

March 4, 1873.

John Gould, Esq., F.R.S., V.P., in the Chair.

Mr. Edwin Ward sent for exhibition the original leg-bones of *Dinornis maximus*, described and figured by Professor Owen in the Society's 'Transactions' (vol. vi. p. 497, pls. lxxxix., xc.), belonging to Col. Michael.

The following papers were read :—

1. On the Spiders of St. Helena.

By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S.

[Received February 1, 1873.]

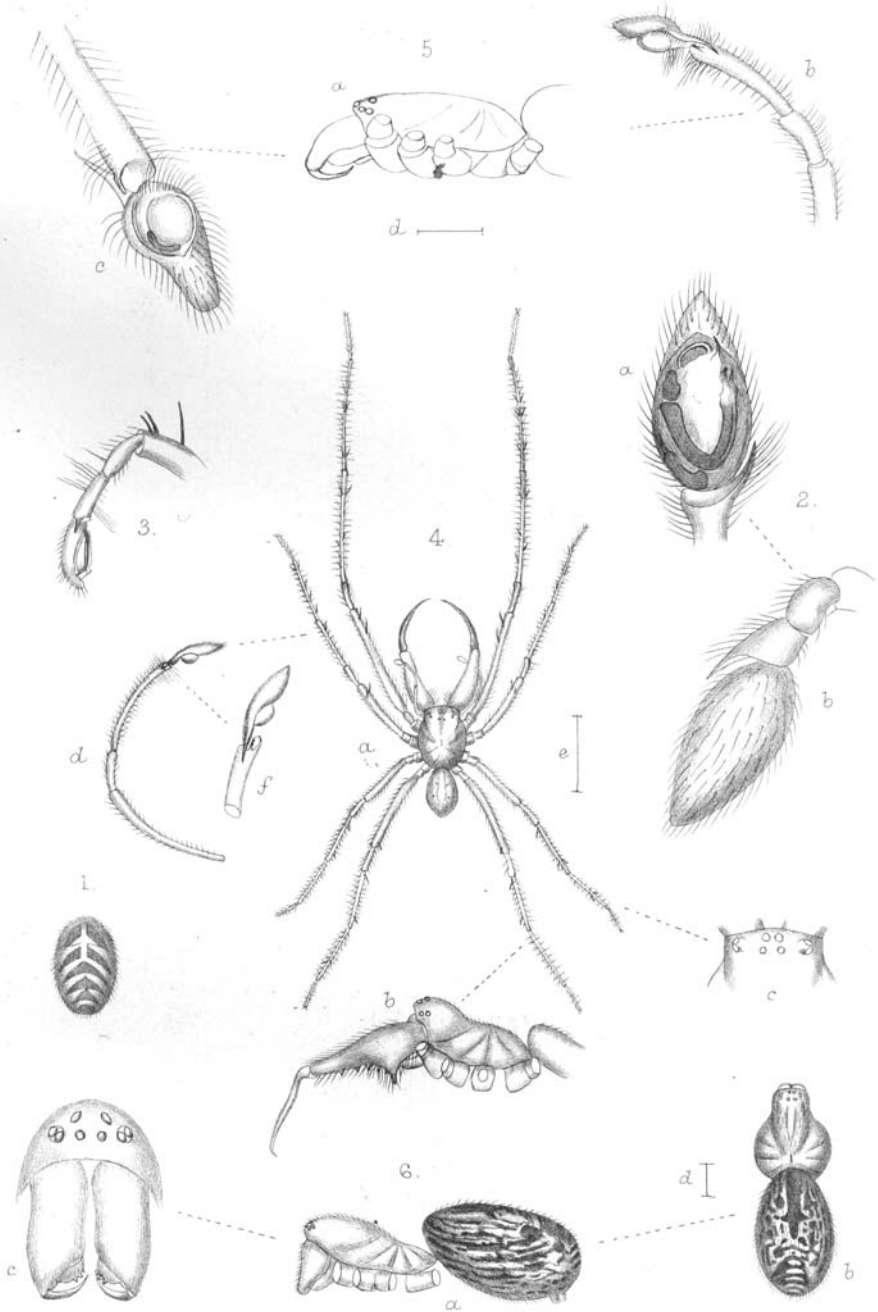
(Plate XXIV.)

In a former paper (Proc. Zool. Soc. 1869, pp. 531–544, pl. xlii.) twenty species of Spiders were recorded and described from a collection received from Mr. Melliss, by whom they were captured in the Island of St. Helena. Since then I have received from the same gentleman two other collections, in which, in addition to most of the species before recorded, I have found twenty-three others : among these, eleven appear to be undescribed, while, of the remainder, five are indigenous to Great Britain, *Segestria senoculata*, *Tegenaria civilis*, *Scytodes thoracica*, *Theridion tepidarium*, and *Linyphia leprosa* ; two have been also received from Ceylon and India, *Pholcus distinctus* and *Artema convexa* ; two are European, *Argyrodes epeiræ* and *Xysticus grammicus* ; and two are Egyptian, *Lutrodictus erebus* and *Tetragnatha pelusia*. The European stamp observed upon in regard to the Spiders of the former collection is thus equally marked in those now recorded and described, three only of those already described belonging to species not hitherto recorded as European.

According to the present and former papers, the known Spiders of St. Helena thus number forty species, a number which will, I doubt not, be greatly added to when a closer and more extended search shall have been made. I understand that Mr. Melliss has ceased to reside in St. Helena, so there is no more chance of further discoveries in Arachnida from his exertions ; but for what he has done, and so kindly placed within my reach as materials for the present and former papers, I desire now to return him my very heartiest thanks.

*List of species, including those recorded in the former paper marked by an *.*

<i>Filistata condita</i> , sp. n.	* <i>Segestria perfida</i> .
* <i>Dysdera crocata</i> , Koch = D.	— <i>senoculata</i> .
<i>rubicunda</i> of former paper.	<i>Gnaphosa lugubris</i> , sp. n.



O.P. Cambridge delt.
A.T. Hollick lith.

Spiders of St. Helena.

W. West & C^s imp.

- **Clubiona dubia*, sp. n.
Cheiracanthium mellissii, sp. n.
 ——— *planum*, sp. n.
Amaurobius crucifer, sp. n.
Tegenaria civilis.
 ——— *proxima*, sp. n. (*T. atrica*
 of former paper).
Scytodes thoracica.
 **Pholcus phalangioides*.
 ——— *distinctus*.
Artema convexa.
 **Ariadne mellissii*, sp. n.
 **Theridion punicum*.
 *—— *fulvolunulatum*.
 ——— *tepidariorum*.
Latrodectus erebus.
Linyphia leprosa.
 ——— *albinaculata*, sp. n.
 ——— *trifididens*, sp. n.
Argyrodes epeiræ.
Tetragnatha pelusia.
- **Meta digna*, sp. n. (includes
 also *Meta indigna* of former
 paper).
 **Epeira solers*?
 **Argiope aurelia*.
Uloborus williamsii.
Xysticus grammicus.
 **Philodromus signatus*, sp. n.
 **Heteropoda* (*Olios*) *tridentigera*, sp. n.
 **Pasithea pulchra*.
 **Lycosa ligata*, sp. n.
 *—— *inexorabilis*, sp. n.
 ——— *dolosa*, sp. n.
 **Salticus nigrolimbatus*, sp. n.
 *—— *adansonii*.
 ——— *inexcultus*, sp. n.
 ——— *subinstructus*, sp. n. (in-
 cludes also *Salticus illigeri*
 of former paper).

Fam. FILISTATIDES.

Genus FILISTATA.

FILISTATA CONDITA, sp. n. (Plate XXIV. fig. 1.)

Immature female, length $2\frac{1}{2}$ lines.

The whole of the fore part of this Spider is of a yellow colour.

The *cephalothorax*, which is of the ordinary form of the genus, has the upper part clothed pretty thickly with coarse and rather adpressed dark brown hairs, giving a darkish hue to that portion.

The *eyes* are rather large, but in the usual position, seated upon a strongish tuberculiform transverse oval eminence, a little way behind the fore margin of the clypeus.

The *legs* are moderately long and strong; they do not differ greatly in length; those of the fourth pair seemed to be slightly longer than those of the first, and the third pair rather the shortest; they are furnished with blackish-brown bristly hairs only, and each tarsus ends with three inconspicuous claws.

The *palpi* are strong, moderately long, similar to the legs in their armature, except that the single terminal claw is stronger than those on the tarsi of the legs.

The *fulces* are short and weak, but rather projecting forwards.

The *maxillæ*, *labium*, and *sternum* present no observable variation from the usual generic type.

The *abdomen* is oval, rounded and bluff behind, where it projects considerably over the site of the spinners; it is of a dull whitish drab-yellow colour, clothed sparingly with coarsish brown hairs, and marked on the hinder half of the upperside with a series of four or five strong and well-defined transverse angulated bars or chevrons of

a dull rusty reddish colour, the apex of each one (except the foremost) running into the one before it. These bars span the whole width of the upperside of the abdomen, being stronger at the angles than at the extremities. The spinners, six in number, are very short and inconspicuous.

A single female, not yet adult, was contained in Mr. Melliss's collection. The pattern on the abdomen distinguishes it at once from any recorded species known to me.

FAM. DYSDERIDES.

Genus DYSDERA.

DYSDERA CROCOTA.

Dysdera crocota, C. Koch, Die Arachn. Bd. v. p. 81, tab. 166. figs. 392-394.

Dysdera rubicunda, Bl. Spid. Great Brit. & Ir. p. 371, pl. 28. fig. 267; Cambr. P. Z. S. 1869, p. 532 (non *D. rubicunda*, Koch).

Dr. Koch has lately sent me typical examples of *Dysdera rubicunda* (Koch) and *D. crocota* (Koch), from which it appears that *D. rubicunda* (Koch) is quite distinct from the Spider so recorded by Mr. Blackwall, the latter being the same as *D. crocota* (Koch).

Examples of both sexes of *D. crocota* were received from Mr. Melliss in his recent collections, as well as in the former one.

Genus SEGESTRIA.

SEGESTRIA SENOCULATA.

Segestria senoculata, Walck. Ins. Apt. vol. i. p. 268.

Immature examples of what I believe to be this species were found among the St.-Helena Spiders received from Mr. Melliss.

FAM. DRASSIDES.

Genus GNAPHOSA (Latr.).

GNAPHOSA LUGUBRIS, sp. n. (Plate XXIV. fig. 2.)

Adult male, length $2\frac{1}{4}$ lines.

Cephalothorax oval, depressed, and almost devoid of any lateral constriction forwards, the normal grooves and indentations being nearly obsolete; it is of a deep blackish-brown colour, thinly clothed with pale adpressed hairs.

The *eyes*, looked at from above and behind, are in two transverse nearly parallel rows; the hind centrals are further from each other than each is from the hind lateral on its side, while those of the foremost row appeared to be as nearly as possible equidistant from each other. The height of the clypeus is equal to half that of the facial space; all the eyes (except those of the fore central pair, which are dark-coloured) are of a dull amber-colour.

The *legs* are rather long, moderately strong; their relative length seemed to be 4, 1, 2, 3; they are more or less of a dark greenish black-brown hue, except the tarsi and metatarsi (of the fourth pair

the tarsi only), which are pale-coloured; they are furnished with hairs of various lengths, and a few spines, chiefly on the tibiæ and metatarsi of the two hinder pairs.

The *palpi* are short and not very strong; the radial and cubital joints are very nearly of equal length; perhaps the former is slightly the shortest, and has its outer extremity continued in a tapering apophysis, whose extreme point is slightly obtuse and of a deep brown colour, the rest being of a greenish-brown hue; the length of this apophysis is rather less than that of the joint itself. The digital joint is rather large, of an oval form, exceeding in length that of the radial and cubital joints together; the palpal organs are neither very prominent nor complex, consisting of several corneous processes, of a red-brown and whitish colour.

The *falces* are moderately long and strong, projecting forwards, and a little prominent near the base in front.

The *maxillæ*, *labium*, and *sternum* are of the normal character, and (with the *falces*) are of a dark yellowish-brown colour.

The *abdomen* is of a narrow, oblong-oval form; it is of a black colour, with a somewhat silky bottle-greenish reflection in some positions. It is well clothed with hairs; and there are four indistinct pale dots, forming nearly a square, near the middle of the upper-side. The spinners are rather long and prominent, those of the inferior pair being the longest and strongest; they are of a blackish colour, tipped with whitish. The spiracular plates are large and of a dull yellowish-brown colour.

A single adult male was comprised in Mr. Melliss's collection from St. Helena.

Genus CLUBIONA.

CLUBIONA DUBIA. (Plate XXIV. fig. 3.)

Clubiona dubia, Cambr. Spid. St. Helena, Proc. Zool. Soc., Nov. 1869, p. 532.

In the former collections received from Mr. Melliss the female only of this Spider was found; in the last collection there were several males and several females also. In size, colours, and general characters the sexes are similar; but the *falces* of the male are longer, and each has a strong conically formed sharp tooth on the under edge of its inner side, near the extremity.

The *palpi* are moderately long and not very strong. The humeral joint has three distinct and nearly erect black spines near its fore extremity on the upperside, two near together in a transverse line, the third, which is the longest, is a little way behind them. The radial and cubital joints are of equal length; the former has a small, pointed, tapering, dark red-brown, somewhat tooth-like, corneous-looking apophysis in continuation of its outer extremity, and four or five longish, bristly, prominent hairs on its inner side; the digital joint is small and of an oval form, not much, if at all, exceeding in length that of the radial joint. The palpal organs are neither very prominent nor complex; a longitudinally placed corneous process on their outer side has a deep, red-brown, shining margin,

near the fore extremity of which, on the inner side, there are one or two small, red-brown, corneous prominences.

An elongate portion of the epidermis on the fore part of the upperside of the abdomen has a smooth and somewhat corneous appearance, and is rather darker-coloured than the rest.

Several examples of this species, which is allied to *C. lutescens* (Westr.), but quite distinct, were contained in the collection last received from Mr. Melliss.

Genus CHEIRACANTHIUM.

CHEIRACANTHIUM MELLISSII, sp. n. (Plate XXIV. fig. 4.)

Adult male, length (exclusive of the falces) 5 lines.

The *cephalothorax* of this fine and striking species is broad oval, rather roundly truncated before, constricted laterally near the fore margin, and moderately convex above; the normal grooves and indentations are not very strongly marked. Its colour (as well as that of the falces, maxillæ, and sternum) is orange-yellow, glossy; and it appeared to be wholly destitute of hairs. The width of the fore margin equals half the length of the cephalothorax.

The *eyes* (eight in number, rather small, and not very unequal in size) are in three groups, rather widely separated from each other; the central one, of four eyes, forms a trapezoid, whose fore side is a little the shortest, and its transverse diameter shorter than the longitudinal; the foremost pair of these eyes, which are the largest of the eight, are separated from each other by about an eye's diameter; those of each lateral pair are placed obliquely, and not quite contiguously to each other on a tubercle.

The *legs* are long, moderately strong; their relative length is 1, 4, 2, 3, those of the first pair being greatly the longest. They are of a yellow colour, furnished with hairs, some of which are very slender and erect, also with a few, not very strong, black spines. Each tarsus ends with two claws and a black claw-tuft.

The *palpi* are rather long, slender, and similar in colour to the legs; the length of the humeral joint, which is considerably bent, is equal to that of the cubital and radial joints together, the latter being nearly three times the length of the cubital, and slightly curved; it has a small, fine, sharp-pointed, red-brown apophysis at its outer fore extremity. The digital joint is small and narrow, being of the same length as the cubital, which it does not exceed in breadth, and its base on the outer side is continued backwards in a sharp-pointed spur, of no great length and running just above the radial apophysis; the palpal organs are small and simple, consisting of a somewhat circular lobe with a small, pale, curved spine in connexion with its upper surface.

The *falces* are of great size and divergent, of a somewhat bent form, and enlarged on the outer sides near the base, as well as prominent underneath in an angular form; at the angle is a strong tooth, followed forwards by a longitudinal series of five other teeth of less size; along the lower margin by these teeth is a fringe of coarsish black hairs: the length of the falces equals that of the

cephalothorax ; and the fangs, which are also equal to the falces in length, are strong, sharp-pointed, of a deep-black chestnut-brown colour, tolerably straight in the middle, but bent at both ends ; a constriction towards their extremity gives them at first sight the appearance of being articulated at that point.

The *maxillæ* are of the normal form, and are thickly furnished with strong black hairs on their inner margins (next to the falces).

The *labium* is broadish oblong in form, strongly emarginate at the apex, and does not much exceed in length half that of the *maxillæ* ; its colour is a dark chestnut-brown.

The *abdomen* is short-oval, and projects over the base of the cephalothorax ; it is of a dull yellow colour, very sparingly clothed with short fine hairs, and marked on its upperside, near the middle, with four impressed dots of a rusty hue, forming a square, whose fore side is the shortest.

A single example of this exceedingly fine and distinct *Cheiracanthium* was contained in Mr. Melliss's St.-Helena collection ; and I have great pleasure in connecting with it the name of that gentleman. By the size of the falces it is allied to *C. italicum* (Canestrini and Pavesi, Atti della Soc. Ital. di Scienze Nat. xi. fasc. 3, 1848, p. 114, separate copy ? ; also Arch. p. Zool. Genova, ser. 2, vol. iii. tab. 4. fig. 3) ; but it may be distinguished at a glance by the remarkable difference in the character and relative proportion of the palpal joints, as well as by the greater length of the legs of the first pair of the present species, and the less size of the Spider itself.

CHEIRACANTHIUM PLANUM, sp. n. (Plate XXIV. fig. 5.)

Adult male, length 4 lines.

The *cephalothorax* of this species is of a rather broad oval, only slightly constricted laterally in front, and flattened above, its upper convexity being very slight, and at the fore part it is somewhat squarely truncated ; it is of a yellow colour, slightly suffused in front with pale reddish brown ; the space enclosed by the four central eyes is dusky blackish ; and from them an indistinct suffused line of the same runs back along the middle, disappearing on the hinder slope.

The *eyes* are in two rows, and occupy a broad transverse, but very narrow longitudinal area, the fore lateral eyes (when looked at from the front) being very nearly as wide apart as the width of the two falces ; the clypeus is obsolete, owing to the fore central eyes being placed immediately upon the fore marginal line of the caput. The eyes are small, and do not differ much in size ; those of the fore central pair are rather more than an eye's diameter distant from each other, and each is considerably further removed from the fore lateral eye on its side ; those of the hind central pair are further from each other than those of the fore central pair, the four central eyes forming a square whose fore side is the shortest ; and the space which separates the central eyes is less than that which separates each from the hind lateral on its side, in about the same proportion as above mentioned in regard to the eyes of the foremost row ; those

of each lateral pair are nearly contiguous to each other, and seated on a tubercle.

The *legs* are long and rather slender; their colour is yellow, and they are furnished with hairs, long, slender, erect bristles, and a few not very long black spines; their relative length is 1, 4, 2, 3, those of the first pair being greatly the longest; each tarsus ends with two curved black claws and a small scopula or claw-tuft of hairs.

The *palpi* are similar in colour to the legs, slender, moderately long, and furnished with hairs and bristles; the humeral joint is curved, and is equal in length to that of the cubital and radial together; the radial joint is double (if not rather more than double) the length of the cubital, and has on its outer extremity a very small, rather bent, dark reddish-brown apophysis; this apophysis is slightly cleft at its extremity. The digital joint is short, of an oval form, and does not exceed in length half that of the radial joint; at its hinder extremity on the outer side it is continued in the form of a rather tapering, sharp-pointed, nearly straight spur, which runs just above the radial apophysis, and is about half the length of the joint itself. The palpal organs are neither complex nor highly developed; they are of a somewhat flattened globular form, with an exceedingly slender, filiform black spine in contact with their inner margin.

The *fulces* are similar in colour to the cephalothorax; they are very strong, projecting, and prominent near their middle in front, but not divergent.

The *maxillæ* are of normal form; and their colour, with that of the sternum, is yellow.

The *labium* is oblong, emarginate at the apex, and of a blackish-brown suffused colour.

The *abdomen* is of moderate size and oval form; its colour is a dull luteous yellow, sparingly clothed with silky yellow hairs, and thinly covered on the sides and upperside with whitish-yellow cretaceous spots or small patches, many of them being nearly conterminous, and leaving a clear short sword-shaped or slightly cruciform marking on the fore part of the upperside.

A single adult male of this species was contained in Mr. Melliss's St-Helena collection.

Fam. AGELENIDES.

Genus AMAUROBIUS.

AMAUROBIUS CRUCIFER, sp. n. (Plate XXIV. fig. 6.)

Adult female, length 2 lines.

The *cephalothorax*, when looked at from above, has more the look of that of Spiders of the genus *Agelena* than the typical *Amaurobius*; it is rounded behind and strongly constricted laterally forwards, the caput being produced or as it were drawn out. It is of a pale yellow-brown colour, thinly clothed with hairs; and the normal grooves and indentations are marked with convergent black-brownish lines and suffusions; the lateral margins are also of the same colour.

The *eyes* are in two transverse rows on the fore part of the caput,

the height of the clypeus being very nearly half that of the facial space; the hinder row, which is the longest (looked at from in front), is strongly curved, the front one nearly straight. The eyes are not very unequal in size, the fore laterals being slightly the largest; the intervals between the eyes of each row respectively are as nearly as possible equal; the four central eyes form a trapezoid whose fore side is shorter than its hinder one, and the length of its sides intermediate between them.

The *legs* are not very long nor very unequal in length, but moderately strong; their relative length is 1, 4, 2, 3, those of the fourth and second pairs being very nearly equal; they are of a pale brownish-yellow colour, broadly annulated with darker brown; they are furnished with hairs, and each tarsus ends with three claws; there is also a calamistrum on the metatarsi of the fourth pair, situated rather on the inner side behind.

The *fulces* are long and strong; each has a small flattish enlargement on the inner side near the extremity, armed with three small sharp teeth; this enlargement is apparently formed by the excavation of the upperside of the falces at that part.

The *maxillæ* are long, strong, obliquely and roundly truncated at their extremities on the outer side, and slightly inclined towards the *labium*, which is about half the length of the maxillæ, of an oblong form, and rather broader at its base than at its apex, where it is somewhat rounded. The *fulces* are similar in colour to the cephalothorax; the maxillæ are similar to the legs and palpi; the labium is suffused with blackish brown, and the *sternum*, which is of a heart-shaped oval form, is slightly suffused with brown.

The *abdomen* is oval, rounded, and rather bluff behind; the ground-colour is a pale luteous yellow, and it is more or less irregularly marked all over with black streaks and markings; among those on the upperside, near the middle, is a fairly defined cruciform marking, followed towards the spinners, in a longitudinal series, by several rather short, blunt-angular, transverse, black stripes. In front of the ordinary spinners is a broad transverse supernumerary one.

Two adult females were contained in Mr. Melliss's St.-Helena collection.

Genus *TEGENARIA*.

TEGENARIA CIVILIS.

Tegenaria civilis, Bl. Spid. Great Brit. & Ir. p. 166, pl. 12. fig. 107.

Adults of both sexes were contained in the collection last received from Mr. Melliss; St. Helena is thus another locality ascertained for this cosmopolitan species.

TEGENARIA PROXIMA, sp. n.

Tegenaria atrica, Cambr. Spiders of St. Helena, P. Z. S. 1869, p. 533.

Adult male, length 3 lines.

In size, colours, and markings this species nearly resembles

T. civilis (Walck.). The markings, however, on the cephalothorax and sternum, as well as the annulation of the legs, are more distinct, and perhaps bear a rather nearer approach, both upon these parts and also on the abdomen, to *T. atrica* (Koch), from which the small size of the present species, independently of other characters, at once distinguishes it. The femora of the first pair of legs are also less suffused with dark reddish brown than in *T. civilis*; but in the *palpi* are perhaps contained the best distinguishing characters. The cubital and radial joints in both species bear the same (or very nearly the same) relative length to each other, the latter being rather longer than the former, enlarging on the outer side towards its extremity, where, as in *T. civilis*, there is a small red-brown corneous-looking apophysis; but in that species this apophysis is broadish and obliquely truncated at its extremity, while in the present species it is less strong, tapering and pointed at its extremity; the digital joint is also larger; and the palpal organs, although bearing the same general form and structure, are perceptibly different in their development; from their centre (connected with a strong corneous process) there issues a filiform spine, which, curving backwards and with a bold sweep round their inner margin, continues in a thread-like form quite round their extremity, ending on or close to their outer margin: an analogous spine exists in *T. civilis*; but in that species it is much shorter and stronger, with a closer and far smaller sweep, and its point is not drawn out into a thread-like form. Several other processes analogous to each other are connected with the palpal organs of the two species; but in the present they are, although longer and more prominent, yet proportionally not quite so strong.

A single adult male was contained in Mr. Melliss's St.-Helena collection now under consideration. I feel no doubt that the example contained in a former collection, and recorded (*l. c.*, *suprà*) as *T. atrica*, is of the same species as the present, though that example had not attained maturity.

It is possible that this may be the *T. testacea*, Sim. (Aranéides nouveaux ou peu connus du midi de l'Europe, 1870, p. 10), found at Granada, in Spain; it agrees with that species in the form of the digital joint and the radial apophysis as described by M. Simon; but I am inclined to think it is distinct.

Fam. SCYTODIDES.

Genus SCYTODES.

SCYTODES THORACICA.

Scytodes thoracica, Walck. Ins. Apt. i. p. 270.

An adult female was contained in Mr. Melliss's St.-Helena collection last received.

Fam. PHOLCIDES.

Genus PHOLCUS.

PHOLCUS DISTINCTUS.

Pholcus distinctus, Cambr. Linn. Soc. Journ. vol. x. p. 380, pl. xi. figs. 28-30.

Females of this species were received from Mr. Melliss from St. Helena.

Genus ARTEMA.

ARTEMA CONVEXA.

Artema convexa, Bl. Ann. Nat. Hist., Nov. 1858.

Females of this Spider (which is nearly allied to if not identical with *Pholcus borbonicus*, Vins.) were found in the St.-Helena collection.

Fam. THERIDIIDES.

Genus THERIDION.

THERIDION TEPIDARIORUM.

