



ZS 1A.

THIS BOOK MAY NOT BE PHOTOCOPIED







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PROCEEDINGS  
OF THE  
ZOOLOGICAL SOCIETY OF LONDON.

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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 {	1	2	
in middle . . . . . }			
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 Phrynoides*, 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

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January 23, 1849.

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

The following papers were read:—

1. NOTE ON THE SPERMATOOZOA 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  $\frac{1}{4000}$ 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

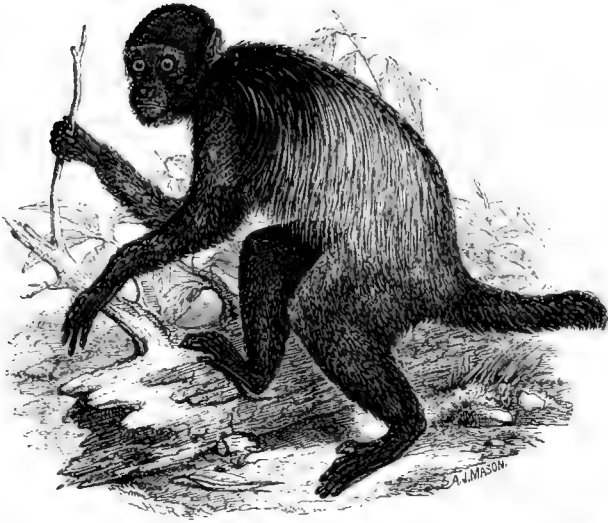


Wolf del. lith.

Printed by Hallmandel & Walzen.

1. CERCO PITHECUS MELANOGENTIS & C. PITHECUS





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 Hoffmanseg, 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.

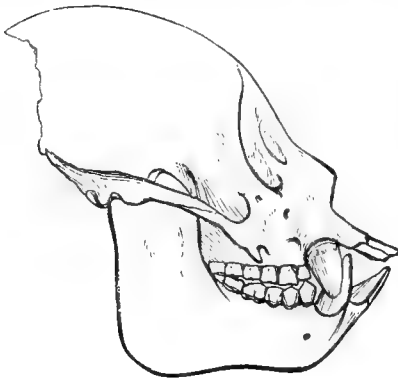
3. *Ouakaria*. The fur short, silky; tail short, subcylindrical, the

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*.

*Jacchina*.

*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 grised 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 vertebrate 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 laminae 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 anthropotomist; 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 ankylosed 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 fawned 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 (*Prothemadera 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.

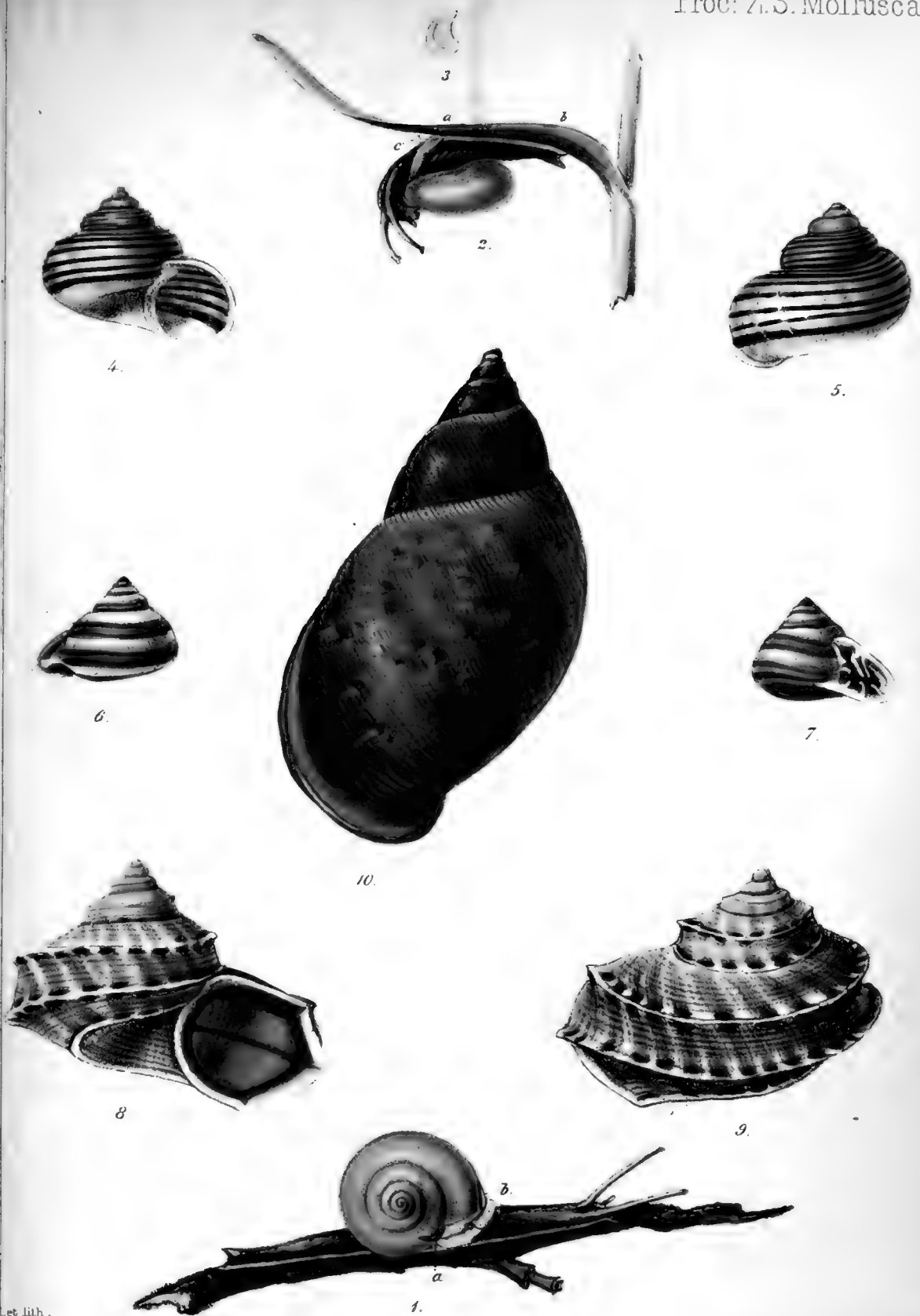
The papers communicated were—

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, lævigatâ, 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



Reeve, Benham & Reeve, imp.

1. 2. 3. NANINA VITRINOIDES. Gray  
 4. 5. CYCLOSTOMA APLUSTRE. Sow.  
 6. 7. TOMIGERUS PRINCIPALIS, 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, subdepressa, tenuiusculâ, spiraliter striatâ, tricarinatâ, fulvo-rufescente; spirâ brevi, acuminatâ, anfractibus quinque 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, ornata; spirâ leviusculâ, subacuminatâ, apice obtuso; anfractibus quinque 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 paululûm 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 acuminate, 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 acuminate 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.* — ?

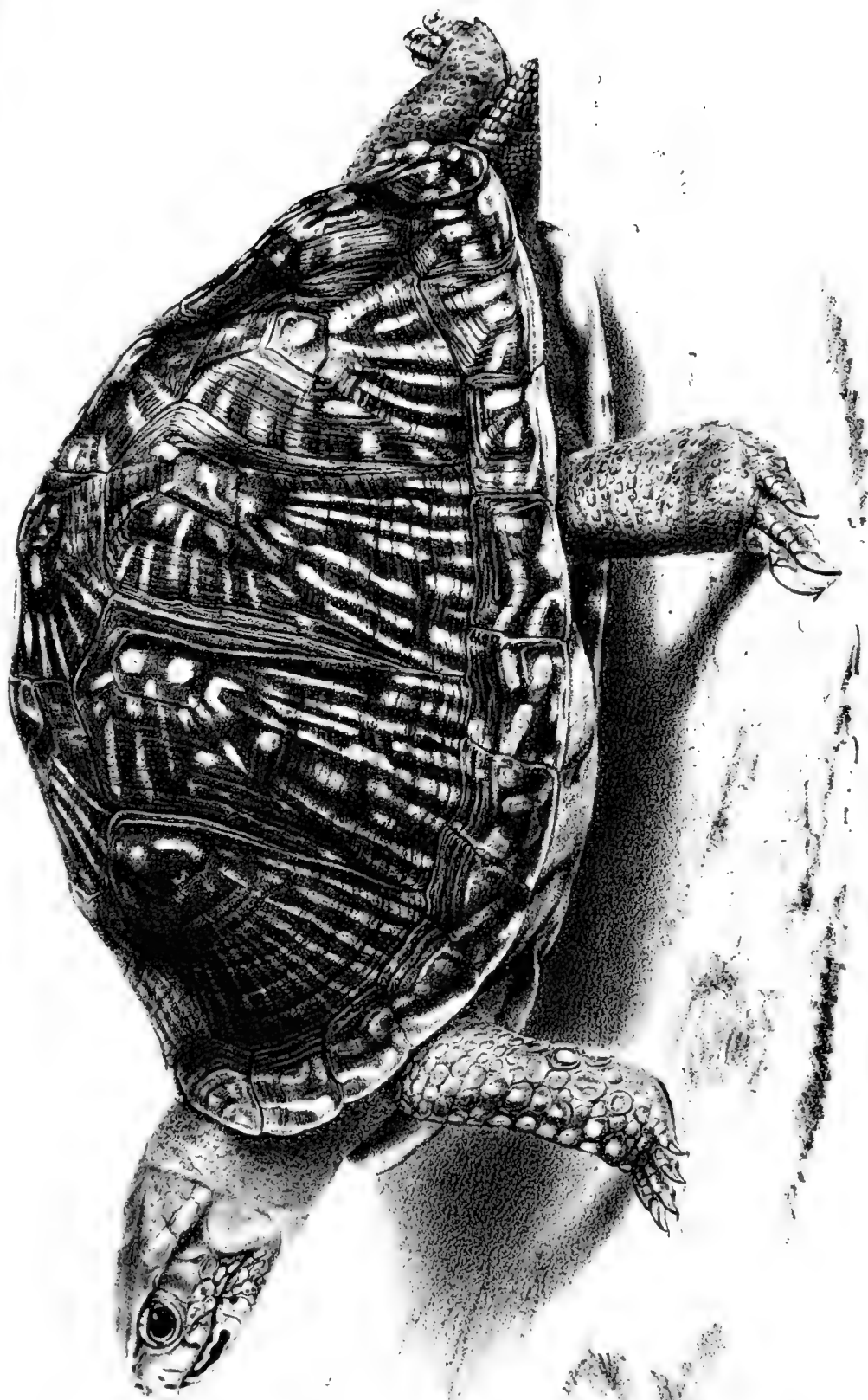
This beautiful species, received by Mr. Cuning from A. L. Gubba, Esq. of Havre, is materially distinct from any hitherto described. It is of a swollen ovate form with the spire rather sharply acuminate, and the columella is distinguished by a sharp winding plate. The ground colour of the shell is a reddish 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 *Emydæ*.

This species will form a section or subdivision of the genus, which may be called *Onychotria*.



CISTUDO ONYCHOTRIS (WALLACE) OLIVIER





**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 CYPREÆ. BY JOHN S. GASKOIN.

MARGINELLA QUADRILINEATA. *Marg. testá oblongo-ovatá, pallidè virescente, nitidá; lineis rufis quatuor, equidistantibus*,  
No. CXCI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

*transversis; basi rotundatâ, lævi; aperturâ latâ anticè præcipuè; canali latissimo; labio lato, marginato, ultra apicem extenso; columellâ anticè quadriplicatâ, 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,  $\frac{9}{10}$  of an inch; wide,  $\frac{4.5}{10}$  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. testâ oblongo-ovatâ, albidâ, fasciis sex vel septem, transversis, continuis, pallidissimè viridi-fulvis; maculis distinctis pallidissimè brunneis interruptis; basi rotundatâ; aperturâ latiusculâ; labio crasso, marginato, ultra apicem extenso; columellâ quinqueplicatâ; 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,  $\frac{2.8}{100}$  of an inch; wide,  $\frac{1.8}{100}$  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. testâ ovatâ, ventricosâ, fulvescente, lævi, nitidâque; aperturâ angustâ; labio tenui, inflexo, marginato; columellâ anticè triplicatâ; canali nullo; spirâ subelatâ, 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, marginated; 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,  $\frac{3.4}{100}$  of an inch; wide,  $\frac{2.0}{100}$  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 has 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. testâ elongatâ, subcylindricâ, pallidâ; aperturâ angustâ; columellâ anticè quadriplicatâ; labio tenui, inflexo, valdè serrato dentibus sex vel octodecim; margine crasso; spirâ subelatâ, 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. testâ oblongo-ovatâ, pallidè floris lactis colore ; extus tenuissimè striatâ ; aperturâ latâ, labio crasso, columellâ sexplicatâ, 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. testâ ovatâ, lævi, anfractibus posticè rotundatis, pallidè flavescente, nigro lineato-punctatâ ; spirâ prominente ; basi rotundatâ ; aperturâ latis-simâ ; columellâ quadriplicatâ ; 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,  $\frac{6.0}{1.00}$  of an inch; wide,  $\frac{3.0}{1.00}$  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 *Marginella 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 fasciâ primâ ad secundam fasciam, tertiâque ad quartam, lineis plurimis tenuissimis fulvescentibus longitudinalibus notatis; aperturâ albâ, latiuscula; columellâ 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,  $\frac{2}{100}$  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. testā subcylindricā, lævi, albā, bruneo omnino obtectā, præter maculis numerosis, testā concoloribus, ferè circularibus, inæqualibus et irregulariter dispensatis; marginibus bruneo-rufescente punctatis; basi subplanulatā, albā; aperturā latā, præcipuè anticè; columellā ventricosiusculā; 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, aperturā rectè continuo; margine externo incrassato; spirā latè umbilicatā.*

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.

