, the value of which however was lessened by many grave errors, which it was important to have corrected, and to effect which was the chief object of his present communication. The second part of this communication would be ready for the next Meeting.

The Chairman proposed a vote of thanks for Dr. Melville's paper on the Ideal Vertebra, and called upon Professor Owen to reply, when the Professor inquired whether Dr. Melville's paper had been received; and the Secretary having stated that the paper had not been received, as had been expected before the preparation of the *Agenda*, Professor Owen remarked that the absence of such a document, vouching for the precise nature and terms of Dr. Melville's present views, and the actual grounds of his objections, rendered him averse to entering upon a refutation of those that had just been urged *vivâ voce*. So far, however, as the author's views were represented by the diagrams exhibited, he thought it due to the Meeting to offer a few brief remarks on these.

Professor Owen then observed, that if the modification of the ideal vertebra now proposed had originated, as it might seem to those present who were unacquainted with his work 'On the Vertebrate Archetype,' from the discovery of new facts by Dr. Melville, of which Professor Owen had not had cognizance when he formed his conclusions on the nature of the typical vertebra, there might then have been a *primâ facie* probability of his idea needing some modification in conformity with such alleged new facts. With the exception, however, of the coexistence in nature of a second hæmal arch internal to the costo-sternal arch, he had long been cognizant of the parts called by Dr. Melville 'hæmal arches' and 'hæmapophyses' in the cervical and dorsal regions of the species cited. Professor Owen then inquired whether the lizard at the British Museum referred to by Dr. Melville actually exhibited the perforated hæmal arch beneath the bodies of the cervical and dorsal vertebræ, as shown in the diagram, and Dr. Melville replied that it did not, but explained that the subvertebral processes in the trunk being serially homologous with the perforated hæmal arches in the tail, he was justified in introducing such arch along with the costo-sternal arch in the diagram.

Professor Owen then resumed, that the main question turned upon

a difference of interpretation of known facts, and stated that even had the structures adduced by Dr. Melville in support of his views been new, it would not therefore follow that his interpretation of them was the true one.

All those structures had, however, been described by Professor Owen, and duly considered by him prior to the publication of his work 'On the Archetype and Homologies of the Vertebrate Skeleton,' 8vo, Van Voorst, 1848, from which he quoted the following passages regarding their true nature and homologies. Viewing them as processes from the cortical part of the centrum, Professor Owen states: "The centrum may develop not only parapophyses, but inferior median exogenous processes, either single, like those of the cervical vertebræ of saurians and ophidians (which in *Deirodon scaber* perforate the œsophagus, are capped by dentine, and serve as teeth*), or double (atlas of *Sudis gigas*† and the lower cervical vertebræ of many birds); or the fibrous sheath of the notochord may develop a continuous plate of bone beneath two or more nuclei of centrams, formed by independent ossification in the body of the notochord, these nuclei being partially coherent to the peripheral or cortical plate." (p. 96.)

To this view Professor Owen had been led chiefly by the coexistence of these inferior exogenous processes in the anterior abdominal vertebræ of certain fishes with the true hæmal arches, the nature and modifications of which were so plainly demonstrated in the caudal region of fishes. Besides the species cited in which these 'processus inferiores' had been noticed by previous authors (Agassiz *e. g.* in the case of *Sudis gigas*), Professor Owen had discovered other modifications of the same nature, and referred to his description and figures of the confluent subvertebral processes in the anterior trunk-vertebræ of the *Bagrus tachypomus*, a large siluroid fish (Vertebrate Archetype, p. 92, pl. 1. fig. 3; Annals of Natural History, vol. xx. 1847, p. 217, fig. 1).

He had shown in his memoir on the so-called wedge-bones of the Enaliosauria, that the subvertebral processes in fishes were homologous with those autogenous wedge-bones, with the exogenous inferior processes of the cervical and dorsal vertebræ of ophidians and saurians, and with the body of the atlas in anthropotomy; and in his work on the Archetype, Professor Owen had summed up his views of their nature in the following words: "The continuous bony plate supporting those centrams was perforated lengthwise by the aorta, offering another mode of formation of a hæmal canal (*c h*), viz. by exogenous ossification in and from the lower part of the outer layer of the capsule of the notochord. The carotid hæmal canal in the necks of birds seems to be similarly formed; and the neck of the ichthyosaurus derives additional strength and fixation from apparently detached developments of bone in the lower part of the capsule of the notochord, at the inferior interspace between the occiput

* Jourdan, cited in Cuvier's *Leçons d'Anat. Comparée*, ed. 1835, p. 340, and *Oöontography*, p. 179.

† Agassiz in Spix, *Pisces Brasilienses*, 4to, 1829, p. 6. tab. B. fig. 8.

and atlas, and at those of two or three succeeding cervical vertebræ*.

"The so-called 'body of the atlas' in recent saurians, birds, mammals and man, is the homologue of the first of these subvertebral wedge-bones, and represents only the inferior cortical part of such body. The odontoid process of the axis is the central and main part of the body of the atlas." (pp. 92, 93.)

But in fishes these subvertebral processes coexisted with the parapophyses in the same vertebræ (Archetype, pl. 1. fig. 4. pp. 3, 4, 5, 6, &c.), and likewise with the hæmal arches in the tail, with which Dr. Melville contended that they were serially homologous; in other words, the homotypes.

The caudal hæmal arches in fishes were, however, manifestly formed by other and true vertebral elements. Here Professor Owen explained by diagrammatic sketches the various ways in which the hæmal arch in the caudal vertebræ of fishes was formed, as he had described in his work. "The best marked general character of the vertebral column of the trunk in the class Pisces is that which Professor J. Müller first pointed out, viz. the formation of the hæmal arches in the tail by the gradual bending down and coalescence of the parapophyses; the exceptions being offered by the ganoid *Polypterus* and *Lepidosteus* and the protopterous *Lepidosiren*. 'The pleurapophyses are sometimes continued in ordinary osseous fishes from the parapophyses, after the transmutation of these into the hæmal arches. The dory, tunny and salmon yield this striking refutation of the idea of the formation of those arches in all fishes, by displaced, curtailed and approximated ribs. In some fishes, however (*e. g.* the cod), reduced pleurapophyses coalesce with the parapophyses to form the hæmal arches of the caudal vertebræ." (p. 90.)

"Thus the contracted hæmal arch in the caudal region of the body may be formed by different elements of the typical vertebra, *e. g.* by the parapophyses (fishes generally); by the pleurapophyses (*Lepidosiren*); by both parapophyses and pleurapophyses (*Sudis*, *Lepidosteus*); and by hæmapophyses, shortened and directly articulated with the centrums (reptiles and mammals) †." (p. 91.)

The last conclusion was that which was now called in question, or rather the sense in which Professor Owen here used the term *hæmapophyses* was altered by Dr. Melville to the signification which some anatomists expressed by the terms 'wedge-bones' and subvertebral processes, and which Professor Owen expresses by the term *hypapophyses*. Professor Owen had concluded that as the hæmal arches in the tail of fishes were formed by more or less of the modified elements of the more expanded hæmal or costal arches in the abdomen, the hæmal arches in the tail of batrachians, saurians and mammals were also formed by modifications of more or less of the expanded hæmal or sterno-costal arches of the trunk.

* Sir Philip de M. Grey Egerton in Geol. Trans. 2nd Ser. vol. v. p. 187, pl. 14.

† By a misconception of the sense in which Professor Owen uses the term 'hæmapophyses,' M. Agassiz has applied it to the laminae of the inferior or hæmal arches in fishes. (Recherches sur les Poiss. Foss. tom. i. p. 95.)

The coexistence of the subvertebral or inferior processes of the centrums (hypapophyses) with the true hæmal arches in fishes, proved that these arches could not be the homotypes of these processes in the tail any more than in the trunk; and a conclusion so established in fishes was good for batrachians, saurians and mammals. Arriving thus at the demonstration, that the hæmal arches in the tails of the air-breathing Vertebrata were formed like those in fishes, by a modification of the true hæmal arches of the trunk, the question remained to be decided, which of the elements of such arches were continued into the caudal region of reptiles, cetacea, &c. in order to constitute those arches; and Professor Owen had shown that the solution was given by the adult perennibranchiate batrachia and by the immature crocodiles, in which diapophyses and pleurapophyses coexisted with such hæmal arches in the tail: the laminae of these arches therefore must be the hæmapophyses as defined in his diagrams of the typical vertebra, and consequently they must be the homotypes of those hæmapophyses which had received in the trunk the special names of 'ischia,' 'pubes,' 'abdominal ribs,' and 'sternal ribs.' But the sternal ribs coexisted in the same vertebra with the inferior exogenous processes from the centrum, to which processes Dr. Melville proposed to transfer Professor Owen's name of '*hæmapophyses*.' Professor Owen had, however, proposed a proper name for these commonly exogenous growths from the cortical part of the centrum, as he had likewise found himself reluctantly compelled to do for analogous exogenous processes from the neural arch, which were independent of and superadded to the ordinary '*diapophyses*' and '*zygapophyses*.' Professor Owen called the attention of Dr. Melville to a series of drawings in which he had proposed to illustrate his descriptions of these accessory processes, and alluded to his description of them in the Catalogue of the Royal College of Surgeons.

Professor Owen finally dissented from the definition of the ideal vertebra, which Dr. Melville had adopted from his friend Mr. Mac-lise.

Professor Owen considered that a typical structure might be departed from by excess as well as deficiency. As an example of such excess, he regarded those vertebræ which, in subserviency to muscular attachments, developed hypapophyses, anapophyses, metapophyses and diapophyses, or which in like adaptive subserviency to stronger union developed epizygapophyses, in addition to the ordinary præ- and post-zygapophyses; or which developed from the upper part of the centrum epi-apophyses, which in the cranial vertebræ had received the special denomination of clinoid processes, and were for the special protection of an appendage to the neural axis. In certain human crania these latter exogenous developments actually formed a secondary and minor neural arch internal to or concentric with the larger and normal neural arch; and Professor Owen drew a diagram of a section of such a vertebra, showing the small neural canal close above the centrum (basisphenoid) of the parietal vertebra, answering to, or homotypical with, the small hæmal canal formed by exogenous growths from the under part of the centrum (basi-occipital) of the

occipital vertebræ of the carp, and from the centrums of certain cervical vertebræ of fishes and birds, and which Dr. Melville had transferred to his diagram of a thoracic vertebra, and made it to consist of three distinct elements. Professor Owen stated that he had not presumed to depart wholly from nature, either by addition or subtraction, in the figures of the typical vertebræ, in his work (p. 81, fig. 14, p. 82, fig. 15) criticised by Dr. Melville; and that he knew of nothing in nature which corresponded with Dr. Melville's diagram, showing distinct hæmapophyses and a hæmal spine coexisting with vertebral ribs, sternal ribs, and sternum, in the same segment. On the principles on which Dr. Melville had constructed his ideal vertebra, viz. by the addition of mere adaptive processes of the centrum, exaggerated and artificially subdivided, to true and constant vertebral elements, such ideal vertebra might with a good reason be made symmetrical by the addition of a second concentric neural arch, as in Professor Owen's sketch of the human parietal vertebra, to the true expanded neural arch, and in his opinion such superadded internal neural arch might, with as good reason, be viewed as the true neurapophyses and neural spine, and had as good title to be diagrammatically represented as subdivided into those three separate elements, as the second internal hæmal arch, which Dr. Melville had superadded to his (Professor Owen's) figure of the second form of the typical vertebra (On the Archetype, &c., p. 82, fig. 15). Such an 'ideal vertebra' would then truly exhibit what Dr. Melville had defined as "the most complete possible vertebra," and what Mr. Mac-lise called "the plus vertebral quantity."

Dr. Melville rejoined by reiterating his conviction that his 'ideal vertebra' was the true one, and would ultimately be accepted as such by all anatomists.

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FROM THE HONORABLE
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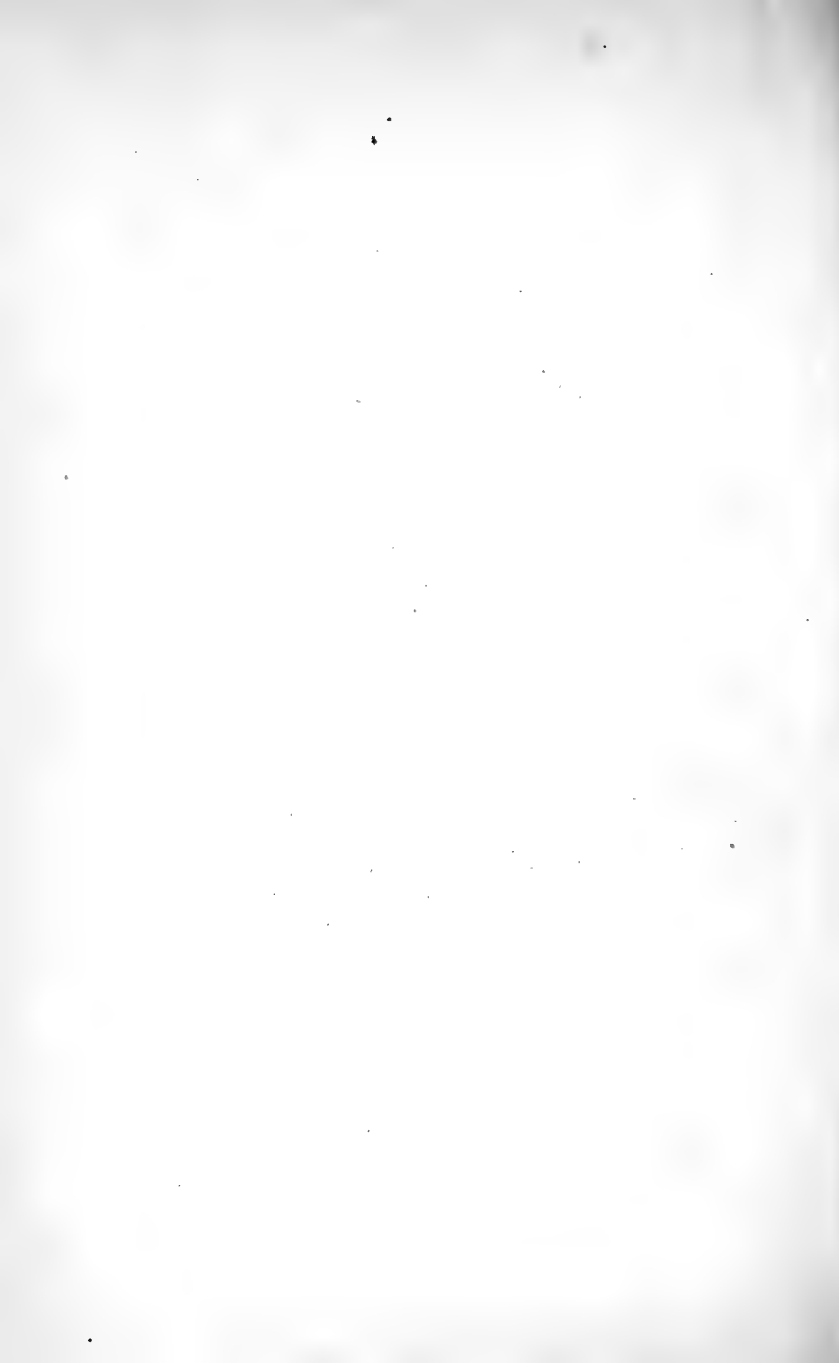
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PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 9, 1849.

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

The Secretary reported that since the last Meeting of the Society a beautiful living example of *Felis viverrina*, Benn., had been presented by Capt. Scanlan, from whose valuable cooperation he had reason to believe that the Menagerie would receive some still more important additions.

A small collection of Insects and Reptiles in spirit had been presented by Dr. E. D. Dickson, Corr. Memb., and Mr. Gagliuffi, British Vice-Consul at Morzook, obtained by them at Bornoo, Morzook, and Tripoli, together with sixteen skins of Birds and five skins of Mammalia, including a magnificent specimen of the Weddān, *Ovis tragelaphus*, or Wild Sheep of Barbary.

A collection of Reptiles in spirit, formed in Hayti by J. N. Tweedy, Esq., Corr. Memb., and presented by him, were also exhibited to the Meeting.

The following papers were read:—

1. DESCRIPTIONS OF THREE NEW SPECIES OF DELPHINIDÆ. BY J. E. GRAY, ESQ., F.R.S., KEEPER OF THE ZOOLOGICAL DEPARTMENT IN THE BRITISH MUSEUM, ETC.

The species which form the subject of the present communication were collected by Dr. Dickie, R.N., during his voyage in the Pacific, and have been transferred by him to the British Museum.

DELPHINUS EUTROPIA.

Nose of skull rather longer than the length of the brain-cavity, rather dilated on the sides before the notch, very convex and rounded above; triangle elongate, produced before the tooth-line, concave on

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the sides, and strongly keeled in the centre behind; hinder edge of blow-hole rather prominent. Intermaxillar wide, convex above, leaving a rather broad open space in front. Palate rather concave in front, convex in the centre behind, the hinder part keeled on each side. Lower jaw thick, blunt, and rather produced beyond the upper in front. Skull rather compressed behind. Teeth $\frac{34}{33}$, rather slender, cylindrical, conical at the top. The frontal ridge half the distance between the notch and the convexity of the condyles; condyles large, rather oblique; foramen magnum rather wider than high.

	in.	lin.
Length, entire	15	0
—— of beak	7	10
—— of teeth-line	6	10
—— of lower jaw	11	11
Width at notch	3	6
—— at orbit	6	5
—— at middle of beak	2	10
—— of middle of intermaxillar ..	1	3
—— at condyles above	3	3
Height of each condyle	1	3
Skull from notch	6	10

LAGENORHYNCHUS CLANCULUS.

Skull wide and rather high behind; beak flat, outline wide at the base, rapidly tapering and acute in front, but rather convex on the sides; sides slightly rounded, the hinder edge near the notch only slightly turned up and rounded; lower jaw high behind; triangle extending to near the middle of the beak. Teeth $\frac{33}{32}$, small, cylindrical, curved, rather acute at the top; the lower front one very small. Intermaxillaries broad, hard.

	in.	lin.
Length entire	14	6
—— of beak	7	3
—— of skull	7	3
—— of teeth-line	6	6
—— of lower jaw	11	3
—— of symphysis of lower jaw ..	1	4
Width at notch	4	2
—— at orbit	7	6
—— at middle of beak	2	7
—— of intermaxillar in middle ..	1	4
—— of condyles above	2	10

Hab. Pacific.

Very peculiar for the elongation and reflexion of the beak before the notch, and the regular beveling of the sides of the beak.

LAGENORHYNCHUS THICOLEA.

Skull rather narrow behind; beak elongate, almost one-fifth longer than the length of the head, rather dilated and concave above behind, with the side edges in front of the notch elongated, keeled, and turned

up; the middle of the beak flat, with flat shelving sides, the shelving part being broader, and forming a slight keel in front. Intermaxillaries flat, gradually tapering. Triangle to the middle of the beak concave on the sides, and keeled in the middle behind. Teeth $\frac{40}{40}$? very slender, curved, elongate, conical, tapering, acute; the front very small.

	in.	lin.	
Length of skull entire	14	6	end of nose injured.
——— of beak	8	4	
——— of teeth-line	7	0	
——— of lower jaw	12	3	entire.
Width at orbits	7	0	
——— at notch	3	11	
——— at middle of beak	2	2	
——— of intermaxillary } in middle }	1	2	
Width of condyles	3	0	

Hab. West Coast of America.

2. DESCRIPTIONS OF APPARENTLY NEW SPECIES OF APTERA FROM NEW ZEALAND. BY ADAM WHITE, F.L.S. ETC.

MYGALE (CTENIZA) ANTIPODUM.

Chelicera deeper than long, ochrey-brown, the top at the base somewhat hollowed, smooth; sides smooth, front and tip with several short hairs.

Cephalothorax rotundo-ovate, pale ochrey-brown, the sides in front somewhat grooved. Eyes situated on a slight elevation in front of cephalothorax: the two posterior eyes on each side close to each other.

Legs of a pale brown, but deeper in colour than the cephalothorax.

Abdomen of the same pale brown as the legs, covered with rather long hairs; the tail nearly as long as the abdomen, the terminal joint elongate, slender, gradually thinner.

Hab. New Zealand.

MYGALE (CTENIZA) HEXOPS.

Chelicera deep black, much deeper than long; above somewhat narrowed; the top and the greater part of the sides quite smooth; the front and a narrow line on the sides slightly punctured, each of the punctures supplied with a hair.

Cephalothorax fulvous yellow, oval, somewhat truncated behind and slightly sinuated; two small silky whitish spots on the fore-part behind the first row of eyes; eyes situated on a slight elevation of cephalothorax, which is deep brown; a narrow brown line extending down the middle of the back, but not reaching the end.

Legs of a pale brown, sparingly furnished with rather long hairs; the femoral joints somewhat thickened.

Abdomen black, covered with shortish hairs, which in some lights have a greyish tinge; the hairs on the under side of the body greyish.

Tail about half the length of abdomen; the last joint the longest, and gradually more slender from the base.

Hab. New Zealand (Port Nicholson).

This species is very remarkable from its possessing only six eyes.

DOLOMEDES LATERALIS.

Cephalothorax of a very pale brown, with a faintish line down the middle; a very distinct white line from the anterior angle of the cephalothorax, continuing down the side and carried along each side of the abdomen; the cephalothorax and abdomen on the inner edge of the white line of a deeper brown colour; the legs and palpi of a pale ochrey-yellow, with many black hairs.

Chelicera covered with greyish hairs.

Hab. New Zealand.

This species, which is described from a male, differs from the *Dolomedes mirificus*, Walck. Apt. i. 355, and the *Dolomedes sagittiger*, as well in markings as in size.

DOLOMEDES SAGITTIGER.

Cephalothorax of a very deep brown; the extreme edge of the sides, where the legs are inserted, pale; a wide yellowish longitudinal line from the anterior angle of cephalothorax; the outside edges with some brown points; the inner edge with some sinuations; the band does not reach the end of the cephalothorax; the middle of the cephalothorax with a narrow white line extending from behind the second line of eyes, almost to the end; on each side of it in front a short interrupted line, somewhat rounded in front.

Abdomen deep brown, the sides of a palish hue as far as the middle.

The eyes of the first row very small.

Legs deep brown, with darker coloured hairs.

Hab. New Zealand.

This species seems to be closely related to *Dolomedes mirificus*, Walckenaer, Aptères, i. 355.

ATTUS DARWINII.

Chelicera black, with greenish reflexions, punctured and striated in front, and somewhat impressed at the end; palpi pale brown.

Cephalothorax deep blackish brown, highly polished, considerably paler in the middle of the back; front part projecting very considerably over the chelicera; the front edge behind the first row of eyes with several tufts of short close-set black hairs.

Eyes with the middle pair of first row very large; the lateral eyes of first row placed somewhat behind the middle pair, and larger than the two hind eyes; the eyes on the second line very small, nearer the lateral eyes of first row than those of the third.

Legs: First pair very long, deep blackish brown; femoral joint rather longer than the tibial, which is double the length of the genual joint; the tarsal joint pale at the end; a small spine near the end of the femoral joint on the inside; a longer spine about the middle of the genual joint; three spines placed after each other on the inner edge of tibial joint; second, third and fourth pairs of legs of a pale yellow, smooth, with a few short bristly hairs on the inside and outside.

Abdomen small, at the base projecting slightly over the cephalothorax with a broad pale line down the middle; an impressed dark longitudinal line in the middle.

Hab. New Zealand.

This makes a third species of *Attus* from New Zealand; the other two recorded species are *Attus abbreviatus*, Walck. Aptères, i. 477, and *Attus Cookii*, Walck. i. 478. Most probably the *Attus Phri-noïdes*, Walck. i. 479, is from the same country, and doubtless many other species will yet be found.

SPHASUS GRACILIPES.

Cephalothorax and abdomen covered with shining silvery hairs.

Legs fulvous.

Cephalothorax narrowed in front, with a slight groove from the end of the narrowed part on each side extending to the middle of the back; the posterior part ovate.

Abdomen nearly three times the length of the cephalothorax, much-elongated and attenuated at the end.

Hab. New Zealand.

EPEIRA VERRUCOSA, Walckenaer, Aptères, ii. 135.

Hab. New Zealand.

The specimens in the Museum collection are not in very good condition, but seem to agree in nearly every important particular with the species to which I have referred it; the posterior lateral eye however can scarcely be said to be almost on the same line as the anterior.

TEGENARIA ANTIPODIANA.

Labium nearly as wide as long, truncated at the end.

Cephalothorax gradually convex above, deep ferruginous brown, with two wide longitudinal fulvous bands.

Legs ringed with yellow and brown, the first two legs with the rings obsolete.

Abdomen as long as cephalothorax, but not quite so broad, apparently without any impressed points in the middle.

This species appears to differ from the *Tegenaria australensis*, Walckenaer, Aptères, ii. p. 12. Lucas, Ann. Soc. Ent. France, in many particulars, especially in the marking of the cephalothorax and the shape of the labium.

DANDRIDGIA DYSDEROIDES.

Chelicera as long as the cephalothorax.

Cephalothorax elongated, square in front, slightly wider just behind the middle; a slight groove down the middle.

Eyes situated on two lines, the posterior line the longest; the two middle eyes of first line nearer each other than the outer eye; the posterior line with the middle eyes rather nearer each other than the side eyes.

Legs elongated, first pair the longest, second pair rather longer than the fourth, the third considerably shorter than the fourth.

Abdomen small, shorter than cephalothorax, smooth.

Hab. New Zealand.

Named after Mr. Joseph Dandridge, an apothecary, who lived in Moorfields more than a hundred years ago, and who has left copious evidence in his MSS. (now preserved in the British Museum) of his love of arachnology.

PHALANGIUM LISTERI.

Chelicera enormously long; first joint not quite so long as the second, and like it rough, with outstanding short spines, the end very slightly thickened; the end of the second joint gradually thickened, with two claws, one fixed, with a small tooth inside near the base, followed by a deepish notch; the moveable claw with a largish tooth about the middle, which fits into the notch of fixed claw.

Hab. New Zealand.

CHELIFER PALLIPES.

Claws and body of a deep brown, the legs pale, the claws with a greenish hue, and furnished with many pale hairs; abdominal segments edged with palish; the femoral joints of legs much-compressed.

Hab. New Zealand.

3. NOTICE OF THE CAPTURE OF ORTHAGORISCUS MOLA OFF THE CHESIL BANK, DORSETSHIRE. BY MAJOR PARLBY.

In this communication, which was addressed in the form of a letter to Mr. Gray, Major Parlby stated that in the beginning of June 1846 the specimen in question was observed almost daily in the West Bay, sometimes sailing about slowly with half its dorsal fin above the surface of the water, sometimes moving with great rapidity, playing about and splashing the water violently, or blowing like a whale or grampus.

As it generally kept off and on between the mackerel and the shore, the fishermen attributed their ill success with the shoals, which never left the deep water, to the presence of this unusual visitant; and it is remarkable that on the day after its capture they took upwards of 20,000 fish.

The capture happened on the 13th of June, in consequence of the Sunfish swimming directly into the centre of the line of nets. When entangled in the first net it exerted itself so powerfully that it broke through, and was only secured by the yawl or outer net and the co-operation of about forty men, who finally succeeded in landing it on the Chesil Bank: and even here its vigour was so great that it dashed about the pebbles, according to the fishermen's account, like a shower of grape. It expired in about three hours, after uttering "hideous groans," like those of a horse dying of the staggers.

On the capture becoming known to Major Parlby and Mr. Fox, surgeon, of Weymouth, they hastened to inspect the fish, and found that the skin was entirely covered with a white mucous slime, upon the removal of which the real colour of the integument was discovered to be of a dull dirty brown colour, and the texture to resemble the most beautiful shagreen.

Major Parlby and Mr. Fox having jointly purchased the fish, pro-

ceeded to have it prepared for the British Museum, to which institution they subsequently presented it.

The dimensions are as follow :—

	ft.	in.
Total length	6	3
Height of dorsal fin	2	5
Breadth of it at base	1	3
Height of ventral fin	2	3
Girth	9	0

January 23, 1849.

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

The following papers were read :—

1. NOTE ON THE SPERMATOZOA OF THE GIRAFFE (*Camelopardalis Giraffa*). BY GEORGE GULLIVER, F.R.S.

In the testicle of the Giraffe that died on the 14th of this month in the Society's menagerie, the semen was tolerably abundant, and there were plenty of spermatozoa in the vas deferens.

The drawings now shown were made from these spermatozoa. They are represented on a scale of $\frac{1}{2000}$ th of an English inch, and magnified about 700 times in diameter.

These spermatozoa resemble in shape, size and chemical characters, those of many other mammals noticed in my former observations in the Proceedings of the Society, July 26, 1842, page 101; April 11, 1843; February 24, 1846; and January 22, 1847, page 105.

The age of the Giraffe was about fifteen years.

2. ON SOME NEW OR LITTLE-KNOWN SPECIES OF MONKEYS.
BY JOHN EDWARD GRAY, ESQ., F.R.S. ETC.

The older authors have described two species of *White-nosed Monkeys* which have been called *Hocheurs* by the French.

In the British Museum we have specimens of each of these species, and also of two very distinct kinds, which appear either not to have occurred to preceding authors, or to have been confounded by them with the species described by Erxleben.

CERCOPITHECUS MELANOGENYS. The Black-cheeked Monkey.
(Mammalia, Pl. IX. fig. 1.)

Dark olive, minutely yellow grised; face, cheek, forehead, chest and hands black; a large cordate spot on the nose and a small spot

on each temple white. Throat, under-part of the body and inside of the legs whitish; the front of the shoulders, outside of the limbs, end of the tail blackish. Ears, the middle of the back, and upper part of the tail, rufous.

In the British Museum collection there is a half-grown specimen of this species which died in a menagerie near London, and was said to have come from Western Africa.

The Black-cheeked Monkey is easily known from *Cercopithecus nictitans* by its yellow punctulated fur and cordate form of the spot on the nose; the latter character equally distinguishes it from *Cercopithecus petaurista*, from which it is also separated by the blackness of its cheeks and the greyness of the outside of the limbs, and the redness of the middle of the back and the tail.

This species was indicated in the 'Annals of Natural History' for 1845, but is redescribed and figured here for the purpose of comparison with the next.

CERCOPITHECUS LUDIO. The Ludio.

(Mammalia, Pl. IX. fig. 2.)

Blackish, minutely yellow grised; face, temple, crown of the head, shoulders and fore-legs, black; outer side of the hinder legs and end of tail blackish; large oblong spot on the nose white; throat, upper part of the inside of arms, and lower side of the body, whitish; rump and under side of base of tail dark reddish brown.

Hab. West Africa.

In the British Museum there is a nearly full-grown specimen of this species, which was procured from a menagerie in Liverpool, and was said to have been brought from the west coast of Africa.

This is at once known from two other species which have the fur punctated with yellow, viz. *C. petaurista* and *C. melanogenys*, by the large size and erect oblong form of the white spot on the nose, and especially by the absence of any white on the cheek or temples; it is easily distinguished also by the general black tint of the fur, and especially by the red hairs of the rump.

In the course of last year there was exhibited in the Gardens of the Society a short-tailed American monkey, which was regarded by several eminent zoologists as a species of *Cebus* which had lost part of its tail; but there was a peculiarity in the position of the thumb as regarded the fingers, which at once showed that whatever might be the natural length of its tail, it evidently did not belong to the genus *Cebus* as at present restricted. The examination of the animal after death showed that it was a most distinct genus, and nearly related to, if not a variety of, *Brachyurus Ouakari* of Spix.

I may observe that the genus *Brachyurus* was established by Spix in his work on American Monkeys for two species, viz. 1. the *Simia Chiropotes* of Humboldt (the *S. Sagulata* of Trail), which has been generally referred to the genus *Pithecia*; and 2. *Brachyurus Ouakari*. Spix in the same work restricted the genus *Pithecia* to the *Saki* or Long-haired American Monkeys.

The examination and comparison of the skull of the short-tailed

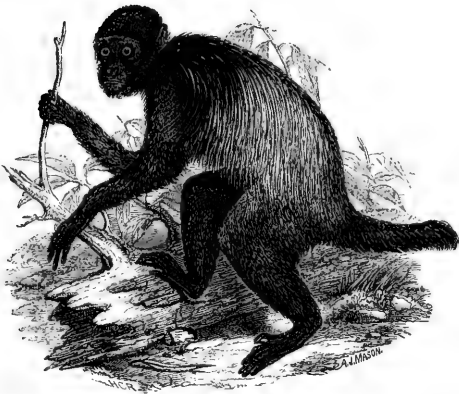


Ed. erub.

Printed by Balzmandel & Walzen.

1. CERCOPITHECUS MELANOGENYS & CERCOPITHECUS FUD.C





monkey and of the allied genera have induced me to think that the American Monkeys with long hairy tails, and with six grinders, may be divided into two very natural subfamilies, characterized by the position and form of the cutting teeth.

The first of these groups I should propose to call *Callitrichina*: they have small erect cutting teeth, forming a regular series with the canines. This group contains the genera *Callithrix* and *Chrysothrix*, with small diurnal eyes, and *Nyctipithecus*, with large nocturnal eyes.

The second group, which may be called *Pithecia*, have the cutting teeth large, converging together, and separated from the canines by a large space, and their under ones more or less shelving. This group contains three genera, viz. :—

1. *Pithecia*. The fur elongate, dry, harsh; the tail club-shaped; the crown like a wig, and the chin slightly bearded; the lower cutting teeth rather shelving.

This is the genus *Pithecia*, as restricted by Spix, the *Yarkea* of Lesson, containing *P. monachus*, *P. leucocephalus*, and *P. rufiventer* of Geoffroy.

Spix (tab. 37. f. 4) figured a skull which appears to belong to a species of this genus, but he does not indicate its name.

2. *Brachyurus*. The fur silky, short; tail elongate club-shaped; the crown like a wig, and the chin largely bearded on each side; the lower cutting teeth are rather shelving; limb short and straight. Containing *Cebus satanas* of Hoffmannseg, which is the type of Spix's genus.

Lesson has given the name of *Chiropotes* to this group, and *Cucajao* to a second group, established on the *Simia melanocephalus* of Humboldt, which is probably only a badly stuffed specimen of this species.

Spix, in his work on Brazilian Monkeys, figures a skull which appears to belong to this genus, but it is like several others on the same plate, without any name, t. 37. f. 5.

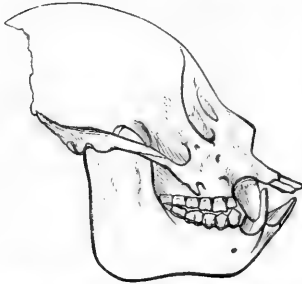
3. *Ouakaria*. The fur short, silky; tail short, subcylindrical, the

crown with short hair; the chin scarcely bearded; the lower cutting teeth very much shelving; legs elongate.

This genus forms part of the genus *Brachyurus* of Spix; and if Spix had not evidently described the teeth, &c. of his first species in his generic character, I should have been induced to have retained for this group the name of *Brachyurus*, which is more applicable to it than to the one to which it is applied; and indeed M. Isidore Geoffroy appears to have so applied it.

Several species have been described which chiefly differ in the length of the tail; as, 1. *Ouakaria Spixii*; *Brachyurus Ouakari*, Spix, Brazil, t. 8, with the tail about one-third the length of the body. 2. *Ouakaria calvus*; *Brachyurus calvus*, I. Geoff. Rev. Cuvier. 1847, 137, much paler in colour, but it is very doubtful if the shortness of the tail does not depend on the imperfection of the specimen, and the colour on partial albinism.

We have specimens of *B. calvus* in the British Museum, presented by M. Bourcier. The skull may be thus described:—



The cutting teeth projecting; the upper one broad, especially the two middle ones; lower one elongate, narrow, more sloping, and projecting like those of *Indri*. Canines conical, far away from the cutting teeth, leaving a large vacancy; flattened in front; they are flattened before and behind, placed rather obliquely, with a sharp inner edge. The skull is very unlike that of the *Cebidæ*; most allied to that of *Pithecia leucocephala*, but the cutting teeth

in that species are not so proclined.

The converging, slender, shelving, cutting teeth in the lower jaw of this genus, as well as its slender limbs and the shortness of its tail, bear a certain resemblance to the *Indri* amongst the *Lemuridæ*.

The form of the lower jaw also offers a good character for the distinction of the genera.

1. Lower jaw not dilated behind. 2. Lower jaw dilated behind.

Atelina (part).

Ateles.

Cebina.

Cebus.

Pithecia (part).

Pithecia.

Jacchiana.

Jacchus.

Midas.

Mycetina.

Mycetes (much).

Lagothrix (moderately).

Atelina (part).

Brachyteles (moderately).

Callitrichina.

Callithrix.

Chrysothrix.

Nyctipithecus.

Pithecia (part).

Brachyurus. *Ouakaria*.

3. DESCRIPTION OF A NEW SPECIES OF HERPESTES.

BY J. E. GRAY, ESQ., F.R.S. ETC.

HERPESTES PUNCTULATUS.

Reddish grey, minutely black and grey punctured; face redder. Under-fur black; long hair brown, upper half whitish, with a broad, black, subapical band and a bay tip. Tail-end black.

Hab. South Africa; Port Natal.

This species is allied to *H. Mutzigella* in size, appearance, and the black tip of the tail, but differs from that species in being redder, and in the face being red bay.

It agrees with *H. badius*, A. Smith, in the colour of the end of the tail; but that species differs from it in the nearly uniform bay colour and in the length of the hair.

I may here remark, that *H. badius* offers two very distinct varieties, one being uniform red bay, the hair being of a uniform colour except a few just over the shoulder-nape which have a black subapical ring. This is the variety figured by Dr. Smith in the 'South African Zoology.' The other with most of the hairs of the back and sides having long white tips edged below with a black band, giving the back a grisled appearance.

The foregoing papers were followed by an address from DR. MELVILLE, M.R.C.S., in continuation of his observations commenced on December 12, 1848, concerning the IDEAL VERTEBRA, of which he has furnished the following abstract:—

I employ the term '*vertebra*' in the extended sense in which it is used by M. Geoffroy St. Hilaire and Prof. Owen, as equivalent to a segment of the endo-skeleton, or to the proximal, more or less ossified, element of that skeleton.

The ideal or typical vertebra is the most complicated possible vertebral segment, exclusive of the ichthyic or other peculiarities; it furnishes the key to the actual vertebræ in the same individual series or in the skeletons of the different vertebrate classes.

An actual vertebra may exist as a unity prior to, or even during chondrosis, but becomes resolved by ossification into a variable number of distinct and independent ultimate elements; which therefore are not repetitions of one and the same elementary 'body' or 'lamina.'

The number of these ultimate elements varies in the actual vertebræ in the same spinal column, and also in those constituting the skeletons of the different vertebrated animals.

The ideal vertebra contains the greatest number of these elements, most of which form arches attached to, or springing from, a central piece or element, and protecting the great nervous and vascular axes and the visceral system.

The upper or neural arch is composed generally of three elements, two lateral, (neural laminæ, or neuropomata); and an upper or mesial

piece, (neural spine, or neuracantha), which may be subdivided in the median plane.

The inferior or hæmal arch is also constituted when most developed (tail of the lepidosiren) by three elements; the two lateral (hæmal laminæ or angiopomata) and the azygos inferior one (angiacantha or hæmal spine), which is never subdivided. This arch is most generally present in the caudal region, disappears in the trunk, and reappears in the cervix. In man it only exists at the junction of the occipital and atlantal vertebræ, forming the so-called 'body of the atlas,' which is regarded by me as the hæmal arch of the third cranial vertebra displaced backwards to the intervertebral interspace, as in the caudal region.

The visceral arch, which is also inferior but external to the last, may be regarded as composed of an azygos inferior and two lateral elements. The former is the sternal segment and may be subdivided mesially. Each lateral piece is also resolvable generally into an upper segment (vertebral rib or pleura); and a lower one usually cartilaginous (sternal rib or hypopleura), which may be subdivided into two or three pieces (three in *Plesiosaurus*).

The segmentation of the vertebræ is partly due to the laws which preside over their genesis, and partly determined by teleological causes.

Several of the elements unite to form the vertebra of the anthropomist; thus the constituents of the neural arch coalesce with the centrum in the dorsal vertebræ; while in those of the cervical, lumbar and sacral regions, the abortive pleural complements also are anchylosed to the elements just mentioned.

In fishes, the lower part of the vertebral body is formed by the expanded bases of the angiopomata, which meet those of the neuropomata and enclose the proper centrum; but in the higher vertebrata the greater development of the centrum excludes the angiopomata from any share in the body, and displaces them backwards to the intervertebral interspace next in succession.

The coexistence of the visceral and hæmal arches is seen in fishes, in the cervical region of many lacertæ, and in the tails of the lizards and crocodiles, &c.

Therefore the one is not convertible into the other, as has been supposed by Professor Owen, who regards the sternum and sternal ribs in the thorax as the equivalents of the angiacantha and angiopomata, the latter being dislocated from their normal attachment to the centrum and suspended to the extremities of the corresponding pleural elements constituting the sternal ribs, while the former is expanded and sometimes divided mesially to form the sternum.

I am therefore compelled to suggest a new nomenclature of the elements of a typical vertebra more conformable to nature than that employed by Professor Owen, who has used the same term for several distinct objects, and given two different appellations to the one and the same element.

My view of the typical vertebra is that which has been adopted by the distinguished German anatomists Müller, Rathke, &c.

The cranial vertebræ are three in number, and may be named, from before backward, the frontal, parietal and occipital vertebræ.

The supposed nasal vertebra has no existence, the bones presumed to constitute it belonging to different categories.

Each cranial vertebra is composed of a centrum, a neural and a visceral arch; the hæmal arch is present only in the third or occipital vertebra forming the so-called 'body of the atlas.'

Between the neural arches of the cranial vertebra pass out diverticula of the cerebral vesicles to the 'sense-capsules,' as well as the ordinary cerebro-spinal sensero-motor nerves. The primary segments of the brain are three in number. The special sense nerves, and those of the cerebro-spinal system, correspond in number to the cranial vertebral segments. The auditory capsule is intercalated between the neuropomata of the second and third cranial vertebræ; the optic nerve issues between those of the first and second, while the corresponding capsule is contained in the orbital cavity, protected by certain bones, pro-orbital, meso-orbital and meta-orbital, &c.; the olfactory capsules are situated in front of the first vertebra, and are thus enabled to approximate mesially, separated only by the prolongation of the body of the frontal vertebra.

The occipital vertebra has for its centrum the basi-occipital, for its neuropomata the ali-occipital, and for its neuracantha the supra-occipital, which is sometimes divided into two.

The basi-sphenoid is the centrum of the second or parietal vertebra; the neuropomata are termed ali-parietals, and the divisions of the neuracantha parietals.

The centrum of the frontal or most anterior vertebral segment is formed by the pre-sphenoid, the neuropomata by the ali-frontal, and the divided neuracantha by the frontals.

The squamosal and mastoid bones may be regarded as belonging to the same category as the ossa Wormiana, namely, the accessory neuropomatous pieces.

The post-petrosal bone in the Chelonia is erroneously regarded by Professor Owen as the equivalent in the occipital vertebra of the angio-paral element of the body of the vertebra in fishes, or of the inferior transverse process in the higher vertebrata, since both receive the same name in his system.

The mastoid is also regarded by Prof. Owen as the 'parapophysis' of the parietal vertebra.

The visceral arch of the frontal vertebra is formed by the palato-maxillary apparatus exclusive of the pro-maxilla, and by the malleus leucus with the lower jaw in the mammalia, or by the os quadratum and Meckel's cartilage with the appendages in birds and reptiles.

The corresponding arch of the parietal is formed by the anterior horn of the hyoid bone, and that of the occipital by the posterior cornua and body of the same bone.

February 13, 1849.

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

The Secretary reported that a male Giraffe had been fawnd in the menagerie on the previous day. The produce of the mother, who was imported in 1836, thus amounted to five males, all of whom, with one exception, were in full health and vigour. The dates of their birth are as follow:—

1. June 9, 1839; died soon after.
2. May 24, 1841; now in possession of the Zool. Soc. Dublin.
3. February 25, 1844; now in the Menagerie.
4. April 22, 1846; „ „
5. February 12, 1849; „ „

The Secretary also stated that the Menagerie had been enriched, since the last meeting, by a fine specimen of the Tui Bird (*Prosthemadera Novæ Seelandiæ*), brought from New Zealand by Lieut. Gough, R.N. This gentleman had also succeeded in conveying to England an example of *Platycercus tabuensis*, Latham, from the Feejee Islands, which unfortunately died before it reached London. The skin had been mounted and was exhibited to the meeting.

The papers communicated were—

1. DESCRIPTION OF A NEW SPECIES OF THE GENUS TOMIGERUS, SPIX. BY G. B. SOWERBY, F.L.S. ETC.

(Mollusca, Pl. II. fig. 6, 7.)

TOMIGERUS PRINCIPALIS, n. sp. *Tom. testâ rotundato-trigonalis, compressiusculâ, tenui, levigatâ, pallescente, lineis brunneis nonnullis, per paria dispositis, cinctâ; spirâ subelatâ, anfractibus quinque, quorum duobus primis nigricantibus, tertio quartoque pallidis, brunneo-unifasciatis, ultimo magno, posticè gibbo, infra planulato; aperturâ axi parallelâ, auriformi; peristomate latè expanso, albo, margine dextro producto, rotundato-subangulato; aperturâ intus lamellis senis instructâ, duabus in pariete aperturali, quarum posticâ compositâ, tribus in margine basali, unâ compositâ posticè furcatâ anticè bifidâ in margine dextro.*

This is the largest species of this genus we remember to have seen; for which reason we have named it *T. principalis*. It is of a somewhat triangular form, rounded at the angles, and rather compressed, not being nearly so globular as the remaining three species. The substance of the shell is rather thin, it is smooth and of a pale colour with several brown transverse lines disposed in pairs; the spire is rather elevated, consisting of five volutions, of which the first and second are small and very dark-coloured, the third and fourth are pale with a brown band, and the fifth is large, and gibbose posteriorly, its anterior margin white, and it is flattish and brown anteriorly; the



et lith.

Reeve, Benham & Reeve, imp.

2. 3. NANINA VITRINOIDES, Gray.

6. 7. TOMIGERUS PRINCIPALIS, Sow.

5. CYCLOSTOMA APLUSTRE, Sow.

8. 9. CYCLOSTOMA FORMOSUM, Sow.

10. BULIMUS IRRORATUS, Reeve.



aperture is parallel to the axis, ear-shaped, with a broadly expanded white peristome, whose right margin is produced and forms a rounded angle; the aperture is furnished within with six lamellar teeth, two on the columellar side, of which the posterior is compound, three within the basal margin; and a single compound plate which is furcate posteriorly and bipartite anteriorly within the right hand margin. In Mr. Cuming's collection.

From Pernambuco.

2. DESCRIPTION OF TWO NEWLY DISCOVERED SPECIES OF
CYCLOSTOMA. BY G. B. SOWERBY, F.L.S.

(Mollusca, Pl. II. figs. 4, 5, 8, 9.)

1. *CYCLOSTOMA FORMOSUM*. *Cycl. testâ suborbiculari, subdepressâ, tenuiusculâ, spiraliter striatâ, tricarinatâ, fulvo-rufescente; spirâ brevi, acuminatâ, anfractibus quinis rapidè crescentibus, rotundatis, carinis duabus validis, albicantibus castaneo-articulatis; anticè striis subobsoletis, gradatim majusculis, carinâque tertiâ umbilicum circumferente; suturâ validâ, lævi; aperturâ magnâ, ferè circulari, posticè paululum acuminatâ, peritremate latiusculo reflexo, incisuris parvis tribus, ad carinas externas idoneis; umbilico magno, profundo, spiraliter striato, striis exterioribus gradatim majusculis.*

This very handsome Cyclostoma bears a general resemblance to *C. Cuvierianum*, though easily distinguishable by having three distinct keels, by having a more acuminate apex, and by the latter having the spiral striæ decussated by other sharp striæ parallel with the lines of growth. The *C. formosum* is nearly orbicular, though somewhat depressed; it is rather thin and smooth, and of a reddish fulvous or brown colour: its spire is rather short, but acuminate, consisting of five volutions which are of a roundish form and increase rapidly, and are ornamented with two keels which are of a pale colour, spotted with chestnut brown: anteriorly the striæ are rather indistinct, but larger; and there is a thick keel surrounding the umbilicus; the suture is distinct and smooth, but belted posteriorly by the middle keel; the aperture is large, nearly circular, slightly acuminate posteriorly, with a rather broad reflected peritreme, in which are three little cuts answering to the ends of the external keels; the umbilicus is large and deep, spirally striated within; the outer striæ being the larger.

From Madagascar, in the collections of A. L. Gubba, Esq., Havre, and Mr. Cuming.

2. *CYCLOSTOMA APLUSTRE*. *Cycl. testâ suborbiculari, tenuiusculâ, lævi, albicante, fasciis nonnullis posticis, angustis, castaneis, subinterruptis, striisque tenuissimis spiralibus, ornatâ; spirâ levatiusculâ, subacuminatâ, apice obtuso; anfractibus quinis rotundatis, creberrimè transversim striatis, striis posticis fortioribus, anticis ferè obsoletis; umbilico magno, intus spiraliter striato, striis tenuissimis; aperturâ ferè circulari, posticè paululum*

acuminatâ, peritremate tenui, acuto, supra umbilicum paululum reflexo.

A species somewhat resembling *C. ligatum*, but differing in several characters. It is suborbicular and thin, smooth, whitish, posteriorly with several narrow slightly interrupted chestnut-coloured bands and close-set very slender spiral striæ; the spire is rather elevated and acuminated, but the apex is obtuse: volutions five, very regularly rounded, and very finely transversely striated, the transverse striæ decussating the spiral striæ, and the posterior striæ being the most distinct, the anterior being almost undistinguishable: the umbilicus is large, very finely spirally striated within; aperture large, nearly circular, slightly acuminated posteriorly, with a thin, sharp-edged peritreme which is rather wide and slightly reflected over a part of the umbilicus.

From Madagascar, in the collection of A. L. Gubba, Esq., Havre.

3. DESCRIPTION OF A NEW SPECIES OF BULIMUS FROM THE COLLECTION OF A. L. GUBBA, ESQ., OF HAVRE. BY LOVELL REEVE, F.L.S.

(Mollusca, Pl. II. fig. 10.)

BULIMUS IRRORATUS. *Bul. testâ acuminato-oblongâ, medio ventricosâ, anfractibus sex, subrotundatis, striis tumidis elevatis interruptis obliquè exsculptis, infra suturas peculiariter concentricè crenulatis, columellâ strictè uniplicatâ; rufescente-purpureâ, epidermide tenui cinerascete, fulvo hic illic punctatâ, indutâ, columellâ cærulescente-albâ, labro incarnato-roseo.*

Hab. — ?

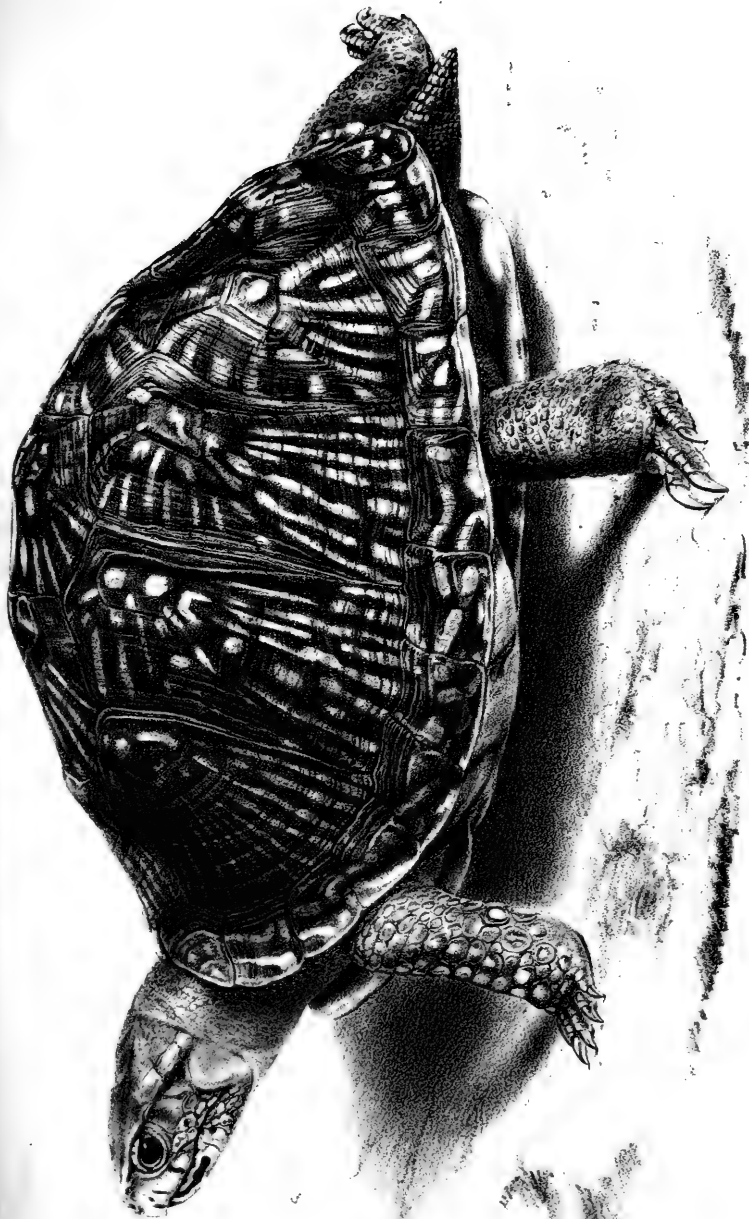
This beautiful species, received by Mr. Cuning from A. L. Gubba, Esq. of Havre, is materially distinct from any hitherto described. It is of a swollen ovate form with the spire rather sharply acuminated, and the columella is distinguished by a sharp winding plate. The ground colour of the shell is a reddish purple, the last whorl being particularly characterized by a thin ash-coloured epidermis sprinkled with light fulvous spots all inclining towards the lip, which is of a delicate flesh-pink.

4. DESCRIPTION OF A NEW SPECIES OF BOX TORTOISE FROM MEXICO. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Reptilia, Pl. II.)

In a collection of reptiles recently received from Mexico are two specimens of a Box Tortoise, which, beside differing from the common box tortoise of North America, in being of a more elongated form, both agree in two characters, which are not found in that species or in any other species of the genus; first, in having an additional vertebral plate; and secondly, in the hind feet being only armed with three large claws: there is no appearance of the fourth claw, and even scarcely any rudiment of the fourth toe found in the other specimens of this genus, and in all other *Emydeæ*.

This species will form a section or subdivision of the genus, which may be called *Onychotria*.



CISTUDO (ONYCHOTRIA) MEXICANA Gray



CISTUDO (ONYCHOTRIA) MEXICANA. Three-toed Box Tortoise. Shell oblong, dark-brown, pale, spotted and rayed, spot and rays sometimes confused.

Vertebral plates with a nearly continued keel, and with a small intermediate one between the usual fourth and fifth plates.

The hinder margin acute revolute.

The head pale brown; the legs yellow or orange spotted, with five unequal claws.

The hind legs brown, uniform, with only three large claws, the middle and the front one largest.

The sternum flat; the gular plates wide in front, and suddenly narrowed behind.

Hab. Mexico.

There was a specimen of the *Kinosternon scorpiodes*, and of the Gopher, *Testudo gopher*, in the same collection: the latter only differed from the usual North American specimen in being rather larger and blacker.

February 27, 1849.

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

The Secretary reported that he had received a letter from His Excellency Lieut.-Col. Butterworth, the Governor of Singapore, dated Jan. 6th, in which he was informed of the shipment of some additions to the Society's menagerie. The facilities possessed by Lieut.-Col. Butterworth for securing the most interesting productions of the Indian Archipelago cannot fail to render the interest which he takes in the progress of this Society of the greatest advantage to it.

The Secretary further stated that he had received information through the Chairman, that Mrs. Martin Stevenson, of Valparaiso, had received from Don Francisco Javier Ovalle a pair of young Pumas, captured on his estate of Catapilco, which he was desirous of presenting to this Society. Mr. and Mrs. Stevenson had obligingly provided for the custody of these interesting animals, until they were sufficiently mature to admit of their being transmitted to England.

The collection had been increased since the last meeting by three living examples of *Lemur rufifrons*, Benn., and one of *Nycticebus javanicus*.

The following papers were read:—

1. DESCRIPTION OF SEVEN NEW SPECIES OF MARGINELLA AND TWO OF CYPRÆA. BY JOHN S. GASKOIN.

MARGINELLA QUADRILINEATA. *Marg. testá oblongo-ovatá, palidè virescente, nitidá; lineis rufis quatuor, equidistantibus*,
No. CXCI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

transversis; basi rotundatá, lævi; aperturá latá anticè præcipuè; canali latissimo; labio lato, marginato, ultra apicem extenso; columellá anticè quadriplicatá, plicis duabus anticis concurrentibus canalem intermediam formantibus; apice oblito.

Shell oblongo-ovate, of an uniform, opaque, pale-greenish colour, highly polished, with four distinct, nearly equidistant, very narrow, uninterrupted, even, red lines or bands, surrounding the shell from the upper or outer edge of the incrassated margin of the lip, which continuing within the columella, extend over the earliest formation of whorls: these lines are equally conspicuous on the inside of the last whorl, and no doubt throughout the whole inside of the shell. The same pale-greenish colour pervades the inside as the outer part; base round and smooth; aperture wide, especially at the anterior portion, where the columella suddenly contracts in diameter, subspiral, curved posteriorly; channel very broad, which and the edge of the lip are subpellucid and whitish; at the anterior part of the columella are four prominent rather tenuous plaits: the first two conjoin and form the inner side of the channel; the two posterior are on the columella; between the inner side of the channel and the anterior third of the columella is a concavity; lip thick, smooth, extends beyond the apex, no trace of crenulation, strongly marginated, and the margin has its upper edge or rim of a darker colour than the shell; it proceeds over the arch of the channel, and becomes obliterated just above the third plait; apex imperceptible.

Long, $\frac{9.0}{100}$ of an inch; wide, $\frac{4.5}{100}$ of an inch.

Hab. — ?

The only specimens I have seen of this species are an adult shell in the cabinet of Mr. Metcalfe, and an adult and a young one in my own; all of which were brought to this country in H.M.S. the Samarang.

It cannot be confounded with any known species of *Marginella*; the four narrow conspicuous red lines or bands, the two anterior plaits being a bifurcation of the inner wall of the channel, the wide aperture, and general form of the shell are ample distinctives.

MARGINELLA PUDICA. *Marg. testá oblongo-ovatá, albidá, fasciis sex vel septem, transversis, continuis, pallidissimè viridi-fulvis; maculis distinctis pallidissimè brunneis interruptis; basi rotundatá; aperturá latiusculá; labio crasso, marginato, ultra apicem extenso; columellá quinqueplicatá; canali lato et profundo; margine interno labii minutè denticulato; apice lato, obtuso.*

Shell oblong-ovate, of a white colour, having six or seven very faint greenish-brown bands traversing the shell from the border of the aperture to the upper edge of the margin, interrupted by rather large, distinct, very light-brown spots or markings; these bands have between them broad white lines, which are the colour of the shell; the posterior end of the shell is in an evenly projecting ridge or varix, surrounding the spire; base round, colour of the shell; aperture rather wide, curved (bowed); lip thick, extending a little beyond the apex, as described in reference to the posterior portion of the shell; margin rather thick, and extending over the arch of the channel; the

columella is furnished with five plaits, the three anterior are prominent, especially the second, which extending over the base obliquely, forms a thickened varix; small obtuse denticulations exist along the whole inner edge of the lip; channel deep and wide; apex broad and obtuse.

Long, $\frac{2\frac{8}{10}}{100}$ of an inch; wide, $\frac{1\frac{8}{10}}{100}$ of an inch.

Hab. Central America.

Cab. Metcalfe, Gaskoin, Cuming.

In size, form, markings, fewer plaits, the denticulations on the inner edge of the lip, &c., separate this species from all others; its nearest affinity may be the *Marginella tessellata*, Lam., although even that affinity is very distant; in the size remarkably so.

MARGINELLA TRIPLICATA. *Marg. testá ovatá, ventricosá, fulvescente, lævi, nitidáque; aperturá angustá; labio tenui, inflexo, marginato; columellá anticè triplicatá; canali nullo; spirá subelatá, anfractibus distinctis, apice acutiusculo.*

Shell ovate, ventricose, of a general light fawn colour, without bands or other markings, smooth and shining; base round, aperture rather narrow; lip thin, much-inflexed, margined; three fine white plaits are situated at the anterior portion of the columella, equidistant; the first forms the termination of the columella, the second passes very slightly on to the base, in a parallel direction to the first, the third not at all so; these plaits convey an idea as though they were differently produced to those of the generality of the *Marginellæ*; that is, in not being formed on the columella, but as though the columella had been delved in itself, leaving the lines or plaits projecting; and the semblance of a fourth plait is given by the depth and abruptness of the notch beyond the third: channel none; spire slightly prominent, with distinct whorls; apex subacute.

Long, $\frac{3\frac{4}{10}}{100}$ of an inch; wide, $\frac{2\frac{0}{10}}{100}$ of an inch.

Hab. The Philippines, &c.

The gibbosity and sudden tapering of this shell, the uniformity of its coloration, in having but three plaits, and those at the anterior end of the columella, and its short but perfect spire, distinguish it from any species yet described.

I had intended, on determining to describe this shell, to have retained for it the appellation by which it is so well known to many naturalists and collectors—*Marginella angustoma*, although by whom so designated I have been unable to learn, it never having before been described nor figured; but finding afterwards that M. Deshayes had described and published a fossil species found at Grignon under that name, I am obliged to forgo my wish, and have called it from perhaps a more leading characteristic—*Marginella triplicata*.

MARGINELLA SERRATA. *Marg. testá elongatá, subcylindricá, pallidá; aperturá angustá; columellá anticè quadriplicatá; labio tenui, inflexo, valdè serrato dentibus sex vel octodecim; margine crasso; spirá subelatá, anfractibus distinctis, apice obtusiusculo.*

Shell elongated, subcylindrical, of a very light greyish colour, some-

times with light brown cloudings; base rather round, aperture narrow, columellar side nearly straight, with four nearly transverse equidistant plaits at the anterior portion, the first continuing to form the inner side of the channel, the second and the third passing obliquely forwards over the base, and the fourth in no degree so; lip slightly spiral, inflexed, thin, and deeply serrated at its entire edge, forming sixteen to eighteen teeth; margin thick, and continuous over the arch of the channel, and, like the lip, is of a lighter colour than the rest of the shell; spire somewhat prominent, whorls distinct; apex rather obtuse.