Theridion tepidarium, Koch, Die Arachn. Bd. viii. p. 75, tab. 273. fig. 646, and tab. 274. figs. 647, 648.

Examples of this widely dispersed species were contained in the St.-Helena collections. I have received it also from Brazil, as well as from Ceylon.

Genus LATRODECTUS.

LATRODECTUS EREBUS.

Latrodectus erebus, Sav. Arachn. de l'Egypte, pl. 3. fig. 9.

The St.-Helena collections contained an example of this Spider.

Genus LINYPHIA.

LINYPHIA LEPROSA.

Linyphia leprosa, Ohl. Die Araneiden der Provinz Preussen, p. 47.

L. confusa, Cambr. Trans. Linn. Soc. xxvii. p. 429, pl. 55. no. 21, *a, b, c, d, f, g.*

Examples of both sexes were found in the St.-Helena collections.

LINYPHIA ALBIMACULATA, sp. n.

Immature female, length nearly 2 lines.

Although not quite adult, yet the very distinct markings and colours of this Spider leave me no doubt whatever about its being (as far as I am aware) undescribed. In form and structure there is no marked departure from the ordinary generic type; the sides of the thoracic portion of the cephalothorax are deep black-brown, the margins being yellowish; the caput is yellow; a continuation of this colour, in a tapering or wedge-shaped form, runs backwards from the occiput to the hinder slope of the thorax; and a deep blackish-brown band runs back from the hind central eyes, tapering to a point at the central indentation where the thoracic segments converge. The clypeus has two brownish maculæ near its lower margin, one on either side of the central point: the height of the clypeus equals half that of the facial space; it is a little impressed transversely immediately below the eyes, from the slight prominence of the ocular area. The eyes are in the ordinary position, on greyish-black tubercular spots, and not very unequal in size; those of the hinder row are not quite equally separated, the centrals being further from

each other than each is from the lateral on its side; those of each lateral pair are bright pearly white, placed a little obliquely, contiguous to each other, and the largest of the eight; those of the fore central pair are the smallest, and nearly, if not quite, contiguous to each other.

The *legs* are rather strong, but not very long; their relative length is 1, 2, 4, 3; they are of a clear pale yellow colour, distinctly banded with dark brown and furnished sparingly with hairs and about the usual number of longish black spines.

The *palpi* are similar in colour and markings to the legs; and from the fore extremity on the upperside of each of the cubital and radial joints is a long, strong, black, slightly curved, tapering bristle; several smaller ones are also on the digital joint.

The *falces* are long, rather slender, slightly diverging, and similar to the legs in colour.

The *maxillæ*, *labium*, and *sternum* are dark-coloured, the two former being the lightest.

The *abdomen* is of ordinary form, very convex above and projecting over the base of the cephalothorax; the ground-colour is of a dark leadenish hue, marked with black patches and markings, the sides and upper surface being pretty thickly and rather symmetrically covered with bright white cretaceous spots; some of these form slightly oblique lines on the hinder part of the sides, and others a sort of horizontal cincture on either side of the fore half; others, again, form a broken horizontal band along the lower part of each side. The general character and disposition of the abdominal markings bear a near resemblance to that of *L. leprosa* (Ohl.); but the markings and colours of the cephalothorax distinguish it from that species at a glance, as well as the distinctly annulated legs.

* A single example was contained in the St.-Helena collection last received from Mr. Melliss.

LINYPHIA TRIFIDIDENS, sp. n.

Adult male, length 3 lines.

This very distinct Spider has the cephalothorax of ordinary form, but rather flattened, and, looked at in profile, it presents a straight line rising gradually from the hinder slope (which is itself very gradual) to the eyes; its colour is yellow; a broad, dark brown, well-defined band runs along each side, converging and almost uniting at the hinder slope, and generally meeting in front above the falces; this band leaves a rather narrow, but distinct, lateral marginal stripe on each side: along the centre of the cephalothorax a tapering dark-brown band runs back from the eyes to the hinder slope, where it ends in a point, and where the junction of the caput and thorax are marked by a strong longitudinal depression.

The *eyes* are similar in their relative size and position to those of *L. albimaculata*: the clypeus is slightly impressed immediately below the eyes, and rather prominent thence to the lower margin; its height exceeds half that of the facial space.

The *legs* are long, tolerably strong; and their relative length is

1, 2, 4, 3; their colour is yellow, distinctly banded with dark yellow-brown, and furnished sparingly with hairs and a few, neither very long nor strong, black spines.

The *palpi* are short and not very strong. The radial joint is double the length of the cubital, and of a clavate form, rather more produced at its extremity on the upper than on the lower side; at the outer extremity a little in front is a long, curved, strong, tapering, black bristle, directed forwards and nearly in connexion with a group of a few less conspicuous bristly hairs. The cubital joint also has a tapering black bristle at the fore extremity of the upperside, but it is not nearly so strong a one as that on the radial joint; the digital joint is small but of the same length as the radial, and of a tapering, pointed oval form. The palpal organs are well developed, rather complex, with various corneous processes and prominently turned outwards; one small, red-brown, rather flattened but abruptly pointed process, separate from the general mass, appears to issue from the radial joint nearly beneath the bristle and group of hairs above mentioned. The palpi are similar in colour and markings to the legs.

The *fulcres* are of a dark yellow-brown colour, rather long, strong, divergent at their extremities, and convexly prominent and massive towards their base in front: on the inner margin of the lower side at the extremity of each is a row of short teeth; and also towards the extremity of the inner margin of the upperside is a strong tooth-like prominence, divided into three small points at its extremity; two of these points are stronger than the other, and from some points of view are the only ones visible, the third being placed beneath and a little below the others; following this tooth-like prominence in an oblique direction downwards are several small bluntish teeth of different sizes. The fangs are strong, and somewhat incrassated towards their articulation with the falces.

The *maxillæ* are rather long and strong, not inclined to the labium, and rather broadest at their extremities, where they are slightly rounded on the outer sides.

The *labium* is short, broad, and semicircular, and with the *maxillæ* of a dark yellowish-brown colour.

The *abdomen* is oval, not very convex above, nor much projecting over the base of the cephalothorax; it is marked with black markings and white cretaceous spots on a dull whitey-brown ground; the pattern is indistinct, but some angular bars or chevrons (running into blotches at their extremities) are visible on the hinder half of the upperside; the sides have a large black patch forwards, followed behind by several slightly oblique black bars more or less distinct; along the underside runs a broad black-brown band, occupying nearly the whole of it.

The *female* is larger than the male, to which it is similar in colour and markings, but differs in wanting the large trifid and other teeth on the front of the falces, having only one row along the inner margin of the lower side; these, however, are more numerous, longer, stronger, and sharper than the corresponding teeth in the

male; in other respects the falces are like those of that sex, though a little less strong.

In colours and markings this species is very like *L. albipunctata*; but the less-convex abdomen, with the massiveness and prominence of the falces, and, especially in the male, the trifid tooth-like prominence in front of them, distinguish it at a glance both from that species and any other of the genus known to me.

L. trifididens shows a decided approach to Spiders of the genera *Pachygnatha* and *Meta*; and it is not without some hesitation that I have (in absence of any knowledge of its habits) placed it in the genus *Linyphia*.

Three males (two adult) and an adult female were comprised in the St.-Helena collection received from Mr. Melliss.

Genus ARGYRODES.

ARGYRODES EPEÏRÆ.

Argyrodes epeïræ, Sim. An. Soc. Ent. Fr. 4^e sér. tom. vi. 1866, p. 282, pl. 4. figs. 1-7.

Adults of both sexes of this remarkable and interesting Spider were contained in Mr. Melliss's St.-Helena collections.

Fam. EPEÏRIDES.

Genus TETRAGNATHA.

TETRAGNATHA PELUSIA.

Tetragnatha pelusia, Sav. Arachn. de l'Égypte, pl. 2. fig. 3.

Well-marked examples of this species were found in the two last-received collections from St. Helena.

Genus META.

META DIGNA.

Tetragnatha digna and *T. indigna*, Cambr. Spiders of St. Helena, Proc. Zool. Soc. 1869, pp. 535, 537, pl. xlii. figs. 3, 4.

Adult male, length from $2\frac{1}{2}$ to $3\frac{1}{2}$ lines.

In the former paper on St.-Helena Spiders a single immature male of *M. digna* was described as a distinct species, owing to a great dissimilarity in the pattern on the abdomen; the present collection contained several adult males and females, proving beyond a doubt that they are of one species only, the apparent difference in the pattern on the abdomen not holding constant in the different adult examples of the sexes.

The *legs* of the adult male are longer than those of the female, being nearly, if not quite, four times the length of the Spider.

The *palpi* are rather long and slender; the cubital joint is very short, and has at its fore extremity on the upperside a long, strong, tapering, nearly straight, black bristle directed forward, the radial being nearly four times as long, and increasing gradually in strength to its extremity, where it is furnished with a few long, strong, prominent black bristles and hairs.

The *digital* joint is rather small and of a narrow-oval form, its convex side being turned inwards. From its base springs a rather long, tapering, almost straight, and nearly perpendicular horn or apophysis, its extremity being bluntish-pointed and black; the length of this horn about equals half the length of the digital joint, but exceeds its breadth. The palpal organs are well developed and prominent, consisting of a somewhat oval, convex, corneous lobe, with a detached curved process at the base on the outer side, and an obtuse one at the extremity projecting forwards just beneath the fore extremity of the digital joint; and springing from it is a small curved sharp-pointed spine.

A remarkable similarity in the form and structure of the palpi and palpal organs exists between *M. digna* and *M. (Tetragnatha) decorata* (Bl.), figured, Linn. Soc. Journ. x. pl. 13. figs. 66, 67; but in other respects the species are totally distinct.

Fam. ULOBORIDES.

Genus ULOBORUS.

ULOBORUS WILLIAMSII.

Orithyia williamsii, Bl. Ann. Nat. Hist., Nov. 1858.

Adult females of this Spider were contained in Mr. Melliss's last two collections from St. Helena.

Fam. THOMISIDES.

Genus XYSTICUS (Koch).

XYSTICUS GRAMMICUS.

Xysticus grammicus, Koch, Die Arachn. Bd. iv. p. 57, tab. 124. fig. 285.

Adult males and numerous females were received from St. Helena; some of the latter sex were accompanied by their nests and egg-cocoons, which last were sewn up in a leaf whose edges were brought together, forming a neat little bag. The male is much smaller and darker-coloured than the female.

Fam. LYCOSIDES.

Genus LYCOSA.

LYCOSA (TROCHOSA) DOLOSA, sp. n.

Adult female, length $7\frac{1}{2}$ lines.

The *cephalothorax* of this fine species is broad-oval, truncate before, constricted laterally forwards; the caput is roundly convex, and the profile line from the thoracic junction to the middle row of eyes is rather arched; it is of a dark reddish yellow-brown colour, the caput being the darkest; from between the hinder pair of eyes three lines of pale hairs run backwards to the thoracic junction, the two lateral ones of these lines enclose a pointed oval space which is

longitudinally bisected by the third line; the normal grooves and indentations are well marked, and give the ordinary radiated appearance to the thorax.

The *eyes* are in the usual three rows; those (four in number) of the foremost row are minute and form a straight line very near to the insertion of the *falces*; those of the central pair of this row appeared to be rather smaller than the laterals; and the interval between them is less than that between each and the lateral on its side: those of the middle row are largest of the eight; they form a line rather less in length than that formed by those of the foremost row, and are separated from each other by an interval about equal to half of the diameter of one of them: those of the hinder row are removed behind the middle row about the space of the diameter of one of the latter, and form a line rather longer than either of the others; with the eyes of the middle row they form a quadrangular figure whose sides and front are equal in length, but its hinder side about one third longer.

Legs strong, moderately long, their relative length 4, 1, 2, 3; they are of a yellow-brown hue, but not of a uniform depth of colour; some portions, particularly the tibiae, tarsi, and metatarsi of those of the first and second pairs, are much the darkest and redtinged, some of the joints also showing faint indications of darker brown annulations: they are furnished with hairs and spines, those of the latter beneath the tibiae and metatarsi of the two foremost pairs being most numerous, longest, and strongest.

The *palpi* are moderately long and strong, and of a dark reddish yellow-brown colour.

The *falces* are long, strong, and massive, prominent near their base in front; their colour is deep red-brown, approaching to black, and they are furnished pretty thickly with hairs and bristles.

The *maxillæ* and *labium* are of normal form, similar to the *falces* in colour, though pale yellowish at their extremities, and furnished, especially at those points, with hairs and bristles.

Sternum oval, yellow, and clothed with a few longish bristly hairs.

Abdomen oval, projecting a little over the base of the cephalothorax, and clothed pretty thickly with hairs; its colour is pale yellow-brown, marked with black-brown, showing a pattern nearly resembling that of *Lycosa agretyca* (Bl.); the normal elongate marking on the fore half of the upperside is large and bold, of a dark yellow-brown colour, edged with blackish; its hinder extremity is obtuse and sends forth a short line from each corner, as well as one from each side nearly halfway towards its fore extremity; and the sides are marked by oblique dark black-brown broken lines; the underside is of a uniform pale yellowish hue.

The *spinners* are short, those of the inferior pair being the strongest.

Two adult females and numerous young examples were contained in Mr. Melliss's St.-Helena collection.

Fam. SALTICIDES.

Genus SALTICUS, Bl. (ATTUS, Sim⁷, &c.).

SALTICUS INEXCULTUS, sp. n.

Adult male, length $2\frac{3}{4}$ lines.

The *cephalothorax* of this species is massive and, looked at from above, of a short, broad, oval form; in profile the hinder slope is very abrupt and a little hollow or impressed, the ocular region sloping forwards and slightly prominent; it is of a deep brown colour, with a not very broad marginal band (running also round the front) of white squamose hairs; the upper surface of the caput is thickly clothed with brightish and rather coppery-yellow, short, adpressed, squamose hairs; and these are continued in a tapering form to the hinder slope, where they merge in a longitudinal central band of white hairs; the sides of the caput and thorax are thinly clothed with dull coppery-yellow hairs; and the upper surface, as also the ocular area and clypeus, is furnished with longish prominent bristles and strong hairs.

The *eyes* are normal both in respect of position and relative size; the two forming the third or hinder row are rather wider apart than the laterals of the first row, and the area enclosed by these four is about double as long in its transverse as in its longitudinal diameter; the exact position of the two minute eyes forming the middle row could not be ascertained, owing to their concealment by the hairs around them.

The *legs* are strong and moderately long; their relative length appeared to be 3, 1, 4, 2; they are of a dark brown colour (the femora of the first pair of a red hue), furnished with hairs, bristles, and spines, a few of the hairs being white and squamose; the tarsi of the second, third, and fourth pairs are of a pale yellowish colour, banded with brown; and each has a terminal tuft of hairs beneath the tarsal claw.

The *palpi* are short and rather slender, of a pale yellowish colour, except the posterior halves of the humeral and the digital joint, which are brown; they are furnished with hairs and bristles; numerous squamose white hairs are distributed over the upper surface and sides of the humeral and cubital joints, and a few on the radial; this last is about equal in length to the cubital joint, and its outer extremity is produced into a tapering, blackish, cornecus, pointed apophysis. The digital joint is equal in length to the radial and cubital together, and has numerous whitish hairs at its extremity. The palpal organs are simple, not prominent nor highly developed; a slender filiform blackish spine issues from their base and curves round their inner margin to their extremity.

The *fulceae* are small, subconical, directed backwards, and of a deep black-brown colour.

The *maxillae*, *labium*, and *sternum* are normal in form, and of a deep brown colour, the former tipped with a paler hue.

The *abdomen* is small, oval, thickly clothed with hairs of a yellowish grey, black, and coppery hue, forming a broadish roughly dentate

dull yellowish coppery band along the middle of the fore half of the upperside, followed towards the spinners by several angular bars or chevrons of the same hue, the intervals being black: on the sides, near the hinder extremity, are one or two short, oblique, black markings edged with yellowish; the whole upper surface of the abdomen has a few long, black, prominent, bristly hairs distributed over it; and at the fore extremity of the upperside is a patch of white squamose hairs; the underside is dull coppery yellowish, with three nearly parallel, indistinct, dark brown longitudinal stripes running throughout its length.

The *female* of this species, which seems nearly allied to *A. petrensis* (Koch), is rather larger than the male; and the colours are not so bright nor the pattern formed by them in general so distinct as in the latter; but the white marginal border of the cephalothorax is a distinctive mark in both sexes, of both of which Mr. Melliss's collection contained individuals.

SALTICUS SUBINSTRUCTUS, sp. n.

S. illigeri, Cambr. P. Z. S. 1869, p. 543.

Adult male, length 2 lines.

The *cephalothorax* is short, broad, oval, and moderately massive; looked at in profile, the caput slopes but very slightly forwards in front, while the hinder slope is rather less abrupt than in *S. inexcultus*; and there is a strongish transverse indentation from one side to the other just behind the hinder row of eyes; the cephalothorax is of a deep black-brown colour, the ocular area quite black and thickly covered with short yellowish hairs; the central longitudinal line of the hinder slope has a broadish band of white hairs; and a few of the same are dispersed in a transverse line behind the eyes of the hinder row; possibly some of these last (in the only example examined) may have been rubbed off; some prominent black bristly hairs are scattered over the upper part of the caput and on the clypeus.

The *eyes* are normal in their relative size and position, though the two centrals of the front row seemed to be of a larger size than usual; they form a regular quadrangular figure, its longitudinal being half the length of its transverse diameter; the small eyes of the second (or intermediate row) are nearer to the laterals of the first than to those of the hinder row.

The *legs* are moderately strong and not very long, not differing nearly so much in the relative strength of the first and other pairs as in many others of this group; they are of a more or less pale yellow-brown colour, broadly annulated with dark brown, furnished with hairs and a few spines, the most conspicuous of the latter being those placed in a double longitudinal series beneath the tibiæ and metatarsi of the first pair; the metatarsi of the third and fourth pairs have several strongish spines disposed in a sort of ring round their anterior extremities; each tarsus has a small claw-tuft at its extremity.

The *palpi* are short and not very strong, of a deep brown colour,

furnished above with white hairs; the humeral joints are strong. The radial is rather shorter than the cubital, but stronger, and has an apophysis beneath its anterior extremity: this apophysis was not easy to be seen satisfactorily; but it appeared to be pointed and a little curved or bent outwards at its extremity. The digital joint exceeds in length the radial and cubital together. The palpal organs are simple, and neither highly developed nor prominent, being almost concealed by the hairs on the margins of the digital joint; they appeared to consist merely of an oval, flattish, deep-black-brown, corneous lobe.

The *falces* are rather long, moderately strong, of a somewhat flattened form, projecting forwards and a little divergent from each other; their colour is a dark reddish yellow-brown.

The *abdomen* is small, oval, and projects but slightly over the base of the cephalothorax; it is thinly furnished with hairs and is of a yellow-brown colour, marked and mottled with blackish brown; but no distinct pattern was traceable; some of the hairs on the hinder half of the upperside are white and appear as if they would form, when uninjured, four indistinct spots in a quadrangle with two short transverse curved lines between them. The *female* is larger than the male, but resembles it in colours and markings: it was recorded (Proc. Zool. Soc. 1869, p. 543) as *S. illigeri* (Sav.); but the male found in the more recent collection received from Mr. Melliss leads me to believe it to be distinct from that species.

EXPLANATION OF PLATE XXIV.

Fig. 1. *Filistata condita* ♀.

Upperside of abdomen.

2. *Gnaphosa lugubris* ♂.

a, b, palpus, in two positions.

3. *Clubiona dubia* ♂.

Palpus.

4. *Cheiracanthium mellissi* ♂.

a, ♂, slightly enlarged; *b*, cephalothorax and falces, in profile; *c*, fore part of caput, from behind; *d*, palpus; *f*, portion of ditto, more magnified; *e*, natural length of Spider.

5. *Cheiracanthium planum* ♂.

a, profile of cephalothorax and falces; *b*, palpus; *d*, natural length of Spider.

6. *Amaurobius crucifer* ♀.

a, profile; *b*, upperside; *c*, caput and falces, from the front; *d*, natural length of Spider.

2. On the Species and Dentition of the Southern Asiatic Shrews, preliminary to a Monograph of the Group. By JOHN ANDERSON, M.D., Calcutta.

[Received December 11, 1872.]

An examination of the Shrews in the Indian Museum, Calcutta, convinces me that our knowledge regarding the Indian species is very defective. This remark seems to be equally applicable to the species

which have been described from Ceylon by Kelaart, and to those which have been distinguished by Blyth as occurring in Burmah, the Malayan peninsula, and China.

All the species referred by Blyth * to the genus *Sorex*, Linnæus, which I have examined, are white-toothed Shrews, his species *S. melanodon* being essentially a white-toothed form, to which I shall hereafter have occasion to allude. They belong to 16 species, from the following countries, viz. India proper, Burmah, the Malayan peninsula, and Ceylon. Besides these, 13 other species have been described from Madras, the North-west Himalayah, Nepaul, Sikkim, and Ceylon, all of them apparently white-toothed forms.

If we analyze these materials, we shall find that one species, *Pachyura indica*, Geoff., is generally distributed over India, that *P. murina*, Linn., and *P. serpentaria*, Geoff., of Blyth and Jerdon †, occur in the Malayan countries and Southern India, and that the former passes into Lower Bengal, and that the latter is said to extend to Ceylon, and even to the Mauritius. One minute species, the *P. melanodon*, Blyth, has been described from Lower Bengal, and two species from the Nilgiris. Three species, *Sorex heterodon*, Blyth, *S. atratus*, Blyth, and *P. griffithii*, Horsf., occur in the Khasya hills, the last extending into Aracan. Burmah and the Tenasserim provinces are characterized by two small Shrews, *Crocidura fuliginosa*, Blyth, and *P. nudipes*, Blyth, and Ceylon by six other species, besides *P. serpentaria*, already mentioned:—viz., *C. kelaarti*, Blyth; *S. macropus*, Blyth; *S. ferrugineus*, Kelaart; *S. montanus*, Kelaart; *S. purpurascens*, Templeton; and *S. horsfieldi*, Tomes. The Himalayah, between longitudes 78° and 90° east, have yielded no less than 10 species of Shrews, eight of which were originally distinguished by Hodgson, and the remaining two by Blyth. They are as follows:—*S. soccatus*, Hodg.; *P. nemorivaga*, Hodg.; *S. leucopus*, Hodg.; *S. saturator*, Hodg.; *S. sikimensis*, Hodg.; *S. homurus*, Hodg.; *S. oligurus*, Hodg.; *S. macrurus*, Hodg.; *S. hodgsoni*, Blyth; and *S. tytleri*, Blyth. To these I must add the Himalayan Water-Shrew, which is a *Crocidura*, and two other Shrews with brown-tipped teeth, viz. *Crossopus nigrescens*, Gray, and *Crossopus alpinus*, Schweig.; so that the total number of the Himalayan Shrews is 13 in all, 11 belonging to the group with wholly white teeth, and two to the other division, distinguished by its brown-tipped teeth.

In connexion with the number of species, it is noteworthy that four out of Blyth's species are founded on single specimens, that one was described from a headless individual, that his *C. kelaarti* is so young that the premaxillary suture is intact between the second and third small lateral teeth—that his *P. melanodon* is based on a very young specimen, with the premaxillary suture intact above, but obliterated as it approaches the alveolar border—and that all the other sutures of the skull are unclosed, the frontal and fronto-parietal sutures being almost

* Blyth has also indicated three other species from the Himalayah, As. Soc. Journ. vol. xxviii. p. 285.

† Jerdon's 'Mammals of India' (Cal.).

membranous in character. There is only one of Hodgson's species in this museum, *S. soccatus* (not *C. nigrescens*), represented by a single specimen identified by Blyth, while an individual referred by the latter naturalist to Elliot's *P. niger* is so shattered about the head that I have hesitated to remove the skull. None of Kelaart's species is represented, neither is any of the species described by Tomes and Templeton; so that, if we exclude *P. indica*, *P. murina*, *P. serpentaria*, *P. griffithii*, *S. soccatus*, and *P. nigra*, the specimens in the museum are all Blyth's species.

I have removed the skulls from as many of the museum specimens as possible; and the result of my inquiries renders it probable that some of the so-called species are only young individuals, and others merely adolescents, of one and the same form, while others appear to be varieties depending on chromatic modifications of the fur. It would be premature, however, to venture any decided opinion on these instances until more materials are collected for comparison.

The general characters of the form of the teeth of the four subgenera of Shrews, *Sorex*, *Crossopus*, *Crocidura*, and *Pachyura*, are the same; but the number of the teeth varies in the interspace between the front incisors of the upper jaw and the first molar, and in the intermaxillary bone. The known limits of the variation of the small lateral teeth in the foregoing interspace is 2 to 5, and in the intermaxillary bone from 1 to 3. The latter, of course, form one section of the incisio-molar interspace. The molars of the maxilla are 4 on each side, a number which prevails throughout the group. The mandible has always 12 teeth, viz. 1 front incisor, 1 lateral incisor, 1 canine, 1 premolar, and 3 molars on each side. The Shrews, for convenience, may be further separated into two great subordinate groups, dependent on the absence or presence of a brownish pigment deposit on the teeth. All the Shrews of the former division are characterized by the simplest type of dentition. The number of teeth in the maxilla varies from 7 to 9 on each side. In Shrews with the former number (*Diplomesodon*) the small lateral teeth in the incisio-molar space are two, with the intermaxillary suture between them, the dental formula being $\frac{2+2}{2} + \frac{2}{2} + \frac{8}{2+6} = 26^*$. The front incisor is arched; and at its base there is a small obtuse tubercle. The intermediate type, with three small lateral teeth (*Crocidura aranea*), has the maxillo-intermaxillary suture between the second and third small lateral teeth; the front incisors have no process on their inner margins; the dental formula is $\frac{2+4}{2} + \frac{2}{2} + \frac{6}{2+6} = 28$.