CYPRÆÆ 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 secerning 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\*.

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March 13, 1849.

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

The Secretary reported that a living specimen of *Herpestes fasciatus*, Desm., and *Cælogenyx 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*.

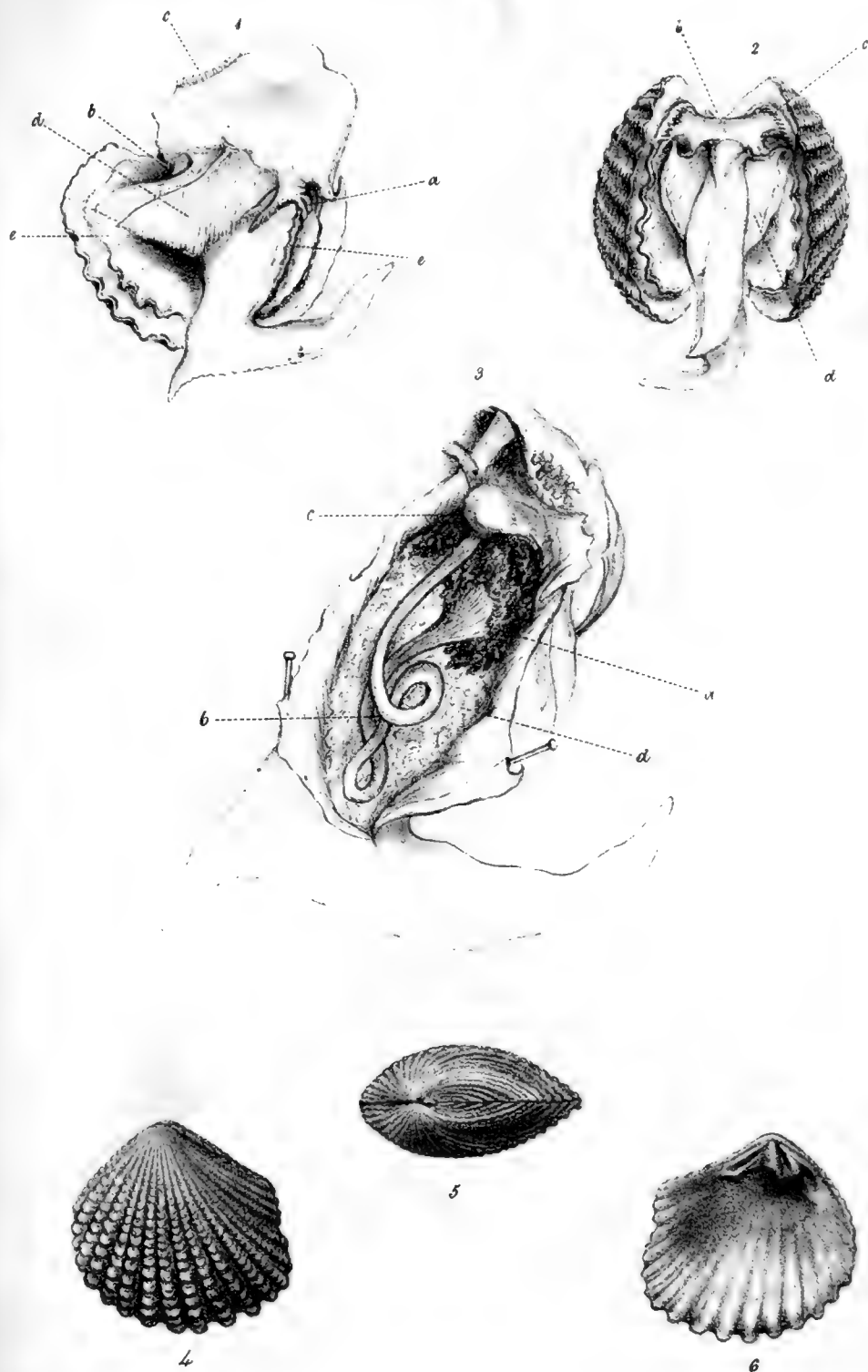
Two of the skulls of the *E. Kiang* show the small rudimentary grinder in front of the other; but this tooth is to be more or less distinctly observed in the skulls of the other *Equidæ* in the Museum collection. I may observe, that in the skull of *Equus Burchellii* in the British Museum collection, 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.H. Bailey

Holmstedt & Walton  
Lithographers.

1.2.3. TRIGONIA PECTINATA. p 32.  
4.5.6. TRIGONIA JUKESEI.





*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'anús 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.

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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 ornata: 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 *Aglaia* and *Endromis*, which possess but little in common: *Aglaia 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 *Aglaia* 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 *Aglaia* 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 *Aglaia* 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 *Aglaia* 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 *Aglaia* are marked in the middle with an eye-shaped spot. Boisduval however appears to have considered that the transformations of *Aglaia* 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 oblecta\*."

From the preceding considerations I am induced to regard *Aglaia* 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 *Aglaia* 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 *Aglaia* 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 *Aglaia* 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. *Erythrina*, 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 *Saturnia*, 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 *Phalæna 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.

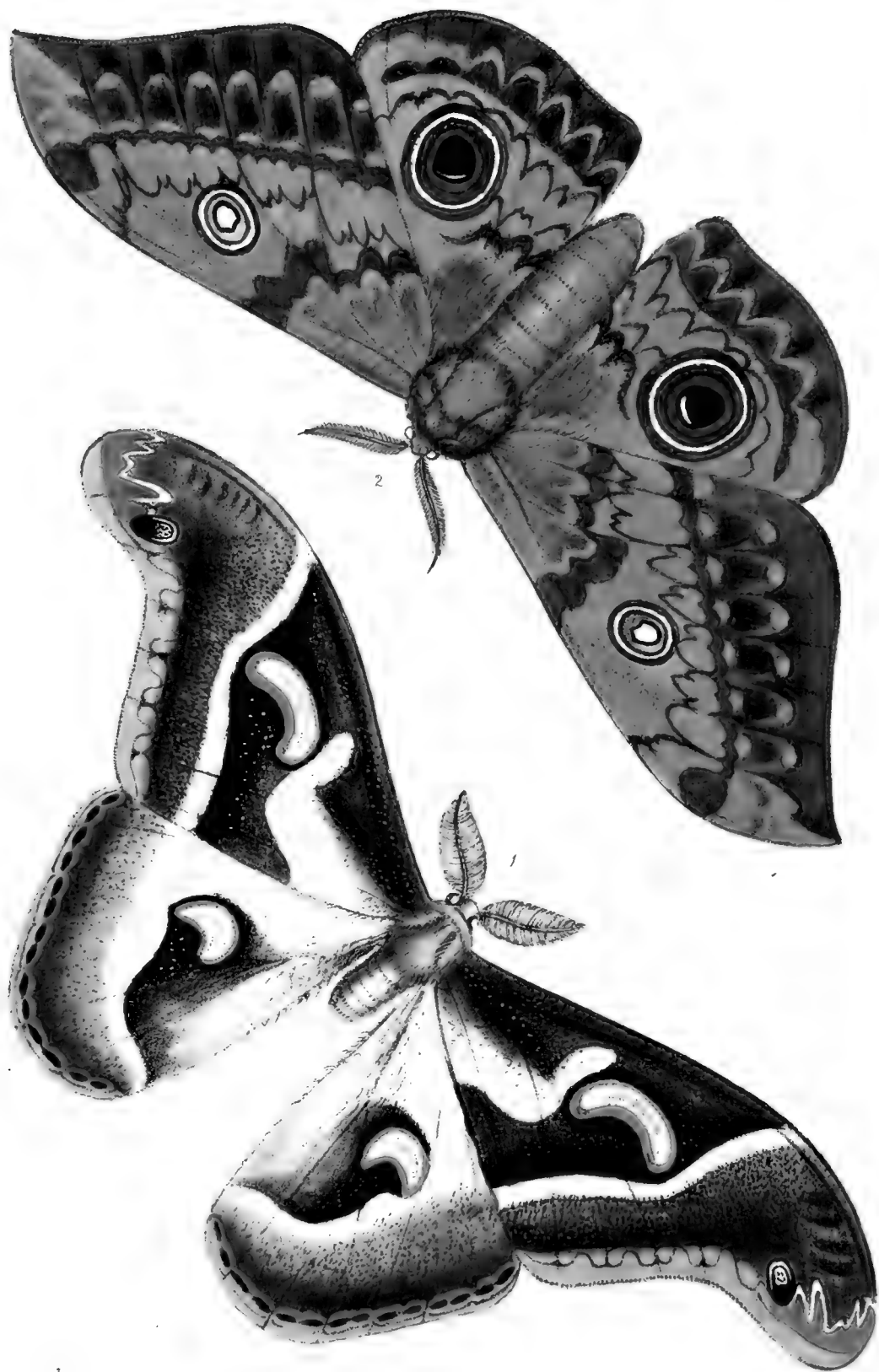
As already stated, the insects of the genus *Saturnia* are among the largest of the Nocturnal Lepidoptera, a few *Hepialidæ* and *Erebi* alone equaling them in size. How far this circumstance gives them the character of a typical group may be reasonably questioned; to me indeed it appears that an increased 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 Linnaeus 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







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 pennate, 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 porrected, 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 oculo 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; oculo magno mediano vitreo iride lata obscure lutea, linea tenui circulari nigra circumdata; alis posticis basi roseo-flavis, oculo maximo mediano vitreo circulis concentricis obscure luteo, nigro, late rufo, et albo cincto, strigaeque subapicali subundata fusca.*

Expans. alar. antic. unc. 5.

*Hab.* Congo. In Mus. Britann.

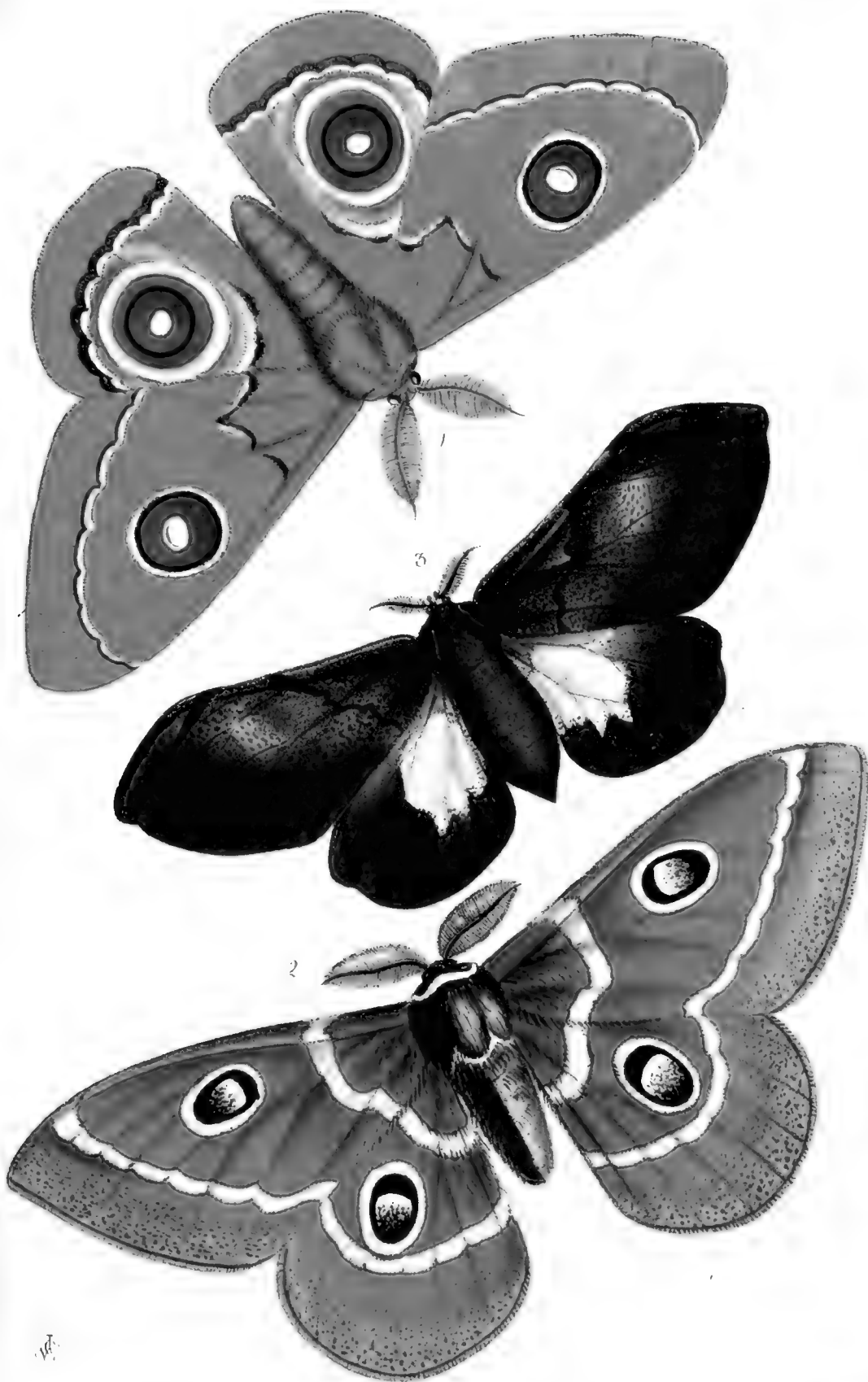
Male with the fore-wings entire, and slightly rounded along the outer margin. General colour yellow; fore-wings finely powdered with small brown scales, having a slender, angulated, brown striga before the middle, slightly tinged on the outside with rosy; in the middle of the wing is a large eye, having 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. S. BELINA, W. 3. S. MYTHIMNIA, W.