Long, $\frac{3.5}{100}$ of an inch; wide, $\frac{1.6}{100}$ of an inch.

Hab. The Mauritius.

Cab. Cuming.

This species approaches nearest in form to the *Marg. triticea* of Lam., but has a much narrower aperture, and the edge of the lip is strongly serrated its entire length.

MARGINELLA CONTAMINATA. *Marg. testá oblongo-ovatá, pallidè floris lactis colore; extus tenuissimè striatá; aperturá latá, labio crasso, columellá sexplicatá, plicis tribus anticis prominentioribus; margine lato, planulatoque; apice prominente obtusissimo.*

Shell oblongo-ovate, of an uniform pale cream colour, without bands or markings; internally the colour is somewhat darker; external texture of the shell is finely striated: the striæ terminate anteriorly at the thickened varix over the arch of the channel curving towards the columella, and in a similar manner at the edge of the white deposit around the spire; base round, aperture wide, slightly curved; on the columella are six or more white plaits, the three anterior being rather prominent, the first continuing to form the inner side of the channel; the second forms a varix on the base of the shell; the channel broad and deep; a white deposit exists on the columella within the aperture, which widens and thickens outwardly from about the anterior fourth of the aperture, covering the plaits and proceeding over the arch of the channel, forming there a ridge or varix at its posterior edge, and diminishing in width as it approaches the lip, along the whole length of which it continues forming a broad flat margin, and terminates around the spire, which is also covered by it: apex slightly prominent, very obtuse.

Long, 1 inch; wide, $\frac{5}{10}$ of an inch.

Hab. —?

Cab. Cuming, Gaskoin.

It differs from *Marginella cornea*, Lam., in its more elongated form, the number, distribution and construction of the plaits, in its broad, flat margin, in the thinness and planeness of the lip internally, the varix at the anterior part of the base, &c.

MARGINELLA LINEATO-LABRUM. *Marg. testá ovatá, lævi, anfractibus posticè rotundatis, pallidè flavescente, nigro lineato-punctatá; spirá prominente; basi rotundatá; aperturá latissimá; columellá quadriplicatá; labio crassiusculo, marginato,*

lineis octo vel novem transversis, supra labrum et marginem continuis.

Shell ovate, smooth, the whorls even (not crenulated), of a light yellow-brown colour, having on the last whorl nine rows of distinct small black spots, or short markings, obliquely longitudinally placed, the two posterior rows of which are continuous along the whorls of the spire even to the apex; spire very prominent, whorls rather gibbous; base round; aperture very wide; the columella has four white prominent plaits, the two anterior passing obliquely outwards, the first to form the inner elevated side of the channel, the two posterior are transverse; lip, slightly bowed, is thick and marginated, and has eight or nine nearly equidistant, dark-reddish, somewhat broad lines crossing its edge and continuing over the margin; margin continuous, but with much less thickness, over the arch of the channel, and with the first or anterior plait; channel broad and deep, obtuse.

Long, $\frac{6}{100}$ of an inch; wide, $\frac{3}{100}$ of an inch.

Hab. — ?

Cab. Cuming.

The only specimen I have seen of this peculiar species is not in fine condition; when so, it must be very beautiful. It differs from *Margarella Faba*, Linn., in the evenness of the shoulders of the whorls, its less attenuated form, and the linear markings of the margin, &c.

MARGINELLA PULCHERRIMA. *Marg. testá oviformi, fulvescente, fasciis albis quinque, angustis, transversis, maculis linearibus nigris, in centros fasciarum conspicuis; interstitiis fasciá primá ad secundam fasciam, tertiáque ad quartam, lineis plurimis tenuissimis fulvescentibus longitudinalibus notatis; aperturá albá, latiuscula; columellá quinque-plicata; labio tenui; apice distincto.*

Shell oviform, shining, of a light fawn colour, with five transverse, distinct, narrow, even, uninterrupted white bands surrounding the shell, from the edge of the lip, the two anterior terminating at the columellar edge of the aperture, the others proceeding inwards over the columella; the posterior is always the least distinct (conspicuous): floating, as it were, in the centre of these white bands, are very dark-brown or black, equidistant, linear markings or streaks, and similar markings in colour and form radiate obliquely on the slight ridge which encircles the spire: the spaces of the shell between the anterior band and the second, and between the third and the fourth, are occupied by numerous, fine, longitudinal and parallel light-brown lines, the other spaces between the bands are irregularly marked with the same colouring, varying in individual specimens, in intensity of coloration, especially in the middle space (that between the third and the fourth bands); base round; aperture white, rather wide, flexuous posteriorly; five plaits on the columella; the three anterior project; the first is continuous with the inner side of the channel, the second takes a similar direction behind it, passing obliquely over the base of the shell, and next this is a white varix following outside the aperture a similar direction, on which are four or five dark-brown spots; lip thin, no margin; apex perceptible.

Long, $\frac{20}{100}$ of an inch; wide, $\frac{14}{100}$ of an inch.

Hab. West Indies.

Cab. British Museum, Metcalfe, Gaskoin, &c.

Differs from the *Voluta catenata* of Montagu* (*Marginella* of others) in having but four distinct, and one rather obscure, bands; in these being uninterrupted, and the linear markings floating in their centres, and not linking interrupted or disjointed portions of the bands, as in *M. catenata*; in the dark colour, and the more oviform shape. I have hitherto found this species among parcels of *Marginella sagittata* of Hinds.

CYPRÆA CRIBELLUM. *Cyp. testâ subcylindricâ, lævi, albâ, bruneo omnino obtectâ, præter maculis numerosis, testâ concoloribus, ferè circularibus, inæqualibus et irregulariter dispensatis; marginibus bruneo-rufescente punctatis; basi subplanulatâ, albâ; aperturâ latâ, præcipuè anticè; columellâ ventricosiusculâ; dentibus labii prominentibus, æqualibus, circa quindecim; dentibus columellaribus subobsoletis (præter dente primo) circa duodecim; dente primo majus prominente deinde anticè est incisura profunda; sulco columellari nullo, extremitatibus anticis leviter productis, externè valdè convergente; canali lato et profundo; extremitatibus posticis obtusis; canali postico lato, aperturâ rectè continuo; margine externo incrassato; spirâ latè umbilicatâ.*

Shell subcylindrical, smooth, white, covered by a dark-brown coating except at numerous nearly circular white spots, of unequal sizes and irregular distribution, thus leaving at those spots the colour of the shell to view; the line of meeting of the two mantles of the mollusc on the dorsum is generally perceptible; internally of a brown colour; outer edge of the margin more or less dotted with rather large dark reddish-brown dots, similar dottings, but less in degree, on the columellar side of the base; base rather flat, white (white deposit, on the centre of the columellar side, semitransparent); aperture wide, especially anteriorly, inner edge of the lip spiral; columella slightly ventricose; teeth on the lip prominent, even, extending partly on to the base, about fifteen in number, those on the columella very slightly prominent (excepting the first), not extending on the base,—about twelve in number; the first greatly projects, between which and the inner anterior extremity is a deep notch,—no columellar groove,—and at the posterior half of the aperture the teeth exist along the outer, those on the inner edge being mere indications of teeth; extremities, anterior very slightly produced, the outer one converging greatly; posterior extremities obtuse, very slightly produced; channels, anterior wide and deep, posterior rather wide and in a straight line with the aperture; margin, only on the outer side, incrassated; spire widely umbilicated.

Long, $\frac{14}{20}$ of an inch; wide, $\frac{9}{20}$ of an inch.

* Which I believe to be a West Indian production only, and not as Montagu was led to suppose, a British species. I have found the *Marginella catenata* frequently among the small West Indian *Marginellæ*, as have many others, and from no other source did Montagu himself obtain it.

Hab. Mediterranean Sea.

Cab. Gaskoin, Saul, &c.

This species differs from *Cypræa Cribraria* of Linn. in the general conformation of the shell, being more cylindrical, in its short, obtuse extremities, its wide aperture, particularly anteriorly, the large dottings on the margin, the character of the teeth, the internal colour of the shell, &c.

CYPRÆA PULICIS VARIETAS. *Cyp. testâ longiore, dentibus numerosioribus minutioribusque, supra labrum circa viginti-novem, supra columellam circa viginti-tribus; canali postico denticulato.*

Shell longer in form, of a light reddish-brown colour, aperture narrower and straighter, teeth finer and much more numerous than the ordinary form, being about twenty-nine on the lip, while the prototype has about nineteen, and on the columella side, about twenty-three, against from fourteen to seventeen; posterior channel more or less denticulated.

Hab. —?

Cab. Cuming, Gaskoin.

2. DESCRIPTION OF A NEW SPECIES OF NUTCRACKER.

BY JOHN GOULD, F.R.S. ETC.

NUCIFRAGA MULTIPUNCTATA, *Gould.*

Crown of the head and nape of the neck brownish black; feathers of the face, sides of the neck, back, chest and abdomen brownish black, with a broad and conspicuous mark of dull white down the centre; wings glossy greenish black, the coverts and secondaries with a lengthened triangular mark of white at the tip, a faint trace of a similar mark appearing on the tips of the primaries; tail glossy greenish black, the two centre feathers slightly, the next on each side more largely, and the remaining three extensively tipped with white, the extent of the white increasing as the feathers recede from the centre; under tail-coverts white; upper tail-coverts and thighs striated with white.

Total length, $14\frac{1}{4}$ inches; bill, $1\frac{7}{8}$; wing, $8\frac{3}{4}$; tail, 7; tarsi, $1\frac{5}{8}$.

This species exceeds in size both the *N. caryocatactes* and *N. hemispila*, but at the same time has a smaller and more slender bill than either of those birds; it also differs from both of them in its lengthened and cuneiform tail; it has a greater quantity of white on the apical portion of the tail-feathers than the European species, but less than is found in the *N. hemispila*; the white markings of the back and the entire under surface are also much larger and more numerous than in either of the other species, and are most remarkably developed on the scapularies.

The only specimen I have seen of this fine species is in the Museum of the Philosophical Society at York; its precise habitat is unknown, but as other species which were certainly from Simla in India accompanied it, we may reasonably conclude it was from that country.

3. NOTES ON THE DISSECTION OF THE PARADOXURUS TYPUS,
AND OF DIPUS ÆGYPTIUS. BY H. N. TURNER, JUN.

Having received, through the liberality of the Society, a few of the animals that have died in the menagerie in the course of the present winter, I feel bound to lay before them, as well as I may be able, whatever details of structure I observe which may be new, or may give rise to ideas calculated to assist in the advancement of the science. Since the Society have done me the honour to insert in their Proceedings the somewhat lengthened communication which I was last permitted to lay before them, I hope that the remarks I have now to offer, some of which have a bearing on the same subject, may also prove acceptable.

It formed part of my object in that paper to demonstrate that the Viverrine group, (of which the Paradoxuri are now universally admitted to form a part,) are so closely allied to the Cats as to safely warrant their being united with them in one family, instead of being looked upon as a section intermediate to the canine and feline groups, or, on account of their number of tuberculous molars, more closely allied to the former, in which light they have very frequently been considered: and I think it will be apparent, from the observations I have now to bring forward, that the genus *Paradoxurus*, one of the least exclusively carnivorous of the order, and formerly associated with the Bears in the plantigrade division, has a much closer relationship with the group, which, from its being pre-eminently carnivorous, is usually considered as "typical" of the order, than naturalists have been wont to anticipate. It is not unfrequently the case, that when an affinity between two species or genera is established upon essential peculiarities of structure, certain minor details, or even habits and actions of the animal, remind one so forcibly of the relationship we have already proved to exist, that they assume an unlooked-for degree of interest; and, having kept for some time a living specimen of the common *Paradoxurus*, I think a few of the observations I have made upon it may on this account be interesting, in connection with the structural peculiarities which the receipt of a dead one has enabled me to remark.

The claws are as retractile as in the domestic Cat, although from the absence of the long and soft hair, with which the sides of the toes are clothed in the latter animal, they are fully exposed when in the retracted position. But on examining the claws of the Paradoxure, it becomes obvious that the raising of the point from the ground is not the only means employed by Nature to maintain their sharpness. Every one must have observed in the common Cat, as well as in the larger species preserved in our menageries, the habit of occasionally scratching or dragging with the claws against the surface of any hard substance, a process not apparently calculated to improve their sharpness, but obviously intended to aid the shelling off of the outer layer of the claw, which is continually renewed by growth from the root, and the blunted point is thus occasionally replaced by a new one. I have not observed this habit in the living *Paradoxurus*; but on examining the claws of the dead one, I noticed that some of them were

much larger than others, these being worn and blunted at the point, while the smaller ones were sharp; also that the series of claws on each foot were irregular as to their sizes, and that the corresponding claws on the opposite feet in some cases differed greatly in size; so that it would appear, that in the absence of the scratching propensity, the claws scale off naturally, and to a much larger extent at a time than in the Cats. I have occasionally noticed my living specimen with a claw apparently loose, but the casting off of the outer layer of the nail is a difficult thing to verify by actual observation.

On one occasion, my specimen having escaped from his cage, on my seizing him by the neck for the purpose of replacing him therein, he made use of his claws to defend himself, just as a cat would naturally be expected to do; while it is well known that any animal of the dog tribe, being seized in that manner, is helpless, having no instinct prompting him to make use of his extremities against his captor; in this tribe also the paws are never used for seizing, but only for the purposes of locomotion, and to steady the prey upon the ground, while the teeth perform their office. The positions sometimes assumed by the *Paradoxurus* in a state of repose, also resemble those of the cat; for instance, it frequently lowers the body between the fore-paws, approximating the shoulder to the foot, while the elbow remains raised by the side: the canine animals, on the other hand, *never* crouch without applying the elbow to the ground. The *Paradoxurus* again resembles the Cat in the habit of occasionally bending the head vertically beneath the neck while asleep, a position never assumed by the Dog.

In all the anatomical characters which in my former communication I assigned to the Felidæ (in which family the viverrine section is included), the *Paradoxurus* fully agrees; those presented by the generative and odoriferous organs are the most remarkable. There is no true musk-bag, simply the two discerning pouches situated one on each side the anus, which are so common among the carnivora. In addition to these, there is at the base of the prepuce, an oval, flat, naked space, which is not simply a secreting surface, as stated by Mr. Gray in a paper contributed to the Proceedings a few years back, but contains a number of minute orifices, each opening into a somewhat cylindrical glandular sac: these are arranged vertically side by side, and, together with the anal pouches, secrete the substance which imparts to the animal its characteristic odour. The generative organs are altogether very largely developed; the prostate is large, of a slightly lobulated form, and the urethra passes obliquely through its centre. Cowper's glands, whose presence is characteristic of the Felidæ, are remarkably large, causing a prominence externally posterior to the scrotum; and, as usual in the family, each is surrounded by a powerful muscular envelope, which is at least an eighth of an inch in thickness; the fibres converge to a tendinous portion, which extends, from the point where the duct issues, some distance on each side of the gland; the size of these organs altogether is about equal to that of the testes. The length of the penis, from the orifices of Cowper's duct to the meatus urinarius, is a little more than three inches; it is

perfectly flexible in every part, and therefore the os penis must be either very minute or wanting; this is another feline character, since in the Bears and Weasels, as well as in the Dogs, the bone forms a considerable part of the organ. The glans is cylindrical, it tapers a little for about six-tenths of an inch, then terminates suddenly in a small conical point, in the groove around the base of which is situated at the lower part the urethral orifice. The body of the glans has a slight median groove beneath, and its whole surface is covered with horny spines directed backwards. Cuvier, who alludes to a similar peculiarity in the Cats, makes no mention of it, either in the *Ichneumon*, the *Civet*, or the *Hyæna*. Its existence is therefore an interesting mark of affinity between two genera apparently so dissimilar, although, from its inconstancy, it will not serve as a character of the family. In the *Paradoxurus* the spines are minute, very numerous, and regularly distributed*.

The same organs in the *Jerboa* present some peculiarities worthy of notice. I will observe, in addition to what has before been described, that Cowper's glands are each curved upon itself in a manner similar to the *vesiculæ seminales*. The two sharp-pointed bony stylets with which the upper part of the glans is armed, and which have been mentioned by authors, arise about the middle of the dorsum of the glans, one on each side of a prominence of its substance; they are gently curved, and rather suddenly pointed at the end. In the recumbent condition they incline a little towards each other, just overhanging the extremity of the glans, and bear some resemblance to the pointed lower incisors of some small Rodent. The glans itself appears tripartite at the extremity, there being a deep fissure running the whole length of its under surface, and just at the extremity another on each side: at the meeting-point of the fissures is the urethral orifice. Just behind the origin of the bony stylets the presence of a small ossicle can be distinctly felt within the substance of the glans.

A very remarkable peculiarity in this little animal is, that amidst the long white hairs which clothe the lower part of the foot is a small sharp horny spike, situated just below the base of the middle toe, as if it were intended to enter the ground, and thus prevent the animal from slipping when it alights. This I have reason to believe is not generally known, although it must I think be alluded to by Dr. Shaw in his *General Zoology*, since he there remarks, "There is also a very small spur or back-toe, with its corresponding claw:" and subsequently adds, "nor does any vestige of it appear in the figure given by Dr. Pallas of the skeleton." This may well be, since it is simply a cutaneous development, having no connection with the skeleton whatever. I have looked at the specimens of the *Jerboa* in the British Museum, but in

* Since the above was written, I have received the body of a male *Coatimondi*. I alluded to that animal in my former paper, as being placed by Cuvier among the list of those possessing the *vesiculæ seminales*, which, I observed, required confirmation. I can now assert that they do not exist; the walls of the *vasa deferentia* are swollen immediately before these vessels enter the urethra, and the prostate has a more sudden projection at its upper end than I have observed in the musteline animals that I have dissected. The absence of the *vesiculæ seminales* is then a constant character of the true *Carnivora*.

consequence of their being dried and mounted, the little appendage, which is concealed by the hair, was not to be perceived; but in the *Alactaga*, as well as the same circumstances would permit, I could see that a little horny process existed, but was rough and blunt.

In the dissection of an animal whose only mode of progression consists of leaping with the hinder extremities, and which differs from the other jumping Mammalia in the circumstance, that in the position of rest the extremity only of the metatarsus is applied to the ground, the muscles of the leg may be expected to afford some points of interest. The most striking of these are, that none of the muscles situated upon the tibia remain fleshy for more than about half the length of that bone, each terminating in a long tendon; and that upon the foot itself there are no muscles whatever, the actions of the flexors of the toes being relieved by a strong ligament, which arises from the os calcis, and divides into five, giving one to the middle toe, two small sesamoid bones being developed in it; and two divisions to each of the other toes, the index and the annularis, each of which has also its sesamoid bones, those furthest from the axis of the foot being rather largely developed, extending some distance over the sides of the articulation. The ligament near its origin contains three little supernumerary bones, one on the outer, two on the inner side; the latter are grooved for the passage of the tendon of the flexor perforans. On the homology of this tendon I have next to remark. It might very naturally be expected, that in animals having no thumb on the hinder extremity, and in which the fibula is in great part wanting, the flexor longus pollicis, which in man has its origin in the fibula, would be either much reduced or absent; but so far from such being the case, it will be seen, on reference to any work on the comparative anatomy of the muscular system, that this muscle exists, and that its tendon becomes entirely confluent with that of the flexor longus digitorum. But further, I think it will appear that in those lower Mammalia, in which the thumb or the fibula, or both, are wanting or imperfectly developed, it is the flexor longus digitorum that is reduced in size, and the flexor longus pollicis that becomes the principal muscle acting on the toes. The dissection of the *Jerboa* made this homology very evident. The large flexor muscle which gives the perforating tendons to the toes arises, as may be expected, partly from the tibia as well as from the fibula; but it is distinctly shown to be the flexor longus pollicis, from the fact that its tendon passes through a distinct sheath, separate from and posterior to that which contains the tendons of the other two muscles, namely the flexor longus digitorum and the tibialis posticus. Of these, which are both very small, the former shows its homology most clearly, by arising from the surface of the tibia, immediately below the insertion of the popliteus. The tibialis posticus is an extremely minute and delicate muscle, arising only from the tibia.

In the Rabbit the two perforating flexors form a single muscle, having the proper origins of both; lower down they become to a certain extent separable, but the tendons are completely reunited *before* they pass the ankle, which they do in the place belonging to the

flexor longus pollicis. This compound muscle, occupying the whole posterior surface of the bones of the leg, so pushes round the tibialis posticus, that it takes the chief part of its origin from the inner side of the tibia, which in Mammalia generally is free from muscular attachment. In the *Paradoxurus* I found that the flexor longus digitorum has, in addition to its usual attachments, a point of origin in the head of the fibula; but then the bones are separate, and the flexor longus pollicis is a distinct muscle, having also origin in both bones, and each tendon passes the ankle in its usual place*.

March 13, 1849.

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

The Secretary reported that a living specimen of *Herpestes fasciatus*, Desm., and *Celogenys paca*, Linn., had just been added to the Society's collection. The former animal was exhibited to the Meeting.

The Secretary directed attention to a small series of skins of Mammalia and Birds collected in Ceylon and Sennaar by Aubrey Paul, Esq., the species of which were briefly noticed by Mr. Gray and Mr. Gould.

The following papers were read:—

1. NOTICE OF A PECULIARITY OF STRUCTURE OBSERVED IN THE AORTA OF THE WILD SWAN. BY JOHN DAVY, M.D., F.R.S. L. & E., INSPECTOR-GENERAL OF ARMY HOSPITALS, ETC. (COMMUNICATED BY MR. GULLIVER.)

When engaged in examining anatomically this bird (a full-grown female, killed in the neighbourhood of Chatham in February 1839), my attention was arrested by a peculiar appearance in the inferior portion of its aorta, which I shall briefly describe with the hope of leading to further inquiry. Before the ischiatic arteries are given off, the aorta is comparatively large and is enveloped externally in a dense fibrous coat, possessing very little elasticity: below the origin of these

* Since writing the above I have taken opportunities of looking at the same muscles in a Fox and in a Monkey (*Cercopithecus pygerythrus*). The former animal differed from the *Paradoxurus*, and resembled the Jerboa, in the great extent of the flexor longus pollicis and the much-reduced size of the tibialis posticus, which here also terminates in a long slender tendon, showing an interesting correspondence of adaptive character in two animals, in which the motion of the hind-limbs is vigorous, but of one kind only. In the Monkey the flexor longus pollicis is a much larger muscle than the flexor longus digitorum, and has considerable attachment to the tibia.

Meckel and Cuvier allude to the union of the two long flexors in the Rabbit before they pass the ankle, but neither author informs us at which point that takes place.

arteries, the trunk of the aorta suddenly becomes small, and continues small and tapering to its termination; and this change is accompanied with an alteration in the structure of its external coat. In place of a dense fibrous envelope, it is now sheathed in a substance very like muscular fibre, and which from its properties I believe to be a muscular layer. It is of some thickness, of a reddish hue, slightly elastic, easily broken, and divided by a ligature and easily separated into longitudinal fibres of considerable length. Under the microscope each filament appears to be composed of nearly parallel fibres of extreme delicacy, and destitute of those peculiar markings which belong to the fibres of the voluntary muscles generally and to some of the involuntary. Moreover, when placed in a warm damp atmosphere, at a temperature between 80° and 90° Fahr., it rapidly putrefies and is reduced to a poultaceous or semifluid consistence. These properties seem to characterize it as a muscular structure; I would not dwell on any one in particular, but rather on the assemblage of them. An attempt of late has been made to revive the old doctrine of the muscularity of the middle coat of the arteries, founded almost exclusively on microscopical appearances. The structure described above, I consider not of the nature of the middle arterial coat, believing that that coat is not truly muscular, but rather of the nature of the muscular coat of the intestines, to which, in point of colour, consistence, the effect of a ligature, its microscopical appearance and proneness to putrefy, it is so very similar.

If this structure be admitted to be muscular, it may be viewed as accessory and of a use similar to that of the accessory hearts of the Chimæra and Torpedo, and destined to some peculiarity of function which further research is required to determine.

Before concluding this notice, I may mention incidentally that I availed myself of the opportunity afforded by this Swan to examine the air contained in its osseous air-cells. I found it to be composed of about 83·3 per cent. azote, and of 16·7 per cent. oxygen, tested by means of lime-water and phosphorus. It was collected from the cells belonging to the cervical vertebræ,—cells by means of which this part of the bird is happily buoyant, floating in water, even when deprived of its feathers and integuments and detached from the trachea. And, further, I may mention, which was new to me, that its large intestine is almost as amply provided with villi as its small; and that even the isthmus or narrow neck of each of its large cæca is similarly provided with villi. Some other animals, especially birds, may be analogous in this respect; but in no other instance in which I have yet examined the large intestines in search of villi have I found them.

2. NOTES ON THE SKULL OF EQUUS HEMIONUS AND EQUUS KIANG. BY J. E. GRAY, ESQ., F.R.S.

Mr. Hodgson has lately sent to the British Museum three specimens of the Horse, which he had described under the name of *Equus Kiang*; unfortunately they were so destroyed by insects during their passage from India, that it was impossible to preserve any part of them except the skull and the bones of the limbs.

As a doubt had arisen as to the distinction of this species from the Hemione, *Equus Hemionus*, of Kutch, I have compared these skulls with the skull of the latter belonging to an imperfect skeleton, which was kindly presented to the Museum, with the skin, by the Earl of Derby, from an animal which lived some time in Knowsley Park.

The forehead of all the three specimens of *E. Kiang* is rather convex between the eyes, and the centre of the face is narrow and keeled on the sides; while in the skull of *E. Hemionus* the forehead is flat between the eyes, and the centre line of the face is rather broader and rounded gradually off on the sides, and the incisive bone is longer and more gradually arched, making the incisor more perpendicular in the latter than in any of the former.

But the most distinctive character between the four skulls is in the position of the infraorbital foramen. In *E. Hemionus* it is high up, about one-third the space between the face-line and the back edge of the teeth; it is far back, being directly over the front end of the cheek-ridge and the back edge of the third grinder: while in all the three specimens of the skulls of *E. Kiang* this foramen is lower down, being nearly in the centre of the space between the face-line and the base of the teeth, and it is placed in a line over the back edge of the second grinder, some distance in front of the end of the cheek-ridge.

The under surface of the body of the posterior sphenoid is narrow and convex in *E. Hemionus*, and broad and flat in *E. Kiang*. The vomer is much more compressed in the latter than in the *E. Hemionus*.

I am not certain that the distinctions here described may be sufficient to show that these two animals are separate species, but they indicate the necessity of the subject being more fully examined.

In the position of the suborbital foramen the *E. Kiang* more nearly resembles the *E. asinus*, and the *E. Hemionus* that of *E. Zebra* and *E. Burchellii*.

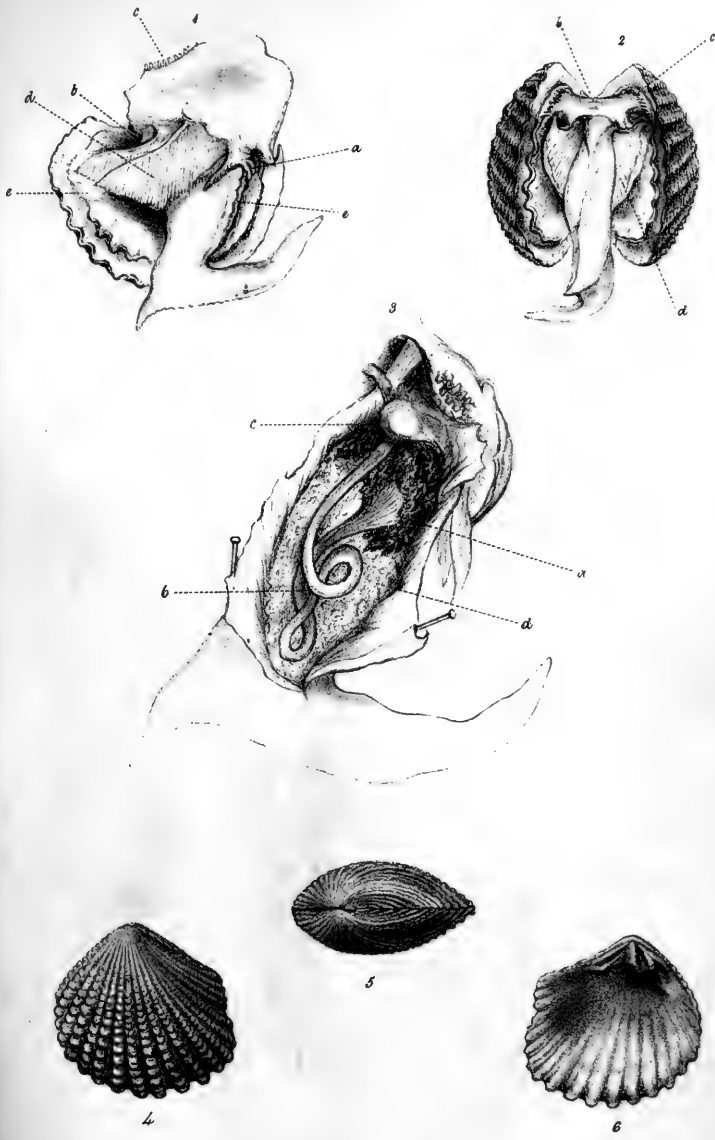
Two of the skulls of the *E. Kiang* show the small rudimentary grinder in front of the other; but this tooth is to be more or less distinctly observed in the skulls of the other *Equidæ* in the Museum collection. I may observe, that in the skull of *Equus Burchellii* in the British Museum collection, this tooth is placed on the inner side of the first true grinder.

3. DESCRIPTION OF THE ANIMAL OF TRIGONIA, FROM ACTUAL DISSECTION. BY G. HUXLEY, ESQ., R.N., WITH AN INTRODUCTORY NOTE BY PROFESSOR E. FORBES, F.R.S. ETC. ETC.

(Mollusca, Pl. III.)

The accompanying account of the animal of *Trigonia* was forwarded to me by Mr. Huxley, Assistant-Surgeon to the Rattlesnake, now surveying in the Eastern and Australian Seas, under the able command and scientific zeal of Capt. Owen Stanley.

The great number, beauty and geological importance of the species of this interesting genus have made especially valuable a knowledge of the structure of its animal. Quoy and Gaimard were the first to give any account of it, and a figure and description of the animal of



T.H. Huxley.
W.R. Bailey.

Hulman del. & Walton
Lithographers.

1. 2. 3. TRIGONIA PECTINATA. p 32.
4. 5. 6. TRIGONIA JUKESII.



Trigonia were published from their drawings and notes in the zoological division of the Voyage of the *Astrolabe**. Since then I am not aware of this curious creature having been re-observed, though much has been written respecting its systematic position. As in such a case a verification of the evidence we possess, through a new and accurate set of observations, is of almost as much importance as the description of an unobserved animal, the Zoological Society may consider Mr. Huxley's notes in the light of a valuable contribution to malacology.

Both accounts confirm the idea suggested by the shell of its position among the *Arcaceæ*, and its close affinity with *Nucula* and *Arca*. The degree of union of the mantle-lobes, and the development of siphonal tubes in this family, as among the neighbouring *Mytilidæ*, is of generic and not sectional significance.

I add the description of the animal given by the French naturalists for comparison:—

“L'animal a le manteau ouvert dans les trois quarts de sa circonférence inférieure. Il est frangé sur ses bords, avec de petites taches ou lunules blanches qui alternent avec des stries rayonnées. On voit, au sommet de ce manteau, les impressions denticulées de la charnière, et en avant et en arrière, les muscles qui unissent les valves. Le pied est grand, robuste, sécuriforme, très recourbé en arrière, tranchant et denticulé sur son arête, de chaque côté de laquelle sont des laciniures, au tiers antérieur seulement. Il ne nous a pas paru se dilater comme dans les muscles. Les branchies sont grandes, libres, subtriangulaires, en pointe, reposant, de chaque côté de la racine du pied, leur doubles lamelles. Les palpes buccaux sont excessivement petits, réunis dans une partie de leur étendue. L'anus est à l'extrémité d'un court pédicule. La disposition du manteau et le manque de tubes rapprochent ce mollusque de celui des *Nucules*, dont il diffère cependant par la disposition des branchies et la brièveté des appendices de la bouche.”

Description of Trigonia.

The mantle-lobes are rounded and plaited, to correspond with the ribs of the shell. The edges of the mantle are marked with white spots; posteriorly, opposite the anus they are provided with short convex appendages. The mantle-lobes are disunited throughout, not joining until they reach the upper surface of the posterior adductor, some distance above the anus.

The gills are somewhat triangular, extending backwards almost horizontally on each side of the visceral mass. Each gill is formed of three stems, fixed at one extremity, free and pointed at the other, and giving attachment throughout their whole length, on one side to depending filaments, which become shorter as they are more posterior. The filaments are formed of a tubular horny thread, supporting on one side a broad membranous fringe. I could perceive no trace of vessels in this fringe, but it appeared to be covered by an epithelium (ciliated?).

* Vol. iii. p. 476, Mollusques, pl. 78. f. 5.

The mouth is placed at the anterior and superior part of the animal, between two thickish horizontal lips. The labial tentacles are two on each side, rather long, lanceolate, and slightly pectinated. The anus is placed posteriorly and superiorly between the gills, and just about the posterior adductor muscle.

The so-called "foot" is composed of two portions, an upper and quadrilateral (properly the abdomen), and a lower pointed part (the true foot), the two being set at right angles to one another.

The first portion is sharp-edged and slightly pectinated posteriorly, marked by a groove bounded by two folded lips anteriorly. The second portion is slightly pectinated along its lower edge, pointed anteriorly, prolonged behind into a curved process, where it joins the superior portion.

Visceral mass.—The mouth opens by a very short œsophagus into a wide pyriform stomach, surrounded by a dark dendritic liver. The stomach narrows into a long intestine, which descends for the whole length of the abdomen, and forms one or two loops in the substance of the generative gland; then passes up again above the stomach, penetrates the heart, and passing between the two small lateral muscles of the foot, terminates in the anus.

Fig. 1. View of the animal with the right valve of the shell removed, and the right lobe of the mantle turned back. *a*, mouth; *b*, anus; *c*, filamentous appendages of mantle; *d*, gill; *e*, grooved superior part of foot.

Fig. 2. View of the animal from behind, with the valves separated. Letters as before.

Fig. 3. Visceral cavity laid open. *a*, stomach, surrounded by the liver; *b*, intestine; *c*, heart; *d*, generative gland.

March 27, 1849.

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

The Secretary communicated to the Meeting a letter which had been addressed to the Council by Sir Roderick Impey Murchison, G.C.St.S., &c. &c., in which he gave the gratifying intelligence of his having been assured by the Count Kisselef, Minister of the Imperial Domains of Russia, that if it was possible to obtain another Male Aurochs, it would afford his Excellency the greatest pleasure to receive the high command of His Majesty the Emperor for its transmission to the Society. Although the communication of Count Kisselef did not amount to an absolute promise, Sir Roderick expressed his conviction, that with so earnest an intention of assisting the Society on the part of the confidential Minister of his Imperial

Majesty, there was still a chance of the Aurochs again living and reproducing its species in Britain.

Letters had also been received from M. Westerman, M. Vekemans, the Hon. C. A. Murray, A. N. Shaw, Esq., and H. N. Tweedie, Esq., Corr. Members, relative to collections already made or to be expected from Egypt, Bombay, and Hayti.

The following paper was read:—

MONOGRAPH OF THE LARGE AFRICAN SPECIES OF NOCTURNAL LEPIDOPTERA BELONGING OR ALLIED TO THE GENUS SATURNIA. BY J. O. WESTWOOD, F.L.S. ETC.

(Annulosa, Pl. VII. VIII. IX. X.)

Linnæus, in pursuance of the plan which he generally adopted, of placing the largest species of any group at its head, introduced as the first species of the Nocturnal Lepidoptera (the whole of which constituted in his System but one genus, *Phalæna*) those gigantic moths of which the *Phalæna Atlas* may be considered as the type, distinguished both by himself and Fabricius by the character "*alis patulis*." Placed thus at the head of this great division, and being in themselves some of the most gigantic and at the same time most beautiful of the insect tribes,—valuable also to the human race on account of the product obtained from several of the species,—I have thought that a synopsis of the African species (a considerable number of which are now for the first time described and figured, and several of which, being inhabitants of Southern Africa, appear as likely to afford a supply of silk as their Indian relatives,) would not be without interest.

So little however has hitherto been effected in the classification of the nocturnal exotic Lepidoptera, even of the larger species, and in fact so completely have the chief characters, on which a real distribution of these insects can alone be established—I allude more especially to the arrangement of the veins of the wings and the transformations of the insects—been neglected, that it is impossible, without a revision of the whole of the family *Bombycidae*, to arrive at the most satisfactory plan of arrangement of a geographical selection of the species. It will however not be useless to notice the attempts which have been made relative to the arrangement of these insects. Dr. Boisduval, in his 'Genera et Index Methodicus,' has divided the Heterocera into a number of tribes of equal rank, amongst which is the *Saturnides**, characterized thus: "Larvæ obesæ arboricolæ, segmentis prominulis, modo tuberculis piligeris, modo spinis verticillatis vel pennatis instructæ. Folliculum tenax. Alæ patulæ latæ sæpius macula ocellari vel diaphana ornatæ: lingua nulla." The tribe comprises the single genus *Saturnia* of Schranck and Ochsenheimer (*Attacus*, Germar), with the four European species *Pyri*, *Spini*, *Carpini*, and *Cæcigena* as its types. The characters given by Boisduval are sufficiently precise, but those obtained from the peculiar structure of the

* Op. cit. p. 73.

antennæ and of the veins of the wings, which Boisduval has not noticed, are far more distinctive. M. Boisduval's next tribe, *Endromides*, is a very artificial one, consisting of the two genera *Aglaiia* and *Endromis*, which possess but little in common: *Aglaiia Tau*, in fact, possesses the broad, flat, pennate, male antennæ of *Saturnia*, with which it also agrees in each joint emitting four branches, two at the base and two at the apex, the latter pair being shorter and more slender than the former; moreover, each branch of the former pair has its fore-margin fringed with very delicate hairs, directed of course to the tip of the antennæ, and its apex is furnished with two stronger bristles, also extended in the same direction, and each of the latter pair of branches has its hinder margin similarly fringed, the hairs of course being directed towards the base of the antennæ, and nearly meeting the opposite row of hairs supplied by the basal branches of each joint. This very peculiar structure, also possessed by the giant *Saturniæ* (alone, as I believe), has not been previously noticed by any writer with whose works I am acquainted, and would most probably afford physiological peculiarities of much interest. The veins of the wings of *Aglaiia* are also disposed on the same general plan as in the *Saturniæ*, namely the apical portion of the fore-wing is traversed by six branches, three arising from the great median vein and three from the post-costal vein, the two hindermost of the latter uniting together near the middle of the wing: there is however this difference between the wings of *Aglaiia* and *Saturnia*; namely, that whereas in *Saturnia* the first branch of the post-costal vein is very minute, consisting of a scarcely visible, almost transverse veinlet, occurring halfway between the tip of the costal vein and the extremity of the wing, in *Aglaiia* this first branch of the post-costal vein is longer than all the rest, arising at about one-third of the length of the wing from the base. Thus *Aglaiia* and *Saturnia* agree in possessing a simple costal vein, a post-costal vein with five branches, a median vein with three branches, and a simple anal vein. We also find that, like *Saturnia*, all the wings in *Aglaiia* are marked in the middle with an eye-shaped spot. Boisduval however appears to have considered that the transformations of *Aglaiia* were the chief grounds for separating it from the *Saturnides*: he describes the larvæ of *A. Tau* as "rugulosæ, per juventutem spinigeræ; adultæ muticæ. Folliculum sub-nullum. Puppa muscis vel foliis demortuis obtecta*."

From the preceding considerations I am induced to regard *Aglaiia* as belonging to the same subsection or tribe as *Saturnia*, considering the differences of metamorphosis existing between them as more than counterbalanced by the striking similarity of their more important characters in the perfect state. As to the connexion between *Aglaiia* and *Endromis*, proposed by Boisduval, I cannot consider it as possessed of any real existence, *Endromis* having a totally different arrangement of the wing-veins, the apical portion of the fore-wings being traversed by seven branches, namely four arising from the median vein, and three simple ones arising from the post-costal vein, the

* Op. cit. supr. p. 74.

wing being furnished with a simple costal, a 5-branched post-costal, a 4-branched median and a simple anal vein. Now this is the typical number of branches which a lepidopterous wing ought to possess, according to the theory of Mr. Edward Doubleday, that we are to suppose the existence of a discoidal vein traversing the middle of the discoidal cell, and that this discoidal vein, as well as the post-costal and median, are respectively furnished with three branches. According to this theory therefore, the two branches of the post-costal vein which run to the tip of the fore-wing of *Endromis*, together with the first branch traversing the front of the disc of the apical portion of the wing, are the only real branches of the post-costal vein; the two following branches of the post-costal vein, as I have regarded them, and the first branch of the median vein, are the branches of the supposed discoidal vein, and the three remaining branches of the median vein are its only true branches. I do not intend in this place to enter into a detail of the reasons which induce me to refuse assent to this theory; I may however observe, 1st, that with regard to the functions of these branches, it is evident that the fourth branch of the median vein, where present, must form a portion of the system of circulation effected by the branches of the median vein, just as in like manner the three branches of the post-costal vein of *Saturnia*, which traverse the apical portion of the fore-wing, must be considered as effectually forming a portion of the post-costal vein; 2ndly, that it seems to me contrary to analogy to admit the existence of fully-developed branches of a vein, the base of which has no real existence; and 3rdly, that instances occur (e. g. *Psyche Stettinella*, *Cochleophasia tessellea*) in which the number of branches exceeds the supposed typical number of nine (i. e. three post-costal, three discoidal, and three median), those insects having ten branches, in which case one of the veins must have an extra branch; whilst in *Saturnia* for instance, the supposed discoidal vein can only have two branches,—hence I see no reason why cases may not be supposed in which one vein should have more, and another vein fewer, than the typical number of branches; or, in other words, why the median vein in *Endromis* should not have four branches, whilst there are only five branches for the post-costal and supposed discoidal veins.

The antennæ also of *Endromis*, as well as its transformations, are quite different from those of *Aglais* and *Saturnia*; indeed the tribe *Endromides* of Boisduval seems to possess no single connecting character.

Hübner, in his 'Verzeichniss bekannter Schmetterlinge*', has attempted an arrangement of these insects which appears to me unnatural, so far as the primary divisions are concerned, whereas his inferior groups (*Coitus*), founded almost entirely upon the form and marking of the wings, appear to bring together the closely allied species. His first tribe of the Bombycoid Nocturnal Lepidoptera is termed *Sphingoides*, and contains five stirpes:—1st, *Dimorphæ* (*Endromis*, *Chaoxia*, *Petasia*, &c.); 2nd, *Ptilodontes* (the Prominent Moths); 3rd,

* Augsburg, 1816, 8vo.

Andriæ (*Stauropus*, *Cerura*, &c.); 4th, *Platyptericides* (*Drepana*, *Platypteryx*, &c.); and 5th, *Echidnæ*, composed of *Aglaiæ* and a number of *Saturniæ*. The second tribe of the Bombycoid Nocturnal Lepidoptera is termed *Veræ*, and consists of the remainder of the *Saturniæ* (*S. Pavonia*, *Pyri*, &c.); *Apollonia*, Cram.; *Maia*, Drury; *perspicilla*, Stoll; *Cedo nulli*, Cram.; and *Pandiona*, Cram., in separate coitus, forming a first stirps *Herææ*; the remaining stirpes, composed of the *Penthophoræ*, *Lariæ*, *Orgyiæ*, *Lithosiæ*, *Arctiæ*, *Lasiocampæ*, *Gastropachæ*, &c.; and the third tribe of the Bombycoid Lepidoptera being composed of *Hepialus*, *Cossus*, and *Zeuzera*.

By this arrangement it will be seen that *S. Pavonia*, *Pyri*, &c., and the other species above named, are separated from the great body of the *Saturniæ*, a step for which I can see no real grounds, the characters of those species in the preparatory and perfect states agreeing with those of the stirps *Echidnæ* far more intimately than with any of the other Bombycoid Nocturna, constituting the tribe named *Veræ*.

Mr. James Duncan, in the volume of Exotic Moths forming part of Sir W. Jardine's Naturalist's Library (vol. vii. 1841), has suggested a mode of distribution of the *Saturniæ*, founded upon the form of the wings in the two sexes of the different species, of which the following is a sketch:—

1. Those with the hind-wings rounded in both sexes.
 - Genus 1. *Hyalophora* [or the *Speculares Attaci* and *Samia* of Hübner], with large vitreous spaces on the disc of the wings: *Atlas*, *Hesperus*, *Cecropia*, &c.
 - Genus 2. *Attacus*, with eye-like spots on the wings, containing the great majority of the species.
2. Those with the hind-wings furnished with an angular projection posteriorly.
 - Genus 3. *Arsenura* [*Rhescyntes* of Hübner]. Hind-wings of male alone angulated. Sp. *Erythrinæ*, Fab.
 - Genus 4. *Lomelia* [*Imbrasia* of Hübner]. Hind-wings of both sexes angulated. Sp. *Epimethea*, Drury.
3. Those with the hind-wings produced into a long tail.
 - Genus 5. *Actias*, Leach [*Tropæa*, Hübner]. Tail about the length of the body. Sp. *Luna*, Linn.
 - Genus 6. *Eustera* [*Eudæmonia*, p. Hübner]. Tail very long; apical margin of fore-wings rounded. Sp. *Argus*, Fab.
 - Genus 7. *Copiopteryx* [*Eudæmonia*, p. Hübner]. Tail very long; fore-wings truncated. Sp. *Semiramis*, Cram.

The application of the character derived from the variation in the form of the wings in the two sexes of the different species is a step gained in their arrangement; it must however be admitted that the species with rounded hind-wings, forming Mr. Duncan's first section, must be cut up into a considerable number of subsections to place them on an equivalent footing with the species with angulated or tailed hind-wings. Moreover the existence of large vitreous patches on the wings is not sufficiently important for the formation of genera among

these insects, since it is found gradually obliterated in a series of the species by the space being more and more clothed with scales, until, as in our common *Saturnia*, all that remains of the vitreous spot is a narrow lunule at the base of the pupil of the eye-like spot. Although Mr. Duncan's observation, that "the species in which the fore-wings of the male are most decidedly falcate have this form much less strongly marked in the female; where the former are not very strongly falcate, in the female they become subfalcate (*H. Promethea* may serve as an example), while the females of subfalcate winged males have the exterior outline of their fore-wings either straight or slightly curved outwards"—is correct, yet he has carried it too far in proposing to unite together two insects belonging to different genera, and equally far removed in their geographical range, namely the curious *Saturnia Lucina* of Drury (which possesses very strongly falcate fore-wings, the veins of which, as is evident from Drury's figure, are arranged as in the typical *Saturniæ*, and which I find recorded in Drury's MSS. to be a native of Sierra Leone) and the Assamese *Bombyx spectabilis**, described by Mr. Hope in the Linnæan Transactions (vol. xviii. part 3, figured in pl. 31. fig. 3. from my drawing), which possesses an outwardly rounded apical margin of the fore-wings, and which, as may be seen from my figure, has a different arrangement of the veins of the fore-wings, the apical portion of the disc of which is traversed by seven branches, the innermost pair of the post-costal vein not being united together in a fork on the disc; the insect in fact belonging rather to the group of which *Lasiocampa* is a good type†.

* This species is the *Bombyx Certhia*, Fabricius, Ent. Syst. iii. 412; *Bombyx Wallichii*, Gray in Zool. Misc. p. 39; and *Phalena maxima*, Chusan, Petiver. Gaz. t. 18. fig. 3.

† I may take this opportunity of describing a very fine new species of *Lasiocampa* from Tropical Africa, in my own collection.

LASIOCAMPA STRIGINA, Westw. *L. alis anticis pallide incarnato-albidis strigis quatuor fulvo-castaneis, posticis basi fuscis strigis tribus transversis albis, pone medium fulvo-castaneis.*

Expans. alar. unc. 6.

Hab. Sierra Leone. In Mus. nostr.

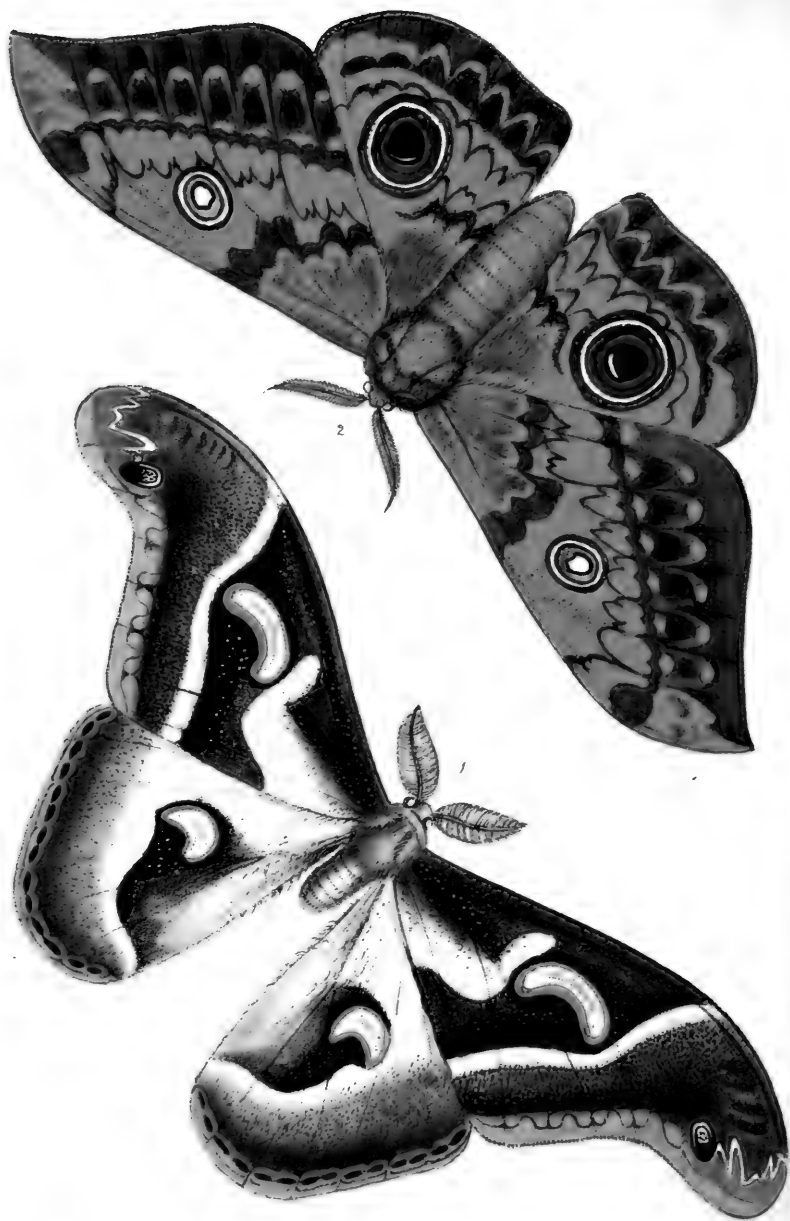
The general colour of this insect is a rich chestnut-fulvous or sorrel colour. The basal half of the fore-wings is of a pinkish buff, the pink tint being strongest at the base, and extending across the hind part of the thorax. Between the base and the distance of one-third of the length of the wing, are two straight, transverse, chestnut-fulvous strigæ, which are shaded off gradually to the pale ground colour of the wing; at the distance of one-third is another abbreviated striga of the same kind (indicating the situation where the discoidal cell is closed). Across the middle of the wing is a broad, more oblique chestnut-fulvous bar, shaded off in the same manner; and beyond this, and parallel with it, is another narrow, darker chestnut-fulvous, oblique striga, leaving a broad apical margin of chestnut-fulvous, slightly clouded with an obscure paler wave. The principal veins of the wing are indicated at a little distance beyond the middle by a double row of minute chestnut dots, and along the apical portion by a brighter tint. The fringe is claret-brown. The hind-wings are blackish-brown at the base, with three transverse white fasciæ, the outer ones being close together, and running nearly across the middle of the wing; the apical half of the wing being chestnut-fulvous, with a slight indication of a paler fascia. The antennæ are very pale buff and bipectinated; the tips are broken off in my specimen, the part remaining having seventy-three pairs of rays. Beneath, the wings are paler chestnut-fulvous, with a darker duplicated striga across the middle, and some slightly indicated waved strigæ beyond the middle.

As already stated, the insects of the genus *Saturnia* are among the largest of the Nocturnal Lepidoptera, a few *Hepialidæ* and *Erebi* alone equalling them in size. How far this circumstance gives them the character of a typical group may be reasonably questioned; to me indeed it appears that an increased size in the species of any group is in itself a proof of a certain degree of aberration: certainly if strength of flight and compactness of form be considered, we must regard the *Lasiocampæ* and allies as much rather the real representatives of the Linnæan *Bombyces*; just as in the Butterflies, no one would consider the species of *Papilio* on account of their large size as the types, but would confer that title on *Vanessa* and its allies, notwithstanding the want of well-developed fore-legs. Another circumstance which might be alleged as a proof of the typicality of the *Saturnia*, is the wide geographical range of the species, which occur in all quarters of the globe, which peculiarity extends even to the minor divisions of the genus; thus we have very closely-allied tailed species from North America, India and South Africa; I believe however that naturalists have at length agreed in refusing to this circumstance the right of conferring typicality on groups.

Saturnia in fact appears to me to be one of those groups like *Papilio* among the Diurnal Lepidoptera, *Carabus* among the *Carabidæ*, *Feronia* among the *Harpalidæ*, or *Cicindela* among the *Cicindelidæ*, which are of great extent and comprise a number of species, generally of comparatively large size, which it is difficult to group into well-defined sections or subgenera, although their forms are very varied. One or more species may be detached and characterized as distinct subgenera, but when the whole group is carefully studied, it is ascertained that these particular species do not possess more important characters than the rest. I shall not attempt therefore, in describing the African species alone of this group, to introduce a system of distribution among the species, further than the artificial division given below.

The beautiful markings of the wings, and especially of the hind-wings, of many of these insects, appear to indicate the character laid down by Linnæus and Fabricius, namely "*Alæ patulæ*," by which we are to understand, that when the insect is at rest the fore-wings do not closely cover the hind-ones, as is the case in the species with dingy-coloured hind-wings, but leave their beautiful markings exposed to view. Mr. E. Doubleday indeed informs me that the North American *S. Luna* generally sits with its wings perpendicularly elevated over its back, like a butterfly at rest. These beautiful eye-like markings of the wings are indeed a good character of the group, although that which is afforded by the arrangement of the veins above described is of higher importance. The latter indeed, together with the emission of four branches from each joint of the flat pennated antennæ, may be considered as the essential characters of the genus, although they have never hitherto been employed to distinguish it. Another character, also hitherto unemployed, which will I think prove of importance in determining the minor groups of *Saturnia*, consists of the difference in the number of branches in the antennæ of the different species; this I have carefully noticed in the following descriptions, as





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1

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1. *SANTONIA VACUNA* W.

2. *S. ABATA* W.

Engraved by F. Verreaux

well as the differences in the formation of the female antennæ, in which sex some of the species possess those organs almost filiform, whilst in others they are nearly as strongly pennated as in the males.

In the following pages thirty-three African species are introduced, of which seventeen are now for the first time described.

For convenience the following artificial mode of division is employed in their arrangement:—

- A. Fore-wings very sickle-shaped; with a small eye-like spot near the tip.
 - a. All the wings with a glassy lunate central spot. Sp. 1.
 - b. Fore-wings with a central bean-shaped vitreous spot; hind-wings with large oval one. Sp. 2.
- B. Fore-wings less strongly sickle-shaped or rounded externally; all the wings with an eye-like spot.
 - a. Hind-wings not tailed. Sp. 3–10.
 - b. Hind-wings tailed. Sp. 11, 12.
- C. Fore-wings with a small triangular or quadrate vitreous central spot; hind-wings with a large eye. Sp. 13–24.
- D. Wings without eyes or vitreous spots. Sp. 25–28.
- E. Aberrant species. Sp. 29–33.

Section A.

Subsection a.

Sp. 1. SATURNIA VACUNA, Westw. (Pl. VII. fig. 1. ♂) *S. alis maris falcatis fuscis, fascia communi media alba, omnibus lunula magna media vitrea, utrinque albo flavoque marginata; anticisque macula ovali nigra subapicali (albo supra circumdata).*

Expans. alar. ♂ unc. $6\frac{1}{4}$; ♀ unc. $5\frac{1}{3}$.

Inhabits Ashantee. In the British Museum.

The male has the fore-wings considerably falcate at the tips, and the hind ones almost triangular. The female has the fore-wings somewhat emarginate in the middle of the hind margin, and the hind-wings less elongated. The general colour of the wings is brown, thickly irrorated, especially in the males, with white. The fore-wings have a broad suboblique bar, extending from the base of the inner margin and directed forwards in a right angle immediately in front of the central lunule, the margin of which is formed of a narrow brown bar, within which it is dirty yellow, internally edged with white, the central part being vitreous. This is followed by a white oblique nearly straight bar, the brown space beyond which is much-powdered with white; the apical margin is pale livid buff, traversed by a very slender undulating brown line, with a black oval dot near the apex, which is powdered at its base with white; the apex of the wings being rosy fulvous, separated from the livid brown antecedent part of the wing by a very much-angulated white line.

The hind-wings are white at the base, which extends on the outside and joins the central white fascia; the apical portion is coloured

as in the fore-wings. The lunule is smaller and more curved than in the fore-wings, but similarly coloured.

The antennæ are fulvous. The abdomen whitish buff.

The male antennæ are broad, and have forty-six rays on each side lying flat; the four rays of each joint of equal length. The female antennæ are of considerable breadth, and with forty-eight or fifty rays on each side.

The palpi are very short but distinct and rather slender, and the spiral tongue is also distinct and composed of two flattened free filaments.

Subsection A. b.

Sp. 2. SATURNIA MYTHIMNIA, Westw. (Pl. VIII. fig. 3.) *S. alis anticis subfalcatis, omnibus purpureo-fuscis albo-irroratis; et pone medium striga alba valde curvata; anticis lunula magna vitrea albo flavoque marginata; maculaque parva subapicali nigra albo irrorata; posticis ocello magno ovali vitreo albo flavoque marginato, serieque catenata submarginali punctorum nigrorum.*

Expans. alar. antic. unc. $4\frac{3}{4}$ – $5\frac{1}{2}$.

Hab. Port Natal. In Mus. Britann.

The fore-wings are considerably emarginate along the outer margin in the male, and more slightly so in the female. The veins agree in arrangement with the typical *Saturniæ*. The general colour of the wings is a dark livid brownish purple, thickly powdered with white atoms; the middle of each wing is occupied by a large transparent spot, kidney-shaped in the fore-wings and oval in the hind ones; the vitreous portion is surrounded by a slender line of white, which is succeeded by a yellow one, and this by a slender black line; these eyes are of nearly equal size. The fore-wings are also marked near the base with an oblique white fascia, extending from near the base of the fore-wings to the base of the large eye; beyond the eye is a curved white bar, internally edged with a darker bar of livid purple; the apical part of the fore-wings is brown shaded to fulvous and buff; the outer margin of the wing dusky buff, with a series of greenish buff spots edged with a slender brown deeply undulating line; near the tip of the wing is a black spot irrorated with white at the base, from which runs a very slender and much-angulated white line. The hind-wings have a fulvous edge gradually shaded to buff-brown, bearing a row of dark brown catenated spots followed by a slender dusky line. The under side of the wings resembles the upper side, with the costa of the hind-wings white. The body is purplish brown, the thorax behind with a white fascia, and the segments of the abdomen have the hinder margin white. The antennæ, head and legs are fulvous. The antennæ are broadly pinnate, with the rays continued to the tip. The males have fifty-eight rays (arranged in double pairs to each joint), with single rays at the tip. The females have also fifty-eight long rays (four to each joint), with eight or ten single rays at the tip. The palpi are prorected, but do not extend beyond the hairs of the clypeus.

Section B.

Subsection a.

Sp. 3. SATURNIA ARATA, Westw. (Pl. VII. fig. 2.) *S. alis flavis; anticis apice acutis basi livide maculatis, medio ocello livido cincto circulo tenui albo, alteroque purpureo marginato, linea tenui dentata media, strigaeque obliqua subundata, posticis ocello magno multi-annulato ornatis.*

Expans. alar. unc. $4\frac{1}{2}$ – $5\frac{3}{4}$.

Hab. Ashantee, Sierra Leone and Port Natal. In Mus. Britann.

The fore-wings are nearly alike in both sexes, being but very slightly emarginated in the male, with the tips acute; wings rich yellow, with several livid or reddish patches near the base, followed by a much-waved livid striga; in the middle of the wing is a moderate-sized ocellus, the centre vitreous, outwardly edged with black, surrounded by a livid ring, and this by a white circle, outside of which is a narrow purplish or reddish ring. Connected with the outer edge of the ocellus is a slender, very strongly denticulated dark brown line; beyond this is a nearly straight purplish brown striga, extending from the fore-margin, where it is rather angulated and extending to the middle of the inner margin; beyond this line the outer margin of the wing is marked with confluent livid or reddish patches, the margin itself being of the same colour except at the tip.

The hind-wings are more or less tinged with red at the base, followed by an angulated dark denticulated striga arising from the anal margin. In the middle of the wing is a large brilliantly coloured ocellus; the pupil is black, with a slender vitreous line towards the base; the iris is livid, outwardly shaded to red, surrounded by a slender white circle and this by a red ring. From the inner margin of the eye runs a dentated brown line to the anal margin, and behind it is a waved or dentated brown striga, the apical portion of the wing being coloured as in the fore-wings. The thorax is yellow, with the head, collar and legs livid brown. The wings are much less brilliantly coloured on the underside, and the great ocellus of the hind-wings is almost obliterated. The vitreous part of the ocellus of the fore-wings is much smaller in the male than in the female; and the ocellus of the hind-wings in the female is much more vividly coloured than in the male.

The antennæ of the males are 32-jointed with forty-eight rays on each side, the two apical rays of each joint being rather shorter than the two basal ones.

The palpi are short, but distinct and broad; the basal joint with scales extending beyond the second joint. The antennæ of the female are 37-jointed, the rays being about three times as long as the thickness of the antennæ, and the two apical rays of each joint being quite short.

Sp. 4. SATURNIA BELINA, Westw. (Pl. VIII. fig. 2.) *S. alis anticis flavo-griseis, striga subangulata ante, alteraque fere-recta pone medium; ocello mediano hyalino fulvo-cincto; alis pos-*

ticis rubidis ocello magno vitreo iride fulva nigro circumdata strigaeque subapicali alba, fusco externe marginata.