The type with nine teeth on each side of the upper jaw has four small lateral teeth (*Pachyura indica*), the last very minute. Brandt has observed the suture between the second and third small teeth, an observation I have verified in a nest of three young speci-

* I have obtained a short-tailed Shrew from Assam, having a large head, with this formula, but with hidden obscure external ears and very short tail, one sixth the length of the animal, and with scaly feet and legs, like a Mole, with the pelvis of that animal. It forms a new genus, which may be designated *Pygmura*.

mens of *P. indica*. The front incisor has no internal process; and the basal tubercle is obtuse and rather small. The dental formula is $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. In the three foregoing types, the lower incisor is either quite smooth or provided with a small eminence.

I shall now point out the peculiarities in the dentition of another Shrew, the *Crossopus himalaicus*, Gray. That most assiduous naturalist referred this Shrew to the genus *Crossopus*, Wagler, in a restricted sense. The only information he gave regarding its dentition was, that the cutting-teeth were $\frac{12}{6}$, which is sufficient evidence that in its dental formula it must have been nearly allied to *Sorex*. He considered it, however, to be a true *Crossopus*. Blyth also had his doubts whether it had been correctly referred to *Crossopus*. There is a specimen in this museum from Darjeeling, which agrees in every particular with the external characters as given by Gray and Tomes; and another from Ponsee, in the Kakhien hills, to the east of Bhamô, Upper Burmah; but the dentition is not that of a *Crossopus*. The teeth are wholly white; there are only three small lateral incisors; the front incisor has a rather small, obtuse, basal process; but the inner margin of this tooth, unlike any of the forms referable to the preceding groups, has a small process developed on it. It is rather obscure, but has all the characters of the process as it occurs in the other two brown-toothed genera of Shrews recognized by Brandt. The teeth, however, of this form, as I have already mentioned, are white; the lower incisors are smooth; and the teeth in all their other characters, with the exception of this process, agree with the section to which *C. aranea* belongs, the dental formula being $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. The presence of this process in this species serves to link the white- to the brown-toothed Shrews; but this character of itself, occurring in the feeble way it does, is not a sufficient reason for separating it generically from *Crocidura*. The genus *Crocidura* may therefore be defined as follows:—Teeth white; first incisors arched, provided with a more or less obtuse moderately developed tubercle at their base posteriorly. The inner margins usually smooth, or provided with a feeble tooth-like process. Lower incisors long, curved forwards and upwards, smooth, or provided on their upper surface with one or more eminences; small lateral teeth varying from two to four.

The following Table is the result of an examination of the dentition of the various white-toothed Shrews in this museum, from which it appears that three of them belong to the genus *Crocidura*, as above defined, and the remainder, 10 in number, to the type of dentition represented by *Pachyura indica*.

White-toothed Shrews.

A. Front incisors of upper jaw without an internal process.

Crocidura kelaartii, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. Lower incisors smooth. Intermaxillary suture examined. Probably young of some other species.

C. fuliginosa, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. Lower incisor with one tubercle.

Pachyura nudipes, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth.

P. niger, Elliot. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth.

P. indica (*S. cærulescens*). $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth. Intermaxillary suture examined.

P. murina, L., apud Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisor with one eminence.

P. griffithii, Horsf. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors with one eminence.

P. serpentaria, Is. Geoff. St.-Hil., apud Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth.

P. albina, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors with one eminence in the middle.

P. nemorivaga, Hodg. (*S. soccatus*?). $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth.

P. melanodon, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisor with a slight eminence.

P. micronyx, Blyth. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors smooth.

B. Front upper incisors with an obscure internal process.

Crociodura himalaica, Gray. $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. Lower incisors smooth.

It will be observed that I have included *P. melanodon*, Blyth, among the white-toothed Shrews, notwithstanding its specific name, because, after a careful scrutiny of the typical and only specimen in this museum, it seems that Blyth mistook the pulp shining through the delicate teeth for a piceous pigment, no trace of which is to be detected externally.

Kelaart's genus *Feroculus* is undoubtedly *Crociodura*, as the teeth are white, the upper front incisors short, strongly hooked, and succeeded by four small lateral teeth. Blyth doubtless regarded it as a *Sorex* because it had less strongly hooked upper incisors than the typical *Sorices*. He describes the feet as remarkably large. Kelaart was inclined to consider it aquatic in its habits.

The brown-toothed Shrews may be referred to two genera, *Crosopus* and *Sorex*. The teeth in the former are not so intensely brown-tipped as in the latter; and there only four small lateral teeth. The front upper incisors are arched; and each is provided on its inner margin with a small tooth-like process; and at the base of each posteriorly there is either a rather short and rounded or a strong basal tubercle. The lower incisors are marked by one or two eminences. Brandt found the intermaxillary suture between the

second and third small lateral teeth, so that the dental formula is $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. There are two Indian Shrews belonging to this genus, viz. *Soriculus nigrescens*, Blyth, and *Corsira alpina*, Schinz, apud Blyth. The former is a true *Crossopus*, with brown-tipped teeth, four small lateral teeth, a hook-like process moderately developed, and a well-marked eminence on the lower incisors, its dental formula being $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. I am not in a position to express any personal opinion whether the Alpine and Himalayan Shrews are of one species; but Mr. Tomes, who compared two specimens of the Himalayan Shrew of Hodgson (? *Crossopus caudatus*) with a specimen of *C. alpinus* of Europe, concluded that they were closely allied, if not perfectly identical; and stated that if one of the examples of *C. caudatus* with a naked compressed tip to its tail had been placed along with the European species it would have been almost impossible to distinguish them. He did not, however, express any more decided opinion regarding their affinity. The dentition of *C. caudatus*, Hodgson, is that of a true *Crossopus*. The upper front incisors have a strongly hooked process on their internal margin; and the inferior incisors are pointed, with a well-developed eminence near their base, the dental formula consequently being $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$.

The genus *Sorex*, as now restricted, has five small lateral teeth; three, according to Brandt, belong to the intermaxillary, and two to the maxillary. Consequently there are eight upper incisors (the two anterior ones being large and arched, the others behind them decreasing in size), two canines, two premolars, and eight molars in the upper jaw, as a whole. The mandible has two incisors, two canines, two premolars, and six molars. The incisors of the lower jaw are each furnished with four eminences, corresponding to the number of the upper incisors. The tooth-like process on the internal margin of the upper incisors is very slightly developed; and the pigment of the teeth is darker than in *Crossopus*. The dental formula is therefore as follows: $\frac{2+6}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 32$. No Shrews with this type of dentition have hitherto been found in India.

Dentition of Indian (Brown-toothed) Shrews.

Crossopus nigrescens, Gray. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors with a well-developed eminence.

C. caudatus, Hodg. $\frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30$. Lower incisors with a well-developed eminence.

It is curious to remark that these two forms are Himalayan, while all the white-toothed Shrews are Indian, no brown-tipped-toothed Shrew having as yet been found in India or Ceylon, and none in the Malayan region, as far as I am aware.

I take this opportunity to describe a small Shrew which I have received from Goalparah on the Brahmaputra, and which appears to be nearly allied to, if not identical with, *P. hodgsoni*, Blyth.

Upper surface rich dark glossy brown, under surface pale brown,

with a silvery sheen; muzzle well clad; extremities brown, sparsely clad; tail dark brown olive, paler below, thinly clad with short hairs and with a few scattered long pale lines along its basal two-thirds. Ears rather prominent, bare posteriorly at the base, the remainder of that surface covered with short stiff hairs; inner surface sparsely clad with short hairs; the fur is very short, and the ears are in no way covered by it. Claws well developed, not prominent, horny yellowish; palms nude; a very few straggling short hairs on the soles of the feet; tail reaches from its base to halfway between the shoulder and the ear. The head is of moderate length, not much dilated over the moustachial region, and attenuatedly pyramidal.

Measurements of Body.

	inch.
Length from snout to base of tail	1.58
Tail	1.00
Eye to tip of snout .....	.25
Anterior margin of ear to tip of snout.....	.33
Greatest depth of ear .....	.17
Antero-posterior diameter.....	.13
Palm of anterior extremity to tip of middle claw .....	.19
Sole of foot .....	.31

Measurements of Skull.

From lower border of foramen magnum to anterior margin of intermaxillary .....	.62
From posterior margin of palate to anterior margin of intermaxillary .....	.19
Length of alveolar surface .....	.19
Length of molar area .....	.13
Greatest breadth of skull.....	.08
Glenoid surface of temporal to anterior margin of intermaxillary .....	.25
Greatest breadth across maxillaries.....	.21
Breadth across skull at glenoid cavity.....	.17
Breadth across anterior margin of intermaxillaries.....	.06
Length of lower jaw from angle (exclusive of process) to anterior extremity .....	.19
From condyle to anterior extremity .....	.44
Depth of jaw, including coronoid process .....	.13
Anterior margin of base of coronoid process to anterior upper extremity of jaw .....	.21

$$\text{Dentition } \frac{2+4}{2} + \frac{2}{2} + \frac{2+8}{2+6} = 30.$$

Teeth white, = *Pachyura*. The upper front incisors are of moderate length, as in the members of this genus generally. The basal tubercle is well developed, slightly recurved, and broadly pointed. The fourth lateral small tooth is very minute. The lower incisors have a hardly perceptible eminence about their middle; no gland on the side. This Shrew has a decided musky smell, although it has been preserved in spirit for five years. The sutures of the skull

indicate that it is fully grown. If it should prove to be new, I would indicate it as *Pachyura assamensis*.

Jerdon, under the name of *S. hodgsoni*, Blyth, evidently includes two Shrews, the *S. pygmaeus* of Hodgson and the *S. hodgsonii* of Blyth. Hodgson's Shrew is described by himself as having the structure of a typical *Sorex*, which would lead to the conclusion that it was a member of the group with white teeth (*Pachyura*), because he apparently regarded the leucodontide species (*P. indica*) as typical *Sorices*. He gave the measurements of his *S. pygmaeus* as, snout to vent less than 2 inches, tail $1\frac{3}{4}$, head $1\frac{1}{4}$, palms $\frac{1}{4}$, planta $\frac{3}{8}$. Blyth was undecided whether his so-called *S. hodgsoni* might not be a female of *Crocidura perottetii*; and in its measurements it is allied to that species. They are as follows:—head and body $1\frac{1}{2}$ inch, tail 1, hind foot and claws $\frac{1}{2}$, skull somewhat exceeding $\frac{3}{4}$. The measurements, however, given by Hodgson of his *S. pygmaeus*, only less than 2 inches, would appear to indicate that it was a considerably larger species than Blyth's hypothetical *C. perottetii*, and that it therefore cannot be regarded as a synonym of the species described by Blyth under that name; and as the latter differs from true *C. perottetii* in other important characters, both Hodgson's and Blyth's species appear to be distinct Shrews, and must be regarded as such until they are found to be otherwise. Both appear to be *Pachyura*; and the two species stand as *P. pygmaeus*, Hodg., and *P. hodgsoni*, Blyth. The species which I have just described I should be inclined to refer to the latter for the reasons already stated. The identity or non-identity, however, of these so-called species must remain unsettled until further materials are obtained from the localities whence they were originally procured, viz. Darjeeling and Calcutta.

I have received a single specimen from Cherra Punji, Khasya hills, that in the shortness of its anterior upper incisors agrees with Blyth's *S. heterodon*. It is a *Crocidura*, however, with the dental formula $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. Its skull is that of an adult.

Measurements of Skull.

	inch.
From inferior border of foramen magnum to anterior end of the intermaxillary	·71
Posterior margin of palate to extremity of intermaxillary	·35
Length of alveolar surface of maxilla	·35
Greatest breadth across maxilla	·27
Breadth across intermaxillaries at tip of snout	·08
Breadth in front of glenoid articulation	·21
Breadth of skull on a line with posterior extremity of alveolar surface of maxilla	·19
Greatest breadth of skull	·35
From glenoid articulation to inferior margin of foramen magnum .	·23
Length of lower jaw from angle (exclusive of process) to anterior margin	·35
Depth before coronoid process	·08

	inch.
Height of coronoid	·16
From condyle to anterior margin of alveolar border	·42
Length of alveolar surface	·21

I have received two young Shrews, evidently one species, from the Garo Hills and from Nazeerah, Assam. They measure ·17 inch from snout to vent; the tail is 1·54 in length, the foot ·58, and the fore foot ·33. The skull shows the intermaxillary suture between the second and third small lateral teeth, so that the dental formula is $\frac{2+4}{2} + \frac{2}{2} + \frac{8}{2+6} = 28$. The lower incisors have a rather prominent process about their middle. The dentition is the same as in *C. fuliginosa*, Blyth; but its feet are proportionally smaller than in that species, and the ears are not so large and are more thickly clad with short hairs, which is also the case with the tail. The fur is moderately long, and of a dark sooty brown, almost black, without any rufescent tinge. The under surface is paler, with a faint bluish tinge, especially about the ears. The snout, limbs, and tail are well clad; and the latter has some long straggling hairs on its basal two thirds. The skin of the feet is palish brown in spirit; and the nails are yellowish, and clad at their bases with longish hairs. The ear is not hidden by the fur, and is moderately developed.

If this species is not the young of *C. fuliginosa*, Blyth, it is possible that it may be one of Hodgson's forms, which, however, can only be determined by reference to the types in the British Museum.

3. Description of a remarkable New Species of *Tanaëcia*. By MONTAGU RUSSELL BUTLER. Communicated by A. G. BUTLER, F.L.S., F.Z.S.

[Received February 7, 1873.]

The following new species is from a small collection made by Mr. W. L. Distant in Penang, and is especially interesting in its excellent mimicry of the blue-banded male of *Adolias puseda* of Moore, hitherto known to occur commonly in Penang and Singapore.

DIURNAL LEPIDOPTERA.

Family NYMPHALIDÆ, Westwood.

Subfamily NYMPHALINÆ, Bates.

Genus TANAECIA, Butler.

TANAECIA FLORA, n. sp.

Wings above brown, with usual black markings in cells; two irregular indistinct transverse discal series of dark brown hastate spots.

Front wings with two cinereous oval spots between discoidal nervures, just beyond termination of cell; two similar less distinct spots between the same nervures and just within the outer hastate series;

outer margin pale greenish blue, increasing in width from the apex to the inner angle, and bounded externally by a marginal line of dark brown; fringe white.

Hind wings with costal margin broadly pale brown; external third of wing pale blue tinted with lilacine, becoming whitish at the anal angle; tridentate internally from discoidal nervure to costa, and gradually widening to inner margin; six large, but indistinct, flesh-coloured submarginal spots from apex to first median branch; margin blackish brown; fringe white.

Body above dark brown; dorsum dark olivaceous; palpi ochreous; antennæ black, with minute orange tip.

Wings below brownish ochraceous; the discal series of spots as above, but lunate; inner series ill-defined, bounded externally by a series of ovate spots paler than the ground-colour: front wings with black markings in cell; outer and inner areas clouded with pale lilacine, more prominent at apex and inner angle; margin brown; fringe white: hind wings with usual basal markings indistinct; outer and inner areas pale lilacine; outer margin indistinctly brown; fringe white. Body ochraceous white; tibiæ and tarsi of legs ochreous; palpi and crest dirty white; antennæ pale brown, club blackish, tip orange.

Expanse of wings 2 inches 10 lines.

4. On new or imperfectly known Fishes of India.

By Surgeon-Major FRANCIS DAY.

[Received February 10, 1873.]

Amongst the fishes which I have examined during the last six weeks, the following appear worthy of record, as either probably new, little known, or some novel facts being observed with reference to them.

Owing to the kindness of Dr. Bidie, I have obtained free access to the fishes in the Madras Museum, several of which seem to be undescribed. Of some of these I previously possessed single specimens, but hesitated to describe them until I had examined a larger number. As my 'Report on the Sea-fisheries of India' will be completed this year, as a fellow volume to my 'Report on the Freshwater-fisheries' just printed, I reserve my list of numerous addenda to the marine fauna for its pages.

Besides the fishes in the Madras Museum, I have fortunately obtained others in the Madras bazars—some through Dr. Bidie's assistance, others at personal visits. Amongst these I collected two specimens of *Æsopia cornuta* in very fine condition.

I have also in a short visit to Cochin, the neighbouring country, and around the Neilgherries, obtained several new species. The existence of a *Semiplotus* in Southern India is exceedingly interesting, as hitherto its range has appeared to be confined to Assam and the eastward of that portion of India.

It is also remarkable that at the time I collected a new species of *Rohtee* with barbels, my old friend, the Rev. H. Baker, of Cottayam in Travancore, should have also found a second species furnished with these appendages.

Amongst a small collection of fishes received from Dr. Duka at Darjeeling is a second *Silurus* new to India. The species which I termed *S. punctatus* (Proc. Zool. Soc. 1868, p. 155), I have altered to *S. wynaadensis*, as Cantor's *Silurus punctatus* from China is said to belong to this genus.

I have received from various friends several other local collections, some of a large size, but have not yet had time and opportunity to examine them.

CARANX BIDII, sp. nov.

D. $8\frac{1}{24}$. A. $2\frac{1}{21}$. L. 1. 24.

Length of head $\frac{3}{8}$, of caudal $\frac{3}{8}$, height of body $\frac{1}{4}$ of the total length. *Eyes*, diameter $\frac{2}{7}$ of length of head, 1 diameter from end of snout, and $1\frac{1}{2}$ apart. The maxilla extends to below the anterior edge of the orbit. *Teeth* fine in the front of the lower jaw, none on vomer or palate. Lower jaw slightly the longer. *Fins*: dorsal spines weak, the third and fourth of equal lengths, and the longest in the fin; caudal forked; pectorals falciform, rather longer than the head, and reaching to above the third or fourth anal ray; ventrals scarcely extending to above the two preanal spines; no detached dorsal or anal rays, none elongated. *Scales* on body, head, and chest. *Lateral line* nearly straight from the opercle to below the first third of the second dorsal, where it very gently descends downwards; its plates are badly developed. *Colours* silvery; a broad, burnished, golden stripe extends from above the eye to the upper edge of the tail. Lower two thirds of the dorsal fin yellow, its upper third dark; outer third of anal white, the rest yellow. A large deep-black shoulder spot.

Hab. Madras. I found it very common in the markets up to 10 inches in length. The first specimen I saw had been collected, however, by Dr. Bidie, after whom I have named the species.

POMACENTRUS JERDONI, sp. nov.

D. 13/13. P. 17. V. 1/5. A. 2/14. C. 17. L. 1. 34. L. tr. 5/11.

Length of head $\frac{1}{5}$, of caudal $\frac{1}{4}$, height of body $\frac{2}{7}$ of the total length. *Eyes*, diameter $\frac{1}{3}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, 1 diameter apart. Preorbital entire; preopercle finely serrated along its vertical margin, and with a few coarse teeth at its angle. Opercle with two spines, the upper having a few more at its base. Angle of opercle slightly serrated, as is also the contiguous portion of the subopercle. Infraorbital ring narrow, not covered by scales. *Fins*: dorsal spines increase in length posteriorly; the soft dorsal and anal pointed; caudal lobes, especially the upper, produced; second anal spine the longest and strongest; ventral reaches the

anal; pectoral rounded, and as long as the head without the snout. *Teeth* compressed, in a single row, about thirty in the lower jaw, and an equal number in the upper. *Scales* ctenoid. *Lateral line* ceasing below the end of the soft dorsal. *Colours* olive, becoming light inferiorly. Seven rows of blue spots behind the eyes, passing across the gill-covers; one row along the suborbital ring, and one across the snout. A black spot at the base of the pectoral. A row of light lines along the centre of the scales on the sides. Fins dark-coloured; base of caudal barred in lines.

Hab. Madras, to 5 inches. Some years since I procured one specimen of this fish, now a second; and one exists in the Madras Museum. This is probably the species alluded to by the late Dr. Jerdon, M. J. L. & S. 1851, p. 133, which he got at Madras up to 3 inches in length, but did not name. I have therefore termed it *jerdoni*, after its first discoverer.

NOVACULA RUFA, sp. nov.

D. 2 $\frac{7}{12}$. A. 3/12. L. 1. 26. L. tr. 5/13.

Length of head $\frac{2}{3}$, of caudal $\frac{1}{3}$, height of body nearly $\frac{1}{3}$ of the total length. *Eyes* high up, and above 2 diameters from end of snout. Body strongly compressed. Upper surface of head sharp. *Fins*, the two first dorsal spines produced, and a deep notch in the interspinous membrane dividing them from the rest of the fin; outer ventral ray produced. *Scales* on chest smaller than those on the body. *Colours* rosy, becoming yellowish along the abdomen; caudal with dark greyish, irregularly reticulated bands; fins, excluding the caudal, yellow; eyes bright red.

Hab. Madras.

OPHIOCEPHALUS MICROPELTES, Cuv.

D. 42. A. 27. L. 1. 100. L. tr. $\frac{7-8}{21}$.

Height of body $\frac{1}{3}$, length of head $\frac{2}{3}$, of caudal $\frac{1}{3}$ of the total length. Otherwise my specimens agree with the descriptions given except in the coloration, as the spots are black and the fins have a white margin.

Hab. Trichoor, near Cochin, where I obtained five specimens, the smallest of which was upwards of a foot in length.

This fish, hitherto recorded from Siam and the East-Indian archipelago, appears to take a wide range. But it is peculiar in not having been found in any of the countries intermediate between Malabar and Siam.

ÆSOPIA CORNUTA, Cuv.

D. 75. P. 10. V. 3-4. A. 61-62. L. 1. 100.

Length of head $\frac{1}{3}$, of caudal $\frac{1}{10}$, height of body about $\frac{1}{3}$ of the total length. Eyes close together, the upper scarcely in advance of the lower. One short tubular nostril on the coloured side. A few minute filaments along the lower edge of the jaw. *Fins*: vertical

ones confluent; both pectorals rudimentary; first dorsal ray thickened and prolonged, the succeeding few low. *Scales* cycloid. *Colours*, twelve to thirteen brown vertical bands, the first on the snout; fins with dark edgings.

Hab. Coromandel coast of India. I obtained two specimens, both 5 inches long, from the Madras bazars.

SILURUS DUKAI, sp. nov.

D. 4. P. $\frac{1}{13}$. V. 10. A. 78. C. 19.

Length of head $\frac{2}{13}$, of caudal $\frac{1}{6}$, height of body $\frac{2}{13}$ of the total length. *Eyes* just above and behind the angle of the mouth and in the anterior half of the head. *Barbels* four, the maxillary reach the base of the ventral, the single mandibular pair as long as the head. A single row of six widely separated open glands under the mandible. *Teeth* in a single uninterrupted horseshoe-shaped band on the vomer. *Fins*: pectoral rather pointed, its spine moderately strong, short, entire, and having a soft termination; dorsal fin rudimentary, and in the anterior fourth of the total length; anal and caudal united, without any distinct notch. *Colours* uniform.

Hab. Darjeeling, whence my friend, Dr. Duka, sent me several specimens, and after whom I have named it.

SEMILOTUS BREVIDORSALIS, sp. nov.

B. iii. D. 14. V. 9. A. 7. L. l. 40. L. tr. 7/9.

Length of head $\frac{1}{6}$, of caudal nearly $\frac{1}{4}$, height of body nearly $\frac{1}{3}$ of the total length. *Eyes*, diameter $\frac{1}{3}$ of length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameter apart. Snout swollen; mouth inferior, transverse; lower jaw not covered by lip, three rows of large pores across the snout; knob at symphysis badly developed. *Fins*: last undivided dorsal ray osseous, very strong, entire, longer than the head by a distance equal to one diameter of the orbit; dorsal fin commences midway between the snout and the base of the caudal, the fin two thirds as high as the body below it; pectoral falciform, extending to over the ventral, which last is long, reaching to the anal; caudal deeply forked. *Scales*, $4\frac{1}{3}$ rows between the lateral line and the base of the ventral fin. *Colours* silvery.

Hab. Rivers below the Neilgherry Hills in the Madras Presidency.

ROHTEE NEILLI, sp. nov.

B. iii. D. 4/8. P. 13. V. 10. A. 21. L. l. 59. L. tr. 12/18.

Length of head $\frac{2}{9}$, of caudal $\frac{1}{4}$, height of body $\frac{2}{9}$ of the total length. *Eyes*, diameter rather above $\frac{1}{3}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, and $\frac{2}{3}$ of a diameter apart. Profile over nape concave, thence a considerable rise to the base of the dorsal fin. Upper jaw somewhat the longer. *Barbels* four, all nearly as long as the eye. *Fins*: dorsal commences midway between the anterior edge of the orbit and the base of the caudal fin, its

fourth ray osseous, serrated, very strong, and as long as the head without the snout; caudal deeply forked. *Lateral line* strongly marked in its first few scales, all the rows of scales regular. *Colours* silvery, opercles golden.

Hab. Rivers near the base of the Neilgherry Hills in Madras.

I have much pleasure in naming this fish after my esteemed friend A. C. Brisbane Neill, Esq.

ROHTEE BAKERI, sp. nov.

B. iii. D. 3/8. P. 13. V. 10. A. 3/11. L. l. 44. L. tr. 8/7.

Length of head from $\frac{1}{5}$ to $\frac{2}{11}$, of caudal $\frac{2}{5}$, height of body from $\frac{1}{4}$ to $\frac{2}{5}$ of the total length. *Eyes* longest transversely, diameter $\frac{2}{5}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, and 1 diameter apart. Profile over nape rather concave, a considerable rise to the base of the dorsal fin. Mouth small, horseshoe-shaped; upper jaw the longer. *Barbels* four, all very short. *Fins*: dorsal rather higher than the body, and arising midway between the end of the snout and the base of the caudal, its spine weak, as long as the head, and serrated posteriorly in almost its whole extent; caudal deeply lobed, both of equal length. *Scales*, $5\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colours* silvery; caudal and dorsal edged with black.

Hab. Cottayam, whence I have received three specimens up to $4\frac{1}{2}$ inches in length, collected by the Rev. H. Baker, after whom I have named the species.

SPRATTELLOIDES MALABARICUS, sp. nov.