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 TYRRHEA, Cramer. *S. alis griseis nigro irro-*

*ratis; anticis striga ante medium alba valde dentata; omnibus ocello 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 Tyrrhea*, Cram. Ins. 4. tab. 46. fig. A. *Bombyx Tyrrhea*, 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 ocello 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 nubilæque lata undata pone strigam externam griseo-carneis, omnibus in medio ocello (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 Erucae Bengaleusis Tesser vocatæ*," is evidently the Tussock 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 le 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 fuscia 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. Angus'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 *Mimosa*, *Luna*, &c. The veins of the fore-wings are similarly arranged to those of *S. Mimosa*, &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 *Saturnia*, 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 ALCINOE, 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. Alcinoe*, 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. Angas'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 saturatioribus 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; foeminae 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 *Saturnia*.

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, strigae 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 albedo 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 pallidiores, 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 *Saturniæ*.

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 (fœminæ) 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. 2–2½.

*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. 2½–2¾.

*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 fasciæque pone medium alba.*

Expans. alar. antic. unc. 3.

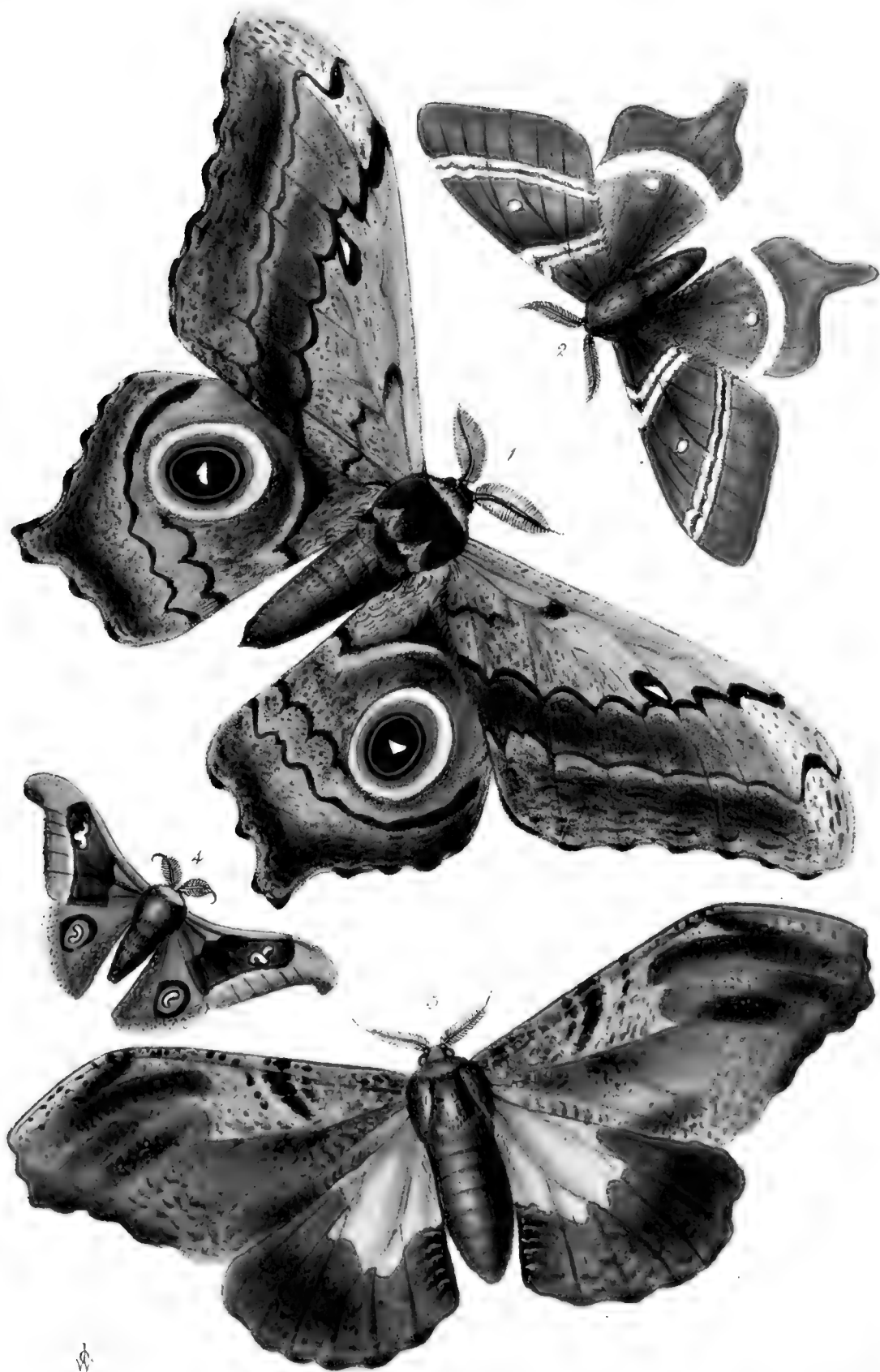
*Hab.* apud Portum Natalensem. In Mus. Britann.

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 Amazoolu 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.

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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.)

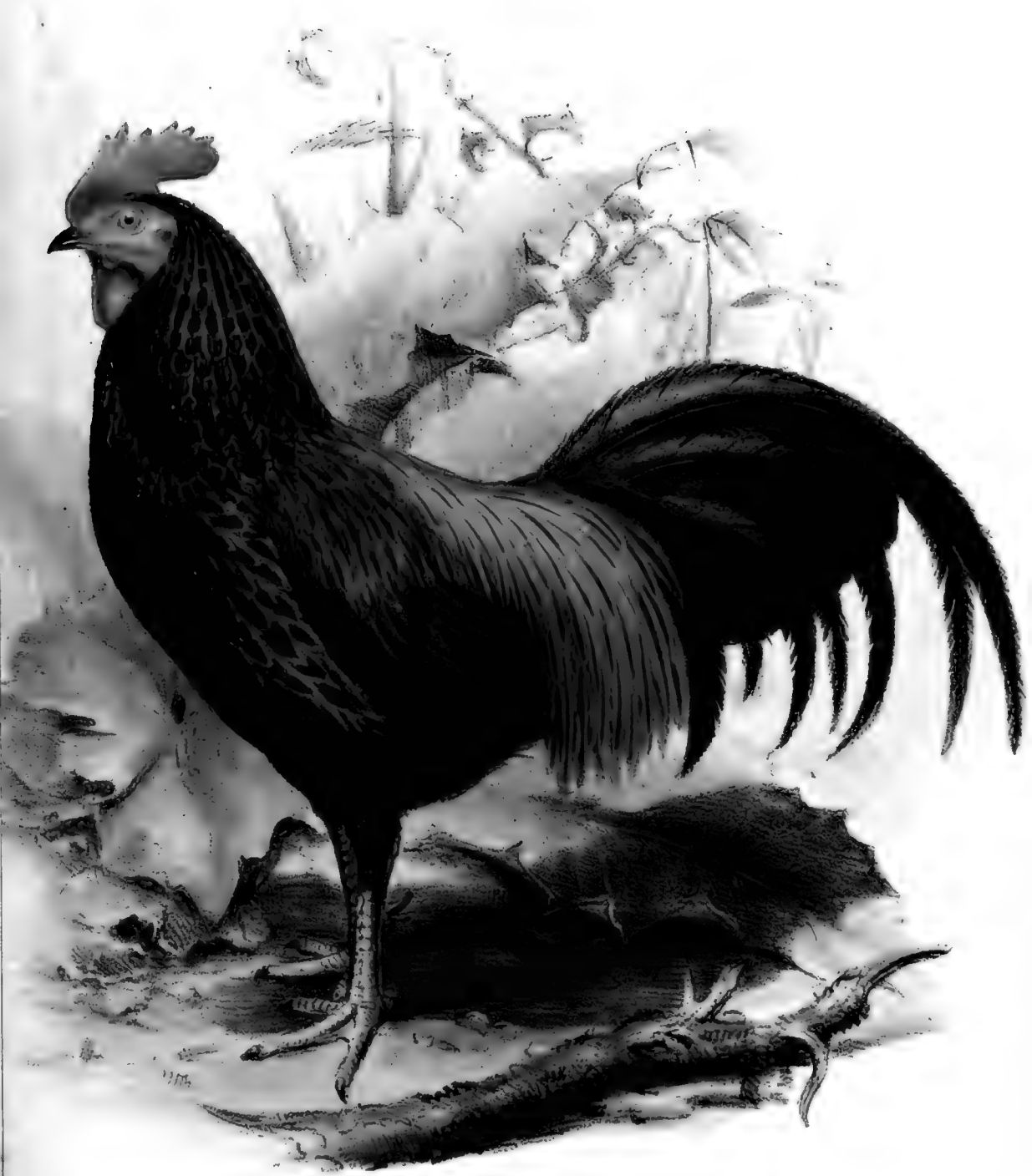
The known interest which the Zoological Society takes in the introduction of Gallinaceous Birds has induced me to call the attention of the meeting to the following examples, which it is supposed may prove species not hitherto noticed, as they exhibit some characters in the form and colouring of the 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 Hulme & Walton

GALLUS TEMMINCKII G. R. Gray









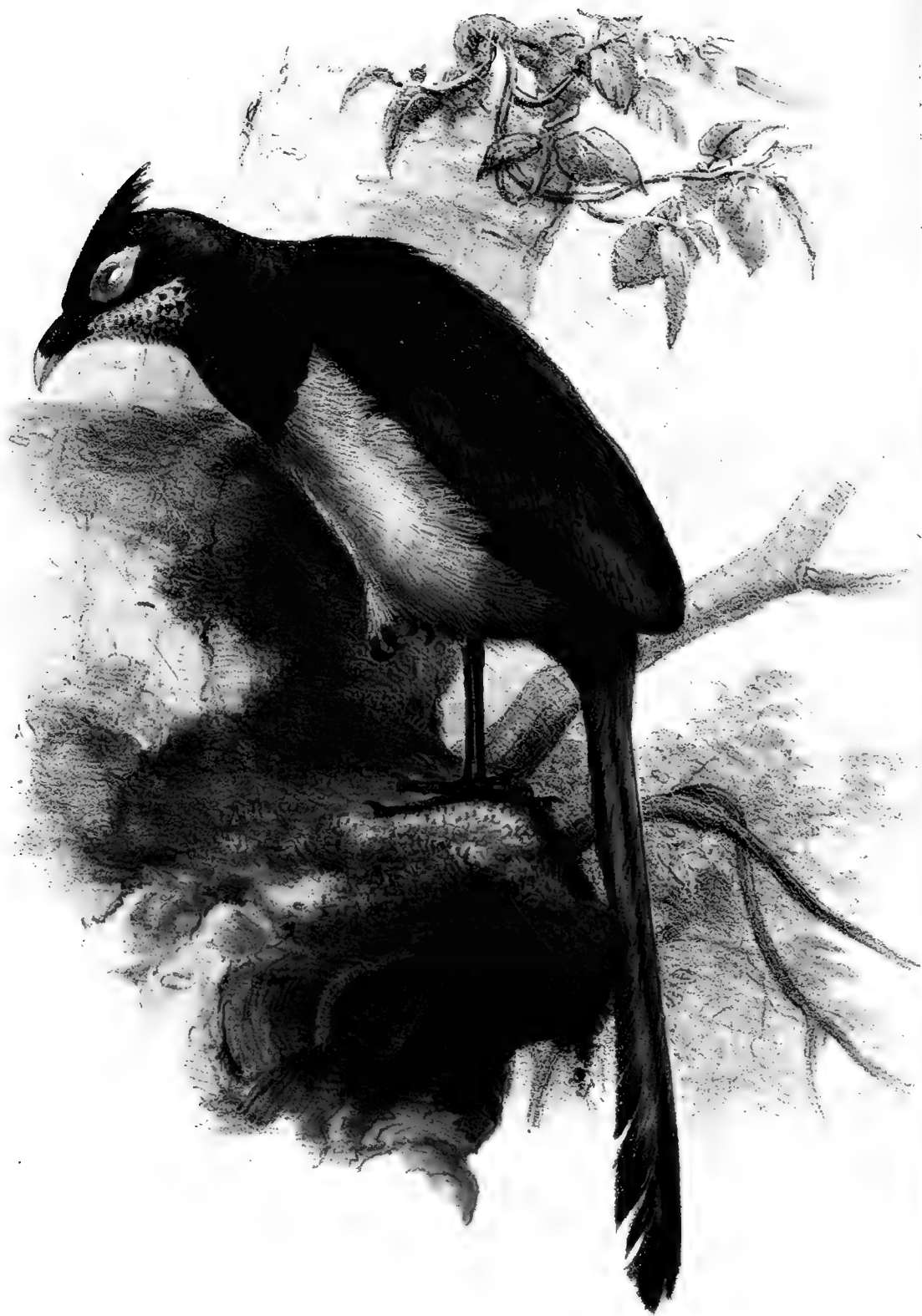


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GLAREOLA NUCHALIS. G R Gray

Welf del et lith







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. (Sta 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*.