Expans. alar. antic. unc. $4\frac{1}{2}$ – $4\frac{3}{4}$.

Hab. Port Natal et Zoolu. In Mus. Britann.

The fore-wings are nearly alike in both sexes, the outer margin being scarcely emarginate. The general colour is uniform obscure yellowish grey, covered with minute black irrorations; at the distance of about one-third of the length of the wing from the base is a rather narrow white transverse striga, slightly angulated outwardly, having a dusky edge on the inside next the base of the wing. In the middle is a rather small ocellus, the centre being semi-oval and vitreous, edged with fulvous, and surrounded by a thin black circle; this is surrounded by a dull buff ring, and this by a white one; beyond the middle is an oblique nearly straight white striga, nearly parallel with the outer margin, outwardly edged with a dark brown line. Hind-wings pale livid pink at the base and along the anterior portion; near the base is an obscure white striga, and in the middle is a large oval ocellus, coloured in the same manner as the ocellus of the fore-wings, and followed by a curved white striga edged outwardly with brown.

The thorax is coloured as the fore-wings, with a narrow transverse white ring across the front. The abdomen is more strongly fulvous-coloured. Wings beneath grey, the fore-ones tinged with pink on the inner margin; across the middle is a fulvous cloud; the basal fascia and the eyelet of the hind-wings are wanting. The veins are arranged in the typical manner.

The male antennæ are 35-jointed with fifty-six rays on each side, the rays rather long; the two basal rays of each joint are obliquely porrected, so that the rays form four series instead of all being on the same plane; the six apical joints minute and not producing rays. The antennæ of the female are setaceous, the rays being scarcely visible without a lens. The palpi are flattened, short and deflexed.

Sp. 5. SATURNIA HERSILIA, Westw. (Pl. IX. fig. 1.) *S. alis maris integris flavis fusco subirroratis, striga angulata transversa ante medium alteraque ante apicem subundata fuscis; ocello magno mediano vitreo iride lata obscure lutea, linea tenui circulari nigra circumdata; alis posticis basi roseo-flavis, ocello maximo mediano vitreo circulari concentricis obscure luteo, nigro, late rufo, et albo cincto, strigaeque subapicali subundata fusca.*

Expans. alar. antic. unc. 5.

Hab. Congo. In Mus. Britann.

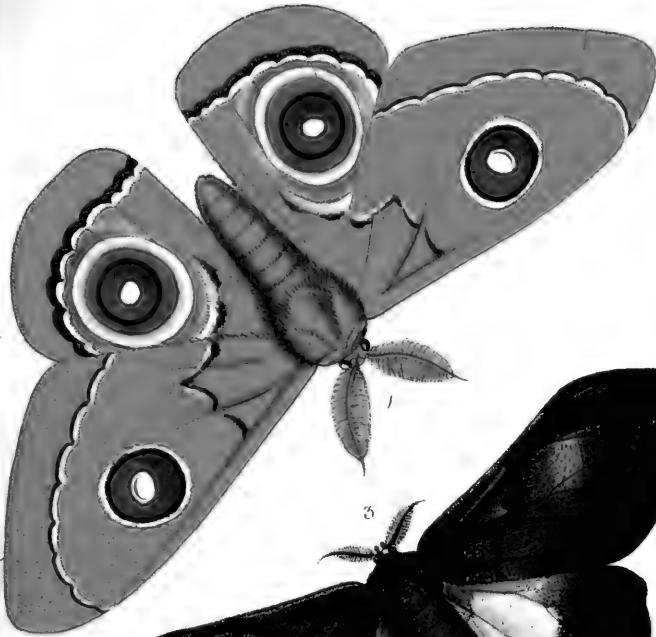
Male with the fore-wings entire, and slightly rounded along the outer margin. General colour yellow; fore-wings finely powdered with small brown scales, having a slender, angulated, brown striga before the middle, slightly tinged on the outside with rosy; in the middle of the wing is a large eye, having a subovate vitreous centre, surrounded by a broad dirty luteous brown ring, succeeded by a narrow black circle with a white outer ring; halfway between this and the outer margin is a narrow brown striga parallel with the outer margin, inwardly edged with rosy white. Hind-wings rosy yellow at



1 SATURNIA TYRRHENA W. 2. SEELENA W. 3. S. MYTHIMNA W.

Verlag von ...





1 SATURNIA HERCYNIA W. 2. S. MENIPPE W. 3. "

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the base, near which is an oblique, very pale brown striga; followed by a very large eye with an oval glassy centre, surrounded by a broad dirty luteous brown ring, and this by a narrow black circle: this is succeeded by a broad red ring, and this by a white one, the adjoining space being rosy buff: between the eye and the apical margin is a subundulated blackish striga, edged internally with white. The fore-wings beneath want the anterior, angulated, brown striga; the ocellus is coloured as on the upper side, and the hind-wings are fulvous yellow, with the ocellus smaller than above, the black ring being surrounded by a white one, and this by a narrow rosy one; the white waved subapical striga is also narrowly bordered within with rosy.

Antennæ of the male chestnut-yellow, rather broad and flat, with forty-eight rays on each side, the two apical rays being very short, four rays being produced from each joint.

Body entirely orange-yellow, the outside of the tibiæ and tarsi blackish.

Sp. 6. SATURNIA MENIPPE, Westw. (Pl. IX. fig. 2.) *S. alis integris testaceo-rufis apicibus fuscis, striga curvata ante alteraque pone medium angustis albis, communibus, alis omnibus ocello nigro (medio subvitreo) iride alba.*

Expans. alar. antic. unc. $5\frac{1}{3}$.

Hab. Port Natal et Africa Austral. In Mus. Brit. et Hope.

Fore-wings of the male entire and slightly rounded along the outer margin. Wings rich testaceous red; fore-wings with the costa pale buff-brown, base carmine-red, having a white slightly curved fascia running across all the wings, each of which is also marked in the middle with an equal-sized oval eye; the centre vitreous, but clothed with black scales, surrounded by a broad black ring, and this by a rather broad white one; this eye is followed by a uniform white bar, nearly parallel with the outer margin, which is rather dull buff, finely irrorated with brown scales; fringe dull buff. Wings beneath greenish buff, the anterior with the eye nearly similar to that of the upper side, followed by a white streak edged outwardly with black, and with a grey triangular patch near the tip of the wing, the outer margin somewhat paler, the middle dotted with brown. Hind-wings buff-white, irregularly clouded with dirty buff; across the middle is a nearly straight brown fascia, the apical half of the wing darker buff-brown, with two large lilac-grey spots, one near the anal angle, and the other towards the outer angle.

Antennæ dark brown; those of the male rather broad, with fifty-two joints in each, and about 100 rays on each side, extending consequently nearly to the extreme tip. Female antennæ nearly resembling those of the male.

Thorax dark carmine-red, brown in front, with a narrow white collar. Abdomen and under side of the body pale whitish buff. Head and legs pale buff-brown.

Sp. 7. SATURNIA TYRREHA, Cramer. *S. alis griseis nigro irro-*

ratis; anticis striga ante medium alba valde dentata; omnibus oculo mediano (majori in alis posticis) vitreo, iride griseo-fulva annulis concentricis nigro, fulvo et albo circumcincta; omnibus etiam striga versus marginem duplicata undata communi.

Expans. alar. antic. fere unc. $5\frac{1}{2}$.

Syn. *Phalæna Tyrreha*, Cram. Ins. 4. tab. 46. fig. A. *Bombyx Tyrreha*, Fabricius, Ent. Syst. iii. part i. p. 415.

Hab. Cap. Bon. Spei et Africa australi. In Mus. Britann.

The antennæ of the male are moderately broad and flat, with fifty-two rays on each side; the four or five terminal joints very short, and not producing any rays; the rays are for the most part of nearly equal length, so that the broad part of the antennæ has its sides nearly parallel.

The antennæ of the female are compressed, and with scarcely any rudiment of pectinations.

The palpi are distinct, but very short.

The outer margin of the fore-wings of the female is entire.

Sp. 8. SATURNIA CYTHEREA, Fabr. *S. alis anticis margine externo parum emarginato; griseis, strigis duabus albis, anteriore undata, omnibus oculo magno (in alis posticis majori) vitreo; parte vitrea in anticis magna ovali, in posticis parva rotundata; iride flava, annulo nigro alteroque albo circumdata.*

Expans. alar. antic. individui typici Banksiani unc. $6\frac{1}{8}$; individ. in Mus. Brit. unc. 5.

Syn. *Bombyx Cytherea*, Fabr. Ent. Syst. iii. a. p. 410. *Echidna communiformis Cytherea*, Hübner, Auss. Sch. F. 3, 4. *Phalæna Capensis*, Cramer, Ins. tab. 302. fig. A, B; tab. 325. fig. G (♀), (nec *Phalæna Capensis*, Linn.). Sulz. Hist. Ins. tab. 21. fig. 1.

Hab. apud Cap. Bon. Spei.

In Mus. Banks. (Soc. Linn. Lond.) et Britann.

The male antennæ are moderately broad, with 126 rays on each side, affixed obliquely, the joints being very short, the ten terminal joints very short, with only one ray on each side, gradually diminishing in size.

The female antennæ are slightly serrated, each joint emitting two oblique serrations on each side, the basal pair being the largest, the size of the serrations gradually diminishing to the tip.

The palpi are short and broad, but do not extend beyond the hairs of the face.

I have seen a variety from the Zoolu country much varied with yellow, especially on the thorax, at the base of the wings, and along the apical portion beyond the subapical striga.

Sp. 9. SATURNIA DIONE, Fabr. *S. alis sulphureo-flavis, anticis in mare parum falcatis, strigis duabus, anteriore antice recta, postice dentata carnea, posteriore (communi) recta obscuriore, anticis etiam plaga albo-carnea basali alteraque versus apicem costæ nubilaque lata undata pone strigam externam griseo-carneis, omnibus in medio oculo (in alis posticis majori), pupilla*

minuta vitrea, iride fulva annulis nigro, albo carneoque circumcincta.

Expans. alar. antic. unc. 5-5½.

Syn. *Phalæna Guineensis flava perelegans*, Petiver, Gazoph. pl. 29. fig. 3. c. 478. *Bombyx Dione*, Fabr. Ent. Syst. iii. a. p. 410. *Phalæna Paphia*, Linn. (*ex parte*).

Hab. Congo, Ashantee (Mus. Brit.), Sierra Leone (Mus. Hope).

The fore-wings in the female are not so subfalcate as in the male, but the apical margin is slightly emarginate. The male antennæ are rather broad and flat, with forty-four rays on each side, four being emitted from each joint; about six of the terminal joints are furnished only with short, gradually diminishing spurs. The female antennæ are almost filiform. The palpi are short, but distinct and deflexed.

The nomenclature of this species is involved in some difficulty. Old Petiver rightly figured it as above referred to, under the name of *Phalæna Guineensis flava perelegans et pulchre oculata*. Linnæus, in the 10th edition of the 'Systema Naturæ' (p. 496), described an insect under the name of *Bombyx Paphia*, thus: "*P. Bombyx* elinguis flava alis patulis falcatis concoloribus ocello fenestratis. M. L. U.," thus indicating that the typical specimen of his species was contained in the museum of the Queen of Sweden. But Linnæus referred not only to Petiver's figure, but also, in the second place, to Catesby's 'Carolina,' ii. p. 91. t. 91, where is represented an insect described by Catesby as "*Phalæna ingens Caroliniana oculata e luteo fusca lineis dilute purpureis insignita*," which Cramer and Fabricius subsequently figured and described under the name of *Polyphemus*. Linnæus however, in this 10th edition of the 'Systema Naturæ,' gave to his *B. Paphia* the "Habitat in Guineâ."

In his 'Museum Ludovicæ Ulricæ,' Linnæus however treated his *B. Paphia* in a different manner. Without altering his specific character, he refers in the first place to Catesby's 'Carolina' (*S. Polyphemus*); 2ndly, with a query, to Petiver's *Phalæna Guineensis*; and 3rdly, to an insect figured by Rumphius in his 'Herbarium of Amboyna' (iii. t. 75), which, from the observation of Rumphius, "Folliculus est Eruçæ Bengalensis Tesser vocatæ," is evidently the Tusseh silk moth of Roxburgh (*S. Paphia*), thus confounding three American, African and Indian species under one name. He moreover in this work gives the "Habitat in Americâ Septentrionali," and his detailed description evidently proves that he had the American species of Catesby in view in proposing the name of *Paphia*; indeed his reference to the "M. L. U." in the 10th edition of the 'Systema Naturæ' likewise fully proves that, although giving in that work Guinea as the habitat of his *Paphia*, the American insect was the one before him.

But in the 12th edition of the 'Systema Naturæ,' we find Linnæus making the matter still more confused; for we now find the reference to Petiver restored to its first position, that to Catesby given with doubt, and the reference to Rumphius added in the third place, the locality being "Habitat in Guineâ, Asia."

Now if we are to regard the last work of an author as containing his matured opinions, and allow him at the same time the right to

modify his opinions to an extent involving the change of specific names, in the manner followed in this instance by Linnæus (which is however a power which I deny that an author ought to possess), we must remove from the Carolina species all right to the name of *Paphia* and confer it on the African insect; but I contend that as Linnæus clearly defined the American species under that name in the 'Museum Ludov. Ulr.,' and in his subsequent work made no attempt to discriminate the three species, we are warranted, 1st, in retaining the name of *Paphia* for the American insect, in which case it will be necessary to sink the Fabrician name of *Polyphemus* into a synonym of *Paphia*; 2ndly, in giving to the African one the Fabrician name of *Dione* (striking out the incorrect Fabrician reference of Petiver's Guinea insect to the Asiatic species); and 3rdly, in giving a different specific name to the Tusseh silk moth of India, to which Fabricius restricted the name of *S. Paphia*, but which it ought certainly not to retain, seeing that Linnæus, when he first proposed that name, knew only the African and American insects. Drury has however enabled us to clear up the difficulty as to this third species, having figured it in the second volume of his 'Illustrations' under the name of *Mylitta* (pl. 5. fig. 1 = *Paphia*, Cramer. Ins. 13. tab. 147. fig. A), which name Fabricius also adopted, giving the Asiatic species twice over under the names of *Paphia* and *Mylitta*.

The synonyms of the three species will stand thus:—

1. *Saturnia Paphia*, Linn. Mus. Lud. Ulr.
B. Polyphemus, Fabr.
Hab. North America.
2. *Saturnia Dione*, Fabricius.
Phalæna Guineensis, Petiver.
Ph. Paphia, Linn. Syst. Nat., ed. 10. *ex parte*.
B. Petiveri, Guérin, Ann. Soc. Sericicole.
Hab. Africa.
3. *Saturnia Mylitta*, Drury, Fabr.
B. Paphia, Cramer, Fabricius.
The Tusseh Silkworm Moth.
Hab. India.

SATURNIA WAHLBERGII, Boisduval in Delegorgue, Voy. dans l'Afr. Austr. ii. p. 600.

Of this supposed species, which inhabits Port Natal, I have seen specimens, but I cannot consider them distinct from *S. Dione*, of which they are highly coloured individuals. The following is M. Boisduval's description:—

“Elle est un peu plus grande que la *Saturnia Pyri* d'Europe, et son port est assez différent. Le dessus des quatre ailes est jaune, fortement saupoudré d'atomes bruns avec une bande étroite, brune doublée intérieurement de gris violâtre commune régulière; commençant près du sommet des supérieures et arrivant au bord interne des inférieures, juste au niveau de l'extrémité de l'abdomen. Vers la base des quatre ailes on voit une autre bande commune très-sinueuse irrégulière, violâtre précédé à la base des supérieures d'une espèce dé-

taché de sa couleur. L'œil des ailes supérieures est petit, transparent, cerclé de jaune et entouré d'un peu de violâtre surtout dans le mâle; l'œil des ailes inférieures est plus grand, jaune, à prunelle diaphane et à iris noir cerclé de violet. Dédié à M. Wahlberg, l'un des compagnons de M. Delegorgue."

In addition to the above characters, it may be noticed, that the bar beyond the middle of the wings is slender, grey, outwardly edged with a dusky line, and inwardly with purplish brown; outside the bar is a series of large, triangular, lilac-white patches united together, and the disc of the wings, especially towards the base, is much more irrorated with lilac-pink.

Sp. 10. SATURNIA APOLLONIA, Cramer, Ins. vol. iii. pl. 250 A.
S. alis pallide fuscis albo flavoque variis; anticis fascia subapicali flava extus fusca; alis posticis albis strigis duabus fuscis pone medium, exteriore flavo intus marginata; omnibus ocello nigro in medio subvitreo iride alba; in anticis etiam annulo flavo cincto: corpore albo thorace macula media fusca.

Expans. alar. antic. unc. $3\frac{3}{4}$.

Hab. Caput Bon. Spei et apud Portum Natalensem.

The antennæ are fulvous and short; the pectinations forming an elongate ovate outline, pointed at the tip, with only thirty-eight rays on each side, four being emitted from each joint. The rays lie flat, and several of the terminal joints are destitute of rays. The female antennæ are 24-jointed, the pectinations forming a much narrower oval outline than in the male; the pectinations of the basal part being short, each joint emitting four rays, of which the apical pair is not above half the length of the basal ones.

This species is well-figured in Mr. Angas's plate of Lepidoptera of the Zoolu country, fig. 14.

Subsection B. b.

Sp. 11. SATURNIA MIMOSÆ, Boisduval (Voy. de Delegorgue dans l'Afrique Austr. p. 600). *S. alis glauco-viridibus, anticarum costa grisea linea vel striga undulata griseo-fusca paullo pone medium maculaque grisea ad angulum posticum; omnibus ocello æquali, flavo, iride tenui castanea anticeque lunula tenui grisea notata; posticis in caudam longissimam spatulatam basi griseo-fuscam, apice flavo-viridi productis.*

Expans. alar. antic. unc. $5\frac{1}{4}$, long. alar. postic. unc. $4\frac{1}{2}$.

Hab. apud Portum Natalensem. In Mus. Britann. &c.

This species belongs to the subgenus *Actias* of Leach, and is allied to *S. Selene* of India, *S. Luna* of North America, *S. Isis** of Java, *S. Cometes* of Madagascar, described by M. Boisduval in his 'Fauna of Madagascar,' (apparently identical with the species captured at Nosse Bé, on the east side of Madagascar, by M. Mitre, exhibited by M. Guérin at the Entomological Society of France (see Annales

* This very rare species, of which M. Boisduval was acquainted with only a single specimen in the collection of M. Robyns of Brussels, will require a new specific name to distinguish it from the *S. Isis* of this monograph.

de la Soc. Ent. 1846, p. civ.) ; *S. Mænas* of Silhet (figured in my Cabinet of Orient. Entomol. pl. 22), and *S. Leto*, Doubleday, also from Silhet (figured in the Trans. of the Entomol. Soc. vol. v. pl. 15. A very fine specimen of this last-named insect, with the markings on the wings much more distinct, is contained in the Ashmolean Museum at Oxford).

The wings of *S. Mimosæ* are pale yellowish-green with the apical margin waved, that of the fore-wings of the male being somewhat more emarginate than in the female. The costa of the fore-wings is broadly purplish-grey, much-irrorated with white ; beyond the middle arises on the costa an oblique dark chestnut spot, which emits an undulating line across the wing (which forms a waved fascia in the female), and near the tip of the wing the pale costa is separated from the green ground by a dark chestnut dash. In both sexes the anal angle of the fore-wings is occupied by a grey-brown patch which extends narrowly into the wing parallel with the outer margin ; the incisures of all the wings are tinged with chestnut-purple ; from the middle of the pale costa of the fore-wings arises a purplish-brown spot to which is attached the ocellus, which is rather small, oval and transverse ; the centre formed of a small glassy spot surrounded by fleshy-brown and this by yellow, more orange-coloured on the side towards the base of the wings, where it is also surmounted by a black-brown lunule powdered with white scales along its middle. The hind-wings are more uniformly green above, with an ocellus similar to that of the fore-wings, the anal angle produced into a slender tail longer than the body of the wing and spatulated at its extremity ; this tail is chestnut-brown throughout its narrow part, where it is much-powdered with white, the dilated apical part being green. The body is yellow and the antennæ are fulvous.

The underside resembles the upper, except that the undulating line beyond the middle of the wing is wanting, and is replaced by a similar one nearer to the outer margin of the wing, and running along the hind-wings.

The underside of the abdomen is marked with purple spots along the apical margin of the segments. The antennæ of the males are very broad, emitting 50 rays on each side, the five or six terminal joints with very short rays. The rays on each side of each joint arise at a little distance from the base and extremity of each joint, so that there is a more decided space between the second ray of one joint and the first ray of the next joint than usual.

The veins of the fore-wings are arranged as in the typical *Saturniæ*, and those of the hind-wings as in *S. Mænas* (as exhibited in my figure above referred to) and as in *S. Luna*, the peculiarity in the subgeneric group *Actias* of Leach containing the above-named species, being that the three branches of the median vein of the hind-wings are compressed closely together, arising on the inside of the ocellus and extending into the long tail, a transverse vein running across the middle of the ocellus, closing the discoidal cell, and uniting the inner branch of the post-costal vein with the outer branch of the median vein.

Boisduval informs us that this species "est très commune à quatre à cinq lieues dans l'intérieur du pays sur les Mimosa. Les cafres se servent du cocon qui est très-gros et très-solide pour se faire des tabatières. Pour cela ils y font un trou pour extraire la chrysalide, et ils le bouchent ensuite avec une cheville de bois."

A beautiful figure of this species is given by Mr. Angas in his plate of Zoolu Moths, fig. 18.

This is evidently the species alluded to in the following note, published by M. Signoret in the Journal of the Proceedings of the Entomological Society of France, Annales 1845, p. xcvi:—"M. V. Signoret présente à la Société un dessin d'une nouvelle espèce appartenant au genre *Saturnia*, et il communique une note à ce sujet. M. V. Signoret dit que le Chenille de cette espèce est inconnue, que les chrysalides en furent trouvées en Novembre 1844, sur un Mimosa près de la rivière Toogela, limite des frontières du royaume Aucayoolao, situé entre Lugoo-Baie et Port-Natal: l'insecte parfait a été rapporté par M. Campion de Douai, et notre collègue propose à la Société de lui appliquer le nom de *Saturnia Campionea*."

Sp. 12. SATURNIA ARGUS, Fabr. *S. omnibus pallide carneo-albidis, anticis margine postico rotundatis, disco punctis sex in medio approximatis, fenestratis, annulo fulvo nigroque cinctis; posticis punctis quinque sparsis ejusdem coloris; margine anali in caudam longissimam extenso.*

Expans. alar. antic. unc. 3, long. alar. postic. unc. 4.

Hab. the Isle of Banana (Smeathmann).

In Mus. Britann., Banks. (Linn. Soc.), Westwood, &c.

Syn. *Bombyx Argus*, Fabr. Ent. Syst. 111 a. p. 414; Stoll, 27. 1; Donovan. Nat. Repos. 5. 173; Oliv. Enc. Meth. 5. 29. 22; Drury, Ent. vol. iii. pl. 29. fig. 1. *Phalæna brachyura*, Cramer, Ins. pl. 29. fig. 1. *Eudæmonia Uroarge*, Hübner, Verz. No. 1586.

The fore-wings are considerably rounded along the apical margin, and the tails of the hind-wings are much longer in proportion than in *Mimosæ*, *Luna*, &c. The veins of the fore-wings are similarly arranged to those of *S. Mimosæ*, &c., but those of the hind-wings are peculiar in having the veinlet which connects the inner branch of the post-costal vein and the outer branch of the median vein closing the discoidal cell so oblique (as well as subangulated in the middle), that it seems like a real fourth branch of the post-costal, running down within the outer margin of the tail, the base of the outer branch of the median vein being so thin and short that it resembles the ordinary condition of the veinlet closing the cell, although its nearly longitudinal direction indicates its real nature as a branch of the median vein*.

* *Saturnia (Eudæmonia) Semiramis*, Cramer, pl. 13 A, differs materially in the veining of its wings from *S. Argus*. In the fore-wings the inner branch of the post-costal vein, instead of arising from the preceding branch in an acute fork, as in the typical *Saturniæ*, arises from the middle of the transverse vein closing the discoidal cell, whilst in the hind-wings the inner branch of the post-costal vein runs within the outer edge of the tail throughout its whole length, the first branch of the median vein arising nearly opposite to the base of the tail, and the second branch at some length down the tail.

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The antennæ of the females (I have seen no male) are 26-jointed, each joint after the second producing only a pair of rays, arising close to the base of the joint. The palpi are also as long as the head and deflexed, with the terminal joint long and pendulous. In these respects it will be necessary to separate this insect at least subgenerically from the other *Saturniæ*; it may therefore be advisable to use Hübner's subgeneric name *Eudæmonia* for it.

Section C.

Sp. 13. SATURNIA EPIMETHEA. *S. alis anticis subfalcatis; subfuscis striga communi subapicali obscura extus pallide griseo marginata; macula minuta mediana triangulari vitrea; posticis acute angulato-caudatis, ocello magno medio fulvo iride nigra annulo puniceo cinereoque cincta, margine antico alarum obscuriori.*

Expans. alar. antic. unc. 5-6.

Hab. in Guinea. In Mus. Britann.

Syn. *Phalæna Attacus Epimethea*, Drury, vol. ii. pl. 13. fig. 1; Fab. Ent. Syst. iii. a. p. 414; Gmel. Linn. Syst. Nat. 2404; Cramer, Ins. t. 176 A; Oliv. Enc. Méth. v. 29.

The antennæ of the male are rather small, with only 34 rays on each side, thirteen of the apical joints being destitute of rays. The palpi are small and distinct, rather dependent, but not extending beyond the hairs of the face.

Sp. 14. SATURNIA ALCINOË, Cramer. *S. alis anticis falcatis rufo-badiis; anticis costa lata alba, striga communi recta transversa prope basin, fascia lata alba pone medium in qua striga recta fusca; anticis macula mediana vitrea subquadrata, posticis ocello ovali pupilla vitrea, iride lata fulva, annulo nigro circumdata.*

Expans. alar. antic. circ. unc. 6.

Syn. *B. Alcinoë*, Cramer, pl. 322 A. *B. Caffraria*, Stoll, Suppl. Cram. pl. 31. fig. 2 & 2 e. *Saturnia Caffra*, Boisduval in Delegorgue, Voy. dans l'Afrique Austr. ii. p. 601.

Hab. in Caffraria, Amazoolu. In Mus. Britann.

The palpi are distinct and slender, but do not extend beyond the hairs of the clypeus. The antennæ of the males have 54 rays on each side, the two basal rays of each joint converging inwardly and being bent more obliquely, so that the tips of the rays form four distinct rows; all the rays are moreover set on more obliquely than in the typical species. The antennæ of the female are moderately pectinated, the two apical rays of each joint being almost obliterated. A beautiful figure of this species is given in Mr. Angus's plate of Zoolu Moths, fig. 15.

Sp. 15. SATURNIA ALINDA, Drury. *S. alis rufo-brunneis margine externo saturatiori strigisque variis undulatis obscuris præsertim pone medium, macula semiovali mediana vitrea, posticis ocello magno pupilla vitrea iride fulva annulo nigro cincta.*

Expans. alar. antic. unc. $7\frac{3}{4}$.

Hab. Sierra Leone.

Syn. *Phalæna Attacus Alinda*, Drury, Illustr. iii. pl. 19; Oliv. Enc. Méth. v. p. 26. 10.

I have not seen a specimen of this species.

Sp. 16. SATURNIA PHÆDUSA, Drury. *S. alis anticis falcatis griseo-fuscis anticis strigis tribus transversis saturatoribus maculaque parva triangulari mediana vitrea; posticis obscurioribus ocello maximo pupilla minuta vitrea, iride lata nigra annulis concentricis anguste sanguinea, pallide punicea, et ferruginea circumcincta.*

Expans. alar. antic. unc. $7\frac{3}{4}$.

Hab. Sierra Leone. In Mus. Britann.

Syn. *Phalæna Attacus Phædusa*, Drury, Illustr. iii. pl. 24 & 25. *Bombyx Saturnus*, Fab. Ent. Syst. iii. a. p. 409; Oliv. Enc. Méth. v. 27. 11.

The palpi are short and thin, but distinct. The antennæ are short, each joint emitting four rays lying flat.

The specimen in the British Museum collection is pale russet-coloured beneath with a pinkish bloom, the centre of each wing with a group of brown spots much larger in the hind- than in the fore-wings; a small brown spot also occurs at the base of the hind-wings.

Sp. 17. SATURNIA TYRRHENA, Westw. (Pl. VIII. fig. 1.) *S. alis anticis falcatis griseo-fuscis basi rubidis, striga undulata prope basin alteraque lunulata subapicali fuscis, macula parva mediana subtrigona vitrea; limbo apicali rufo; alis posticis rufis ocello magno ovali nigra pupilla parva vitrea; striga undata obscuriori, limbo lato pallide griseo-fusco.*

Expans. alar. antic. unc. 4-5 $\frac{1}{4}$.

Hab. Port Natal. In Mus. Britann.

The fore-wings are pale greyish-brown, sometimes with a reddish tinge; they are acute at the tip in both sexes, but the outer margin is considerably more emarginate than in the female; the base of the wing is red, and near the base is a red, very much angulated striga almost suffused into the ground colour of the wing, and outwardly edged with a slight dusky striga; across the middle of the wing is a waved but nearly obsolete striga, and in the middle of the wing towards the fore-margin is a small subtriangular vitreous spot without any appearance of ocellus; beyond the middle is a row of reddish arches inwardly slightly edged with a thin dusky line.

The hind-wings are reddish, with a broad pale greyish-brown border; in the middle of the wing is a large round black spot, with a very small vitreous lunar spot in the middle, preceded and followed by a slight dusky waved striga. The body above is of the ground colour of the wings, with the hind part of the thorax marked with red. The underside of the body, collar, and spot at the base of the hind-wings are white. The head, antennæ and legs dark brown.

The wings beneath are very pale buff, with the centre of each marked by a large brown irregular spot, traversed by the pale veins.

Antennæ of the male with 32 rays on each side (four from each

joint). One-third of the apical part of each antenna is destitute of rays.

The antennæ of the female are slightly pectinated for two-thirds of the base, the two apical rays of each joint being almost obsolete. The tips are serrated.

The palpi are deflexed, and the tips appear just beyond the hairs of the lower part of the face.

Var. Smaller, with the fore-wings and body destitute of the red colour, and the hind-wings fulvous with the outer margin purplish-grey, with the eye as in the others.

Sp. 18. SATURNIA FORDA, Westw. *S. pallide griseo-fusca* ♂, *pallide cervino-lutea* ♀, *striga subobsoleta pone medium, posticis etiam ocello parvo subvitreo, fusco, medio; alis posticis maris angulato-subcaudatis; fœminæ rotundatis.*

Expans. alar. antic. unc. $4\frac{1}{2}$ – $4\frac{3}{4}$.

Hab. in Natalia. Mus. Brit.

Male with the fore-wings very slightly emarginate along the outer margin; hind-wings produced into a strong angle in the middle of the hind-margin; all on the upper side of a silky, pale brownish-grey, uniform colour, traversed by a slightly distinct, slender, brown striga beyond the middle. The hind-ones marked moreover in the middle with a small, round, dusky spot, having an indistinct vitreous lunule in the middle, and surrounded by an indistinct whitish circle. The antennæ are dark brown; those of the male are moderately bipectinated, each having about thirty-six rays on each side, a few of the apical joints being destitute of rays, and some of the preceding having the second ray gradually becoming obsolete. The female antennæ are only slightly serrated, the second spur on each side of each joint being obliterated. The veins are those of the typical *Saturniæ*.

The female has the body and wings of a pale reddish buff, with the dusky striga beyond the middle almost obliterated, and the dusky spot in the middle semicircular. On the underside the hind-wings have also a small oval dark spot towards the base.

Sp. 19. SATURNIA ANGASANA, Westw. *S. alis anticis apice acutis isabellinis, fascia pallide grisea ante medium, strigaeque tenui oblique fusca pone medium maculaque parva semi-ovali vitrea mediana; posticis ocello magno nigro, pupilla minuta vitrea, annulis concentricis testaceo, puniceo-albo, et sanguineo cincta.*

Expans. alar. antic. unc. $5\frac{3}{4}$.

Hab. apud Portum Natalensem. In Mus. Britann.

Isabelle-coloured or pale rufous brown, with an irregular pale greyish bar before the middle, followed by an oblique darker fascia, on the outside of which is a small semi-oval tale-like spot; beyond this, extending from near the tip of the wings towards the middle of the inner margin, is a nearly straight, slender, darker line, edged with greyish on each side; the apical margin of the wing beyond the dark line becoming grey, shaded off to the ground colour of the wing. The hind-wings have a large ocellus, black in the centre, with a minute vitreous dot in the middle, with a red lead-coloured ring outside the

black, followed by a fleshy-coloured one, and this by a purple-carmine one: the outside of the ocellus rests upon a dark, slender, curved line. The collar and underside of the body whitish; head and legs darker olive-brown; antennæ black.

Wings beneath pale reddish buff, of a redder brown near the tip, with the dusky subapical line as above, and the vitreous spot preceded and followed by a dark claret-brown spot: hind-wings destitute of the ocellus, which is replaced by an indistinct claret-brown spot, followed by a red-brown fascia, widest at the anal margin. Near the base is also a small brown spot.

The antennæ of the female are serrated, the two terminal rays of each joint nearly obliterated, with one-fourth at the apex simple.

This species is figured by Mr. Angas in his plate of Amazoolu Lepidoptera, fig. 16.

Sp. 20. SATURNIA ACETES, Westw. *S. alis anticis apice acutis obscure fulvis striga valde undulata cinerea prope basin ocello mediocri mediano fusco et vitreo strigaeque recta fusca subapicali, posticis magis ferrugineis ocello magno medio pupilla vitrea, iride nigra annulo albo cincta strigaeque tenui transversa fusca recta prope medium* (♀).

Expans. alar. antic. unc. $6\frac{1}{2}$.

Hab. apud Caput Palmarum (D. Savage). In mus. nostr.

The fore-wings are of a dark reddish fulvous colour, tinged with red-brown between the middle and the apex. Near the base is a very irregular, rather indistinct, ashy-purplish striga, and in the middle of the wing is an oval moderate-sized ocellus, the basal half being brown, and the apical half vitreous, the latter surrounded by a slender brown line; halfway between this ocellus and the apical margin of the wing is a straight, slender, brown line, running from near the apex of the wing towards the middle of the inner margin. The hind-wings are of a much redder hue, especially on the anterior portion, with a slight appearance of the sub-basal ashy striga of the fore-wings near the base; the middle of the wing occupied by a large ocellus, with a vitreous centre, having a rather broad greyish-black iris surrounded by a white ring, the outer extremity of which rests on a slender dusky striga running from near the outer angle of the wing towards the middle of the anal margin. The body is rich brownish fulvous, with an ashy-brown collar and legs. The antennæ black and very slightly pectinated in the female, consisting of about thirty-five joints, the first twenty-five emitting a pair of short slender branches from the base, the tip of the joints being also slightly serrated; the ten terminal joints are shorter, each emitting a single branch set on in front of each joint, the branches of the preceding joints being set on the upper and lower edges.

The wings beneath are paler buff-brown, with a broad, subapical, dusky bar, undulated externally; the eye of the fore-wings less distinct, and that of the hind-wings replaced by two brown spots and a vitreous patch. Near the base of the wings is also a round brown dot.

Sp. 21. SATURNIA ISIS, Westw. *S. alis griseis nigro fuscoque irro-*

ratis, striga fusca valde dentata ante medium alterisque duabus nigris pone medium, ocello parvo vitreo antice nigro; posticis ocello maximo ornatis, pupilla nigra postice subvitrea, iride obscure fulva annulisque concentricis nigro, subluteo, pallide carneo, purpureo-rufescenti, iterumque carneo et pone hanc striga curvata nigra, apice obscure albido limbo griseo.

Expans. alar. antic. unc. $5\frac{3}{4}$.

Syn. *Saturnia Isis*, Westwood in Jard. Nat. Library, Entomol. vol. vii. p. 138. pl. 13. *S. Maia*, Klug, Neue Schmett. t. 5. fig. 1 (nec *Ph. Maja*, Drury, Ill. vii. pl. 24. fig. 3).

Wings of a very pale grey colour, especially the anterior pair, which are almost entirely covered with fine black and brown scales. The centre of these wings is ornamented with a small oval ocellus, the basal half of which is covered with black scales, and the outer half is vitreous: between this and the base is a very curved and irregularly dentate dark striga, and immediately behind the eye is a nearly straight, slender, brown bar. This is succeeded by slender black wavy bars, the space between which and the apex of this wing is divided as it were into three compartments, the first of which is covered with small brown scales; the second is paler, and covered with very fine black speckles, and the apical part is much darker, with large black speckles; the apical margin of the fore-wings is slightly waved. The hind-wings are entirely covered on the upper side by a most magnificent eye-like spot, surrounded by successive rings of various colours. The oval pupil is black, but the part furthest removed from the body is denuded of scales, and would be vitreous were not the underside of the wings clothed with scales: this is surrounded by a narrow fulvous iris; then black; then a broader oval ring of dirty clay colour; then a narrow oval of pale flesh-colour; then a broad, rich, claret, oval ring: between this and the base of the wing is first a bar of flesh-colour, then black, shaded into claret; towards the extremity of the wing the claret is succeeded by a half-ring of flesh-colour; then a narrow one of black; then of pale buff stone-colour, and another moderately broad of grey speckled with black, extending to the extremity of the wings. The thorax is dark and rich brown coloured, with two white bands across the neck and two across the extremity of the thorax whitish; the abdomen is buff, with black dots. The margin of the wings is scalloped.

Beneath, all the wings are very pale buffish white with dark speckles; the fore-wings are marked nearly as on the upper side, but the hind-wings have only a very small eye in the centre, having a black pupil with a fulvous orbit surrounded by a slender black circle; immediately connected with the posterior part of this eye is a curved row of brown arches, between which and the apex of the wings is another and more slightly marked series of black scallops. The palpi are distinct, forming a small brown muzzle, but they are not visible from above; they, as well as the rest of the head, are brown. The spiral tongue appears to be wanting. The antennæ of the male are considerably elongated, with the rays bent backwards instead of lying flat, and there are eighty-eight rays on each side of the antennæ, the rays ex-

tending to the tip, so that the antennæ are composed of about forty-four or forty-six joints. The antennæ of the female are setaceous, and only slightly bipectinated, being gradually more slender from about one-third of the distance from the base to the apex, each joint emitting four rays, the joint at each point of emission being swollen.

The female has the wings rather shorter, and not at all emarginate along the apical margin.

Sp. 22. SATURNIA NICTITANS, Fabr. *S. alis margine apicali integro, fusco incarnatis medio obscuriore, striga tenuissima angulata prope basin alteraque recta subapicali fuscis punctoque parvo medio vitreo; posticis concoloribus ocello magno medio pupilla parva vitrea, iride flava, annulis nigro, puniceo et albo cincta, strigaeque transversa nigra subapicali.*

Expans. alar. antic. fere unc. 5.

Hab. in Africa tropicali. In Mus. Banks. (Soc. Linn. Lond.), Mus. Britann. et nostro.

Syn. *Bombyx nictitans*, Fab. Ent. Syst. iii. a. 413.

The antennæ of the male are 39-jointed, with fifty-eight rays on each side (four from each of the twenty-nine or thirty basal joints), the rays lying nearly flat.

The antennæ of the female are about 42-jointed, only slightly serrated, each joint having two serratures on each side, the basal one being most prominent, the antennæ becoming gradually more slender to the tips. The palpi are short, but distinct and deflexed.

Sp. 23. SATURNIA ALOPIA, Westw. *S. alis anticis fusco-albidis, striga recta puniceo-alba ante medium maculaque parva triangulari mediana vitrea, strigaeque postica recta fusca externe puniceo-tincta, posticis etiam bistrigatis ocelloque parvo vitreo, iride obscure lutea circulo nigro alteroque late puniceo-albo circumdata.*

Expans. alar. antic. unc. 4½.

Hab. —? In Mus. Britann.

Fore-wings brownish buff, with a pale pinkish white, nearly straight fascia across the wings before the middle, edged towards the base with a fine dark line, the other side shaded off to the ground colour of the wings; beyond the middle is a small triangular vitreous spot, bounded at the base by the transverse veinlet closing the discoidal cell; beyond the middle is a straight, slender, dark striga, edged with pale pinkish white; the outer margin of these wings slightly emarginate; hind-wings entire, somewhat oval, brownish buff, the middle with a pale rosy tint, bearing an ill-defined whitish fascia towards the base, and another, followed by a dusky line, beyond the middle; the middle of the wing occupied by an ocellus, with a small glassy centre, surrounded by dirty buff, and this by a black circle and a larger, pale pinkish white one; thorax in front with a white transverse fascia; antennæ dark brown.

The antennæ of the male are small, moderately short, the rays flat, thirty-four rays on each side, one-fourth of the antennæ at the tip being destitute of rays.

The palpi are distinct, but small.

Sp. 24. SATURNIA ETHRA, Westw. (Plate X. fig. 1.) *S. alis omnibus apice undulatis, anticis subfalcatis, posticis in medio in caudam truncatam productis; fusco-albidis fusco irroratis, anticis dimidio basali pallidioribus, strigis tribus fuscis undatis 2nda magis distincta mediana et cum ocello parvo medio conjuncta; posticis ocello maximo; pupilla lunata vitrea iride nigra circulo tenui luteo, 2do nigro, 3tio latiore luteo-fulvo, 4to albo; striga basali angulata alterisque duabus pone medium undulatis nigris; parte antica alarum puniceo-rufa.*

Expans. alar. antic. unc. $5\frac{3}{4}$.

Hab. — ? In Mus. D. Loddiges.

The fore-wings of this fine species are rather narrow and subfalcate, with the apical margin rather waved; they are of a buff-brown, very much irrorated with darker scales, the basal half of the wing and costa being much paler; they are traversed by three very oblique brown strigæ, of which the middle one is the thickest; the anterior one is very much waved and dentated, the second much-waved, having attached to it near the middle of the wing a small oval ocellus, of which the anterior half is brown and the other half vitreous: the third fascia arises on the costa from a larger brown spot. The hind-wings are similarly coloured to the apical portion of the fore-ones, except that the anterior portion is of a rich pinkish red which extends half round the ocellus, which is large and central, having a small semicircular vitreous pupil surrounded by a black iris round which is a very slender luteous ring, and another black, followed by a pinkish-buff broader ring, and this by a white one. Across the base of the wing is a brown angulated striga, being the continuation of the central one of the fore-wings, and from the inner margin of the ocellus runs a waved one to the anal margin, followed by another running across the wing parallel to the apical margin. The apical part of the wing is much freckled with brown, and a thin brown line runs just within the margin. The thorax is dark brown, with a pale buff collar; the hind-part pale, with a short black bar. Wings beneath coloured as above, except that the fore-ones are tinged on the inner margin with pink, which colour is entirely wanting in the hind-wings, which are more freckled with brown than above, the ocellus being replaced by a small brown spot.

The pectinations of the antennæ of the only specimen I have seen (which is probably a female) are comparatively short, each antenna having thirty-eight rays on each side (four from each joint), and about one-fourth of the antennæ at the apex is destitute of rays. The palpi are very small, but distinct.

This fine insect is unique in the collection of Conrad Loddiges, Esq., of Hackney, who is not aware of its locality; but from its relationship to *S. Isis*, I have but little doubt of its being a native of Africa.

Section D.

Sp. 25. SATURNIA LUCINA, Drury. *S. alis anticis falcatis, posticis rotundatis, omnibus albido-griseis fusco multum rivulosis*

strigis undulatis submarginalibus, anticis maculis nonnullis mediis ocelloque parvo apicali nigris.

Expans. alar. antic. unc. $6\frac{3}{4}$.

Hab. Sierra Leone.

Syn. *Phalæna Attacus Lucina*, Drury, Illustr. iii. pl. 34. fig. 1; Oliv. Enc. Méth. v. 31.

I have not seen any specimen of this insect, the veins of which agree rather with *Saturnia* than *Lasiocampa*, although the antennæ seem but narrowly pectinated.

Sp. 26. SATURNIA NENIA, Westw. (Plate IX. fig. 3.) *S. alis anticis apice rotundatis; plumbeo-nigris apicibus magis fuscis luteoque irroratis striga tenui irregulari nigra obliqua, ante medium alteraque minus distincta at magis obliqua, et ad costam valde angulata, macula media irregulari albida; posticis nigricanti-fuscis basi puniceis macula magna media pallide flava.*

Expans. alar. antic. unc. $4\frac{1}{4}$.

Hab. apud Caput Palmarum (D. Savage). In mus. nostro.

This curious species has the fore-wings broad, with the fore-margin rather suddenly angulated beyond the middle, and with the apical margin rounded, the extreme tip forming a small, rounded, slightly detached lobe. The general colour of the wing is a dark leaden-coloured blackish-brown, slightly irrorated with fulvous scales, especially towards the tip of the wing, which is rather paler and more varied than the rest. At about one-third from the base runs an oblique, black, irregular striga, which is followed by another more slender and indistinct, and more slanting, being suddenly strongly angulated near the costa, where it terminates in a strong black dash. Between the strigæ is an ill-defined fulvous-buff patch in the middle of the wing. The hind-wings are blackish brown, with the base pink, and with a large, very pale yellow patch in the middle. The body is blackish brown and slightly irrorated. The abdomen is much swollen in the only specimen I have seen. Beneath, the wings are very much freckled with grey, black, buff and white, especially beyond the middle; the fore-wings have a large patch of rose-pink along the inside at the base, followed at some distance by a rather broad, very pale yellow bar; the hind-wings want the pink colour, but have the pale yellow patch as on the upper side.

The antennæ of the female consist of twenty-two joints, emitting only a pair of rays from the base of each, the apical pair being indicated by a very slight serration, followed by about twelve joints at the tip which are destitute of rays. The palpi are porrected into a short distinct muzzle.

From these characters it will probably be necessary to form this species into a separate subgenus, when the male shall be known. The veins of the wings are arranged as in the typical *Saturnia*.

Sp. 27. SATURNIA HERILLA, Westw. (Plate X. fig. 3.) *S. alis apice undulatis, anticis angulatis brunneo-fulvis valde irroratis, medio fulvescenti fascia obliqua fusca abbreviata; posticis macula magna sulphurea, limbo lato fusco, fulvo irrorato.*

Expans. alar. antic. unc. $4\frac{3}{4}$.

Hab. Sierra Leone (D. Morgan). In Mus. Brit.

Wings fulvous-brown, much varied with darker and lighter shades, and with numerous small dark dots and streaks; the base with a grey shade much-mottled with small dark brown patches; before the middle of the wing is an ill-defined, pale, nearly square patch, resting on the median vein, but extending narrowly along the costal margin, which is much marked with dark dots; the middle of the wing is more uniformly fulvous brown, with a dark, very oblique dash arising from the costa, which is considerably curved beyond the middle: a dark brown oval patch also rests on the middle of the last branch of the median vein; the apical margin of the wing is scalloped and dark brown, preceded by a paler patch marked with undulating fulvous-brown lines; the hind-angle of the wing being much dotted with different shades of fulvous and brown. The hind-wings have a large sulphur-white patch occupying the base of the wings, except the extreme base, which is pink. The remainder is brown, varied with minute fulvous spots, the anal angle being more mottled.

On the underside the wings are paler and richer coloured, more decidedly mottled; the fore-wings having the base suffused with pink. The veins are fulvous.

The antennæ are but slightly pectinated.

The body is fulvous-brown, the thoracic portion tinged with pink.

Sp. 28. SATURNIA AGATHYLLA, Westw. *S. alis anticis subfalcatis posticis denticulatis; supra pallide rufo-fulvis (in specimine nostro unico valde detritis), in medio ut videtur exocellatis.*

Expans. alar. antic. unc. $3\frac{5}{8}$.

Hab. Congo. In Mus. Brit.

A single specimen only of this insect exists in the British Museum, having the wings so completely denuded of scales, except at the base, that it is impossible to give a detailed character; their outline is however entire. The anterior ones are subfalcate, and the hind ones are denticulated along the outer margin, the tooth at the extremity of the middle branch of the median vein being the most acute. All that remains of the colouring of the fore-wings is a reddish-fulvous buff, which seems indeed to have extended all over these wings, as well as over the hind-wings, which are suffused with pink on the upper side towards the anterior margin. On the under side the wings are coloured as above; the fore-wings are also suffused with pink along the posterior margin at the base, and they, as well as the hind-wings, have the anterior margin somewhat streaked transversely with brown. I can discern no trace of eyes in the middle of the wings. The body both above and below is fulvous brown, as are also the antennæ and legs.

The basal joint of the antennæ is clothed beneath with a thick mass of hairs; each is furnished with eighty rays, each of the twenty joints succeeding the basal one emitting four rays, one close at the base and one close at the apex on each side, the inside of the two on each side being furnished with fine hairs, the tips of which come in

contact with each other. The thirteen terminal joints are destitute of rays. The palpi are quite distinct, but scarcely extend beyond the hairs of the face.

Section E.

Sp. 29. SATURNIA (HENUCHA) GRIMMIA, Hübner. *S. alis anticis nigris albo irroratis lunulisque magnis albis, ocello medio fulvo maculam mediam virgatam includente; posticis basi puniceis medio albis maculis duabus nigris, majori ocellum fulvum (cum lunula alba) includente, limbo nigro albo irrorato, maculis marginalibus albidis.*

Expans. alar. antic. circ. unc. 3.

Hab. Africa meridionali.

Syn. *Phalæna (Henucha) Grimmia*, Hübner, Exot. Schm. F. 3, 4.

Sp. 30. SATURNIA (HENUCHA?) DELEGORGUEI, Bdv. (Pl. X. fig. 4. ♂.) *S. alis anticis (maris) valde falcatis; posticis subtriangularibus; omnibus (femineæ) subrotundatis et parum sinuatis; anticis brunneis basi costa et limbo apicali cinerascensibus, pone medium macula parva vitrea angulata; posticis basi et antice roseis, limbo fusco, striga alba; medio nigro, ocello fulvo, lunula vitreo annuloque nigro.*

Expans. alar. antic. unc. 2-2 $\frac{1}{4}$.

Hab. in Terra Amazoolu, et apud Portum Natalensem. In Mus. Britann.

Syn. *Saturnia Delegorguei*, Boisduval in Delegorgue's Voyage dans l'Afrique Austr. ii. p. 601.

Mr. Angas having figured the female of this interesting species in his plate of Amazoolu Lepidoptera (fig. 13), I have represented the more remarkably-formed male.

The antennæ of the male are 32-jointed, each of the fourteen basal joints emitting four rays, the second ray in one joint and the first of the following joint being close together, and only gaping at the tip: one-third of the antennæ at the tip is simple; the rays are set on at right angles, lying flat. The antennæ of the female are very shortly pectinated on each side, except about one-fourth of the length at the tip. The veins of the wings differ from those of the typical *Saturniæ* in having the outer branch of the post-costal vein arising from the middle of the transverse veinlet which closes the discoidal cell, and the two small vitreous spots, forming the angulated spot above described, rest on the outside of the veinlet, being divided from each other by the outer branch of the post-costal vein.

Sp. 31. SATURNIA (HENUCHA?) SMILAX, Westw. *S. alis anticis maris valde falcatis obscure fulvis (♂) seu griseo-fuscis (♀), fascia lata obliqua livida seu castanea utrinque linea tenui pallida marginata, anticis plaga magna subtriloba vitrea; posticis lunula parva media vitrea.*

Expans. alar. unc. 2 $\frac{1}{2}$ -2 $\frac{3}{4}$.

Hab. Port Natal. In Mus. Britann. et Saunders.

The fore-wings of the male are rather narrow and very much hooked

at the tip, and angulated beyond the middle of the costa, fulvous brown, palest along the fore-margin, with a rather broad, very oblique fascia a little beyond the middle of the wing, of a rich chestnut colour, shaded to purplish towards the costa; nearly straight along the fore-edge, but much-arched on the outer margin, both edges being marked with a pale, slender, buff line: beyond the middle of the fore-wing is a large, irregular, somewhat trilobed vitreous spot, outwardly edged with a dark line, and succeeded by a pale buff one. The apical portion of the wing beyond the fascia is fulvous buff, shaded to brown in the middle, and to purple. There is also a small dark dot in the middle of the costa.

The hind-wings are fulvous, the middle with a darker oblique fascia tinged with purple, with a pale line on each side; the outer margin curved, and in the middle of this fascia is a small lunate vitreous spot.

The female has the fore-wings slightly waved along the outer margin: the general colour of the wings is darker and more ashy than in the male, the fulvous colour replaced by ashy brown.

The head and a large patch on the thorax are dark fulvous brown in the male, chestnut in the female.

The antennæ of the males are scarcely pectinated beyond the middle; there are twenty-two rays on each side. The apical half simple, with only numerous short setæ at the extremity of the joints. The antennæ of the female are quite simple and setaceous. The veins of the wings are arranged as in the last species, the ocellus of the fore-wing resting on the outside of the transverse veinlet closing the discoidal cell, and being divided into two parts by the outer branch of the postcostal vein*.

Sp. 32. SATURNIA (UROTA) SINOPE, Westw. (Pl. X. fig. 2.)

S. alis anticis integris, posticis breviter caudatis; anticis fulvo-brunneis fasciis duabus albis singula strigam fuscam includente, punctoque parvo ovali media alba, posticis livide puniceis puncto medio albo fasciaque pone medium alba.

Expans. alar. antic. unc. 3.

Hab. apud Portum Natalensem. In Mus. Britann.

The wings of the male are entire and nearly straight; along the apical margin they are buff-brown or pale reddish brown, with a transverse white bar before and another beyond the middle, each edged on each side with a thin black line, and bearing a black streak along its middle. In the middle of the wing is a small oval white spot edged with black. Hind-wings livid pink, with a white spot in the middle, followed by a white fascia: apical portion of the wing fulvous brown, produced into a short, broad, somewhat triangular tail, obtuse at the tip.

Beneath similarly marked, but with all the colouring dull. Body, legs and antennæ fulvous brown.

The antennæ are rather short, and consist of forty-eight joints, each

* Mr. Angas has represented this species in his plate of Amazoou Lepidoptera, figure 12.





joint with one short ray on each side; the rays set on obliquely and directed backwards, the tips of the rays being turned forwards.

There are no traces of palpi to be perceived. The veins of the fore-wings are arranged as in the typical *Saturniæ*.

Sp. 33. SATURNIA (APHELIA) APOLLINARIS, Bdv. *S. alis externe rotundatis albis venis nigricantibus, anticis maculis duabus parvis mediis flavis fusco-cinctis; apice nigricanti striga communi extus dentata cum margine postico parallela, margine fusco-nigricanti maculis flavis ornato; abdomine albo apicibus segmentorum flavidis; serieque dorsali laterali et ventrali punctorum nigrorum, pronoti margine antico flavido.*

Expans. alar. antic. fere unc. 3.

Hab. apud Portum Natalensem. In Mus. Britann.

Syn. *Saturnia Apollinaris*, Boisduval in Delegorgue's Voyage dans l'Afrique Austral. ii. p. 601.

The texture of this insect, as described by Boisduval, is "mince et délicate"; the same author states that it is "tout autant une Liparide qu'une Saturnide." The veins of the fore-wings are however arranged as in the typical *Saturniæ*; but the antennæ are different, consisting of about thirty-six joints, bipectinated in both sexes with only thirty-four rays on each side, each joint except one or two at the apex emitting only a pair of rays, which are rather short. The palpi are distinct and turned upwards, extending rather further than the hairs of the face: the spiral tongue is distinct.

Boisduval states that this species "vole en plein jour. Une année, aux environs de Port Natal, on aurait pu en prendre par centaines en quelques heures. Deux ou trois jours après il n'existait plus. La femelle que nous est inconnue ne vole pas, peut-être même est-elle aptère, et tous les mâles voltigeaient sans doute à sa recherche." The female is however winged and scarcely distinguishable from the male, as I have ascertained by extracting eggs from the abdomen of a specimen in the British Museum collection, which M. Boisduval would doubtless have taken for a male.

The structure of the antennæ and presence of a spiral tongue, together with the fragile texture of the insect, will require a subgenus for its reception.

April 24, 1849.

William Spence, Esq., V.P., F.R.S., in the Chair.

The Secretary reported, that since the last meeting the collection of living animals had been increased by the purchase of three Bower Birds (*Ptilonorhynchus holosericeus*), brought to this country by Mr. Aspinwall of Sydney. A pair of Pumas, presented by Mrs. Martin

Stevenson and Don Javier Ovalle, had arrived from Valparaiso; and the first division of a collection of Reptiles, indigenous to France, had been received from the Muséum d'Histoire Naturelle at Paris.

Among the correspondence was a letter from Mr. Drummond Hay, Corr. Memb., H.M. Chargé d'Affaires in Morocco, offering a pair of Gazelles (*Gazella Cuvieri*, Ogilby?) for the acceptance of the Society, and promising to transmit, in the course of the summer, all the species of Reptiles which are found in the neighbourhood of Tangier.

The following papers were read:—

1. NOTICE OF TWO EXAMPLES OF THE GENUS GALLUS. BY G. R. GRAY, F.L.S. ETC., SENIOR ASSISTANT IN THE ZOOLOGICAL DEPARTMENT OF THE BRITISH MUSEUM.

(Aves, Pl. VII. VIII.)

The known interest which the Zoological Society takes in the introduction of Gallinaceous Birds has induced me to call the attention of the meeting to the following examples, which it is supposed may prove species not hitherto noticed, as they exhibit some characters in the form and colouring of the hackles which are not found in any published descriptions. Thus in the bird figured in pl. 7, the hackle feathers are of a broad form, rounded at the apex, with the centre of a shining violet, which colour is margined with deep blue, broadest at the apex, and then extending in a point on the shaft at the top of the feather; these colours are externally margined with fulvous, which is less prominent on the larger feathers near the back and sides. The feathers of the back are prolonged and narrow, of a black colour, broadly margined with fulvous; the tail-feathers are bronzy-black, with the prolonged coverts black, broadly margined with violet; the lesser wing-coverts deep fulvous; the larger coverts violet, narrowly margined with black, and in some cases with fulvous; the quills black, narrowly margined with brownish-white; and the secondaries black, margined with chestnut. The feathers of the chest and under parts lengthened and pointed, of a black colour, more or less margined with fulvous.

The comb is large, extending far back, and is irregularly dentated on the upper margin; the throat naked and the wattle large and pendulous, with a small wattle on each side near the base of the lower mandible.

This fine bird was said to be brought from Batavia, but I regret to say its correct history is unknown. It has been thought right to name it provisionally *Gallus Temminckii*, until it may be proved otherwise than a species.

In the Society's Garden will be seen a living example, which Mr. Mitchell has pointed out to me, and which in some respects agrees with that described above, except that its comb is not dentated, and though the hackles are violet, yet they are narrowly lined down the shaft and margined only with black, the end of each feather being rather truncated and rounded. The breast and some of the feathers of the thigh rufous, and those of the former with a black spot at



Wolf del et lith

Printed by Halmann & Walton

GALLUS TEMMINCKII. G. R. Gray











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GLAREOLA NUCHALIS. G. R. Gray





Walden's copy

CULTRIVORUS PIPILLIS. C. R. Gray.

Printed by Hahn and Co.

their apex. In other respects it partly agrees with the before-mentioned example, but bears most resemblance to *Gallus æneus* of M. Temminck, although the hackles of the latter are described as "vert métallique à reflets pourpres très-éclatans," &c. These differences have made it desirable to add a figure of the bird alluded to (pl. 8), that persons who have the means of studying these birds in their native places may be induced to determine whether these examples may justly be considered species, or only hybrids of others that are already known to naturalists.

2. ON A NEW SPECIES OF THE GENUS GLAREOLA.

BY G. R. GRAY, F.L.S. ETC.

(Aves, Pl. IX.)

GLAREOLA NUCHALIS.

Brownish ash tinged with bronze, paler on the throat and breast, and darkest on the quills and tail; a white line commencing at the gape and extending round the nape, thus forming a prominent collar; the base of the tail-feathers, with the space gradually enlarging to the outermost, and the tips of the third, fourth and fifth feathers, white; the abdomen and under tail-coverts ashy-white; the two longest of the latter with a broad patch near the tip of each dark brownish ash.

Bill black, with the base yellow; feet yellow, with black claws.

Total length, $5\frac{1}{2}$ " ; bill from gape, 8" ; wings, $5'' 7'''$; tarsi, 9" ; middle toe, 8" .

The bird here described was discovered by Francis Galton, Esq., at the fifth cataract of the Nile. This species may prove eventually to be found also on the Quorra, Western Africa, as is partly shown by an immature specimen in rather bad condition, which is contained in the collection at the British Museum.

3. DESCRIPTION OF A NEW SPECIES OF THE GENUS CULTRIDES.

BY G. R. GRAY, F.L.S. ETC.

(Aves, Pl. X.)

CULTRIDES RUFIPENNIS.

Head, neck, and breast, blue-black, tinged in some lights with green; the back and smaller wing-coverts olivaceous; the greater wing-coverts and the outer webs of the secondaries bright cinnamon; the inner webs of latter and primaries dark violet; the throat and lower part of breast and abdomen ashy-white; the middle feathers of the tail changeable bronzy-green; the second, third, and fourth feathers, dark green slightly tinged with bronze on the outer margins, the first feather on each side dark violet-blue. Bill black, with the tip white; the legs and feet pale.

Total length, 1' 10" ; bill to gape, 2" 4" ; wing, $7\frac{1}{2}$ " ; tail, 1' ; tarsi, 2" 7" .

This bird, which is supposed to be a native of Mexico, forms a second species of the genus *Cultrides*, which was established by M. Pucheran, with the *Coccyzus Geoffroyi* of M. Temminck for its type.

May 8, 1849.

Harpur Gamble, Esq., M.D., in the Chair.

The Secretary reported that living specimens of *Ptilinopus melanocephalus*, *Platycercus Barnardi*, *Lanius septentrionalis*, and *Dasyprocta Azaræ*, had been purchased for the Menagerie; that a Hog-Deer fawn and a Chinchilla had been produced in the Gardens; and that a beautiful example of *Equus hemionus* from Cutch, presented by the Hon. Sir T. Erskine Perry, Chief Justice of Bombay, had been brought to England free of expense in the Peninsular and Oriental Steam Navigation Company's ship 'Pottinger.'

Among the correspondence were letters from the Lord Harris, Governor of Trinidad, the Hon. C. A. Murray, and Lieut. Tyler, R.E. (St^a Lucia).

The following papers were read:—

1. ON A VERY LARGE ROE-DEER (*C. leucotis*) IN THE COLLECTION OF THE EARL OF DERBY. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Mamm. Pl. XII.)