B. vi. D. 14. P. 13. V. 8. A. 18. C. 17. L. l. 38. L. tr. 9.

Length of head, caudal fin, and height of body each $\frac{2}{5}$ of the total length. *Eyes*, diameter $\frac{1}{3}$ of length of head, 1 diameter from end of snout, $\frac{3}{4}$ of a diameter apart. Body compressed; abdomen neither keeled nor serrated. Gill-membranes separated. Pseudobranchiæ well developed. Snout pointed; lower jaw the longer, and prominent. The maxilla reaches to below the anterior edge of the orbit. No osseous gular plate. *Teeth* minute and deciduous in both jaws. *Fins*: dorsal commences slightly before the origin of the ventral, its anterior rays being about as long as the head, its posterior ones equalling one diameter of the orbit; the fin commences midway between the end of the snout and the base of the caudal fin, which latter is deeply forked. *Lateral line* absent. *Colours* light yellowish green superiorly, a silvery band along the side, and abdomen white. Upper caudal lobe with a bluish posterior edge, some fine black points along the back. Upper edge of eye dark green.

Hab. Sea, ascending rivers in Malabar, and attaining 3 inches in length. It is not uncommon.

5. On Secondary Sexual Characters in the *Chiroptera*.

By G. E. DOBSON, B.A., M.B.

[Received February 11, 1873.]

In the first volume of 'The Descent of Man' (p. 268) Mr. Darwin writes as follows:—"Hardly a single species amongst the Chiroptera and Edentata, or in the great orders of the Rodents and Insectivora, presents well-developed secondary sexual differences. . . ."

I purpose in this paper to inquire into the applicability of Mr. Darwin's statement so far as regards the first of the orders referred to, the Chiroptera; and I hope to be able to show that several species in this order present well-marked secondary sexual differences.

As in other orders of Mammalia these differences may be considered under two heads:—

1. Differences in structure.
2. Differences in the colour of the fur.

The first is the most important and constant character; the second is observable in by far the larger number of species possessing secondary sexual characters; but the distinction between male and female in this respect is less well-marked generally in the Chiroptera than in some other orders of Mammalia.

I shall therefore first enumerate and describe the secondary sexual characters depending on structural differences which have been observed in the Bats of the eastern hemisphere.

Among the *Rhinolophidae*, or Horseshoe Bats, the species of the genus *Phyllorhina* present most remarkable secondary sexual characters. The males of sixteen species are provided with a peculiar frontal sac, placed immediately behind the erect portion of the transverse nose-leaf. The sides of this sac are usually covered with a peculiar waxy secretion; and a pencil of long, fine, black hairs arising from the bottom of the sac projects for about half its length from its mouth. "This cavity," remarks Mr. Elliot (quoted by Blyth*), "the animal can turn out at pleasure, like the finger of a glove; it is lined with a pencil of stiff hairs, and secretes a yellow substance like wax. When alarmed, the animal opens this cavity and blows it out, during which it is protruded and withdrawn at each breathing." In the females this frontal sac is quite rudimentary, consisting only of a slight depression in the skin of the forehead surrounded by a cutaneous ring. From the bottom of this depression hairs project, as in the males, but are much finer and shorter.

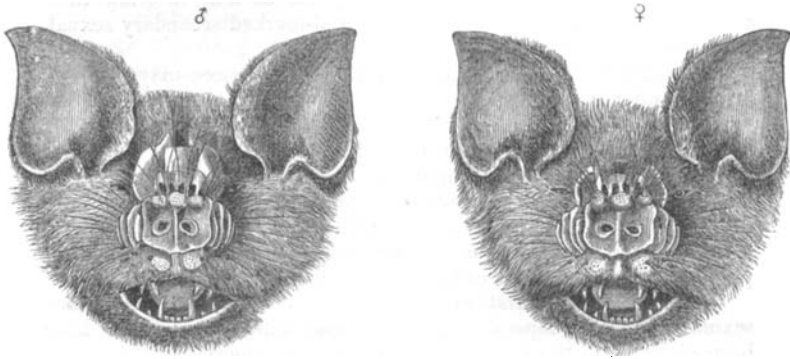
In every known species of *Phyllorhina* a small, wart-like glandular elevation, covered with fine straight hairs, and having on its summit two small apertures, exists on either side of the forehead behind the transverse nose-leaf, slightly internal to and above the eye. Between these glandular prominences the frontal sac is placed in all species so provided. In the adult males of *P. armigera*, Hodgs., the wart-

* Journ. Asiatic Soc. of Bengal, vol. xiii. p. 487.

like elevation on each side is enormously developed, forming a large callosity, extending forwards in front of the eye, and backwards to the posterior margin of the opening of the frontal sac. These, with the raised and swollen margins of the opening of the frontal sac, form on the forehead a naked, livid, triangular space, extending from the transverse nose-leaf backwards between the ears. The adult female possesses, as in other species, a very rudimentary sac, placed close behind the transverse nose-leaf; and the small wart-like elevations on either side are almost concealed by the hair of the forehead.

Fig. 1.

Fig. 2.

*Phyllorhina armigera.*

The drawings well represent the relative development of the parts referred to above in the male and female *P. armigera*. The original drawings have been made from specimens in the Indian Museum.

I have observed a similar development of these glandular prominences in an adult male specimen of *P. larvata*, Horsfield, from Assam; but in all other apparently adult specimens of this species in the Indian Museum they are not larger than in other species of *Phyllorhina*. The question therefore arises whether this enlargement of the glandular elevations, with proportional development of the frontal sinus in the male, depends on season, or on the age of the individual, or on both.

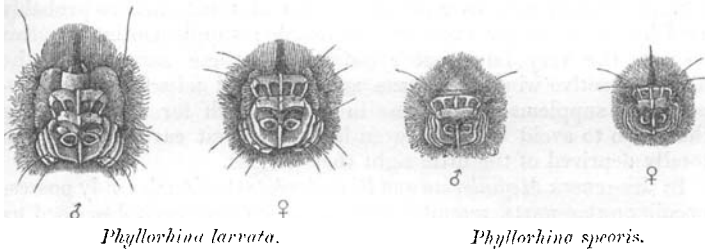
Mr. Blyth remarks, in a footnote, on the frontal sinus of Bats of this genus (Journ. As. Soc. Beng. vol. xiii. p. 487):—"It is probable that the development of this sinus, and also of the throat-sac of the *Taphozoi*, depends much on season, like the infraorbital cavities of various ruminants and analogous glandulous follicles in many other animals."

The development of the frontal sinus and glandular prominences being primarily a sexual character, I believe that the relative development of these parts among males of the same species is dependent on both age and season. I have always found the frontal sac in aged individuals greatly developed; the development of the

glandular eminences on either side is probably more connected with season. In a large number of male specimens of *P. larvata*, Horsfield, from Burma, obtained at the same time, in which the testes lie in a false scrotum formed by the skin of the perinæum, the glandular eminences on either side of the frontal sinus are not more developed than in the females; while the frontal sac is very large, contrasting remarkably with the rudimentary one in the other sex. In a specimen from the Kasia hills, in which the testes occupy the abdominal cavity, the frontal glandular eminences are greatly developed (as shown in fig. 3), and their development is evidently

Fig. 3.

Fig. 4.



connected with season; for, in the Chiroptera and some genera of Rodentia and Insectivora the testes, during the rut, pass into the abdominal cavity*.

In *P. larvata* and *P. speoris* the external margins of the frontal sac are, in the males, greatly swollen, naked, and elevated considerably above the surface; while in the females the margins of the slight depression in the skin of the forehead, corresponding to the frontal sac in the males, are not more thickened or elevated than in young males of the first year. This is well shown in the illustration above (fig. 4).

In other species, where thickening and elevation of the margins of the frontal sac, or enlargement of the neighbouring glandular prominences do not exist, a permanent secondary sexual difference is found in the depth of the sac, which, in the most adult females, is a mere shallow depression in the skin of the forehead.

The above described remarkable difference between the males and females of *P. larvata* and of *P. speoris*, taken with a slight difference in the colour of the fur, has caused more than one distinguished zoologist to separate the males and females into distinct species†.

It is difficult to assign a use to this protrusible frontal sac. The only other animals possessing apparently homologous organs are the

* See Wagner's 'Comparative Anatomy,' ed. Tulk, p. 56.

† Thus the species *P. insignis* and *P. deformis* were founded on male and female specimens respectively of *P. larvata*; and, similarly, *P. apiculatus* and *P. penicillatus* on *P. speoris*. (For synonymy see Peters in 'Monatsbericht Berlin Akademie,' June 1871, p. 320; also Blyth, Journ. Asiatic Soc. Bengal, vol. xiii. p. 481.)

male Sea-elephant (*Macrorhinus proboscideus*) and the Bladder-nosed Seal (*Cystophora cristata*); and Mr. Darwin, when referring to the sexual peculiarities of these animals, does not suggest any use for the remarkable structures possessed by the males; but cites Lesson, who "compares the erection of the proboscis [in *M. proboscideus*] to the swelling of the wattles of male gallinaceous birds whilst they court the females" *.

I am disposed, however, to regard the protrusible frontal sac of the male Phyllorhine Bats as a more specialized structure than the erectile nose of *M. proboscideus*, or the inflatable skull-cap of *C. cristatus*. The peculiar finger-like appearance of the everted sac, armed at the extremity with a pencil of long straight hairs, seems to indicate that it acts as a delicate organ of touch, and is probably used by the male for exciting the female; supplementing, in this respect, the very imperfect eye-sight† of these animals, as the highly sensitive wing-membrane and expanded foliaceous nasal appendages supplement the same in their search for food, enabling them also to avoid obstacles even in the darkest caverns and when totally deprived of the little sight they possess.

In the genera *Megaderma* and *Rhinolophus* the females only possess peculiar pubic warts, resembling teats, which have been described by Temminck and other zoologists. Temminck regards them as odoriferous glands, in no manner connected with the function of nutrition, and writes:—"J'ai soumis un grand nombre d'individus de plusieurs espèces différentes à l'examen de ces parties, et le résultat m'a pleinement convaincu que ces mamelons ne servent en aucune manière à la nutrition, ce sont des appendices d'où suinte une matière onctueuse, fétide; cet appareil doit servir à augmenter l'odeur désagréable que ces animaux exhalent, et paraît destiné aux mêmes fins que les siphons ou les glandes odorifères observées dans plusieurs espèces de Cheiroptères" ‡.

These pubic warts, if Temminck's remarks be correct, present another very interesting secondary sexual character; but, although I have examined a large number of specimens of *Megaderma lyra* and of various species of *Rhinolophus* preserved in spirit, I am unable to assert positively, as Temminck has done, that they are in no respect connected with the function of nutrition. To determine this question it would be necessary to examine recent specimens obtained during the season of lactation.

Dr. Anderson, Curator of the Indian Museum, during a collecting-tour in Lower Bengal, obtained at Purneah a large number of specimens of the females of *M. lyra* with their young; and the following remarks occur in a letter received by me from him on his return to Calcutta:—"All the young, even the largest, were adherent to the teats, some attached to the abdominal, and others to the pectoral

* Descent of Man, vol. ii. p. 278.

† Mr. Darwin enumerates many instances where he considers the brilliant colours of the fur or feathers of male animals, or other sexual peculiarities, are admired by the females.

‡ Monographies de Mammalogie, vol. ii. p. 3.

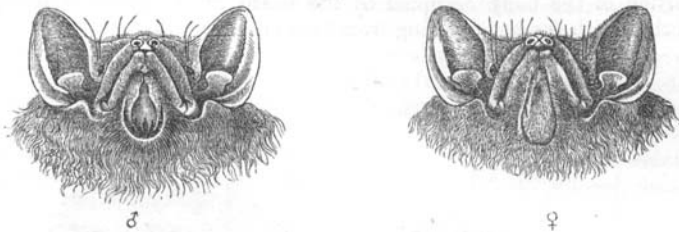
nipples; but I observed that they moved about with great energy from one teat to another. Besides the specimens collected I examined about forty other females; and each had only one young."

Dr. Anderson saw nothing, he informs me, to lead him to believe that the young obtained nourishment from the pubic teats, save that they occasionally attached themselves to them. Probably the young *Megadermus* held on to these teat-like organs as every young animal will attach itself to any thing resembling the nipple of its mother.

We find the next most remarkable secondary sexual differences among the *Noctilionidæ*, especially in the genus *Taphozous*, Geoff. In this genus the males and females of most species are distinguished by well-marked secondary sexual characters.

In *Taphozous longimanus*, Hardwicke, a species very common about Calcutta, the males are provided with a deep gular pouch, placed between the angles of the mandible, and opening anteriorly by a crescentic margin. This sac contains a yellowish, unctuous, fetid substance, on which the peculiar odour of the animal appears

Fig. 5.



Taphozous longimanus.

in a great measure to depend. In the female no sac exists, but a thin semicircular fold of skin marks the position of the opening as found in the males. In *T. saccolæmus*, Geoff., a similar sexual difference is met with; but the gular pouch, though relatively much smaller in the female, is not reduced to such a rudimentary condition as in *T. longimanus*. In *T. kachhensis*, Dobson, the gular pouch is represented in the male by a slightly raised semicircular fold of skin (in the position occupied by the opening of the pouch in other species) and surrounding nakedness of the integument; while in the female the skin is quite smooth in the same place.

Thus the transition from species possessing a well-developed gular pouch to those in which it is altogether absent is gradual.

In Dr. J. E. Gray's "Synopsis of the genera of Vespertilionidæ and Noctilionidæ" (Ann. & Mag. Nat. Hist. 1866, p. 92) those species possessing a gular pouch are separated into a distinct genus, under the name of "*Saccolaimus*." According to this principle we should be obliged to place the males of *T. longimanus* in one genus, and the females in another; and, indeed, this is what Dr. L. Fitzinger has lately done.

In his "Critical Analysis of the order Chiroptera"* Dr. Fitzinger has redescribed three species, as *Saccolaimus brevicaudatus*, *S. fulvidus*, and *S. cantori*, Blyth, which had many years previously been recognized by their original describer (Mr. Blyth) as males of *T. longimanus*, Hardw., differing from one another in the colour of the fur, length of tail, and in some other points of no specific importance, dependent on season, age, and locality. These imaginary species have been relegated by Dr. Fitzinger to the genus *Saccolaimus*, distinguished by the possession of a gular pouch; while the females, being without a gular pouch, appear in a separate genus under the names of *T. longimanus*, Hardw., and *T. bicolor*, Temm.

The males of *T. melanopogon*, Temm., possess a peculiar beard of long black hairs, extending from the angles of the mandible backwards to the sternum. This beard contrasts remarkably with the rest of the fur, both in the length of the hairs composing it and in their colour. The usual colour of the fur of the animals of this species is white at the base, with black extremities. The hairs of the beard, however, are black throughout, thicker and longer than the hairs occupying the rest of the body. In the females the portion of the body occupied by the beard in the males is thinly clothed with fur not differing from that covering other parts.

Fig. 6.

*Taphozous melanopogon.*

The position of the beard, and comparative length of the hairs composing it, are shown in the above woodcut (fig. 6).

Among the *Molossi* the males of some species are provided with thoracic or gular glandular pouches, which are either wanting or less developed in the females. The thoracic pouch of *Dysopes alecto*, an American species, is described by Temminck as follows:—"Plusieurs individus conservés à l'esprit de vin ont servi à nous faire découvrir que l'espèce est munie au thorax d'une poche ou siphon assez large, couvert par un repli de la peau et conduisant à une cavité pourvue de muscles propres, qui servent à la sécrétion d'un fluide onctueux; le bord inférieur de ce siphon est pourvu d'un bourrelet, et la cavité se trouve en grande partie cachée par quelques poils assez longs du devant du cou. Les mâles ont cette ouverture,

* "Kritische Durchsicht der Ordnung der Flatterthiere," Sitzungsber. Wien. Akad. lxi. Abth. i. p. 447 (1870).

mais elle est moins grande chez les jeunes. . . . Les femelles n'ont point de siphon"*.

The same writer notices the presence of a gular pouch in the males only of *Dysopes obscurus*, and describes the thoracic glandular pouch of *Cheiromeles torquatus*, which differs in structure and is less developed in the female†.

Among the Frugivorous Bats several species present well-marked secondary sexual differences.

The species of the genus *Epomophorus* possess peculiar shoulder-tufts, consisting of long stiff hairs, differing in colour and length from the surrounding fur. These tufts correspond to the position of odoriferous glands, and are either less developed or wanting in the female.

In Mr. Tomes's "Monograph of the genus *Epomophorus*" the form of the shoulder-tufts‡ in each species is described, but the author does not notice their relative development in the sexes.

In *E. labiatus* = *Pteropus labiatus*, Temm., the absence of the shoulder-tufts in the female is particularly noticed by Temminck§. In *E. gambianus*, Ogilby, = *E. crypturus*, Peters, these epaulettes are well developed in the male, and are thus described by Mr. Tomes:—"The conspicuous shoulder-tufts of *E. macrocephalus* are here very fully developed. They consist of a very slight warty excrescence clothed with fur, which differs from that which surrounds it only in being of a dirty white colour"||. As this description was taken from specimens obtained twenty-five years previously it is most probable that in the living animal these shoulder-tufts present much more conspicuous objects. Judging from the fine coloured illustration, representing the female of this species, in the 'Reise nach Mossambique,' and from the absence of any mention of these epaulettes in Dr. Peters's description¶, taken from an adult female specimen, we may conclude that in the female of this species also the shoulder-tufts are wanting.

The only known specimen of *E. franqueti*, Tomes, is a male; and the remarkable development of the shoulder-tufts is shown in the illustration accompanying Mr. Tomes's paper referred to above. They are thus described:—"The shoulder-tufts are very much developed, and differ somewhat from those of *E. macrocephalus*. They occupy a space on the shoulder of as much as 1½ inch in length, in a descending direction; the lower half of this space consists of fur, which is of the same length and texture as that of the surrounding parts, but is of a buffy yellow colour; whilst the upper part, constituting the real shoulder-tuft, is composed of long yellow hairs, which spring outwards and then curve downwards, partially

* Temminck, 'Monographies de Mammalogie,' vol. ii. p. 355.

† *Loc. cit.* p. 349.

‡ Well shown in a fine coloured illustration of *E. franqueti*, Tomes, accompanying Mr. Tomes's Monograph of the genus (see Proc. Zool. Soc. 1860, p. 42, pl. lxxv.).

§ Monographies de Mammalogie, vol. ii. pp. 83, 84.

|| P. Z. S. 1860, p. 53.

¶ Reise nach Mossambique, Säug. p. 26, pl. v.

hiding the short yellow hair already mentioned. All this yellow fur, both long and short, has a clear and well-defined outline"*.

If the shoulder-tufts, so conspicuous in the male, are absent in the female of this species also, as judging from analogy we may expect, we have then three species of Bats of this genus alone possessing secondary sexual characters as remarkable as any known in the class Mammalia.

Temminck describes somewhat similar secondary sexual differences in *Pteropus macklotii*. The male possesses a well-developed odoriferous gland on each side of the neck, covered by a large tuft of stiff unctuous hairs of a bright chestnut colour, contrasting with the surrounding fur. In the female these glands and shoulder-tufts are absent.

The same author thus describes the sexual peculiarities of *Cynonycteris stramineus*, Geoff.:—"Pelage lisse, très-court et rare; région des côtés et du devant du cou ornés d'un demi-collier rouxdoré à pinceaux de poils onctueux et divergens. Les teintes de ce collier et des pinceaux de poils courtes et divergens qui existent seulement chez le mâle, varient plus ou moins; l'un des sujets a toutes les parties latérales et le devant du cou d'une teinte jaune-orange encadrée par une bande brune.

"La femelle manque d'appareil onctueux et de poils divergens aux côtés du cou; ces parties sont d'un jaunâtre terne plus ou moins nuancé de brun-clair. Le reste du pelage est le même pour les deux sexes"†.

I have no opportunities here for examining specimens of Bats from the western hemisphere; and very little can be gleaned from the writings of zoologists regarding the occurrence of secondary sexual differences among them. However, Prof. W. Peters, who has contributed so very much to our knowledge of the Chiroptera, has most kindly, in reply to my inquiries, supplied me with some valuable information on this head.

In the American continent and its islands the place of the Rhinophidæ or Leaf-nosed Bats of the Eastern World is taken by the Phyllostomidæ, which, though possessing well-developed nasal appendages, are in no other respect connected with the former family, but rather with the Noctilionidæ, which they resemble in structure and in their secondary sexual characters.

Dr. Peters notes the presence of a gular sac, as in some species of *Taphozoi*, in the males only of *Phyllostoma hastatum* and in several species of *Molossi*, and adds:—"There is nothing more striking amongst American Bats than the development of a large sac in the humeral membrane of *Saccopteryx*, *Peropteryx*, *Balaniopteryx*, and other genera; and this organ is only found developed in the males, the females having only a rudiment, which is so small that it has been overlooked by most observers until lately."

I have no doubt that, as the species of this little-studied order become better known, as great or, perhaps, a still greater number will

* *Loc. cit.* p. 54.

† *Loc. cit.* p. 85.

be found to possess structural differences depending on sex, as have been described in other orders of Mammalia.

It remains now to consider the secondary sexual differences arranged under the second head—namely, differences in the colour of the fur.

As the colour of the fur in Bats, as in other mammals, varies very considerably according to age, season, and locality, it is necessary in comparing males and females to pay particular attention to this fact. Thus the common Flying Fox of Europeans in India, *Pteropus medius*, Temm., varies considerably; and the difference in the colour of the fur of individuals obtained from different localities or the same locality has caused some zoologists to rank them as distinct species, though perfectly similar in structure*. There is probably scarcely a single species of Bat to which this rule does not apply; but the variability of colour is often not noticeable in those in which the fur is of a very dark shade.

It is interesting to observe how Dr. Fitzinger, either from imperfect knowledge or from want of due appreciation of these facts, has reproduced the mistakes of former observers by republishing the names and descriptions of species previously recognized as synonyms of other species, in some cases by the authors themselves. Thus four species of *Rhinolophus* (*Aquias*) are recognized and described (*op. s. c. p. 192 et seq.*) which differ from one another only in the colour of the fur. And so we have, according to Dr. Fitzinger, "the grizzled leaf-nosed Bat" (*Aquias luctus*, Temm.), "the reddish leaf-nosed Bat" (*A. eudouxii*, Laplace), "the dark red leaf-nosed Bat" (*A. morio*, Gray), and "the black leaf-nosed Bat" (*A. perniger*, Hodgs.). Except the second named, these forms of *R. luctus* are in the Indian Museum, and they have all been obtained at Darjeeling. Similarly Kelaart's *R. rubidus* et *fulvidus*, which Blyth had shown to be identical with *R. affinis*, Horsf., are restored on the same grounds—difference in colour.

The examination of many specimens of these Bats has shown me that, where male and female specimens of the same species have been obtained at the same time and place, the lighter-coloured specimens are invariably males. This confirms Dr. J. A. Allen's observation regarding some species of American Bats†. Thus a male specimen of *R. luctus* from Darjeeling, in the Indian Museum, answers in every respect to the original description of *R. morio*, Gray; while several females from the same locality, and taken at the same time, are wholly black, and belong, therefore, according to Fitzinger,

* Dr. J. E. Gray notices the variability of colour in specimens of the same species found in the same locality as follows:—"There is a general similarity in the colouring of the majority of the species; specimens found in the same locality or island often vary considerably from one another, even when the examination of the skull and teeth show that they are of the same species. On the other hand, specimens from different localities often resemble one another so much in their external colouring that it is difficult to distinguish them in any description that can be made; but when the skulls and teeth are examined they prove to be very different species." ("Revision of the Genera of Pteropine Bats," Proc. Zool. Soc. Lond. 1866, p. 65.)

† Quoted by Mr. Darwin, 'Descent of Man,' vol. ii. p. 286.

to a distinct species, *R. perniger*, Hodgs. ; others are black, sprinkled with silvery grey, and must therefore, according to the same authority, be relegated to a distinct species. But the closest examination fails to detect any structural difference other than sexual between these specimens from Darjeeling. The "reddish leaf-nosed Bat" of Fitzinger, *R. eudouxii*, Laplace, from the Philippine Islands, is most probably the male *R. luctus*, its brighter colour depending on locality, and perhaps, in a less degree, on season.

In the Journ. As. Soc. Beng. vol. xli. p. 220, I have shown the identity of *Phyllorhina fulva*, Gray, with *P. murina*, Gray, and *P. cineracea*, Blyth, and have expressed my belief that *P. atra* et *atrata*, which differ from *P. fulva* also only in the colour of the fur, are referable to the same species. Later, in the Proc. As. Soc. Beng., Aug. 1871, p. 155, I have remarked that the rich golden hue of the fur of some specimens of *P. fulva* depends most probably on sex and season, seeing that, of several specimens possessing this golden colour examined by me, all were females and each contained a more or less developed fœtus. In the same paper I have adduced evidence which now satisfies me that this golden colour is only possessed by the females, and by them only under certain circumstances, as when in the pregnant condition.

Mr. Blyth, who, in common with other zoologists, regarded the golden-coloured specimens of *P. fulva* as representing a species distinct from the white and black specimens, writes as follows:—"This is perhaps the most vividly coloured of the whole class of Mammalia; at least I know of no species which can at all compete with it for brilliancy of hue. The colour of the fur is here alluded to; for that of the naked skin of the Mandrill and of certain *Cercopithecii* can scarcely be surpassed. The general tint of the fur is splendidly bright ferruginous, that of the upper parts being slightly tipped with a darker shade; membranes dusky." To this Mr. Blyth adds:—"Inhabits Southern India, where very rare"*.

The comparative rarity of the golden-coloured specimens is easily explained when we know that this colour is only possessed by the females of *P. fulva*, and by them only under certain conditions.

I believe the same change occurs in the breeding-season among the females of *Nycticeius temminckii*, Horsf., the commonest Bat about Calcutta. The usual colour of this Bat is pale straw-colour on the under surface, sometimes almost white. This colour I have observed in male and female specimens from all parts of India; but in females obtained in the months of March and April I found the prevailing hue to be rich saffron-colour, exceeding that of the Canary bird.

Among the Frugivorous Bats the same rule appears to hold good, that the females are always darker in colour than the males of the same age. This I have constantly observed in *Pteropus medius*, Temm. Also in a *Pteropus* from the Audamans† and Nicobars the females

* Journ. As. Soc. Beng. vol. xiii. p. 489.