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 Commadore 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.*

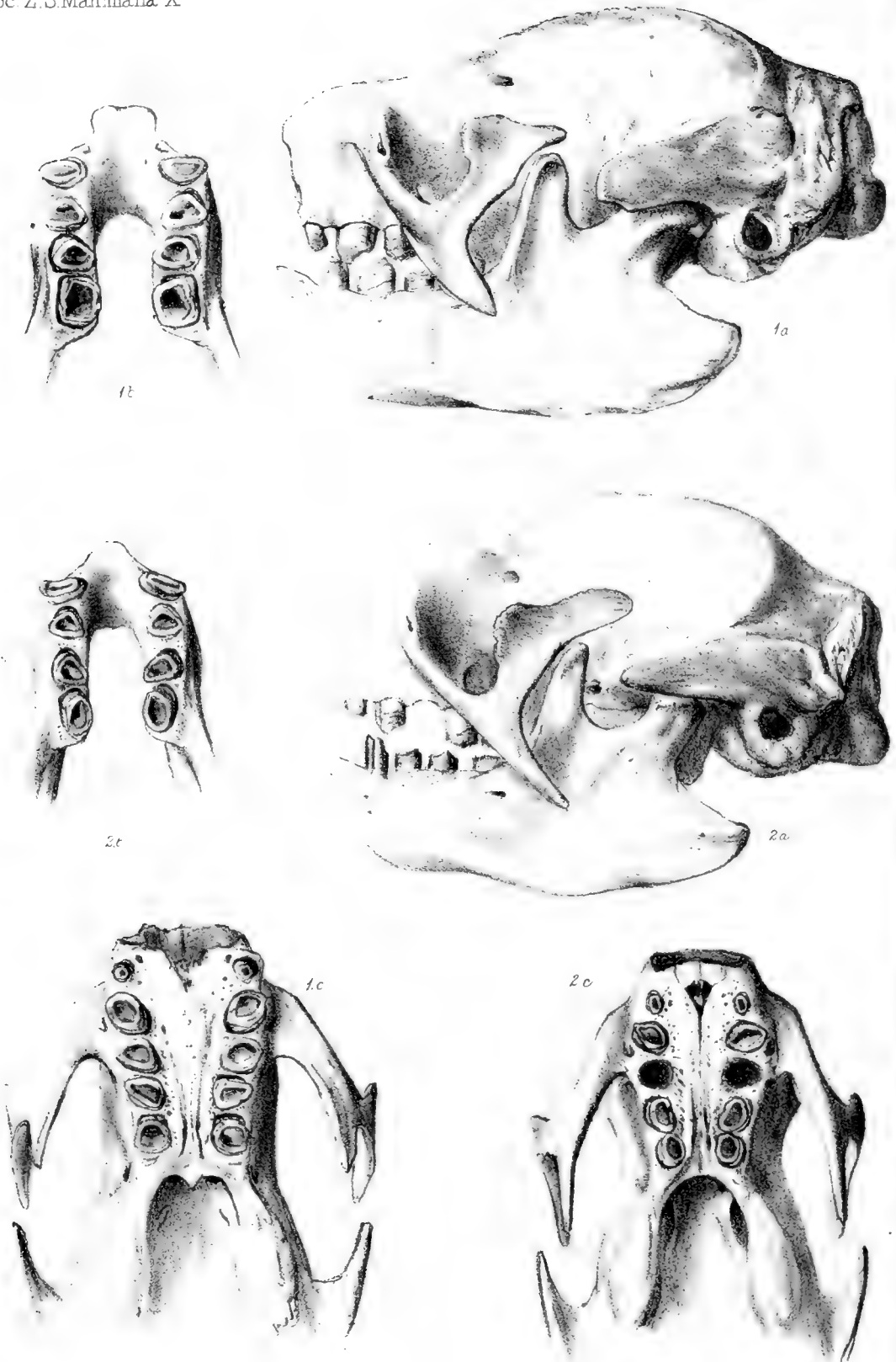
Hands and feet three-clawed. Skull flattened above on the forehead. Grinders : front upper small, cylindrical ; front lower small, transverse, compressed. Intermaxillary bones none, or very rudimentary. The upper process of the zygomatic arch with a broad process in front, forming a back edge to the 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. Mamm.*

? "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 conspicitur;*" and better described and figured at p. 373 as follows: "*Universum corpus a summo capite ad unguis usque, densissimis iisque 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.

<i>Skull.</i>	<i>B. torquatus.</i>		<i>B. affinis.</i>	
	in.	lin.	in.	lin.
Length .....	2	9 $\frac{1}{2}$		
Length of palate .....	1	2		
—— from palate to occipital hole .	1	4		
Breadth at occipital ridge .....	1	4 $\frac{1}{2}$	1	2 $\frac{1}{2}$
—— at front of ear-hole .....	1	5	1	2 $\frac{1}{2}$
—— at front of zygoma .....	1	10	1	8
<i>Lower jaw.</i>				
Length .....	2	4	2	2 $\frac{1}{2}$
Width at condyles .....	1	8	1	4 $\frac{1}{2}$
—— 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.)

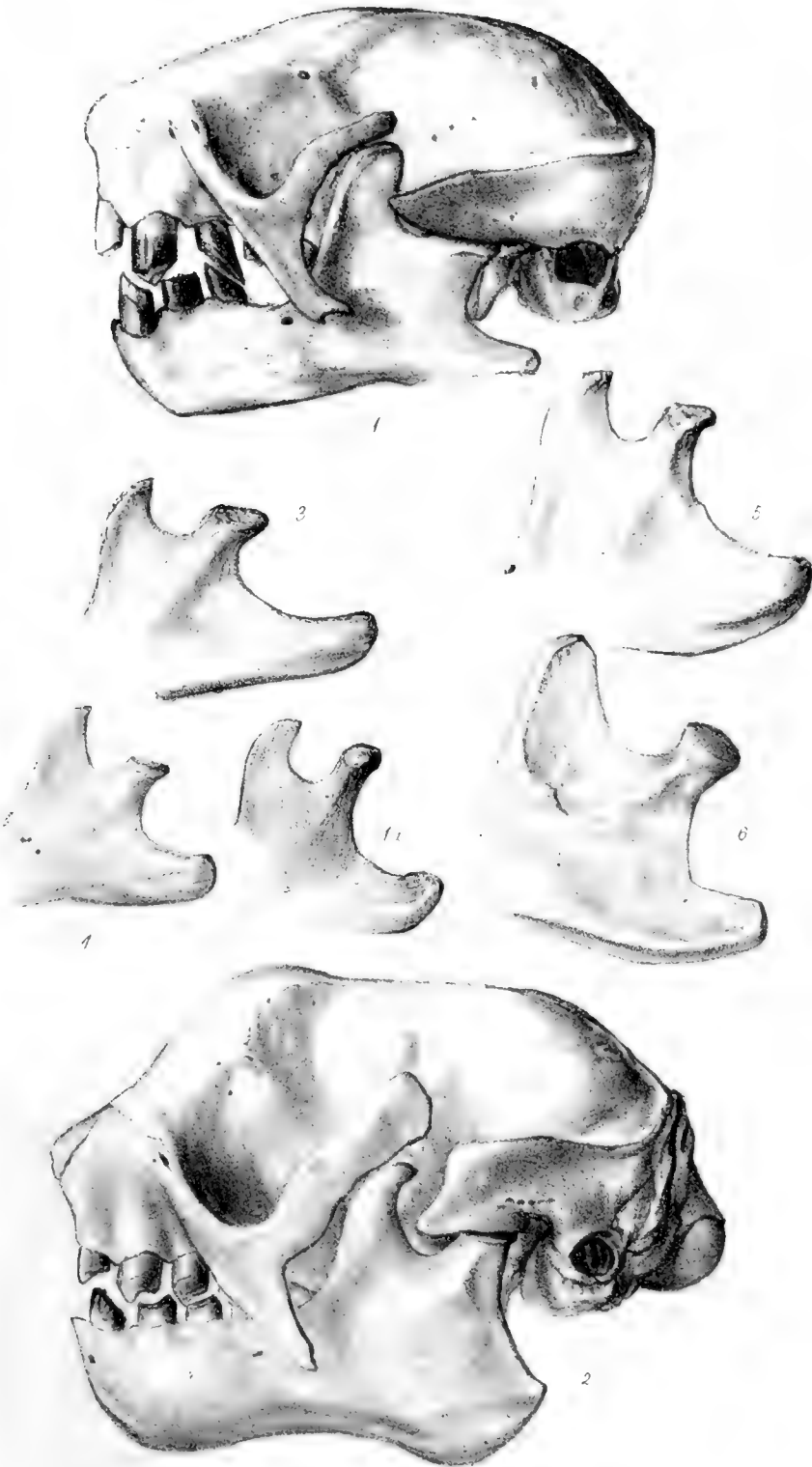
*Hab.* Venezuela; *Mr. Dyson*.

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.

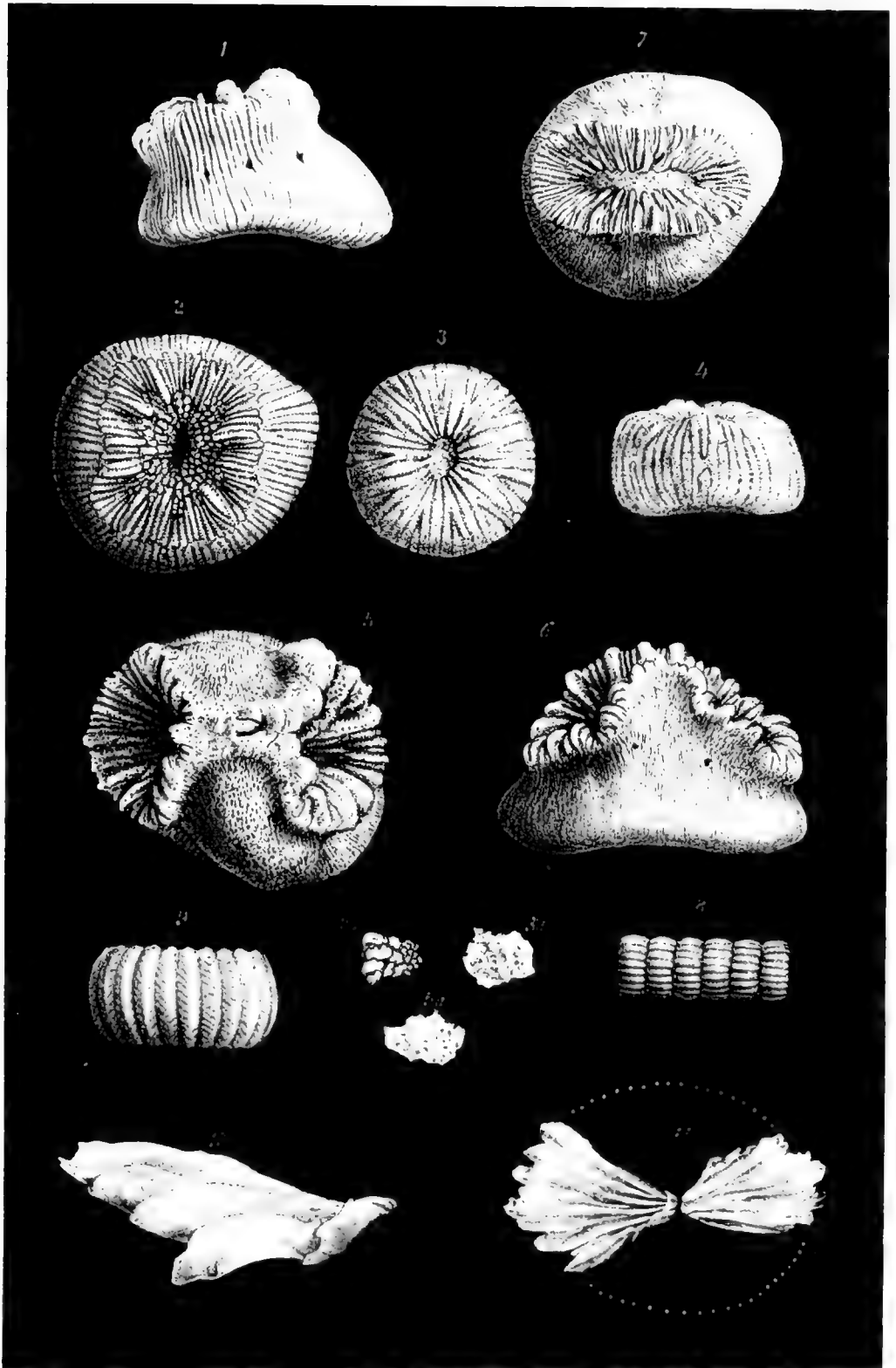
(Radiata, Pl. II.)

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 3 HETEROCYATHUS COCHLEA. 3 3a 4 H. HEMISPHERICA. 5 5a 6 H. EUPSAMMIDES & VAR.  
8 9 PRIMNOA AUSTRALIS. 10 H. FLABELLUM MAC-ANDREW!



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 Pavorinum* 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 Pavorinum*, 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 lævis*, 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. Roussæanus*, 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. Roussæanus*, 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.