The President has sent for exhibition a stuffed specimen of a female Deer, which has lately been obtained by him from Valparaiso, and is a native of South America. It evidently belongs to the genus *Capreolus* or Roebucks.

I may observe that most of the groups into which the Deer have been divided are strictly geographic divisions; the only exception is in the Stags, or the restricted genus *Cervus*, one species of which is found in America. The following animal appears to be a similar example in the genus *Capreolus*, which has hitherto been restricted to species found in the Old World.

In size it agrees with the specimens of the male Ahi or *C. pygargus* from Siberia in the British Museum collection, being at least three times as large as the usual European Roebucks; but it differs from that species in being much darker, in not having the white spot which extends over the upper part of the sides of the haunches, and in having the greater part of the front of the chin and a spot on each side of the upper lip white, instead of the lip and chin being nearly black, as in that species.

In all the characters above noted it agrees with the European Roebuck, as it also does in the greater stoutness of the legs and the greater length of the face. Indeed I can see no difference between it and the European Roebuck, except in the greater size, the greater length of the quills, and their more distinct and broader subterminal yellow bands, and in the hair on the inside of the ears being whiter; but in the latter character it also differs from *C. pygargus*.

I think it may be distinguished by the provisional name of *C. leucotis*.



LEUCOTIS GRAY



Sundevall observes of *C. pygargus*, "A priori (*C. Europæus*) non minus differt quam omnes Cervi indici inter se; hi igitur, non minus quam ille, distinguendi, sed rectius forsan ut meræ varietates habendi."—*Pecora*, 61.

I have seen six specimens of the Ural species, and they were all alike, and very distinct from any variety of the European Roebuck I have seen, especially in the form of the head and the extension of the white disk over the sides of the rump, forming a broad oblong white spot; while in the European species it is an erect longitudinal disk only, occupying the back part of the haunches.

The height at the shoulder of Lord Derby's specimen is 38 inches. His Lordship's correspondent states, "It was brought to Valparaiso by Don Benjamin Munoz, a Commodore in the Chilian Navy. The animal was shot by one of the Chileno officers about twenty leagues from Port Famine in the Straits of Magellan. The Indians assured the officer that there was another similar kind of Deer there, but quite white. He did not see any of them, but the other kind (*C. leucotis*) did not seem uncommon."

2. ON THE GENUS *BRADYPUS* OF LINNÆUS. BY JOHN EDWARD GRAY, ESQ., F.R.S. ETC.
(Mammalia, Pl. X. XI.)

Illiger, and afterwards F. Cuvier, divided the Linnæan genus *Bradypus* into two, according to the number of the claws and the absence or presence of the canine, and the form of the crown of the grinders.

The examination of the collection of skulls of the family in the collection at the British Museum, has induced me to believe that the recent species may be divided into three very distinct subdivisions, and that there are at least seven distinct species.

Synopsis of Genera.

1. *CHOLÆPUS*.—Hands two-clawed, feet three-clawed; front grinder large, like a canine; pterygoid bone rather swollen, sub-vesicular.

2. *BRADYPUS*.—Hands and feet three-clawed; front grinder small; pterygoids swollen, hollow, vesicular.

3. *ARCTOPITHECUS*.—Hands and feet three-clawed; front grinder small; pterygoids compressed, crest-like, solid.

I. *CHOLÆPUS*, Illiger (1811); *Bradypus*, *F. Cuvier, Dent. Mamm.* t. 77; *Bradypus*, sp. *Linn.*; *Tardigradus*, sp. *Brisson*.

Hands two-clawed, feet three-clawed. Grinders: front upper and lower large, like canines; the upper ones separated from the other grinders by a broad space, with a deep concavity in front, at the back edge of the teeth. Intermaxillary bones small, distinct, and produced in front, with a long canal behind them; pterygoid bones separate, rather swollen, spread out on the sides, thick, with a moderate internal vesicular cavity.

Lower jaw much-produced in front between the teeth.

The skull of this genus is well-figured by M. Cuvier, *Oss. Foss.* v. No. CXCIV.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

t. 5, and M. De Blainville, *Ostéograph. Bradypus*, t. 1; skeleton, t. 3. f. 1, 2, old and young skull.

1. *CHOLÆPUS DIDACTYLUS*.

Bradypus didactylus, *Linn.*; *Cuvier, Oss. Foss.* v. 73. t. 6; t. 7. f. 3, 5; skull, cop. *Cuvier, Règ. An. Illust.* t. 70. f. 2; *Blainv. Ostéog. Bradypus*, t. 1. t. 3. f. 13; *Guérin, Icon. R. A.* t. 33. f. 2-2 a, skull.

B. Unau and B. Curi, *Link*.

We have three more or less perfect skulls from different-aged individuals of this species.

The projection in the front of the lower jaw in the young specimen is narrow and acute; it then becomes thin, wider and rounded at the end, and in the adult skull it is thickened, prolonged, and again becomes rather more acute.

In the adult skull there are very large air-cavities between the parietes of the bones, and a considerable cavity in the pterygoid bone.

In the younger skull the pterygoid bone is small, and appears to be nearly solid, but there is a very large circular perforation which communicates with a cavity under the pterygoid bones, which is nearly entirely obliterated in the adult skull; and the intermaxillary bones of the two young skulls are much less projecting than those of the adult one.

The young skull exhibits a small, distinctly tapering, produced, additional central nasal bone, which is not preserved (or not to be found) in the adult one, or in any of the other skulls of the family which have come under my observation.

The hinder angle of the lower jaw of the two skulls, the one of a young and the other of an adult animal, in the Museum collection, is nearly similar in form. The condyloid process of the young is short and truncated behind, that in the older jaw being produced and bent back at the tip.

In the British Museum collection there are five skins of adults, two very young, one dry, the other in spirits, and three skulls more or less perfect.

The very young specimen in spirits in the British Museum is figured in Griffith's *Animal Kingdom*, and Seba figures the *fœtus* from spirits.

II. *BRADYPUS*. ? *Acheus pars*, *F. Cuvier, Dent. Mamm.* t. 78; *Guérin. Bradypus pars*, *Linn.* *Bradypus*, *Illiger. Tardigradus*, sp. *Brisson. Arctopithecus*, *Gesner*.

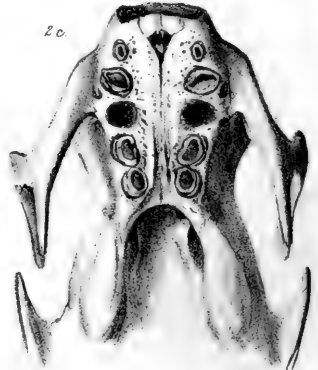
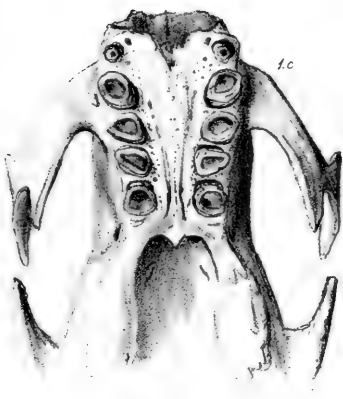
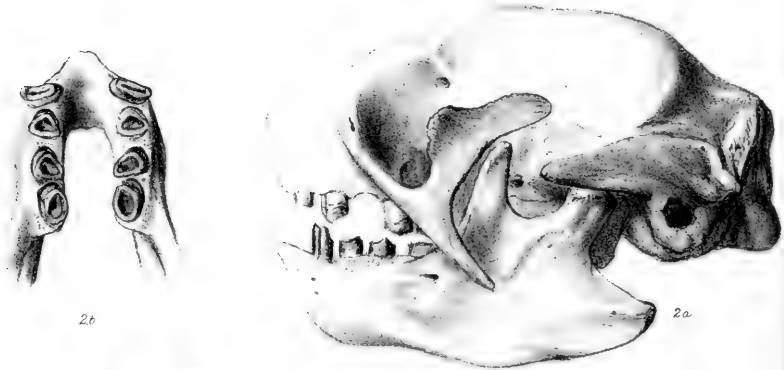
Hands and feet three-clawed. Skull flattened above on the forehead. Grinders: front upper small, cylindrical; front lower small, transverse, compressed. Intermaxillary bones none, or very rudimentary. The upper process of the zygomatic arch with a broad process in front, forming a back edge to the orbit. Pterygoids separate, much-swollen and raised, very thin, enclosing a large vesicular cavity.

Lower jaw produced in front between the teeth, flattened.

Cuvier, Oss. Foss. v. 88, described the skull of this subgenus.

Blainville (Osteograph. Bradypus, t. 3) figured an imperfect skull of a young animal under the name of *B. torquatus*, but it does not





1 BRADYPUS CRINITUS. 2. B. AFFINIS.

show the characters of the pterygoid process, and it has no appearance of the anterior process on the upper part of the zygomatic arch forming the upper hinder part of the orbit, which is found in most of the skulls of this genus. This skull may be the one described by Cuvier, as M. Blainville observes that the skull he figures formed part of the old collection, and was taken from a skin collected in Brazil by M. Delalande.

1. BRADYPUS CRINITUS.

(*Skull, Mammalia, Pl. X. f. 1. a, b, c.*)

Greyish, sides reddish; back of the neck with a mane formed of elongated black hairs.

B. crinitus, *Browne, Jam.* 489.

B. tridactylus, *Linn. Am. Acad.* i. 487; *Syst. Nat.*; *Shaw, Mus. Lever.* t. 3; *Nat. Misc.* t. 5; *Griffith, A. K.* v. t. 135.

B. tridactylus, var. *c. Desm. Mann.*

? "*B. variegatus*, *Schinz. Cuvier, Thierre*, iv. 510"?

B. torquatus, *Illiger, Prod.* 109; "*Temm. Ann. Gen. Sci. Phys.* vi. 212. t. 91;" *Fischer, Syn. Mamm.*; *Geoff. Ann. Mus.*

Acheus torquatus, "*Geoff.*" *Guérin, Iconog. R. A.* t. 33. f. 1 & 1 a, skulls.

B. cristatus, "*Temm. MSS.*" *fide H. Smith, Griff. A. K.* iv. 271.

Ai à collier, *Cuvier, Oss. Foss.* v. 88.

Three-toed Sloth, *Penn. Syn.* t. 29 (from B.M.).

Ignarus, *Clusius, Exot.* 110 fig. 372 fig.

Unau, Laet. Amer. 618. f. 618. cop. *Clusius* fig. at p. 372.

Ai sive Ignarus, Marcgrave, Brazil, 221. fig. cop. *Clusius*, 372.

Hab. British Guiana; Schomburgk.

This is evidently the species described and figured by Clusius (*Exot.* 111), for he observes, "*Collum non adeo crassum ut pictura refert, quia oblongioribus densisque pilis, quemadmodum et totum corpus, tectum erat: pilorum color ex fusco quodammodo spadiceus, sive potius qualis fere in crassiore illa lanugine magnas et crassas Indicas nuces tegente conspicetur;*" and better described and figured at p. 373 as follows: "*Universum corpus a summo capite ad unguis usque, densissimis usque prolixis villis erat obsitum, coloris partim nigri, partim cineracei, pæne ut meles, quem vulgus tassum sive taxum appellat, mollioribus tamen, atque a collo secundum dorsi longitudinem, usque ad posteriora fere crura, nigrorum pilorum quadam serie erat insignitum: totum collum a cervice ad anteriora usque crura veluti juba quadam nigrorum crinium in utrumque latus propendentium tectum habebat.*"

Marcgrave gives a copy of the second figure in Clusius (at p. 221), but with a rather different description, viz. "*Totum corpus prolixis et duo digitos pæne longis pilis est vestitum cinerei coloris. Tarsi similis sed mollioribus et cum abbedine nucis in dorso pilis magis albescunt et per medium dorsi tendit linea fusca a capite, per colli longitudinem pilis jubæ modo ad latera explicantur paulo longiores quam in reliquo corpore.*" (p. 221.)

The forehead (of the skull) flat over the orbit, rather concave between the front of the temple, wide and rather depressed over the

occiput. The pterygoid bones much-swollen, very thin, paper-like. The lower jaw with a broad square truncated process in front between the teeth, the sides converging, with the outer edge reflexed; the angle broad, acute, slightly produced beyond the back edge of the condyles. Teeth large, broad, the lower front one oblong, transverse: the lower process of the zygoma broad, flat, dilated.

The skull is easily known from the next by being much wider in all its parts compared with its length; this is especially visible at the occipital ridge and the palate, and on the under side of the lower jaw.

The *Sloth* figured by Edwards (Gleanings, t. 310) is from a badly-preserved specimen in the collection of Lord Peters, brought from Honduras. It appears to belong to this species, being the only one having long hair on the neck, but the black colour of this crest is not mentioned in the description.

Bradypus tridactylus, Linnæus, was first described by that author in the *Amœnitates Acad.* i. 487, but the description is so slight that it is not possible to determine with certainty the specimen for which it is intended, the only specific character being the following: "*facie vero pilis flavis vestitum; gula flava, totum corpus ursorum instar, pilis longis et asperioribus vestitur colore ex fusco sive griseo et albo variante.*" In the *Mus. Adolph. Fred.* p. 4, Linnæus refers to this description. The mixed colours of the first description and the habitat Surinam best agree with this species.

Gmelin merely described this species as "*Corpus pilosissimum griseum, facies nuda, gula flava.*"

Browne (Jamaica) mentions it as an animal which is sometimes brought from the mainland to Jamaica (not as a native of the island); his name at once shows that it must belong to this species.

The skull above described was taken from the skin of a specimen in the British Museum. We have also a skeleton of a second specimen, which was received from M. Becker under the name of *Bradypus torquatus*, from Brazil. It is the skull of this skeleton (it being more perfect than the former) that is figured in tab. X. f. 1. *a, b, c.*

2. BRADYPUS AFFINIS.

(*Skull, Mammalia, Pl. X. f. 2. a, b, c.*)

Fur unknown.

The forehead of the *skull* rather convex, with a slight convexity over the orbits and a higher convexity over the front part of the temples. The occipital ridge very concave and rather narrow. The pterygoid bones rather swollen, rather compressed on the sides, and moderately thick. The lower jaw with a broad, gradually tapering, truncated process in front between the teeth; the sides rather curved, simple-edged beneath; the angle broad, acute, slightly produced beyond the back edges of the condyles. The lower process of the zygoma slender, tapering. Teeth moderate, the lower front one much-compressed, transverse, linear.

Hab. Tropical America.

The skeleton from which this skull has been described and figured was received by the British Museum from M. Brandt, under the name of *Bradypus torquatus*, from Brazil.

It has been suggested that the two skulls in the Museum which have been extracted from skins of *Bradypus crinitus*, may both belong to male or female animals, and that the skull here described may belong to the other sex. As this is a matter of doubt which can only be settled by the examination of more specimens the sexes of which are known, I have considered it desirable that the skull should be figured and described. I may remark that the form of the hinder side and angle of the lower jaw of all the three specimens of these skulls are very similar.

Skull.	<i>B. torquatus.</i>		<i>B. affinis.</i>	
	in.	lin.	in.	lin.
Length	2	9½		
Length of palate	1	2		
—— from palate to occipital hole .	1	4		
Breadth at occipital ridge	1	4½	1	2½
—— at front of ear-hole	1	5	1	2½
—— at front of zygoma	1	10	1	8
<i>Lower jaw.</i>				
Length	2	4	2	2½
Width at condyles	1	8	1	4½
—— of back part of them	0	11	0	10

III. ARCTOPITHECUS. *Bradypus*, sp. *Rüppell*; *Pr. Max.*; *Cuvier*, *Oss. Foss.*; *Blainv.* *Acheus*, *F. Cuvier*, *Dent. Mamm.* t. 78. *Tardigradus*, sp. *Brisson*.

Hands and feet three-clawed. Skull rounded above on the forehead. Grinders: front upper very small, cylindrical; front lower smaller than the others, subcylindrical. Pterygoid separate, compressed, erect, thin, simple. Intermaxillaries none.

Lower jaw not produced on the upper edge between the teeth, but slightly keeled in front of the chin.

Face with a black streak from the back angle of the eye.

Cuvier, *Oss. Foss.* v. t. 4, figured the skeleton, and t. 5, the skull and bones of the feet of this genus; the skull is copied R. A. *Illust.* t. 70. f. 1 a. *Wiedemann*, *Arch. Zool. und Zoot.* i. t. 1 and 1*, and *Spix*, *Cephal.* t. 7. f. 12, figure the skull, and *Blainville* figured two skulls belonging to this genus in his 'Osteographia.'

In the young skull there is sometimes a slight projection on the front edge of the zygomatic arch, assisting to form the back edge of the orbit, but this process seems soon to disappear as the animal increases in size, and I have not found it in any of the older skulls.

Cuvier, *Desmarest*, and most French authors, have considered all the individuals of this genus as belonging to one species, and have given an indefinite description, so as to include them. *Cuvier* (*Règ. Anim.* ed. 1. 217) thus describes that species: "Sa couleur est grise, souvent tachetée sur le dos de brun et de blanc: plusieurs individus portent entre les épaules une tache d'un fauve vif que traverse une ligne longitudinale." He refers for the species to both *Buffon's figures*, xiii. t. 5 & 6. In the second edition he remarks, "On connaît un *Ai* dit la *dos brûlé*, parce qu'il a entre les épaules une tache noire en-

tourée de fauve ; ce n'est selon M. Temminck, qu'une variété résultant de ce que des longs poils de ses épaules sont usés."—*Cuvier, Règ. Anim.* ed. 2. p. 225.

Desmarest describes it in nearly the same words, but he notices four varieties, including amongst them *B. crinitus* (var. *c.*) ; the special description of the species and var. *b.* appear to be *A. gularis* ; var. *a.* appears to be from a female, and var. *d.* from a male of *A. flaccidus*.

Knorr (*Délices*, i. 97. t. K. f. 3) figures the fœtus of a species of this genus.

a. Fur moderately rigid ; the back white-spotted ; dorsal streak elongate.

1. ARCTOPITHECUS GULARIS.

(*Lower jaw, Mammalia, Pl. XI. f. 6.*)

Dark grey-brown ; back white varied, with an elongated black streak, with a broad patch of soft yellow hair on each side between the shoulders. Skull with a broad forehead, rather convex over the back part of the orbits. The upper front grinder rather large. The hinder side of the lower jaw concavely cut out, and with the lower angle slender and acutely produced ; front of the lower jaw flat, not keeled up the suture.

Bradypus gularis, Rüppell, Mus. Senckenb. iii. t. 11.

Ai à dos brûlé, Buffon, Hist. Nat. xiii. 62.

Ai adult, Buffon, Hist. Nat. xiii. t. 6.

B. tridactylus, Griffith, A. K. iv. 271.

B. tridactylus, description and var. *b.* *Desm. Mamm.*

D'Ai B. tridactylus, var. *Cuvier, Règ. Anim. Illust. Mamm.* t. 70. f. 1.

A. tridactylus, var. *Cuvier, Oss. Foss.* v. t. 5. f. 1, 2, 3, skull ; cop. *Cuv. R. A. Éd. Illust.* t. 70. f. 1 a.

B. tridactylus β , *Fischer, Syn.* 387.

Hab. Bolivia, *Bridges* ; Guiana, *Rüppell*.

This species was well-described by Buffon, and is at once known by its dark colour, white varied back, and the yellow patch of soft hair between the shoulders.

Cuvier states (*Règ. Anim.* ed. 2) that M. Temminck thought that the yellow spot on the back depended on the skin being worn in that part. Probably he never saw a specimen, or he could hardly have made such an observation.

According to Mr. Waterhouse, Mr. Bridges considers the specimens here described as the males of *A. marmoratus*.

Cuvier's upper figure of the skull (fig. 1) most accurately represents the form of the hinder end of the lower jaw, the other figures being distorted by the perspective position.

The skull from which the end of the lower jaw is figured was from an adult animal. There is also the skeleton of a young specimen from the same locality in the Museum collection, which only differs in the coronoid process being less developed. There are two speci-

mens in the Museum collection, one half the size of the other; the smaller specimen is yellower on the face and much darker on the neck, forming a nearly black collar, and the white is smaller in quantity and more mixed with the grey-brown of the back. The larger one is probably a male, which according to the observations of the Prince of Wied is whiter than the female.

2. ARCTOPITHECUS MARMORATUS.

(*Lower jaw, Mammalia, Pl. XI. f. 3, adult; f. 4, half-grown.*)

Grey-brown, back and outer side of the arms white varied, with an elongated narrow streak extending nearly the whole length of the back.

The angle of the lower jaw longly produced, narrow, subacute.

B. tridactylus, var. *Griffith, A. K. t. 136.*

Bradypus tridactylus Guianensis, Blainv. Osteogr. Brad. t. 3.

Hab. Brazils; Gordon Graham, Esq.

This species, which is the most common in English collections, is easily known by the whiteness of the back and limbs, which is well-defined from the uniform dark grey-brown tint of the rest of the body; the dorsal streak is always very distinctly marked, and, as in *A. gularis*, reaches nearly to the rump, while in *A. flaccidus* it is confined to the upper part of the back.

In 'Griffith's Animal Kingdom' there is a figure by T. Landseer of this species, taken from an adult specimen in spirits in the British Museum, which appears to have formed part of Sir H. Sloane's collection; but the character of the colouring of the back is not well-shown, and it may represent either *A. marmoratus* or *A. Blainvillii*.

In the British Museum there is a nearly adult and a young specimen of this species, the hinder part of the lower jaws of which are here figured. The specimens agree in all points of external colouring with the following species (*A. Blainvillii*); but the form of the lower jaw at once separates it both from *A. gularis* and *A. Blainvillii*. It may be the female of the former, the skull having more alliance to that species than to *A. Blainvillii*.

The front of the lower jaw of the older specimen is rather prominent, while that of the younger individual is truncated and quite destitute of any convexity or keel, like the adult skull of *A. gularis*.

3. ARCTOPITHECUS BLAINVILLII.

(*Skull, Mammalia, Pl. XI. f. 2.*)

Grey-brown, back and outside of the arms white varied, with an elongated narrow streak extending nearly the whole length of the back; the forehead very convex and swollen over the back of the orbit. Teeth rather large; front lower compressed.

Lower jaw distinctly keeled up the symphysis, and slightly angularly produced on the front edge.

B. tridactylus Braziliensis, Blainville, Osteog. t. 2, skeleton; 3, skull partly broken.

Hab. Tropical America.

We have three specimens of the animal agreeing with the skulls here described, but they offer no external character by which I can distinguish them from the preceding specimens (*A. marmoratus*); yet the skulls all agree in the greater convexity of the forehead and in the form of the angle of the lower jaw. Two of the lower jaws have a distinct angular ridge up the front symphysis. The figure is taken from the skull of a skeleton received from M. Becker as the *B. tridactylus* from Brazil.

It has been suggested that the differences in the form of the hinder part of the lower jaw, which, it should be observed, are not the only, but are the most easily described characters to separate these species, are not sufficient for specific distinction. I am willing to own that it is a fair question of discussion, and one that can only be settled by the comparison of more specimens than we at present possess. Should these variations prove only individual, and not specific, then it must lead us to be very cautious in the formation of species on the examination of skeletons alone, as is of necessity the case in the animals now only found in a fossil state.

b. Fur elongate, very flaccid, whitish; dorsal streak very short, indistinct, only seen where the hair is worn.

4. ARCTOPITHECUS FLACCIDUS.

(*Skull, Mammalia, Pl. XI. f. 1, adult; f. 1 a, young.*)

Pale grey-brown; back, sides of the back and hinder part white varied, with a short blackish dorsal streak between the shoulders. Skull with a broad rather convex forehead. (3 spec.)

Ai (seconde), *Buffon, Hist. Nat. xiii. 62.*

Jeunes Ais, Buffon, H. N. xiii. t. 5.

Bradypus tridactylus, Temm. Ann. Gen. Sci. Phys. vi. 51, not Linn.; Pr. Max. Abbild. Nat. Braz. t. . ♀ & jun.; Beitr. zur Nat. ii. 482.

B. tridactylus, var. a. ♀ ?, Desm., and var. d. ♂, Mamm.

Var. 1. White grey-brown; back of the hairs blackish, with a short black streak, and with a white spot on each side between the shoulders. (1 spec.)

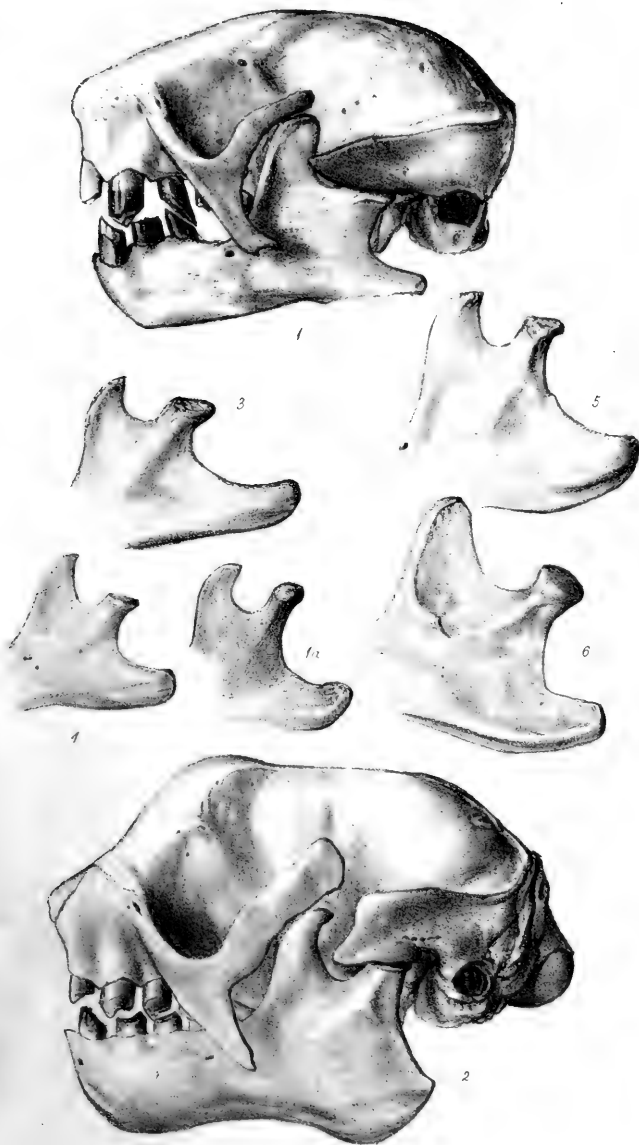
Hab. Venezuela; Mr. Dyson.

Var. 2. Nearly uniform whitish grey-brown; base of the hairs blackish, without any dorsal streak. (1 spec.)

Hab. Para; J. P. G. Smith, Esq.

This species, of which we have four specimens of different ages in the Museum, is easily known by the length, very loose and flaccid nature of its hair, and the indistinctness of its markings. The black on the back appears to arise from the hair of the shoulders being worn away. Three, of very different ages, are pale grey-brown, with a short, broad, blackish streak between the shoulders, and have the rump and each side of the dorsal streak more or less white, and an indistinct whiteness on the outer side of the upper arms.

Buffon's description of his second specimen of *Ai* agrees better with this species than with any other which has come under my observation.



1 ARCTOPITHECUS FLACCIDUS. 2 A. BLAINVILLII.
3 4 A. MARMORATUS 5 A. PROBLEMATICUS 6 A. GULARIS



Prince Maximilian gives a good figure of the female and young of this species. He observes, "*Les mâles a de chaque côté du dos une ligne longitudinale blanche.*"

In the British Museum there is a specimen about half the size of the largest of the former, which is very like it in the flaccid nature of its fur, but the whole upper part of the body is pale whitish grey, with two or three indistinct white spots on the sides, and there is a short black streak edged with a white spot of soft hair on each side between the shoulders. This was brought from Venezuela by Mr. Dyson.

There is another specimen rather smaller than the former, and like it in colour and appearance, but it has no indications of the back streak or white soft hair on the shoulders. Brought from Para by my son-in-law, Mr. J. P. George Smith.

I am by no means certain that these specimens may not be indications of the existence of other species, which can only be proved by the comparison of more specimens.

The skull of the older specimen is figured, pl. 2. f. 1. The lower edge of the angular process in this specimen is eroded; the lower jaw of the younger specimen is similar, and the angular process is broader.

Besides these species of which we have skins and skulls, there is in the British Museum the skeleton of a species of this genus, which was sent from Para by my son-in-law, which differs essentially from all those before described, both in the greater length of the head and in the form of the hinder edge of the lower jaw, and which I have therefore indicated under the name of

5. ARCTOPITHECUS PROBLEMATICUS.

(*Lower jaw, Mammalia, Pl. XI. f. 5.*)

Fur unknown. Skull rather elongate; forehead broad, rather convex on each side over the middle of the orbit.

Lower jaw with a broad rather produced angle, bent up at the tip and regularly rounded beneath, and with a distinct angular keel up the symphysis, rendering the upper edge angularly produced.

Hab. Para; *J. P. George Smith, Esq.*

The keel in the lower jaw is similar to that of *A. Blainvillii*, but the angle is much more produced. In the form of this part it most resembles that which I have considered as the young of *A. flaccidus*; but the angle is much broader and more recurved, and it differs from both skulls of that species in the skull, and especially the lower jaw, being much more elongated behind compared with the length of the tooth-line.

May 22, 1849.

Harpur Gamble, Esq., M.D., in the Chair.

The following papers were read :—

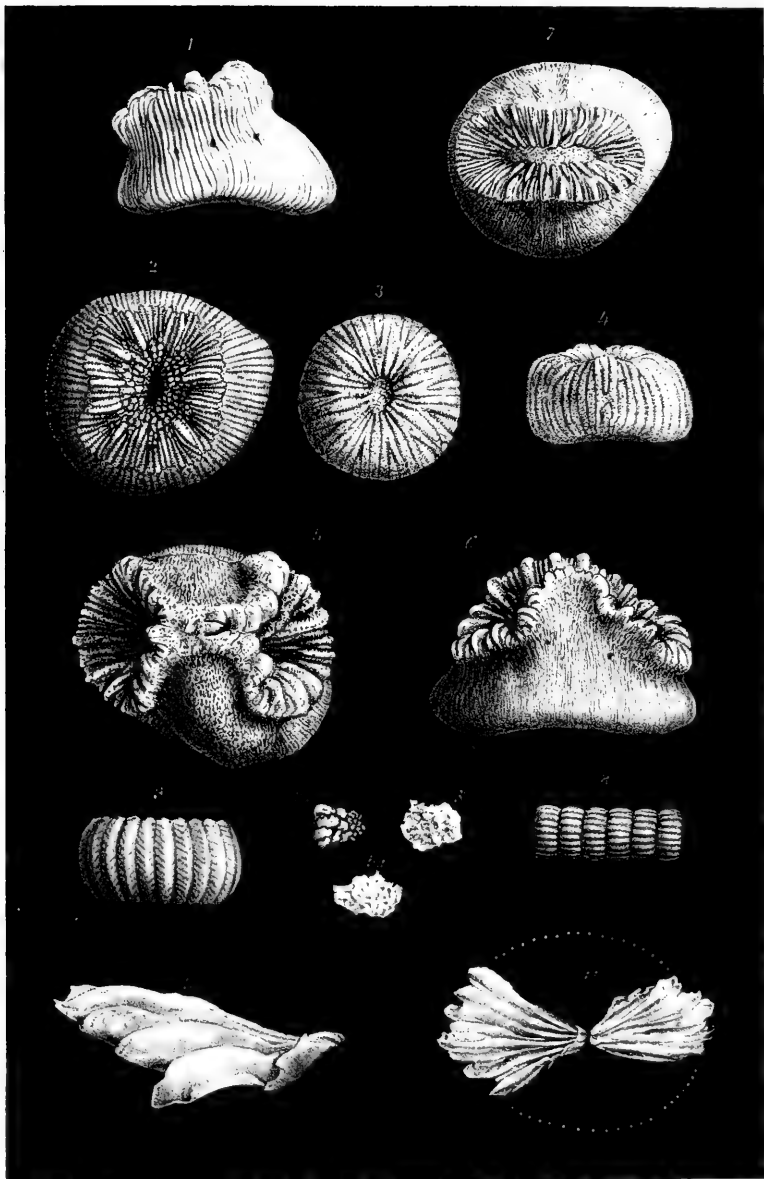
1. DESCRIPTION OF SOME CORALS, INCLUDING A NEW BRITISH CORAL DISCOVERED BY W. MACANDREW, ESQ.
BY J. E. GRAY, ESQ., F.R.S. ETC.
(Radiata, Pl. II.)

As yet only a single living species of recent stony coral has been recorded as inhabiting our coast. I am aware that M. Milne-Edwards and M. Haime have described the Torbay coral as belonging to two species and to different genera, viz. *Desmophyllum Stokesii*, Ann. Sci. Nat. ix. 255. t. 7. f. 12, 12 a, and *Cyathina Smithii*, l. c. ix. 288; but from the varieties in form, and especially in the contraction of the base, which I have seen in specimens on the same stone, I believe the genera and species have been established on very unessential characters.

I may state, that from the observations I have been able to make, I believe that the recent corals are very much more influenced by external circumstances, by the rarity or the abundance of food that the animals are able to procure, and by the roughness or quietness of the water they happen to inhabit, and the stations they may accidentally occupy, than the describers of corals even the most recent are willing to allow. This greatly added to the difficulty of distinguishing the species; and if this is the case with the recent corals which we receive in a good state, how much more difficult must it be to distinguish those only found in a fossil, and often in a worn and imperfect condition!

The British coral here noticed is perfectly distinct from the former, and from any European coral that has come under my examination; and when I showed it to M. Milne-Edwards and M. Haime on their late visit to this country, they stated that it was quite unknown to them, and most nearly allied to an Australasian species. It belongs to the genus *Flabellum*, established by the late M. Lesson in his 'Illustrations of Zoology' in 1831 for a coral from the Japanese Seas. And more lately (in 1841) Dr. A. Philippi established a genus under the name of *Phyllodes* for some fossil allies. Dana, in his work on Zoophytes in 1846, has applied the name of *Euphyllia* to this genus. Quoy and Gaimard referred one of the species to the genus *Turbinolia*.

The only specimen of the coral found by Mr. MacAndrew is unfortunately in an imperfect state, having been broken by the dredge, and I have some doubts if it absolutely belongs to the genus *Flabellum*, as it appears rather to form a more or less circular expanded disk, than a compressed wedge-shaped body. But Messrs. Milne-Edwards and Haime appeared to have no doubt of its belonging to



1. 2. 2a HETEROCYATHUS COCHLEA. 3. 3a. 4. H. HEMISPHERICA. 5. 5a. 6. 7. H. EUPSAMMIDES & VAR.
 8. 9. PRIMNOA AUSTRALASIE. 10. FLABELLUM MAC-ANDREWII



that genus when it was shown to them, and I have therefore adopted their opinion until more perfect specimens are found to verify or correct our knowledge. It may be described as follows :—

FLABELLUM MACANDREWII. (*Radiata*, Pl. II.)

Coral expanded, subcircular? ; outline irregular, torn, with acute marginal processes ; outer surface smooth, polished, as if varnished ; septa thin, far apart, very finely crenulated on the edge in three series ; the primary plates large, the secondary nearly as large, but much more narrow near the centre ; the tertiary plates small, very narrow.

Hab. North Sea.

The single imperfect specimen here described was found about twenty-five miles from East Shetland, in ninety fathoms water.

Mr. MacAndrew has kindly presented the specimen to the British Museum collection.

M. Milne-Edwards and M. Haime, in their monograph of the genus *Flabellum*, published in the 'Annales des Sciences Naturelles,' ix. p. 256 (in 1848), describe forty-three species, and divide them into three sections, thus :—

a. Coral becoming free by the progress of age.

* Coral becoming free by the cessation of the adherence of the pedicel—*Flabellines pedicellés*.

** Coral becoming free by the rupture of its base—*F. tronquées*.

b. Coral always fixed by its enlarged base—*F. fixées*.

The last section is very distinct from the two former, and might almost form a separate genus, for which I should be inclined to retain Dana's name of *Euphyllia*.

The other two sections are separated from one another by very slight characters, which I believe are not even sufficient to separate the specimens of the same species, for some specimens from the same localities retain their narrow base, while in others this part is more or less truncated.

Indeed from the numerous specimens of this genus which I have been enabled to examine in the Japanese boxes which are sent to the Canton market, and from thence to London, and others brought from Northern China by Mr. Fortune, I have little doubt that the species is very variable. I had come to this conclusion, and arranged all the specimens together in one tray in the British Museum, before Messrs. Milne-Edwards and Haime came to examine the corals in the Museum for description in their papers in the 'Annales des Sciences Naturelles' for 1848 ; and the examination of the characters given by these naturalists for their several species has not induced me to change my opinion, which has, on the contrary, been strengthened by a second comparison.

I may state that we have in the British Museum two very distinct recent species :—1. *Flabellum affine*, Edwards and Haime, n. 31. t. 8. f. 10, from Australia, which has very close plates. 2. *Flabellum Pavoninum*, n. 1, from Japan and North China. And Milne-Edwards and M. Haime have described another from the Falkland

Islands, brought to France by M. Dupetit Thouars, and hence called *Flabellum Thouarsii*, n. 10. t. 8. f. 5, which appears to be distinct from the two former.

From the examination of the numerous specimens of *Flabellum Pavoninum* which I have been enabled to compare and collect, I am inclined to believe that all the specimens which are brought from the Japanese Seas belong to a single species, which I believe will include as varieties the following species described by M. Milne-Edwards and M. Haime, viz.:—

1. *Flabellum distinctum*, n. 2. The specimen in the British Museum, from which this species is described, came from Japan, and not the Red Sea, as stated in the work cited.
2. *F. debile*, n. 23. t. 8. f. 2.
3. *F. Sumatrense*, n. 24.
4. *F. spinosum*, n. 25. t. 8. f. 4.
5. *F. aculeatum*, n. 26. t. 8. f. 3.
6. *F. compressum*, n. 20 = *Fungia compressa*, Lamk.
7. *F. Bairdii*, n. 32. From Japan.
8. *F. Cumingii*, n. 33. t. 8. f. 11.
9. *F. elongatum*, n. 34. t. 8. f. 7.
10. *F. profundum*, n. 35. China (Fortune). *F. spheniscus*, n. 42?
11. *F. crassum*, n. 36. t. 8. f. 8.
12. *F. crenulatum*, n. 37.
13. *F. elegans*, n. 38. From Japan; B. M.
14. *F. Candeanum*, n. 39. t. 8. f. 13.
15. *F. Stokesii*, n. 40. t. 8. f. 12.
16. *F. Owenii*, n. 41. t. 8. f. 9.

I thought at first that these specimens might be separated into two, according to the colour, some being red, with the sides of the coral keeled, and others white, with the sides more or less rounded; *Flabellum Pavoninum*, Lesson, being the type of one species, and *Fungia compressa*, of Lamarck, of the other. But there are specimens red on one side and white on the other, and some on the other hand keeled on one edge and rounded on the other; some with elongated spines on one edge, and spiniferous or only with a slight tubercle on the opposite one; sometimes one edge has two spines and the other only one, or a tubercle, and the extent of the truncation of the base differs in every example.

The same examination has also induced me to believe that the specimen which these authors have described under the name of *Placotrochus levis*, p. 283. t. 8. f. 15, is only a variety of the same species; and that *Acanthocyathus Grayii*, 293. t. 9. f. 2, is only a specimen of the same species which has lost its compressed form. I have not seen *Rhizotrochus typus*, p. 282. t. 8. f. 16, or *Blastotrochus nutrix*, p. 284. t. 8. f. 14; but from the figures, I have great suspicions that they are only modifications of the same species.

To give some idea of the variations produced by local causes in corals, I may state that the specimens which Messrs. Milne-Edwards and Haime have described under the generic name of *Heterocyathus*, are only specimens of the genus *Cyathus* which have been changed

in form from their having grown attached to a spiral shell which was inhabited by parasitic crustacea. I have specimens showing all the grades of change, from the nearly normal conical form of the genus to the truncated form which has been described as the type of the genus *Heterocyathus*. This form was well-described by Spengler in 'Nova Acta Hafniæ,' i. 240, and noticed by Gmelin under the name of *Madrepora Cochlea*, p. 3763.

Messrs. Milne-Edwards and Haime described two species of this genus under the names of *H. æquicostatus*, t. 10. f. 8, and *H. Rousseanus*, t. 10. f. 9. Of the former he appears only to have seen a single specimen. We have in the British Museum three very distinct species, which may be thus described:—

1. *H. COCHLEA* = *Mad. Cochlea*, Gmelin, S. N. *H. æquicostatus*, Milne-Edwards and Haime, 324. t. 10. f. 8. (*Radiata*, Pl. II.)

Coral subcylindric, hard, white, with narrow, equidistant, distinct grooves, crenulated on the edges; base rather dilated; laminæ narrow, sharp-edged, very unequal, grooved on each side, and with crowded columns in the centre of the star.

Hab. Chinese Seas.

The holes on the outer surface are large and distinct.

2. *H. HEMISPHERICA*. (*Radiata*, Pl. II.)

Coral subcircular, depressed, subhemispherical, nearly flat below, regularly convex above; sides rounded; plates of star broad-topped, as if truncated, covered on top and sides with very numerous crowded spines and tubercles; centre of star roundish, with small columella.

Hab. Chinese Seas.

The plates of this species resemble those figured as belonging to *H. Rousseanus*, l. c. 325. t. 10. f. 9; but the shape of all the two specimens in the Museum, which are nearly similar, is quite distinct from the view of the side of that species.

3. *H. EUPSAMMIDES*. (*Radiata*, Pl. II.)

Coral polymorphous, base flat, sides shelving, sinuous, surface covered with very close, irregular, sinuous, denticulated ridges, and pierced with numerous minute pores; star irregular, compressed or sinuous; laminæ narrow, then cribellated on the surface, and with an oblong, elongated, convex, cribellated centre.

Var. star more or less contracted in the centre, forming two more or less distinct roundish stars.

Hab. Chinese Seas.

This species is immediately known from the former by the peculiarity of the surface, which is like that of *Caryophyllea ramea*, and by the convex elongated form of the centre of the star.

I have described these three species together on account of their having the same form and habit, but the structure of the surface and the great difference in the form and conformation of the stars induce me to believe that they probably belong to three very distinct families of corals.

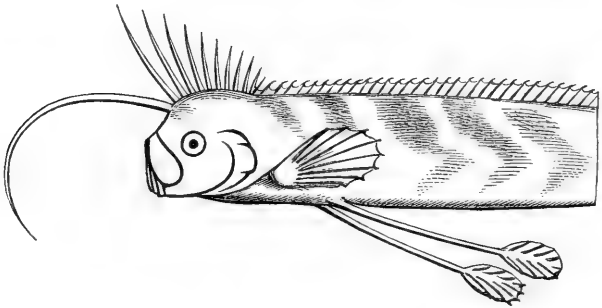
Since I described these corals I have shown the two latter species to M. Milne-Edwards, who states that they had not before come under his observation.

2. ON THE BRITISH SPECIMENS OF REGALECUS. BY J. E. GRAY, Esq., F.R.S. &c.

The occurrence of a specimen of *Regalecus* on the coast of Northumberland, which is now being exhibited in Regent-street, has induced me to communicate the following remarks which I have collected connected with the history of its former occurrence in this country, some of which appear to have escaped the researches of our British naturalists.

Though the materials here referred to are mentioned by M. Valenciennes in the tenth volume of the 'Histoire des Poissons,' the reference is so indistinct and indefinite that it has not enabled British naturalists to discover where they were to be seen.

On a very accurate drawing of a fish of this genus, bound up with other notes on British fishes, at the end of a 4to copy of Pennant's British Zoology of 1776, which is contained in the library of the late Sir Joseph Banks, now forming part of the library of the British Museum, is the following, the head of which is reduced two-thirds in the following figure:—



“On Saturday the 23rd day of February, 1788, was caught near Newlyn Quay, on the sand at ebb-tide, a fish which measured in length 8 feet 4 inches, breadth 10 inches, and thickness $2\frac{1}{4}$ inches; weight 40 lbs.”

The drawing is inscribed, by another hand, “*Regalecus Glesne*, Ascan. Icon. t. 11; Müller, Z. D. n. 355. *R. remipes*, Nov. Act. Hafn. n. 414;” and on the margin there is added in another hand the following note:—

“N.B. A gentleman who saw this fish informed Capt. Chemming (Chelwynn?) that the tail was not perfect, and supposed it was originally longer than is represented.”

The body of the fish is silvered, with obscure indications of darker cross-bands, and the fins are all salmon-coloured; the first ray of the dorsal over the eyes is elongated and bent down over the front of the head, and each of the two ventral fins ends in an ovate radiated appendage.

This figure, representing the first British example on record, is certainly the best and most trustworthy representation of the fish that I have seen. A reduced copy of this drawing is here given.

Valenciennes, to whom a copy of this figure has been sent by Mrs. Lee, mentions it in the History of Fish, vol. x. p. 365, but has translated *Newlyn Quay* into "*Necolyn Quay*."

Dr. Russell (Fishes of Coromandel, i. 29) observes: "In 1796 a fish of this genus was cast on shore in Cornwall, a drawing and description of which were sent to Sir Joseph Banks. It has two ventral cirri, and in the crest of the head resembled the present subject more than any of the others: the tail had been broken off."

Shaw (Zool. iv. 198) observes: "It appears from a print published in the year 1798, that a specimen of this fish (*Gymnetrus Hawkenii*) was thrown on the coast of Cornwall in the month of February in the same year. Its length was 8 feet 6 inches, its breadth in the widest part $10\frac{1}{2}$ inches, and its thickness $2\frac{3}{4}$ inches. The tail in this specimen was wanting; the colour the same as in the specimen (of *Gymnetrus Hawkenii*) figured by Dr. Bloch."

I have no doubt, as Valenciennes suspected (see Hist. Poiss. x. 375), from comparing these accounts with the drawing in the edition of Pennant above quoted, and with Russell's and Shaw's notices, that they are from that authority, and that the two dates in the notes, and the length mentioned by Dr. Shaw, are mistakes of the copyist. I have not been able to find the engraving mentioned by Shaw, which was doubtless made from this drawing, though there is a slight variation in each of the items of the measurements given by the latter author. Could he have considered this drawing as a published print? The writing is so beautifully executed that he might be deceived unless he examined it very carefully.

Mr. Couch, in his paper on Cornish fishes, Linn. Trans. xiv. 77, informs us, under

"*Ceil Conin*.—This fish was drawn on shore in a net at Newlyn (Newlyn) in this country in February 1791. The extremity of the tail was wanting; the length of what remained was $8\frac{1}{2}$ feet, the depth $10\frac{1}{2}$ inches, thickness $2\frac{3}{4}$ inches, weight 40 lbs. A coloured drawing of this fish is in the possession of W. Rashleigh, Esq., F.L.S., of Menabilly."

Mr. Couch has seen this drawing. A copy reduced to one-fourth its size is given by Mr. Yarrell in his excellent work on British Fishes, vol. ii. p. 221.

I have great doubt if the fish mentioned by Mr. Couch is not also the same specimen as the one described as caught on 23rd of February 1788, as it is found in the same place, is the same size and weight, &c., and that the date is a mistake. The addition of the two ventral fins was probably a fancy of the artist, like the addition of the tail, the drawing of the fish sent to Sir Joseph Banks being without these fanciful embellishments.

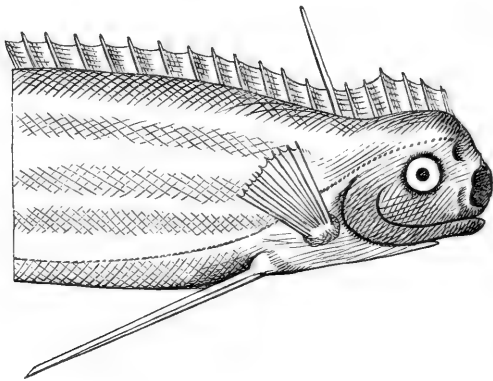
It has been supposed, because the copy of the drawing given by Mr. Yarrell is very like the figure of *Gymnetrus Hawkenii* in Bloch's Hist. Ich. xii. t. 433, that the drawing of the Cornish fish was the

origin of Bloch's figure; but it is to be observed that Mr. Hawken sent a specimen as well as a drawing of the fish he received from *Goa*; that his specimen was only $2\frac{1}{2}$ feet long, and the Cornish specimen $8\frac{1}{2}$ feet. See Cuvier, *Hist. Poissons*, x. 374.

Dr. Shaw (*Zool.* iv. 197) informs us that the drawing of *Gymnetrus Hawkenii* was communicated by "J. Hawkins, Esq.;" and he added, "I am assured by Mr. Hawkins that this is really the case (the tail being added by the draughtsman), the specimen from which the drawing was taken having been defective in that part."

From this examination I conclude that these accounts are all from the specimen and figure in Pennant.

In the same copy of Pennant's '*British Zoology*' occurs the following note and figure, which is here copied two-thirds the size:—



“ ‘York, March 29, '96.—On Friday last a curious and uncommon fish came on shore at Filey Bay, and was taken by four women; they sold it to a man who brought it to this city; it was $13\frac{1}{2}$ feet in length, rather more than one foot in depth, and not more than 3 inches in thickness. Its skin was smooth and of a silver hue: had no tail, and its fins were the colour of those of the roach or perch. It may be considered as a nondescript, neither Linnæus, Pennant, or any other writers on Ichthyology having given any description of it.’

“This paragraph is cut from the York Chronicle of last Thursday, and the enclosed I traced from a drawing by Dr. Burgh, who penned the paragraph and made the following notes on his drawing.”—J. F.

“13 feet long, 1 deep, 3 inches thick; head 7 inches long; eye $1\frac{3}{8}$ diam.; no scales, but very small protuberances, silvered over like the swim of a herring; these run the whole length in stripes, alternate with others which are bare, and of a light colour.

“The dorsal fin runs the whole way from the head to the other end, at which there is no tail. The dorsal fin is red, like that of a roach or perch; 6 bronchial rays; dorsal fin 290 and 13 rays; the

pectoral 12; ventral 1; no anal. No teeth; a soft tongue. The face and inside of the mouth black. Anus 4 feet 9 inches from the head. Iris a silver-white. He ran on shore at Filey Bay, March 18, 1796; was seen by four women, who took him and sold him to a man who brought him to York, where on March 21 I saw him. Though there was then no caudal fin, it is not clear that he never had one, for there was an appearance of mutilation in its place. The two sides were precisely alike. The eye in the drawing is placed a little too low."—W.B.

This description is mentioned by M. Valenciennes in his 'Histoire des Poissons,' x. 365, under the name of *Gymnetrus Banksii*; nothing is said of the figures which accompanied the letter. I can see nothing in the account or figures to induce me to believe that it is different from the *Regalecus Glesne*, or the specimen from Cornwall.

Mr. Yarrell, in his letter to Mr. Whitehead, printed in Dr. Jacobs's account of the Northumberland specimen, p. 10, gives the description of a specimen which was caught in March 1844, at Crovie, near Macduff, in Scotland, sent by Mr. John Marten of Elgin to Dr. George Johnston and Mr. Yarrell.

It would therefore appear that the specimen from the coast of Northumberland is at least the fourth time that a fish of this genus has been recorded as found on the coast of Britain.

From the comparison of the various descriptions and figures given by the English observers, and those given by Ascanius, Brunnich and Lindroth, I believe there is only a single species yet found in the North Sea, and it appears that that species occasionally comes as far south as the coast of Cornwall.

The great distinction between *Regalecus Glesne* and *R. Grillii* is the number of the rays in the dorsal fin; but as Valenciennes justly observes, that Ascanius's figure represents more rays than he describes the specimen to have had, and in this respect it agrees with the description of *R. Grillii* and with the specimens which have since occurred, I think it probable that the number in the text is a misprint.

Ascanius represents the five longitudinal streaks mentioned in the description of the Filey specimen.

Mr. Whitehead's specimen agrees with the one from Filey, in having the five convex longitudinal lines. These lines are shown in the painting made from the fish when more fresh, but they are not so distinct in the specimen in the fluid; yet they have been rendered more visible than when I first saw it by some glass which had been put on the specimen to sink it in the fluid.

The black bands so well marked in the painting of this fish were also observed in the specimen cast ashore at Crovie, near Macduff, in March 1844, described by Mr. Marten, and in *Gymnetrus Grillii* of Lindroth; and they are indistinctly represented in the drawing of the Cornish specimen.

The ventral fins in Mr. Marten's specimen "consisted of two filaments 3 feet in length; they were fringed with a thin membrane on two sides, and had evidently been broken."

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This shows the affinity of the black-striped fish with the *Glesne* of Ascanius and the *S. Grillii* of Lindroth, and I have no doubt that the slight dilatation at the end of the ventral fins in his figure is a mere enlargement of the membranous fringes above described.

The following appear to be the synonyma of this species:—

REGALECUS GLENE.

1. *Ophidium Glesne*, Ascanius, Mem. Soc. Copenh. iii. 419.
Regalecus Glesne, Ascanius, Icon. ii. t. 11. cop. E. M. t. 358;
 J. J. (J. Jacob), An account of the rare fish, &c. 8vo, 1849,
 figures Illustrated London News, June 2, 1849, p. 384 fig.
Regalecus remipes, Brunnich in Nya Saml. iii. 414. t. 13. f. 4, 5;
 copied by Walbaum, t. 3. f. 4.
Gymnetrus remipes, Schneider, Syst. Ichth. 482. t. 88, altered
 from Ascanius; copied by Yarrell, Brit. Fish.
Regalec Glesne, Lacep. ii. 214, 215.
Gymnetrus Ascanii, Shaw, Zool. iv. ii. 1. t. cop. from Ascanius.
Le Gymnetre Glesne, Valenciennes, Hist. Poissons, x. 365 & 366.
 From the figure of the Newlyn specimen.
2. *Gymnetrus Grillii*, Lindroth, Kongl. Vetensk. Acad. Nya Handl.
 1798, 288. t. 8 (from a dry fish); Schneider, Syst. Ichth. 482;
 Valenciennes, Hist. Poissons, x. 370.
3. *Le Gymnetrus Banksii*, Valenciennes, Hist. Poissons, x. 365.
 From the letter respecting the Filey specimen.
4. *Ceil Conin* = *Gymnetrus Hawkensii*, Couch, Trans. Linn. Soc. xiv.
 77. part.; Yarrell, Brit. Fish. 221. part. From the Newlyn
 specimen (not Bloch, Ich. xii. t. 423?).
5. *Gymnetrus Northumbrius* (Hancock's MSS.?), 1849.
Gymnetrus — ? Marten in Jacobs's Account of Rare Fish, 1849,
 p. 10.
6. *Sea Serpent*, Ladies' Newspaper, 12th May, 1849.

M. Valenciennes, by mistake, thinks that Ascanius described this fish first as *Regalecus*, and then as an *Ophidium*, but 1766 comes before 1772. The specific name of *Glesne* is derived from the name of the place on which the fish was found, near Bergen in Norway.

The generic name of *Regalecus*, characterized in 1772, has the undoubted priority over *Gymnetrus* of Schneider, and therefore ought to be used; neither are quite unexceptionable, the one being a mixture of Greek and Latin, and the latter as conveying a false character, for the fish has ventral fins; but I think it is not desirable to change names which have once been used for such reasons, though it is well to avoid giving names having the first objection, and the second should always be avoided.

The Banksian copy of Pennant is very valuable to the British zoologist, and contains, besides the figures and letters here referred to, some shorter notes, the titles of which I here give, as they may be of use to persons residing at a distance from the library.

Vol. I. Aylmer Bourke Lambert, letter on the Irish Wolf Dog.
 P. 224. Note on Grouse.

P. 346. Mr. Pearson of Newport Street, account of keeping Swallows through the winter.

Letter from James Hervey of Manchester, on the arrival of Swallows.

P. 352 List of indigenous Mammalia and Birds that are wanting to the British Museum, by W. E. Leach, M.D.

The price of Heronshaws in 1556.

A Fenman's List of the Fowls found in the East Fen.

Vol. II. p. 357. Letter from T. J. Woodward of Walcot, respecting the Heron with the crest.

Vol. III. p. 109.—1. A figure of a short Sun-fish, inscribed "Portrait of a Sun-fish for Sir Joseph Banks, Bart., from his obliged and humble serv^t Richard Brocklesby."

P. 137.—2. A beautiful drawing of a Launce, by "W. W. Ellis, ad viv. delin. et pinxt. 1779."

P. 138.—3. A letter from L. Morris, accompanied by a pen sketch of the 'Morris' *Leptocephalus*, copied from a blank page in Lewis Morris's Ray Synopsis, by Mr. Lloyd, at Aberystwith, 1786. This note is copied into the edition of 'Pennant's Zoology' for 1812, p. 215, where the editor observes: "The above memorandum is preserved in the copy of the British Zoology in the valuable library of the President of the Royal Society in Soho Square." The editor does not notice any of the other papers in the Banksian copy of Pennant.

P. 178.—4. A note about the name of the *Torse*.

P. 187.—5. Sir William Musgrave's note accompanying a Spotted Goby and a young Angel Fish.

P. 213.—6. Hugh Davies' reply to Donovan respecting the trifurcated Hake, from the North Wales Gazette, March 1810.

P. 213.—7. Moses Griffith in reply to Donovan, from the Cambrian, Dec. 30, 1809.

P. 372.—8. The description of three fish, accompanied by very good figures in India ink, probably by Colonel Montague (? ?).

Viz. 1. *Leptocephalus Morrissii*.—I may observe, that on the continent they apply this name to a species which is much longer and more slender than the one figured by Pennant and Yarrell, and Costa has given the name of *L. candidissimus* to the shorter British species; we have both species from Costa in the British Museum.

2. *Cepola rubescens*.

3. The Variegated Sole, *Solea lingula*. In the MSS. it is stated, "This fish is sometimes taken in Torbay in the trawling-nets. It differs at first sight from the common sole in the edges of the scales being strongly ciliated, and in wanting the numerous small beards that hang from the lower side of the head of the common sort." This appears to be the Red-back described from E. Hanmer's MSS. in the 1812 edition of Pennant, but there is no reference to this figure.

9. The letter from J. F. respecting the fish from Filey Bay, *R. Banksii* of Valenciennes.

10. The drawing of *Regalecus Glesne* from Newlyn Quay.

I may also mention, that in this copy of Pennant the plate 93,

called *Ophidium imberbe*, Brit. Zool. App. iii., is marked in pencil, apparently by Dr. Solander, as being "*Muræna Anguilla*." This probably explains why the figure is replaced in the edition of 1812 by Montague's figure from the Wernerian Transactions, as mentioned by Yarrell, Brit. Fishes, 412 & 414, where these two figures are copied.

Since this paper was read, there has appeared in the 'Annals of Natural History' a full description of Mr. Whitehead's specimen, and an account of some other specimens found on other parts of the English coast.

3. MONOGRAPH OF THE FAMILY LIMNADIADÆ, A FAMILY OF ENTOMOSTRACOUS CRUSTACEA. BY W. BAIRD, M.D., F.L.S. ETC.

(Annulosa, Pl. XI.)

Jean Frederic Hermann, in his 'Mémoire Aptérologique,' published at Strasbourg in 1804, described and figured an Entomostracous crustacean, which from its resemblance to the genus *Daphnia* of Müller and its large size, he called *Daphnia gigas*. About thirty years previous to that time, he tells us, his father discovered a number of these interesting little animals in a deep ditch near Strasbourg filled with clear rain-water and well-stocked with weeds. Struck with their beauty he collected several dozens of specimens, and placing them in a vessel full of water less pure than that which the ditch contained, took them home. By the time he reached his house however they were all dead but one, and he only succeeded in preserving two specimens in spirits of wine. Linnæus had long before that described a species of *Monoculus* in his 'Fauna Suecica,' under the name of *Monoculus lenticularis*, found in Finland. His description is very brief, and Hermann (*père*) considering it probable that his animals might be identical with the species described by Linnæus, preserved the shells or bucklers of the little creatures which had died, and distributed them among his friends and correspondents. He sent some more particularly to the celebrated Müller, at that time engaged in working out the history of the Entomostraca, and entreated him and his other friends to inform him if they considered the specimens he had sent to be identical with the *Monoculus lenticularis* of Linnæus. Müller and his other correspondents all replied that they were not able to inform him, as they did not know Linnæus's insect—and from that time up to the period at which the younger Hermann's 'Mémoire Aptérologique' was published, neither father nor son had ever again succeeded in finding these animals. Nothing farther seems to have been known of any species belonging to the family till M. Adolphe Brongniart in 1826, in the sixth volume of the 'Mémoires du Muséum d'Histoire Naturelle,' published a description of an animal found by him in a pool of fresh water at Fontainebleau, which he considered (I think erroneously) as identical with the *Daphnia gigas* of Hermann. Of this species he formed his genus *Limnadia*, and at the same time entered fully into the details of the structure and habits of the animal. In the 'Bulletin de la Société Impériale des Nat. de Moscou'

for 1830, M. Krynicki has described a third species belonging to the family, which he found in Russia. M. Audouin, in the 'Annales de la Société Entomologique' for 1837, announced to the Society that he had received specimens of another species of the same family, found by M. Bravais, a naval officer, near Oran on the coast of Africa, in a little marsh of brackish water; and in the same year M. Straus Durckheim published a description and good figure of a fifth species found by Dr. Rüppell in Abyssinia. M. Guérin-Ménéville, in the 'Magazin Zoologique' for the same year, 1837, has published the description of a sixth species brought from the Mauritius, collected there by M. Desjardins; and finally, M. Joly, in the 'Annales des Sciences Naturelles,' 2nd series, vol. xviii. 1843, has published an elaborate memoir upon a species collected by him at Toulouse.

From a careful examination of the figures and descriptions given by these authors, it is evident that these animals do not belong all to the same genus. It is perhaps in vain now to attempt to ascertain the species mentioned above as described by Linnæus. Hermann says, the animal described by him "is very likely to be in reality the *Monoculus lenticularis* of Linnæus;" and upon examining the Linnæan cabinet in the possession of the Linnæan Society, I have found one mutilated specimen of a species belonging to this family which bears much resemblance to that figured by M. Hermann. As there is no ticket attached to the specimen, it is impossible now to decide whether this is really the individual originally in the possession of Linnæus; but if it be, it confirms my opinion, derived from comparing the figures and descriptions of the two species given by Hermann and Brongniart, that the latter author is decidedly in error in considering them to be identical. The species found at Fontainebleau is the true representative of the genus *Limnadia*, whilst that of Strasbourg forms the type of another genus. This genus was indicated by Audouin and Straus Durckheim in the same year; the former proposing for the species brought by M. Bravais from Oran, the name of *Cyzicus*; and the latter for that brought by Dr. Rüppell from Abyssinia, the generic name *Estheria*. From the simultaneous publication of these two generic names, it is difficult to decide which should stand; and M. Joly, apparently feeling the difficulty, has proposed a third name, taking as the type the species found by him at Toulouse, and calling it *Isaura*. As M. Audouin merely indicates the genus without giving a description of either genus or species, whilst M. Straus details at full length both generic and specific characters, and figures the typical species, I propose adopting his name and retaining the generic name *Estheria*, a name originally proposed by Dr. Rüppell himself.