† Distinguished by the form and size of its ears from *Pt. medius* and other allied species, probably *Pt. nicobarensis*, Schriezer, Novara Expedition. The first

are generally of an intensely black colour throughout; in a few specimens only, of apparently very aged individuals, the fur on the back of the head and neck has a slightly reddish tinge; while the males have the whole back of the head and nape of the neck to the shoulders bright orange or pale yellow (very rarely, in old males, reddish brown) as in *Pt. medius*, contrasting as remarkably with the sombre hues of the females as the brilliantly coloured skin of the male Mandrill contrasts with the same parts in the other sex.

A review of the varieties of secondary sexual characters exhibited by various species of Chiroptera described in the foregoing pages shows that in almost all cases these differences depend on the possession by the male (rarely by the female) of accessory organs, generally odoriferous glands, used probably for the purpose of bringing the sexes together during the rutting-season, or for exciting the female; and this might be expected in animals in which the power of vision is almost entirely supplemented by an extraordinary development of the senses of touch and smell.

Differences, depending partly or entirely on the possession by the male of fur of a much more brilliant hue, or distinguished by different markings, or by the greater length of certain portions, are met only, to any appreciable extent, in the Frugivorous Bats, in which the sense of sight is well developed*.

The inference that will naturally be drawn from a perusal of this paper will be, not only that many species of Chiroptera possess well-marked secondary sexual characters, but also that several species exhibit as remarkable differences in this respect as any that have been observed in the whole class Mammalia.

The danger of generalizing statements from imperfect data is thus strikingly illustrated; and we are reminded of the old axiom in logic which biologists, both great and small, would do well to keep ever before their minds:—"A particulari ad universale argumentum non est."

The science of life is yet in its infancy. Man has existed for thousands, perhaps millions, of years upon the earth; but the grand question of his origin and of that of other animals is believed by many distinguished biologists to have already been finally settled from a consideration of a few facts collected within the past half century, most of them within the past decade.

specimen I received, a female with intensely black fur throughout, was sent me by Mr. Homfray, Assistant Superintendent, Port Blair. Other specimens, male and female, were obtained by me in May last near Port Blair; and Mr. Homfray has since sent me from the Nicobars specimens of the common Flying Fox of these islands, which I find in no respect different from the Andamanese species.

* The beard in the males of *Tuplous melanopogon* evidently depends on the presence of a subcutaneous gland, in the position occupied by the gular pouch in other species of the genus, which discharges its secretion by minute pores. The long black hairs forming the beard grow about these pores, their coarseness and length depending on the glandular secretion by which they are abnormally nourished.

The length of the hair composing the epaulettes of the *Eponaphori* is probably due to the same cause; but its remarkable difference in colour requires another explanation.

When we consider how little is known of even the higher mammals, and how limited at present is the range of geological inquiry, we must acknowledge that, for some time to come, all generalizations bearing on the question of our origin are premature; for a vast field for observation still widens out before us, within the boundaries of which we have but lately entered.

6. On the Birds of Eastern Peru. By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society, and OSBERT SALVIN, M.A., F.Z.S. With Notes on the Habits of the Birds, by EDWARD BARTLETT.

[Received February 7, 1873.]

(Plates XXV. & XXVI.)

In our first paper on the collections made by Mr. Edward Bartlett*, we have given an account of the principal authorities on the ornithology of Eastern Peru. In that and subsequent communications we have also given lists of the greater part of Mr. Bartlett's collections.

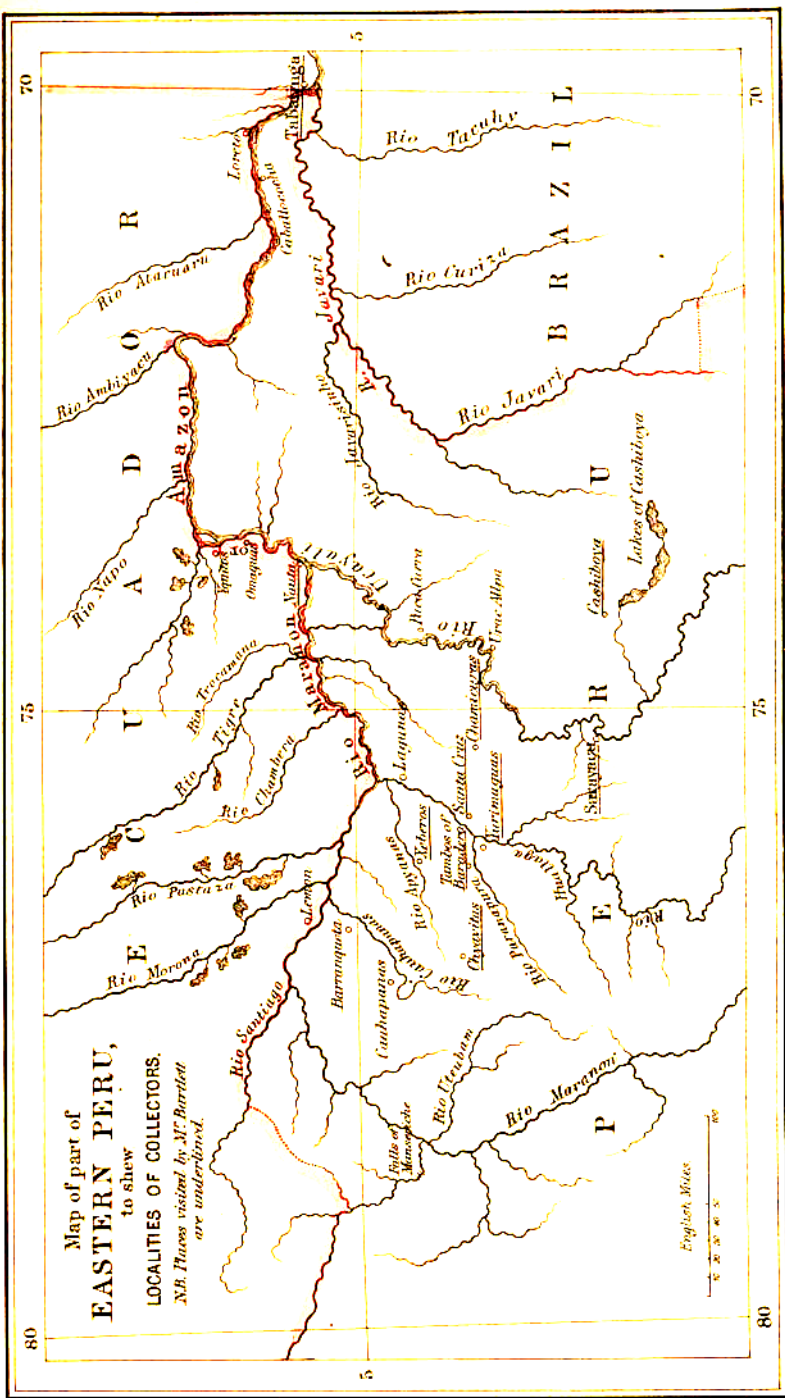
Soon after his return home, Mr. Bartlett furnished us with a complete list of the birds he had obtained, based upon our papers, together with valuable notes on the habits of many of the species. This list, however, on account of changes in nomenclature and imperfect determinations, required thorough revision; and it is only lately that we have been able to devote the necessary time to that purpose.

In order to make it more complete we have included in the list, besides some additional species brought home by Mr. Bartlett on his return, the names of the species obtained by Mr. Bates from the Rio Javari, and by Mr. Hauxwell at Pebas and on the Huallaga and Ucayali. Thus the present paper contains a summary of nearly all that is accurately known of the ornithology of the most eastern part of the wood-region of Eastern Peru, from its extreme eastern boundary (the Javari) to the district traversed by Mr. Bartlett on the western bank of the Huallaga†.

* Proc. Zool. Soc. 1866, p. 175.

† The following is a complete list of the ornithological papers referring to this district:—

1. On a Collection of Birds transmitted by Mr. H. W. Bates from the Upper Amazon. By Philip Lutley Sclater. P. Z. S. 1857, p. 261.
2. Description of eight new Species of Birds from South America. By John Gould. P. Z. S. 1855, p. 67.
3. Catalogue of Birds collected by Mr. E. Bartlett on the river Ucayali, Eastern Peru, with Notes and Descriptions of New Species. By P. L. Sclater and Osbert Salvin. P. Z. S. 1866, p. 175.
4. On some additions to the Catalogue of Birds collected by Mr. E. Bartlett on the river Ucayali. By P. L. Sclater and Osbert Salvin. P. Z. S. 1866, p. 566.





The accompanying map (Plate XXV.), prepared mainly from Mr. Bartlett's information, will serve to show more exactly the extent of this district, and the situation of the various towns and villages where collections have been made.

Mr. Bartlett has kindly supplied us with the subjoined general account of his expedition:—"I left England in January 1865, for the purpose of exploring and examining the ornithological fauna of Eastern Peru, and returned in February 1869. The route taken was from Liverpool by a small schooner bound to Pará, thence by steamer up the Amazons, calling at many of the towns on the upper river, as far as Tabatinga, thence by the Peruvian steamer to Nauta on the Marañon of the Peruvians. Nauta is one of the first settlements made by traders on this side of the Andes. I remained in that town about a month, during which time I occupied myself by collecting the few birds and other things marked from that locality. At the end of the rainy season, I prepared for a long and tedious journey up the Ucayali. I started in May, and proceeded in canoes accompanied by Cucuma Indians of Nauta. The journey occupied a little over four months. I formed the greater part of my first collections on the banks of the river as I proceeded, staying at some of the Cucuma and wild Conibo Indians' houses or Tambos, which afforded me an opportunity of obtaining some of the forest mammals, birds, and other objects. At Sarayacu I remained some time, and then went on to Cashiboya, a town named after the wild Cashibo Indians. It was at Sarayacu and Cashiboya that I procured a large number of most interesting birds. Towards the end of August I returned to Nauta, as I became anxious concerning the safety of the large collection already formed, knowing the danger of travelling down rapid streams with canoes heavily laden. I arrived at the mouth of the Ucayali about the 16th of September, and safely landed in Nauta on the same night, when I prepared the collections to forward to England. In reference to these collections see 'Proc. Zool. Soc.' 1866, p. 176. This done, I remained at Nauta collecting from the surrounding country till February 1866, when I left on board the Peruvian steamer for Yurimaguas, that being the furthest accessible port on the Upper Huallaga. There I remained about two months, waiting for the appearance of the dry season to commence my excursions through Mission Alto, or Alto Amazonas, which it would have been almost impossible to undertake during the rainy season. I started in a canoe up the Paranapura river, and succeeded in reaching the desired spot in a few days. Many canoes are from twenty to thirty days going the same distance at the time that the

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5. Catalogue of Birds collected by Mr. E. Bartlett on the river Huallaga, Eastern Peru, with Notes and Descriptions of New Species. By P. L. Selater and Osbert Salvin. P. Z. S. 1867, p. 748.
 6. List of Birds collected at Pebas, Upper Amazons, by Mr. John Hauxwell, with Notes and Descriptions of New Species. By P. L. Selater and Osbert Salvin. P. Z. S. 1867, p. 977.
 7. On two new Birds collected by Mr. E. Bartlett in Eastern Peru. By P. L. Selater and Osbert Salvin. P. Z. S. 1869, p. 437.

river rises, when the current is fearfully rapid. After arriving at Baradero, the Tambos of the Teniente Gobernador, I prepared for five or six days' journey through the dense forest of this wonderful region, rain continuing to fall the whole of the five days of tramp, in which time I arrived at the magnificent open town of Xeberos. I there formed a fair collection of all the small birds which are always to be found upon the open sandy campos. I made myself well acquainted with the surrounding country, and ascertained that there was an Indian footpath, some six or eight days' journey, through the forest to Chyavitas; so I determined upon going to that town, and returning the same for the rest of my baggage, which I was compelled to leave behind. Chyavitas is a small town situated on one of the lower spurs of the eastern ranges of the Andes, running towards the great river. I obtained from that region several interesting specimens, amongst which was the *Ateles bartlettii*, Gray (see Proc. Zool. Soc. 1867, p. 748). I returned to Xeberos by the same road, and thence descended the Apyanas, which flows into the Huallaga, below the town of Lagunas, and not into the Marañon as has been stated. I ascended the Huallaga as far as Lagunas, and thence took the steamer to Yurimaguas for the purpose of preparing my collections to forward to England. I collected about Yurimaguas until April 1867, and then went on to Chamicuros, where I passed twelve months. I afterwards visited Santa Cruz on the Huallaga, where I made the largest and most valuable portion of the collections brought home."

The following is a summary of the birds met with of this district, so far as they are known to us from the collections above referred to, and of the species amongst them which may be considered probably peculiar to the Upper-Amazonian fauna:—

Order.	Species peculiar.	Species not peculiar.	Total.
I. Passeres	72	173	245
II. Cypseli	9	34	43
III. Pici	4	11	15
IV. Coccyges	14	41	55
V. Psittaci	5	20	25
VI. Accipitres .....	...	24	24
VII. Striges .....	...	4	4
VIII. Steganopodes .....	...	2	2
IX. Anseres .....	...	5	5
X. Herodiones .....	...	13	13
XI. Columbæ .....	...	7	7
XII. Gallinæ	2	5	7
XIII. Grues	1	7	8
XIV. Grallæ .....	...	12	12
XV. Gavie .....	...	3	3
XVI. Crypturi	1	4	5
	108	365	473

Our general conclusions as to the avifauna of the Peruvian Department Amazonas, from the examination of these collections, are as follows:—

1. This district belongs strictly to that great division of the Neotropical fauna which contains Guiana and the whole of the basins of the Amazons and Orinoco, and may be called the "Amazonian province."

2. This division is characterized by the presence of certain peculiar ornithic types, such as *Phenicocercus*, *Gymmoderus*, *Galbalcyrrhynchus*, *Opisthocomus*, and *Psophia* *.

3. The Amazonian province is roughly divisible into three sections—(1) Guiana, up to the Rio Negro, (2) Lower Amazonia †, (3) Upper Amazonia—to the last of which the district now under consideration belongs.

4. The Upper Amazonian district, however, is more distinct from the Guianan than the Lower Amazonian, nearly one third of the species hitherto found in it being absent from Guiana.

5. In some cases the Guianan species are replaced in the Amazonas by nearly allied representatives, *e.g.* :—

Guianan species.		Upper-Amazonian representatives.
<i>Rupicola crocea</i>	by	<i>R. peruviana</i> .
<i>Phenicocercus carnifex</i>	„	<i>P. nigricollis</i> .
<i>Capito erythrocephalus</i>	„	<i>C. peruvianus</i> .
<i>Psophia crepitans</i>	„	<i>Ps. leucoptera</i> .

6. The most abundant families of the Upper-Amazonian avifauna are the Formicariidæ and Dendrocolaptidæ; and these also show the greatest number of peculiar species.

Fam. TURPIDÆ.

Of this family Mr. Bartlett obtained examples of four species, all of which are of rather wide range, one of them being a North-American species, but occurring here in one of the most southern points of its distribution.

1. *Turdus swainsoni*, Cab.

Chamicuros (*Bartl.*).

"Only one specimen obtained."—E. B.

2. *Turdus phæopygus*, Cab.; *Scl. & Salv. P. Z. S.* 1867, pp. 749, 754.

Chyavetas and Chamicuros.

"Common in Eastern Peru; always on high and sandy country."—E. B.

3. *Turdus fumigatus*, Licht.; *Scl. & Salv. P. Z. S.* 1866, p. 177.

Turdus hauxwelli, Lawr. Ann. L. N. Y. ix. p. 265.

Nauta, Chamicuros, and Santa Cruz (*Bartlett*); Pebas (*Hauxw.*).

We have no doubt of the identity of *T. hauxwelli* with this species,

* N.B. All these genera occur in Guiana and also in the Amazonas.

† Concerning this section see our paper on Mr. Wallace's collections, *P. Z. S.* 1867, p. 566.

as Mr. Lawrence's description agrees with specimens of it obtained by Mr. Bartlett.

"Not so common as *T. phaeopygus*: resorts to low boggy places near water."—E. B.

4. *TURDUS LEUCOMELAS*, Vieill.

Turdus amaurochalinus, Scl. & Salv. P. Z. S. 1866, p. 177; 1867, p. 749.

T. leucomelas, Scl. & Salv. Ex. Orn. p. 143, tab. 72.

Lower Ucayali, Xeberos (*Bartlett*).

Fam. SYLVIIDÆ.

POLIOPTILA BUFFONI, Scl.; Scl. & Salv. P. Z. S. 1866, p. 177.

Sarayacu (*Bartlett*).

"Three specimens only obtained."—E. B.

Fam. TROGLODYTIDÆ.

Eight Wrens were obtained by Mr. Bartlett in Eastern Peru. Five of these are wide-ranging species, two only being peculiar to Upper Amazonia (*Cyphorhinus modulator* and *Microcerculus marginatus*), while the last (*Campylorhynchus hypostictus*) occurs also in Bogota collections.

1. *DONACOBIVS ATRICAPILLUS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 178.

Nauta and Santa Cruz (*Bartlett*).

"In tall grasses and canebrakes on the banks of rivers and lakes: always to be heard, but seldom seen."—E. B.

2. *CAMPYLORHYNCHUS HYPOSTICTUS*, Gould, P. Z. S. 1858, p. 68; Scl. & Salv. P. Z. S. 1866, p. 178.

Campylorhynchus striaticollis, Sclater, P. Z. S. 1857, p. 272, et Cat. A. B. p. 16.

Cashiboya, Nauta, and Santa Cruz (*Bartlett*).

"Keeps to the tops of the trees, and at intervals sends forth its loud harsh notes."—E. B.

A recent comparison of my *C. striaticollis* (from Bogota collections) with the specimens of *C. hypostictus* obtained by Mr. Bartlett has convinced me of their identity.—P. L. S.

3. *CYPHORHINUS MODULATOR* (D'Orb.); Scl. & Salv. P. Z. S. 1867, p. 749.

Chyavetas, Yurimaguas, Chamicuros, and Santa Cruz (*Bartlett*).

"The Flute- or Organ-bird of the Peruvians has a most wonderful song, and well deserves its name. Its nest is composed of sticks loosely laid together, and placed about five feet from the ground. The eggs are of a yellowish white."—E. B.

Cyphorhinus thoracicus of Tschudi, included as a synonym of this

species in Sclater's American Catalogue (p. 19), is quite different, having a long tail*.

4. *MICROCERCULUS MARGINATUS*, Scl.; Scl. & Salv. P. Z. S. 1867, p. 977.

Chamicuros (*B.*); Pebas (*H.*).

"Found near lakes and streams; has a sharp and powerful call."

—E. B.

5. *THRYOPHILUS LEUCOTIS* (Lafr.); Scl. & Salv. P. Z. S. 1867, p. 568.

T. albipectus, Scl. & Salv. P. Z. S. 1866, p. 178.

Upper and Lower Ucayali (*Bartlett*).

"Only found in the dense forest."—E. B.

6. *THRYOTHORUS CORAYA* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 178; 1867, p. 977.

Sarayacu and Nauta (*Bartlett*); Pebas (*Haußweller*).

"Near the towns, and on the borders of the campos."—E. B.

7. *TROGLODYTES FURVUS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 178.

Lower Ucayali, Xeberos, and Chyavetas (*B.*).

"Rather plentiful in Xeberos, breeding in palm-thatched houses. Note like that of our *T. europæus*."—E. B.

8. *TROGLODYTES TESSELLATUS* (Lafr. et D'Orb.); Scl. & Salv. P. Z. S. 1867, pp. 749, 754.

Xeberos and Chyavetas (*B.*).

"In habits similar to *T. furvus*; and I believe it to be the same species."—E. B.

Fam. MNIOTILTIDÆ.

It is curious how scarce the Mniotiltidæ (so abundant in North America) are directly we get south of Panama. Their place in the economy of nature is, no doubt, supplied by the Tanagridæ. Mr. Bartlett only obtained one species in Eastern Peru.

BASILEUTERUS UROPYGIALIS, Sclater; Scl. & Salv. P. Z. S. 1867, pp. 749, 754.

"Chyavetas and Santa Cruz. Keeps close to the brooks, and utters at intervals a shrill note."—E. B.

Fam. VIREONIDÆ.

1. *CYCLORHIS GUIANENSIS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 179.

Upper Ucayali, not common (*Bartlett*).

* *CYPHORHINUS THORACICUS*.

Cyphorhinus thoracicus, Tsch. F. P. Aves, p. 184, t. 16. fig. 1.

Platyrus affinis, Sw. B. of Braz. pl. 57 (?).

Fuscus, subcristatus: *colli lateribus et corp. subtus ad inum pectus castaneis*: *long. tota 5·8, alæ 2·8, caudæ rectr. med. 1·9, lat. 1·3, tarsi 1, rostri a rictu 1.*

Hab. Uchubamba, Peruv. orient. (*Tsch.*).

Mus. Bremensi (ex Tschudi).

2. *VIREOSYLVIA OLIVACEA* (Linn.); Finsch, P. Z. S. 1870, p. 565.

V. olivacea et *V. agilis*, Scl. Cat. A. B. p. 43; Scl. & Salv. P. Z. S. 1866, p. 179; 1867, pp. 749, 977.

Upper Ucayali, Chyavetas, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

Fam. HIRUNDINIDÆ.

The seven Swallows obtained by Mr. Bartlett are mostly wide-ranging species. *Atticora fasciata* ranges into Guiana on one side and Western Ecuador on the other, but not further.

1. *PROGNE TAPERA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 178; 1867, p. 749.

Upper and Lower Ucayali; Xeberos (*Bartlett*).

"Common on the Upper and Lower Amazon, and breeds in large numbers in all the country visited. The eggs, white, and four or five in number, are deposited in holes in sandy banks; nest made of fine dried grass or fibres; breeds in September."—E. B.

2. *PROGNE CHALYBEA* (Gm.) *.

P. leucogastra, Scl. & Salv. P. Z. S. 1867, pp. 749, 754.

Xeberos, Yurimaguas, Chyavitas, and Chamicuros.

"Breeds, like a Woodpecker, in holes in trunks of trees."—E. B.

3. *ATTICORA FASCIATA* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 178; 1867, p. 749.

Upper Ucayali, Yurimaguas, and lakes of Santa Cruz (*Bartlett*).

"Breeds in banks along with *Stelgidopteryx ruficollis*, and lays four or five white eggs. The nest is rather more complete in structure than that of the latter, the grass-fibres and bents being finer. Nest taken in July."—E. B.

4. *ATTICORA CYANOLEUCA* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 178; 1867, p. 749.

Nauta, Chyavetas, and Yurimaguas (*Bartlett*).

"Does not breed on the Upper Amazon."—E. B.

5. *COTYLE RIPARIA* (Linn.).

"Nauta; several specimens obtained."—E. B.

Natterer had previously obtained specimens of this species on the Rio Negro (see Pelzeln, Orn. Bras. p. 18).

6. *HIRUNDO ALBIVENTRIS*, Bodd.

Petrochelidon albiventris, Scl. & Salv. P. Z. S. 1866, p. 178.

Hirundo aquatorialis, Scl. & Salv. P. Z. S. 1867, pp. 977, 979.

Lower and Upper Ucayali and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

"Builds in the holes of dead trees on the banks of rivers overhanging the water. The nest is composed of fibres of bark, dry grass, and feathers of different kinds of birds, such as the White

* *Vide* Scl. P. Z. S. 1872, p. 606.

Heron, Roseate Spoonbill, &c. Four white eggs are laid in July or August."—E. B.

Having now had an opportunity of comparing Amazonian skins of this Swallow with a specimen from Cayenne, we must pronounce them identical. Such being the case, the present bird must be called *H. albiventris*, that name having been founded on Buffon's *Hirondelle à ventre blanc de Cayenne*.

7. *STELGIDOPTERYX RUFICOLLIS* (Vieill.); *Scl. & Salv. P. Z. S.* 1866, p. 178; 1867, p. 749.

Upper and Lower Ucayali, Yurimaguas (*Bartlett*).

"The nest, like that of *Atticora fasciata*, is composed of leaves, stems of a prickly climber, fine bents, and fibres of bark very loosely put together, and is placed in holes in banks. Four or five white eggs are laid in September; but I also took nests on the Huallaga in July."—E. B.

Fam. CÆREBIDÆ.

This characteristic family of the tropics of the New World, although not very rich in species, is, I believe, very abundant in individuals in South America. Of the nine species obtained by Mr. Bartlett, most are widely distributed. The lovely *Dacnis flavi-ventris*, *Cæreba nitida*, and *Hemidacnis* are, I believe, strictly Upper-Amazonian forms. I have met with skins of all of them in Bogota collections; but these are probably obtained from the wood-region of the Amazonian slope of Columbia.

1. *HEMIDACNIS ALBIVENTRIS*, Sclater; *Scl. & Salv. P. Z. S.* 1867, p. 749.

Xeberos and Chamicuros (*B.*).

"Congregates in flocks, like the rest of the group."—E. B.

2. *DACNIS MELANOTIS*, Strickl.; *Scl. & Salv. P. Z. S.* 1866, p. 179; 1867, pp. 749, 977.

D. angelica, *Scl. P. Z. S.* 1857, p. 263.

Upper and Lower Ucayali, Xeberos (*Bartlett*); Pebas (*Hauxwell*).

3. *DACNIS CAYANA* (Linn.); *Scl. P. Z. S.* 1857, p. 263; *Scl. & Salv. P. Z. S.* 1866, p. 179; 1867, pp. 749, 977.

Lower Ucayali, Xeberos, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*); Éga (*Bates*).

"This and the two following species of *Dacnis* unite in flocks at certain seasons, when the fruits are ripe on the trees."—E. B.

4. *DACNIS FLAVIVENTRIS*, Lafr. et D'Orb.; *Scl. & Salv. P. Z. S.* 1866, p. 179; 1867, p. 977.

Upper and Lower Ucayali, Sarayacu (*Bartlett*); Pebas (*Hauxwell*); Rio Javari (*Bates*).

5. *DACNIS ANALIS*, Lafr. et D'Orb.; *Scl. & Salv. P. Z. S.* 1866, p. 179.

Upper Ucayali (*Bartlett*).

"Not so abundant as the preceding species."—E. B.

6. *CHLOROPHANES ATRICAPILLA* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 179; 1867, pp. 749, 977.

Upper Ucayali, Xeberos, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

"Abundant throughout the country."—E. B.