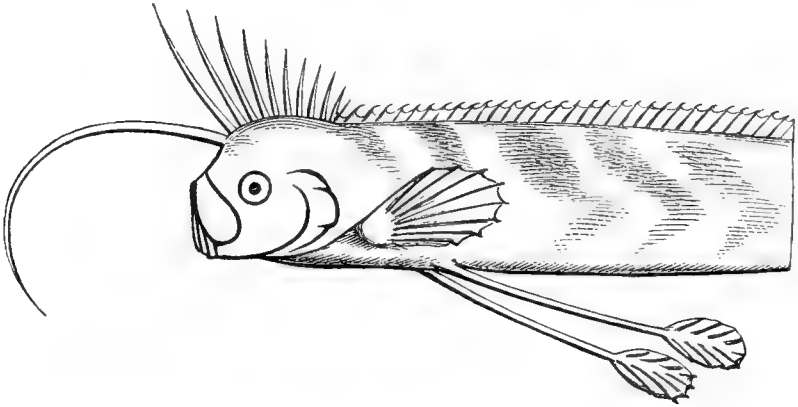
Since I described these corals I have shown the two latter species to M. Milne-Edwards, who states that they had not before come under his observation.

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 (Chelnwyn?) 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.

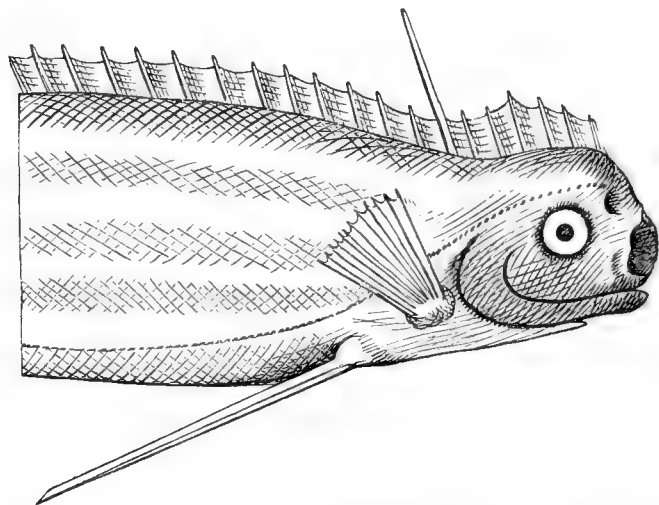
It has been supposed, because the copy of the drawing given by Mr. Yarrell is very like the figure of *Gymnetrus Hawkenii* in Bloch's *Hist. Ich.* xii. t. 433, that the drawing of the Cornish fish was the

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 branchial 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<sup>t</sup> 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. *Cæpola 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 "*Muraena 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 1820, 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.

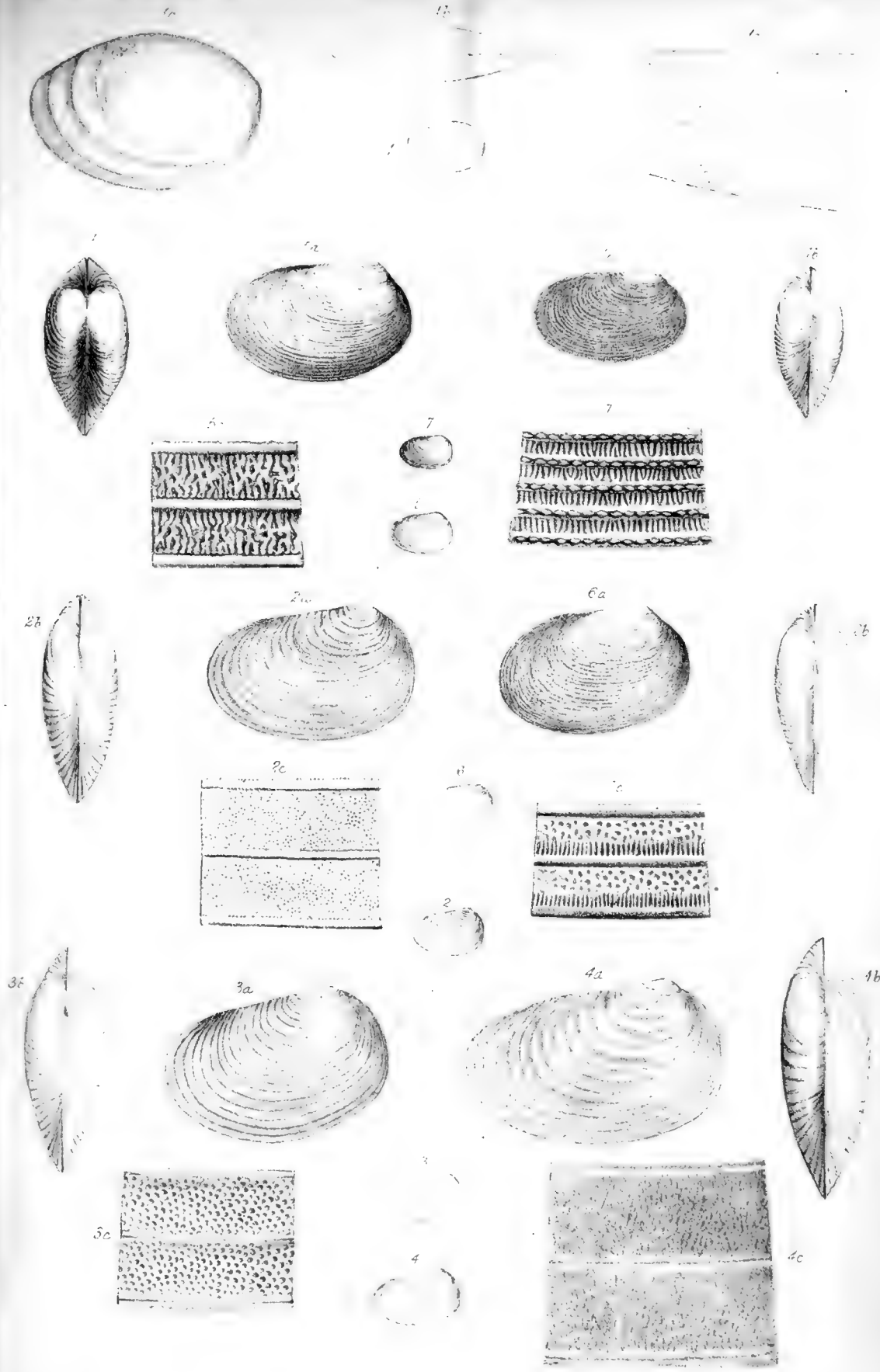
The animals swim on their back, and no males have ever as yet been observed.

#### 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 Cycladoides*, Joly, Ann. des Scien. Nat. 2nd ser. xviii. t. 7, t. 8, t. 9, f. 1-44, 1843.

*Estheria Cycladoides*, 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, 4*a*, 4*b*, 4*c*.)

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, 5*a*, 5*b*, 5*c*.)

*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, 6*a*, 6*b*, 6*c*.)

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*.

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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.





CIMBEX



Letters had been received from Richard Hill, Esq., W. C. Kelaart, Esq., R. J. Bouchier, 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*.

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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.

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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.*  
*Casuarus 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.

#### ERIOPUS 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. cupreovertris*, 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. testā elongato-turritā, sinistrali, compressē umbilicatā, anfractibus novem, supernē obscurē*

*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 striae.

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-lilaceâ.*

*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 *haemastoma* 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-fusâ, 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, subcylindraceut, subcompressè umbilicatá, anfractibus octo, leviter convexis, sub lente striatis et corrugato-indentatis, columellá reflexá, aperturá parviusculá, labro simplici; fulvescente-spadiect.*

*Hab.* Cuzco, Bolivia; W. Lobb.

Of a delicate nankeen colour throughout.

7. *BULIMUS PRÆTEXTUS*. *Bul. testá acuminato-oblongá, subcylindraceut, 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 fuscescente.*

*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 subcylindraceut-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 fusciscentibus et purpureo-castaneis irregulariter conspicuè pictá, ponè labrum et aperturæ fauce purpureo-nigricante.*

*Hab.* Banks of the Marañon, 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 ventricosâ, ampliter umbilicatâ, anfractibus septem ad octo, subrotundatis, lævibus, sub lente striis obliquis elevatiusculis et spiralibus incisiss minutè decussatis, aperturâ suborbiculari, columellâ 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. testâ acuminato-oblongâ, basi rotundatâ, subcylindraceâ, compressè umbilicatâ, anfractibus octo, leviter convexis, longitudinaliter corrugato-striatis, ad suturas subcrenulatis, columellâ latè reflexâ, labro tenui, simplici; pallidè stramineâ, strigis brevibus rufo-fuscis longitudinalibus et obliquis fasciatim decussatis peculiariter notatâ.*

*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. testâ acuminato-oblongâ, basi subobliquè rotundatâ, compressè umbilicatâ, anfractibus octo ad novem, planulato-convexis, longitudinaliter striatis, infra suturas subcrenulatis, columellâ latè reflexâ, labro simplici; albidâ, vittis irregularibus castaneis et fusciscentibus confertim longitudinaliter pictâ.*

*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. testâ acuminato-ovatâ, tenuiculâ, ampliter compressè umbilicatâ, aperturam versus obliquè ventricosâ, inflatâ, anfractibus septem, convexis, apicem versus creberrimè elevato-striatis, striis spiralibus incisiss sub lente minutè decussatis, columellâ latè verticaliter reflexâ, aperturâ obliquè suborbiculari, labro effuso, non reflexo; fulvescente lacteâ, apicem versus cærulescente, lineis castaneis subdistantibus irregulariter longitudinaliter notatâ, maculis brevibus contrariè obliquis bifasciatim pictâ, macularum serie unicâ 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. testâ oblongo-ovatâ, umbilicatâ, anfractibus septem, convexis, creberrimè corrugato-striatis, aperturâ ovali, columellâ reflexâ, labro vix reflexo; intensè ustulato-castaneâ, zonulâ unicâ albâ medio cingulatâ, labro albo.*

*Hab.* Cuzco, Bolivia; W. Lobb.

The entire surface of this shell is sculptured longitudinally with very closely-packed crinkled striæ.

15. **BULIMUS PRIMULARIS.** *Bul. testâ acuminato-ovatâ, tenuiculâ, subventricosâ, umbilicatâ, anfractibus septem, lævibus, columellâ tenui reflexâ, labro simplici; albidâ, basin versus vividè luteâ, fasciis castaneo-nigris quatuor aut pluribus, nonnullis multò interruptis, cingulatâ.*

*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. testâ cylindraceo-elongatâ, haud umbilicatâ, anfractibus septemdecim ad octodecim, planis, angustis, obliquè subobsoletè striatis, anfractu ultimo ad basin subangulato, columellâ tortuosâ, leviter recedente, aperturâ subquadratâ, ad basin effusâ; roseo-albicante, 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.

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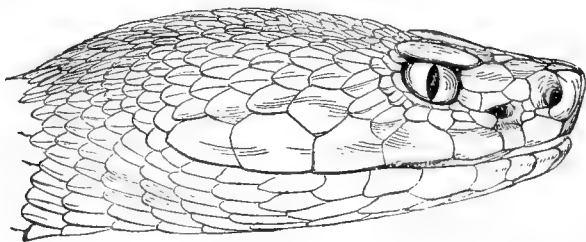
July 24, 1849.

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  $2\frac{1}{8}$  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.)

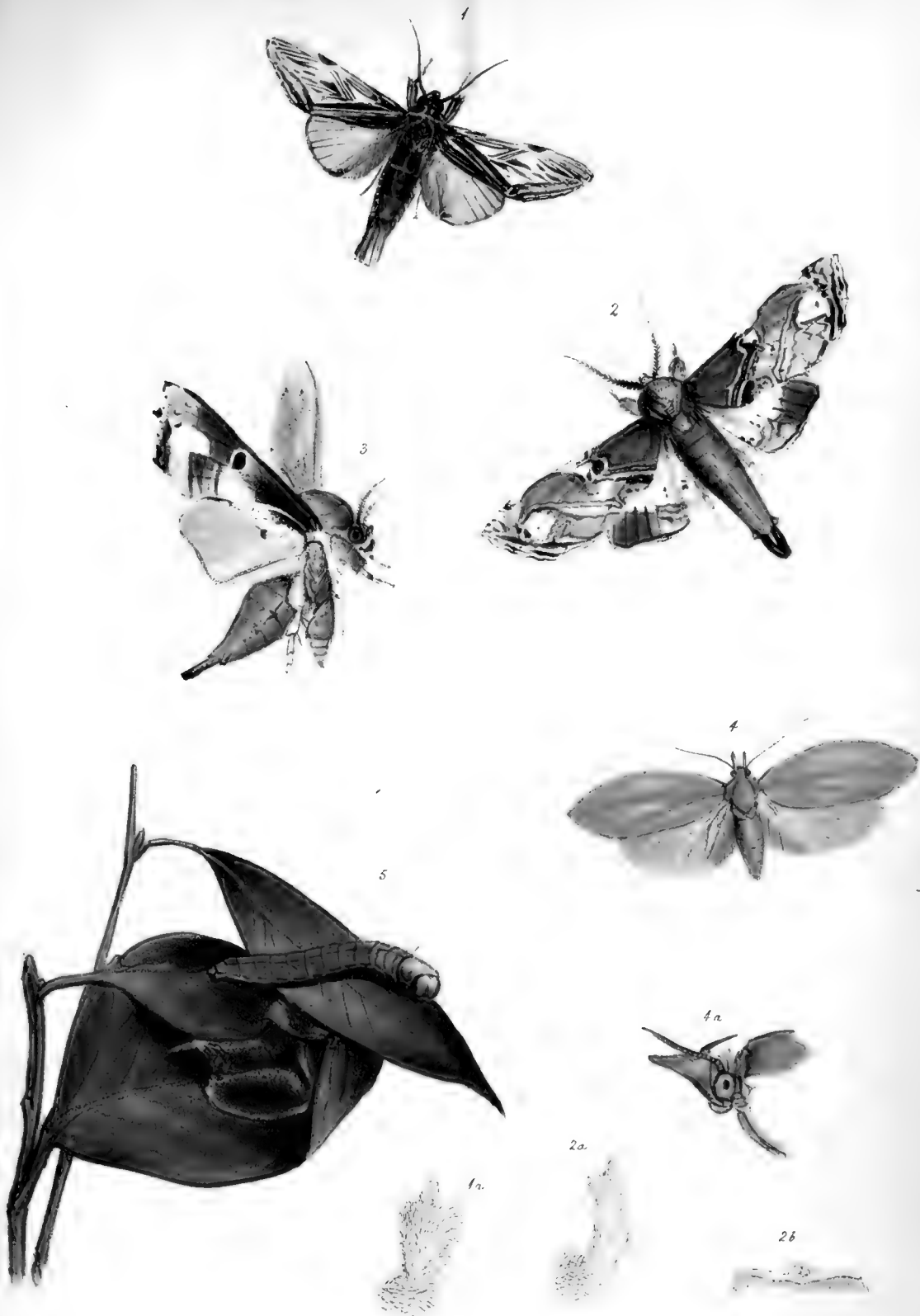
Fam. NOCTUIDÆ.