The genus *Limnadia* thus at present contains two species:—

1. *Limnadia Hermannii* of Ad. Brongniart.
2. *Limnadia Mauritanica* of M. Guérin.

The genus *Estheria* at present contains three species:—

1. *Estheria gigas*, the *Daphnia gigas* of Hermann, identical with the *Cyzicus Bravaisii* of Audouin and the *Isaura cycladoides* of Joly.

2. *Estheria tetracera*, the *Limnadia tetracera* of Krynicki.

3. *Estheria Dahalacensis*, Straus Durckheim.

To these three species I now propose adding six others, all in the collection of the British Museum.

Legion BRANCHIOPODA.

Order PHYLLOPODA.

Family LIMNADIADÆ.

Animal almost entirely enclosed within a buckler or carapace resembling exactly a bivalve shell. Feet all branchial; from eighteen to twenty-seven pairs in number. Antennæ four pairs; the two superior used as organs of locomotion. Eyes two; closely approximated.

Genus LIMNADIA, Brongniart.

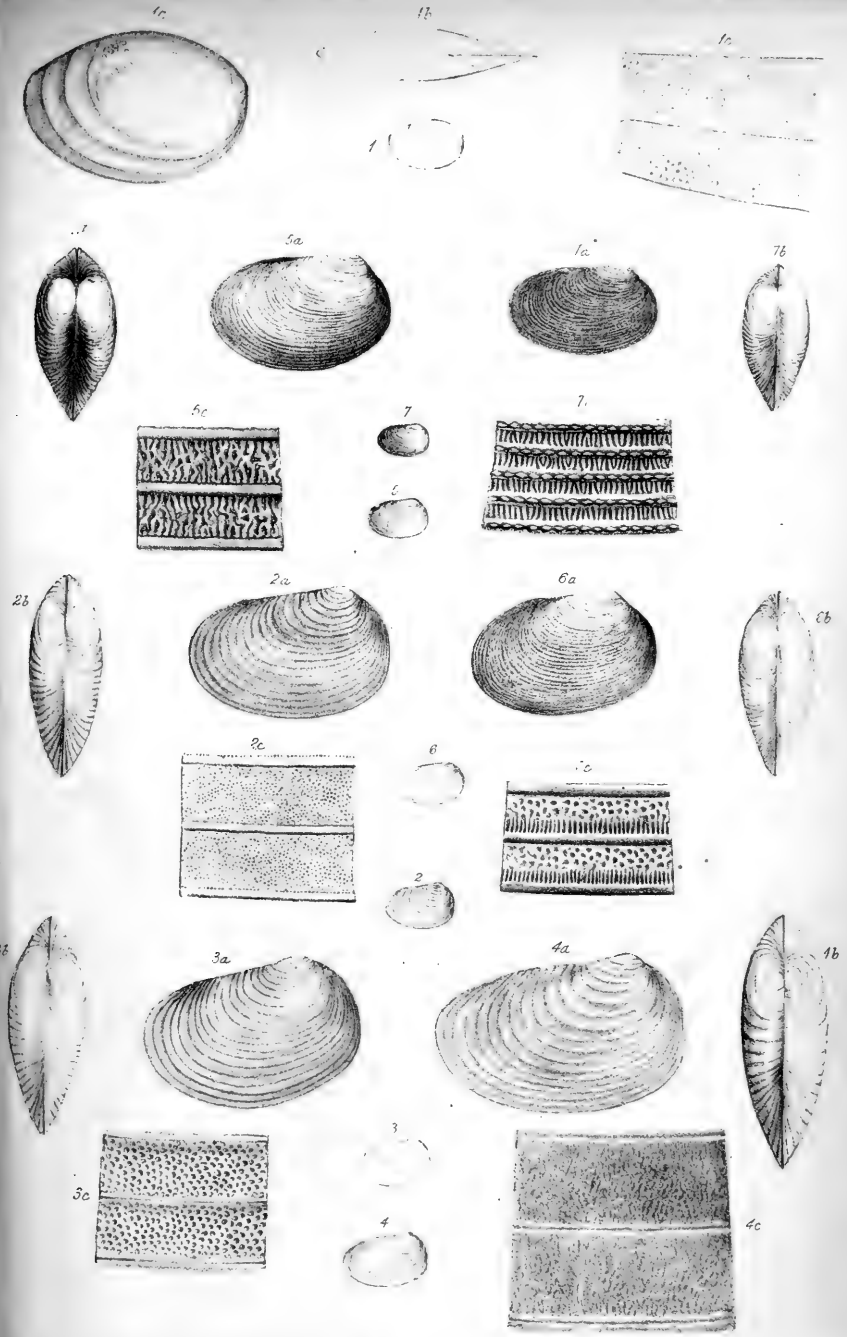
Carapace very large in proportion to the size of the animal, which appears not to fill much more than half of it. Head small, and having a little behind the eye a small pear-shaped body on its dorsal margin. Caudal segment truncate and terminating in two diverging lamellæ, ciliated on their under margin. Small antennæ club-shaped. Jaw foliated. Carapace beautifully transparent, of a whitish colour and very thin and delicate. Valves nearly quite smooth or only showing two or three slight concentric ridges on their anterior margin, and when highly magnified, numerous very minute dots or puncturations.

The animals swim on their back, and no males have ever as yet been observed.

Sp. 1. *LIMNADIA HERMANNI*. (Pl. XI. f. 1, 1a, 1b, 1c.)

L. Hermannii, Ad. Brongniart, Mém. du Mus. d'Hist. Nat. vi. t. 13. f. 1-2, 1820. Desmarest, Consid. gén. sur les Crust. 379. t. 56. f. 1, 1825. Latreille, Cuv. Règn. Anim. iv. 173, 1829. Bosc, Man. d'Hist. Nat. des Crust. ii. 236, 1830. Guérin, Magaz. de Zool. Class 7. t. 21. f. 12, 1837. Lamarck, An. sans Vert. 2nd edit. v. 185 (note). M. Edwards, Hist. Nat. Crust. iii. 362. No. 1. Cuv. Règn. Anim. edit. Crochard, Crustacés, t. 74. f. 1, 1a.

Carapace-valves of a rounded oval form, and permitting only the terminal branches of the large antennæ and the tips of the caudal lamellæ to pass beyond their margins; antennules of the length of the peduncles of the large antennæ, club-shaped and crenulated on their upper edge; large antennæ nearly half as long as the body, and having in each branch 12 joints; feet 22 pairs in number; caudal lamellæ of considerable length; carapace of a clear transparent white colour, and nearly quite smooth on its surface. On the anterior half we see two or three concentric striæ or rather delicate ridges running parallel with the lower margin, and when examined by a microscope of considerable power, we can detect the whole surface of the valves covered with numerous minute dots or puncturations. These do not appear raised, but as if they were mere opacities in the otherwise clear transparent shell.



1. LIMNADIA HERMANNI. 2. ESTHERIA MELITENSIS. 3. E. POLITA.
 4. E. BRASILIENSIS. 5. E. DONACIFORMIS. 6. E. BOYSII 7. E. SIMILIS.



Hab. Fontainebleau. British Museum; sent to Dr. Leach by M. Brongniart.

Sp. 2. LIMNADIA MAURITIANA.

L. Mauritiana, Guérin, Mag. de Zool. Class 7. t. 21. f. 1-11, 1837; Iconogr. Règn. Anim. Cuv. t. 33. f. 2. M. Edwards, Hist. Nat. Crust. iii. 363. No. 2. t. 35. f. 7-8. Burmeister, Organiz. of Trilobites, Ray edit. t. 6. f. 15.

Carapace-valves of an oval shape, slightly pointed at the extremities; antennules club-shaped, not crenulated on the upper edge, and considerably shorter than in preceding species, and the branches composed of only 9 joints in each; feet 18 pairs in number; caudal lamellæ shorter than in preceding species and more spine-shaped.

Not having seen this species I am unable to describe the structure of the carapace.

Hab. Island of Mauritius, *M. Desjardins*.

Genus ESTHERIA, Rüppell.

Carapace smaller in proportion to the size of the animal than in preceding genus, the animal nearly filling the entire cavity; head large and somewhat projecting beyond the margins of the valves; no pyriform organ; caudal segment large and terminating in four lamellæ in form of strong curved hooks; small antennæ linear or slightly tapering towards the apex; jaws fleshy; carapace of a translucent horny or yellowish colour, of moderate thickness, and showing numerous strong concentric ribs; the surface between the ribs is generally strongly punctate or striated, presenting considerable variety in their sculpture, which affords good specific characters; the animals swim on their belly, and many males are found among them.

A. *Valves of carapace dotted or punctate on the surface.*

Sp. 1. ESTHERIA GIGAS.

Syn. Daphnia gigas, Hermann, Mém. Aptérol. 134. t. 5. f. 4-5; t. 9. f. a, 1804.

Cyzicus Bravaisii, Audouin, Ann. de la Soc. Entomol. vi. Bulletin, p. 9, 1837.

Isaura Cycladoïdes, Joly, Ann. des Scien. Nat. 2nd ser. xviii. t. 7, t. 8, t. 9, f. 1-44, 1843.

Estheria Cycladoïdes, Lucas, Explor. Scient. de l'Alger. Crustacés, 81, 1845.

Limnadia Hermannii, Koch, Deutsch. Crust. H. xxxv. t. 10.

Monoculus lenticularis? Linnæus, Faun. Suec. 2051. No. 8; Syst. Nat. ed. 12th, 1059, No. 8.

Carapace-valves of a rounded oval form, resembling considerably the shell of a *Cyclas*; of a horny amber colour and translucent; anterior extremity rather broader than posterior; both finely rounded; beaks prominent, situated nearer the anterior extremity of the carapace, which is much more convex at that part than elsewhere; the two valves are marked with concentric striæ or ribs, varying from 20 to 26 in number. When viewed under the microscope, the

structure of this carapace presents the following appearance : the ribs are strongly marked and are somewhat prominent, the lower edge being beaded or ornamented with a line of raised round dots of a rather regular figure. The surface between the ribs is slightly concave, and is marked very distinctly with numerous raised dots or punctations of a rather irregular form and size.

Hab. Strasbourg, *Hermann*. Toulouse, *Joly*. Oran, *M. Bravais*. Algeria, *Lucas*. Regency of Tunis, *Mr. Frazer*. Brit. Mus.

That this is the *Daphnia gigas* of Hermann I think there is no doubt, and quite different from the *Limnadia Hermannii* of Brongniart. The body of the *Limnadia* is entirely enclosed within a carapace, regularly oval, transparent, and of a whitish colour. That of the *Daphnia gigas*, according to Hermann, is enclosed within a carapace of the colour of amber, horny, transparent, oval, with the back gibbous, keeled, and edged with brown. The carapace of the *Limnadia* is smooth, or offering only two or three zones parallel to its free edge. That of the *Daphnia gigas* has 7 rings or parallel zones on the two lower thirds of its body, and to judge from the figure given by Hermann, has several more on the upper portion. In structure and form it thus agrees with the characters of the genus *Estheria*, and appears to me to be perfectly identical with the *Isaura Cycladoides* of *Joly*.

Sp. 2. ESTHERIA MELITENSIS, Nobis. (Pl. XI. f. 2, 2a, 2b, 2c.)

Carapace-valves of an elongated oval form, considerably narrower at the posterior than the anterior extremity ; of a light horny colour, and semitransparent. Anterior extremity rounded ; the beaks situate near that extremity and prominent, causing that part of the shell to be much more convex than any other portion. Ribs somewhat prominent, the surface between them slightly concave and completely covered with numerous very small dots or raised punctations of rather a regular figure. The lower edge of each rib is beaded like the last, but the dots are smaller. The shell is considerably more elongated than in preceding species, and the beaks are more prominent and rather nearer the anterior extremity. The colour is much lighter ; the ribs rather less prominent, and the punctations on the intermediate spaces much smaller and a great deal more numerous.

Hab. Pool of rain-water at Malta, *Rev. Mr. Hennah*. Brit. Mus.

Sp. 3. ESTHERIA POLITA, Nobis. (Pl. XI. f. 3, 3a, 3b, 3c.)

Carapace-valves obovate, resembling in form the shell of a *Pisidium*. Anterior extremity somewhat broader than posterior, much more convex and gaping. Beaks prominently elevated, and situated near the anterior extremity. The shell is of a light yellowish horny colour internally and externally, and of a fine glossy polished appearance and finely pellucid. The ribs are numerous, about 27 in number, elevated, and smooth. The spaces between are slightly concave, and are beautifully dotted with numerous small impressed punctations.

Hab. India, *Captain Boys*. Brit. Mus.

Sp. 4. *ESTHERIA BRASILIENSIS*, Nobis. (Pl. XI. f. 4, 4a, 4b, 4c.)

Carapace-valves elongately obovate and pisidiform. Anterior extremity much broader than posterior, much more convex, and gaping. Beaks prominent and situated near anterior extremity. The shell is of a uniform dull horny colour and appearance externally and internally, very thin and translucent. Ribs numerous, elevated and smooth. The intermediate spaces are slightly concave, and appear roughened all over with numerous very small dots. This is a larger species than the preceding, and is much more elongated in form,—not possessing the fine polished appearance which distinguishes it, but appearing as if covered with a very thin epidermis.

Hab. Brazil, Mr. Sowerby. Brit. Mus.

Sp. 5. *ESTHERIA DAHALACENSIS*.

E. Dahalacensis, Rüppell & Straus, Mus. Senkenberg. ii. 119. t. 7. f. 1–15.

Carapace-valves irregularly quadrilateral. Anterior extremity slightly rounded, posterior extremity cut sloping or with beveled edges. Dorsal and ventral margins both straight. Beaks rather prominent, placed near anterior extremity. The carapace is of a light horny colour and lustre, both internally and externally, and translucent. The ribs are about 14 in number and rather prominent. The spaces between them are slightly concave and covered with very numerous exceedingly minute raised dots or punctations, and a good many much larger intermixed.

Hab. Dahalac, Abyssinia, Rüppell. Mus. Dom. J. O. Westwood.

B. *Valves of carapace longitudinally striated on their surface.*

Sp. 6. *ESTHERIA DONACIFORMIS*. (Pl. XI. f. 5, 5a, 5b, 5c.)

Nuculina donaciforme, Parreyss MSS. in Mus. Brit.

Carapace-valves shortly obovate and pisidiform; anterior extremity broader than posterior, more convex but not gaping; beaks prominent, placed near anterior extremity; the carapace is quite opaque, of a light brownish yellow externally, of a dull lustre and with a spot of dark purple and of a metallic lustre on the anterior margin and on the dorsal edge behind the beaks; the interior is of a beautiful shining lustre and of a deep purple colour; the ribs are numerous and rather unequal; the spaces between them are striated longitudinally; the striæ, when examined by the microscope, being irregular and of a somewhat complicated structure, near the edge of the rib frequently forming loops and running one into the other.

Hab. Abeid, Kordofan, Parreyss. Sent to the British Museum Collection as a species of mollusk belonging to the genus *Nuculina*, and called *Nuculina donaciforme*.

Sp. 7. *ESTHERIA BOYSII*, Nobis. (Pl. XI. f. 6, 6a, 6b, 6c.)

Carapace-valves broadly obovate; anterior extremity convex, gaping, much broader than the posterior, which however is rounded and obtuse; beaks prominent, placed near anterior extremity; carapace opaque; externally of a dull shining grey colour, with the anterior

extremity, beaks, and dorsal edge of a purplish tint possessing a somewhat metallic lustre; the interior is of a light purple tint and somewhat shining lustre; the ribs are numerous, about 34 in number, and prominent, and the surface between them is striated longitudinally and impressly punctate, the striæ extending across one-half the space, the other half being occupied with the punctations.

Hab. India, *Capt. Boys.* Brit. Mus.

Sp. 8. ESTHERIA SIMILIS, Nobis. (Pl. XI. f. 7, 7a, 7b, 7c.)

Carapace-valves elongate obovate; anterior extremity considerably broader than posterior, which is rather narrow; beaks very prominent, placed very near anterior extremity; carapace opaque; colour externally and internally the same as in last; the ribs are numerous and prominent, the first 7 or 8 rather broader than the rest, smooth, and flattish; the remainder sharply prominent, and having on their surface a row of sharp angular beads; the surface between the ribs is deeply striated, the striæ extending nearly quite across the space. This species differs from the preceding in being smaller, more elongate in proportion; in having the posterior extremity considerably narrower and sharper, and the beaks nearer anterior extremity, and in having the ribs beaded.

Hab. India, *Capt. Boys.* Brit. Mus.

Sp. 9. ESTHERIA TETRACERA.

Syn. Limnadia tetracera, Krynicki, Bull. Soc. Imp. Nat. Moscou, 1830, 176. t. 7. f. 1, 2. M. Edwards, Hist. Nat. Crust. iii. 363. No. 3.

Isaura tetracera, Joly, Ann. Sc. Nat. 2nd ser. xviii.

Carapace-valves broadly obovate; anterior extremity broader than posterior, which is obtusely rounded; beaks prominent, very near anterior extremity.

Not having seen this species I cannot describe the structure of the carapace.

Krynicki describes this species as a *Limnadia*, but at the same time remarks "that it ought to form the type of a new genus."

Hab. Neighbourhood of Charkow, Russia, *Krynicki.*

June 12, 1849.

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

The Secretary reported that the youngest female Bison had given birth to a calf in the Menagerie on the 6th inst. after an apparent gestation of 270 days. A fine male example of *Macropus major* had been added to the collection by purchase.





SCYTHUS GLIENS.

Letters had been received from Richard Hill, Esq., W. C. Kelaart, Esq., R. J. Bourchier, Esq., and Dr. Bland, Corr. Members.

Mr. Hill's letter was dated Spanish Town, May 8, and communicated to the Secretary that his notice of the desire of the Society to possess living specimens of the Reptiles of Jamaica, had secured promises of aid from all parts of the island; and information had been received of several examples of the Yellow Snake, Iguana, and other forms being already in confinement for the purpose of being transmitted to England.

Mr. Kelaart's letter was dated San Fernando, Trinidad, May 6. Among other interesting intelligence he states that he has "no doubt of the existence of a large Red Monkey, and according to some, of a white one also, inhabiting the woods of this island; and although no specimens have yet been procured, the promises of several of the proprietors give hope of a speedy solution of the question as to what species these animals may belong."

Mr. Gray exhibited, from the collection of J. H. Hora, Esq., a female specimen of *Ovis Gmelini*, from Tauri in the Persian Gulf.

It was peculiar for the large size of the tuft of hair over the orbital gland, which was closely matted together by the secretion from it; the nostrils are surrounded by a distinct narrow callous edge; the callosity occupies the space between the nostrils and a narrow central band down to the lips; the body is covered with very close soft hair, and on the haunches and other parts where the hair is longer, it retains its softness, but approaches to the quill-like character of the Roebuck; the upper part of the body is ochraceous yellow, the lower part paler and whitish; the head is paler yellowish, and the hairs on the forehead and face are tipped with whitish.

The following paper was read:—

1. ON THE VARIATION IN THE TEETH OF THE CRESTED SEAL, *CYSTOPHORA CRISTATA*, AND ON A NEW SPECIES OF THE GENUS FROM THE WEST INDIES. BY J. E. GRAY, ESQ., F.R.S. ETC.

In a paper which I lately communicated to the Society on the genus *Bradypus*, I drew their attention to some variations in the form of the lower jaw, which were not accompanied by any appreciable difference in the external appearance of the specimens; I now wish to bring before the Society some variations which I have observed in the teeth of the different skulls of the Crested Seal which I have received from Greenland. I consider it of more importance to record these variations, as the formation of the teeth in the family of Seals has been considered as affording one of the best characters for the distinction of the species.

Several zoologists have considered the Crested Seal of the northern and the Proboscis Seal of the southern hemisphere as belonging to the same genus; but though there are several characters which are common to both, they are very easily distinguished.

The grinders of the Proboscis Seal are only slightly plaited on the crown, all have only simple subcylindrical roots, which are cylindrical in the young animal, and enlarged, short, and clavate in the adult specimens. The grinders of the Crested Seal, on the contrary, are rather tubercular and very closely and strongly plaited on the crown, and this character is seldom obliterated by age, and in most of the skulls the 4th and 5th grinder of both jaws have two roots, and the root of the 3rd grinder is partially divided on the outer side; but in some adult skulls (probably belonging to the males?) the roots of the 4th and of the 1st, 2nd and 3rd grinders are enlarged and simple-rooted, and in one young skull the 4th grinder is also simple-rooted.

I shall proceed to give the variations to be observed in the following skulls, all received from Greenland:—

1. No. 332 *b.* in *Brit. Mus. Cat.*—The skull of an adult or aged specimen: the crowns plaited, the roots of all the grinders enlarged and short, club-shaped and simple, separated from the crown by a narrow collar.

2. No. 332 *a.*—Skull of adult: the crown worn; the root of the 1st, 2nd, 3rd, 4th, rather enlarged, oblong club-shaped, rather elongate, the root of the 5th grinder compressed, of the left side simple, of the right partially divided into two short roots continued in grooves on each side.

3. No. 332 *c.*—Skull of an aged specimen: the crowns plaited and tubercular, the roots of the grinders rather enlarged, the root of the 3rd grinder rather compressed, simple, with a groove on the outer side of the 4th and 5th grinders, scarcely enlarged, and divided into two distinct diverging roots.

4. No. 332 *h.*—Skull of nearly adult: the crown of few grinders remaining plaited; the root of 4th and 5th grinder of the left side, as shown by the cavities, divided into two roots; of the 4th grinder of the right side simple, with a slight groove on the outer side, and of the 5th grinder two-rooted, like the similar grinder on the other side.

5. No. 332 *d.*—Skull of nearly adult, wanting the grinders; but the cavity for the grinders shows that the 4th grinder on both sides had a short clavate root with a slight central groove on the outer side, and the 5th grinder on each side had two separate roots.

6. No. 332 *e.*—Skull of a half-grown animal: the crown plaited and tubercular, the 4th grinder on each side with ovate, short, simple roots, and the 5th grinder with compressed truncated simple roots; the grinders are rather further apart than in the other skull.

7. No. 332 *f.*—Skull of a very young animal: the crowns are very distinctly plaited, the 4th and 5th grinders of both sides have two distinct roots, and the 3rd grinder has a groove down the middle of the outer side. In all these skulls the grinders are close together, forming a nearly continuous line.

8. Is the skull of a young female of the Seal caught in the Orwell on the 29th of June, 1847, described and figured by Dr. W. B. Clarke, and now in the Ipswich Museum. This skull very much

resembles No. 6 (No. 332 *e.*) in proportions and distance of grinders, but is only about two-thirds the size, and the blood-vessel on each side the palate, which in that skull is open, is here partly covered over with a thin layer of bone; the 4th upper grinder has a compressed simple root with a groove on the lower part of its outer side, and the 5th grinder is two-rooted. It is to be observed, that the Orwell specimen, No. 8, was a female, and that the nose of this and of skull No. 6 differ from the others in being rather longer, and in the grinders being rather further apart: is this the character of the female sex? and in both these skulls the 4th grinder is single-rooted: is that also a sexual character? It is to be hoped that the Danish or American naturalists who have the opportunity of examining these seals, will determine the question.

It would thus appear, from what I have stated, that in this genus the form of the root of the grinders is very liable to variation; I have not observed any similar variation in the teeth of any other seal, and still believe that the form of the roots affords a good character in most of the genera.

We have lately received from the West Indies the skin and skull of a seal which evidently belongs to the same genus as the crested seal of the northern hemisphere. The skull, or rather the teeth, when compared with those of the Greenland specimens, induce me to believe that it is distinct from them. It chiefly differs in the form of the outer upper cutting teeth and canines. In *all* the specimens, both old and young, from the North Sea, the outer upper cutting teeth and the canines are narrow and compressed. In the West Indian skull, which is that of a very young specimen, the outer upper cutting teeth and the canines are broad, strongly keeled on each side and longitudinally plaited within. In this skull the 4th grinder has only a single root, and the 5th grinder has two; the crowns of the teeth are plaited and tubercular like those of the North Sea specimens. The face is rather broader than in a skull of the northern kind of nearly the same size. This species may be called *Cystophora antillarum*.

We have received an imperfect skin of a seal from Jamaica, which was brought home by Mr. Gosse. It is unfortunately without any bones. The whiskers are short, thick, white, cylindrical, regularly tapering, and without any appearance of a wave or twist. In this character it most agrees with *Phoca barbata*.

June 26, 1849.

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

The Secretary reported that two living examples of *Crotalus durissus* had been presented to the collection by R. Davis, Esq., F.Z.S.,

and that examples of *Rhamphastos carinatus* and *Felis mitis* had been acquired by purchase; that a Virginian Deer (*C. virginianus*) had fawned on June 16, and the Sambur Deer (*C. hippelaphus*), presented by Capt. Molison, had fawned on June 19. The period of gestation in the latter species appears to be eight months and twenty-four days.

Letters had been received from Lieut. Tyler, R.E. (Santa Lucia), R. J. Bouchier, Esq. (Malta), and A. N. Shaw, Esq. (Bombay).

Dr. Melville gave an oral exposition of Dr. Kaup's views of the natural arrangement of Birds, derived from a paper by that distinguished ornithologist, which he was engaged in translating for publication. Dr. Melville's address was illustrated by the original diagrams transmitted to him by Dr. Kaup.

July 10, 1849.

Harpur Gamble, Esq., M.D., in the Chair.

The Secretary stated that he had the pleasure of reporting the safe arrival of the animals announced at the meeting of Feb. 27 as having been presented by Lieut.-Colonel Butterworth. In addition to this liberal donation from the Governor of Singapore, which the Society could not fail to regard as a valuable proof of His Excellency's interest in the Institution, the great collection from Egypt had been successfully transported to the Gardens, and the combined accessions formed by far the most important aggregate ever introduced at the same period.

The species presented by his late Highness Ibrahim Pasha were as follow :—

Camelopardalis giraffa, ♀.
Antilope leucoryx, ♀ ♀.
 „ *nasomaculata*, ♂ ♀.
 „ *dorcas*, 3 ♂, 2 ♀.
Camelus dromedarius, ♂ ♀.
Struthio camelus, ♂ ♀.

The species collected by the Hon. C. A. Murray were :—

Cynocephalus hamadryas, ♂.
Felis Leo, 3 ♂.
 „ *jubata*, ♀.
Camelopardalis giraffa, ♀.
Struthio camelus, 2 ♂.
Porphyrio smaragnotus, ♂ ♀.
Phœnicopterus antiquorum.
Pelecanus crispus, ♂ ♀ et juv.

Naia haje.
Cerastes Hasselquistii.
Psammosaurus griseus.
Uromastix spinipes.
Stellio vulgaris.
Gongylus ocellatus.
Sphenops capistratus.
Tarentola ægyptiaca.
Chamæleo vulgaris.

A male Giraffe and a male Leucoryx, which were to have been included in the gift of His Highness Ibrahim Pasha, and a fine male Lion, the gift of the Hon. C. A. Murray, died in the transit from Cairo to Alexandria. The remainder of the collection, amounting to 18 Mammalia, 14 Birds, and 60 Reptiles, were conveyed from Alexandria in the Peninsular and Oriental Company's Steamer 'Indus,' without the loss of a single individual.

The species presented by Lieut.-Colonel Butterworth were:—

Helarctos malayanus.
Casuarius emu.
Grus antigone, ♂ ♀.

Mr. E. Doubleday exhibited specimens of the larva, pupa, and perfect insect of *Sirex gigas*, an insect mostly very rare in Great Britain. These specimens were sent to Mr. Gray from Bath by Mr. Brunel, and were accompanied by fragments of the wood on which the larvæ had fed.

It appears that about eighteen months since a quantity of larch-trees were cut in the neighbourhood of Bath, and after having been used as scaffolding-poles in the repairing of one of the churches of the city, were applied to a similar purpose at the railway-station. From these poles thousands of individuals, chiefly females, of *Sirex gigas*, are now coming forth. From the specimens exhibited, it would seem that the larvæ prefer the soft sap wood to the more solid internal part of the trees, penetrating this part longitudinally at a little distance from the bark, the perfect insect gnawing its way through when ready to make its appearance. (Annulosa, Pl. XII.)

Mr. Doubleday remarked that there was here ample evidence to disprove St. Fargeau's idea, that this fine insect is a parasite upon some timber-boring beetles, an opinion already controverted by Mr. Westwood and others. The larva, pupa, and perfect insect are beautifully figured by Ratzeburg in his work on insects injurious to forests; but he gives no details of the habits of the insect, nor any figures indicating the mode of life of the larva.

The following papers were read:—

1. DESCRIPTION OF TWO NEW SPECIES WITH THE CHARACTERS OF A NEW GENUS OF TROCHILIDÆ. BY JOHN GOULD, F.R.S. ETC.

Genus HELIODOXA, Gould.

Bill straight or slightly curved downwards, of moderate length;

nostrils covered by an operculum; wings pointed, rigid, of moderate size, and well-adapted for sustaining flight; tail of moderate size, considerably forked; feet of moderate size; the outer toe and claw shorter than the inner toe and claw; the hind toe and claw the shortest of all; tarsi clothed with fine feathers.

Species, *H. jacula*, *H. Leadbeateri* (*H. Otero* ?), *H. rubinoïdes*, and *H. rubinia* ?

HELIODOXA JACULA, Gould.

Male: crown of the head, breast and abdomen resplendent metallic green; in the centre of the throat a crescentic mark of metallic blue; the metallic green of the crown running to a point towards the occiput; back of the neck, back, and upper wing-coverts bronzy green; under wing-coverts and flanks grass-green; wings purplish brown; upper tail-coverts purplish brown with green reflexions; under tail-coverts dark brown with green reflexions; tail considerably forked and of a bluish black; thighs and tarsi white; feet blackish brown; bill black.

Total length $5\frac{1}{4}$ inches; bill $1\frac{1}{8}$; wing 2; tail $2\frac{3}{8}$; tarsi $\frac{1}{4}$.

Female: crown of the head and upper surface green; throat shining metallic green, the white bases of the feathers showing through and giving the throat a speckled appearance; tail bluish black tipped with white; in some specimens the lores are buff, and a line of the same hue extends beneath the eye; thighs white; under tail-coverts dull green; bill black.

Hab. Santa Fé de Bogota.

Remark.—This splendid new species, which I have recently received from Santa Fé de Bogota, is precisely of the same form and about the size of the *T. Leadbeateri* of authors.

ERIOPIUS SIMPLEX, Gould.

The entire body obscure olive-green; the crown of the head and back of the neck tinted with purple; rump and upper tail-coverts a very little brighter than the back; under tail-coverts dull bluish purple; wings purplish brown; tail considerably forked, and black with purplish reflexions; thighs and tarsi thickly clothed with snow-white plumes; bill and feet black.

Total length $4\frac{3}{8}$ inches; bill $\frac{7}{8}$; wing $2\frac{1}{4}$; tail 2.

Remark.—The only specimen I have seen is in the collection of E. Wilson, Esq.; it is most nearly allied to *E. cupreiventris*, but its uniform dusky colour renders it conspicuously distinct. It was received in a collection sent from Santa Fé de Bogota.

2. DESCRIPTIONS OF SIXTEEN NEW SPECIES OF BULIMUS, IN THE COLLECTION OF H. CUMING, ESQ., DISCOVERED BY MR. WILLIAM LOBB IN THE ANDES OF PERU. BY LOVELL REEVE, F.Z.S.

1. BULIMUS CLAUSILIOIDES. *Bul. testá elongato-turritá, sinistrali, compressè umbilicatá, anfractibus novem, supernè obscurè*

costatis, longitudinaliter creberrimè et minutissimè rugoso-striatis, columellâ verticaliter reflexâ, aperturâ subquadratâ, labro tenui, simplici; colore murino.

Hab. Andes of Caxamarca, Peru; W. Lobb.

Very like a *Clausilia* in form, and of a silken aspect, arising out of the very close and minute development of longitudinal striæ.

2. **BULIMUS NIGROPILEATUS.** *Bul. testâ acuminato-ovatâ, subampliter umbilicatâ, anfractibus septem, convexis, obtusè subrugoso-striatis, columellâ verticaliter reflexâ, aperturâ ovali, labro simplici; albidâ, basin versus obsoletè fusco-fasciatâ, apice nigro.*

Hab. Chachapoyas, Alto Peru; W. Lobb.

It is probable, from the faintly-banded appearance of this shell, that this is but the pale variety of a darker type.

3. **BULIMUS FOVEOLATUS.** *Bul. testâ oblongo-ovatâ, tenuiculâ, subventricosâ, haud umbilicatâ, ad apicem obtusâ, anfractibus quinque ad sex, convexis, longitudinaliter obtusè plicato-striatis, punctis oblongis spiraliter lineatim exsculptis, infra suturas plicato-crenulatis, apicem versus peculiariter foveolatis, suturis rudibus, anfractu ultimo obliquè descendente, columellâ latâ, depressiusculâ, obliquè recedente, aperturâ oblongo-ovali, labro subincrassato, vix reflexo; intensè olivaceo-brunneâ, infra suturas pallidè unifasciatâ, suturis albidis, columellâ labroque cærulescente-albis, aperturæ fauce iridescente-lilacâ.*

Hab. Vitoe, near Sarma, Alto Peru; W. Lobb.

This is the species which Dr. Pfeiffer has assigned to the *Bulimus Mahogani* of Sowerby, Conch. Illustr. f. 59; a species of the *B. roseus* or *hæmastoma* type, of which I can find no description or tidings.

The species under consideration will be found, on comparison with Sowerby's figure, to be of a more oblong form, more acuminate at the apex, and very peculiarly indented round the upper sutures, reminding one very much of the indentations in the shells of *Phorus*.

4. **BULIMUS DEPSTUS.** *Bul. testâ subacuminato-ovatâ, compressè umbilicatâ, anfractibus septem, rotundatis, lævibus, supernè depressiusculis, minutè plicato-crenulatis, columellâ reflexâ, aperturâ parviusculâ, labro simplici, intus extusque ustulato-fuscâ, hic illic saturatiore-strigatâ.*

Hab. Chachapoyas, Alto Peru; W. Lobb.

A thin shell, approaching in form and colouring to the *Bulimus nux*, from which it differs in being of lighter structure, and having a more rounded aperture.

5. **BULIMUS SCITULUS.** *Bul. testâ subfusiformi-oblongâ, vix umbilicatâ, anfractibus octo, leviter convexis, lævibus, columellâ parum reflexâ, aperturâ subangustâ, labro simplici; albidâ, purpureo-cæruleo tinctâ, basin versus ferrugineo-rufâ, lineis subtilibus albis, irregulariter undulatis, creberrimè longitudinaliter notatâ.*

Hab. Chachapoyas, Alto Peru; W. Lobb.

Neatly marked with fine white waved lines upon a purple-blue ground, tinged towards the base with a bright rust-red.

6. *BULIMUS CUZCOENSIS*. *Bul. testá acuminato-oblongá, subcylindraceá, subcompressè umbilicatá, anfractibus octo, leviter convexis, sub lente striatis et corrugato-indentatis, columellá reflexá, aperturá parviusculá, labro simplici; fulvescente-spádiceá.*

Hab. Cuzco, Bolivia; W. Lobb.

Of a delicate nankeen colour throughout.

7. *BULIMUS PRÆTEXTUS*. *Bul. testá acuminato-oblongá, subcylindraceá, subampliter umbilicatá, anfractibus octo, leviter convexis, lævibus vel obscurè indentatis, columellá latissimè reflexá, aperturá parviusculá, labro simplici, paululum reflexo; lacteá, cæruleo-nebulatá, maculis rotundatis albidis promiscuè floccatá, lineis minutis albidis undulatis longitudinaliter creberrimè notatá, apice fuscéscente.*

Hab. Andes of Caxamarca, Peru; W. Lobb.

A delicate blue-clouded shell, sprinkled with a few white flakes, and very closely marked with fine white lines, which are irregularly waved and sometimes ramified like veins.

8. *BULIMUS LOBBII*. *Bul. testá subcylindraceo-oblongá, compressè umbilicatá, aperturam versus subobliquè tumidá, anfractibus octo, leviter convexis, lævibus vel obscurè indentatis, columellá latè expansá, aperturá obliquè effusá, labro reflexo; albá, vittis longitudinalibus fuscéscentibus et purpureo-castaneis irregulariter conspicuè pictá, ponè labrum et aperturæ fauce purpureo-nigricante.*

Hab. Banks of the Maranon, near Balsas, Peru (on branches of a species of *Jatropha*); W. Lobb.

This fine species is of a delicate cream-white, striped longitudinally by distinct ribands of light brown and dark purple chestnut, without any of intermediate tint. Immediately behind the lip there is more of the dark purple chestnut, approaching to black, and the interior of the aperture is coloured with the same, having a somewhat metallic hue.

I have the pleasure to name it in honour of Mr. William Lobb, botanical collector of Messrs. Veitch and Son, the eminent nurserymen of Exeter, to whose zeal in the pursuit of natural history the discovery of these interesting species bears honourable testimony.

9. *BULIMUS PURPURATUS*. *Bul. testá subacuminato-ovatá, compressè umbilicatá, anfractibus sex, convexis, longitudinaliter rugoso-corrugatis, ad suturas plicato-crenatis, anfractu ultimo ventricosiusculo, columellá reflexá, labro simplici; purpureo-fuscá, lineis albidis hic illic longitudinaliter interruptá, basi et aperturæ fauce albidá.*

Hab. Andes of Caxamarca, Peru; W. Lobb.

A rather stout, rough shell, stained with dark purple brown.

10. *BULIMUS RHODOLARYNX*. *Bul. testá acuminato-ovatá, basin*

versus obliquè ventricosá, ampliter umbilicatá, anfractibus septem ad octo, subrotundatis, lævibus, sub lente striis obliquis elevatiusculis et spiralibus incisís minutè decussatis, aperturá suborbiculari, columellá labroque latè reflexis; roseo-albicante, intus purpureo-rosed.

Hab. Banks of the Aparimao, Alto Peru; W. Lobb.

Distinguished by its very delicate purple-rose interior, the colour of which is seen through the substance of the shell.

11. *BULIMUS DECUSSATUS.* *Bul. testá acuminato-oblongá, basi rotundatá, subcylindraceá, compressè umbilicatá, anfractibus octo, leviter convexis, longitudinaliter corrugato-striatis, ad suturas subcrenulatis, columellá latè reflexá, labro tenui, simplici; pallidè stramineá, strigis brevibus rufo-fuscis longitudinalibus et obliquis fasciatim decussatis peculiariter notatá.*

Hab. Andes of Caxamarca, Peru; W. Lobb.

Singularly characterized by the bands of short brown streaks, ranging obliquely in the direction opposed to the lines of growth.

12. *BULIMUS MYRISTICUS.* *Bul. testá acuminato-oblongá, basi subobliquè rotundatá, compressè umbilicatá, anfractibus octo ad novem, planulato-convexis, longitudinaliter striatis, infra suturas subcrenulatis, columellá latè reflexá, labro simplici; albidá, vittis irregularibus castaneis et fuscescentibus confertim longitudinaliter pictá.*

Hab. Andes of Caxamarca, Peru; W. Lobb.

This differs but little from the preceding species in form and detail of sculpture; yet there is a marked distinction in the style of painting.

13. *BULIMUS ALTO-PERUVIANUS.* *Bul. testá acuminato-ovatá, tenuiculá, ampliter compressè umbilicatá, aperturam versus obliquè ventricosá, inflatá, anfractibus septem, convexis, apicem versus creberrimè elevato-striatis, striis spiralibus incisís sub lente minutè decussatis, columellá latè verticaliter reflexá, aperturá obliquè suborbiculari, labro effuso, non reflexo; fulvescente lacteá, apicem versus cærulescente, lineis castaneis subdistantibus irregulariter longitudinaliter notatá, maculis brevibus contrariè obliquis bifasciatim pictá, macularum serie unicá infra suturas.*

Hab. Chachapoyas, Alto Peru; W. Lobb.

The painting of this delicate and boldly convoluted shell is singularly characterized by two bands of short oblong chestnut spots or dashes, ranging obliquely in a direction contrary to that of the painted lines.

14. *BULIMUS ALUTACEUS.* *Bul. testá oblongo-ovatá, umbilicatá, anfractibus septem, convexis, creberrimè corrugato-striatis, aperturá ovali, columellá reflexá, labro vix reflexo; intensè ustulato-castaneá, zonulá unicá albá medio cingulatá, labro albo.*

Hab. Cuzco, Bolivia; W. Lobb.

The entire surface of this shell is sculptured longitudinally with very closely-packed crinkled striae.

15. *BULIMUS PRIMULARIS*. *Bul. testá acuminato-ovatá, tenuiculá, subventricosá, umblicatá, anfractibus septem, lævibus, columellá tenui reflexá, labro simplici; albidá, basin versus vividè luteá, fasciis castaneo-nigris quatuor aut pluribus, nonnullis maltò interruptis, cingulatá.*

Hab. Chachapoyas, Alto Peru; W. Lobb.

Of simple structure, but abundantly characterized by its bright primrose colour and dark basal bands.

16. *BULIMUS COLUMELLARIS*. *Bul. testá cylindraco-elongatá, haud umblicatá, anfractibus septemdecim ad octodecim, planis, angustis, obliquè subobsoletè striatis, anfractu ultimo ad basin subangulato, columellá tortuosá, leviter recedente, aperturá subquadratá, ad basin effusá; roseo-alicante, apicem versus livido-cærulescente et rufescente.*

Hab. Andes of Caxamarca, Peru (under stones at an elevation of 12,000 feet); W. Lobb.

An interesting *Pupa*-like species, distinguished by its square effuse aperture and erect columnar form.

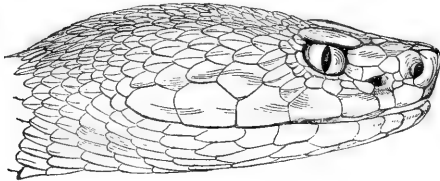
July 24, 1849.

John Edward Gray, Esq., F.R.S., in the Chair.

The following papers were read:—

1. NOTES ON THE SERPENTS OF ST. LUCIA. BY LIEUT. TYLER, R.E. COMMUNICATED BY THE SECRETARY.

Of the snakes of the island of St. Lucia, the most numerous species is the "*Rat-tail*;" then follow the "*Couresse*," the "*Clibro*," and the "*Tête Chien*;" and in this order I propose to give you, as I promised, a short description of each.



1. *CRASPEDOCEPHALUS ATROX*, Gray. The Rat-tail Serpent.

This much-dreaded serpent, which attains a length of from five to six, and sometimes even seven feet, and a circumference of from four to five inches, bears a strong resemblance, as to its shape and nature, to the common Rattle-snake of America, and is the more dangerous from its being unprovided with the means of warning its victims.

The Rat-tail appears to be ovoviviparous; and it is said that after producing her young she leaves them for a short time, and that she devours those among them which she finds in the same spot on her return. This seems to be a most improbable construction to place upon the fact of their being sometimes found in the belly of the mother, which to my idea rather tends to corroborate statements which have been already made of the female's opening her mouth in cases of danger, and the young rushing down her throat for protection. The scales of the Rat-tail are large in proportion, and carinated; the number of abdominal scuta is 213, and there are 69 pairs of subcaudal squamæ. The head is heart-shaped, very large at the back, and flat, and is covered with small scales; the eye resembles in some measure that of the cat, though, as in all the serpent-tribe, it is without outer lids, and therefore apparently always on the watch, which appearance is kept up even after death. The shape of this serpent differs from that of the others hereafter mentioned, in being more broad, or lying more flatly on the ground; and the tail, instead of tapering gently from the body, becomes suddenly small, and, as the name implies, is much like that of a rat. When not in motion, the Rat-tail is almost invariably coiled up in a circle, with its head on the top. Its movements are fortunately not so rapid as those of the other serpents of the island, and to this circumstance may be attributed the advantage always gained over it by its deadly enemy the Clibro, which will be presently referred to. The Rat-tail is armed with two fangs, or hollow teeth, placed one at each side of the extremity of the upper jaw, frequently seven-eighths of an inch in length, with a small slit at the point and towards the front, through which the poisonous liquid, a yellow viscid matter, is ejected; and it has two rows of teeth down the centre of the mouth for purposes of deglutition.

An important point in the history of this serpent is the method of treating its venomous bites. If the wounds caused by these be not at once attended to, the most fatal consequences ensue, and within a short space of time. Should the fang penetrate any large blood-vessel, and inject therein any of the poisonous matter, I suppose that no remedy would be of avail: but under ordinary circumstances, if the wound can be at once laid open, a ligature tied between it and the heart, and sucked, then rubbed with a mixture of lime-juice, rum and salt, and intoxication and sleep produced by administering rum-punch with plenty of lime-juice in it to the patient, there is little danger of loss of life; as is proved by the fact, that out of thirty soldiers treated in this way some time since in this island, only one died.

The person sucking the wound has nothing to fear if he has no sore in his mouth.

There are native "*panseurs*" who pretend to the knowledge of certain herbs, which they mix with rum, gunpowder, salt and lime-

juice, and place upon the wound in the shape of a poultice, after well-cutting, sucking and squeezing it, and concoctions of which they cause the unfortunate patient to drink ; but they appear to produce no decided relief to the patient, and although perhaps very good as poultices to any inflammatory wounds, I do not imagine that these herbs possess any antidotal properties to the venom of the serpent. It is calculated that at the least twenty persons die annually in St. Lucia from the bites of these serpents ; and, as I have often heard it stated that in nineteen cases out of twenty the patient recovers, it may be inferred that 180 people per annum are maimed or dangerously wounded by them.

2. ——— ? ——— ? The Couresse.

The Couresse is a beautifully-formed little snake, perfectly harmless, from two and a half to three feet in length, and seldom attaining more than $2\frac{3}{8}$ inches in circumference, with 96 abdominal scuta and 86 rows of subcaudal squamæ.

Its small head, bright attractive eye, quick and elegant motion, and its tapering body and tail, present a remarkable contrast to the corresponding characteristic of the last-mentioned Rat-tail serpent.

The colour of the Couresse varies much ; they are generally found of a dark blue colour, with white and grey variegations of every possible shape ; sometimes however yellowish brown prevails, but spotted in a similar manner ; the belly is white, slightly tinged with blue, and at the point of junction of the abdominal and other scales is always found a dark spot.

Four rows of small teeth are to be found in the upper jaw and two rows in the lower. The head is covered by large scales.

The Couresse cannot exist long without water, and will even drink milk. When kept in a box with a vessel of water for their use, they are more frequently found in the water than out of it, this being their only protection against their deadly enemies the ants.

This snake is oviparous : the longest diameter of the eggs is five lines, the shortest three lines. It feeds upon lizards, crapauds, mice, and other small animals and reptiles.

3. COLUBER CONSTRICTOR ? The Clibro.

The Clibro is found in this island as long as five and six feet, and as large as from three and a half to four inches in circumference. It is perhaps one of the most remarkable and useful of its species : it has 236 abdominal scuta and 72 rows of subcaudal squamæ, is of a bluish colour with a white belly, and after its change of skin shines like marble. The head is small, covered with large scales, and the eye dark blue and opaque. There are four rows of small teeth in the upper jaw and two in the lower. The longest diameter of the egg is eighteen lines, the shortest nine.

One peculiarity of the Clibro is its apparently total disregard of man.

But its great singularity consists in its choice of food. It lives principally upon other serpents, and of those chiefly the Rat-tail,

which it has not the power of killing until after it has swallowed it, whose bite, so fatal to the human species and all other animals (in some cases killing even horses), has no effect upon the Clibro; for I have myself seen distinctly on more than one occasion, in their combats, the fang of the Rat-tail enter into the body or head of the Clibro, and bring blood from the spot, while the Clibro has taken no more notice of it than to get the head of the Rat-tail into his mouth as quickly as possible and begin to swallow him. I have satisfactorily proved that the Clibro does not kill his prey before he has swallowed it, by allowing a Clibro to swallow a Couresse, all excepting the very point of his tail, then pulling him out, after a short interval giving it to him again, pulling out the Couresse by the tip of his tail as before, and keeping him alive for months afterwards.

The common belief is that the Clibro, when bitten by the Rat-tail, rubs himself in a grass which is commonly found in uncultivated land; but this I have at all events shown to be an unnecessary proceeding on the part of the Clibro.

It may not be uninteresting to describe here a fight which I witnessed some months since between a large Clibro and Rat-tail, the latter being nearly half as thick again as the former, but not so long; they were each however upwards of four feet in length.

Upon being placed together in a barrel, the Clibro immediately seized the Rat-tail by the middle, and twisted three times round him, in doing which the Rat-tail bit him in the back, and drew blood; they both then remained perfectly quiet for a few seconds, when the Clibro moved his head slowly up behind his own body, and looking over it, advanced under its cover, to the point which lay nearest to the head of the Rat-tail, which was between four and five inches distant; waiting about a couple of seconds in this position—the Rat-tail never having moved all this time—the Clibro made a dart, and with almost incredible rapidity seized the head of the Rat-tail in his mouth, and began to swallow him, which he accomplished in rather more than three hours.

But the Clibro does not confine itself to snakes of other species, for on one occasion I lost a large Clibro by its being eaten by another. The two had lived for weeks together in the same drawer, and there was no great difference between them in size: having offered them food a few days previously, they refused it, and on my next visit I found only one in the drawer. Not being able to discover the means of egress of the missing Clibro, I then began to remark that the one in the drawer was thicker than usual, and after taking him out and disturbing him a little, he vomited up his late friend in a half-digested state, but enough of him was left to enable me to recognise his scales.

4. BOA DIVINILOQUA, Dum. et Bibr. The Boa.

The St. Lucian Boa, which is called by the natives "*Tête Chien*," from the resemblance of its head to that of a greyhound, is found in great numbers in cane-pieces, where it is highly valued as a means of destroying rats, but so feared that few natives can be induced to touch or even approach very near to it.

This fear is however perfectly unnecessary, as although it constantly leaves its teeth in the object of its attack, no result more than from the scratch of a thorn ensues.

The general length of the Boa of this island is from eight to ten feet, and it is rarely found longer than fourteen feet. It feeds upon rats, birds, cats, rabbits, fowls, and all small animals. Its head is covered with small scales, unlike the generality of harmless serpents. The scales over the body are small and smooth, and beautiful tints may be observed in them when exposed to a strong light or in the sun. The abdominal scuta are 280 in number, and the subcaudal squamæ consist of 70 rows. I believe the Boa to be viviparous, from some young having been cut out of the womb of a dead female.

The Boa has the property of being able to live for a great length of time without food, water, and almost without air. I have witnessed cases of their existing in drawers and boxes unopened for months, and I have been told upon good authority of a case of a Boa looking as well and as fat after thirteen months of this species of confinement as before it.

I am unable to fix any regular period for the changes of skin to which all serpents are liable, and which appears greatly to depend upon the state of their stomachs.

2. CHARACTERS OF THREE NEW GENERA AND SPECIES OF LEPIDOPTERA. BY WILLIAM WING, M.E.S.

(Annulosa, Pl. XIV.)

Fam. NOCTUIDÆ.

1. CALIGATUS, n. g.

Palpi short, ascending; densely clothed with scales; penultimate joint long (fig. 2 a): *antennæ* bipectinated at the base, and bearded (fig. 2 b, section) ♂: *head* small, rounded, nearly concealed: *thorax* with a large, acute crest in front: *abdomen* long, furnished with two anal tufts, ♂: *anterior wings* acute at tip, broad, dentate, slightly deflexed; *posterior wings* abbreviated. Type,

CALIGATUS ANGASII, n. sp. (Annulosa, Pl. XIV. fig. 2, 3.)

Sp. Ch.—Body and base of the anterior wings of a bright fawn-colour, with a triangular diaphanous patch at the costa, another of an oval form between the costa and posterior margin, and a nearly square patch in the centre of the outer margin. General colour of the apical half of the wing pink, varied with yellow and fawn-colour; posterior wings diaphanous, with a broad ashy brown margin marked with a triangular yellow spot, and a lunular pink spot at the inner angle; cilia of all the wings white. In the male the metatarsi and tibiæ are densely clothed with long hair-like scales, making them appear very broad and flat (fig. 3). I have named this species after Mr. Angas, who has recently explored the highly interesting country of which this is a native, the Cape of Good Hope. In the collection of the British Museum.



1 TRICHOMOPLATA VITTATA 2 3 CALIGATUS ANGASH 4 5 PALPARIA LAMBERTELLA.



2. *TRICHOMAPLATA*, n. g.

Palpi short, ascending; penultimate joint somewhat wedge-shaped (fig. 1 a): *antennæ* long, bipectinated at the base: *thorax* with a very small crest in front; scapular plates furnished with long pencils of hairs: *body* long, tufted at the extremity, ♂: *anterior wings* deflexed, lanceolate, entire. Type,

TRICHOMAPLATA VITTATA, Pl. XIV. fig. 1.

Sp. Ch.—Head and thorax ashy grey; abdomen ferruginous; anterior wings pinkish white, with a deep ferruginous mark on the anterior margin near the costa, and a strong ferruginous vitta extending from the shoulder to the posterior angle of the outer margin; posterior wings subdiaphanous, with the inner margin fulvous.

Hab. Brazil. In the collection of the British Museum.

Fam. HYPONOMEUTIDÆ.

3. *PALPARIA*, n. g.

Palpi large; penultimate joint with a large triangular patch of scales extending horizontally; terminal joint recurved (fig. 4 a): *thorax* broad, slightly depressed: *anterior wings* oval, apex acute; *posterior wings* broad, ciliated; apex acutely oval: *posterior tibiæ* large and broad. Type,

PALPARIA LAMBERTELLA, Pl. XIV. fig. 4.

Sp. Ch.—Thorax and anterior wings of a rose-pink colour, with two longitudinal yellow lines extending from the shoulder to the apex and posterior angle of the outer edge respectively; posterior wings yellow, shading into orange towards the apex; abdomen yellow. Larva depressed, 16-footed, whitish green, slightly hairy, solitary.

In the collection of the British Museum.

This species was reared by Mr. Lambert in Australia. The figure of the larva is from his drawing.

The meeting was then adjourned to Tuesday, November 13.

November 13, 1849.

William Yarrell, Esq., in the Chair.

The Secretary reported that the recent additions to the Menagerie included two species of Mammalia, five species of Birds, and six species of Reptiles, which had not been previously exhibited, viz. :—

Mus (Hesperomys) pilorides, Desm.

From St. Lucia; presented by Lieut. Tyler, R.E.

Ursus isabellinus, Blyth.

From the Himalayah; deposited by Sir H. Hurler, Bart.

Vidua concolor? Cass.
Ardea goliath, Temm.
Nycticorax caledonicus (Gmel.).
Tigrisoma tigrinum (Gmel.).
Numida ptilonorhyncha, Rüpp.
Craspedocephalus atrox, Gray; and
Coluber constrictor?

From St. Lucia; presented by Lieut. Tyler, R.E.
Eunectes murinus, Wagler.
Python regius, Bibron.
Cyclura Collei, Gray.

From Jamaica; presented by Dr. A. Smith,
 F.Z.S. &c.
Iguana tuberculata, Laur.

A letter was read from Alexander Elphinston, Esq., H.E.I.C. Civil Service, Bombay, dated Dhoolia, Sept. 1849, in which he stated his intention of forwarding to Bombay, at his own expense, a collection of animals of which he desired the Society's acceptance. In this interesting letter, which was transmitted by A. N. Shaw, Esq., F.Z.S., Mr. Elphinston communicated several particulars relative to the distribution of species in Candeish and Goojerat, and having stated his opinion "that England has a right to expect from her sons in the colonies contributions to our National Zoological Society in London," expressed his determination of continuing his active support to the Institution during his residence in India.

A letter was read from Capt. the Hon. H. Keppel, R.N., communicated by Rear-Admiral Bowles, V.P., in which he announced that he had shipped a young female Urang-utan, on the 6th of September last, on board a merchant vessel from Singapore.

The Secretary reported also that he was in correspondence with the Hon. C. A. Murray, Mrs. Martin Stevenson, Mr. Duncan, Mr. Grace, and Lieut. Tyler, R.E., in reference to collections which might be expected from Egypt, Valparaiso, Whydah, Mogador, and St. Lucia.

The following papers were read:—

1. DESCRIPTION OF A NEW SPECIES OF TUPAIA DISCOVERED IN CONTINENTAL INDIA BY WALTER ELLIOT, ESQ. BY G. R. WATERHOUSE, PRES. ENT. SOC. ETC.

(Mammalia, Pl. XIII.)

Of the species of Tupaia about to be described, three specimens were forwarded to me by W. Elliot, Esq., who, in a letter which accompanied them, states that they were procured from the hills between Cuddapah and Nellox, in what may be termed the Eastern Ghats.

Mr. Elliot, it appears, had abstained from describing and naming this animal from his not having the means of instituting a comparison between it and the known species of the genus. From the comparison which I have made, I am quite satisfied that it is distinct from the three species found in the Indian islands, as well as from the



et lith.

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TUPAIA ELLIOTI. Waterh



animal described by M. Isidore Geoffroy in Bélanger's 'Voyage aux Indes-Orientales*', which latter was discovered by M. Bélanger at Pegu in the southern part of Birmah. I propose to name the new species after its discoverer, whose researches in Indian zoology merit high praise.

TUPAIA ELLIOTI.

The Tupaia of the Eastern Ghats is about equal in size to the *T. Tana*, but differs in the comparatively pale colouring of its fur, in having the tail less bushy, and in the smaller size of its teeth. Its head is shorter than is the head of the animal last mentioned, and consequently considerably shorter than that of the *T. ferruginea*, or of the Tupaia of Pegu, the head of which is said to be 2' 2''' in length, in which respect it agrees very closely with the *T. ferruginea*. The fur is rather less soft than in *T. Tana*, and its general hue on the upper parts of the body is palish rufous brown, very indistinctly freckled with dusky. On the hinder parts of the back the darker penciling is almost entirely wanting, and hence the tint is more uniform; whilst over the shoulders, and especially on the crown of the head, the black or dusky penciling is very evident. The sides and under parts of the body are of a rich yellow tint: on the abdomen the hairs are of an uniform colour—almost of a golden yellow; but on the sides of the body is a moderately distinct penciling of dusky. The chin, throat and chest are of a paler hue than the abdomen, and in parts they are nearly white. The orbits are of the same pale tint, and there is a shoulder-mark (as in other species of the genus) which is nearly white. The feet are clothed above with yellow hairs, and are entirely naked beneath, where they appear to have been flesh-coloured in the living animal. The tail is depressed. The hairs on this organ are of a rich rufous brown tint; but each hair has a narrow dusky ring, if we except those which cover the mesial part of the under surface, which are shorter than the rest, and which are of an uniform ochre-yellow. The specimen from which this description is drawn up is a male, and evidently adult, having all the true molars well-developed, as well as the hindermost of the false molars, which is the last tooth to show itself in these animals. Its dimensions are as follows:—

	in.	lin.
From tip of nose to root of tail, about	7	9
Length of tail, including the hair, about	9	0
————, not including the hair	7	6
From nose to ear	1	8†
Height of ear	0	4
Width of ditto	0	9
Length of fore-foot and nails	0	11
———— of nail of middle toe of ditto	0	2
———— of hind-foot and nails	1	8
———— of nail of middle toe of ditto	0	2

With regard to the remaining two specimens sent by Mr. Elliot, one is a young animal, being about half-grown, and the other is an

* P. 105, pl. 4.

† In *T. ferruginea* the length from nose to ear is full two inches.

adult female, which differs from the adult male in being of an uniform, and very pale, rufous tint on the upper parts of the body, and of a pale yellow on the under parts. The throat, cheeks and shoulder-mark are yellow-white. I suspect it is an accidental variety. It appears to have but four mammæ, two of which are situated on the lower part of the abdomen, and the remaining two near the insertion of the fore-legs.

The skull of *Tupaia Elliotti* is smaller, considerably shorter, and has a broader muzzle than that of *T. ferruginea*, whilst on the other hand it is longer and larger than that of *T. Javanica*, which is remarkable for the shortness of the facial portion. These differences approximate the skull under consideration to that of *T. Tana*; there are, however, ample differences between the skulls of *T. Elliotti* and *T. Tana*. The skull of the former of these two animals is rather smaller than that of *T. Tana*, has the muzzle relatively shorter, the nasal bones shorter, and broader behind; the zygomatic arch deeper, and the perforation in the malar bone much smaller (less than half the size). In the structure of the teeth, moreover, there are some differences worthy of note. The incisors and premolars in *T. Elliotti* are relatively smaller than in *T. Tana*; but a more important distinction—and one which distinguishes the new *Tupaia* from the other three species noticed—consists in the form of the third premolar: it here resembles the last, or fourth premolar in all respects, excepting in being of smaller size; having like that tooth a distinct inner lobe: this lobe in the other species of *Tupaia* is represented only by a minute and indistinct tubercle. The corresponding lobe in the last premolar in *T. Elliotti* is larger than usual, and so is the posterior inner lobe of the true molars. Subjoined are the principal dimensions of the skulls of the four* species of *Tupaia*.

	<i>T. Tana.</i>		<i>T. ferruginea.</i>		<i>T. Elliotti.</i>		<i>T. Javanica.</i>					
	in.	lin.	in.	lin.	in.	lin.	in.	lin.				
Total length of skull	2	4	2	0 $\frac{1}{2}$	2	0 $\frac{3}{4}$	.....†	1	4 $\frac{3}{4}$			
Length of ditto to the posterior margin of the auditory bulla	2	0 $\frac{1}{2}$	2	1	1	9	1	7 $\frac{1}{4}$	1	2 $\frac{1}{2}$		
Width of ditto, measuring from the outer surface of the zygoma	1	0 $\frac{2}{3}$	.....	1	0 $\frac{1}{4}$	1	0 $\frac{1}{2}$	0	10 $\frac{1}{2}$	0	9 $\frac{3}{4}$	
Width of ditto between orbits	0	7 $\frac{1}{4}$	0	7	0	6 $\frac{3}{4}$	0	7	0	6 $\frac{2}{3}$	0	6 $\frac{1}{2}$
Length of palate	1	3 $\frac{1}{4}$	1	3 $\frac{3}{4}$	1	0 $\frac{1}{2}$	1	1 $\frac{1}{8}$	0	11	0	8 $\frac{1}{2}$
— of nasal bones	0	11 $\frac{1}{2}$	0	11	0	8 $\frac{3}{4}$	0	9	0	7	0	4 $\frac{2}{3}$
Width of ditto in front	0	1 $\frac{3}{4}$	0	1 $\frac{1}{2}$	0	1 $\frac{3}{4}$	0	1 $\frac{5}{8}$	0	1 $\frac{1}{2}$	0	1 $\frac{1}{8}$
— of ditto behind	0	2 $\frac{1}{2}$	0	2 $\frac{2}{3}$	0	2 $\frac{1}{3}$	0	2 $\frac{1}{2}$	0	3 $\frac{1}{4}$	0	1 $\frac{1}{2}$
Length from anterior part of first premolar to hinder margin of last true molar	0	9 $\frac{1}{2}$	0	9 $\frac{2}{3}$	0	9	0	9	0	7 $\frac{1}{2}$	0	6
Length of lower jaw	1	6 $\frac{2}{3}$	1	7	1	5 $\frac{1}{3}$	.....	1	3	0	10	
Height of ditto, measured from apex of coronoid process	0	6 $\frac{1}{2}$	0	6 $\frac{1}{4}$	0	6 $\frac{3}{4}$	.....	0	6 $\frac{1}{8}$	0	5 $\frac{1}{4}$	

* I do not include the "*Tupai de Pégou*," because it is not yet determined that that animal is a distinct species from the *Tupaias* of the Indian Islands.