7. *CÆREBA CYANEA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 179; 1867, p. 749.

Sarayacu, Xeberos, and Chamicuros (*Bartlett*).

"Common at certain seasons."—E. B.

8. *CÆREBA NITIDA*, Hartlaub; Scl. & Salv. P. Z. S. 1867, pp. 749, 977.

Xeberos and Chamicuros (*B.*); Pebas (*H.*).

"Generally distributed."—E. B.

9. *CERTHIOLA LUTEOLA* (Licht.); Scl. & Salv. P. Z. S. 1866, p. 179.

Upper and Lower Ucayali (*Bartlett*).

Fam. TANAGRIDÆ.

Tanagers are very numerous in Upper Amazonia, as in most other parts of tropical America. Mr. Bartlett obtained examples of 29 distinct species—and Mr. Hauxwell specimens of several others, not apparently met with by Mr. Bartlett. Several of these are quite confined to this district (such as *Ramphocælus nigrigularis*, *Tachyphonus phæniceus*, *T. rufiventris*, and *Diucopsis speculigera*), and many of the others only met with elsewhere in other parts of the great Amazonian wood-region.

1. *PROCNIAS OCCIDENTALIS*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 566; 1867, pp. 749, 977.

Nauta and Xeberos (*Bartlett*); Pebas (*Hauxwell*).

"Abundant at certain seasons in Xeberos, when the fruit is ripe, feeding with the Cærebidæ in flocks."—E. B.

2. *EUPHONIA NIGRICOLLIS* (Vieill.).

"Ucayali; one male obtained."—E. B.

3. *EUPHONIA XANTHOGASTRA*, Sund.; Scl. & Salv. P. Z. S. 1866, p. 179.

Sarayacu (*Bartlett*).

4. *EUPHONIA MINUTA*, Cab.; Scl. & Salv. P. Z. S. 1866, p. 179; 1867, p. 749.

Nauta, Upper Ucayali, and Xeberos (*Bartlett*).

5. *EUPHONIA MELANURA*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 179; 1867, p. 977.

Upper and Lower Ucayali (*Bartlett*); Pebas (*Hauxwell*).

6. EUPHONIA CHRYSOPASTA.

Euphonia, sp., ScL. & Salv. P. Z. S. 1866, p. 180.

E. chrysopasta, ScL. & Salv. P. Z. S. 1869, p. 438, t. xxx. f. 1, 2.
Upper and Lower Ucayali (*Bartlett*).

7. EUPHONIA RUFIVENTRIS (Vieill.); ScL. & Salv. P. Z. S. 1867,
pp. 749, 977.

Xeberos and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

8. TANAGRELLA IRIDINA (Hartl.); ScL. P. Z. S. 1857, p. 264.

Rio Javari (*Bates*).

9. CALLISTE YENI (Lafr. et D'Orb.); ScL. & Salv. P. Z. S. 1866,
p. 180; 1867, pp. 749, 977.

Upper Ucayali, Nauta, Xeberos, and Chyavetas (*Bartlett*);
Pebas (*Hauxwell*).

10. CALLISTE SCHRANKI (Spix); ScL. & Salv. P. Z. S. 1866,
p. 180; 1867, pp. 749, 977.

Upper Ucayali, Xeberos, Chyavetas (*Bartlett*); Pebas (*Hauxwell*);
Ega and Rio Javarri (*Bates*).

"Found, like *C. yeni*, in small flocks at certain seasons when the
fruit is ripe."—E. B.

11. CALLISTE XANTHOGASTRA, ScL.; ScL. & Salv. P. Z. S. 1866,
p. 180; 1867, p. 977.

Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*).

"Rather scarce, only met with on the Ucayali."—E. B.

12. CALLISTE GYROLOIDES (Lafr.); ScL. & Salv. P. Z. S. 1867,
p. 749.

Rio Javari (*Bates*); Chyavetas, only once obtained (*E. B.*).

13. CALLISTE BOLIVIANA, ScL.; ScL. & Salv. P. Z. S. 1866,
p. 180; 1867, p. 977.

Sarayacu, Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*); Rio
Javari (*Bates*).

14. TANAGRA CŒLESTIS, Spix; ScL. & Salv. P. Z. S. 1866,
p. 180; 1867, p. 749.

"Nauta, Upper and Lower Ucayali, Xeberos, Yurimaguas, Chami-
curos. Common in all the towns I visited. It is a lively active
little fellow about the gardens and plantations. It builds in low
fruit-trees, the nest being loosely made of sticks, bents, fibres,
intermixed with moss and the wild cotton called *Flora de Balsa*, and
lined with the bark of the wild cane. The eggs are four in number,
the ground-colour of which is a dull brownish pink, finely marked
all over with darker brown, and a few blackish speckles and
streaks."—E. B.

15. *TANAGRA PALMARUM* (Max.).

T. melanoptera, Scl. & Salv. P. Z. S. 1866, p. 180 ; 1867, p. 749.

"Upper and Lower Ucayali, Xeberos, and Chamicuros. This bird is abundant in these localities, feeding in flocks along with others of this family and of the Cœrebidæ. It is active and cheerful, and has rather a shrill note."—E. B.

16. *RAMPHOCÆLUS JACAPA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 180 ; 1867, pp. 749, 977.

Nauta, Upper Ucayali, Yurimaguas, Xeberos, and Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

17. *RAMPHOCÆLUS NIGRIGULARIS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 180 ; 1867, p. 977.

Sarayacu, Upper Ucayali, and lakes of S. Cruz (*Bartlett*); Pebas (*Hauxwell*).

"This pretty Tanager prefers thickly wooded streams and lakes, and breeds, in company with *Cassicus persicus*, in the large spiny palms that overhang the streams."—E. B.

18. *PHÆNICOTHAUPIS RUBICA* (Vieill.); Scl. & Salv. P. Z. S. 1867, p. 749.

"Yurimaguas, Chyavetas, and Chamicuros. Inhabits the densest forests and is very difficult to obtain."—E. B."

19. *LANIO VERSICOLOR* (Lafr. et D'Orb.); Scl. P. Z. S. 1857, p. 264.

Rio Javari (*Bates*).

20. *EUCOMETIS PENICILLATA* (Spix); Scl. & Salv. P. Z. S. 1866, p. 180.

Upper Ucayali and Santa Cruz ; not common (*E. B.*).

21. *TACHYPHONUS PHÆNICEUS*, Sw.; Scl. & Salv. P. Z. S. 1867, pp. 749, 754 ; Ex. Orn. p. 65, pl. xxxiii.

Xeberos ; somewhat rare and not seen elsewhere (*E. B.*).

22. *TACHYPHONUS CRISTATUS* (Gm.).

T. cristatellus, Scl. & Salv. P. Z. S. 1867, p. 977.

Pebas (*Hauxwell*).

23. *TACHYPHONUS SURINAMUS* (Linn.); Scl. & Salv. P. Z. S. 1867, pp. 749, 754.

Xeberos and Chyavetas, rather plentiful (*E. B.*).

24. *TACHYPHONUS RUFIVENTRIS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 180 ; 1867, p. 749.

Sarayacu, Chamicuros, Yurimaguas, and Chyavetas, but not common (*E. B.*); Rio Javari (*Bates*).

25. *NEMOSIA PILEATA* (Bodd.); *Scl. & Salv. P. Z. S.* 1866, p. 180; 1867, p. 977.

Sarayacu (Bartlett); Pebas (Hauxwell).

26. *NEMOSIA GUIRA* (Linn.); *Scl. & Salv. P. Z. S.* 1866, p. 180. *Sarayacu; somewhat scarce (E. B.).*

27. *NEMOSIA FLAVICOLLIS* (Vicill.); *Scl. P. Z. S.* 1857, p. 264. *N. auricollis, Scl. & Salv. P. Z. S.* 1867, p. 750.

Xeberos, Chyavetas, and Chamicuros (E. B.); Rio Javari (Bates).

28. *NEMOSIA FULVESCENS* (Strickl.).

N. sordida, Scl. & Salv. P. Z. S. 1866, p. 180.

“*Nauta and Lower Ucayali, found in the reeds and tall grasses on the sand-banks.*”—*E. B.*

29. *CHLOROSPINGUS FLAVIGULARIS*, *Scl.; Scl. & Salv. P. Z. S.* 1867, p. 750.

Chyavetas (E. B.).

30. *CISSOPIS MEDIA.*

Cissopis leveriana, Scl. & Salv. P. Z. S. 1866, p. 181.

C. media, Scl. & Salv. P. Z. S. 1867, pp. 750, 977.

Sarayacu, Xeberos, Chamicuros, and Yurimaguas (Bartlett); Pebas (Hauxwell).

“*Visits the gardens and plantations; the nest is composed of cotton-wool, and is always placed in a bunch of bananas.*”—*E. B.*

31. *SALTATOR MAGNUS* (Gm.); *Scl. & Salv. P. Z. S.* 1867, pp. 750, 977.

Xeberos, Yurimaguas, and Chamicuros (Bartlett); Pebas (Hauxwell).

32. *SALTATOR SUPERCILIARIS* (Spix).

S. azaræ, Scl. & Salv. P. Z. S. 1866, p. 181; 1867, p. 977.

Nauta and Upper Ucayali (Bartlett); Pebas (Hauxwell).

We now consider that both *S. mutus* and *S. azaræ* of *Sclater's Syn. Av. Tanagr.* may be referred to *S. superciliaris*.

33. *DIUCOPIS SPECULIGERA* (Gould); *Scl. P. Z. S.* 1856, p. 68.

Ucayali, August 1852 (Hauxwell).

34. *PITYLUS GROSSUS* (Linn.); *Scl. P. Z. S.* 1857, p. 264.

Rio Javari (Bates).

Fam. FRINGILLIDÆ.

Finches are not very abundant in the wood-region of Eastern Peru. Nine species only were obtained by Mr. Bartlett; and most of them are widely distributed and well known. One of these (*Oryzoborus*

melas) was first described as new from specimens from this locality ; but we have since met with it from Venezuela and Cayenne, and are doubtful whether older synonyms may not yet be found for it.

1. *GUIRACA CYANEA* (Linn.).

Guiraca cyanoides, Scl. & Salv. P. Z. S. 1866, p. 566; 1867, p. 750. Nauta, Lower Ucayali and Chyavetas (*Bartl.*).

The Panama form of this species, to which Lafresnaye applied the name *cyanoides*, is nearer to the Mexican *G. concreta*, or at all events intermediate between it and *G. cyanea*. The Guianan and Amazonian form is not specifically divisible from the S.E. Brazilian.

2. *ORYZOBORUS MELAS*, Scl. & Salv.

Oryzoborus, sp.?, Scl. & Salv. P. Z. S. 1866, p. 181; 1867, p. 750. *O. melas*, Scl. & Salv. 1867, p. 979.

Nauta, Xeberos and Chyavetas (*Bartl.*); Pebas (*Hauw.*).

3. *OXYZOBORUS TORRIDUS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 181; 1867, pp. 750, 977.

Xeberos and Nauta (*Bartl.*); Pebas (*Hauw.*).

4. *SPERMOPHILA CASTANEIVENTRIS* (Cab.); Scl. & Salv. P. Z. S. 1866, p. 181; 1867, p. 977.

Nauta (*Bartlett*); Pebas (*Hauw.*).

"Met with on the banks of the Marañon, opposite the town of Nauta, and not elsewhere."—E. B.

5. *SPERMOPHILA OCELLATA*, Scl. & Salv. P. Z. S. 1866, p. 181; Sclater, Ibis, 1871, p. 14, pl. ii. fig. 3.

"Found in small flocks on the river-banks opposite to Nauta, in company with *S. castaneiventris*."—E. B.

6. *SPERMOPHILA LUCTUOSA*, Lafr.; Scl. & Salv. P. Z. S. 1867, p. 750.

"Xeberos and Chyavetas, in small flocks near the towns, and in the campos."—E. B.

7. *VOLATINIA JACARINA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 181; 1867, p. 750.

"Sarayacu and Xeberos, but rare in these localities."—E. B.

8. *PAROARIA GULARIS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 181.

"Specimens obtained at Nauta. I have also seen this pretty little bird at Yurimaguas, on the lakes of Santa Cruz, and in several places on the Huallaga. It associates in small flocks of eight to ten along the banks of rivers and lakes."—E. B.

9. *COTURNICULUS PERUANUS*, Bp.; Scl. & Salv. P. Z. S. 1866, p. 182; 1867, pp. 750, 977.

Nauta, Upper and Lower Ucayali, and Chyavetas (*Bartlett*); Pebas (*Hauw.*).

"This Finch is generally distributed in the open campos and towns. The nest is composed of fine roots, fibres, &c. The egg pinkish ground-colour, with a few spots of brown on the large end."—E. B.

Fam. ICTERIDÆ.

Of the 18 Icterines in Mr. Bartlett's collections three may be regarded as essentially Upper Amazonian species—namely *Clypeicterus oseryi*, *Icterus croconotus*, and *Lampropsar tanagrinus*. The others are of more or less wide distribution.

1. *CLYPEICTERUS OSERII* (Dev.); *Scl. & Salv. P. Z. S.* 1867, pp. 750, 755.

"Xeberos and Chamicuros. The only two obtained in Chamicuros were young males of the same year. The specimen from Xeberos, now in Mr. Sclater's collection, is nearly in full plumage. These birds appear to be very local in their haunts, keeping to the old plantations in the dense forest, in company with *Ostinops angustifrons*."—E. B.

2. *OCYALUS LATIROSTRIS*, Waterh.; *Scl. & Salv. P. Z. S.* 1866, p. 182.

"Nauta, Upper Ucayali, Chamicuros, and Santa Cruz. This bird is generally distributed throughout the Ucayali and Huallaga. It breeds in large colonies; and I believe that they continue to breed throughout the year in the same trees. When the nest is left by the birds, after the first brood, it decays and falls to the ground."—E. B.

3. *OSTINOPS YURACARIUM* (Lafr. & D'Orb.); *Scl. & Salv. P. Z. S.* 1866, p. 182.

Rio Javari (*Bates*); Upper and Lower Ucayali, Sarayacu, Chamicuros and Santa Cruz (*Bartlett*).

"Although I obtained this bird in so many localities, it is far from being so common as *O. angustifrons*. Two or three pairs are seen breeding in the largest and tallest trees of the forest."—E. B.

4. *OSTINOPS CRISTATUS* (Gm.); *Scl. & Salv. P. Z. S.* 1866, p. 182; 1867, p. 750.

Pebas (*Haußwell*); Lower Ucayali, Chyavetas, Chamicuros, and Santa Cruz (*Bartl.*).

"The first time that I saw this bird breeding was at the last-named locality, in a tree on the banks of a large lake, near the town, and where it was impossible to obtain it."—E. B.

5. *OSTINOPS VIRIDIS* (Vieill.); *Scl. & Salv. P. Z. S.* 1867, p. 750.

"Xeberos and Chyavetas, but apparently very local, not having been seen elsewhere."—E. B.

6. *OSTINOPS ANGUSTIFRONS* (Spix); *Scl. & Salv. P. Z. S.* 1866, p. 182.

"Sarayacu, Upper and Lower Ucayali, Nauta, and whole of the

Huallaga. This is the greatest depredator in the country ; it visits the plantations in large flocks, in early morning and evening, eating and destroying the ripe bananas and other fruit of the planter. It is the commonest of all the genus, and breeds in large colonies."—E. B.

7. *OSTINOPS ATROVIRENS* (Lafr. & D'Orb.) ; Scl. & Salv. P. Z. S. 1866, p. 182.

"Upper Ucayali and Santa Cruz. Found in the company of, but rare in comparison with, *O. angustifrons*."—E. B.

8. *CASSICUS PERSICUS* (Linn.) ; Scl. Cat. A. B. p. 128.

"Upper and Lower Ucayali, Nauta, Santa Cruz. This beautiful species breeds in small numbers in the trees on the banks of lakes and streams, near town, sometimes low down, and at others high up in the tall spiny palms. The nests are generally matted together ; and I found that the whole of this group of birds select a tree with a large nest of Wasps or of White Ants in it, whether for protection or for food I am unable to determine. I watched them for hours, and could never discover them interfering with the nests of either of these insects. I obtained the eggs and nest of this species with great difficulty and with the chance of being stung to death.

"The nest is about $1\frac{1}{2}$ foot long, with a pocket at the upper end. The eggs four in number, of a pale greenish white ground-colour, streaked and spotted at the large end with brown and grey."—E. B.

9. *CASSICUS HÆMORRHOUS* (Linn.) ; Scl. Cat. A. B. p. 129.

"Five examples of this widely extended species were obtained at Chamicuros, the only locality in which I observed it. I found it in company with *Ocyalus latirostris*."—E. B.

10. *CASSICULUS SOLITARIUS* (Vieill.) ; Scl. & Salv. P. Z. S. 1866, p. 182 ; 1867, p. 978.

Nauta, only twice obtained (*Bartlett*) ; Pebas (*Hauxwell*).

11. *ICTERUS CHRYSOCEPHALUS* (Linn.) ; Scl. & Salv. P. Z. S. 1866, p. 182.

Sarayacu, not common (*E. B.*).

12. *ICTERUS CAYANENSIS* (Linn.) ; Scl. Cat. A. B. p. 131.

One example obtained on the Ucayali (*E. B.*).

13. *ICTERUS CROCONOTUS* (Wagl.) ; Scl. Cat. A. B. p. 138.

"Only two examples obtained at Nauta, rare in this locality. Found on the borders of the rivers."—E. B.

I have Upper-Amazonian skins of this species, transmitted by Mr. Bates, and others from Guiana.—P. L. S.

14. *XANTHOSOMUS ICTEROCEPHALUS* (Linn.) ; Scl. & Salv. P. Z. S. 1866, p. 182 ; 1867, p. 978.

Lower Ucayali (*Bartlett*) ; Pebas (*Hauxwell*).

15. *GYMNOMYSTAX MELANICTERUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 182.

"Upper and Lower Ucayali and Santa Cruz. Always found perched about the low mud banks of lakes; breeds in March. I obtained the young birds, just able to fly, in April."—E. B.

16. *LEISTES GUIANENSIS* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 750.

Xeberos (*E. B.*).

"Xeberos is the only locality in which I obtained this bird. It is found on the campos or open tracts of land covered with tall grass."—E. B.

17. *LAMPROPSAR TANAGRINUS* (Spix).

Icterus tanagrinus, Spix, Av. Bras. i. p. 67, t. 64. fig. 1.

Lampropsar guianensis, Cab. in Schomb. Guian. iii. p. 682, et Mus. Hein. i. p. 194.

Quiscalus, sp.?, Scl. & Salv. P. Z. S. 1866, p. 182.

Lampropsar tanagrinus, Cab. Mus. Hein. p. 194; Pelz. Orn. Bras. p. 200.

Icterus (Potamopsar) minor, Scl. Cat. A. B. p. 141.

Hr. v. Pelzeln has compared Nattererian examples of this species with originals of Spix, and is therefore unquestionably correct in referring it to Spix's *Ict. tanagrinus*, though Sclater had supposed it to be the latter's *Icterus minor*.

Sclater has compared one of Natterer's skins with the type of *L. guianensis*.

"Sarayacu, Upper Ucayali, and Santa Cruz; congregated in small numbers of from eight to ten, and always in the dense forest."—E. B.

18. *CASSIDIX ORYZIVORA* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 978.

Pebas (*Hauxwell*); Upper Ucayali and Santa Cruz (*E. B.*).

"This is a desperate enemy to the Indians, as on account of its powerful mandible and legs it is enabled to destroy the finest heads of Indian corn, grown in the outlying plantations of the Indians. The birds muster in flocks at the season of the year when the corn is ripe."—E. B.

Fam. CORVIDÆ.

Only one Corvine bird is known to us from Upper Amazonia—one of the characteristic Neotropical group *Cyanocorax*. The same species also occurs in Bogota collections.

CYANOCORAX VIOLACEUS (Du Bus); Scl. & Salv. P. Z. S. 1866, p. 182; 1867, pp. 750, 978.

Cyanocorax azureus, Scl. P. Z. S. 1857, p. 265 (*err.*).

Rio Javari (*Bates*); Pebas (*Hauxwell*); Upper and Lower Ucayali, Chyavetas, and Santa Cruz (*E. B.*).

"This noisy and destructive bird is found in all the large plantations when the bananas are ripe."—E. B.

Fam. DENDROCOLAPTIDÆ.

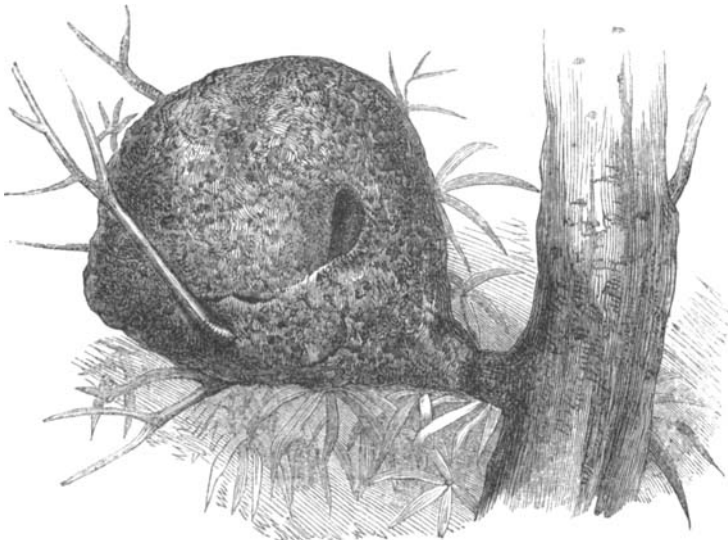
Twenty-eight species of Dendrocolaptidæ occur in Mr. Bartlett's and Mr. Hauxwell's collections. More than half of these are peculiar Amazonian forms, amongst which are most of the species of *Furnarius*, *Synallaxis*, *Philydor*, *Automolus*, and *Dendroornis* met with.

1. *FURNARIUS TORRIDUS*, Scl. et Salv.; Scl. & Salv. P. Z. S. 1866, p. 183; 1867, p. 978.

Upper and Lower Ucayali and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

"This bird builds its nest in the banks near the water, like the Swallow or Kingfisher; it is composed of fine sticks and bents, very loosely put together. The eggs are four in number, and of a creamish-white colour, oblong in shape."—E. B.

2. *FURNARIUS MINOR*, v. Pelz.; Scl. & Salv. P. Z. S. 1866, p. 183.



Nest of *Furnarius minor*.

"Nauta and Santa Cruz. This interesting little fellow, very different in habits from the preceding species, builds its nest of mud on the bough of a tree. The nest (see figure) is round, and consists of an inner chamber, the entrance to which is by a passage formed on one side. The chamber is lined with long fine grass-

fibres, hairs, &c. The eggs are white, and four in number."—E. B.

3. *SCLERURUS CAUDACUTUS* (Vieill.); *Scl. & Salv. P. Z. S.* 1867, p. 750.

"Yurimaguas and Chyavetas. Found always in dense forest, on the ground, hunting for insects."—E. B.

4. *SCLERURUS MEXICANUS*, *Scl.*; *Scl. & Salv. P. Z. S.* 1867, pp. 750, 755.

"Yurimaguas. Similar in habits to the preceding species."—E. B.

5. *SYNALLAXIS ALBIGULARIS*, *Scl.*; *Scl. & Salv. P. Z. S.* 1866, p. 183.

"Nauta and Upper Ucayali. Seen among the dense canes on the banks of the rivers."—E. B.

6. *SYNALLAXIS TERRICOLOR*; *Scl. & Salv. P. Z. S.* 1866, p. 183.

"Upper and Lower Ucayali. Habits the same as in *S. albigularis*."—E. B.

7. *SYNALLAXIS VULPECULA*; *Scl. & Salv. P. Z. S.* 1866, p. 184. Upper and Lower Ucayali (*E. B.*).

8. *SYNALLAXIS RUTILANS*, *Tem.*; *Scl. & Salv. P. Z. S.* 1867, p. 750.

"Xeberos, Chyavetas, and Chamicuros. This species differs in habits from the former three. It is never to be seen on the banks of rivers, but always keeps to the dense and darker parts of the forest, continually near the ground, uttering a short musical note at intervals."—E. B.

9. *LEPTOXYURA CINNAMOMEA* (Gm.); *Scl. & Salv. P. Z. S.* 1866, p. 183; 1867, p. 978.

Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*).

"Is, like the three first-mentioned *Synallaxes*, found amongst the canes on the sand-banks."—E. B.

10. *PHILYDOR PYRRHODES* (Cab.); *Scl. & Salv. P. Z. S.* 1867, p. 978.

Pebas (*Hauxwell*)

11. *PHILYDOR OCHROLÆMUS* (Tsch.).

Philydor turdinus, *Scl. & Salv. P. Z. S.* 1866, p. 184.

Philydor ochrolæmus, *Scl. P. Z. S.* 1871, p. 86.

Upper Ucayali; only once obtained (*E. B.*).

12. *PHILYDOR ERYTHROCERCUS* (Pelzeln).

"Four specimens obtained at Chamicuros and Xeberos, and compared with examples in Mr. Sclater's collection."—E. B.

13. *PHILYDOR ERYTHROPTERUS* (Sclater); Scl. & Salv. P. Z. S. 1866, p. 566.

Nauta; only once obtained (*E. B.*).

14. *ANCISTROPS LINEATICEPS*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 566; 1867, p. 750.

Lower Ucayali, Xeberos, Chyavetas, and Chamicuros; rather common in the dense forests (*E. B.*).

15. *AUTOMOLUS SCLATERI* (v. Pelz.); Scl. & Salv. P. Z. S. 1867, p. 750.

Xeberos and Chyavetas (*E. B.*).

16. *AUTOMOLUS SUBULATUS* (Spix).

"Two examples of this species obtained at Chamicuros; also the nest and eggs. The nest is composed of leaves, and placed in the fork of the cane-palm, from 7 to 8 feet high, and amongst the dead leaves that accumulate in the same palm. There is a thin lining to the nest of fine roots and fibres of palm, extremely loose and roughly put together. Ground-colour of eggs white, inclining to pink, marked with pale brown, mostly at the larger end, and resembling somewhat the eggs of our Redbreast."—*E. B.*

17. *XENOPS RUTILUS*, Licht.