### 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 CALICATUS 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. H. Munloke, 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



del 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 hindmost 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. Tana.</i>		<i>T. ferruginea.</i>		<i>T. ferruginea.</i>		<i>T. Elliotti.</i>		<i>T. Javanica.</i>	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Total length of skull .....	2	4	.....†		2	0½	2	0¾	.....†		1	4¾
Length of ditto to the posterior margin of the auditory bulla } .....	2	0½	2	1	1	9	1	10	1	7¼	1	2½
Width of ditto, measuring from the outer surface of the zygoma } .....	1	0¾	.....		1	0¼	1	0½	0	10½	0	9¾
Width of ditto between orbits ...	0	7¼	0	7	0	6¾	0	7	0	6¾	0	6½
Length of palate .....	1	3¼	1	3¼	1	0½	1	1½	0	11	0	8½
— of nasal bones .....	0	11½	0	11	0	8½	0	9	0	7	0	4¾
Width of ditto in front .....	0	1¾	0	1¾	0	1¾	0	1½	0	1½	0	1½
— of ditto behind.....	0	2½	0	2¾	0	2½	0	2½	0	3¼	0	1¾
Length from anterior part of first premolar to hinder margin of last true molar.....	0	9½	0	9¾	0	9	0	9	0	7½	0	6
Length of lower jaw .....	1	6¾	1	7	1	5½	.....		1	3	0	10
Height of ditto, measured from apex of coronoid process ...	0	6½	0	6¼	0	6¾	.....		0	6½	0	5¼

\* I do not include the "*Tupaia de Pégou*," because it is not yet determined that that animal is a distinct species from the *Tupaia*s 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 *Victoriæ*;—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 oil-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 *aurea* 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. CXC VII.—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; Me-gerle, 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 EPHIPPIUM.

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 Ehippium, 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.

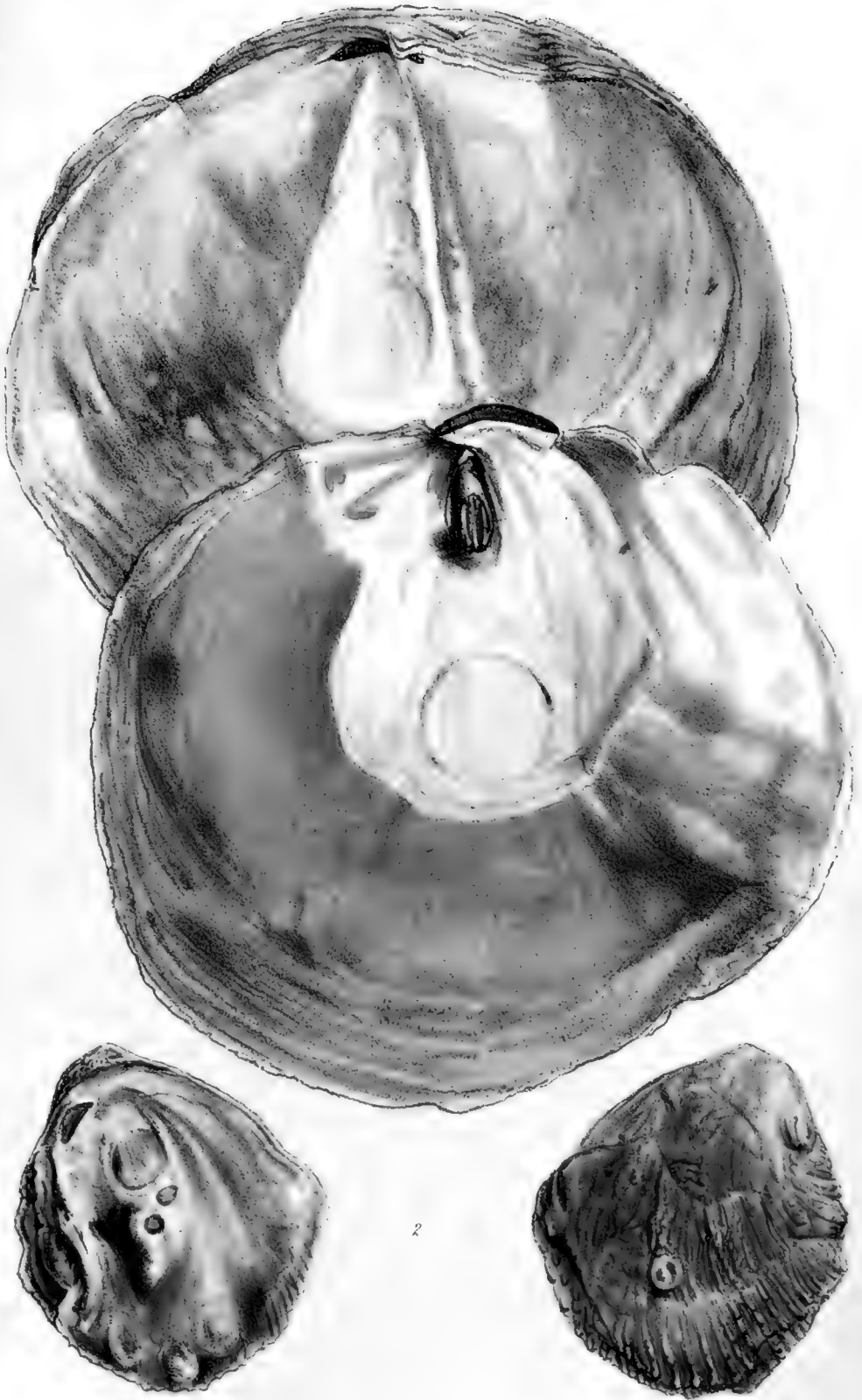
Anomia sulcata, Poli, Test. Sicil. t. 30. f. 12; Brocch. t. 10. f. 2.

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*, *Bruguère, 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*, *Bruguère, 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, porcellaneous 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*,  $\beta$ , *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 superadita.*" 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 Arcs (*Arcæ*); for, like it, it is formed of numerous parallel, erect, longitudinal horny laminæ, 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 *Anomiæ* 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.*

#### 131. 2. PLACUNANOMIA RUDIS.

White; disk brown; smooth laminæ.

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 laminæ, 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.

"*Placunomia 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 échancre, 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.*

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 undulatum 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.

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.

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.

— *Dr. Sinclair*, Brit. Mus., a single dorsal valve.

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'Egypte, Minéralogie*, t. 11. f. 6.

*Hemiplacuna* Roziéri, G. B. Sow. MSS.

*Anomia?* or *Placuna?* Desh. in Lamk. *Hist.* vii. 270, note.

Fossil. Shore of the Red Sea; Vallée de l'Egarement.

#### 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. testá orbiculari-cordatá, crassá, transversim concentricè liratá, liris rudibus, obtusis, subplanulatis, numerosis, crebris, valdè irregularibus, hic illic intermissis, non parallelis; lacteá, epidermide tenui corned, translucidá, indutá.*

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. testá umbilicatá, depressè ovatá, tenui, pellucidá, virescenti-albidá, omnino glabrá; spirá laterali, acutiusculá; suturá albo-marginatá; anfractibus 6 convexiusculis, penultimo inflato, ultimo antrorsum deviante; umbilico angusto, non pervio; aperturá perobliquá, semicirculari, dente minuto parietis aperturalis munitá; peristomate albo, subincrassato, breviter reflexo.*

Diam. maj. 8, min. 6, alt. 5 mill.

*Hab.* Demerara.

2. STREPTAXIS CUMINGIANA, Pfr. *Str. testá perforatá, depresso-globosá, solidulá, glabrá, virenti-albidá; spirá sublaterali, conoidé; anfractibus 7 angustissimis, subplanis, penultimo prominulo, ultimo antrorsum deviante; aperturá perobliquá, auriformi, lamellá intrante parietis aperturalis coarctatá; 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. testá perforatá, turbinatá, tenui, levi, carinatá, striis incrementi et lineis confertissimis impressis, obliquè antrorsum descendentibus subtilissimè decussatá, diaphand, albidá, rubro-unicingulatá; spirá conoidé, apice obtusiusculá; suturá submarginatá; anfractibus 6 subplanulatis, ultimo magno, infra cingulum carinato (cariná anticè ob-*

*soletā*), *basi convexiusculo*; *aperturā obliquā, 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. testā perforatā, depressā, striatūlā, sublævigatā, nitidā, hyalino-albidā*; *spirā vix elevatā*; *suturā impressā, marginatā*; *anfractibus 5 planiusculis, lentè accrescentibus, ultimo non descendente, subrotundato, circa perforationem impresso*; *aperturā verticali, latè lunari*; *peristomate simplice, acuto, margine columellari brevissimè reflexo*.

Diam. maj. 8, min. 7, alt. 4 mill.

*Hab.* in insulā Jamaica.

5. *HELIX PHLOGOPHORA*, Pfr. *H. testā subperforatā, depressulā, tenuissimā, striatūlā, pellucidā, nitidā, fulvo-luteā, flammulis angulatis et serrulatis rufis confertis pictā*; *spirā parum elevatā, apice subpapillatā*; *anfractibus 3½ convexis, rapidè accrescentibus, ultimo depresso, basi planiusculo*; *aperturā perobliquā, rotundato-lunari*; *peristomate simplice, recto, margine columellari subreflexo*.

Diam. maj. 6½, min. 5½, alt. 3 mill.

Locality unknown.

6. *HELIX SERICATULA*, Pfr. *H. testā perforatā, depressā, discoidē, subtiliter et confertim costulatā, striatā, subsericā, griseo-cornē, lineis brunneis irregularibus radiatā*; *spirā pland*; *anfractibus 4½ vix convexiusculis, ultimo subrotundato, juxta perforationem subimpresso*; *aperturā 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. testā angustè umbilicatā, subturbinato-depressā, solidā, striatā, lineis impressis concentricis et obliquis subtiliter decussatā, fulvā*; *spirā parum elevatā, subturbinatā*; *anfractibus 6 parum convexis, ultimo medio circulo elevato, obtuso cincto, infra eum fasciā saturatè castanē, deorsum dilutā, ornato, circa umbilicum pallido*; *aperturā amplā, parum obliquā, latè lunari, intus margaritacē*; *peristomate simplice, recto, margine columellari ad umbilicum in laminam brevem, triangularem reflexo*.

Diam. maj. 53, min. 45, alt. 30 mill.

*Hab.* in insulā Borneo, var. pallida in insulis Philippinis.

8. *HELIX BORNEENSIS*, Pfr. *H. testā obliquè perforatā, depressā, tenuiusculā, striis incrementi distinctis et lineis obliquis, impressis, crebris decussatā, saturatè fulvā*; *spirā vix elevatā, obtusā*; *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-fusâ 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 umbilicatâ, discoided, 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 umbilicatâ, 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 intransibus 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 circumcludentem 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 umbilicatâ, 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 columellâ; peristomate simplice, recto, acuto, margine basali retrorsum in laminam, umbilicum coarctantem, continuatâ.*

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, diaphand, 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-conoidè, tenui, carinatâ, undique confertim concentricè striatâ, hyalind, supernè lineis albis et ad suturam fasciâ albâ, castaneo-punctatâ ornatâ; spirâ brevi, conoidè, apice obtusâ; anfractibus 4 planiusculis, ultimo carinâ albâ, lineis castaneis marginatâ et articulatâ munito, supernè et ad carinam subitò 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 carnè; 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 sub-simplice, 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 obsoletis rugosulâ, parum nitidâ, diaphand, 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, albâ, lined rufâ ad suturam ornatâ; spirâ conicâ, acutiusculâ; anfractibus 6 convexiusculis, sensim accrescentibus, ultimo obsoletè angulato, basi subplano; aperturâ obliquâ, latè lunari; peristomate simplice, marginibus subparallelis, dextro breviter expanso, columellari supernè per dilatato, calloso.*

Diam. maj. 22, min. 19, alt. 19 mill.