† The occipital portion of the cranium is wanting in the specimen.

2. ON NEW SPECIES OF MAMMALIA AND BIRDS FROM AUSTRALIA. BY J. GOULD, F.R.S., F.Z.S. ETC.

The Proceedings of the Zoological Society having been the means by which the many interesting novelties in Natural History obtained during the surveying voyages of Captains King, Beechey, Belcher, Fitzroy, Blackwood, &c., by the naturalists attached to their several ships, have been made known to the scientific world, a more appropriate channel cannot, I presume, be selected for communicating the interesting results, so far as known, of the expedition now exploring the coasts of Northern and Eastern Australia, under the command of Capt. Owen Stanley; and I therefore hasten to lay before the Society such novelties as have been received in the two branches of natural history to which I have devoted myself, viz. Mammalia and Birds.

The collection recently sent home by Capt. Stanley and Mr. MacGillivray, the able naturalist of H.M.S. 'Rattlesnake,' is a very fine one; it has been procured on what may be considered hitherto untrodden ground, I cannot therefore do better than give a list of the whole,—such lists, showing the geographical distribution of species, being in the highest degree valuable. I have said that the collection is a very fine one, and I must not omit observing that much credit is due to Capt. Stanley for affording the naturalist the requisite opportunities for obtaining so many interesting species; nor is a lesser meed of praise due to Mr. MacGillivray, for the very excellent manner in which the specimens are prepared, and the accuracy with which all the information connected with them that could be obtained has been noted down. The collection of Quadrupeds and Birds only has been placed in my hands for examination, with a view to my publishing such novelties as it may contain in my works on these subjects; after which the specimens are to be sent to the British Museum. The period that has elapsed since the arrival of the collection has been far too short to admit of my investigating the subject as I could wish; I shall therefore, on the present occasion, exhibit some of the species that appear to me to be new, and defer my remarks upon the entire collection to the next or some future meeting of the Society.

I shall now proceed to describe two species of mammalia and two species of birds from this collection, as follows:—

PTEROPUS CONSPICILLATUS, Gould.

Sp. Ch.—Crown of the head black, slightly grizzled with buff; round each eye a large oval patch of deep brownish buff, which advances on the sides of the face and shows very conspicuously; at the nape a broad crescent-shaped band of deep sandy buff, which extends down the sides of the neck and nearly meets on the breast; centre of the back glossy black, slightly grizzled with grey; cheeks, chin, all the under surface and rump, black, slightly grizzled with buff; ears and wing-membranes naked and of a deep purplish black; claws black.

Hab. Fitzroy Island.

This species is about the size of *Pteropus poliocephalus*, but has a

somewhat larger head and much larger and more powerful teeth, and is moreover rendered conspicuously different from that species by the nuchal band being of a deep sandy buff instead of deep rust-red, and not continuous round the neck; by the crown of the head and back being almost jet-black; and the eyes being conspicuously encircled with deep buff (whence the specific name); in which latter character it assimilates to *P. funereus*, but scarcely to any other. Respecting this species Mr. Macgillivray writes: "Is this not new to Australia? It is not *funereus*, of which see skull No. 7 and skin No. 8, nor is it *poliocephalus*. Of its habits I extract the following note from my journal: 'On the wooded slope of a hill on Fitzroy Island I one day fell in with this bat in prodigious numbers, looking while flying along the bright sunshine (so unusual for a nocturnal animal) like a large flock of rooks: on close approach a strong musky odour became apparent, and a loud incessant chattering was heard; many of the branches were bending under their load of bats, some in a state of inactivity suspended by their hind claws, others scrambling along among the boughs and taking to wing when disturbed. In a very short time I procured as many specimens as I wished, three and four at a shot, for they hung in clusters, but unless killed outright they remained suspended for some time: when wounded they are handled with difficulty, as they bite severely, and on such occasions their cry reminds one of the squalling of a child.'"

PHALANGISTA (PSEUDOCHEIRUS) NUDICAUDATA, Gould.

Sp. Ch.—Head, all the upper surface, the sides of the body, and the outer sides of the limbs, brownish grey; the tips of the hairs with a silky appearance; under surface of the neck and body and the inner sides of the limbs pale buff; the colouring of the upper and under surface distinctly defined on the sides of the body, but gradually blending on the limbs, the rump and root of the tail, which is thickly clothed on its basal third and naked for the remainder of its length; hands, feet, and naked portion of the tail pinky flesh-colour.

	inches.
Length from tip of nose to root of tail	12
——— of tail	8
——— of fore-feet, including the nails	3
——— of hind-feet, including the nails	3½

Hab. Cape York, the most northern point of Australia.

This species differs from all the other Australian members of the genus, in having the apical three-fourths of its tail entirely destitute of hair; in the light-coloured mark on the rump, somewhat resembling that on the same part of the Koala; and in its short dense fur and short ears.

The above description and admeasurements are taken from a female said to be about two-thirds grown. The ears are exceedingly short and rounded, and the fur is remarkable for its extreme density and for its resemblance to that of the Koala.





PTILORIS VICTORIÆ, Gould. (Aves, Pl. XII.)

Sp. Ch.—Male: general plumage rich deep velvety black, glossed on the upper surface, sides of the neck, chin and breast with plum-colour; feathers of the head and throat small, scale-like, and of a shining, metallic bronzy green; feathers of the abdomen very much developed, of the same hue as the upper surface, but each feather so broadly margined with rich deep olive-green, that the colouring of the basal portion of the feather is hidden, and the olive-green forms a broad abdominal band, which is sharply defined above, but irregular below; two centre tail-feathers rich shining metallic green, the remainder deep black; bill and feet black.

Female: all the upper surface greyish brown, tinged with olive; head and sides of the neck dark brown, striated with greyish brown; over each eye a superciliary stripe of buff; wing-feathers edged with ferruginous; chin and throat pale buff; remainder of the under surface, under wing-coverts, and the base of the inner webs of the quills rich deep reddish buff, each feather with an irregular spot of brown near the tip, dilated on the flanks into the form of irregular bars; bill and feet black.

Total length, $10\frac{1}{2}$ inches; bill, $1\frac{3}{4}$; wing, 5; tail, $3\frac{1}{4}$; tarsi, $1\frac{1}{4}$.

Hab. Barnard's Isles.

Remark.—This new species must be placed in the first rank of the many beautiful birds inhabiting Australia; indeed there are few from any part of the world that can vie with it in the richness of its colouring; and I cannot possibly have a better opportunity than now presents itself of paying a just tribute of respect to our most gracious Queen, by bestowing upon this lovely denizen of the Australian forests the specific appellation of *Victoria*;—I say of the Australian forests, for although the specimen from which my description is taken is from the Barnard Isles, within the Barrier Reef and only a few miles from the north-eastern shore of Australia, I have evidence, in the notes of the late Mr. Gilbert, that it inhabits the mainland, since he states therein that the Rifle-bird inhabits the northern as well as the southern part of Australia; in which he was in error; the bird he saw in the northern part of the country being doubtless the one here described.

It is very nearly allied to the *Ptiloris paradiseus*, but is a smaller bird, with a still more gorgeous colouring. It may be distinguished from that species by the purple of the breast presenting the appearance of a broad pectoral band, bounded above by the scale-like feathers of the throat, and below by the abdominal band of deep olive-green, and also by the broad and lengthened flank-feathers, which show very conspicuously.

SPHECOTHERES FLAVIVENTRIS, Gould.

Sp. Ch.—Male: crown of the head and cheeks glossy black; orbits, and a narrow space leading to the nostrils naked, and of a light buffy yellow, or flesh-colour; all the upper surface, wing-coverts, outer webs of the secondaries, and a patch on either side of the chest, olive-green; chin, chest, abdomen and flanks beautiful yellow; vent and under

tail-coverts white; primaries and inner webs of secondaries black, edged with grey; tail black, the external web and the apical half of the internal web of the outer feather on each side white; the apical half of the second feather on each side white; the next, or third, on each side with a large spot of white at the tip; bill black; feet flesh-colour.

Female: striated on the head with brown and whitish; all the upper surface olive-brown; all the wing-feathers narrowly edged with greenish grey; under surface white, with a conspicuous stripe of brown down the centre of each feather; vent and under tail-coverts white, without striæ.

Total length, $10\frac{1}{2}$ inches; bill, $1\frac{1}{8}$; wing, $5\frac{3}{4}$; tail, $4\frac{1}{4}$; tarsi, $\frac{7}{8}$.

Hab. Cape York.

Remark.—Of the same size as *Sphecotheres Australis*, but may be distinguished from that and every other species of the genus by the beautiful jonquil-yellow of its under surface.

3. DESCRIPTIONS OF THREE NEW SPECIES OF INDIAN BIRDS.

BY J. GOULD, F.R.S. ETC. ETC.

1. RUTICILLA GRANDIS, Gould.

Sp. Ch.—Crown of the head and the basal portion of the primaries and secondaries white; forehead, cheeks, chin, throat, back, wing-coverts, and the apical portion of the primaries and secondaries black; abdomen, lower part of the back, upper and under tail-coverts and tail rich rufous; bill and feet black.

Total length, 7 inches; bill, $\frac{3}{4}$; wing, $4\frac{1}{8}$; tail, $3\frac{1}{4}$; tarsi, $1\frac{1}{8}$.

Hab. Afghanistaun and Thibet.

Remark.—This, the largest and one of the best-marked species of the genus, is nearly allied to the *aurorea* of Pallas.

2. YUNX INDICA, Gould.

Sp. Ch.—Upper surface pale brown, finely freckled with grey, and blotched, particularly down the back of the neck, on the centre of the back, and on the wing-coverts, with brownish black; primaries brown, crossed on their outer webs with regular bands of deep buff, and toothed on their inner webs with the same hue; remainder of the wing-feathers like the upper surface, but crossed by broad, irregular bands of brown; tail like the upper surface, but crossed by narrow, irregular bands of brownish black; sides of the throat and neck crossed by numerous narrow bars of blackish brown, the cheeks the same, but somewhat paler; on the centre of the throat a spatulate mark of chestnut-red; centre of the abdomen and under tail-coverts pale buffy white, with a fine stripe of brownish black down the centre of each feather; flanks crossed by irregular bars of brownish black; bill pale horn-colour, deeper at the tip; legs apparently yellowish flesh-colour.

Total length, $7\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $3\frac{5}{8}$; tail, $3\frac{1}{4}$; tarsi, $\frac{7}{8}$.

Hab. Afghanistaun and Thibet.

Remark.—Nearly allied to the *Y. pectoralis* of Southern Africa,

but differs from that species in being of a larger size, in the lighter hue of the centre of the abdomen, in the striæ down the centres of the abdominal feathers being less strongly defined, and in the under tail-coverts being buff instead of rufous.

3. *SITTA LEUCOPSIS*, Gould.

Sp. Ch.—Crown of the head and back of neck jet-black; all the upper surface deep blue-grey; primaries black, edged with grey; centre tail-feathers blue-grey; lateral feathers black, tipped with blue-grey; the two outer ones on each side with a small spot of white on the inner web near the tip; face, chin, throat, breast, and centre of the abdomen white, the latter slightly washed with buff; flanks and under tail-coverts bright chestnut; bill black, with a blue-grey base; legs grey.

Total length, 5 inches; bill, $\frac{7}{8}$; wing, $3\frac{1}{8}$; tail, 2; tarsi, $\frac{3}{4}$.

Hab. The Himalaya Mountains.

Remark.—This is doubtless the species described by Mr. Blyth in his observations on the *SITTINÆ* as nearly allied to the *S. caesia*, without however assigning to it a specific name, an omission which I have now ventured to supply.

4. ON THE SPECIES OF *ANOMIADÆ*. BY J. E. GRAY, ESQ., F.R.S. ETC. ETC.

The European species of *Anomiadæ* have been much multiplied, while on the other hand the exotic species have been almost entirely neglected.

The form, substance, surface and colour of the shell, which have been used to distinguish the species, were suspected by Montague to be dependent on the age of the specimens and the locality in which they happened to be found, and further researches have proved the accuracy of these observations.

There being in the British Museum considerable series of specimens of this family from different localities, I have attentively examined them, and believe that I have observed some characters by which they may be distinguished from each other, which are but little, if at all, modified by external circumstances or age.

Mr. Cuming has kindly allowed me to examine the original specimens of *Placunanomia*, described by Mr. Broderip, with some additional specimens which he has since received, and thus enabled me to identify the exotic species which have been described by that naturalist; and also the collection of *Anomiæ* contained in his cabinet, which has furnished me with several additional species.

The species may be divided into two very distinct genera:—

1. *ANOMIA*. Upper valve with three subcentral muscular scars; the anterior upper lobe of the notch separated from the cardinal edge; the plug entirely shelly, and quite free from the edge of the notch.

2. *PLACUNANOMIA*. Upper valve with two subcentral muscular scars; the anterior upper lobe of the notch agglutinated to the cardinal edge; plug shelly at the top and near the body to which it is attached, and with horny longitudinal laminæ below and internally.

No. CXCVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

I. ANOMIA.

Upper valves with three subcentral muscular scars; byssal notch distinct; the upper part of the anterior lobe of the notch separate from and often partially overlapping the front of the cardinal edge; the plug thick, elongate, entirely shelly, and quite free from the edge of the notch.

Syn. Anomia, Müller, 1776; Retzius, 1788; Lamk. 1801; Megerle, 1811; Schum. 1817.

Anomia, pars, Linn. S. N.

Anomia, A. Schumach. Essai, 1817.

Echion and Echinoderma, sp. Poli, Mol. Sicil.

Fenestrella, Bolten, 1798.

Lampades, pars, Gevers, 1787.

"Ænigma, Koch," according to the cabinet of Mr. Cuming.

I am by no means certain that all the species here indicated are distinct, or are to be distinguished by the characters here assigned to them, unassisted by the country which they inhabit; but they seem distinct, and it appears to be desirable that they should be distinguished until we have the means of more completely investigating them, and of examining and comparing the animals which form them.

* The upper scar in dorsal valve large; two lower scars smaller, and nearly under the upper one. Shell suborbicular. ANOMIA.

† European.

1. ANOMIA EPHIPIUM.

Shell white, yellow, rosy or red-brown; upper valve radiated; internally pearly. The upper scar large, oblong, the two others rather smaller, subequal, one above the other; the lowest of the two rather more behind. Plug large, broad, short; the sinus in lower valve large.

Anomia Ephippium, Linn. S. N. 1150; Chemn. viii. 82. t. 76. f. 692, 693; Mont. T. B. 155; Lamk. Syst. 138; Dillw. R. S. i. 286; Poli, Test. ii. 186. t. 20. f. 9, 10; Lamk. Hist. vi. 226, ed. 2. vii. 273. n. 1.

Anomia Tunica Cepa, Dacosta, B. Conch. 165. t. 11. f. 3.

Anomia cepa, Linn. S. N. 1151; Chemn. viii. 85. t. 76. f. 694, 695; Dillw. R. S. i. 287; Poli, Test. ii. 182. t. 30. f. 1-8; Lamk. H. v. 227, ed. 2. vii. 274. n. 3.

Anomia violacea, Brug. Enc. Meth. 71.

Anomia plicata, Brocch. Conch. 665. t. 16. f. 9.

Anomia scabrella, Philippi, Sicil. i. 92. ii. 65. t. 18. f. 1.

Anomia polymorpha, Philippi, Sicil. i. 92. ii. 65.

Anomia costata, Brocchi, 463. t. 10. f. 9.

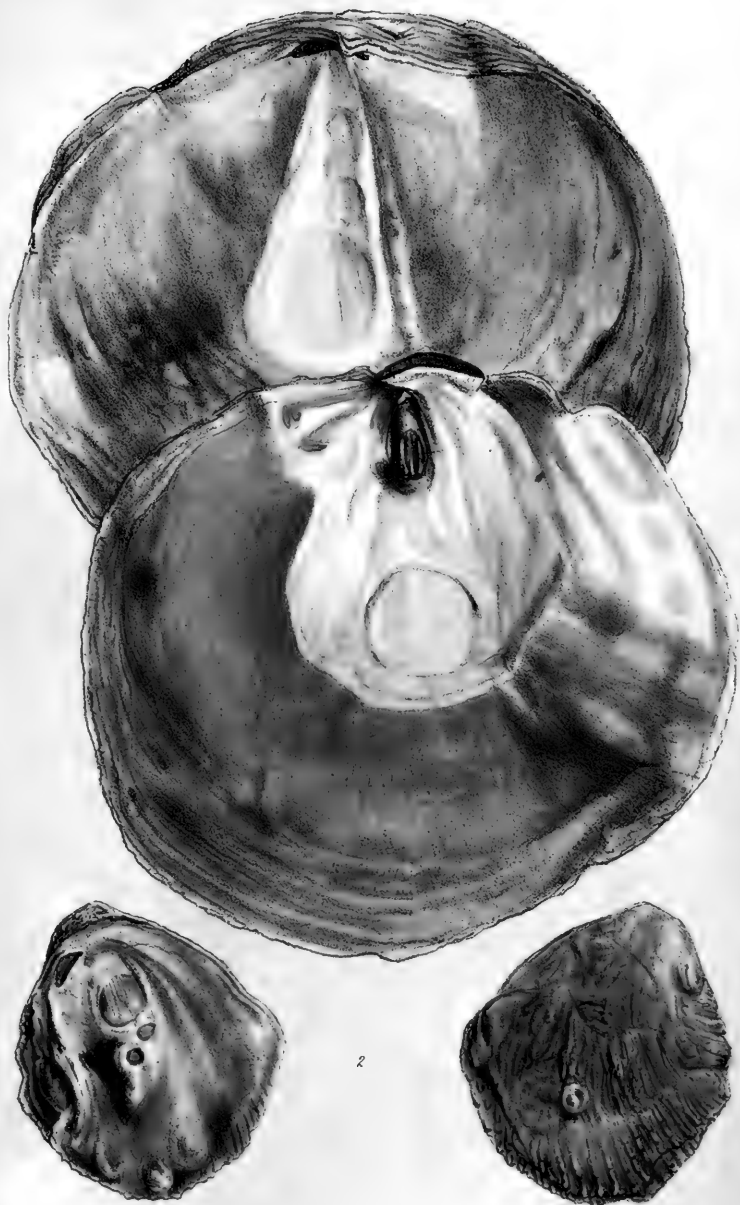
Anomia sulcata, Poli, Test. Sicil. t. 30. f. 12; Brocch. t. 10. f. 2.

Anomia radiata, Brocchi, t. 10. f. 10.

Anomia pectiniformis, Poli, Sicil. t. 30. f. 13, on a Pecten; Philippi, Sicil. ii. 63. t. 18. f. 3.

Anomia margaritacea, Poli, Sicil. t. 30. f. 11; Philippi, Sicil. ii. 63.

Anomia electrica, Linn. S. N. 1151; Chemn. Conch. viii. t. 76. f. 691; Lamk. Hist. vi. 227, ed. 2. vii. 274. n. 4.



1 ANOMIA (PATROS) ELYROS.
2 _____ ACHÆUS.



Anomia squamula, *Linn. S. N.* 1151; *Chemn. Conch.* viii. 86. t. 76. f. 696; *Lamk. Hist.* vi. 228, ed. 2. vii. 275. n. 8.

Anomia punctata, *Chemn. Conch.* viii. 88. t. 77. f. 698; *Dillw. R. S.* ii. 288.

Anomia aculeata, *Müller, Z. D. Prod.* 249; *Chemn.* viii. 92. t. 77. f. 702; *Mont. T. B.* 157. t. 4. f. 5; *Dillw. R. S.* i. 288.

Anomia scabra, *Solander MSS.* fide *Dillwyn*.

Anomia lens, *Lamarck, Hist.* vi. 228, ed. 2. vii. 276. n. 9.

? *Anomia aspera*, *Philippi, Sicil.* ii. 65. t. 18. f. 4.

Anomia elegans, *Philippi, Sicil.* ii. 65. t. 18. f. 2.

Anomia patelliformis, *Chemn. C.* viii. 89. t. 77. f. 700; *Dillw. R. S.* i. 290.

Anomia striatula, *Bruguière, Enc. Meth.* 74.

? *Anomia bifida*, *Chemn. Conch.* viii. 79. t. 76. f. 689, 690; *Dillw. R. S.* 290.

Anomia cylindrica, *Gmelin, S. N.* 3349; *Dillw. R. S.* i. 291.

Anomia cymbiformis, *Maton & Racket, Linn. Trans.* viii. 104. t. 3. f. 6; *Mont. Supp.* 64.

Anomia coronata, *Bean, Mag. N. Hist.*

Anomia patellaris, *Lamk. Hist.* ed. 2. vii. 273. n. 2; *Deles. Recueil*, t. 17. f. 3.

Anomia pyriformis, *Lamk. Hist.* vi. 227, ed. 2. vii. 275. n. 5; *Deles. Rec.* t. 17. f. 4.

Anomia fornicata, *Lamk. Hist.* vi. 228, ed. 2. vii. 275. n. 6 = *Enc. M.* t. 170. f. 45.

? *Anomia membranacea*, *Lamk. Hist.* vi. 228, ed. 2. vii. 275. n. 7 = *Enc. Meth.* t. 170. f. 1-3?

? *Anomia cucullata*, *Bruguière, E. M.* 70.

Hab. European Seas.

Coast of Africa; Capt. Edward Owen. B. M.

†† Asiatic.

2. ANOMIA AMABÆUS.

Flat, white, smooth; internally pearly, with a very thin disk.

Upper scar moderate; lower scars 2, rather large (nearly as large as the upper one), confluent into a broad oblong scar.

Hab. Philippines, Island Buraas (Jackass Island); on stones, sand, ten fathoms.

3. ANOMIA CYTÆUM.

Shell suborbicular, smooth; internally reddish.

Upper muscular scar very large, subcordate; lower 2, suborbicular, smaller, nearly equal-sized; the upper in the notch of the upper one; the lower hinder close to lower hinder edge of the upper one; sinus in lower valve large.

Hab. China, River Zangtze Keang; *Fortune*. Mus. Cuming; two specimens.

4. ANOMIA DRYAS.

Suborbicular, flat, white; upper valve internally and radiately lined.

Upper scar large, oblong; lower scars 2, small, circular, nearly confluent, placed side by side nearly on the same line.

Hab. Singapore ; on dead shells, ten fathoms, in coarse sand and gravel. Mus. Cuming ; one small specimen.

5. ANOMIA ACHÆUS.

Shell purplish, smooth ; umbo rather acute ; upper valve generally convex ; inside purplish white.

Upper muscular scar large, lower edge slightly arched ; lower scars 2, small, nearly equal-sized ; the hinder rather lower than the other.

Hab. Indian Ocean, Kurachee, mouth of the Indus. Brit. Mus. and Mus. Cuming.

Major Baker has kindly sent to the Museum a very large series of the dorsal valves of this species, collected at *Kurachee*. They are extremely variable in form, surface, colour and thickness, and they also offer considerable variety in the disposition of the muscular scar. In all the upper scar is largest, but variable in shape from round to broad cordate. In most the two lower scars are close together, but separate, and nearly on the same line. In others the lower scar is rather lower than the middle one, and in a few (four) specimens, which are mostly produced posteriorly, the lower scar is much lower ; that is to say, in some the upper edge is parallel with the lower edge of the middle one. In one specimen the two lower scars are on the same line, and are confluent together, forming a scar about the same size as the upper scar, yet showing that the lower scar is formed by two muscles ; so that this valve cannot be confounded with a *Placunanomia*.

The examination of this series of specimens from the same locality I think shows, that though the comparative size and disposition of the scars may furnish good characters for the distinction of the species, yet they are not to be implicitly relied on.

6. ANOMIA BELESIS. (Mollusca, pl. 4. fig. 3, 4.)

White or red ; the upper part of the centre of the dorsal valve white, externally radiately striated ; apex acute, at some distance from the dorsal edge.

Upper valve with three separate scars, the upper one very large oblong, and rather transverse ; two lower ones very small, nearly equal-sized, and nearly on the same line.

Hab. Indian Ocean ? *General Hardwicke*. Brit. Mus.

††† *American*.

7. ANOMIA ACONTES.

Yellowish white, suborbicular, flat, smooth ; disk pearly.

Upper scar moderate, subcircular ; lower scars smaller, distant, circular, subequal, the lower one nearly on a line with the lower edge of the middle one.

Hab. Jamaica ; *Gosse*. Mus. Cuming ; one small specimen.

8. ANOMIA FIDENAS.

White, pearly, thin, flat, smooth externally, pearly within, with a thick white disk.

Upper scar large, elongate, arched below; lower scars 2, small, circular, far apart, the lower one considerably below the other.

Hab. America, west coast. Panama; on *Pinna* at low water. Mus. Cuming, No. 2; three specimens.

9. ANOMIA ADAMAS.

Red, thick, with numerous indistinct radiating ribs, most distinct on the edge of the lamina; internally red, pearly, with a small white disk.

Upper muscular scar oblong, arched below; lower scars subequal, separate, but close together, and nearly on the same line.

Hab. Galapagos; Lord Hood's Island, attached to *Avicula margaritifera* at nine fathoms. Mus. Cuming, No. 5; three specimens.

10. ANOMIA PACILUS.

Red, with distinct radiating ribs; internally reddish pearly, with a thick white disk.

Upper muscular scar oblong, broad, lower edge arched; lower scars 2, rather smaller, nearly similar in size, rather close together but separate, the hinder one rather lower than the other.

Hab. Peru; Tambaz; dredged from five fathoms in soft mud. Mus. Cuming, No. 9.

11. ANOMIA LARBAS.

Shell white, smooth, lower valve pale green.

Upper muscular scar large; lower scars 2, nearly as large as, and close to, the upper one, nearly equal, and nearly in a line.

Hab. Coast of Peru, Payta. Mus. Cuming.

12. ANOMIA ALECTUS.

Irregular, upper valves convex, reddish, internally pearly; lower valve green, internally green.

Upper scar large, oblong; lower scars 2, large, rather smaller than the upper one, close together, but not confluent; the lowest one the largest.

Hab. Peru, Bay of Guayaquil; *Hinds*. Mus. Brit., and Mus. Cuming, No. 7.

13. ANOMIA HAMILLUS.

Reddish, thin, sinuous. Dorsal valve with a triangular, white, porcellanous disk.

Upper scar large, roundish; lower scars 2, separate, close together, nearly equal-sized, small, and nearly on the same line.

Hab. West Columbia, Bay of Cañes. Mus. Cuming, No. 6.

14. ANOMIA LAMPE.

Shell yellowish green, radiately costated; internally green.

Upper muscular scar large, squareish; lower two rather smaller, subequal, near together and to the upper scar, and nearly on the same line; sinus in lower valve very large.

Hab. California; *Lady Katherine Wigram*, Mus. Brit. Mus. Cuming; three specimens.

15. ANOMIA TENUISTRIATA.

Shell very variable in shape, regularly radiately striated; sinus of lower valve very large, ovate.

Dorsal valve with three nearly equal muscular scars very close together; the two lower small, placed close together side by side, just on the lower margin of the upper scar, the hinder one being rather behind the hinder edge of the upper one.

Ostrea anomialis, Lamk. *Hist. A. s. V.* vi. 220.

Anomia Ehippium, DeFrance, *Dict. Sci. Nat.* ii.

Anomia striatula, Desh. *Coq. Foss. Paris*, t. 65. f. 7, 11.

Anomia tenuistriata, Desh. *Coq. Foss. Paris*, i. 377, in Lamk. *Hist.* vii.

Fossil, Grignon.

The very characteristic scars of the dorsal valve are well shown in M. Deshayes' plate above referred to, but not mentioned in the description.

** *Upper scar of dorsal valves large; two lower scars smaller, far behind the upper one. Shell oblong, transverse. ÆNIGMA, Koch.*

16. ANOMIA ÆNIGMATICA.

Shell elongate, transverse, oblong, purple or yellowish, with a purplish disk; apex acute, considerably within the dorsal edge.

The upper scar large, suborbicular, subcentral; lower scars 2, much more posterior, small, equal-sized, and nearly confluent.

Tellina ænigmatica, Chemn. *Conch.* xi. t. 199. f. 1949, 1950.

Anomia rosea, Gray, *Ann. Philos.* 1825, 5.

Anomia ænigmatica, Alton in *Wiegmann Arch.* 1837, *Verz.* 21; *Reeve, Nomen. Conch.*

Hab. Indian Ocean.

Var. 1. Elongate, purplish brown, smooth, flat. *Chemn. l. c.* f. 1949, 1950.

Hab. Indian Ocean, on the surface of flat wooden piles, &c.

Var. 2. Like former, but more elongated, and the sides folded together.

Anomia naviformis, Jonas; fide *Mus. Cuming.*

Ænigma, sp. Koch; fide *Mus. Cuming.*

Hab. Manilla. *Mus. Cuming.*

Var. 3. Flat, smooth; like *Var.* 1, but yellow, with a dark purple-brown transverse ray.

Hab. Philippines. *Mus. Cuming.*

Var. 4. Flat, purple; like *Var.* 1, but often more ovate, and with a few radiating ribs, ending in projections, making the edge sinuous.

Hab. Singapore; on piles of wood forming the wharves. Borneo. *Mus. Cuming.*

*** *Two upper scars small; lower one large. Shell suborbicular; sinus small. PATRO.*

17. ANOMIA ELYROS. (Mollusca, pl. 4. fig. 1, 2.)

White, lamellar, closely radiately striated.

The disk of the upper valve with three separate subcircular scars; the two upper scars small, subequal, one under the other; the lower one large, nearly circular, subcentral. Notch in lower valve very small. Plug small, elongate, subcylindrical; the notch small, with reflexed edges.

Hab. Port Essington; *Earl of Derby*. Depuch Island; *Capt. Sir Everard Home, Bart.* British Museum.

Var. 1.? Shell very thin. Mus. Cuming.

Var. 2. Very thick; disk white, very thick. Mus. Cuming.

The small size of the upper scars in this species probably depends on the small size and elongated form of the plug. The other species, which have the upper scar the largest, have at the same time a larger notch and a broader plug.

II. PLACUNANOMIA.

Upper or dorsal valve with two subcentral muscular scars; the upper scar radiately veined. Byssal notch distinct, converted into a hole by the upper part of the anterior lobe of the notch being soldered to and forming part of the cardinal edge: the plug triangular, gradually enlarging in size; the apex and outer surface next to the body to which it is attached, calcareous, longitudinally striated; the inner surface covered with horny, longitudinal, parallel laminæ, and more or less agglutinated to the edge of the notch.

Syn. Placunanomia, *Broderip, Proc. Zool. Soc.* 1832, 29; *Müller, Syn.* 176; *Desh. in Lamk. Hist.* vii. 269.

Anomia, β , *Schumacher, Essai*, 1817.

Anomia, pars, *Blainv. Man. Moll.*; *Montague*; *Forbes & Hanley, Ostrea*, sp. *Da Costa*; *Montague*.

Placunonomia, *D'Orb. Amér. Mérid.*

Placunomia, *Swains. Malac.* 39, 1840.

Pododesmus, *Philippi, Wiegmann Arch.* i. 385, 1837.

Mr. Broderip, who established this genus, does not observe the character furnished by the muscular impressions, or the lobe of the notch: he merely says, "Impressio muscularis in utrâque valvâ subcentralis. In valvâ superiore organi adhesionis impressio superad-dita." And further, that "the organ of adhesion, which in its bony character (for it is more bone than shell) resembles that of *Anomia*, does not perforate the lower valve directly, but is inserted between the laminæ of the internal surface of the lower valve, above the muscular impression and below the hinge, and passes out into an external, irregular, somewhat longitudinal, superficial fissure or *cicatrix*, which is narrowest at the hinge margin, and which it entirely fills to a level with the surrounding surface."

This form is produced by the gradual increase of the size of the plug and the simultaneous increase of the size of the shell.

Some have considered the "plug" or "stopper" of *Anomia* to be a third valve, which is evidently a mistake. *Philippi (Moll. Sicil.* i. 92) considers it as the ossification of the tendon of the adductor muscle.

Mr. Broderip, in the passage quoted, regards it as a bone. In Dr. Dieffenbach's *Travels* I have remarked: "The plug is evidently only

a modification of the kind of laminar beard formed by the end of the foot of the *Arcæ* (*Arcæ*); for, like it, it is formed of numerous parallel, erect, longitudinal horny laminae, placed side by side, extending from the apex to the margin, and it is on these plates that the calcareous matter is deposited when the attachment assumes its shelly substance. The same structure is to be observed in the plug of the European *Anomia Ehippium (striata)*.—*Voy. New Zealand*, ii. 261.

Messrs. Forbes and Hanley compare it to the byssus of *Pecten*, and venture to predict that when the very young *Anomia* have been observed, they will be found to be attached by threads like that genus (*Brit. Moll.*). I have examined a very small specimen of the genus, and found it laminar, like that of the adult shell.

M. Philippi, when describing *Pododesmus*, appears to have observed only the upper of the two muscular scars, for he gives as the generic character, "*Impressio muscularis unica, ovata*," and he only figures the larger upper one on the plate.

The upper scar, which is usually of a larger size, and has its surface covered with radiating veins, while the lower is generally punctated, appears to be the one which gives rise to the muscle that is attached to the inner surface of the plug.

* *Shell plicately folded. Perforation of lower valve small, firmly embracing the plug. PLACUNANOMIA.*

1. PLACUNANOMIA CUMINGII.

Shell depressed; edge of the valves with three or four large angular folds.

Placunanomia Cumingii, Broderip, Proc. Zool. Soc. 1832, 29; Sow. Genera, t. ; Manual, t. f.

Hab. Central America; Gulf of Dulce, Province of Costa Rico.

** *Shell ovate, radiately ribbed; edge not plicated. Perforation of lower valve moderate, firmly embracing and inclosing the plug. PODODESMUS.*

† *American.*

BM 2. PLACUNANOMIA RUDIS.

White; disk brown; smooth laminae.

Upper valve with two rounded separate scars of nearly equal size, the hinder one rather more transverse.

Placunanomia rudis, Broderip, Proc. Zool. Soc. 1834, 2.

Pododesmus decipiens, Philippi, Wiegmann Arch. i. 1837, 387. t. 9. f. 1 (one scar left out).

Hab. East Indies? *Broderip.* Havana; *Philippi.* West Indies; *Brit. Mus.*

3. PLACUNANOMIA FOLIATA.

White, smooth laminae, with very slight, distant, radiated ribs; disk purple brown.

Upper valve with two nearly united scars; the upper largest, and rather elongated; lower small, rounded.

Placunanomia foliata, Broderip, *Proc. Zool. Soc.* 1834, 2.

P. echinata, Broderip, *Proc. Zool. Soc.* 1834, 2.

"*P. pectinata*, Brod." in *Mus. Cuming*.

Hab. Eastern Columbia, Bay of Guayaquil. Isle of Muerte; *Broderip*. Martinique, n. 6, and Brazils, n. 7; *Mus. Cuming*. Jamaica (upper valve of young only); *Rev. L. Guilding*; *Brit. Mus.*

The specimen of *Placunanomia echinata*, from the island of Nevis, in Mr. Cuming's collection, appears to be only an imperfect specimen of this species. Mr. Broderip doubted if this might not be the case, when he described it.

4. PLACUNANOMIA ABNORMALIS.

White, radiated, ribbed.

Upper valve with two scars, confluent on the lower hinder edge; the upper one rather the largest.

"*Placunanomia abnormalis*, Sow." in *Brit. Mus.*

Hab. West Indies.

These three species are very nearly related to each other, and if it were not for the difference in the position of the scars, might be taken for one. The first is white, and the two last have a brown blotch on the internal surface of the dorsal valve.

*** *Shell ovate, not plicated; radiately ribbed. Perforation of lower valve large, only slightly embracing the large thin plug.*
MONIA.

5. PLACUNANOMIA MACROCHISMA.

Upper valve with two scars, partly confluent on the lower hinder edge; the upper scar largest. Lower valve with an oval oblique scar, narrowed behind, rather in front of the plug.

Anomia macrochisma, *Deshayes*, *Rev. Soc. Cuvier*. 1839, 359; *Mag. de Zool.* 1841; t. 34.

Placunanomia Broderipii, *Gray*, *B. M.* 1842, and *Mus. Cuming*.

Hab. Kamtschatka; *Deshayes*. "Onalaski," *Mus. Cuming*. "Cagayan, Lucon," fide "G. B. Sowerby," in *Brit. Mus.*

M. *Deshayes* observes: "On sait que dans le plus grand nombre des Anomies la perforation se réduit ordinairement en un simple échancrure, parce que les deux parties du bord supérieur ne se rejoignent jamais. Ici au contraire le trou est complète, et la valve est réellement perforée." This character is common to all the species of *Placunanomia*. M. *Deshayes* does not figure nor describe the plug. I think the habitat assigned to this species by Mr. G. B. Sowerby must be a mistake. It is the specimen referred to by Mr. Broderip in the observations on the genus in the Proceedings of the Zoological Society.

6. PLACUNANOMIA CEPIO.

Scars 2, far apart; upper very large, ovate, longitudinal, central; *BM* lower smaller, oblong, oblique, rather behind the upper.

Plug large, flat, broad. Notch large, wide.

Hab. California; *Lady Katherine Wigram*; *Brit. Mus.*

BM 7. PLACUNANOMIA ALOPE.

Upper valve flat, smooth, radiately striated. Scars two, well separated, rounded, equal-sized.

Hab. California; *Lady Katherine Wigram*.

Two upper valves in British Museum.

†† *European*.

8. PLACUNANOMIA PATELLIFORMIS.

Shell suborbicular, convex or quite flat, radiately striated; inner disk greenish. Apex rather within the dorsal margin.

The upper muscular scar of the dorsal valve very large, oblong; the lower one small, roundish, on the lower part of the hinder margin of the upper one.

The peduncle of the cartilage with a triangular cavity in front, under the tip, and continued in an oblong rib-like ridge towards the centre of the shell.

Anomia patelliformis, *Linn. S. N.* 1152; *Nov. Act. Upsal.* 1773, i. 42. t. 5. f. 6, 7; *Retzius, Nov. Gen. Test.* ii.; *Sars, fide Mus. Cuming*; *Loven, Moll. Scand.* 30; *Forbes & Hanley, Brit. Moll.* 334. t. 56; *Wood, Index Test.* t. 10. f. 10, not *Chemn.*

Squama Magna, Chemn. Conch. vii. 87. t. 77. f. 697.

Anomia Squama, Gmelin, S. N.; *Schumacher, Essai.*

Ostreum striatum, Da Costa, Brit. Conch. 162. t. 11. f. 4.

Anomia undulatim striata, &c., Chemn. Conch. viii. 8. t. 77. f. 699.

Anomia undulata, Gmelin, Syst. Nat. i. 3346; *Mont. Test. Brit.* 157. t. 4. f. 6; *Maton & Racket, Trans. Linn. Soc.* viii. 103; *Turton, Conch. Dict.* 4. *Bivalves*, 230. t. 18. f. 8, 9; *Dillw. R. S.* i. 289; *Wood, Index Test.* t. 11. f. 9.

Ostrea striata, Pulteney in Hist. Dorset, 36; *Donovan, B. Shells*, ii. t. 45; *Mont. T. B.* 153, 580.

Anomia striata, Loven, Index Moll. Scand. 29; *Forbes & Hanley, Brit. Moll.* 336. t. 55. f. 1, 6. t. 53. f. 6.

Hab. Coast of Europe. British Seas, *Lister*. North Sea, *Sars, fide Mus. Cuming*, n. 51.

This species is easily known from the other European species by being generally thicker and regularly radiately ribbed, and greenish; but the number and position of the muscular scars at once separate it from all the multiform varieties of that species. Some authors, overlooking the latter character, have been inclined to regard it as a mere variety.

I may remark, that the large series of this species which I have examined has shown that the position of the two muscles is liable to a slight variation; in by far the larger number of specimens the small lower muscle is quite close to and confluent with the scar of the upper larger muscle, but in a few specimens it is separated from the upper larger one by a small interval or space. This has induced me to believe that probably the three West Indian species of the genus may prove, when a larger series of specimens have been collected and compared, only varieties of the same species.

††† *Australian.*9. *PLACUNANOMIA ZEALANDICA.*

Suborbicular, white, smooth; upper valve with distant radiating grooves; internally dark green. Bm.

Upper valve with two confluent scars; upper oblong, longitudinal, lower rather small and more transverse.

Anomia Zealandica, Gray, in *Dieffenbach's New Zealand*, ii. 261, 1843.

Hab. New Zealand; on the inside of mussel shells.

10. *PLACUNANOMIA IONE.*

Shell white, laminar; edge of the laminae with small, slender, elongated processes; internally green. Dm

Lower muscular scars small, round, on the lower hinder edge of the larger one; sinus or perforations large.

— *Hab.* Australia, Sydney; on rocks, *Mr. Strange*.

Mus. Cuming; three specimens. ? Van Diemen's Land. Bm

— *Dr. Sinclair*, Brit. Mus., a single dorsal valve. Bm

11. *PLACUNANOMIA COLON.*

Shell (upper valve) flat, with rather irregular, flat, radiating ribs; white, lower spotted; upper valve with two separate scars; the upper one oblong, longitudinal, the lower much smaller, circular.

Hab. —?

Mr. Cuming's Collection (no. 10). Mr. Humphrey's Collection; a single upper valve of a rather young shell.

Here may be added the description of a new genus, intermediate between this family and *Placunidae*.

III. *HEMIPLACUNA.*

Shell free; valves orbicular, flat, external surface minutely laminar and radiately striated, especially on the edge of the plates; muscular scar in each valve single, nearly central, circular; the right valve flat, with a large oblong, elevated transverse process for the cartilage, having a very small concavity in the inner surface in front of the cartilaged process representing the sinus in *Anomia*; the left valve rather more convex, with an oblong transverse pit for the internal cartilage under the umbo.

Hemiplacuna, G. B. Sowerby, MSS.

This shell has all the external characters of the flat species of *Placuna*, and has the same muscular impression; but instead of having the two linear diverging ridges and grooves to give attachment to the cardinal cartilage, it has an oblong elevated process in the right valve, and an oblong cavity in the left, exactly similar to those found in the genus *Anomia*; and on the inner surface of the right valve, just in front of the base of the process which supports the cartilages, there is a small shallow roundish pit with a short furrow towards the centre of the shell, which is evidently a rudimentary representation of the sinus found in the genus *Anomia*. This sinus is not visible on the outer surface of the shell.

This shell forms a most excellent passage between the genus *Anomia*, or rather *Placunanomia*, and *Placuna*. It shows the gradual change which takes place between the three genera. In *Anomia* there are two muscles for the purpose of attaching itself to marine bodies, which form a plug which is free from the sinus of the shell.

In *Placunanomia* there is only a single muscle to perform the same office, but in the more typical species of this genus the plug itself is affixed into the surface of the shell, forming, as it were, part of its substance. In *Hemiplacuna* and *Placuna* there is no muscle or plug for attachment, and the shells are free; but in *Hemiplacuna* there is a rudimentary development of the sinus through which the plug is emitted, and the ligament which connects the shell is of the same form as that found in the genera *Anomia* and *Placunanomia*.

Mr. George B. Sowerby kindly showed me this shell, which he purchased with a number of other fossil shells brought from the Red Sea. He informed me that he intends to describe it at length, and give it the name which I have with his permission here used. The specimen now forms part of the British Museum collection. I immediately recognized in it the species of *Placuna* figured by M. Rozière in his plates of the fossils of the Red Sea, engraved in Napoleon's large work on Egypt.

The name for the genus is not consistent with the Linnæan canon; but I use it rather than attempt to form a less objectionable one, and thus burthen the genus with two names.

HEMIPLACUNA ROZIERI.

Placuna, sp., *Rozière, Description d'Égypte, Minéralogie*, t. 11. f. 6.

Hemiplacuna Rozieri, *G. B. Sow. MSS.*

Anomia? or *Placuna?* *Desh. in Lamk. Hist.* vii. 270, *note.*

Fossil. Shore of the Red Sea; Vallée de l'Égarement.

5. ON THE HABITAT OF *CYPRÆA UMBILICATA*, SOWERBY. BY RONALD GUNN, ESQ. IN A LETTER TO J. E. GRAY, ESQ.

Mr. Gunn, the enthusiastic and intelligent naturalist in Launceston, Van Diemen's Land, from whom we have received so many productions of that island, has most kindly sent to the British Museum a fine specimen of the above shell, which was described by Mr. Sowerby in the Appendix to the Tankerville Catalogue. Mr. Gunn in his letter observes:—

“Cowries, found upon the east shore of Barren Island, one of Hunter's islands, N.W. of Van Diemen's Land. Considerable numbers of the dead shell of this species were to be seen lying upon a deep bed of the dead shells of a species of *Pectunculus*.”

“I will send you a Cowry which is new: it is most closely allied to *Cypræa eximia* of Strzelecki, ‘Physical Description of New South Wales and Van Diemen's Land;’ at all events it is not figured in Reeve's monograph of the genus. It is larger than *C. eximia*. I am not perfectly clear that it will prove to be the same; if so, it will

corroborate an opinion which I have some time held, that the *C. eximia* was not a fossil, but carried inland by the aborigines, and fell from near the surface to the position in which it was said to be found. *Vide pp. 296, 297.*"

6. ON *CYPRÆA UMBILICATA* AND *C. EXIMIA* OF SOWERBY.

By J. E. GRAY, ESQ.

Cypræa umbilicata was described from a single specimen which was formerly in the Tankerville Collection and is now in the British Museum. From its external resemblance to some specimens of *Cypræa Pantherina*, some peculiarities in its formation, and especially from certain apparent irregularities in its teeth, it has been thought that it might be a monstrosity or irregular growth of that species.

The discovery of the habitat by Mr. Gunn, who has kindly sent two specimens of the species to Europe, has removed this impression, and shown that it is a distinct species; and that what was regarded as the irregularities in the plaits of the front of the pillar, is in fact the normal form of the species.

Such being the case shows that the species should be removed from the genus *Cypræa*, as restricted in my monograph in the Zoological Journal, and placed in the genus *Cyprovula*, first described in that work.

The shell, instead of having the single large plait in front of the inner lip separated from other plaits by a wide space, has the front of the inner lip covered with several oblique plaits, nearly up to the front edge of the notch.

It also agrees with *Cyprovula* in the spire being concave or sunken, forming a deep umbilicus.

Cypræa eximia, figured in Strzelecki's 'New South Wales and Van Diemen's Land,' is a very nearly allied species, and equally a *Cyprovula (eximia)*. It differs in the body being more globular and the canal longer. Both these species are to be distinguished from the other *Cyprovulæ* by the canal at each end of the mouths being more developed and produced: they also both have a somewhat angular depression across the upper part of the anterior canal, at the anterior extremity of the dorsal line, evidently formed by the junction of the two expansions of the mantle in this part.

The elongation of the canals, and the depression above referred to, are more developed in *Cyprovula eximia* than in *Cyprovula umbilicata*. They are, especially the latter, the giants of the genus. The original specimen of *C. eximia* is in the cabinet of Mr. John Morris of Kensington.

To give some idea of the extraordinary price which is now sometimes required for shells, I may state that the second specimen of this Cowry, sent home by Mr. Gunn to a London collector, was offered by him to Miss Saul for £30, and eventually realised that price.

7. DESCRIPTION OF A NEW SPECIES OF CYTHEREA.

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

CYTHEREA NOBILIS. *Cyth. testâ orbiculari-cordatâ, crassâ, transversim concentricè liratâ, liris rudibus, obtusis, subplanulatis, numerosis, crebris, valdè irregularibus, hic illic intermissis, non parallelis; lacteâ, epidermide tenui corneâ, translucidâ, indutâ.*

Long. $4\frac{1}{4}$ in.; lat. $2\frac{1}{2}$ in.; alt. 4 in.

Hab. — ?

This fine species, from the collection of A. L. Gubba, Esq., is distinguished by a peculiarity in the form and arrangement of the concentric ribs with which it is sculptured. They are very numerous, flattened, close-set, and extremely irregular, now narrow, now broad, each one varying irregularly in width and now and then suddenly intermitted. It is of a pure cream-colour, covered with a thin, horny, transparent epidermis. Mr. Gubba obtained it from a vessel in Havre-de-grace, but could not ascertain its locality.

8. DESCRIPTIONS OF TWENTY-FOUR NEW SPECIES OF HELICEA, FROM THE COLLECTION OF H. CUMING, ESQ.

BY DR. L. PFEIFFER.

1. STREPTAXIS GLABRA, Pfr. *Str. testâ umbilicatâ, depressè ovatâ, tenui, pellucidâ, virescenti-albidâ, omnino glabrâ; spirâ laterali, acutiusculâ; suturâ albo-marginatâ; anfractibus 6 convexiusculis, penultimo inflato, ultimo antrorsum deviante; umbilico angusto, non pervio; aperturâ perobliquâ, semicirculari, dente minuto parietis aperturalis munitâ; peristomate albo, subincrassato, breviter reflexo.*

Diam. maj. 8, min. 6, alt. 5 mill.

Hab. Demerara.

2. STREPTAXIS CUMINGIANA, Pfr. *Str. testâ perforatâ, depresso-globosâ, solidulâ, glabrâ, virenti-albidâ; spirâ sublaterali, conoidè; anfractibus 7 angustissimis, subplanis, penultimo prominulo, ultimo antrorsum deviante; aperturâ perobliquâ, auriformi, lamellâ intrante parietis aperturalis coarctatâ; peristomate simplice, breviter expanso, marginibus callo tenui junctis, dextro arcuato, infernè dente 1 acuto munito, basali stricto, dente 1 transversè elongato instructo, columellari brevissimo, ad perforationem non perviam subreflexo.*

Diam. maj. $6\frac{2}{3}$, min. $5\frac{1}{3}$, alt. 4 mill.

Locality unknown.

3. HELIX MONSSONI, Pfr. *H. testâ perforatâ, turbinatâ, tenui, levi, carinatâ, striis incrementi et lineis confertissimis impressis, obliquè antrorsum descendentibus subtilissimè decussatâ, diaphanâ, albidâ, rubro-unicingulatâ; spirâ conoidè, apice obtusiusculâ; suturâ submarginatâ; anfractibus 6 subplanulatis, ultimo magno, infra cingulum carinato (carinâ anticè ob-*

soletá), basi convexiusculo; aperturá obliquá, subangulato-lunari; peristomate simplice, recto, margine columellari supra perforationem breviter reflexo.

Diam. maj. 38, min. 33, alt. 23 mill.

Locality unknown.

4. *HELIX ALBICANS*, Pfr. *H. testá perforatá, depressá, striatá, sublævigatá, nitidá, hyalino-albidá; spirá vix elevatá; suturá impressá, marginatá; anfractibus 5 planiusculis, lentè accrescentibus, ultimo non descendente, subrotundato, circa perforationem impresso; aperturá verticali, latè lunari; peristomate simplice, acuto, margine columellari brevissimè reflexo.*

Diam. maj. 8, min. 7, alt. 4 mill.

Hab. in insulá Jamaica.

5. *HELIX PHLOGOPHORA*, Pfr. *H. testá subperforatá, depressá, tenuissimá, striatá, pellucidá, nitidá, fulvo-luted, flammulis angulatis et serrulatis rufis confertis pictá; spirá parum elevatá, apice subpapillatá; anfractibus 3½ convexis, rapidè accrescentibus, ultimo depresso, basi planiusculo; aperturá perobliquá, rotundato-lunari; peristomate simplice, recto, margine columellari subreflexo.*

Diam. maj. 6½, min. 5½, alt. 3 mill.

Locality unknown.

6. *HELIX SERICATULA*, Pfr. *H. testá perforatá, depressá, discoidè, subtiliter et confertim costulatá, striatá, subsericá, griseo-cornèa, lineis brunneis irregularibus radiatá; spirá planá; anfractibus 4½ vix convexiusculis, ultimo subrotundato, juxta perforationem subimpresso; aperturá subverticali, latè lunari; peristomate simplice, recto, obtusiusculo, margine basali declivi, supernè reflexo, perforationem ferè occultante.*

Diam. maj. 4½, min. 4, alt. 2½ mill.

Hab. ad Port Jackson (Mr. Strange).

7. *HELIX NOBILIS*, Pfr. *H. testá angustè umbilicatá, subturbinato-depressá, solidá, striatá, lineis impressis concentricis et obliquis subtiliter decussatá, fulvá; spirá parum elevatá, subturbinatá; anfractibus 6 parum convexis, ultimo medio circulo elevato, obtuso cincto, infra eum fasciá saturatè castanèa, deorsum dilutá, ornato, circa umbilicum pallido; aperturá amplá, parum obliquá, latè lunari, intus margaritacèa; peristomate simplice, recto, margine columellari ad umbilicum in laminam brevem, triangularem reflexo.*

Diam. maj. 53, min. 45, alt. 30 mill.

Hab. in insulá Borneo, var. pallida in insulis Philippinis.

8. *HELIX BORNEENSIS*, Pfr. *H. testá obliquè perforatá, depressá, tenuiusculá, striis incrementi distinctis et lineis obliquis, impressis, crebris decussatá, saturatè fulvá; spirá vix elevatá, obtusá; anfractibus 4 parum convexis, celeriter accrescen-*

tibus, ultimo medio zonâ nigricante, deorsum dilutâ, ornato; suturâ lined impressâ marginatâ; aperturâ obliquâ, amplâ, transversè lunari-ovali, intus margaritaced, fasciâ pellucente; peristomate simplice, acuto, margine columellari in laminam brevem, triangularem, umbilicum semitegentem, reflexo.

Diam. maj. 52, min. 42, alt. 25 mill.

Hab. in insulâ Borneo.

9. *HELIX AFRICANA*, Pfr. *H. testâ perforatâ, depressâ, tenui, nitidâ, minutissimè striatâ, lineis confertis, concentricis, impressis sub lente minutissimè decussatâ, rufo-fuscâ vel pallidè corned; spirâ brevissimè conoided, apice subelevato; suturâ submarginatâ; anfractibus 7 vix convexiusculis, sensim accrescentibus, ultimo carinato (carinâ anticè obsoletâ), non descendente, basi paulo convexiore; aperturâ depressâ, latâ, lunari; peristomate simplice, recto, acuto, margine columellari supra perforationem brevissimè reflexo.*

Diam. maj. 26, min. 23, alt. 13 mill.

Hab. ad Axim in littore occidentali Africæ.

10. *HELIX SANDVICENSIS*, Pfr. *H. testâ umblicatâ, discoïded, striatâ, nitidâ, luteo-corned; spirâ planâ; suturâ impressâ; anfractibus 5-6 lentè accrescentibus, ultimo depresso, basi vix convexiore; umbilico lato, dimidium ferè diametri occupante; aperturâ parum obliquâ, lunari-rotundatâ; peristomate simplice, recto, tenui, marginibus conniventibus.*

Diam. maj. 18, min. 15, alt. 5 mill.

Hab. in insulis Sandwich.

11. *HELIX JACQUINOTI*, Pfr. *H. testâ umblicatâ, fornicato-conoided, solidulâ, acutè carinatâ, confertim arcuato-costatâ, albo et fusco variegatâ; spirâ conoided, obtusâ; anfractibus 8 angustis, omnibus carinatis (carinâ exsertâ, compressâ, costis decurrentibus denticulatâ), ultimo basi vix convexiusculo, radiatim striato; umbilico extus laminâ horizontali coarctato, intus lato; aperturâ depressâ, securiformi, lamellis 6 intrantibus munitâ; 2 in pariete aperturali elongatis, 1 columellari et 3 in margine basali profundis, vix conspicuis; peristomate simplice, recto, acuto, margine basali in lamellam umbilici introitum circumclaudentem continuato.*

Diam. maj. 9, min. $8\frac{1}{2}$, alt. 5 mill.

Hab. in insulâ Tahiti, et in insulis Marquesas.

12. *HELIX COARCTATA*, Pfr. *H. testâ umblicatâ, depressâ, distanter arcuato-costatâ et sub lente minutissimè spiraliter striatâ, fuscâ, brunneo-tessellatâ; spirâ fornicatâ, supernè depressâ; anfractibus $8\frac{1}{2}$ angustis, carinatis, ultimo infra penultimum recedente, tertiam paginæ inferæ penultimi partem liberam relinquente, basi vix convexiusculo, obsoletè radiatim costato, distinctius concentricè striato; umbilico lato, extus laminâ horizontali coarctato; aperturâ depressâ, securiformi,*

lamellis 6 intrantibus munita: 2 in pariete aperturali, 2 in margine basali, 1 in supero, 1 dentiformi in columella; peristomate simplice, recto, acuto, margine basali retrorsum in laminam, umbilicicum coarctantem, continuata.

Diam. $6\frac{1}{3}$, alt. $3\frac{1}{2}$ mill.

Hab. in insulâ Tahiti.

13. **HELIX NYMPHA**, Pfr. *H. testâ imperforatâ, globoso-depressâ, tenui, obliquè striatâ, nitidâ, diaphandâ, virenti-albidâ; spirâ brevissimâ, apice obtusâ; suturâ albo-filosâ; anfractibus 4 subplanis, rapidè accrescentibus, ultimo subdepresso, basi convexo; columellâ intrante, subverticali, compressâ, albâ; aperturâ obliquâ, latè lunari; peristomate simplice, tenui, castaneo-limbato, margine supero recto, basali breviter reflexo, cum columellâ angulum obtusum formante.*

Diam. maj. 32, min. 26, alt. 18 mill.

Hab. in insulis Philippinis.

14. **HELIX TRICOLOR**, Pfr. *H. testâ lenticulari-conoideâ, tenui, carinatâ, undique confertim concentricè striatâ, hyalinâ, supernè lineis albis et ad suturam fasciâ albâ, castaneo-punctatâ ornatâ; spirâ brevi, conoideâ, apice obtusâ; anfractibus 4 planiusculis, ultimo carinâ albâ, lineis castaneis marginatâ et articulatâ munito, supernè et ad carinam subitè deflexo, basi juxta columellam subgibbo; aperturâ angustâ, perobliquâ, subquadrangulâ; peristomate simplice, castaneo-limbato, margine dextro recto, basali breviter reflexo, columellari perdeclivi, introrsum dilatato, excavato, saturatè castaneo.*

Diam. maj. 34, min. 29, alt. 17 mill.

Hab. St. Christoval, ins. Salomonis.

15. **HELIX RECEDENS**, Pfr. *H. testâ imperforatâ, subsemiglobosâ, solidâ, carinatâ, supernè confertim costulato-striatâ, pallide carnèâ; spirâ fornicatâ; suturâ vix impressâ; anfractibus 6 planiusculis, lentè accrescentibus, ultimo a medio infra penultimum recedente, basi planiusculo, striato; carinâ rufolineatâ; aperturâ obliquâ, angulato-lunari; peristomate subsimplice, margine dextro recto, basali subincrassato, columellari brevissimè reflexo.*

Diam. 12, alt. 7 mill.

Locality unknown.

16. **HELIX SALLEANA**, Pfr. *H. testâ imperforatâ, conicâ, tenuiusculâ, striatâ et impressionibus obsolete rugosulâ, parum nitidâ, diaphandâ, cinereo-lutescente, ad peripheriam fasciis 2 fusco-viridibus, punctisque castaneis ornatâ; spirâ conicâ, acutiusculâ; anfractibus 5 convexiusculis, ultimo lineis concentricis impressis notato, subangulato, basi parum convexo; aperturâ parum obliquâ, lunari-ovali, intus nitidâ, concolore, fasciis nigricantibus; peristomate tenui, rectangulè expanso et reflexiusculo, albo, margine columellari supernè dilatato, calloso.*

Diam. maj. 30, min. 24, alt. 24 mill.

Hab. in ripis fluvii St. Johan. Guatemalæ (Sallé).

17. *HELIX PLATYSTYLA*, Pfr. *H. testâ imperforatâ, conicâ, solidâ, costulato-striatâ, albidâ, lineâ rufâ ad suturam ornatâ; spirâ conicâ, acutiusculâ; anfractibus 6 convexiusculis, sensim accrescentibus, ultimo obsolete angulato, basi subplano; aperturâ obliquâ, latè lunari; peristomate simplice, marginibus subparallelis, dextro breviter expanso, columellari supernè perdidatato, calloso.*

Diam. maj. 22, min. 19, alt. 19 mill.

Hab. in insulis Moluccis?

18. *HELIX BREVIPIILA*, Pfr. *H. testâ umbilicatâ, globoso-depressâ, pilis brevissimis, rigidis, quincuncialiter dispositis asperâ, haud nitidâ, saturatè brunneâ; spirâ parum elevatâ, obtusâ; anfractibus vix 5 convexiusculis, ultimo rotundato, anticè subdeflexo, circa umbilicum angustum subcompresso; aperturâ obliquâ, rotundato-lunari, intus nitidâ; peristomate tenui, brunneo-carneo, breviter expanso, marginibus conniventibus, columellari subdidatato-reflexo.*

Diam. maj. 12, min. 10, alt. $6\frac{1}{2}$ mill.

Hab. in orâ orientali Novæ Hollandiæ (Mr. Strange).

19. *HELIX BASKERVILLEI*, Pfr. *H. testâ umbilicatâ, globoso-depressâ, solidâ, striis incrementi rugulosis, lineisque spiralibus impressis subgranulatâ, olivaceo-fuscâ, parum nitidâ; spirâ subconoideo-elevatâ, apice obtusiusculâ; suturâ impressâ, crenulatâ; anfractibus $6\frac{1}{2}$ angustis, convexiusculis, ultimo rotundato, anticè vix descendente; aperturâ parum obliquâ, lunari, dente linguæformi albo parietis aperturalis, obliquè intrante, coarctatâ; peristomate validè carneo-labiato, margine dextro arcuato et basali subhorizontali, latè subdentato latè expansis et reflexis, columellari brevi, perdidatato, umbilicum angustum semitegente.*

Diam. maj. 24, min. 19, alt. 14 mill.