Xenops heterurus, Scl. & Salv. P. Z. S. 1866, p. 566.

"Two examples only of this species obtained at Chamicuros. These little tree-creeping fellows are always found in the dense forest, running about the bark of trees like our *Certhia*."—*E. B.*

18. *XENOPS GENIBARBIS*, Ill.

Xenops approximans, Scl. & Salv. P. Z. S. 1866, p. 184, 1867, pp. 750, 755.

Nauta, Upper Ucayali, Chyavetas, and Chamicuros (*E. B.*).

19. *SITTASOMUS OLIVACEUS* (Max.).

Sittasomus amazonus, Scl. & Salv. P. Z. S. 1866, p. 184.

Sittasomus olivaceus, eor. P. Z. S. 1868, p. 630.

"Upper Ucayali. The habits of this bird and of *Xenops* are so much alike that the difference cannot be discerned when they are on the trees."—*E. B.*

20. *SITTASOMUS STICTOLÆMUS*, v. Pelzeln, Orn. Bras. p. 42.

Chamicuros (*E. B.*).

Mr. Bartlett obtained but one example of this newly described species. It seems to agree with v. Pelzeln's description; but I have no specimen to compare with it.

21. *GLYPHORHYNCHUS CUNEATUS*.

Glyphorhynchus castelnaudi, Scl. & Salv. P. Z. S. 1867, p. 750.

Chyavetas and Chamicuros; inhabits the dense forests (*E. B.*).

Having recently compared together a series of specimens of this genus from Brazil, Cayenne, Columbia, Ecuador, Panama, and Guatemala, we are of opinion that there are not sufficient grounds for maintaining the local forms as distinct species. We therefore propose to reunite the so-called *G. castelnaudi* and *G. pectoralis* to *G. cuneatus*.

22. *DENDROCINCLA MERULA* (Licht.).

"Two examples only of this species were obtained at Chamicuros. The specimen from Borba in Dr. Sclater's collection is perhaps different, being larger than those obtained by me."—E. B.

23. *DENDROCOLAPTES VALIDUS* (Tsch.); Scl. & Salv. P. Z. S. 1866, p. 184.

"Upper Ucayali and Chamicuros. Two specimens of this rare bird were obtained in the above localities."—E. B.

24. *DENDROCOLAPTES RADIOLATUS*, Scl.; Scl. & Salv. P. Z. S. 1876, pp. 750, 755.

"Yurimaguas and Chamicuros. Several examples were obtained in the latter locality. Only found in the dark and dense forest, climbing about the trees like *Xenops*."—E. B.

25. *DENDRORNIS ROSTRIPALLENS*, Des Murs; Scl. & Salv. P. Z. S. 1866, p. 184.

"Sarayacu. I never saw this bird after obtaining it in this locality. The habits of all the species of this genus are so much alike that one description will suffice for the whole of them. They are always met with in the dense forest, on the trunks of trees, and breed in holes very high up in the trees."—E. B.

26. *DENDRORNIS OCELLATA* (Spix).

Dendrornis palliata, Scl. & Salv. P. Z. S. 1866, p. 184.

Dendrornis ocellata, Scl. & Scl. P. Z. S. 1867, pp. 750, 755, 978. Xeberos (*Bartlett*); Pebas (*Hauzwell*).

This species is the *D. palliata* of Sclater's American Catalogue (but perhaps not of Des Murs). See notes, P. Z. S. 1871, p. 86.

27. *DENDRORNIS ELEGANS*, v. Pelz. Orn. Bras. p. 45.

Dendrornis sp.?, Scl. & Salv. P. Z. S. 1867, p. 750.

Mr. Bartlett's two skins from Chyavetas in Sclater's collection agree with a typical Nattererian specimen. Sclater has a fourth example of the same bird from Bogota.

"One of the commonest of all this genus, especially at Chamicuros. Very lively and active, alarming every other bird on the approach of an intruder. Builds in holes of trees. I obtained two eggs, which are nearly white."—E. B.

28. *DENDRORNIS MULTIGUTTATA*, Lafr.

In April 1865 Mr. Bartlett obtained a single skin of a *Dendrornis*

on the Lower Ucayali, which remained undetermined. We have since compared this specimen with the types of *Picolaptes notatus*, Eyton, Contr. Orn. 1852, p. 26, and *Dendroornis multiguttata*, Lafr. R. Z. 1850, p. 417, and have decided that these names are synonyms, and both belong to it. A Nattererian skin from Para, determined by v. Pelzeln as *Dendroplex similis* (Orn. Bras. p. 46), is also apparently not different.

Fam. FORMICARIIDÆ.

The Ant-Thrushes and their allies are very abundant in the great forests of Upper Amazonia, no less than forty-six species being represented in the collections of which we speak, about half of which are peculiar to the district.

1. *CYMBILANIUS LINEATUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 566; 1867, p. 978.

Nauta (*Bartlett*); Pebas (*Hauxwell*).

"This species appears very rare in Peru; the only specimen obtained was taken near the town of Nauta."—E. B.

2. *THAMNOPHILUS UNDULIGER*, Pelz. Orn. Bras. p. 75.

Th. fuliginosus, Scl. & Salv. P. Z. S. 1867, pp. 750, 755.

The specimen spoken of "as probably a female of *Th. fuliginosus*" (P. Z. S. 1867, p. 755) is undoubtedly referable to *Th. unduliger* of v. Pelzeln (quite a different bird), of which Mr. Bartlett subsequently obtained both sexes.

"Of this rare and beautiful species I obtained one female in Xeberos, and three females and one male in Chamicuros. The male is slate-coloured on the back and crest, with transverse black bars all over the body; the females are dark brown all over, and marked like the male."—E. B.

3. *THAMNOPHILUS MELANURUS*, Gould; Scl. & Salv. P. Z. S. 1866, p. 185; 1867, pp. 750, 978.

Nauta, Upper and Lower Ucayali, Chyavetas, and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

"Generally distributed throughout the hilly country."—E. B.

4. *THAMNOPHILUS LEUCONOTUS*, Spix, Av. Bras. ii. p. 28, pl. xxxix. fig. 2 (♂).

Th. melanoceps, Spix, *ibid.* (♀).

Th. corvinus, Scl. & Salv. P. Z. S. 1866, p. 185.

"Upper Ucayali, near Cashiboya, and Santa Cruz. Found about the banks of the small streams. Both sexes obtained: male black, with white shoulder; female brown, with black head. Having shot a female one day, I obtained the eggs of this fine species by finding one perfect and ready to be laid inside her. The egg has a whitish ground-colour, with elongated streaks and spots of a pinkish or olive brown and grey colours, most predominant at the large end."—E. B.

5. *THAMNOPHILUS PLUMBEUS*, Scl.

Myrmelastes plumbeus, Scl. P. Z. S. 1858, p. 274, pl. 143; Cat. A. B. p. 189; Scl. & Salv. P. Z. S. 1866, p. 567 (♂).

Thamnophilus hyperythrus, Gould, P. Z. S. 1855, p. 70; Scl. & Salv. P. Z. S. 1866, p. 185 (♀).

Pebas (*Hauxwell*); Nauta, Xeberos, and Santa Cruz (*Bartl.*).

"Found about the streams and small lakes in the interior of the forest. The remarks of Messrs. Sclater and Salvin on this species (P. Z. S. 1867, p. 981) I can verify, as I always found the two supposed species together, *T. hyperythrus* being the female (*by dissection*)."—E. B.

6. *THAMNOPHILUS NÆVIUS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 185.

Upper Ucayali (*E. B.*).

7. *THAMNOPHILUS AMAZONICUS*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 185.

Upper Ucayali (*E. B.*).

8. *THAMNOPHILUS MURINUS*, Pelz. Orn. Bras. p. 77; Scl. & Salv. P. Z. S. 1867, pp. 750, 756.

"Xeberos, Yurimaguas, and Chamicuros. Appears to be the most common of the genus in Chamicuros. The egg has a whitish ground-colour, and the streaks and marks are rather more distributed and more clearly marked than in those of the other species."—E. B.

9. *THAMNOPHILUS RADIATUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 185; 1867, p. 978.

Sarayacu and Nauta (*Bartlett*); Pebas (*Hauxwell*).

10. *THAMNOPHILUS ATRICAPILLUS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 185.

Upper Ucayali (*E. B.*).

11. *PYGOPTILA MACULIPENNIS*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 185; 1867, p. 750.

Sarayacu, Upper Ucayali, Xeberos, and Chamicuros (*E. B.*).

12. *PYGOPTILA MARGARITATA*, Sclater, Cat. A. B. p. 177.

"Xeberos and Chamicuros. Rather common in the latter locality. The nest is composed of fine roots, bents, dried grass, and fibres of palms; it is built on a low open bush. The ground-colour of the egg is a pale whitish brown, mottled with rich reddish brown and grey at the large end; markings rather distinct. The complement is four."—E. B.

13. *DYSITHAMNUS SCHISTACEUS*, D'Orb.; Scl. & Salv. P. Z. S. 1867, pp. 750, 756, 978.

Yurimaguas and Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

14. *DYSITHAMNUS ARDESIACUS*, Scl. & Salv. P. Z. S. 1867, pp. 750, 756.

"Chyavetas and Chamicuros. Only one female obtained in the former, and a male and female in the latter locality."—E. B.

15. *THAMNOMANES GLAUCUS*, Cab.; Scl. & Salv. P. Z. S. 1867, p. 750.

"Xeberos, Yurimaguas, Chyavetas, and Chamicuros. Plentiful at Chamicuros; very active and noisy when disturbed; is always found in the dark lonely parts of the forest, where its voice is well known to the traveller."—E. B.

16. *MYRMOTHERULA PYGMÆA* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 185; 1867, pp. 750, 978.

Upper Ucayali, Xeberos, Yurimaguas, Chyavetas, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

17. *MYRMOTHERULA SURINAMENSIS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 185.

Upper Ucayali, very scarce (*E. B.*).

18. *MYRMOTHERULA MULTOSTRIATA*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 185.

"Upper Ucayali, Santa Cruz. Only once obtained in the latter locality."—E. B.

19. *MYRMOTHERULA HÆMATONOTA*, Scl. & Salv. 1866, p. 185; 1867, pp. 750, 756.

Upper Ucayali, Xeberos, Chyavetas, and Chamicuros (*E. B.*).

20. *MYRMOTHERULA AXILLARIS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 186; 1867, p. 978.

Upper Ucayali, Xeberos, Chamicuros, and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

21. *MYRMOTHERULA MELÆNA*, Scl. & Salv. P. Z. S. 1866, p. 186; 1867, p. 750.

Lower Ucayali, Xeberos, Chyavetas, and Chamicuros (*E. B.*).

22. *MYRMOTHERULA CINEREIVENTRIS*, Scl. & Salv. P. Z. S. 1867, pp. 750, 756, 978.

Chyavetas and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

23. *MYRMOTHERULA HAUXWELLI*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 186; 1867, p. 750.

Upper Ucayali, Nauta, Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

24. *FORMICIVORA QUIXENSIS* (Corn.); *Sci. & Salv. P. Z. S.* 1866, p. 566.

"Only one example of this pretty species obtained at Nauta."—E. B.

25. *CERCOMACRA CINERASCENS*, *Sci.*; *Sci. & Salv. P. Z. S.* 1866, p. 186; 1867, pp. 750, 978.

Sarayacu and Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

"Several specimens from the latter locality. The nest is composed principally of leaves and sticks. The colour of the egg is pale brown, streaked and blotched with rich brown and grey. The markings, as in the eggs of all this group, as far as I can see, are elongated towards the small end. The eggs in colour resemble those of *Pygoptila margaritata*, but are much smaller."—E. B.

26. *PYRIGLENA SERVA*, *Sci.*; *Sci. & Salv. P. Z. S.* 1866, p. 186. Nauta, Upper and Lower Ucayali, and Chamicuros (*E. B.*).

27. *PERCOSTOLA FUNEBRIS* (Licht.); *Sci. & Salv. P. Z. S.* 1866, p. 186.

Nauta; only once obtained (*E. B.*).

28. *PERCOSTOLA FORTIS*, *Sci. & Salv. P. Z. S.* 1867, pp. 978, 980, t. xlv.

Pebas (*Hauxwell*); Chyavetas (*E. B.*).

29. *HETEROCNEMIS ARGENTATA* (Des Murs).

Herpsilochmus argentatus (Des Murs).

Myrmeciza argentata, *Scalater, P. Z. S.* 1858, p. 250, et *Cat. A. B.* p. 187.

"Chamicuros. Agrees with the female in Dr. Scalater's collection from Eastern Peru. Probably the first male of this species seen; it is now in the British-Museum collection. Slate-grey on back, belly white; wings blackish, darkish on primaries; bill rather long; legs flesh-colour. Female light brown. Always about brooks and boggy places."—E. B.

I have recently obtained a male of this species, from Oyapok, Cayenne, through Madame Verdey.—P. L. S.

30. *MYRMECIZA HEMIMELÆNA* (Sci.); *Sci. & Salv. P. Z. S.* 1867, pp. 750, 756.

Xeberos, only once obtained (*E. B.*).

31. *HYPOCNEMIS CANTATOR* (Bodd.); *Sci. & Salv. P. Z. S.* 1866, p. 186; 1867, pp. 750, 978.

Upper Ucayali, Xeberos, Chyavetas, Chamicuros, and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

"The egg of this species somewhat resembles that of the others; but it is smaller and rounder. The ground-colour is whiter and markings very dark and close at the large end. The nest is loosely made of leaves, sticks, &c."—E. B.

32. *HYPOCNEMIS PÆCILONOTA*, Cab. ; Scl. Cat. A. B. p. 187.

The skin thus determined by us (P. Z. S. 1866, p. 186) is not of this species (see *Pithys lunulata*); but *H. pæcilonota vera* also occurs on the Upper Amazon. Selater has a skin from this locality, and we have seen others.

33. *HYPOCNEMIS MYIOTHERINA* (Spix); Scl. & Salv. P. Z. S. 1867, pp. 750, 757, 978.

Xeberos, Yurimaguas, Chyavetas, Chamicuros, and Santa Cruz abundant (*Bartlett*); Pebas (*Hauxwell*).

34. *HYPOCNEMIS MELANURA*; Scl. & Salv. P. Z. S. 1866, p. 186. Upper Ucayali (*E. B.*).35. *HYPOCNEMIS MELANOPOGON*, Scl.; Scl. & Salv. P. Z. S. 1866, p. 186.

Cashiboya (*E. B.*).

36. *HYPOCNEMIS HEMILEUCA*, Scl. & Salv. P. Z. S. 1866, p. 186. Lower Ucayali (*E. B.*).37. *HYPOCNEMIS THERESÆ* (Des Murs); Scl. & Salv. P. Z. S. 1866, p. 187; 1867, p. 750.

Upper Ucayali, Xeberos and Chamicuros (*E. B.*).

38. *PITHYS ALBIFRONS* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 751. Chyavetas (*E. B.*).39. *PITHYS LEUCASPIS* (Scl.); Scl. & Salv. P. Z. S. 1867, p. 751. Chyavetas and Xeberos (*E. B.*).40. *PITHYS LUNULATA*, sp. nov. (Plate XXVI.)

Hypocnemis pæcilonota, Scl. & Sal. P. Z. S. 1866, p. 186.

Supra fusca, loris albis, pileo vix rufescente; interscapulii, tectricum alarum et secundariorum plumis nigro notatis et limbo angusto pallide rufescenti-ochraceo terminatis: subtus paulo dilutior, gula tota pure alba: rectricibus in pogonio inferiore albo quater transfasciatis et hoc colore anguste terminatis: pedibus schistaceis: rostro superiore corneo, inferiore albido: long. tota 5·5, alæ 3, caudæ 1·8.

Hab. Peruv. orient., Sarayacu (*Bartlett*).

This skin from Sarayacu, which we formerly referred to the female of *Hypocnemis pæcilonota*, is certainly not of that species, but probably the female of a new species of *Pithys*. In form and colour it somewhat resembles *P. bicolor*, but has a restricted white throat, and distinct lunate markings above.

The female of *H. pæcilonota*, which we have recently obtained, is of a uniform rich brown on the head and body below.

41. *FORMICARIUS NIGRIFRONS*, Gould; *Scl. Cat. A. B.* p. 191.
Chamicuros (*E. B.*).

Originally described by Mr. Gould from Hauxwell's first collection from Chamicuros.

42. *FORMICARIUS ANALIS* (Lafr. & D'Orb.); *Scl. & Salv. P. Z. S.* 1867, p. 751.

Xeberos and Chyavetas (*E. B.*).

43. *CHAMÆZA NOBILIS*, Gould, *P. Z. S.* 1855, p. 68.
Chamicuros (*Hauxw.*).

44. *GRALLARIA BREVICAUDA*; *Scl. & Salv. P. Z. S.* 1867, p. 978.
Pebas (*Hauxwell*); one specimen only obtained at Chamicuros (*E. B.*)

45. *CONOPOPHAGA PERUVIANA*, Des Murs; *Scl. Cat. A. B.* p. 193.

Chamicuros and Santa Cruz (*E. B.*).

46. *CORYTHOPIS ANTHOIDES*, *Scl. Cat. A. B.* p. 194.

"Agrees with the specimens in Mr. Selater's collection; a single specimen obtained at Chamicuros."—*E. B.*

Fam. TYRANNIDÆ.

Of the great family Tyrannidæ forty well-determined species were obtained by Mr. Bartlett, besides skins of several others not determinable from imperfection or other causes. Most of them are widely distributed; but several are peculiarly Upper-Amazonian, viz. *Muscisaxicola fluviatilis*, *Todirostrum chrysocrotaphum*, *Euscarthmus spicifer*, *Serpophaga hypoleuca*, *Myiozetetes sulphureus*, and *Muscivora castelnaudi* (if distinct from *M. regia*). The occurrence of the North-American King bird (*Tyrannus pipiri*) so far south is of interest, as is also the meeting with *Tyrannus aurantio-atrocristatus* so far north.

1. *FLUVICOLA PICA* (Bodd.); *Scl. & Salv. P. Z. S.* 1866, p. 187.

Fluvicola albiventris, *Scl. & Salv. P. Z. S.* 1867, p. 978.

One specimen obtained on the Upper Ucayali, apparently very rare in Peru (*E. B.*); Pebas (*Hauxw.*).

2. *ARUNDINICOLA LEUCOCEPHALA* (Linn.); *Scl. & Salv. P. Z. S.* 1867, p. 978.

Pebas (*Hauxw.*).

3. *MUSCISAXICOLA FLUVIATILIS*, *Scl. & Salv. P. Z. S.* 1866, p. 187.

"Nauta, Upper Ucayali, and along the Huallaga. The nest of this bird is composed of extremely fine roots and fibres of a tree

called '*Pajaro bobal*' by the Peruvians. It is very compactly made, and is placed in a forked branch of the same tree, low down, near the ground, and so much resembles the place of its concealment that it is very difficult to discover. The eggs are four in number, of a pale cream-white colour, with a few brown spots at the large end."—E. B.

4. *TODIROSTRUM MACULATUM* (Desm.); Scl. & Salv. P. Z. S. 1866, p. 187; 1867, p. 978.

"Nauta and Upper Ucayali. This bird seems to be very local. I never met with it again after I left these localities."—E. B.

Pebas (*Hauxw.*).

5. *TODIROSTRUM CHRYSOCROTAPHUM* (Strickl.); Scl. & Salv. P. Z. S. 1866, p. 187.

Very local; only two specimens obtained near Sarayacu (*E. B.*).

6. *EUSCARTHMUS SPICIFER* (Lafr.); Scl. & Salv. P. Z. S. 1866, p. 187; 1867, p. 751.

"Lower Ucayali, Xeberos, Chyavetas, and Chamicuros. Always found in company with several other species of this family."—E. B.

7. *SERPOPHAGA HYPOLEUCA*, Scl. et Salv. P. Z. S. 1866, p. 188.

"Upper Ucayali, near Sarayacu. Never seen after leaving this locality."—E. B.

8. *STIGMATURA BUDYTOIDES* (Lafr. et D'Orb.); Scl. & Salv. P. Z. S. 1866, p. 188.

Upper and Lower Ucayali; two examples only obtained (*E. B.*).

9. *MIONECTES OLEAGINEUS* (Licht.); Scl. & Salv. P. Z. S. 1866, p. 188; 1867, pp. 751, 978.

Upper Ucayali, Xeberos, Chyavetas, and Chamicuros, rather plentiful in these localities (*E. B.*); Pebas (*Hauxw.*).

10. *LEPTOPOGON PERUVIANUS*; Scl. et Salv. P. Z. S. 1867, p. 757.

Chyavetas, only one specimen (*E. B.*).

11. *LEPTOPOGON AMAUROCEPHALA*, Cab.; Scl. & Salv. P. Z. S. 1866, p. 567.

Nauta (*E. B.*).

12. *ORNITHION PUSILLUM* (Cab.).

Myiopatis pusilla, Cab. et Hein. Mus. Hein. ii. p. 58.

Camptostoma flaviventre, Scl. & Salv. P. Z. S. 1854, p. 358; 1866, p. 188.

Upper Ucayali (*E. B.*).

Mr. Salvin and I have lately come to the conclusion that my

Camptostoma imberbe (type of the genus) is not separable from *Myiopatis obsoleta* of Cab. & Hein. (Mus. Hein. ii. p. 58), that our *Camptostoma flaviventris*=*Myiopatis pusilla*, Cab. & Hein., and that the proper generic term to be employed for this group of Tyrannidæ is *Ornithion*, Hartlaub, Journ. f. Orn. 1853, p. 35.

13. *TYRANNULUS ELATUS* (Lath.); Scl. & Salv. P. Z. S. 1866, p. 188; 1867, pp. 751, 978.

Upper Ucayali and Chyavetas, but not by any means common (*E. B.*); Pebas (*H.*).

14. *TYRANNISCUS GRACILIPES*; Scl. & Salv. P. Z. S. 1867, p. 981.

Chamicuros, one specimen only (*E. B.*); Pebas (*H.*).

15. *ELAINEA PAGANA* (Licht.); Scl. & Salv. P. Z. S. 1866, p. 188; 1867, p. 978.

Nauta, Xeberos, Chyavetas, and Chamicuros; rather abundant in all these localities (*E. B.*); Pebas (*H.*).

16. *ELAINEA CANICEPS* (Sw.); Scl. & Salv. P. Z. S. 1867, p. 958.

Pebas (*H.*).

17. *ELAINEA PLACENS*, Sclater.

Elainea, sp., Scl. & Salv. P. Z. S. 1866, p. 189.

Upper Ucayali (*E. B.*).

18. *ELAINEA ALBICEPS* (Lafr. et D'Orb.); Sclater, P. Z. S. 1870, p. 834.

Elainea, sp., Scl. & Salv. P. Z. S. 1866, p. 188.

Elainea modesta, eor. 1867, p. 751.

Xeberos and Chyavetas.

19. *MYIOZETETES SIMILIS* (Spix).

Myiozetetes cayennensis, Scl. & Salv. P. Z. S. 1867, p. 978.

"Nauta, Upper and Lower Ucayali. This bird breeds in holes in banks, under the roots of overhanging bushes and ferns, about the end of April. I saw the young nearly half-grown at the end of the first week in May."—*E. B.*

Pebas (*H.*).

20. *MYIOZETETES SULPHUREUS* (Spix); Scl. Cat. A. B. p. 220.

"Two examples only of this beautiful species were obtained at Chamicuros."—*E. B.*

21. *RHYNCHOCYCLUS SULPHURESCENS* (Spix); Scl. Cat. A. B. p. 220; Scl. & Salv. P. Z. S. 1867, p. 751.

"Ucayali, Xeberos, Chyavetas, Chamicuros, and Santa Cruz. I found this species most abundant in Chamicuros."—*E. B.*

Pebas and Chamicuros (*H.*).

22. *RHYNCHOCYCLUS VIRIDICEPS*, sp. nov.

Olivaceus, alis nigricanti-fuscis flavido limbatis, cauda fusca olivaceo marginata: subtus sulphureo-flavidus, ventre medio clariore: rostro nigro mand. inf. ad basin albicante: pedibus obscure cinereis: long. tota 4·7, alæ 2·2, caudæ 1·7, lat. rostri ad basin 0·4.

Hab. Amazonia superior.

Mus. P. L. S.

Obs. Sim. præc. sed minor et pileo omnino dorso concolori.

Pebas, May 28, 1866 (*Hauxwell*).

23. *RHYNCHOCYCLUS MEGACEPHALUS* (Swains.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 978

Upper Ucayali and Xeberos (*E. B.*); Pebas (*H.*).

24. *RHYNCHOCYCLUS RUFICAUDA* (Spix).

"I found this bird always solitary, in the dense overgrown plantations in the interior of the forest near Chamicuros."—*E. B.*

25. *PITANGUS SULPHURATUS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, p. 751.

"Nauta and Yurimaguas. This bird is generally seen perched on some dead branch. Every now and then it flies after its prey, such as insects, and chases every small bird which may come near it."—*E. B.*

Pebas (*H.*).

26. *SIRYSTES ALBOGRISEUS* (Lawr.).

Lipaugus albogriseus, Lawr. Ann. L. N. Y. viii. p. 9.

Tyrannus, sp.?, Scl. & Salv. P. Z. S. 1866, p. 189.

A single example obtained at Santa Cruz (*E. B.*).

Mr. Bartlett's skin was in a bad state, and we did not recognize the bird; but I have since obtained a perfect skin from a Bogota collection. The species is nearly allied to *S. sibilator* of Brazil, but differs in its white rump, whiter plumage below, and longer bill.

27. *MYIODYNASTES SOLITARIUS* (Vieill.); Scl. & Salv. P. Z. S. 1867, pp. 751, 978.

"Yurimaguas, Xeberos, Chyavetas, and Chamicuros. I obtained one egg of this species. The ground-colour is green, which is generally marked and spotted all over with light brown, but rather thicker at the large end."—*E. B.*

Pebas (*H.*).

28. *MUSCIVORA CASTELNAUDI* (Dev.); Scl. & Salv. P. Z. S. 1867, p. 981.

Chamicuros (*Bartl.*); Pebas (*Hauxw.*).