*Hab.* in insulis Moluccis?

18. *HELIX BREVIPILA*, 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 subdilatato-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 lingueformi albo parietis aperturalis, obliquè intrante, coarctatâ; peristomate validè carneo-labiato, margine dextro arcuato et basali subhorizontali, latè subdentato latè expansis et reflexis, columellari brevi, per dilatato, 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-*



*orbiculatâ, solidâ, striatâ, sub lentè granulatâ, fulvâ; spirâ brevi, fornicatâ, obtusâ; anfractibus  $4\frac{1}{2}$  convexiusculis, sensim accrescentibus, penultimo angulato, ultimo subdepresso, anticè deflexo, basi subangulatim in umbilicum, mediocrem, pervium,  $\frac{1}{5}$  diametri vix superantem descendente; aperturâ perobliquâ, lunari-ovali, intus lacted; 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 insulâ Madagascar.

22. *HELIX ROSARIUM*, Pfr. *H. testâ umbilicatâ, depressâ, tenui, supernè subtilissimè granulatâ, diaphand, pallide fulvâ, flammis a suturâ exeuntibus, cingulisque 3 interruptis, moniliformibus rufis ornatâ; spirâ pland; anfractibus vix 5 convexis, ultimo subdepresso, anticè non descendente, basi radiatim striatulo et lineis impressis spiralibus distantibus notato, circa umbilicum mediocrem, infundibuliformem subcompresso; aperturâ parum obliquâ, lunato-subtriangulâ; 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. testâ perforatâ, ovato-conicâ, tenui, striis incrementi lineisque spiralibus minutissimè decussatulâ, vix nitidulâ, fulvescenti-albidâ, diaphand; spirâ brevi, conicâ, obtusiusculâ; suturâ mediocri; anfractibus  $4\frac{1}{2}$  convexis, ultimo  $\frac{5}{9}$  longitudinis æquante, rotundatâ; columellâ subplicatâ, recedente; aperturâ 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 insulâ Navigatorum.

24. *BULIMUS (PARTULA) NAVIGATORIUS*, Pfr. *B. testâ dextrorsâ, perforatâ, oblongo-ovatâ, solidâ, obsolete granulato-striatâ, nitidulâ, fulvâ, lineis confertis saturatioribus signatâ; spirâ conicâ, acutiusculâ; suturâ levi, albo-marginatâ; anfractibus 5 planiusculis, ultimo spiram superante; aperturâ oblongâ, angustâ, intus albidâ, dente calloso parvulo profundo in ventre anfractûs penultimi munitâ; 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 insulâ 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, aurâ; 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, diaphand, 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 STRANGEL, 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 Britannîâ, 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, diaphand, 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 plicatâ, 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-corneâ; 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 striatâ 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, striatâ, 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, striatulá, sub lente obsoletè decussatá, diaphaná, parum nitidá, pallide corné; spirá brevi, acutiusculá; anfractibus  $2\frac{1}{2}$ , penultimo convexo, ultimo  $\frac{2}{3}$  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, striatulá, sub lente obsoletè granulosa, diaphaná, parum nitidá, luteo-rubescente; spirá brevi, sanguineá, subpapillatá; anfractibus  $2\frac{1}{2}$  convexis, ultimo inflato; columellá callosá, substrictè recedente; aperturá parum obliquá, angulato-ovalí, 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 insulâ Masafuera (Cuming).

12. *SUCCINEA SOLIDULA*, Pfr. *S. testá depressè ovatá, solidulá, longitudinaliter subplicatá, sub lente minutissimè granulatá, vix diaphaná, parum nitidulá, fulvá; spirá brevi, scalarí, apice papillatá, rubicundá; anfractibus  $2\frac{1}{2}$  convexis, ultimo inflato,  $\frac{3}{5}$  longitudinis æquante; columellá substrictè descendente, callosá; aperturá oblongá, intus submargaritaceá; 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, striatulá, epidermide olivaceo-lutescente indutá; spirá elongato-conicá, apice acutá; anfractibus  $5\frac{1}{2}$  vix convexiusculis, ultimo  $\frac{3}{7}$  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 striatulá, 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 canaliculatà; peristomate albo, expanso, reflexiusculo, supernè affixo.*

Long. 26, diam.  $8\frac{2}{3}$  mill.; ap. c. perist.  $6\frac{1}{2}$  mill. longa, 7 lata.

*Hab.* in insulà Haiti.

3. *CLAUSILIA CYCLOSTOMA*, Pfr. *Cl. testà non rimatà, fusiformi, gracili, solidà, sub lente subtilissimè et confertissimè undulato-striatà, non nitente, purpurascenti-nigricante; spirà regulariter attenuatà, sursum pallidiorè, apice obtusiusculà, purpureà, nitidà; suturà filari, supernè papilliferà; anfractibus 9 planiusculis, ultimo deorsum soluto, basi bicristato; aperturà circulari, intus nigrà; lamellis approximatis, superà compressà, acutà, inferà minore; lunellà nullà; plicis palatalibus 2-3 profundis, vix conspicuis, subcolumellari immersà; peristomate continuo, supernè subemarginato, 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. testà vix rimatà, subclaviformi, tenui, lævigatà, nitidà, luteo-corneà, albo-variegatà; spirà turrità, apice acutà; anfractibus 9 convexiusculis, ultimo basi rotundato; aperturà elliptico-pyriformi; lamellis tenuibus, inferà profundà, subtransversà; lunellà nullà; plicis palatalibus 2, superà suturæ parallelà, breviusculà, inferà brevissimà, subcolumellari usque ad marginem porrectà; 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. testà subrimatà, fusiformi-subulatà, solidulà, lævigatà, pellucidà, luteo-corneà, albo-variegatà; spirà gracillimà, apice acutà; anfractibus 13 convexis, ultimo basi tumidulo; aperturà pyriformi; lamellis mediocribus, conniventibus; lunellà nullà; plicis palatalibus 2 suturæ parallelis, superà longiore, alterà brevi, subcolumellari inconspicuà; 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. testà subrimatà, fusiformi-turrità, solidà, longitudinaliter subarcuatim striatà, albà, punctis cinereis conspersà, nitidulà; spirà elongatà, gracili, apice corned, acutà; anfractibus 14 planis, ultimo anticè corrugato, basi subcompresso; aperturà obliquà, pyriformi-ovali, intus fuscà; lamellis parvulis, superà ferè obsoletà, inferà profundà, obliquà; lunellà inconspicuà; plicà palatali 1 superà, subcolumellari immersà; 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 Candià et Siphanto (Spratt).

7. *CLAUSILIA CANDIDA*, Pfr. *Cl. testà rimatà, cylindraco-fusi-*

*formi, solidâ, medio sublævigatâ, candidâ, punctis corneis irregulariter aspersâ, haud nitente; spirâ sensim attenuatâ, apice corned; 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 corned, 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 corned, acutiusculâ; suturâ impressâ, submarginatâ; anfractibus 12 planiusculis, ultimo latere compresso, basi bicristato; cristis conniventibus, basi contiguâ, alterâ juxta periomphalum*

*subarcuatâ, compressâ, alterâ breviorē; aperturâ pyriformi-oblonga, intus fuscâ; lamellis conniventibus, minutis, inferâ sursum furcatâ; lunellâ inconspicuâ; plicâ palatali 1 superâ, subcolumellari immersâ; 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. testâ rimatâ, fusiformi, solidâ, confertissimè costulatâ, cinereo-albidâ, non nitente; spirâ regulariter attenuatâ, apice corned, acutiusculâ; suturâ subcrenulatâ; anfractibus 10 convexiusculis, ultimo infra suturam compresso, anticè rugoso-costulato, basi breviter cristato; aperturâ oblongâ, intus albâ; lamellis parvulis, conniventibus; lunellâ inconspicuâ; plicâ palatali 1 superâ, subcolumellari immersâ; 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. testâ vix rimatâ, ventroso-fusiformi, truncatâ, confertim et acutè lamellatâ, haud nitente, fusciscenti-albidâ; suturâ profundâ, lamellis prominentibus denticulatâ; anfractibus (spec. trunc.) 7 scalaribus (margine supero ampliati, supra suturam prominente), ultimo latere impresso, basi subbicristato: cristâ rimali obsoletâ, alterâ distinctâ; aperturâ amplâ, pyriformi; lamellis exiguis, approximatis; lunellâ inconspicuâ; plicâ palatali 1, subcolumellari emersâ; 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 Melitâ (Spratt).

14. *CLAUSILIA CANALICULATA*, Pfr. *Cl. testâ subrimatâ, fusiformi, solidâ, striatâ, purpureo-brunneâ, vix nitidâ; spirâ gracili, apice acutâ; suturâ subalbofilosâ; anfractibus 10 planulatis, ultimo costulato, latere impresso, basi æqualiter bicristato; aperturâ rotundato-pyriformi, basi canaliculatâ, intus fuscâ; lamellis approximatis, superâ marginali, parvâ, inferâ altâ, flexuosâ; lunellâ imperfectâ, interruptâ; plicâ palatali 1, suturæ parallelâ, lunellam utrinque transgrediente, subcolumellari inconspicuâ; peristomate continuo, soluto, tenui, expanso, basi regulariter rotundato.*

Long. 13, diam. 3 mill.; ap.  $3\frac{1}{4}$  mill. longa, 3 lata.

β. *Clavato-fusiformis, anfractibus 9, peristomate carneo-labiato.*

*Hab.* in Eubœâ. Var. β. in Monte Delphi, 6500 ped. supra mare.

15. *CLAUSILIA HOMALORHAPHE*, Pfr. *Cl. testâ rimatâ, cylindraceo-fusiformi, solidâ, longitudinaliter striatâ, cærulescenti-albâ, vix nitidâ; spirâ sursum attenuatâ, apice corned, tum saturatè cæruleâ; suturâ planâ, marginatâ; anfractibus 11 planis, ultimo subcompresso, anticè rugoso-striato, basi obtusè*

*bigibboso ; aperturá ovali, intus carneá ; 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, corned, 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, cretaceá, flammulis longitudinalibus corneis pictá ; spirá sursum attenuatá, apice pallidè corned, 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, castaneá, 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-*



*matís, 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 acutiusculá; 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 exiguá, inferá flexuosá; lunellá magná, suturam attingente; plicis palatalibus 2, alterá superá, breviusculá, 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-fusiformi, 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, fuscúlo.*

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, cylindraceo-fusiformi, solidulá, subtiliter striatulá, griseo-carnéá, 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;*

*lunellâ validâ; plicâ palatali 1 superâ, subcolumellari emersâ; 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. testâ subrimatâ, fusiformi, tenui, confertim costulatâ, sericinâ, fuscâ; spirâ apice pallidè corned, obtusiusculâ; suturâ albo-marginatâ; anfractibus 10 convexiusculis, ultimo basi breviter cristato; aperturâ amplâ, subrotundâ, supernè angulatâ, intus hepaticâ; lamellâ superâ parvulâ, inferâ flexuosâ; lunellâ validâ, arcuatâ; plicis palatalibus 2 elongatis, superis, 1 inferâ emersâ, medianis pluribus irregularibus, callosis, subcolumellari immersâ; 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. testâ vix rimatâ, cylindraceo-fusiformi, tenui, longitudinaliter confertissimè costulato-striatâ, pallidè fuscâ, diaphanâ, vix nitidulâ; spirâ supernè attenuatâ, apice glabrâ, luteâ, obtusâ; suturâ submarginatâ, costulis crenulatâ; anfractibus 9, prioribus 6 convexis, sequentibus 2 planulatis, ultimo basi tumido, obsoletissimè bigibboso; aperturâ latè ovali; lamellâ superâ exiguâ, inferâ magnâ, compressâ, transversâ, basi ramosâ; lunellâ leviter arcuatâ; plicâ palatali 1 superâ, subcolumellari inconspicuâ; 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. testâ vix rimatâ, fusiformi, tenui, longitudinaliter confertissimè costulato-striatâ; vix sericinâ, cinerascenti-fuscâ; spirâ apice corneâ, obtusulâ; suturâ submarginatâ, crenulatâ; anfractibus 9, summis convexis, reliquis vix convexiusculis, ultimo latere impresso, basi suberistato; aperturâ pyriformi-ovali, intus fusculâ; lamellis tenuibus, approximatis; lunellâ filari, leviter arcuatâ; plicâ palatali 1 superâ (nonnullisque obsoletis supra eam), subcolumellari immersâ; 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. testâ breviter arcuato-rimatâ, fusiformi, solidulâ, haud nitente, saturatè cinereâ, costis filiformibus, rectis, albis, confertis munitâ; spirâ sensim attenuatâ, apice acutâ; suturâ vix impressâ, albo-filosâ; anfractibus 13 planis, ultimo fortius rugato, basi cristâ brevi, arcuatâ juxta periomphalum latiusculum, et gibbere obtuso munito; aperturâ ovali, intus fusculâ; lamellâ superâ parvâ, inferâ obliquâ, 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-fusiformi, tenui, confertim costulatá, diaphaná, fuscescenti-albíá; 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 parvú, inferá transversá; lunellá distinctá inter cristarum originem; plicá palatali 1 superá, subcolumellari immersá; 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-fusiformi, truncatá, longitudinaliter costulato-striatá, diaphaná, fuscá; suturá albo-marginatá; anfractibus (superstit.) 6½ planiusculis, ultimo latere excavato, basi validè bicristato; cristis parallelis, alterá arcuatá, periomphalum latiusculum cingente, alterá sursum furcatá; aperturá subrhombéd, basi leviter canaliculatá; lamellis mediocribus, conniventibus, inferá profundá, vix flexuosá; lunellá validá; plicis palatalibus 2 brevibus supra lunellam, subcolumellari vix emersá; 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 Pamphylíâ (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 ramosá; lunellá parvulá; plicis palatalibus 2, superá 1, alterá inferá, breviter emersá, subcolumellari suboccultá; 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 gularis*, 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 torquæ 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.