Hab. Vancouver's Island (Lieut. Baskerville).

20. *HELIX CONNIVENS*, Pfr. *H. testâ angustè umbilicatâ, depressâ, solidâ, striis incrementi distinctis, lineisque subtilibus concentricis sub lentè decussatâ, corneo-stramineâ, nitidulâ; spirâ parum elevatâ; suturâ impressâ; anfractibus 6 parum convexis, ultimo anticè non descendente, peripheriâ subangulato, basi convexiore; aperturâ obliquâ, latè lunari, intus albidâ; peristomate intus valide albo-labiato, marginibus conniventibus, dextro acuto, parum expanso, basali breviter reflexo, columellari supernè dilatato, patente.*

Diam. maj. 26, min. 22, alt. 14 mill.

Hab. Liew-Kiew.

21. *HELIX GALACTOSTOMA*, Pfr. *H. testâ umbilicatâ, convexo-*

orbiculatá, solidá, striatá, sub lentè granulatá, fulvá; spirá brevi, fornicatá, obtusá; anfractibus $4\frac{1}{2}$ convexusculis, sensim accrescentibus, penultimo angulato, ultimo subdepresso, anticè deflexo, basi subangulatim in umbilicum, mediocrem, pervium, $\frac{1}{5}$ diametri vix superantem descendente; aperturá perobliquá, lunari-ovali, intus lacteá; peristomate simplice, fusculo-limbato, marginibus conniventibus, callo junctis, dextro brevissimè expanso, basali subreflexo, columellari albo, supra umbilicum dilatato-reflexo.

Diam. maj. 36, min. 31, alt. 18 mill.

Hab. in insulá Madagascar.

22. *HELIX ROSARIUM*, Pfr. *H. testá umbilicatá, depressá, tenui, supernè subtilissimè granulatá, diaphand, pallide fulvá, flammis a suturá exeuntibus, cingulisque 3 interruptis, moniliformibus rufis ornatá; spirá planá; anfractibus vix 5 convexis, ultimo subdepresso, anticè non descendente, basi radiatim striatulo et lineis impressis spiralibus distantibus notato, circa umbilicum mediocrem, infundibuliformem subcompresso; aperturá parum obliquá, lunato-subtriangulari; peristomate albo-labiato, breviter reflexo, margine supero ab insertione primum ascendente, tum sinuato, basali strictiusculo, repando, columellari brevi, triangulatim patente.*

Diam. maj. 21, min. 17, alt. 9 mill.

Locality unknown.

23. *BULIMUS (PARTULA) DECUSSATULUS*, Pfr. *B. testá perforatá, ovato-conicá, tenui, striis incrementi lineisque spiralibus minutissimè decussatúlá, vix nitidulá, fulvescenti-albidá, diaphand; spirá brevi, conicá, obtusiusculá; suturá mediocri; anfractibus $4\frac{1}{2}$ convexis, ultimo $\frac{5}{5}$ longitudinis æquante, rotundatá; columellá subplicatá, recedente; aperturá angulato-ovali; peristomate simplice, tenui, marginibus conniventibus, dextro campanulatim expanso, columellari super perforationem reflexo.*

Long. 15, diam. $8\frac{2}{3}$ mill.; ap. 9 mill. longa, $6\frac{1}{2}$ lata.

Hab. in insulá Navigatorum.

24. *BULIMUS (PARTULA) NAVIGATORIUS*, Pfr. *B. testá dextrorsá, perforatá, oblongo-ovatá, solidá, obsoletè granulato-striatá, nitidulá, fulvá, lineis confertis saturatoribus signatá; spirá conicá, acutiusculá; suturá levi, albo-marginatá; anfractibus 5 planiusculis, ultimo spiram superante; aperturá oblongá, angustá, intus albidá, dente calloso parvulo profundo in ventre anfractús penultimi munitá; peristomate subincrassato, intus valide albo-labiato, marginibus parallelis, dextro breviter expanso, medio subdentato, columellari dilatato, plano, reflexo.*

Long. 23, diam. 11 mill.; ap. (c. perist.) 13 mill. longa, 8 lata.

Hab. in insulá Navigatorum.

9. DESCRIPTIONS OF TWELVE NEW SPECIES OF VITRINA AND SUCCINEA, FROM THE COLLECTION OF H. CUMING, ESQ.

BY DR. L. PFEIFFER.

1. VITRINA LUZONICA, Pfr. *V. testâ depressâ, tenui, lævigatâ, nitidâ, pellucidâ, aureâ; spirâ planiusculâ; suturâ simplice, vix impressâ; anfractibus 3 sensim accrescentibus, ultimo subdepresso, peripheriâ rotundatâ, basi lato; aperturâ obliquâ, lunari-ovali; peristomate tenui, margine supero antrorsum subarcuato, columellari tenuissimo, declivi.*

Diam. maj. $7\frac{1}{2}$, min. $5\frac{2}{3}$, alt. 4 mill.

Hab. Sorsogon, insulæ Luzon (H. Cuming).

2. VITRINA VERREAUXII, Pfr. *V. testâ depressâ, striatâ, tenui, diaphanâ, parum nitente, olivaceo-fulvâ; spirâ subplanulatâ; suturâ impressâ, marginatâ; anfractibus $3\frac{1}{2}$ rapidè accrescentibus, ultimo depresso, basi angusto, planiusculo; aperturâ perobliquâ, amplâ, lunari-ovali; peristomate simplice, acuto, marginibus approximatis, dextro antrorsum arcuato, columellari breviter recedente, leviter arcuato.*

Diam. maj. 13, min. 10, alt. 6 mill.

Hab. in Australiâ (Verreaux).

3. VITRINA STRANGEI, Pfr. *V. testâ depressâ, tenuissimâ, lævigatâ, nitidâ, fusco-vel virenti-corneâ; spirâ parvâ, vix convexiusculâ, vertice subtili, laterali; suturâ impressâ, submarginatâ; anfractibus 3 vix convexiusculis, rapidè accrescentibus, ultimo supernè depresso, peripheriâ rotundatâ, basi convexiore; aperturâ obliquâ, amplâ, lunari-subcirculari; peristomate simplice, obtusulo, marginibus approximatis, dextro antrorsum dilatato, columellari recedente, perarcuato, angustissimè membranaceo-marginato.*

Diam. maj. 10, min. $7\frac{1}{2}$, alt. 5 mill.

Hab. Brisbane, in orâ orientali Novæ Hollandiæ (Strange).

4. SUCCINEA ACUTA, Pfr. *S. testâ oblongâ, subfusiformi, tenui, distinctè striatâ et minutè malleatâ, nitidissimâ, pellucidâ, rosâ, epidermide deciduâ fulvâ munitâ; spirâ subelongatâ, conicâ, acutâ; suturâ profundâ; anfractibus 4 convexis, ultimo $\frac{3}{5}$ longitudinis vix æquante, basi attenuato; columellâ subcallosâ, substrictè recedente; aperturâ axi ferè parallelâ, oblongo-ovali, supernè angulatâ; peristomate simplice, tenui, margine dextro leviter arcuato.*

Long. 20, diam. $9\frac{1}{2}$, alt. 7 mill.; ap. 12 mill. longa, medio 7 lata.

Hab. in Britanniâ, prope Scarborough.

It is impossible to join this beautiful shell to any of the varieties of *S. putris*, from which it differs by its colour, by the elongated and sharply-pointed spire, whorls more convex, nearly straight columella, and oblong-ovate aperture.

5. SUCCINEA SUBGRANOSA, Pfr. *S. testâ elliptico-ovatâ, tenui,*

subgranulato-striatâ, diaphanâ, parum nitidâ, pallide corned; spirâ brevi, obtusiusculâ; anfractibus vix 3 convexis, ultimo basi attenuato; columellâ substrictè recedente, supernè leviter callosâ; aperturâ parum obliquâ, subangulato-ovali, intus nitidissimâ; peristomate simplice, acuto, margine dextro mediocriter arcuato.

Long. $8\frac{1}{2}$, diam. 5, alt. ferè 4 mill.; ap. 6 mill. longa, 4 lata.

Hab. Kurmant, Indiæ, varietas ventrosior, albida prope Calcutta.

6. *SUCCINEA INDICA*, Pfr. *S. testâ depressè oblongâ, tenuissimâ, longitudinaliter plicatulâ, pellucidâ, pallide corned; spirâ brevi, obtusiusculâ; anfractibus vix 3, penultimo convexiusculo, ultimo $\frac{2}{3}$ longitudinis æquante; columellâ substrictè ferè ad basin recedente, supernè calloso-marginatâ; aperturâ axi ferè parallelâ, basi recedente, ovali-oblongâ, angulatâ, intus nitidissimâ; peristomate acuto, margine dextro leviter arcuato.*

Long. 17, diam. $7\frac{1}{2}$, alt. 6 mill.; ap. 12 mill. longa, infra medium 7 lata.

Hab. Bleensal, Indiæ.

7. *SUCCINEA BENSONI*, Pfr. *S. testâ ovato-conicâ, tenui, regulariter confertim striatâ, pellucidâ, sericinâ, luteo-corned; spirâ conicâ, acutiusculâ; anfractibus 3, penultimo convexiusculo, ultimo $\frac{2}{3}$ longitudinis æquante; columellâ callo tenui indutâ, vix arcuatâ, recedente; aperturâ ovali; peristomate tenui, margine dextro mediocriter arcuato.*

Long. 8, diam. 5, alt. $3\frac{1}{2}$ mill.; ap. 5 mill. longa, 3 lata.

Hab. Moradabad, Indiæ (Mr. Benson).

8. *SUCCINEA PICTA*, Pfr. *S. testâ semiovatâ, tenuissimâ, longitudinaliter striatulâ et irregulariter plicatâ, pellucidâ, nitidissimâ, rubenti-fulvâ, roseo-albido strigatâ; spirâ minimâ, papillatâ; suturâ levi; anfractibus $2\frac{1}{2}$, ultimo inflato, anticè lineis impressis spiralibus notato; columellâ supernè subcallosâ, recedente, leviter arcuatâ; aperturâ amplâ, parum obliquâ, angulato-ovali, intus rubenti-fulvâ; peristomate simplice, ad insertionem subinflexo.*

Long. 17, diam. 11, alt. 7 mill.; ap. 15 mill. longa, medio 9 lata.

Hab. Diana Peak, insulæ St. Helenæ. (On the leaves of cabbage-trees.)

9. *SUCCINEA SALLEANA*, Pfr. *S. testâ depressè ovatâ, tenuissimâ, striatulâ, lineis spiralibus impressis irregulariter notatâ, pellucidâ, nitidâ, corneo-albidâ; spirâ brevissimâ, subpapillatâ; anfractibus $2\frac{1}{2}$, penultimo convexo, ultimo $\frac{3}{4}$ longitudinis superante; columellâ subcallosâ, strictè recedente; aperturâ axi subparallelâ, angulato-ovali; peristomate submarginato, margine dextro vix arcuato.*

Long. 19, diam. 10, alt. 7 mill.; ap. 16 mill. longa, infra medium 9 lata.

Hab. New Orleans (Mr. Sallé).

10. *SUCCINEA PUSILLA*, Pfr. *S. testá ovatá, tenui, striatúlá, sub lente obsolete decussatá, diaphaná, parum nitidá, pallide cornéa; spirá brevi, acutiusculá; anfractibus 2½, penultimo convexo, ultimo ⅔ longitudinis æquante; columellá vix arcuatá, recedente; aperturá obliquá, ovali; peristomate simplice, margine dextro supernè subincurvato, tum strictiusculo.*

Long. $4\frac{2}{3}$, diam. 3 mill.; ap. $3\frac{1}{4}$ mill. longa, 2 lata.

Hab. Ceara, in Americâ meridionali.

11. *SUCCINEA RUBICUNDA*, Pfr. *S. testá ovatá, tenui, striatúlá, sub lente obsolete granulosá, diaphaná, parum nitidá, luteo-rubescente; spirá brevi, sanguineá, subpapillatá; anfractibus 2½ convexis, ultimo inflato; columellá callosá, substrictè recedente; aperturá parum obliquá, angulato-ovalis, intus nitidissimá; peristomate simplice, margine dextro regulariter arcuato.*

Long. 14, diam. 8, alt. 5 mill.; ap. $10\frac{1}{2}$ mill. longa, medio 6 lata.

Hab. in insulá Masafuera (Cuming).

12. *SUCCINEA SOLIDULA*, Pfr. *S. testá depressè ovatá, solidulá, longitudinaliter subplicatá, sub lente minutissimè granulatá, vix diaphaná, parum nitidulá, fulvá; spirá brevi, scalari, apice papillatá, rubicundá; anfractibus 2½ convexis, ultimo inflato, ⅔ longitudinis æquante; columellá substrictè descendente, callosá; aperturá oblongá, intus submargaritacéa; peristomate submarginato, marginibus callo tenui junctis, dextro supernè arcuato, tum strictiore.*

Long. 12, diam. 7, alt. $5\frac{1}{2}$ mill.; ap. $8\frac{1}{2}$ mill. longa, 5 lata.

Locality unknown.

The form of this shell is most nearly approaching to *Succinea campestris*.

10. DESCRIPTIONS OF THIRTY NEW SPECIES OF TORNATELLINA, CYLINDRELLA, AND CLAUSILIA, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

1. *TORNATELLINA CUMINGIANA*, Pfr. *T. testá ovato-oblongá, solidá, striatúlá, epidermide olivaceo-lutescente indutá; spirá elongato-conicá, apice acutá; anfractibus 5½ vix convexiusculis, ultimo ⅔ longitudinis subæquante; columellá subarcuatá, distinctè et obliquè truncatá; pariete aperturali lamellá magná, horizontaliter intrante munito; aperturá semiovali, intus callosá; peristomate simplice, acuto.*

Long. 8, diam. $3\frac{2}{3}$ mill.; ap. $3\frac{2}{3}$ mill. longa, medio $1\frac{2}{3}$ lata.

Hab. in Real Llejos (H. Cuming).

2. *CYLINDRELLA SERICEA*, Pfr. *C. testá profundè rimatá, subcylindraceá, truncatá, solidulá, subtilissimè striatúlá, diaphaná, hyalino-albidá, supernè fuscescente; suturá albo-filosá; anfractibus 9 angustis, subæqualibus, vix convexiusculis, ultimo non protracto, basi cariná funiformi munito; aperturá subobliquá,*

ferè circulari, basi canaliculatá; peristomate albo, expanso, re flexiusculo, supernè affixo.

Long. 26, diam. $8\frac{2}{3}$ mill.; ap. c. perist. $6\frac{1}{2}$ mill. longa, 7 lata.

Hab. in insulâ Haiti.

3. *CLAUSILIA CYCLOSTOMA*, Pfr. *Cl. testá non rimatá, fusiformi, gracili, solidá, sub lente subtilissimè et confertissimè undulato-striatá, non nitente, purpurascenti-nigricante; spirá regulariter attenuatá, sursum pallidiore, apice obtusiusculá, purpureá, nitidá; suturá filari, supernè papilliferá; anfractibus 9 planiusculis, ultimo deorsum soluto, basi bicristato; aperturá circulari, intus nigrá; lamellis approximatis, superá compressá, acutá, inferá minore; lunellá nullá; plicis palatalibus 2-3 profundis, vix conspicuis, subcolumellari immersá; peristomate continuo, supernè submarginato, albo, latè expanso.*

Long. 21, diam. medio 5 mill.; ap. $4\frac{2}{3}$ mill. longa, $4\frac{1}{3}$ lata.

Hab. in Archipelago Koreano (Sir Edw. Belcher).

4. *CLAUSILIA CLAVIFORMIS*, Pfr. *Cl. testá vix rimatá, subclaviformi, tenui, lævigatá, nitidá, luteo-corned, albo-variegatá; spirá turritá, apice acutá; anfractibus 9 convexiusculis, ultimo basi rotundato; aperturá elliptico-pyriiformi; lamellis tenuibus, inferá profundá, subtransversá; lunellá nullá; plicis palatalibus 2, superá suturæ parallelá, breviusculá, inferá brevissimá, subcolumellari usque ad marginem porrectá; peristomate continuo, vix soluto, tenui, breviter expanso.*

Long. 12, diam. $3\frac{1}{2}$ mill.; ap. 3 mill. longa, $2\frac{1}{4}$ lata.

Hab. in Archipelago Koreano (Belcher).

5. *CLAUSILIA BELCHERI*, Pfr. *Cl. testá subrimatá, fusiformi-subulatá, solidulá, lævigatá, pellucidá, luteo-corned, albo-variegatá; spirá gracillimá, apice acutá; anfractibus 13 convexis, ultimo basi tumidulo; aperturá pyriiformi; lamellis mediocribus, conniventibus; lunellá nullá; plicis palatalibus 2 suturæ parallelis, superá longiore, alterá brevi, subcolumellari inconspicuá; peristomate continuo, breviter soluto, labiato, breviter reflexo.*

Long. 12-13; diam. 3 mill.; ap. 3 mill. longa, $2\frac{1}{4}$ lata.

Hab. in Archipelago Koreano (Sir Edward Belcher).

6. *CLAUSILIA TURRITA*, Pfr. *Cl. testá subrimatá, fusiformi-turritá, solidá, longitudinaliter subarcuatim striatá, albá, punctis cinereis conspersá, nitidulá; spirá elongatá, gracili, apice corned, acutá; anfractibus 14 planis, ultimo anticè corrugato, basi subcompresso; aperturá obliquá, pyriiformi-ovali, intus fuscá; lamellis parvulis, superá ferè obsoletá, inferá profundá, obliquá; lunellá inconspicuá; plicá palatali 1 superá, subcolumellari immersá; peristomate continuo, soluto, tenui, expanso.*

Long. $21\frac{1}{2}$, diam. $4\frac{1}{2}$ mill.; ap. $4\frac{1}{3}$ mill. longa, $3\frac{1}{4}$ lata.

Hab. in insulis Candiâ et Siphanto (Spratt).

7. *CLAUSILIA CANDIDA*, Pfr. *Cl. testá rimatá, cylindraco-fusi-*

formi, solidâ, medio sublævigatâ, candidâ, punctis corneis irregulariter aspersâ, haud nitente; spirâ sensim attenuatâ, apice cornê; anfractibus 10-11 planulis, summis et ultimis costulato-striatis, ultimo anticè rugoso, juxta periomphalum latiusculum arcuato-cristato; aperturâ amplâ, pyriformi-rotundatâ, intus fuscâ; lamellis conniventibus, inferâ subfurcatâ; lunellâ indistinctâ; plicâ palatali 1 superâ, subcolumellari immersâ; peristomate continuo, soluto, tenui, undique expanso.

Long. 21, diam. $4\frac{2}{3}$ mill.; ap. 5 mill. longa, 4 lata.

Hab. in insulâ Candiâ (Spratt).

8. *CLAUSILIA PUELLA*, Pfr. *Cl. testâ rimatâ, fusiformi, solidâ, lævigatâ, nitidâ, candidâ; spirâ gracili, apice cornê, acutiusculâ; suturâ mediocri; anfractibus 11, primis 8 convexis (quarto ad sextum costulato-striatis), 2 penultimis planioribus, ultimo costulato, basi arcuato-cristato; aperturâ angustâ, oblongâ; lamellis tenuibus, subparallelis; lunellâ inconspicuâ; plicis palatalibus 2 profundis, brevibus, subcolumellari inconspicuâ; peristomate continuo, libero, breviter expanso.*

Long. $13\frac{1}{2}$, diam. 3 mill.; ap. 3 mill. longa, 2 lata.

Hab. in Græciâ (Spratt).

9. *CLAUSILIA MILLERI*, Pfr. *Cl. testâ non rimatâ, fusiformi, gracili, solidulâ, longitudinaliter confertissimè et subarcuatim costulatâ, albidâ, punctis raris corneis adpersâ; spirâ regulariter turratâ, apice nigricante, nitidâ; anfractibus 11-12 planiusculis, ultimo anticè ramoso-rugato, basi arcuato-cristato; aperturâ oblongo-pyriformi, intus fuscâ; lamellâ superâ tenui, marginali, inferâ profundâ, obliquâ; lunellâ indistinctâ; plicâ palatali 1 superâ; subcolumellari inconspicuâ; peristomate soluto, continuo, breviter expanso.*

Long. 18-19, diam. $4\frac{1}{2}$ mill.; ap. 4 mill. longa, $2\frac{3}{4}$ lata.

Hab. in insulâ Paros (Miller).

10. *CLAUSILIA STRIGATA*, Pfr. *Cl. testâ non rimatâ, fusiformi, ventrosulâ, solidulâ, longitudinaliter confertim costulato-striatâ, albâ; spirâ supernè attenuatâ, nigricanti-striatâ, apice acuto, nigro; suturâ marginatâ; anfractibus 11 planiusculis, ultimo anticè vix validius costulato, basi obtusè bicristato; aperturâ oblongo-pyriformi, intus pallidè fuscâ; lamellis mediocribus, inferâ introrsum furcatâ; lunellâ vix conspicuâ; plicâ palatali 1 superâ, subcolumellari immersâ; peristomate continuo, soluto, tenui, undique expanso.*

Long. 18, diam. $4\frac{1}{3}$ mill.; ap. 4 mill. longa, 3 lata.

Hab. in insulâ Candiâ (Spratt).

11. *CLAUSILIA COMPRESSA*, Pfr. *Cl. testâ subrimatâ, fusiformi, solidulâ, confertim costulato-striatâ, cærulescenti-albâ, punctis et strigis corneis marmoratâ, parum nitidâ; spirâ gracili, apice cornê, acutiusculâ; suturâ impressâ, submarginatâ; anfractibus 12 planiusculis, ultimo latere compresso, basi bicristato; cristis conniventibus, basi contiguâ, alterâ juxta periomphalum*

subarcuatá, compressá, alterá brevioré; aperturá pyriformi-oblonga, intus fuscúlá; lamellis conniventibus, minutis, inferá sursum furcatá; lunellá inconspicuá; plicá palatali 1 superá, subcolumellari immersá; peristomate continuo, soluto, tenui, expanso, albo.

Long. 17, diam. 4 mill.; ap. 4 mill. longa, $2\frac{2}{3}$ lata.

Hab. in insulâ Cerigo (Spratt).

12. *CLAUSILIA GRÆCA*, Pfr. *Cl. testá rimatá, fusiformi, solidá, confertissimé costulatá, cinereo-albídá, non nitente; spirá regulariter attenuatá, apice corneá, acutiusculá; suturá subcrenulatá; anfractibus 10 convexiusculis, ultimo infra suturam compresso, anticé rugoso-costulato, basi breviter cristato; aperturá oblongá, intus albá; lamellis parvulis, conniventibus; lunellá inconspicuá; plicá palatali 1 superá, subcolumellari immersá; peristomate continuo, soluto, tenui, breviter expanso.*

Long. 13, diam. $3\frac{1}{3}$ mill.; ap. 3 mill. longa, 2 lata.

Hab. in Moreâ (Spratt).

13. *CLAUSILIA SCALARIS*, Pfr. *Cl. testá vix rimatá, ventroso-fusiformi, truncatá, confertim et acuté lamellatá, haud nitente, fuscescenti-albídá; suturá profundá, lamellis prominentibus denticulatá; anfractibus (spec. trunc.) 7 scalaribus (marginé supero ampliato, supra suturam prominente), ultimo latere impresso, basi subbicristato: cristá rimali obsoletá, alterá distinctá; aperturá amplá, pyriformi; lamellis exiguis, approximatis; lunellá inconspicuá; plicá palatali 1, subcolumellari emersá; peristomate continuo, soluto, tenui, campanulato-expanso.*

Long. 13, diam. $4\frac{1}{2}$ mill.; ap. 4 mill. longa, $3\frac{1}{3}$ lata.

Hab. in insulâ Melitá (Spratt).

14. *CLAUSILIA CANALICULATA*, Pfr. *Cl. testá subrimatá, fusiformi, solidulá, striatulá, purpureo-brunneá, vix nitidulá; spirá gracili, apice acutá; suturá subalbofilosá; anfractibus 10 planulatis, ultimo costulato, latere impresso, basi æqualiter bicristato; aperturá rotundato-pyriformi, basi canaliculatá, intus fuscúlá; lamellis approximatis, superá marginali, parvâ, inferá altá, flexuosâ; lunellá imperfectá, interruptá; plicá palatali 1, suturæ parallelá, lunellam utrinque transgrediente, subcolumellari inconspicuá; peristomate continuo, soluto, tenui, expanso, basi regulariter rotundato.*

Long. 13, diam. 3 mill.; ap. $3\frac{1}{4}$ mill. longa, 3 lata.

β. *Clavato-fusifformis, anfractibus 9, peristomate carneo-labiato.*

Hab. in Eubœâ. Var. β. in Monte Delphi, 6500 ped. supra mare.

15. *CLAUSILIA HOMALORHAPHE*, Pfr. *Cl. testá rimatá, cylindraceo-fusifformi, solidá, longitudinaliter striatá, cærulescenti-albá, vix nitidulá; spirá sursum attenuatá, apice corneá, tum saturatè cæruleá; suturá planá, marginatá; anfractibus 11 planis, ultimo subcompresso, anticé rugoso-striato, basi obtusé*

bigibboso; *aperturá ovali, intus carnéd*; *lamellis conniventibus, inferá ferè transversá*; *lunellá distinctá*; *plicis palatalibus 2, alterá superá, alterá inferá, juxta subcolumellarem emersá*; *peristomate continuo, breviter soluto, reflexiusculo-expanso.*

Long. 20, diam. 4 mill.; ap. 5 mill. longa, $3\frac{1}{2}$ lata.

Hab. in insulâ Candiâ (Spratt).

16. **CLAUSILIA HEDENBORGI**, Pfr. *Cl. testá subrimatá, fusiformi, turritá, solidulá, longitudinaliter subremotè plicatá, interstitiis striatá, parum nitidá, cinereo-albidá*; *spirá gracili, apice lutescente, acutiusculá*; *anfractibus 12 planiusculis, ultimo basi validè cristato*; *periomphalo latiusculo*; *aperturá ovali, intus albá*; *lamellis tenuibus, inferá subtransversá*; *lunellá vix distinctá*; *plicá palatali 1 superá, subcolumellari immersá*; *peristomate continuo, soluto, tenui, breviter expanso.*

Long. 18, diam. 4 mill.; ap. 4 mill. longa, 3 lata.

Hab. in Syriâ, inter Nahr et Kelb. (Road of Antoninus: Hedenborg.)

17. **CLAUSILIA STRIATA**, Pfr. *Cl. testá non rimatá, fusiformi, confertissimè striatá, opacá, albidá, punctis corneis conspersá*; *spirá turritá, apice acutiusculá, corneá, nitidá*; *suturá levi, marginatá*; *anfractibus 11 planis, ultimo anticè undulato-costulato, basi obtusè cristato*; *aperturá ovali, intus fuscá*; *lamellis tenuibus, conniventibus, interstitio biplicatulo*; *lunellá parum conspicuá*; *plicá palatali 1 superá, 1 inferá, juxta subcolumellarem emersá*; *peristomate continuo, soluto, tenui, undique mediocriter expanso.*

Long. 19, diam. $4\frac{1}{2}$ mill.; ap. $4\frac{1}{2}$ mill. longa, $3\frac{1}{2}$ lata.

Hab. in insulâ Candiâ (Spratt).

18. **CLAUSILIA FLAMMULATA**, Pfr. *Cl. testá profundè arcuato-rimatá, fusiformi, solidulá, lævigatá, nitidulá, cretacéa, flammulis longitudinalibus corneis pictá*; *spirá sursum attenuatá, apice pallidè corneá, obtusiusculá*; *anfractibus 10, superis costulato-striatis, sequentibus subplanis, penultimo infra crenulato, ultimo anticè costulato-striato, juxta periomphalum compressè cristato*; *aperturá oblongo-ovali*; *lamellá superá mediocri, inferá profundá, subramosá*; *lunellá validá*; *plicá palatali 1 superá, elongatá, subcolumellari immersá*; *peristomate continuo, soluto, albo, expanso, margine extero repando.*

Long. 16, diam. 4 mill.; ap. 4 mill. longa, 3 lata.

Hab. in Moreâ (Spratt).

19. **CLAUSILIA TETRAGONOSTOMA**, Pfr. *Cl. testá subrimatá, clavato-fusiformi, tenui, læviusculá, castanéa, pellucidá, sericiná*; *spirá sursum attenuatá, apice nigrá, acutiusculá*; *anfractibus 11, mediis vix convexiusculis, ultimo anticè capillaceo-striato, latere valdè compresso, basi bicristato*; *cristis parallelis, alterá periomphalum cingente brevi, alterá valdè elatá, compressá, crenulatá*; *aperturá subtetragoná, intus fuscá*; *lamellis approxi-*

matis, superá tenui, marginali, inferá validá, transversá; lunellá angustá, arcuatá, cum plicá palatali unicá crucis formam exhibente; plicá subcolumellari inconspicuá; peristomate continuo, soluto, tenui, expanso.

Long. 15, diam. 4 mill.; ap. 4 mill. longa, 3 lata.

Hab. in Eubœâ (Spratt).

20. *CLAUSILIA LUNELLARIS*, Pfr. *Cl. testá subrimatá, fusiformi, solidulá, striatulá, corneo-fuscá, sursum deorsumque pallidiore, nitidulá; spirá apice acutiúsculá; suturá anfractibus superiorum lined impressá marginatá, inferiorum subpapillatá; anfractibus 9 vix convexiusculis, ultimo paulo distinctius striato, basi leviter bigibboso; aperturá ovali-rotundatá; lamellis conniventibus, superá exigulá, inferá flexuosá; lunellá magná, suturam attingente; plicis palatalibus 2, alterá superá, breviúsculá, alterá brevissimá, subcolumellari emersá; peristomate continuo, supernè appresso, sublabiato, breviter expanso.*

Long. 14, diam. 4 mill.; ap. $3\frac{2}{3}$ mill. longa, 3 lata.

Hab. in Eubœâ (Spratt).

21. *CLAUSILIA NEGROPONTINA*, Pfr. *Cl. testá subrimatá, ventroso-fusiforimi, solidá, longitudinaliter confertim striatá, purpureo-brunneá, haud nitente; spirá apice corneá, obtusá; suturá subcrenulatá, papillis albis striæformibus ornatá; anfractibus 8 subplanis, ultimo basi tumido, sulco levi bigibboso; aperturá subrotundá, supernè subangulatá; lamellá superá minutissimá, inferá altá, transversá; lunellá magná, callosá, à suturá ad basin elongatá; plicá palatali 1 superá, subcolumellari inconspicuá; peristomate continuo, supernè appresso, reflexiusculo, margine externo subdentato, fusculo.*

Long. 13, diam. vix 4 mill.; ap. $3\frac{2}{3}$ mill. longa, 3 lata.

Hab. in Eubœâ (Spratt).

22. *CLAUSILIA HANLEYANA*, Pfr. *Cl. testá vix rimatá, subclavatá, longitudinaliter striatulá, tenui, vix nitidulá, corneo-fuscescente; spirá subcylindricá, sursum attenuatá, pallidiore, apice obtusá; suturá marginatá, irregulariter papilliferá; anfractibus $8\frac{1}{2}$ vix convexiusculis, ultimo basi tumido, juxta rimam obsolete gibboso; aperturá amplá, subcirculari; lamellis approximatis, superá parvulá, inferá magná, compressá, transversá, basi ramosá; lunellá parum arcuatá; plicá palatali 1 superá, subcolumellari immersá; peristomate continuo, vix soluto, albo, expanso.*

Long. 13, diam. 3 mill.; ap. $3\frac{1}{2}$ mill. longa, 3 lata.

Hab. in Eubœâ (Spratt).

23. *CLAUSILIA THERMOPYLARUM*, Pfr. *Cl. testá subrimatá, cylindræo-fusiforimi, solidulá, subtiliter striatulá, griseo-carneá, parum nitente; spirá supernè attenuatá, apice corneá, obtusiusculá; suturá marginatá; anfractibus 9-10 vix convexiusculis, ultimo distinctius striato, basi breviter et obsolete bicristato; aperturá ovali-pyriformi; lamellis mediocribus, conniventibus;*

lunellá validá; plicá palatali 1 superá, subcolumellari emersá; peristomate continuo, breviter soluto, albo-labiato, reflexiusculo-expanso.

Long. 17, diam. 4 mill.; ap. 4 mill. longa, $3\frac{1}{3}$ lata.

Hab. prope Thermopylas (Spratt).

24. *CLAUSILIA SERICATA*, Pfr. *Cl. testá subrimatá, fusiformi, tenui, confertim costulatá, sericiná, fuscá; spirá apice pallidè corned, obtusiusculá; suturá albo-marginatá; anfractibus 10 convexiusculis, ultimo basi breviter cristato; aperturá amplá, subrotundá, supernè angulatá, intus hepaticá; lamellá superá parvú, inferá flexuosá; lunellá validá, arcuatá; plicis palatalibus 2 elongatis, superis, 1 inferá emersá, medianis pluribus irregularibus, callosis, subcolumellari immersá; peristomate continuo, breviter soluto, tenui, expanso.*

Long. 19, diam. $4\frac{1}{2}$ mill.; ap. $4\frac{1}{2}$ mill. longa, $4\frac{1}{4}$ lata.

Hab. in Eubœâ (Spratt).

25. *CLAUSILIA CHARPENTIERI*, Pfr. *Cl. testá vix rimatá, cylindraceo-fusififormi, tenui, longitudinaliter confertissimè costulato-striatá, pallidè fuscá, diaphaná, vix nitidulá; spirá supernè attenuatá, apice glabrá, luteá, obtusá; suturá submarginatá, costulis crenulatá; anfractibus 9, prioribus 6 convexis, sequentibus 2 planulatis, ultimo basi tumido, obsoletissimè bigibboso; aperturá latè ovali; lamellá superá exigú, inferá magná, compressá, transversá, basi ramosá; lunellá leviter arcuatá; plicá palatali 1 superá, subcolumellari inconspicú; peristomate continuo, supernè appresso, albo-labiato, expanso, margine externo subdentato.*

Long. 14, diam. 4 mill.; ap. 4 mill. longa, $3\frac{1}{3}$ lata.

Hab. in Eubœâ (Spratt).

26. *CLAUSILIA REEVEANA*, Pfr. *Cl. testá vix rimatá, fusiformi, tenui, longitudinaliter confertissimè costulato-striatá; vix sericiná, cinerascenti-fuscá; spirá apice corned, obtusulá; suturá submarginatá, crenulatá; anfractibus 9, summis convexis, reliquis vix convexiusculis, ultimo latere impresso, basi subcristato; aperturá pyriformi-ovali, intus fuscúlá; lamellis tenuibus, approximatis; lunellá filari, leviter arcuatá; plicá palatali 1 superá (nonnullisque obsoletis supra eam), subcolumellari immersá; peristomate continuo, breviter soluto, tenui, expanso.*

Long. $13\frac{1}{2}$, diam. 4 mill.; ap. $3\frac{2}{3}$ mill. longa, 3 lata.

Hab. in Græciâ (Spratt).

27. *CLAUSILIA IDÆA*, Pfr. *Cl. testá breviter arcuato-rimatá, fusiformi, solidulá, haud nitente, saturatè cineré, costis filiformibus, rectis, albis, confertis munitá; spirá sensim attenuatá, apice acutá; suturá vix impressá, albo-filosá; anfractibus 13 planis, ultimo fortius rugato, basi cristú brevi, arcuatá juxta periomphalum latiusculum, et gibbere obtuso munito; aperturá ovali, intus fuscúlá; lamellá superá parvú, inferá obliquá, pro-*

fundè furcatá; lunellá extus conspicuá; plicá palatali 1 superá, subcolumellari immersá; peristomate continuo, soluto, carneo, labiato, expanso.

Long. 22, diam. 5 mill.; ap. 5 mill. longa, 4 lata.

Hab. in Monte Idá, 5500 ped. supra mare (Spratt).

28. *CLAUSILIA DUNKERI*, Pfr. *Cl. testá rimatá, ventroso-fusi-formi, tenui, confertim costulatá, diaphand, fuscescenti-albidá; spirá à medio attenuatá, apice obtusiusculá; anfractibus 10½ vix convexiusculis, ultimo latere compresso, basi validè bicristato; carinis conniventibus, æqualibus; aperturá pyriformi-ovali, intus albá; lamellá superá parvâ, inferá transversâ; lunellá distinctâ inter cristarum originem; plicá palatali 1 superá, subcolumellari immersâ; peristomate continuo, soluto, albo-sublabiato, undique latè expanso.*

Long. 19, diam. $4\frac{2}{3}$ mill.; ap. $4\frac{2}{3}$ mill. longa, 4 lata.

Hab. ad "Caunus," Asiæ Minoris.

29. *CLAUSILIA SOWERBYANA*, Pfr. *Cl. testá breviter rimatá, ventroso-fusiforimi, truncatá, longitudinaliter costulato-striatá, diaphand, fuscá; suturá albo-marginatá; anfractibus (superstit.) 6½ planiusculis, ultimo latere excavato, basi validè bicristato; cristis parallelis, alterá arcuatá, perionphalum latiusculum cingente, alterá sursum furcatá; aperturá subrhombéd, basi leviter canaliculatá; lamellis mediocribus, conniventibus, inferá profundâ, vix flexuosâ; lunellá validâ; plicis palatalibus 2 brevibus supra lunellam, subcolumellari vix emersâ; peristomate continuo, breviter soluto, albo, reflexiusculo-expanso.*

Long. (trunc.) 16, diam. 5 mill.; ap. $4\frac{2}{3}$ mill. longa, $4\frac{1}{3}$ lata.

Hab. in Pamphylia (Spratt).

30. *CLAUSILIA SEMIDENTICULATA*, Pfr. *Cl. testá rimatá, fusiformi, solidulá, longitudinaliter confertim costatá, brunneá, albido-striolatá; spirá supernè attenuatá, obtusiusculá; anfractibus 13 angustis, convexiusculis, ultimo rugoso-costato, basi tumido, juxta rimum compresso-cristato; aperturá pyriformi-ovali, basi canaliculatá; lamellá superá marginali, inferá utrinque ramosâ; lunellá parvulâ; plicis palatalibus 2, superá 1, alterâ inferâ, breviter emersâ, subcolumellari suboccultâ; peristomate continuo, soluto, intus albo-labiato, reflexiusculo, margine sinistro extrorsum confertim denticulato.*

Long. 15, diam. $3\frac{3}{4}$ mill.; ap. $3\frac{1}{3}$ mill. longa, $2\frac{2}{3}$ lata.

Hab. prope Bujukderé ad Bosporum.

November 27, 1849.

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

The following papers were read :—

1. ON THE LORINE GENUS OF PARROTS, ECLECTUS, WITH THE DESCRIPTION OF A NEW SPECIES, ECLECTUS CORNELIA. BY CHARLES LUCIAN, PRINCE BONAPARTE, F.M.L., F.Z.S. ETC. ETC. ETC.

The richness, good scientific order and proper management of the well-kept Zoological Garden of Amsterdam, as well as the courtesy and liberality of its able director, Mr. Westerman, will strike every naturalist, even though coming, as I did myself, from England. The establishment has been lately illustrated by the pen of H. Schlegel, equally superior when it removes the boundaries of science for professed zoologists, or renders it useful and popular to ladies and children. With or without his valuable book, a visit to this attractive spot would be fully repaid by the inspection alone of the gigantic Salamander, *Sieboldia maxima*, Bonap., which has grown more than a foot in length since I gave it that generic name; not to speak of the beautiful collection of living *Fringillidæ* and *Parrots*. Among the rarest and most splendid species of these latter birds, collected from every quarter of the globe, I will only mention, from America, a magnificent *Macrocerus hyacinthinus*, Vieill., with the bill still larger than usual; from Africa, the Congo Jack, *Pionus guielmi*, established a few weeks ago by Sir William Jardine; and from Malasia the *Lorine*, which I now introduce to the Zoological Society, sure of their receiving with forbearance my compendious account of its relations.

The genus *Eclectus* of Wagler holds a conspicuous place in the family of *Lorine Parrots*, and is eminently natural if kept within the proper boundaries assigned to it by its founder, including his two only species, and, as a third, my new one, all from the Moluccan islands, and similar in form, having a large stature, the plumage loose, red, with more or less blue, a powerful black bill with scarcely a cere, a smooth simple tongue, and a shortish square tail.

1. ECLECTUS PUNICEUS. *E. coccineus*, dorso, alis, caudâque purpureo-fuscescentibus; margine alarum, tectricibus inferioribus, remigibus, annulo ophthalmico, fasciâ abdominali et torque interscapulari, pulchrè cyaneis; crisso, et caudæ apice, rubris.

Synonyms.

Psittacus puniceus, Gm. (exclus. specimin. rostro rubro.)

Lorius amboinensis? Briss. *Orn.* iv. p. 231. sp. 19.

Psittacus cardinalis? Bodd. ex Lory d'Amboine, *Buff. Pl. Enl.* 518.

Domicella! punicea? *Wagl. Mon. Psitt. in Act. Monac.* p. 569. gen. xiii. sp. 3.





Wolf del et lith.

coloured by Hutton sculp

ECLECTUS CORNELIA. Pr. Bonap.

Eclectus Linnæi, *Wagl. Mon. Ps.* p. 571. gen. xiv. sp. 1; *Gray, Gen. tab.* 103. f. 1.

Lorius cardinalis? *G. Gray, nec Hombr. et Jacq. Voy. Astrolabe et Zéélé.*

Hab. New Guinea, where it has been killed often on the west coast near Lobo, by M. Sal. Muller.

The iris in this species is black.

Misled by Wagler, and judging by the plate of Buffon, which certainly gives the idea of a true *Lorius*, Mr. G. R. Gray has, by double employment, considered the *puniceus* as one of these birds in his 'Genera.' Should he have seen the Parrot, he would have perceived it to be identical with his *Eclectus Linnæi*, and consequently that *puniceus*, which Kuhl only went a little too far in confounding with *B. grandis*, far from being generically distinct, is, even as a species, very nearly allied to it.

2. **ECLECTUS GRANDIS.** *E. coccineus, dorso, alis, caudâque, purpureo-fuscescentibus; margine alarum, tectricibus inferioribus, remigibusque, apice cyaneis; abdomine, et torque interscapulari, subviolaceis; crisso, et caudæ apice, luteis.*

Synonyms.

Psittacus grandis, *Gm. Lath. Kuhl* (who unites the preceding with it).

Psittacus ceylonensis, *Bodd. ex Lory de la Nouvelle Guinée, Buff. Pl. Enl.* 683; *Brown, Ill. tab.* 6; *Levaillant, Perr. tab.* 126 adult, 127 junior, 128 juv.

Eclectus grandis, *Wagl. Mon. Psitt. in Act. Monac.* 1832, p. 573. gen. xiv. sp. 2.

Eclectus ceylonensis, *G. Gray, Genera of Birds.*

Hab. In Insulis Moluccis.

Often brought from Amboina, but the native place is not well ascertained. Doctor Forsten (too often confounded with Forster), one of the scientific victims of climate, sent it to Holland from the island of Gilolo.

The iris in this species is golden yellow.

3. **ECLECTUS CORNELIA.** *E. coccineus, dorso, alis, caudâque, purpureo-fuscescentibus; margine alarum remigibusque apice cyaneis; tectricibus inferioribus rubro cyaneoque variis; abdomine, crisso, et caudæ apice, rubris concoloribus.*

(Aves, Pl. X., reduced to half the natural size precisely.)

I have named this beautiful bird after H. Schlegel's virtuous and talented wife, whose quick eye detected the species before professed ornithologists themselves, who relied on their possessing it among the unnumbered treasures of the as yet uncatalogued Leyden Museum*; and I dedicate it to that lady with additional pleasure, as a

* The superiority of the Leyden Museum over any other is unquestionable, not perhaps so much on account of its containing a greater number of species than those of London, Paris, Philadelphia and Berlin, but for the freshness and perfec-

small testimony of gratitude for the happy hours spent, and the useful information collected, under the hospitable roof of the zoologist,

tion of the specimens, for the quantity of skeletons, and above all for the never-sufficiently-praised series of individuals of the various species of both sexes, in different ages, and from different localities and countries, which facilitate one's judgement, and show at once in most cases, especially with *Mammalia*, what is or is not a good species. For this and many other reasons, a detailed Catalogue of this splendid collection is a necessity of our days. We can hardly conceive how the many treasures accumulated in that National establishment by the indefatigable zeal of its so well-known director, Temminck, seconded by M. Schlegel and their subordinates (whose industry may be appreciated in England by those acquainted with M. Frank the Amsterdam merchant, so useful to science and naturalists of every country), are still allowed to remain unknown and undescribed; the Museum itself, with its numerous new species, being left *uncatalogued*, and that in the year 1850! The discoveries made by Dutchmen in far-distant lands, to the peril of their lives, and with their own or their government's capital, are thus daily exposed to be anticipated by other nations, and monopolized by the ever-increasing struggles of English industry; whilst a scientific Catalogue published on the plan long since advocated by Professor Is. Geoffroy St. Hilaire for the museum of the great French Nation, that is, with descriptions and figures of all new or not sufficiently-known species, would be an imperishable monument for science and for the Dutch Nation. And the greater benefit have we the right to expect for science from the execution of this noble enterprise, inasmuch as M. Schlegel, who would certainly be the head and arm of the publication, combines the knowledge for which he has long been celebrated all over the world, with the skill of a first-rate draftsman. His paper on Iconography applied to Natural History (Mem. Taylerian Soc. Haarlem), in which beautiful drawings of his own are produced as examples, after he has critically reviewed the standard works of every nation, and while giving sound precepts to artists devoted to our science, ought to be known everywhere, and at least translated into the English language. Under such circumstances, no book on Natural History, we shall never enough repeat it, would prove more effectual to the progress of science, more creditable to the nation, to the government, and to the able individuals willing to accomplish the labour, than the Catalogue of the Leyden Museum on the enlightened plan above-mentioned, which such a naturalist as Schlegel certainly could not fail to improve in the course of elaboration.

In order to prove our assertion, it is enough to remark, how much by the desired publication would be improved our knowledge of the Malasian fauna, since, of the productions of the island of Gilolo alone, all those collected at the mere landing of the Dutch naturalists, upon a surface of a square mile, proved to be new, and many of them very important additions to science; to indicate the number of undescribed objects received from Ashantee; and to point out the advantages arising from the facility of placing henceforth beyond the possibility of doubt the existence of remarkable species unaccountably rejected or misplaced, as *Gavialis Schlegeli* and *Testudo enys*. But to justify fully our insisting on these facts, I will select a few animals which I shall have perhaps the honour thus first to introduce to the English naturalist, and these examples I shall take out of each of the different classes, saying of the animals just as much as is necessary to excite, not to satisfy scientific curiosity. Among the new *Mammalia*, some of which will constitute new genera, I shall choose a third living species of Elephant.

ELEPHAS SUMATRANUS, Temm., based upon four skeletons which I admired in company with my learned friend and colleague, Prof. Is. Geoffroy St. Hilaire of Paris. This species is perfectly intermediate between the Indian and African, especially in the shape of the skull, and will certainly put an end to the distinction between *Elephas* and *Loxodon* with those who admit that anatomical genus; since although the crowns of the teeth of *E. sumatranus* are more like the Asiatic animal, still the less numerous undulated ribbons of enamel are nearly quite as wide as those forming the losanges of the African. The number of pairs of false ribs (which alone vary, the true ones being always 6) is 14, one less than in the *africanus*, one more than in the *indicus*; and so it is with the dorsal vertebræ,

who possesses the deepest knowledge of each and every class of vertebrate animals, and whose literary and *truly philosophical* attainments are only equaled by his practical and thorough acquaintance with species, the only solid base of our science.

Hab. In Insulis Moluccis; most probably from Ceram.

The total length of this Parrot is 1 English foot 2 inches, the wings measuring $8\frac{3}{4}$ inches, and its tail $5\frac{1}{2}$ inches. The bill is black, as in the other Noble-Lories (*Eclecti*), and the small portion of the cere that remains uncovered by the red feathers of the front is greyish; the red colour on the head is brighter than on the rest of the plumage, and somewhat lighter than in the other species; the naked ring around the eye is very narrow and grey, without the small blue feathers that surround it in *Eclectus puniceus* only; the iris is stramineous and exteriorly of a reddish colour; the pupil, excessively dilatible, is blue-black. The feet are grey, with the granular little scales blackish; the nails black. The quills are greenish internally, reddish externally, but with their point of a shining blue; on the under surface they are entirely blackish; the under wing-coverts are red, intermixed with blue. The tail-feathers are of a dull red, with black shafts, and internally somewhat greenish. The bottom of the whole plumage is lead-colour.

The absence of blue on the back and abdomen at once distinguishes our new Parrot from both its congeneric species, the red colour prevailing so much on its plumage that even the under wing-coverts are variegated with that colour, and not pure blue as in the others. Our

which are 20 (21 and 19 in the others), whilst the new species agrees with *afri-canus* in the number of sacral vertebræ (4), and with *indicus* in that of the caudal ones (34).

Of the Birds I shall only mention *Agelastes meleagrides*, Temm., a lesser Talegalla, furnished with a strong spur, very rounded wings, and a flat tail. The head and neck are naked; a very broad white collar; all the rest of the plumage black, finely undulated with white.

In the Reptiles a new *Viperine* may be spoken of with great interest, constituting certainly an independent genus (*Chloroechis*, Schlegel), and showing that Nature takes pleasure in hiding under the similarity of tints the snares of a detestable animal, as the innocence of the females of showy birds affords them protection against the tyrants of the air. The green colour of this poisonous Serpent from Ashantee, as well as its forms, recall the *Dendrophidinae*, and make it, though a true *Viperine*, lead an arboreal life, and conceal its perfidious power among the foliage of the trees.

From the Amphibians a dozen of undescribed *Hyladinæ* will prove Africa not so deficient of these elegant Frogs as it has been supposed to be; whilst another small *Batrachian* from New Holland (*Myiobatrachus paradoxus*, Schlegel) has the general appearance of a *Bombinator*, but with the body rounded and the legs and toes shortish, somewhat connected or at least entangled by the marginal skin of the flanks. It is rendered remarkable in the whole class of Amphibia by two long curved canine teeth situated towards the end of the superior jaw, and much resembling fangs.

Among the Fishes I have particularly admired a *Percine* from the Cape, allied to the *Anthias buphthalmos* of my 'Fauna Italica,' and called by Schlegel *Anthias gibbiceps*. . . . But what, if hundreds of new species of that class (and I am still dazzled by the sight of many and many even of my favourite *Pleuronectidæ*) would by their being well known greatly benefit our science, and alone give convincing proof of the propriety, nay, I may add, of the urgent necessity, of the publication?

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Ecl. Cornelia stands therefore with *puniceus* and *grandis* precisely in the same relation that *Lorius unicolor*, Bechst. (Levaill. pl. 125) does to *Lorius tricolor*, Steph. (*Ps. lory*, L., figured in Levaillant's plates 123 and 124), both being almost entirely red, and wanting the blue tinges on the so-called scapular. From that analogous variety of a red-billed species, however, the black bill will tell it at once, even to those superficial observers who only look to colours; and as to another *cardinalis* (besides the *puniceus*, so called by Gray, through reverence to the heterodox Boddaert), that of the Astrolabe and Zé-lée's voyage, the generic difference is still more strongly declared in that species of French naturalists, since it has a greater nudity round the eye, a wedge-shaped tail, and more slender and elegant forms.

This is not the place to enter into a discussion about geographical species, local races, or varieties. Our *Eclectus Cornelia*, notwithstanding its identity of forms and similarity of colours with *E. puniceus* and *grandis*, which might induce a philosophical mind to consider the three as forming but one and the same species, differs more from either of the two than they do from each other, although they have been placed in different genera. It is impossible at all events that the three should not be kept distinct by those naturalists who wish to represent Nature as it is, not as they would have it; and consistency forbids to consider them otherwise than species as long as we admit as such the *Lagopus scoticus*, and the different kinds of Sparrows of Europe; and they certainly deserve that title more than the inconstant geographical modifications of *Falco peregrinus*, admitted as species by those who slight over the much more important and at least constant differences of the Vulturines. *Habent sua sidera . . . species!* That is all we have to say on so important a subject for the present.

It is impossible to imagine a bird of milder and more gentle disposition than our *Eclectus*. The specimen figured allowed itself not only to be handled in every manner, but placed free, out of its cage, would allow every measurement to be taken, its wings pulled, its tail spread, and every feather to be counted and described. Even when its patience was at an end, and it resorted to its bill, it was gently; and it would only use the powerful weapon in seizing the intruding finger without inflicting any kind of injury. It uttered a low note, resembling that of the coot (*Fulica atra*, L.) when heard at a distance.

2. DESCRIPTION OF A NEW SPECIES OF GORGONIA FROM AUSTRALIA. BY J. E. GRAY, ESQ., F.R.S.

PRIMNOA AUSTRALASIE. (Radiata, Pl. II. f. 8, 9, nat. size.)

Coral elongate, unbranched, rather tapering; cells numerous, regular, placed in close regular circles round the stem, each formed of two series of imbricate calcareous scales.

Inhab. Australasian seas, on oyster-shell and stones.

Several specimens of this very interesting coral were sent to the British Museum by the Royal Society of Van Diemen's Land.

This coral is often covered with various species of smaller *Coral-*

lines and *Algæ*. It varies from two to three feet in height. The axis is known from the unbranched species of *Gorgonia* by being more calcareous, and of a pale greyish colour.

Joseph Millingin, Esq., F.L.S., the Secretary of the Royal Society of Van Diemen's Land, has kindly sent me the following particulars of this coral:—

“It was fished up from a depth of some fathoms in D'Entrecasteaux Channel, between the mainland of Tasmania and Bruce's Island. It is found, as you will see, affixed to rocks and stones, and to dead, broken and half-decayed oyster and scallop-shells, &c. It usually exists in groups, groves or families, varying from three to four to a great many. The long delicate stem, which is horny-looking and highly elastic when dry, varies from the thickness of a knitting-wire to that of a crow-quill, and from its mineralized and root-like attachment, tapers gradually and gracefully to the beautiful acicular point, attaining not unfrequently a length of two or three feet, and having its entire surface covered with a calcareous coat of a cream-yellow colour, delicately annulated, so as much to resemble the fine string of wooden beads worn as a necklace by the poorer natives of Bengal, but with this difference,—that in the coralline the beads form a connected or rather continuous chain, independently of the delicate elastic centre upon which the mineral structure is deposited. I am informed that in one or two instances, when these corallines were procured, they were enveloped throughout with a mucilaginous or jelly-like substance, which when they become dry is exsiccated and shriveled to such a degree as to be scarcely if at all traceable. You will be able to say whether you consider it likely that there exists, in the recent and living state of the zoophyte, such an external and soft organization.”

This jelly-like substance was doubtless the polypes.

3. ON THE EVIDENCES OF AFFINITY AFFORDED BY THE SKULL IN THE UNGULATE MAMMALIA. BY H. N. TURNER, JUN.

I had occasion in the introductory part of my communication on the arrangement of the Carnivora, to make allusion to certain details of structure in the crania of the Pachydermatous and Ruminant Mammalia; and I there pointed out a few peculiarities, which clearly distinguished the Perissodactyla of Professor Owen, both from the Ruminant and Non-ruminant Artiodactyla, and also the two latter divisions from each other. It is to our eminent Comparative Anatomist that we are indebted, by the discovery of some new characters, and the correction of certain former errors of observation, for the establishment of that mode of subdividing the Ungulata which first suggested itself to Cuvier; but there can be no doubt, that when the entire anatomy of the order is investigated with this view, many constant distinctions will yet be made apparent, and our appreciation of the comparative degrees of affinity among its members will become clearer as we proceed.

In taking up the subject as it has thus been left, I have first directed my attention to the skull, as being that part in which the

greatest number of characters are presented at one view, and for the study of which I have had the most ready opportunities; and I now propose to offer such results of my observations as I have been able sufficiently to mature. In pointing out the characters of the skull which distinguish these two grand divisions of the Ungulata, the differences will appear more striking if I consider the Perissodactyla as they are restricted by Prof. Owen, namely exclusive of the Proboscidian and other aberrant forms, which, though they agree with them in the most essential characters, differ in many points of conformation.

The nasal bones in the Perissodactyla are gradually widened behind, so that their posterior angles approach the anterior margins of the orbits, between which the suture which separates them from the frontals runs more or less directly across the skull; we may naturally expect such a character to be masked by the singular modification which these bones undergo in the Tapir; but in the Artiodactyle division, even though the extreme points of the nasal bones occasionally extend very high, or as in the Llama, and in the genus *Cephalophorus* among the Antelopes, a sudden extension from their outer edge descends a little on each side of the face, this decided character is never manifested.

The intermaxillary bones in the Perissodactyla, if there be teeth developed in their median portion to a functional size, are always deep enough to allow them to be vertically implanted, while in the Artiodactyla, the teeth when existing in this bone always incline towards each other, their roots being divaricated to allow the nasal opening to extend down between them. In this group, with the singular exception of the genus *Hippopotamus*, we find a distinct foramen above the orbit for the passage of the supraorbital nerve, with a groove extending from it down the face; while in the Perissodactyla, it would appear as though this nerve would issue at a point more towards the outside, since the foramen only exists in the Horse, in which it is placed quite at the commencement of the postorbital process, and has no groove continued from it.

In the interior of the orbit, there is always, in the Artiodactyla, an increased concavity of surface upon the anterior side about the junction of the lacrymal and frontal bones; and in the middle of this fossa, upon the edge of the lacrymal somewhere between the ductus ad nasum and the entrance of the infraorbital canal, a pit, most strongly marked in the Hogs, which serves, as I have found in the Sheep, for the origin of the obliquus inferior muscle of the eye, the remainder of the fossa being filled up with adipose matter. In the Perissodactyla no such fossa exists, and there is never more than a very slight depression marking the origin of the muscle, in most cases not perceptible at all. The shortening of the bony palate in the latter group, the small difference of level between it and the base of the cranium, together with the longitudinal extension of the posterior nasal orifice, the lateral spreading-out of its walls and the constant existence of the alisphenoid canal, which I pointed out in my former communication, may be again adverted to.



W. H. Fish. Front. a Sketch made at Cairo, Dec. 1844.

YOUNG HIPPOPOTAMUS
Presented to the Zoological Society by H. H. Abbas Pasha.

W. H. Fish. Front. a Sketch made at Cairo, Dec. 1844.



The pterygoid ridge in this group is not very strongly marked, and gradually dies away upon the lamina enclosing the alisphenoid canal; the pterygoid processes have considerable antero-posterior extent, and the true pterygoid bones are reduced to mere ribands. On the other hand, in the Artiodactyla, the pterygoid ridge, continued from the inferior root of the zygoma, terminates abruptly, with a free process in the Ruminants; while in the Hogs and other allied forms, it is from this process that a laterally projecting plate extends down on the outer side of the pterygoid process, forming a pterygoid fossa in a manner different from all other mammalia, and very characteristic of these Non-ruminant Artiodactyles. The temporal bone in the Perissodactyla also furnishes characters in the back of the zygoma, which gently slopes away to its origin, and in the association of a distinctly marked eminentia articularis with a rather large and more or less thickened and mammilliform post-articular process. The principal differences in the occipital bone I pointed out in my former paper, and notwithstanding the marked difference between the Hog and the Ruminant, I must observe that they agree in the flatness and squareness of the basal portion, while in the Perissodactyla it is transversely convex, being rounded off on each side into the great foramen lacerum.

I mentioned in a note appended to my former communication, an idea which occurred to me just before that paper went to press, that a further distinction between the two groups might be found in the structure of the premolar teeth. I have found, on investigation, that the character will not always admit of being rigidly applied, since in some genera of Perissodactyla, as the *Lophiodon* to which I there alluded, the posterior lobes of the premolars are not so completely developed as they are in the true molars; and on the other hand, in some of the Artiodactyla, as the Peccary, they advance a little beyond the rudimentary condition in which they are usually found, though never attaining an equal development with the others. The character will however in most cases enable us to distinguish; and in the course of the observations I was thus led to make, I have discovered another more important one, which I will next proceed to explain.

If we consider as an entire molar tooth that which has four principal tubercles, the molars of the lower jaw must be said to be placed each in advance of its homologue in the upper jaw to the extent of a quarter of a tooth, so that the premolars, which in most cases represent but half molars, alternate with their opposing teeth above. It is in accordance with this universal law, that the last lower milk molar in the Artiodactyle division of the Ungulata has three pair of lobes; not, as has been imagined, that it may pretypify the last true molar, which in the same group is usually also six-lobed. The last lower true molar, being placed like the rest, a quarter of a tooth in advance of its four-lobed opponent, the pair of tubercles that are added to it behind play against the posterior surface of the hindmost pair of lobes of the upper tooth; but in the last lower milk molar it is the anterior pair of cusps that are supernumerary, since they close between the two pair of principal tubercles of the penultimate upper milk tooth, which like the last one has the form of a true molar; while

the penultimate lower milk molar, which in this as in most groups represents but the half of a true molar, furnishes opposition to its most anterior surface. Although it is not always literally true, that in the Artiodactyla the premolars represent each but the half of a true molar, and in the Perissodactyla an entire one, it is certain that in the exceptional cases among the former group, the parts representing the posterior division of the tooth are small, or merely rudimental; and that in the latter group, it is only in the most anterior of the series that the posterior portion of the tooth is ever altogether wanting. It is also certain, that all those genera of which the milk dentition has been seen, conform in that particular to the general character, the distinction being well-marked in the Artiodactyla between the *two last* upper milk teeth, whose characters are those of true molars, and those which precede them and represent but half ones, the same difference also prevailing between the *last* and those which precede *it* in the lower jaw; always necessitating the existence of a third pair of tubercles in the last lower milk molar to work in the interval of the two pairs in the penultimate above; while in the Perissodactyla, the constant existence of a well-developed posterior pair of lobes in the penultimate lower milk tooth abrogates the necessity of a third pair in the last one, and consequently we need not expect to find it, even in those genera, such as *Lophiodon* and *Palæotherium*, of which the additional lobe to the last true molar is characteristic. Of the first-named genus, the milk dentition, so far as I am at present aware, is as yet unknown; but among the plates in the 'Ossemens Fossiles' examples may be seen of the lower jaws of young Palæotheria, exhibiting the milk teeth, of which the last has but two lobes*. Therefore the tripartite condition of this tooth becomes a constant and important character of the Artiodactyle division.

Most of the characters which separate the Ruminant and Non-ruminant divisions of the Artiodactyla have been pointed out in my former paper, as well as those which distinguish the two subdivisions of the Hog-tribe, which by the analogy of the amount of difference in those of other groups, I think must be looked upon as families,—*Suidæ* and *Hippopotamidæ*. The striking character derived from the sudden termination of the pterygoid ridge in the Ruminant, and the formation of the pterygoid fossa in the other division, has been alluded to above†. The considerable upward extension of the masseteric ridge upon the os malæ beneath the orbit seems also characteristic of the Ruminants, as well as the bifurcation of the orbital ala of the sphenoid,

* Pl. 4. fig. 1 (alluded to by Professor Owen), and pl. 56. fig. 2.

† In the Hippopotamus the pterygoid ridge runs inwards and even a little backwards, and then forms a slight angle at the point of junction with the pterygoid process, which then runs downwards and forwards, so that the outer wall of the fossa exists as in the allied forms, while, as I have before observed, it is the inner one which is wanting. I must again refer to the remarkable osseous bulla within the orbit of this animal, since I find that the same thing exists, though of much smaller size, in most ruminants; in many skulls it is broken away, and when remaining it so lies upon the "tuberosity" or posterior termination of the alveolar process of the maxillary bone as to appear at first like a part of it. It opens into the nose and antrum maxillare, and has no connection with the lacrymal apparatus.

which sends a branch forwards for a considerable distance, often so far as to articulate with the lacrymal bone. They also differ from the Hog-tribe in having, like the *Perissodactyla*, a distinct styloid process, emanating from the mastoid bone, partly enclosed by a portion of the tympanic, and with a truncated extremity, to which one of the angles terminating the "lesser cornu" or stylo-hyal bone is attached; while in the Hog-tribe this process is so completely pressed between the paroccipital process and the auditory bulla, that in most cases it does not seem to exist.

It will perhaps be most convenient to assign the rank of "family" to the four generally received subdivisions of this ancient order, although the osteological differences which they present are very slight; such few as I could find in the skull I will now point out. In the Camels and Llamas, the articulation of the lower jaw differs from that of Ruminants in general, in having a distinct eminentia articularis, separated by a fossa not having the character of an articulating surface from the post-articular process, upon which is another facet; the condyle of the jaw having likewise two articulating surfaces placed at right angles with each other. There is also a marked peculiarity in the auditory bulla, since the outer wall of the vaginal process forms a deep, thickened, vertical plate, burying the styloid process between it and the opposite part of the bulla. On looking at the casts of the skull of the *Anoplotherium* existing in our museums, I perceive, immediately under the meatus auditorius, a strong vertical process, apparently the outer edge of this lamelliform expansion, the remainder being concealed in the matrix. I fully concur in Professor Owen's reasons for considering the *Anoplotherium* as a ruminant, and this indication of character, in addition to the many resemblances which authors have pointed out, renders it probable that this early representative of the *Artiodactyla* belonged to the family *Camelidæ*. The existing members of this family also most approach the *Anoplotherium* in the form of the ascending ramus of the lower jaw, and the strongly-marked notch which bounds the angular process above.

I am glad to find that I have the sanction of Professor Owen's opinion in referring the *Merycopotamus* to the ruminant division, since on examining the specimens in our National Museum, I find that in addition to the form of the teeth, which if taken alone are not always to be depended on, all the essential characters of the skull are in accordance with that type. The masseteric ridge reaches to within half an inch of the orbit, and above the zygoma is a distinct indication of the foramen usually existing there in Ruminants. The glenoid surface is slightly convex anteriorly, and terminated behind by a distinct post-articular process, on to which the articulating surface is continued without intermission, thus indicating the animal to be ruminant, but removing it from the *Camelidæ*. The pterygoid ridge terminates in an angle, which, however, is not prolonged into a process; from this angle there is no transverse lamina extending down to join the pterygoid process, and consequently no pterygoid fossa. The articulating surfaces of the occipital condyles seem to extend on to the processes anterior to them; the auditory bulla is rounded, but

as the state of the specimens will not permit any definite character to be drawn from it, I will not venture an opinion as to which family of Ruminants should claim this remarkable form.

Among the remaining families, I have noticed that in the *Moschidæ* and *Cervidæ* the styloid process becomes free almost immediately at the base of the auditory process, while in the *Bovidæ* or Cavicorn Ruminants, it is enclosed more or less completely for some distance in the downward and forward direction. The *Cervidæ* may also be distinguished from the latter by the form of the infraorbital depression, which has its most sudden sinkage on the upper side, or that which is next the infraorbital fissure. The Giraffe, although it has neither the depression nor the fissure, resembles the *Cervidæ* in the character of the auditory bulla, and in having the molar teeth expanded at the base of the crown, and compressed towards the summits of the lobes. The *Moschidæ* must, of course, be distinguished from the *Cervidæ* by their trilocular stomach, and by the presence of the gall-bladder*, and it is probable that further differences in their internal anatomy may yet be found; I must however revert to the subject of dentition to point out some characters in which they differ from all other Ruminants, and agree with the non-ruminant Artiodactyla. In these, as well as in some of the Musk-deer, the premolars, and those that represent them among the milk series, assume a trenchant form, and have a more or less developed additional cusp both before and behind; this little cusp also shows itself upon the anterior extremity of the penultimate upper milk tooth, which, as well as the last one, has the bipartite form of a true molar, and therefore by this combination of characters may be recognised if found alone. In most Ruminants the cusp is very small, and when worn down shows itself merely as a thickening of the anterior border of the crown. This tooth, however, also presents us occasionally with a zoological character in the development or non-development of the internal tubercle of the anterior pair; it is absent in the Hog; in the Peccary (who seems loath to relinquish any of the full number of cusps that nature can allow him) it is present; the *Moschidæ* are the only true Ruminants in which I have found it wanting; this seems to characterize the family, and together with the trenchant character of the premolars in the *Meminna* and *Hyeomoschus*, seems to associate with them the genera *Dichobune*, *Dichodon*, and *Cainotherium*†.

* The singular variety in this respect noticed by Prof. Owen in the Giraffe, must detract somewhat from the value of the character; but as the absence of the gall-bladder seems to be the rule in this animal, it strengthens, so far as it can avail, the idea of Cervine affinity.

† In the true *Moschus* the premolars have much the same form as in the generality of Ruminants; the incisors are uniform and nearly equal in size, and the auditory bulla is small: in the *Meminna*, and in those to which the generic name *Tragulus* has been applied (which I can see no reason for separating from it), the last upper premolar alone is bicuspid, the other two and all the lower ones being trenchant; the two median incisors are expanded, the others narrowed and curved outwards to make room for them, and the auditory bulla swollen: *Hyeomoschus* only differs from these in the penultimate upper premolar, which though trenchant is short, and when worn down has the appearance of being simply conical.

This characteristic form of the penultimate upper milk tooth, namely the want of the inner crescent of the anterior pair, with the presence of the additional cusp in front, plainly marks as this tooth, that which Prof. Owen has indicated as the penultimate premolar in his recently discovered genus *Hyopotamus*, and as the *last* premolar in his also newly-described genus *Dichodon*; the tooth behind it in each case being the last milk tooth, which always agrees exactly with the true molars, but is distinguishable from them by its suddenly diminished size. The series of upper molars of the latter animal have been placed, in the published figure, to the extent of one tooth too far back; were they brought forward to their true position, the tripartite tooth below, which, according to all laws of form and succession, can be no other than the last milk molar, (of which the successor has not begun to appear,) would antagonize by its anterior pair of crescents with the space in front of the posterior pair in the penultimate milk tooth above. Of the *Hyopotamus Vectianus*, the figure represents a series of the crowns of five upper molars, of which the first is, as I have before observed, manifestly a penultimate milk tooth. These being represented without any appended portion of jaw, and no mention being made in the text as to whether they were found connected, it seems rather probable that such was not the case, and in the side view roots are added in outline to certain of the teeth and not to others, which makes that matter still more doubtful. At all events, this condition of things could not possibly have co-existed with that represented in the lower jaw attributed to the same species; since in the upper series of teeth we may count ten principal transverse eminences, while in the lower series of five molars, which ought to fit them, there are only eight depressions: besides which, it is impossible that the elevated summits presented by the trenchant lower premolars, with the correspondingly deep notch which their interval affords, could ever fit the comparatively diminutive elevations and depressions presented by the foremost teeth above. The lower true molars, however, show a much more worn condition than the upper ones; but even if it should be possible that the series of upper molars represented were in place and in use at the same time, it is evident that the foremost of them cannot be premolars*.

* I do not claim to be the sole discoverer of these incongruities (apparently the results of a too hasty determination), since I am aware that the true nature of the tripartite inferior tooth in the *Dichodon* has been perceived by some eminent comparative anatomists and naturalists; but I am here compelled to attempt their refutation, since, were Prof. Owen's determinations in these instances correct, insuperable objections would be presented to my generalizations on the character of the premolars as distinguishing the two groups of Ungulate Mammalia, and on that of the penultimate upper milk tooth as indicative both of its position in the series, and of the affinities of certain genera.

That the character of the penultimate upper milk tooth was appreciated by Cuvier, will appear from a passage in the 'Ossemens Fossiles,' although it is rather vaguely and not quite correctly described. In speaking of a fragment of the upper jaw of a deer from the breccia at Nice, he observes: "On reconnoit aisément la seconde de lait pour ce qu'elle est, à sa forme allongée, à ses trois paires de croissans, et à son appendice transverse placé avant les croissans."—*Deux* "paires de croissans" would have been more correct. The possibility of an error in relation

Having now summed up as much of my series of observations with regard to the Artiodactyle division as I think it at present expedient to offer, I proceed to consider the Perissodactyle group. I observe that Prof. Owen separates the Proboscidea as a third group, to which he seems to assign a rank equivalent to that of the other two, and passes the *Deinotherium* and the *Toxodon*, as well as the "Sirenoïd" forms, with some remarks which do not assign to them any very definite location. There will always be room for difference of opinion as to the rank that should be assigned to a group, even when its limits are fully recognised; since, as I have elsewhere endeavoured to show*, "granting affinities and even groups to be natural, the limits assigned to those degrees of difference and similarity which we are wont to indicate by definite terms are not;" but it seems to me, that although these more aberrant groups of Ungulata possess several peculiarities which are entirely their own, they do not differ from the Perissodactyla in essential characters to the same degree as the latter do from the Artiodactyla, while in certain respects they agree among themselves, as though they would constitute a second subdivision of the Perissodactyla again divisible into strongly marked families. Among the characters which I have brought forward, we find that the Proboscidea, the Sirenia, and the singular fossil genus *Toxodon*, agree with the more typical Perissodactyla in the depth of the intermaxillary bone and the vertical implantation of the incisors, in the absence of the supraorbital foramen, of the fossa and pit within the orbit, and of a strongly marked pterygoid ridge, in the character of the zygoma, except that in the Proboscidea there is no descending post-articular process; in the narrowing anteriorly, and rounded sides of the basioccipital bone, and in the resemblance between the anterior and posterior molars. They differ from the typical Perissodactyla and agree among themselves, in the upward direction of the nasal opening, the large size of the infraorbital foramen, the lengthening of the bony palate, with the comparative narrowing of the posterior nares, in the short antero-posterior extent and the transverse thickening of the pterygoid processes, and in the considerable angle formed between the basioccipital and basisphenoid bones (least marked in the Manatee), the latter being inclined upwards, of course with reference to the upward direction of the nasal canal. Points of resem-

to the upper molars of the *Dichodon* seems to have crossed the mind of Prof. De Blainville, for in a recent number of the 'Ostéographie,' after describing the dentition of the lower jaw in that animal, he proceeds: "D'après ce qui vient d'être dit du système dentaire de cette mandibule, on voit qu'il est incomplet par l'absence de la dernière molaire non encore sortie; mais ne doit-il pas en être de même pour la série d'en haut, si les deux pièces proviennent du même individu? Alors il faudrait admettre qu'au lieu de deux, il ne manquerait qu'une seule avant-molaire, ce qui paraît peu probable."

With regard to the *Hypotamus Vectianus*, M. De Blainville seems to doubt a little that the upper and lower jaw really belong to each other, but refrains from a decided judgement, not yet being acquainted, as he observes, with any principle that can direct the mind in the question of the relation of two parts of the dental system to each other. He inadvertently calls this species "*annectens*," the name given by Prof. Owen to his *Paloptotherium*.

* Essay on Classification, 'Zoologist' for December 1847.

blance and of difference no doubt may be traced through the entire structure; as, for instance, the femur of the Proboscidea, although it wants the third trochanter, so characteristic of the more typical Perissodactyla, resembles the corresponding bone in that group in the characters of the posterior side of its upper part.

If it be admitted that this assemblage of singularly modified forms have sufficient resemblance to form a group which shall, with the more typical Perissodactyla, constitute two divisions, about equal in rank to the two divisions of the Artiodactyla, there cannot be much difference in opinion as to the manner in which this group should be subdivided into families. The Proboscidea stand forth as one (*Elephantidae*), and the Sirenia as another (*Manatidae*); while the *Toxodon*, which in its most essential characters seems to agree with both, and in some points with each, has so many peculiarities of its own, that it appears entitled to rank as a distinct family of itself, which should be placed between the other two, not as a "connecting link," which its marked differences from either must forbid, and which if it were, it would but annihilate the distinction that exists.

It seems time that naturalists should have decided what it is that constitutes an affinity; whether a form can really be allied to several widely-different groups. We may naturally expect to find, that amidst the varied forms each part assumes, a character which is the rule among the members of one group may be the exception in another, without of necessity supposing that a species presenting such a character can truly belong to both, and thus tend to destroy the difference of the original models on which the two groups are organized. In the present case, notwithstanding the peculiarities of structure mentioned as connecting the *Toxodon* with the Rodentia, its renowned describer, even while strengthening the idea of that affinity by adverting to Cuvier's assertion that the Elephants approach the same order, yet places it, apparently without a doubt, among the Ungulata, to which it obviously belongs. Although Cuvier affirms, that if all the parts of the head of the Elephant be compared successively with those of other animals, it is almost always among the Rodentia that their analogies will be found, he alludes only to three parts as indicating any such affinity. The relative size of the incisors and their alveoli can signify but little when their widely different structure is considered; and he correctly tells us why the infraorbital foramen is large in both: the character of the os malæ is common to the Bats and Insectivora as well as the Rodentia, and seems to be a frequent concomitant of a degree of organization comparatively low. The direction of the incisors in the *Toxodon* differs very little from that which we find in many of the typical Perissodactyla, and the absence of roots is simply a physiological adaptation, and an indubitable proof that the detrition to which they were subjected was considerable; while on the other hand, the whole structure of the cranium is on the ungulate type, especially different from the Capybara and the forms allied to it, whose skulls present so many striking characters, that if any resemblance really did exist, an anatomist to whom they were familiar would certainly perceive it at a glance.

It is a matter of considerable regret to me, that before concluding my notice of the Perissodactyla, I am again compelled to differ from that high authority to whom we owe so much, and in whose footsteps I may here be said, as it were, to follow. Although I am prepared to show that the evidence of the teeth, on which Prof. Owen decided the place of his genus *Hyracotherium*, is not so strong as it may appear; yet, on the other hand, their resemblance to those of the group to which I must transfer it is not so striking as to have caused me in the least to doubt the correctness of the place assigned to it, until I was well satisfied of the value of the cranial characters which I have pointed out. Although the true molars resemble those of the *Chæropotamus* and other non-ruminant Artiodactyla in the tubercular form of the four principal eminences, and in having the ridge surrounding the base more complete than is usual in the Perissodactyla, yet to make the resemblance good, they should have, in addition to the two smaller tubercles, the one in the front, the other in the middle of the tooth, a third one behind; and the fact is well worthy of attention, that each of these secondary tubercles is placed upon the angle of a bent ridge which connects the pair of larger ones immediately behind it, and which in the smaller species (*Hyracotherium Cuniculus*) exists, while the little tubercle itself is wanting; thus showing that the ridge is a more essential part of the tooth than the tubercle developed upon it; and this ridge just marks out in a rudimental way the bent transverse ridges in the Rhinoceros, Tapir, Palæotherium, and other allied genera. The two last premolars differ from the true molars only in the non-development of the inner tubercle of the posterior pair, but of which a slight rudiment is still traceable; and the sudden change of form between these teeth and the two first is met with in no other genus, either of the Artiodactyle or Perissodactyle group. This would be perfectly in accordance with law, if the third and fourth molars belonged to the milk series, and the animal were Artiodactyle; but the whole series has the appearance of adult completeness, and neither the form nor the degree of wear of these teeth at all indicates such to be their nature;—indeed Prof. Owen himself never once hints at such an idea. To whichever group, then, this little animal be referred, the teeth will present marked exceptional characters, and therefore it becomes more necessary to seek for further evidence. I was first led to suspect a Perissodactyle affinity, through observing, by the figures and description published in Prof. Owen's very useful work on the British Fossil Mammalia, that the nasal bones exhibit the character of this group in a very decided manner, and that the supraorbital foramen and groove are entirely wanting. This induced me to examine with care the unique specimen in the Museum of the College of Surgeons, and I thus confirmed these characters, and also found that the mark indicating the origin of the obliquus inferior oculi is but a slight depression, not more marked than I have seen it in some skulls of Rhinoceros and Hyrax, and not placed in a fossa, but simply upon the general uniform concavity. Although the posterior portion of the skull is entirely lost, yet enough remains to show that there was but a slight

difference of level between the base of the cranium and the palate ; and to the inner side of the posterior molars there is just sufficient of the matrix removed to show a slightly raised curved line whose place is about that which the edge of the posterior nasal opening should occupy, if the animal be organized upon the true Perissodactyle type. A further confirmation is afforded by the distinct appearance of a groove, whose broken edges testify the loss of the little piece with which the alisphenoid canal should be enclosed ; so in the only fragment we possess every character that remains agrees, to help us through the difficulty in which the ambiguous dentition leaves us.

May I be permitted to express the hope, that before forming a decided judgement on these matters, naturalists will carefully investigate for themselves ; recollecting, that so long as man is not infallible, the continued progress of research must with new discoveries find something to be corrected in that which has been done before ? but whatever be the judgement on these points of difference, I trust that doubts will cease as to the truth of the original idea, which nought but error hindered from being sooner developed ; and that one important step may thus be gained towards that correct appreciation of the comparative value of groups, which we must attain throughout organic nature, before further generalizations can safely be attempted.

I will conclude by giving a list of genera arranged as I should now propose ; the characters of the groups, although many remain to be discovered, are already too numerous to be again repeated, and I only include such genera of which I have been able to examine skulls ; or in the case of fossils, of which actual specimens, casts, or well-authenticated figures of some characteristic portion of the skeleton have come within my observation.

ARTIODACTYLA.

RUMINANTIA.

Merycopotamus.
Chalicotherium*.

Bovidae.

Sivatherium.

—

Bos.

Ovis.

Capra.

Antelope, and several of the genera into which these have been dismembered.

NON-RUMINANTIA.

Hippopotamidæ.

Hippopotamina.

Hippopotamus.

Hyopotamus.

Anthracotheium.

Chæropotamus.

Adapis.

Dicotylina.

Dicotyles.

* Of these two genera I have not yet sufficient evidence to determine the family.

RUMINANTIA.

*Cervidæ.**Cervina.*

Cervus, and various sub-
genera.

Camelopardalina.

Camelopardalis.

*Moschidæ.**Moschina.*

Moschus.

Meminna.

Hyeomoschus.

Dorcatherium.

Dichobunina.

Cainotherium.

Dichodon.

Dichobune.

Xiphodon.

*Camelidæ.**Anoplotheriana.*

Anoplotherium.

Camelina.

Llama.

Camelus.

NON-RUMINANTIA.

Suidæ.

Sus.

Hippohyus.

Babirussa.

Phascochærus.

PERISSODACTYLA.

TYPICA.

*Rhinocerotidæ.**Equina.*

Equus.

Rhinocerotina.

Macrauchenia.

Nesodon.

Rhinoceros.

Acerotherium.

Elasmotherium.

Hyrax.

Palæotherium.

Paloplotherium.

Tapirus.

Lophiodon.

Coryphodon.

Hyracotherium.

ABERRANTIA.

Elephantidæ.

Deinotherium.

Mastodon.

Elephas.

Toxodontidæ.

Toxodon.

Manatidæ.

Halicore.

Manatus.

4. MONOGRAPH OF THE RECENT SPECIES OF TRIGONIA, INCLUDING THE DESCRIPTION OF A NEW SPECIES FROM THE COLLECTION OF H. CUMING, ESQ. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. III.)

TRIGONIA, Bruguière.

Testa æquivalvis, inæquilateralis, transversa, trigona, interdum suborbicularis; dentes cardinales oblongi, lateraliter compressi, divaricati; duo in valvâ alterâ, utroque latere transversim sulcati; quatuor in alterâ, uno tantum latere sulcati; ligamentum externum, crassum, marginale; impressiones musculares duæ.

Shell equivalve, mostly inequilateral, transverse, rather triangular, sometimes suborbicular; cardinal teeth oblong, laterally compressed, divaricated, two in one valve transversely grooved on both sides, four in the other grooved on one side only; ligament external, thick, rather short, marginal; muscular impressions two, distinct, lateral; palléal impression very nearly entire.

TRIGONIA MARGARITACEA, Lamarck. *T. testâ suborbiculatâ, radiatim costatâ, intus margaritaceâ, costis elevatis, verrucosis, subasperis; margine plicato.*

Shell rather compressed, with 20 or 23 rather narrow, nodulose, radiating ribs; the hinder ribs very compressed, all excepting the front ribs wide apart.

Hab. Van Diemen's Land; *Ronald Gunn, Esq.* (Mus. Cum.)

Trigonia margaritacea, Lamarck, Ann. du Mus. tom. iv. p. 355. pl. 67. fig. 2.

T. pectinata, Lamk.

TRIGONIA LAMARCKII, Gray. *T. testâ subventricosâ, solidâ, costis 20-26 angustatis planiusculis nodulosis radiantibus, costis areæ posticæ confertis angustatis, costis omnibus confertis nodulosis.*

Hab. in Novâ Hollandiâ.

Shell rather ventricose, solid, with 20 to 26 narrow, flat-topped, nodulose radiating ribs; the ribs of the hinder slope narrow, rather crowded; ribs convex, all close together and nodulose.

Hab. New Holland, Port Jackson; *Mr. Stutchbury.* (Mus. Cum.)

Varies, with the inside white, salmon-coloured, yellow, or purple bronze.

Trigonia Lamarckii, Gray, Annals of Nat. Hist. 1838, p. 482.

TRIGONIA JUKESII, A. Adams, n. sp. *T. testâ ovato-trigond, posticè truncatâ, margine sinuato, radiatim costatâ, costis circa 20-24, elevatis, tuberculato-nodosis, tuberculis rotundatis, obtusis, margine ventrali valdè pectinato.*

(Mollusca, Pl. III. figs. 4, 5, 6.)

Shell ovately trigonal, posteriorly truncated, the margin sinuated,

radiately ribbed; ribs about 20-24, elevated, tubercularly nodose; tubercles rounded, obtuse, ventral margin strongly pectinated.

Hab. Cape York, 6 fathoms; *J. Jukes, Esq.* (Mus. Cuming.)

5. ON A NEW GENUS OF PHOLADIDÆ, WITH NOTICES OF SEVERAL NEW SPECIES AND OF A REMARKABLE SPECIMEN OF PHOLAS CALVA IN MR. CUMING'S COLLECTION. BY G. B. SOWERBY, JUN., F.L.S.

(Mollusca, Pl. V.)

Among the species of *Pholades* there are various modifications of structure, particularly with regard to the form, position and number of the accessory valves, and the test enclosing the anterior hiatus of the shell in some species, which are very interesting and important, and have given rise to various proposals for the division of the species into distinct genera. The propriety or otherwise of such divisions it is scarcely worth while to argue about, as it is after all a mere question of convenience, whether such modifications should be expressed by arranging the species in so many genera of a family, or so many subdivisions of a genus. It will be sufficient for my present purpose to remark, that there is one character in which the *Pholades*, whether open or closed, with or without accessory valves, cup-bearing or tube-forming, all agree, and that is, in the curved processes commencing under the hinges inside the shell. In the genus now to be described these are wanting, and this fact removes the hesitation which might have been felt in attempting to establish a generic distinction from the other characters, however well-marked and interesting.

Genus TRIOMPHALIA*.

Char. Gen.—Molluscum acephalum terebrans. Testa bivalvis, ætate juniore hians, ætate maturâ clausa. Valvæ inæquales; utraq̃ue anticè laminâ testacêâ inflatâ ad marginem ventralem affixâ, internè cardine unidentato, sine processu subcardinali. Valva dextra posticè alteram longitudine superans. Valva sinistra alteram involvens, ad dorsum nucleo quasi-umbonali incipiens.

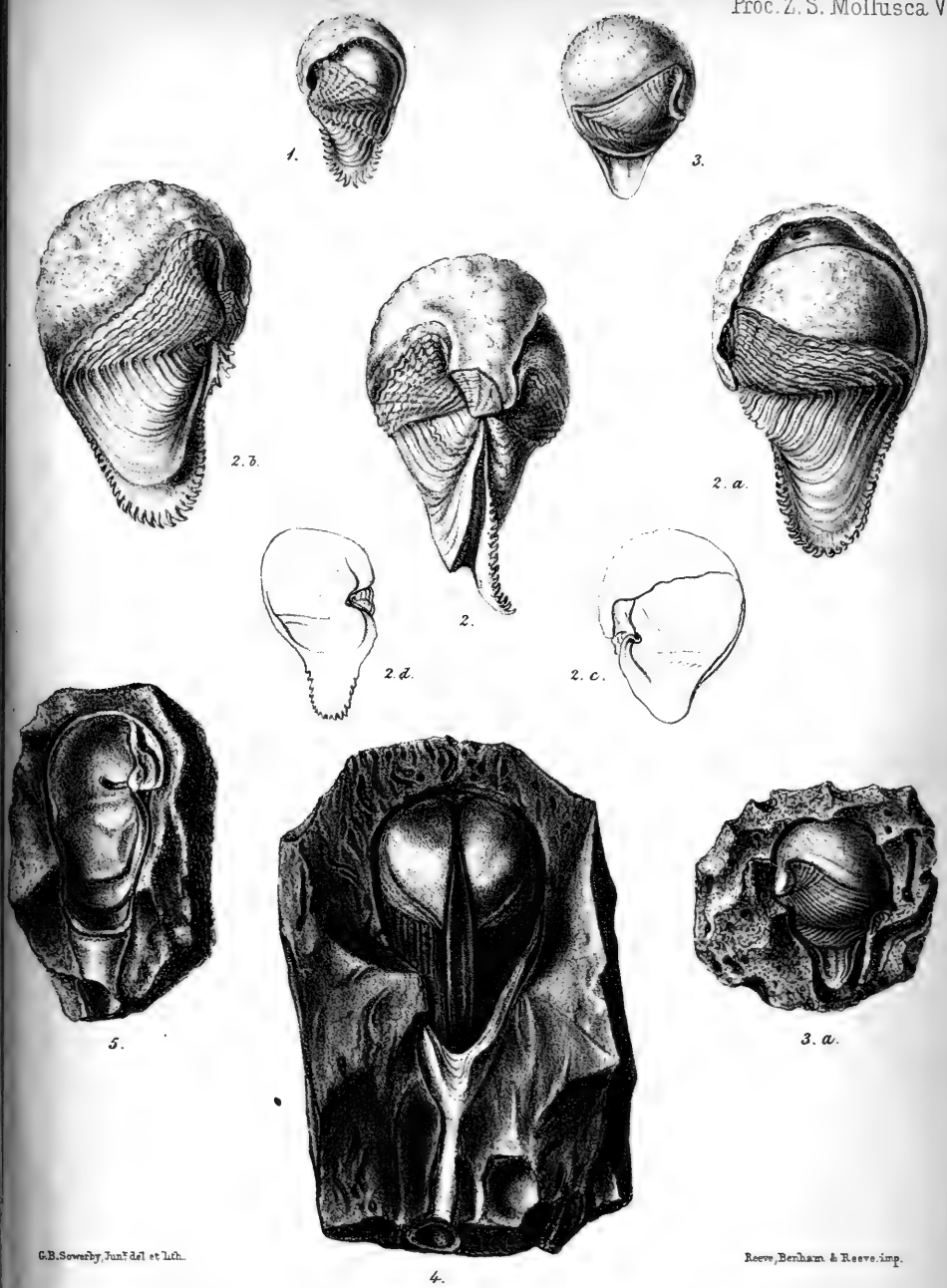
The shells of this genus, when mature, have the ventral hiatus closed by an expanded test fixed to the edge of each valve; that of the left valve commences at the back, in a nucleus resembling an extra umbo, and in front overwrapping that of the other. The right valve, on the other hand, materially exceeds in length, at the posterior extremity, the other valve, which terminates very abruptly. The hinge is without sub-umbonal processes, but has an obtuse tooth on the hinge in each valve.

The name is taken from the nucleus of the covering-test in the right valve, which forms, as it were, a third umbo. The typical species is the *Pholas globosa* of Quoy.

TRIOMPHALIA GLOBOSA, Pl. V. f. 1. (*Pholas globosa*, Quoy.)

Tr. testâ subovali, posticè subattenuatâ, anticè globosâ; valvis transversè dimidiatis, parte posticâ concentricè lyratâ; in medio

* Τρεῖς, tres; ὀμφαλὸς, umbo.



G.B. Sowerby, Jun' del et Lith.

Reeve, Benham & Reeve, imp.

1. TRIOMPHALIA GLOBOSA, 2 2a. 2b TR. PULCHERRIMA, 2c. 2d inside of valves of the same, 3. 3a. TR. CUMINGII, 4. PHOLAS CALVA, *in situ*, with a stony tube; 5, PHOLAS TUBIFER, *in situ*, with shelly tube.



costâ imbricatâ unicâ, parte anticâ lyratâ, radiatim costis acutè imbricatis ornatâ: valvâ dextrâ productâ sublinguiformi, dentibus acutis recurvis serratâ: nucleo laminæ terminalis valvæ sinistræ triangulari, striatâ, subcomplanatâ.

Found in soft stone, at half-tide. Island of Leyte; Cuming.

TRIOMPHALIA PULCHERRIMA, Pl. V. f. 2, 2 a, b, c, d. *Tr. testâ subovali ventricosâ, anticè globosâ, corrugatâ, anticè subattenuatâ; valvis transversè dimidiatis, parte posticâ costis distantibus concentricè lyratâ, parte anticâ lineis lyratâ, margine dentibus acutis crispatis serratâ: nucleo laminæ terminalis valvæ sinistræ subtriangulari, rotundo, lineis elevatis lyrato.*

This species is much larger than *Tr. globosa*, the ventral covering much more rough and inflated, the concentric ribs on the posterior part of the valves more strongly defined, and not crossed by the oblique row of raised points which is seen in the former species.

Found in soft stone at low water at West Colombia; Cuming.

TRIOMPHALIA CUMINGII, Pl. V. f. 3, 3 a. *Tr. testâ rotundâ, crassâ; valvis posticè canali divisâ, concentricè lineis elevatis lyratis, anticè costis minutis serratis radiatis; parte posticâ concentricè laminatâ; valvâ dextrâ posticè in linguam triangularem margine triplicatam productâ; valvâ sinistrâ posticè brevissimâ margine terminali circulari.*

This shell would be completely spherical but for the linguiform extension of the right valve. The left valve terminates in a circular margin, where the rounded part of the right valve meets it.

Found in coral rock at low water. Isle of Zebu, Philippines; Cuming.

The following new species of *Pholas* will be figured and described in the forthcoming number of my 'Thesaurus Conchyliorum':—

1. **PHOLAS LAQUEATA**, Thes. Conch. Pl. CIII. f. 19, 20.
2. **PH. MANILLÆ**. Thes. Conch. Pl. CIII. f. 17, 18.
3. **PH. FRAGILIS**, Thes. Conch. Pl. CVIII. f. 92, 93.
4. **PH. CONSTRICTA**, Thes. Conch. Pl. CIV. f. 27, 28.
5. **PH. TEREDINIFORMIS**. *Ph. testâ globosâ, apertâ, in medio divisâ; anticè margine ventrali subangulatâ, costis laqueatis concentricis ornatâ; posticè brevi, lævigatâ; laminâ dorsali und subquadratâ super marginem reflexam testæ positâ.*

Although short, and with an angular opening, like the species of the genus *Xylophaga*, this species and the following have the curved subcardinal processes which are characteristic of the true *Pholades*, and are not found in *Xylophagæ*.

Found in cakes of floating wax on the coast of Cuba.

6. **PH. APERTA**, Thes. Conch. Pl. CVIII. f. 99, 100.
7. **PH. INCII**, Thes. Conch. Pl. CV. f. 45, 46.

This differs from the great Californian species in the characters of No. CC.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

the dorsal side of the anterior part, which is finely striated in both directions; in the epidermidal laminæ, which are beautifully serrated; and in the integumental covering of the dorsal edge, which is divided into four parts.

Collected by Capt. Ince, R.N., in coral rocks at Rain Island, Torres Straits.

8. PH. MULTISTRIATA, Thes. Conch. Pl. CIV. f. 35, 36.

9. PH. LATISSIMA. *Ph. testâ subquadrata, subcompressâ, apertâ, anticè angulatâ posticè truncatâ; costis moniliferis radiatis et lineis concentricis cancellatâ; umbonibus subcentralibus margine dorsali reflexo.*

A wide, rather flat shell, widely gaping in front, and truncated at the posterior extremity, with radiating ribs forming knots on the raised lines of growth. It appears to be without accessory valves.

Taken in Manilla Bay; Cuming.

10. PH. SPATHULATA. *Ph. testâ elongatâ, clausâ, obliquè divisâ; parte anticâ radiatim costatâ subangulatâ; parte posticâ concentricè leviter striatâ, subtruncatâ, ad margines integumente protectâ, ad terminus in cyatho-corneo, lateribus spathuliformibus, productâ: ad umbones laminis duabus æqualibus posticè bilobatis, anticè elongatis.*

From New Zealand.

PHOLAS CALVA (Sowerby, Proc. Zool. Soc. 1834), Pl. V. f. 4.

I wish to call the attention of the Meeting to a remarkable specimen of *Ph. calva in situ*, which may be considered as bearing, in some degree, upon the boring question in a manner somewhat unfavourable to the 'rasping' theory. In this specimen the animal has lined the anterior narrow end of its hole with a thick laminated tube, formed not of shelly matter, as in the case of *Pholas tubifer*, of which I figure a specimen *in situ*, but of the same material as the stone in which it has burrowed, and bearing every appearance of a reformation of its substance by precipitation, after having been dissolved by a chemical agent. The structure is far too fine to have been formed from any *débris* which could be the result of merely mechanical action.

The specimen of *Ph. tubifer*, Pl. V. fig. 5, in my father's collection, shows in a remarkable manner the fitting of the hole to the shape of the shell, which is not symmetrical, and could not turn in the slightest degree.

December 11, 1849.

R. C. Griffith, Esq., in the Chair.

The Secretary stated that he had the pleasure of announcing the probability of the Society's success in an object to which he had devoted a considerable share of his attention, which the Council had frequently considered, and towards which all previous efforts had been rendered fruitless by the magnitude of the difficulties by which it is surrounded. He then proceeded to read the following extracts from a letter addressed to him by the Hon. C. A. Murray, dated Cairo, Nov. 16, 1849:—

"It is with the greatest satisfaction that I communicate to you the intelligence that I have succeeded in obtaining for the Society a live HIPPOPOTAMUS! It is now in a yard at the back of my house, and apparently in perfect health; you cannot be more anxious than I am that I may be able to keep it through the winter and send it to you safe in spring. It is only five or six months old *, and still lives entirely on milk; I think a fresh importation of cows will be necessary in Cairo, as our little monster takes about thirty quarts of milk daily for his share already. H. H. Abbas Pasha has been most liberal in having the animal brought here at his own expense from the White Nile. A lieutenant and a party of ten Nubian soldiers formed his escort; a boat was built on purpose for him; and the viceroy sent him to my house in charge of the chief officer of his palace. I may also mention that by H. H. orders, another officer with a party of soldiers is still out on the White Nile, charged with the duty of securing a young female for us, so that I am not without hope of sending you the pair together."

Five days afterwards, on the 21st of November, Mr. Murray writes:—

"The Hippopotamus is quite well, and the delight of every one who sees him. He is as tame and playful as a Newfoundland puppy; knows his keepers, and follows them all over the courtyard; in short, if he continues gentle and intelligent as he promises to be, he will be the most attractive object ever seen in our Garden, and may be taught all the tricks usually performed by the elephant."

In addition to the preceding correspondence, the Secretary stated that he had received a most interesting letter from Mr. Duncan, the well-known African traveller, now bearing the appointment of H. M. Vice-Consul at Whydah. The letter was dated from the British fort, and dated Sept. 14, 1849:—

"I have the honour to inform you that I started from Whydah on the 24th of August, and arrived at Abamey, the capital of the kingdom of Dahomey, on the 30th, when I and my friends met with a very cordial reception. I was allowed two days to prepare the presents sent by the British government to the king of this country.

* Mammalia, Pl. XIV.

On the 2nd of September we delivered these presents, and also the pea-fowls sent by the Zoological Society. On the following day I was honoured by an interview with the king, who received me in the same cordial manner as before. I read to him your letter, which was interpreted as I read: he is much pleased with the birds, which were turned out and fed in his presence. I explained to him the reason of their being without tails, and showed him a picture of the bird in full plumage. He asked a great many questions respecting the Society, and requested me to read over a number of members' names from the list with which you furnished me. As soon as I mentioned Lord Palmerston's name, the king readily recognised it.

"In reply to your letter, the king promises to catch you elephants, and he suggested to me that it is always necessary to kill the old one to secure the young. He says that his female soldiers have caught many, but never kept them alive. If they are bound with ropes they surely die: the king thinks the only way to secure one is to have a large cage made, of great strength, and carried to the immediate vicinity of the elephants' track, so that the young elephant may be placed in it as soon as captured, and at once conveyed to Whydah.

"I have asked for several other animals, which have also been promised to me. I am, thank God, in excellent health, as well as my companions."

The following papers were read:—

1. DESCRIPTION OF A NEW GENUS AND SEVERAL NEW SPECIES OF TERRESTRIAL, FLUVIATILE AND MARINE MOLLUSCOUS ANIMALS INHABITING NEW ZEALAND. BY J. E. GRAY, ESQ., F.R.S., PRESIDENT OF THE BOTANICAL SOCIETY, ETC.

Major Greenwood has most kindly transmitted to me, for the Museum Collection, a number of small species of terrestrial and fluviatile Mollusca which he had collected near Auckland in New Zealand.

I hasten to lay before the Society a description of those which were not noticed in the Faunula attached to Dr. Dieffenbach's Travels.

1. ARDONIDÆ.

1. NANINA? KIVI, *Gray, Fauna N. Z.* 262. n. 220.
Hab. Auckland; *Major Greenwood.*

2. NANINA MARIE, *Gray, Fauna N. Z.* 262. n. 221.
Hab. Auckland; *Major Greenwood.*

These species were each described from a single specimen; Major Greenwood has sent one of the former and several of the latter, of different ages, and they prove very distinct and well-marked species.

3. NANINA? CELINDE.

Shell rather depressed, pale brown; spire subconic; whorls five, rather closely adpressed, with transverse membranaceous ridges, the last slightly keeled, convex in front; axis with a narrow deep perfo-

ration ; peristome with a very slightly thickened internal submarginal rib. Diam. 2 lines.

Hab. Auckland.

4. NANINA ERIGONE.

Shell trochiform, pellucid, brown-spotted ; spire conical, as high as broad, apex blunt ; whorls rather convex, very slightly concentrically wrinkled, brown, cross-banded, last rounded, evenly convex in front, axis with a narrow deep perforation ; peristome rather reflexed near the axis. Diam. $\frac{1}{2}$ th of an inch.

Hab. Auckland, New Zealand ; *Major Greenwood.*

5. NANINA TULLIA.

Shell depressed, pellucid, whitish ; spire scarcely raised, with close-pressed, rather convex, transversely-grooved whorls, crossed with pale brown streaks ; the last whorl rounded, convex in front, and crossed with brown lines and distinct cross-grooves ; axis imperforated. Diam. $\frac{1}{3}$ th of an inch.

Hab. Auckland, New Zealand.

2. LIMACIDÆ.

1. *HELIX DUNNIE*, *Gray, Ann. Nat. Hist.* v. 317, 1841 ; *Fauna N. Z.* 247. n. 143. Named in honour of Mrs. Dunn, a relative of Mr. Joshua Alder, from whom I received the first land-shell from New Zealand.

2. *HELIX GREENWOODII.*

Shell rather depressed, largely umbilicated, pale brown, thin, pellucid, rugose ; spire slightly raised, outer whorl rounded, with three or four rather oblique ridges directed towards the front ; umbilicus very large, conical, wide, deep, the pillar side of the outer lip straight and high.

Hab. Auckland, New Zealand ; *Major Greenwood.*

This species is very like *Helix Dunnie* in size, colour and form, but the outer whorl is rounded, and with some very peculiar oblique ridges on the outer periphery ; the umbilicus is much larger ; the pillar-lip, as high as the confines of the umbilicus, is straight, and not arched, as in that species.

I have great pleasure in dedicating it to Major Greenwood, who has so kindly enabled me to add the above genus, and this and the following species, to the New Zealand Fauna.

3. *HELIX (CAROCOLLA) ZELANDIÆ*, *Gray, Faun. N. Z.* 247. n. 144 and 262.

Hab. Auckland.

4. *HELIX PORTIA.*

Shell rather depressed ; spire convex, rounded, pale brown ; whorls five or six, rather close-pressed, rather convex, crossed with close concentric laminal ridges, edged with elongated hairs, and marked with rather dark brown cross-bands ; last whorl rounded, convex in front ;

axis with a rather narrow deep umbilicus; mouth rather wide, peristome thin, slightly reflexed near the axis, and rather sinuous near the suture of the spire. Diam. $\frac{1}{3}$ rd of an inch.

Hab. Auckland; *Major Greenwood and Dr. Sinclair.*

5. HELIX IDE.

Shell depressed, pellucid, whitish, brown rayed; spire flat or rather sunk in the middle whorl, close-pressed, convex, with rather distant very slight spiral membranaceous ridges, and larger and more distinct membranaceous cross-ridges, fringed on the edge with hair-like elongations; last whorl rounded externally in front, slightly flattened near the axis; axis large, umbilicated, showing the volutions. Diam. $\frac{1}{4}$ of an inch.

Hab. Auckland.

6. HELIX (ZONITES) COMA, Gray, Fauna N. Z. 263. n. 224.

Hab. Auckland (abundant); *Major Greenwood.*

7. HELIX EGESTA.

Shell depressed, dark brown; spire scarcely raised, at length irregular and rather distorted; whorls subcylindrical, regularly and closely spirally grooved, with rather distant, thick, broad, membranous cross-ridges; last whorl subcylindrical, often twisted rather in front of the regular course, rounded externally and in front, and closely spirally grooved in front; axis widely umbilicated, showing all the whorls. Diam. $\frac{1}{6}$ th of an inch.

Hab. Auckland; *Dr. Sinclair and Major Greenwood.*

8. ZONITES CHIRON.

Shell depressed, dark olive-green, covered with a thick, polished periostraca, and crossed with rather sinuous, concentric, membranous ridges; spire rather convex, rounded; whorls rather convex, last spread out, rounded on the edge and convex in front; axis widely umbilicated, showing the lower whorls; mouth roundish, sublunate; peristome thin, outer lip rather expanded behind, and separated from the penultimate whorl by a slight notch. Diam. $\frac{1}{4}$ of an inch.

Hab. Auckland; *Major Greenwood.*

The upper surface resembles a miniature *Helix Busbyi*, but the under surface is very different.

9. ZONITES? CORESIA.

Shell depressed, dark olive-green, with brown cross-bands covered with a thick, smooth, polished periostraca; spire scarcely raised, rather convex; whorls convex, last expanded, rounded on the edge and in front; axis broadly umbilicated, showing all the whorls; mouth roundish, sublunate; peristome thin, with the periostraca inflexed when dry. Diam. $\frac{1}{6}$ th of an inch.

Hab. Auckland, New Zealand.

This shell is exactly like a very minute specimen of *Helix Busbyi*. It differs from the former, *Z. Chiron*, in being smaller, more depressed, and in the umbilicus being much wider, showing the front side of the upper whorls, which appear rather transverse.

10. *BULIMUS?* (*LAOMA*) *LEIMONIAS*.

Shell trochiform, polished, brown-spotted; spire conical, rather higher than broad, apex obtuse; whorls very slightly convex, polished, with one or two slightly sunk lines on the front half; last whorl with a distinct rib-like keel on the front edge; two spiral grooves on front half outer side; the side flattened with several small concentric grooves; axis minutely and deeply perforated; mouth square; peristome simple, slightly reflexed near the axis; the throat with three equal, well-marked spiral ridges, one on the outer side of the posterior, and another opposite to it on the outer side of the front lip, and one on the middle of the right side or outer edge of the last whorl. Diam. $\frac{1}{12}$ th of an inch.

Hab. Auckland; *Major Greenwood*.

I am inclined to regard this shell as the type of a particular subgenus of shell which may be characterized by the simple peristome, the perforated axis, the square mouth, and the spiral ridges in the throat; but I have only seen a single specimen, and it may be, though I regard it as very improbable, the young state of a *Pupa* or *Vertigo*. If it prove distinct, it may be called *Laoma*.

AURICULIDÆ?

ELASMATINA RECLUSIANA, *Petit, Proc. Zool. Soc.* 184 .

Hab. Auckland, New Zealand; *Major Greenwood*.

M. Petit described this specimen from the island of Opara in the South Seas.

CYCLOSTOMIDÆ.

REALIA EGÆA.

Shell ovate, pale brown, covered with a dull brown periostraca marked with elevated, transverse, membranaceous ridges rather fringed on the edge; apex rounded; whorls convex, rounded in front, and with a deep brown band round the axis; axis scarcely perforated; mouth ovate; peristome reflexed, sharp-edged, with a thin, sharp-edged, slightly-raised internal peristome. Length $2\frac{1}{2}$ lines.

Hab. Auckland, New Zealand.

CYCLOPHORUS CYTORA. *B3, 1953.*

Shell minute, trochiform, brown, closely and uniformly spirally striated and slightly concentrically wrinkled; apex subacute; spire conical, nearly as high as broad; whorls convex, the last rounded and convex in front; axis perforated; mouth subcircular; peristome scarcely reflexed, thickened internally; ? operculum horny, of a few rapidly enlarging whorls. Diam. $\frac{1}{16}$ th of an inch.

Hab. Auckland, New Zealand; *Major Greenwood*.

LYMNEADÆ.

PLANORBIS CORINNA.

Shell depressed, white, above flat, beneath rather concave; whorls convex, rounded.

Hab. Auckland, New Zealand.

This species is very like the European *P. albus*, but not spirally striated.

The most interesting of these shells is a new genus, which appears to belong to the family *Lymneadæ*, and allied to the genus *Ancylus*, but to be immediately distinguished from it by the shell possessing a thin lamina on the hinder edge of the cavity, most probably extended between the upper part of the body and the upper edge of the foot, as is the case in *Crepidula*. It is easily to be distinguished from the latter genus by the posterior plate having its edge bent suddenly down towards the base of the aperture and enlarged at the front part of the right side, and produced into a lobe having a groove between it and the inner surface of the right side of the shell. This character also separates it from *Navicella*.

The genus may be thus characterized:—

LATIA.

Shell half ovate, spiral, of one or two very rapidly enlarging whorls; spire very short, placed nearly in the centre rather on the left of the hinder edge; aperture very large, nearly occupying the whole of the shell, oblong, rather oblique; cavity simple, hinder edge with a thin, narrow, flat, horizontal lamina occupying the hinder and nearly half the length of the left side of the cavity; the left and hinder edge suddenly bent down towards the base of the shell, and produced into a rather broad expansion at the right side, leaving a rather broad space between it and the inner part of the right side of the aperture; periostraca thin, pale brown, spirally striated.

Animal.—Head with a short broad snout, rounded in front; tentacula two, short, triangular, the eyes on the outer side of their base; body subspiral; mantle submarginal, continued all round; edge simple; aperture of the respiratory cavity on the hinder part of the right side, protected on the inner side by the process of the lamina; upper part of the body subspiral, separate from the back of the foot and fitting into the upper cavity of the shell above the posterior plate; abductor muscle submarginal, horse-shoe-shaped?; foot oblong, rounded at each end.

The description of the animal is imperfect, being taken from a dried specimen softened by being soaked in a weak solution of caustic potash, and then placed in weak spirits.

This genus is evidently allied to *Ancylus*, but differs in the shell being more Nerite-like, and in the aperture of respiration being placed on the right side.

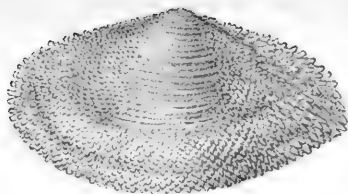
LATIA NERITOIDES.

Pale brown, spirally striated, internal lamina white, transparent.

Hab. Auckland, New Zealand.

Dr. Sinclair sent some specimens of this shell to the British Museum, with animals dried in them, in 1847, and Major Greenwood has kindly sent two additional specimens.





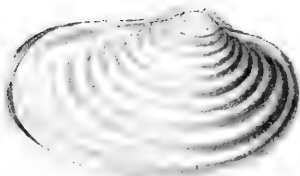
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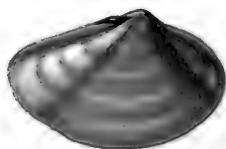
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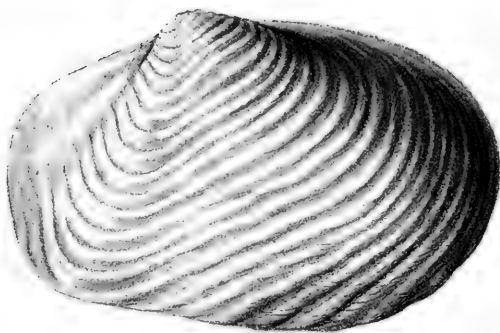
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Sowerby, Bel et lith.

Reeve Benham & Co

1. TELLINA SQUAMULOSA. 2.3. & 4. GEOMELANIA JAMAICENSIS.
5. PANOPEA JAPONICA. 6. SANGUINOLARIA TELLINOIDES.
7. THRACIA MAGNIFICA. Jonas.

LITTORINIDÆ.

Amnicola? *antipodarum*, Gray, *Fauna New Zeal.* 241. n. 101.
Auckland, New Zealand; *Major Greenwood.*

Amnicola? *Zelandiæ*, Gray, *Fauna New Zeal.* 241. n. 102.
Auckland, New Zealand; *Major Greenwood.*

Amnicola? n. sp.

A single specimen, not in a good state.

Auckland, New Zealand; *Major Greenwood.*

Major Greenwood also sent two specimens of a marine shell. He observes, that it was "entirely enveloped by the animal when alive." It proved a new species of *Lamellaria*.

LAMELLARIA OPHIONE.

Shell oblong, elongate, pellucid, white; spire very short, conical; whorls convex, last whorl very large, convex, rather iridescent; aperture ovate; pillar-lip curved, slightly reflexed.

Auckland, New Zealand.

2. ON THE ANIMAL OF GEOMELANIA. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

(Mollusca, Pl. VI. figs. 2, 3, 4.)

An examination of the animal of *Geomelania Jamaicensis*, Pfeiffer (which the kindness of Mr. Cuming has allowed me to make), shows it to belong to the family of Looping-Snails, *Truncatellidæ* of Gray; in fact, it differs in no respect from the animal of *Truncatella*.

The tentacles are short, conical and depressed, with the eyes large, black, and sessile on the middle of the upper surface of their base; the head terminates anteriorly in a broad, flattened bilobate proboscis, as long as the tentacles; and the foot is short, depressed, and divided by a deep groove from the head, bearing on its upper hind surface a horny, simple, thin, oval operculum, with the apex slightly spiral, and the nucleus subterminal. The order, which consists of the genera *Truncatella*, *Skenea*, *Geomelania*, and possibly *Acicula* and *Assimineæ*, differs from the *Cyclostomidæ* in the position of the eyes and the short depressed tentacles; and would seem to be placed most naturally between *Auriculidæ* and *Cyclostomidæ*. By means of *Rissoa* and *Hydrobia* it has also relations with *Littorinidæ*; *Truncatella* resembling the former and *Assimineæ* the latter genus. In habits they are amphibious.

3. DESCRIPTIONS OF NEW SPECIES OF SHELLS FROM THE CUMINGIAN COLLECTION. BY ARTHUR ADAMS, F.L.S.

1. TELLINA SQUAMULOSA. (Mollusca, Pl. VI. fig. 1.) *T. testâ transversâ, æquilaterali, albâ, concentricè in medio plicatâ, plicis angulatis subdistantibus, interstitiis longitudinaliter striatis; regionibus lateralibus squamulis spinosis, regione ventrali*

squamulis verrucosis obsitá; latere antico rotundato, postico subflexuoso rostrato; areá sulco impressá; margine ventrali convexo, posticè subflexuoso.

Hab. in littoribus Australiæ.

Shell transverse, equilateral, white, transversely concentrically plicated in the middle; plicæ rather wide apart and angulated; interstices longitudinally striated; ventral region and both extremities covered with scales, spinose at each end and wart-like in the middle.

Hab. Cape York, North Australia; collected by J. B. Jukes, Esq.

2. SANGUINOLARIA TELLINOIDES. (Mollusca, Pl. VI. fig. 6.)

S. testá transversá, inæquilaterá, utrinque hiante, rubiginosa, tenui, lævi, striis transversis concentricis radiatim lineolatá; latere antico latiore, rotundato; postico angustiore, rotundato, subrostrato; areá laterali lined latá impressá; margine ventrali convexo, posticè valdè sinuato.

Hab. in Sinu Californiæ.

Shell inequilateral, gaping at both ends, rubiginose, thin, smooth, with transverse concentric striæ and longitudinal fine radiating lines; anterior side the widest and rounded, posterior side narrowest, round and somewhat beaked; lateral area with a depression extending from the umbo to the ventral margin; ventral margin convex, strongly sinuated posteriorly.

Hab. Gulf of California.

3. PANOPEA JAPONICA, A. Adams. (Mollusca, Pl. VI. fig. 5.)

Pan. testá æquivalvi, transversá, lateribus inæqualiter hiante, inæquilaterá, utrinque rotundatá, albá, tenui, fragili, transversim concentricè plicatá, plicis subdistantibus rotundatis; latere antico breviorè, postico duplo ferè anticum superante; margine ventrali arcuato, integro.

Hab. Japoniam.

4. DESCRIPTION OF A NEW SPECIES OF THE GENUS THRACIA.

BY DR. JONAS. COMMUNICATED BY H. CUMING, ESQ.

THRACIA MAGNIFICA, Jonas. (Mollusca, Pl. VI. fig. 7.) *Th. testá ovato-oblongá, transversá, inæquivalvi, lacted; utrinque rotundatá; lateribus hiante; valvâ dextrâ ventricosiore et majore quam sinistrâ; latere antico flexuoso, posteriore brevi, obliquè carinato, transversim corrugato-plicatá, plicis subdistantibus concentricis longitudinaliter radiatim granulato-striatá, margine neutrali arcuato anticè subsinuato.*

Hab. — ?

5. NOTICE OF A HYBRID CROWNED-PIGEON, HATCHED IN THE MENAGERIE. BY D. W. MITCHELL, SEC. Z.S. ETC. ETC.

The habits of so singular a form as the Crowned-Pigeon possess an interest, which will, I believe, be a sufficient apology for my desire to make some record of the first instance of its successful nidification in

confinement. And I make the record of this particular instance with greater confidence, because the previous experience of the Society's Menagerie affords proof that the bird discovered by M. Steurs in Gillolo, and described in the Proceedings of 1844 under the name of *Goura Victoriae*, by Mr. L. Fraser, is not the female of *Goura coronata*, as has been suggested, but a true and distinct species.

The number of Crowned-Pigeons in possession of the Society having been reduced to a single female of *Goura Victoriae*, and a male of *Goura coronata*, they were placed, by my direction, in the same division of the old Aviary. In the beginning of June last it was observed that they had paired. About two months afterwards they began to make attempts at the construction of a nest. In the open part of the Aviary there was a large branch of a tree fixed transversely, as a perch, about six feet from the ground. They commenced their work by carrying up twigs and pieces of stick which had been purposely placed within their reach, to the extremity of the perch, and vainly endeavoured to fabricate a platform on this slippery and insufficient foundation. The careful keeper watched their difficulty, and supplied them with the necessary support by fixing there a flat piece of basket-work.

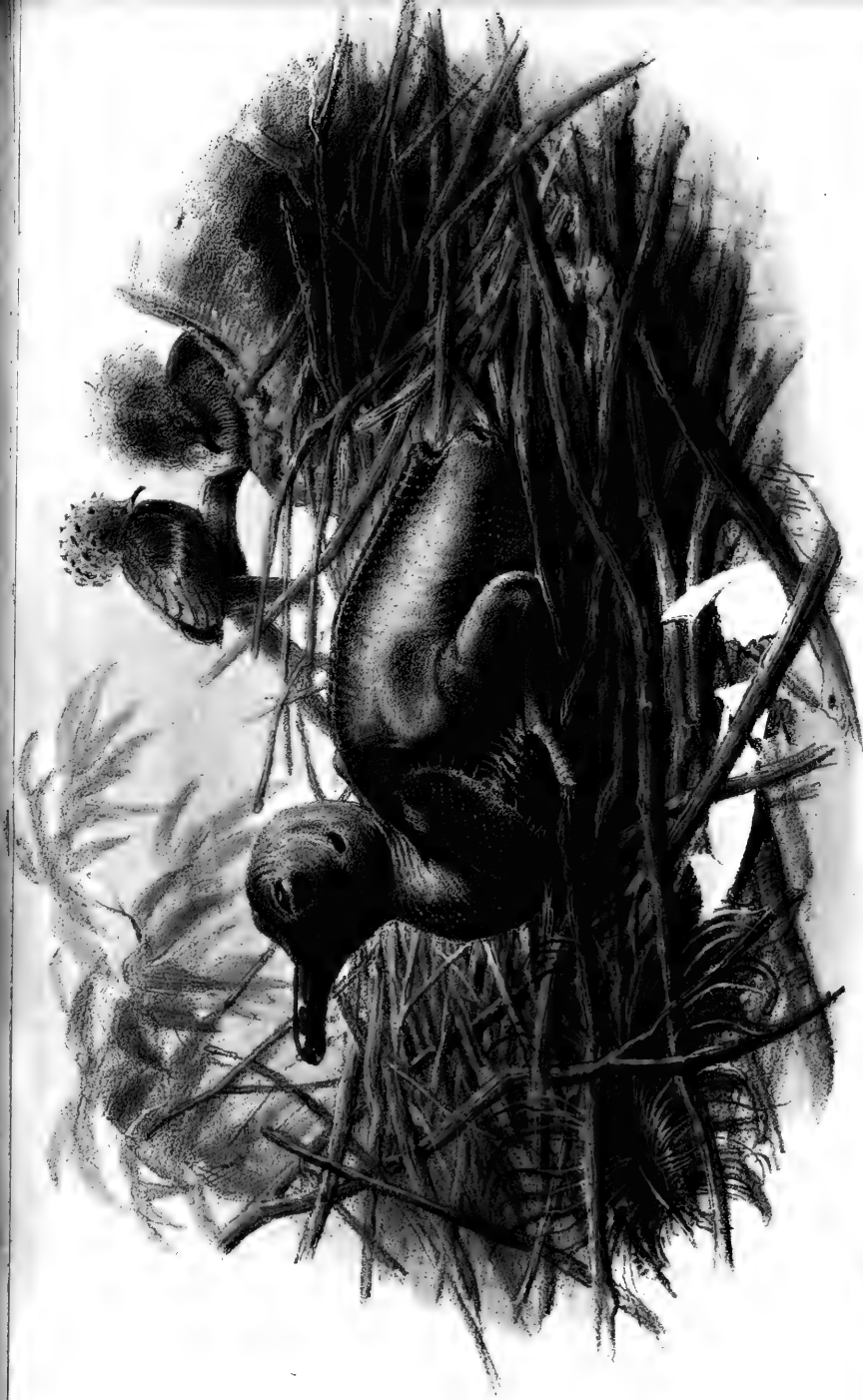
They now began in earnest, and on the 15th of August they ceased from their labor, during which the male had generally carried up the materials and the female disposed of them. On this eventful day it is supposed the single egg was laid, but it was so constantly covered by one or other of the birds, that the keeper did not get sight of it for some time afterwards. The nest was within a few feet of the front of the Aviary, which during the period of incubation was passed by many thousands of visitors: still so adroitly did the birds watch their opportunity, that I heard of no instance, except that in which the keeper saw the egg, in which they were discovered in the act of relieving each other. The exposed situation of the nest, which was very slightly protected by the thin foliage of a climbing rose, rendered me apprehensive of the effects of the weather on the young bird, which was hatched on the 13th of September. It was covered with constant assiduity by one or other of the parents, who fed it while beneath them. Whether from excess of care or from accident I know not, but it was found dead in the nest on the morning of the 17th, the mother still sitting there with unmoved constancy, and overshadowing the dead corpse with her warm breast, as if incredulous of her bereavement. Knowing the interest with which I regarded this Malasian child, my accomplished friend Mr. Wolf was kind enough to preserve its aspect in the characteristic sketch which forms the subject of the annexed engraving (*Aves*, Pl. XIII.).

On the 24th of October another egg was produced, but, having been dropped from a perch in the house, was found broken on the ground. These birds are still in admirable health, and I have hope that if they breed at an earlier period in the approaching season, they will have better fortune, and succeed in bringing their produce to maturity.

While upon this subject, I may perhaps not inappropriately advert

to another Columbine hybrid, of which two specimens exist in the Collection, the produce of *Ectopistes migratorius* ♂ and *Turtur risorius* ♀. They have neither the tail of *Ectopistes* nor the collar of *risorius*, and to any one who was ignorant of their origin, would present indubitable indications of at least specific distinction.

And I may also notice in this place a hybrid of an entirely different kind, which was deposited during the earlier part of this year in the Society's Menagerie, and has become the property of the Earl of Derby. The pencil of Mr. Wolf has again afforded me the means of recording the characteristic features of this singular Bovine (Mammalia, Pl. XV.); and it is only necessary for me to add to the information conveyed by his figure, that this animal was imported from India some four years ago, and appears to be the produce of a *Zebu* mother and a *Yak* sire, although I have been altogether unable to trace its actual history.



Woolf del. et lith.

HYBRID CROWN PIGEON.

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Welf. hch.

HYBRID BULL.



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The names of New Species, and Species newly characterized, are printed in Roman Characters: those of Species previously known, but respecting which novel information is given, in *Italics*: those of Species respecting which Anatomical Observations are made, in CAPITALS.

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