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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 Zélée.*

*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 dilatable, 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 *africanus* 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 *Hyladinae* 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 AUSTRALASIÆ. (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.



Washed with water and dried.

THE JOURNAL OF THE

Preserved to the Zoological Society by Mr. Abbas Kasha



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 'Ossements 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 'Ossements 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 reconnaît 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 "Sirenoid" 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 molares. 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 *Hypopotamus 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 *Paloplotherium*.

\* 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 (*Elephantidæ*), and the Sirenia as another (*Manatidæ*) ; 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 rudimentary 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\*.

*Bovidæ.*

Sivatherium.

—

Bos.

Ovis.

Capra.

Antilope, and several of  
the genera into which  
these have been dis-  
membered.

### 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-nodosi, tuberculis rotundatis, obtusis, margine ventrali valdè pectinatâ.*

(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; utraque anticè laminâ testaceâ 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.

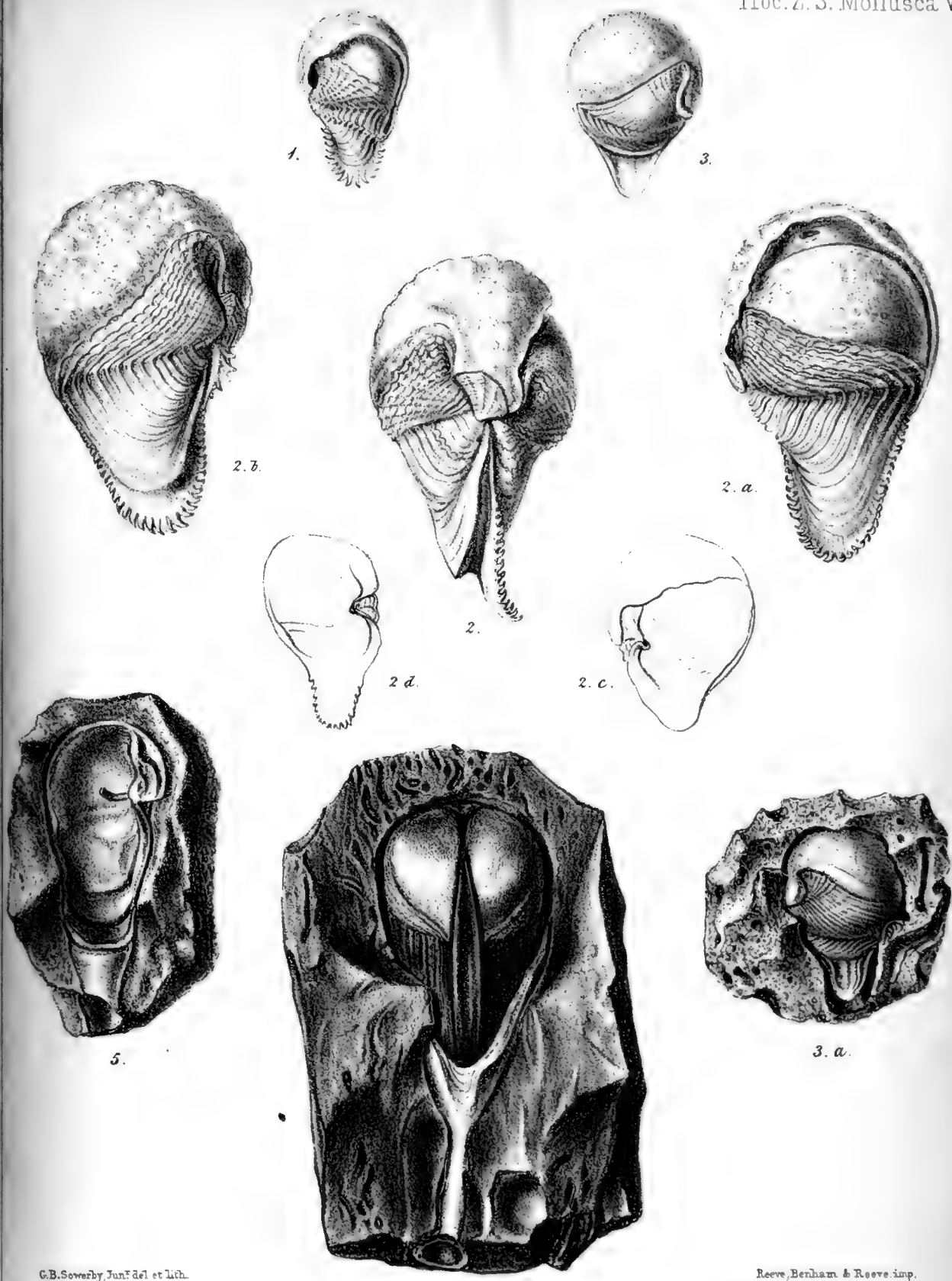
The shells of this genus, when mature, have the ventral hiatus closed by an expanded test fixed to the edge of each valve; that of the left valve commences at the back, in a nucleus resembling an extra umbo, and in front overwrapping that of the other. The right valve, on the other hand, materially exceeds 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.

4.

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 subattonuatâ; 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 divisis, 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 subquadratâ, 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.

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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 vice-roy 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 MARIÆ, *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.  $\frac{1}{12}$ 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.  $\frac{1}{9}$ th of an inch.

*Hab.* Auckland, New Zealand.

### 2. LIMACIDÆ.

1. *HELIX DUNNIÆ*, Gray, *Ann. Nat. Hist.* v. 317, 1841 ; *Faunula 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 Dumniæ* 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.  $\frac{1}{10}$ 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.

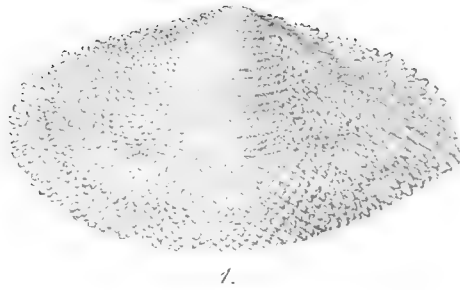
#### LATIA NERITOIDES.

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.





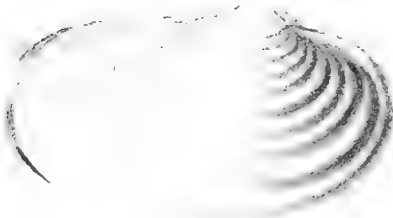
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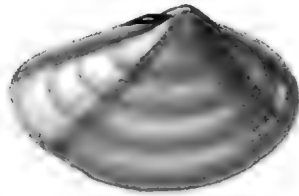
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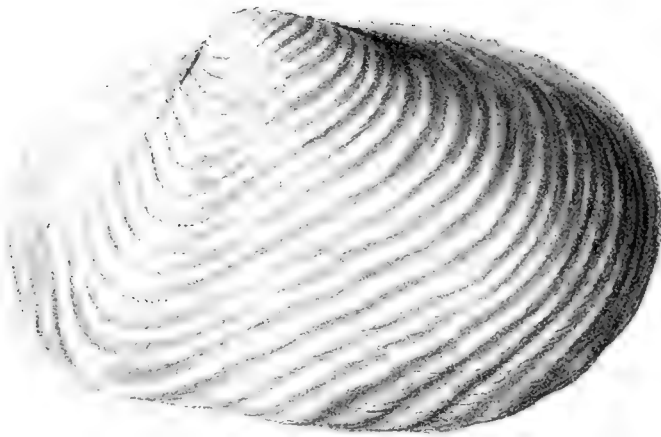
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1. *TELLINA SQUAMULOSA*. 2. 3. & 4. *GEOMELANIA JAMAICENSIS*.  
 5. *PANOPEA JAPONICA*. 6. *SANGUINOLARIA TELLINOIDES*.  
 7. *THRACIA MAGNIFICA*. Jonas.

## 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 obsitâ; latere antico rotundato, postico subflexuoso rostrato; areâ sulco impressâ; 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. testâ transversâ, inæquilaterâ, utrinque hiantè, rubiginosâ, tenui, lævi, striis transversis concentricis radiatim lineolatâ; latere antico latiore, rotundato; postico angustiore, rotundato, subrostrato; areâ laterali lined latâ impressâ; 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. testâ æquivalvi, transversâ, lateribus inæqualiter hiantè, inæquilaterâ, utrinque rotundatâ, albâ, tenui, fragili, transversim concentricè plicatâ, 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.*

*testâ ovato-oblongâ, transversâ, inæquivalvi, lacted; utrinque rotundatâ; lateribus hiantè; valvâ dextrâ ventricosiore et majore quam sinistrâ; latere antico flexuoso, posteriore brevi, obliquè carinato, transversim corrugato-plicatâ, plicis subdistantibus concentricis longitudinaliter radiatim granulato-striatâ, 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.

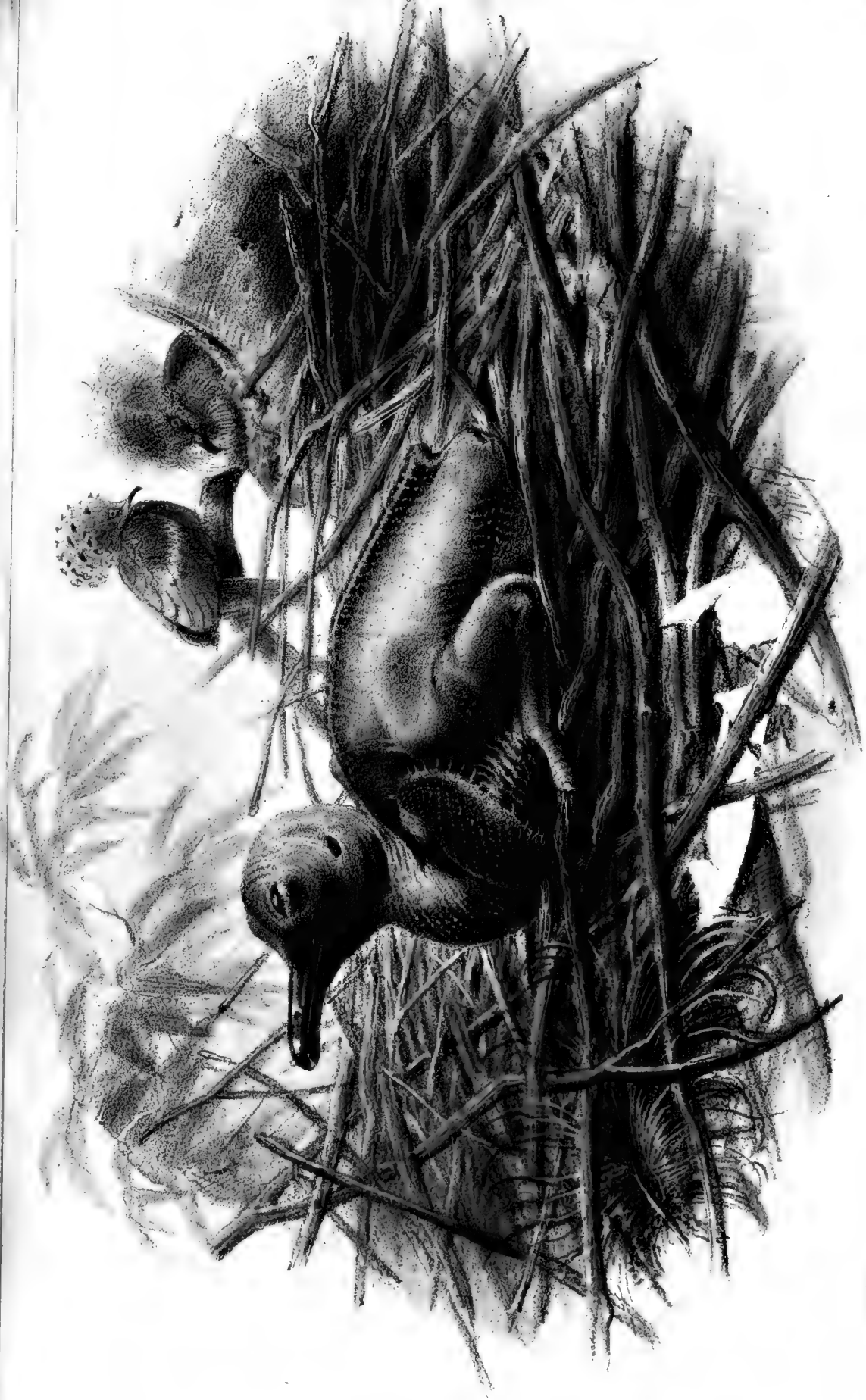
They now began in earnest, and on the 15th of August they ceased from their labor, during which the male had generally carried up the materials and the female disposed of them. On this eventful day it is supposed the single egg was laid, but it was so constantly covered by one or other of the birds, 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.



Young of the year.

HYBRID CROWN PIGEON.

Painted by J. G. Thompson, & A. B. Allen.







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