"I only obtained a single old male of this rare and beautiful species."—*E. B.*

29. *CNIPODECTES SUBBRUNNEUS*.

Cyclorhynchus subbrunneus, Scl. P. Z. S. 1860, pp. 282, 295.

Myiochanes subbrunneus, Scl. Cat. p. 232.

Chamicuros (*E. B.*).

For this curious form, which will not go with either of the genera to which it has been hitherto referred, we propose the new generic term *Cnipodectes* *. It is a larger and stronger form of *Myiobius*, and should be placed next to that genus.

30. *MYIOBIUS BARBATUS* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 751.

M. xanthopygius, Scl. & Salv. P. Z. S. 1866, p. 189.

Xeberos and Chyavetos (*E. B.*).

31. *MYIOBIUS ERYTHRURUS* (Cab.); Scl. & Salv. P. Z. S. 1867, p. 751.

Xeberos, Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

32. *MYIOBIUS NÆVIUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 189.

Lower Ucayali, Xeberos, and Chyavetas; not common in these localities (*E. B.*).

33. *PYROCEPHALUS RUBINEUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 978.

"Upper and Lower Ucayali and Santa Cruz. This pretty little bird appears to be common throughout the two rivers I visited. It is always found on the banks of the river, where it breeds in the holes of dead trees. The eggs much resemble those of *Muscicapa grisola* of Britain, having the markings closer round the middle than at the extremities."—*E. B.*

Pebas (*H.*).

34. *EMPIDOCHANES FUSCATUS* (Max.); Scl. & Salv. P. Z. S. 1867, pp. 751, 978.

Xeberos and Chyavetas (*E. B.*); Pebas (*H.*).

35. *MYIARCHUS FEROX* (Gm.).

Myiarchus, sp., Scl. & Salv. P. Z. S. 1866, p. 189.

"Xeberos, Chamicuros, and Santa Cruz. The nest of this bird I found inside the nest of *Furnarius minor*, the inside wall that divided the chambers having been removed. The colour of the egg is light or pale pink-brown, streaked and marked over with darker brown."—*E. B.*

36. *EMPIDONOMUS VARIUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189.

Upper Ucayali (*E. B.*).

37. *TYRANNUS MELANCHOLICUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 979.

"Nauta, Sarayacu, and the whole of the Ucayali and Huallaga. I

* *κνιψ*, *culex*, et *δῆκρης*, *mordicator*.

found this Tyrant also at Chyavetas; in fact it is the commonest of the whole group, and to be seen perched on the trees near towns, lakes, and rivers. The nest is composed of climbing plants, roots, and bents of various kinds. It is very loosely made. The eggs are yellowish white, with very dark brown or nearly black and grey spots round the large end."—E. B.

Pebas (*H.*).

38. *TYRANNUS PIPIRI* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189.

"I never met with this species after leaving Nauta."—E. B.

39. *TYRANNUS AURANTIO-ATRO-CRISTATUS* (Lafr. et D'Orb.); P. Z. S. 1866, p. 190; 1867, p. 751.

Ucayali and Xeberos, two specimens only obtained (*E. B.*).

40. *MILVULUS TYRANNUS* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 978.

Pebas (*H.*).

Fam. PIPRIDÆ.

At least eighteen species of this family are represented in the Peruvian Amazonas, amongst which the most noticeable as peculiar species of the district are *Pipra filicauda*, *P. cornuta*, *Neopipo cinnamomea*, and *Metopothrix aurantiaca*.

1. *PIPRITES CHLORION* (Cab.); Scl. & Salv. P. Z. S. 1866, p. 190.

Upper Ucayali (*E. B.*).

2. *CHLOROPIPO*, sp., P. Z. S. 1867, pp. 751, 758.

"Chyavetas. I believe this to be a good species, as Mr. Sclater's collection contains a single skin in the same plumage as my specimen, which was a male."—E. B.

3. *PIPRA FILICAUDA*, Spix; Scl. & Salv. P. Z. S. 1866, p. 190.

"Sarayacu and Upper Ucayali. I also saw this species on the Paranapura river, on the road to Xeberos."—E. B.
Rio Javari (*Bates*).

4. *PIPRA FASCIATA* (Lafr. et D'Orb.).

"One specimen obtained on the Ucayali. In habits the species of this genus are all alike. They are found in the open forest and are solitary. They are very pugnacious, and keep always about the same tree or bush, catching the passing insects."—E. B.

5. *PIPRA CORNUTA*, Spix; Scl. & Salv. P. Z. S. 1867, p. 751.

Chyavetas (*E. B.*).

6. *PIPRA RUBRICAPILLA*, Temm.

A single example of this pretty species was obtained at Santa Cruz (*E. B.*).

7. *PIPPRA AURICAPILLA*, Licht.; Scl. & Salv. P. Z. S. 1866, p. 567; 1867, pp. 751, 978.

"Nauta and Chyavetas. I found this species very abundant in the mountains of Chyavetas."—E. B.

Pebas (*H.*).

8. *PIPPRA LEUCOCILLA*, Linn.; Scl. & Salv. P. Z. S. 1866, p. 190; 1867, p. 751.

"Sarayacu, Xeberos, Yurimaguas, Chyavetas, and Chamicuros. The most common of all the species of *Pippa* met with."—E. B.

9. *PIPPRA CYANEOCAPILLA*, Hahn; Scl. & Salv. P. Z. S. 1866, p. 190; 1867, pp. 751, 978.

"Upper Ucayali and Chyavetas. Not very common in these localities."—E. B.

Pebas (*H.*); Rio Javari (*Bates*).

10. *PIPPRA VIRESCENS*, Pelzeln, Orn. Bras. p. 187.

Pippa, sp., ♀, Scl. & Salv. P. Z. S. 1867, p. 751.

"Xeberos, Chyavetas, and Chamicuros. This species remained unnamed in Mr. Sclater's collection until my return from Peru, when I brought more specimens for comparison. The males and females are alike in plumage."—E. B.

11. *NEOPIPO CINNAMOMEA* (Lawr.).

Pippa? cinnamomea, Lawr. Pr. Ac. Sc. Phil. 1868, p. 429.

Neopipo rubicunda, Scl. & Salv. P. Z. S. 1869, p. 438, pl. 30. fig. 3. Chamicuros and Xeberos; two males and one female obtained (*E. B.*).

12. *METOPOTHRIX AURANTIACUS*, Scl. & Salv. P. Z. S. 1866, p. 190.

"I obtained two specimens of this new form at Sarayacu."—E. B.

13. *CHIROXIPHIA REGINA*, Sclater.

Rio Javari (*Bates*).

14. *MACHÆROPTERUS STRIOLATUS* (Bp.); Scl. & Salv. P. Z. S. 1866, p. 567; 1867, pp. 751, 978.

Nauta, Xeberos, Chyavetas, and Chamicuros, rather plentiful (*E. B.*); Pebas (*H.*); Rio Javari (*Bates*).

15. *CHIROMACHÆRIS MANACUS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 567; 1867, pp. 751, 978.

Nauta and Chyavetas (*E. B.*); Pebas (*H.*).

16. *HETEROPELMA WALLACII*, Scl. & Salv. P. Z. S. 1867, p. 579.

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17. *HETEROCERCUS LINTEATUS*, Strickl.Chamicuros (*E. B.*).18. *SCHIFFORNIS MAJOR*, Bp. ; Scl. & Salv. P. Z. S. 1866, p. 190.Nauta ; a single specimen of this species obtained (*E. B.*).

Fam. COTINGIDÆ.

Twenty species of Cotingidæ were obtained by Mr. Bartlett, many of them being amongst the most characteristic species of the Upper-Amazonian avifauna, such as *Iodopleura isabellæ*, *Phenocercus nigricollis*, *Cotinga maynana*, and *C. porphyrolæma*.

1. *TITYRA CAYANA* (Linn.) ; Scl. P. Z. S. 1857, p. 265.Rio Javari (*Bates*) ; Santa Cruz (*E. B.*).2. *TITYRA PERSONATA* (Jard. & Selb.) ; Scl. Cat. A. B. p. 238.Yurimaguas (*E. B.*).3. *TITYRA ALBITORQUES* (Du Bus) ; Scl. & Salv. P. Z. S. 1867, p. 751.Chyavetas (*E. B.*).4. *HADROSTOMUS MINOR* (Less.) ; Scl. & Salv. P. Z. S. 1866, p. 190.Upper Ucayali, a single female obtained (*E. B.*).5. *PACHYRHAMPHUS CINEREUS* (Bodd.) ; Scl. & Salv. P. Z. S. 1866, p. 190.Sarayacu, Chyavetas, and Chamicuros ; not common in these localities (*E. B.*).6. *PACHYRHAMPHUS NIGER* (Spix) ; Scl. & Salv. P. Z. S. 1866, p. 190 ; 1867, p. 978.Nauta and Upper Ucayali (*Bartl.*) ; Pebas (*Hauzw.*).7. *PACHYRHAMPHUS ATRICAPILLUS*, Gm. ; Scl. & Salv. P. Z. S. 1867, pp. 751, 978.Xeberos and Chyavetas (*E. B.*) ; Pebas (*H.*).8. *LIPAUGUS CINERACEUS* (Vieill.).

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Male and female obtained at Sarayacu (*E. B.*); Ucayali (*Hauxw.*).

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20. *CEPHALOPTERUS ORNATUS*, Geoffr. ; Scl. & Salv. P. Z. S. 1866, p. 191 ; 1867, p. 751.

"Cashiboya, Upper Ucayali, and Chyavetas. This magnificent bird is found at the pairing-season on the topmost boughs of the highest trees in the forest. The male shows himself off to the females, which are seen flying round and about the male, while he utters his bull-like hum."—E. B.

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Thirty-three species of Humming-birds were obtained by Mr. Bartlett and Mr. Hauxwell, about six of which may be considered denizens of Upper Amazonia only. Three of these were originally described from Mr. Bartlett's specimens, namely *Thaumantias fluviatilis*, *Th. bartletti*, and *Leucippus chlorocercus*.

1. *GLAUCIS AFFINIS*, Lawr. ; Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Yurimaguas, Xeberos, Chyavetas, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

Mr. Bartlett also obtained the nest and eggs of this species.

2. *GLAUCIS MELANURA*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 193.

Upper Ucayali (*Bartlett*).

3. *THRENETES CERVINICAUDA*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 979.

Chamicuros (*Bartlett*) ; Pebas (*Hauxwell*).

4. *PHAËTHORNIS HISPIDUS*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 193.

Upper Ucayali (*Bartlett*).

The nest and eggs of this species were obtained by Mr. Bartlett near Cashiboya.

5. *PHAËTHORNIS MALARIS*, Nordm. ; Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Xeberos and Chyavetas (*Bartlett*) ; Pebas (*Hauxwell*).

The nest and eggs of this species were obtained by Mr. Bartlett.

6. *PHAËTHORNIS BOURCIERI* (Less.) ; Scl. & Salv. P. Z. S. 1867, p. 752.

Xeberos, Chyavetas, and Chamicuros (*Bartlett*).

The nest and eggs were also obtained by Mr. Bartlett.

Camptostoma imberbe (type of the genus) is not separable from *Myiopatis obsoleta* of Cab. & Hein. (Mus. Hein. ii. p. 58), that our *Camptostoma flaviventris*=*Myiopatis pusilla*, Cab. & Hein., and that the proper generic term to be employed for this group of Tyrannidæ is *Ornithion*, Hartlaub, Journ. f. Orn. 1853, p. 35.

13. *TYRANNULUS ELATUS* (Lath.); Scl. & Salv. P. Z. S. 1866, p. 188; 1867, pp. 751, 978.

Upper Ucayali and Chyavetas, but not by any means common (*E. B.*); Pebas (*H.*).

14. *TYRANNISCUS GRACILIPES*; Scl. & Salv. P. Z. S. 1867, p. 981.

Chamicuros, one specimen only (*E. B.*); Pebas (*H.*).

15. *ELAINEA PAGANA* (Licht.); Scl. & Salv. P. Z. S. 1866, p. 188; 1867, p. 978.

Nauta, Xeberos, Chyavetas, and Chamicuros; rather abundant in all these localities (*E. B.*); Pebas (*H.*).

16. *ELAINEA CANICEPS* (Sw.); Scl. & Salv. P. Z. S. 1867, p. 958.

Pebas (*H.*).

17. *ELAINEA PLACENS*, Sclater.

Elainea, sp., Scl. & Salv. P. Z. S. 1866, p. 189.

Upper Ucayali (*E. B.*).

18. *ELAINEA ALBICEPS* (Lafr. et D'Orb.); Sclater, P. Z. S. 1870, p. 834.

Elainea, sp., Scl. & Salv. P. Z. S. 1866, p. 188.

Elainea modesta, eor. 1867, p. 751.

Xeberos and Chyavetas.

19. *MYIOZETETES SIMILIS* (Spix).

Myiozetetes cayennensis, Scl. & Salv. P. Z. S. 1867, p. 978.

"Nauta, Upper and Lower Ucayali. This bird breeds in holes in banks, under the roots of overhanging bushes and ferns, about the end of April. I saw the young nearly half-grown at the end of the first week in May."—*E. B.*

Pebas (*H.*).

20. *MYIOZETETES SULPHUREUS* (Spix); Scl. Cat. A. B. p. 220.

"Two examples only of this beautiful species were obtained at Chamicuros."—*E. B.*

21. *RHYNCHOCYCLUS SULPHURESCENS* (Spix); Scl. Cat. A. B. p. 220; Scl. & Salv. P. Z. S. 1867, p. 751.

"Ucayali, Xeberos, Chyavetas, Chamicuros, and Santa Cruz. I found this species most abundant in Chamicuros."—*E. B.*

Pebas and Chamicuros (*H.*).

22. *RHYNCHOCYCLUS VIRIDICEPS*, sp. nov.

Olivaceus, alis nigricanti-fuscis flavido limbatis, cauda fusca olivaceo marginata: subtus sulphureo-flavidus, ventre medio clariore: rostro nigro mand. inf. ad basin albicante: pedibus obscure cinereis: long. tota 4·7, alæ 2·2, caudæ 1·7, lat. rostri ad basin 0·4.

Hab. Amazonia superior.

Mus. P. L. S.

Obs. Sim. præc. sed minor et pileo omnino dorso concolori.

Pebas, May 28, 1866 (*Hauxwell*).

23. *RHYNCHOCYCLUS MEGACEPHALUS* (Swains.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 978

Upper Ucayali and Xeberos (*E. B.*); Pebas (*H.*).

24. *RHYNCHOCYCLUS RUFICAUDA* (Spix).

"I found this bird always solitary, in the dense overgrown plantations in the interior of the forest near Chamicuros."—*E. B.*

25. *PITANGUS SULPHURATUS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, p. 751.

"Nauta and Yurimaguas. This bird is generally seen perched on some dead branch. Every now and then it flies after its prey, such as insects, and chases every small bird which may come near it."—*E. B.*

Pebas (*H.*).

26. *SIRYSTES ALBOGRISEUS* (Lawr.).

Lipaugus albogriseus, Lawr. Ann. L. N. Y. viii. p. 9.

Tyrannus, sp.?, Scl. & Salv. P. Z. S. 1866, p. 189.

A single example obtained at Santa Cruz (*E. B.*).

Mr. Bartlett's skin was in a bad state, and we did not recognize the bird; but I have since obtained a perfect skin from a Bogota collection. The species is nearly allied to *S. sibilator* of Brazil, but differs in its white rump, whiter plumage below, and longer bill.

27. *MYIODYNASTES SOLITARIUS* (Vieill.); Scl. & Salv. P. Z. S. 1867, pp. 751, 978.

"Yurimaguas, Xeberos, Chyavetas, and Chamicuros. I obtained one egg of this species. The ground-colour is green, which is generally marked and spotted all over with light brown, but rather thicker at the large end."—*E. B.*

Pebas (*H.*).

28. *MUSCIVORA CASTELNAUDI* (Dev.); Scl. & Salv. P. Z. S. 1867, p. 981.

Chamicuros (*Bartl.*); Pebas (*Hauxw.*).

"I only obtained a single old male of this rare and beautiful species."—*E. B.*

29. *CNIPODECTES SUBBRUNNEUS*.

Cyclorhynchus subbrunneus, Scl. P. Z. S. 1860, pp. 282, 295.

Myiochanes subbrunneus, Scl. Cat. p. 232.

Chamicuros (*E. B.*).

For this curious form, which will not go with either of the genera to which it has been hitherto referred, we propose the new generic term *Cnipodectes* *. It is a larger and stronger form of *Myiobius*, and should be placed next to that genus.

30. *MYIOBIUS BARBATUS* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 751.

M. xanthopygius, Scl. & Salv. P. Z. S. 1866, p. 189.

Xeberos and Chyavetos (*E. B.*).

31. *MYIOBIUS ERYTHRURUS* (Cab.); Scl. & Salv. P. Z. S. 1867, p. 751.

Xeberos, Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

32. *MYIOBIUS NÆVIUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 189.

Lower Ucayali, Xeberos, and Chyavetas; not common in these localities (*E. B.*).

33. *PYROCEPHALUS RUBINEUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 978.

"Upper and Lower Ucayali and Santa Cruz. This pretty little bird appears to be common throughout the two rivers I visited. It is always found on the banks of the river, where it breeds in the holes of dead trees. The eggs much resemble those of *Muscicapa grisola* of Britain, having the markings closer round the middle than at the extremities."—*E. B.*

Pebas (*H.*).

34. *EMPIDOCHANES FUSCATUS* (Max.); Scl. & Salv. P. Z. S. 1867, pp. 751, 978.

Xeberos and Chyavetas (*E. B.*); Pebas (*H.*).

35. *MYIARCHUS FEROX* (Gm.).

Myiarchus, sp., Scl. & Salv. P. Z. S. 1866, p. 189.

"Xeberos, Chamicuros, and Santa Cruz. The nest of this bird I found inside the nest of *Furnarius minor*, the inside wall that divided the chambers having been removed. The colour of the egg is light or pale pink-brown, streaked and marked over with darker brown."—*E. B.*

36. *EMPIDONOMUS VARIUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189.

Upper Ucayali (*E. B.*).

37. *TYRANNUS MELANCHOLICUS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189; 1867, pp. 751, 979.

"Nauta, Sarayacu, and the whole of the Ucayali and Huallaga. I

* *κνιψ*, *culex*, et *δῆκρης*, *mordicator*.

found this Tyrant also at Chyavetas; in fact it is the commonest of the whole group, and to be seen perched on the trees near towns, lakes, and rivers. The nest is composed of climbing plants, roots, and bents of various kinds. It is very loosely made. The eggs are yellowish white, with very dark brown or nearly black and grey spots round the large end."—E. B.

Pebas (*H.*).

38. *TYRANNUS PIPIRI* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 189.

"I never met with this species after leaving Nauta."—E. B.

39. *TYRANNUS AURANTIO-ATRO-CRISTATUS* (Lafr. et D'Orb.); P. Z. S. 1866, p. 190; 1867, p. 751.

Ucayali and Xeberos, two specimens only obtained (*E. B.*).

40. *MILVULUS TYRANNUS* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 978.

Pebas (*H.*).

Fam. PIPRIDÆ.

At least eighteen species of this family are represented in the Peruvian Amazonas, amongst which the most noticeable as peculiar species of the district are *Pipra filicauda*, *P. cornuta*, *Neopipo cinnamomea*, and *Metopothrix aurantiaca*.

1. *PIPRITES CHLORION* (Cab.); Scl. & Salv. P. Z. S. 1866, p. 190.

Upper Ucayali (*E. B.*).

2. *CHLOROPIPO*, sp., P. Z. S. 1867, pp. 751, 758.

"Chyavetas. I believe this to be a good species, as Mr. Sclater's collection contains a single skin in the same plumage as my specimen, which was a male."—E. B.

3. *PIPRA FILICAUDA*, Spix; Scl. & Salv. P. Z. S. 1866, p. 190.

"Sarayacu and Upper Ucayali. I also saw this species on the Paranapura river, on the road to Xeberos."—E. B.

Rio Javari (*Bates*).

4. *PIPRA FASCIATA* (Lafr. et D'Orb.).

"One specimen obtained on the Ucayali. In habits the species of this genus are all alike. They are found in the open forest and are solitary. They are very pugnacious, and keep always about the same tree or bush, catching the passing insects."—E. B.

5. *PIPRA CORNUTA*, Spix; Scl. & Salv. P. Z. S. 1867, p. 751.

Chyavetas (*E. B.*).

6. *PIPRA RUBRICAPILLA*, Temm.

A single example of this pretty species was obtained at Santa Cruz (*E. B.*).

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Pebas (*H.*).

8. *PIPPRA LEUCOCILLA*, Linn.; Scl. & Salv. P. Z. S. 1866, p. 190; 1867, p. 751.

"Sarayacu, Xeberos, Yurimaguas, Chyavetas, and Chamicuros. The most common of all the species of *Pippa* met with."—E. B.

9. *PIPPRA CYANEOCAPILLA*, Hahn; Scl. & Salv. P. Z. S. 1866, p. 190; 1867, pp. 751, 978.

"Upper Ucayali and Chyavetas. Not very common in these localities."—E. B.

Pebas (*H.*); Rio Javari (*Bates*).

10. *PIPPRA VIRESCENS*, Pelzeln, Orn. Bras. p. 187.

Pippa, sp., ♀, Scl. & Salv. P. Z. S. 1867, p. 751.

"Xeberos, Chyavetas, and Chamicuros. This species remained unnamed in Mr. Sclater's collection until my return from Peru, when I brought more specimens for comparison. The males and females are alike in plumage."—E. B.

11. *NEOPIPO CINNAMOMEA* (Lawr.).

Pippa? cinnamomea, Lawr. Pr. Ac. Sc. Phil. 1868, p. 429.

Neopipo rubicunda, Scl. & Salv. P. Z. S. 1869, p. 438, pl. 30. fig. 3. Chamicuros and Xeberos; two males and one female obtained (*E. B.*).

12. *METOPOTHRIX AURANTIACUS*, Scl. & Salv. P. Z. S. 1866, p. 190.

"I obtained two specimens of this new form at Sarayacu."—E. B.

13. *CHIROXIPHIA REGINA*, Sclater.

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Thirty-three species of Humming-birds were obtained by Mr. Bartlett and Mr. Hauxwell, about six of which may be considered denizens of Upper Amazonia only. Three of these were originally described from Mr. Bartlett's specimens, namely *Thaumantias fluviatilis*, *Th. bartletti*, and *Leucippus chlorocercus*.

1. *GLAUCIS AFFINIS*, Lawr. ; Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Yurimaguas, Xeberos, Chyavetas, and Chamicuros (*Bartlett*) ; Pebas (*Hauxwell*).

Mr. Bartlett also obtained the nest and eggs of this species.

2. *GLAUCIS MELANURA*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 193.

Upper Ucayali (*Bartlett*).

3. *THRENETES CERVINICAUDA*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 979.

Chamicuros (*Bartlett*) ; Pebas (*Hauxwell*).

4. *PHAËTHORNIS HISPIDUS*, Gould ; Scl. & Salv. P. Z. S. 1867, p. 193.

Upper Ucayali (*Bartlett*).

The nest and eggs of this species were obtained by Mr. Bartlett near Cashiboya.

5. *PHAËTHORNIS MALARIS*, Nordm. ; Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Xeberos and Chyavetas (*Bartlett*) ; Pebas (*Hauxwell*).

The nest and eggs of this species were obtained by Mr. Bartlett.

6. *PHAËTHORNIS BOURCIERI* (Less.) ; Scl. & Salv. P. Z. S. 1867, p. 752.

Xeberos, Chyavetas, and Chamicuros (*Bartlett*).

The nest and eggs were also obtained by Mr. Bartlett.

7. *PHAETHORNIS OSERYI* (Bourc. et Muls.); *Scl. & Salv. P. Z. S.* 1867, p. 979.

Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*).

8. *PYGMORNIS AMAURA* (Bourc.); *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas (*Bartlett*).

9. *PYGMORNIS NIGRICINCTA* (Lawr.); *Scl. & Salv. P. Z. S.* 1867, pp. 752, 979.

Chyavetas and *Chamicuros* (*Bartlett*); Pebas (*Hauxwell*).

10. *CAMPYLOPTERUS ÆQUATORIALIS*, Gould; *Scl. & Salv. P. Z. S.* 1867, pp. 752, 979.

Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

11. *APHANTOCHROA GULARIS*, Gould; *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas (*Bartlett*).

12. *LAMPORNIS MANGO* (Linn.); *Sclater, P. Z. S.* 1857, p. 263; *Scl. & Salv. P. Z. S.* 1866, p. 193; 1867, pp. 752, 979.

Sarayacu, Xeberos (*Bartlett*); Pebas (*Hauxwell*).

13. *DORYPHORA JOHANNÆ* (Bourc.); *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas (*Bartlett*).

Found in the mountains, where Mr. Bartlett obtained the nest and eggs.

14. *IOLÆMA SCHREIBERSI* (Gray & Mitch.); *Scl. & Salv. P. Z. S.* 1867, p. 979.

Pebas (*Hauxwell*).

15. *THALURANIA TSCHUDII*, Gould; *Scl. & Salv. P. Z. S.* 1867, p. 752.

Xeberos and *Chyavetas* (*Bartlett*).

Mr. Bartlett found this species rather plentiful in *Chamicuros* and Santa Cruz, and also obtained the nest and eggs.

16. *THALURANIA NIGROFASCIATA*, Gould; *Scl. & Salv.* 1866, p. 194; 1867, p. 979.

Sarayacu (*Bartlett*); Pebas (*Hauxwell*).

17. *FLORISUGA MELLIVORA* (Linn.); *Scl. & Salv. P. Z. S.* 1867, pp. 752, 979.

Xeberos, *Chyavetas*, and *Chamicuros* (*Bartlett*); Pebas (*Hauxwell*).

18. *POLEMISTRIA VERREAUXI* (Bourc.); Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Xeberos, Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

19. *GOULDIA MELANOSTERNON*, Gould, Ann. N. H. ser. 4, (1868) i. p. 323.

G. langsdorffi, Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Xeberos, Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

20. *CALLIPHLOX AMETHYSTINA* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 752.

Chyavetas (*Bartlett*).

21. *CLAIS GUIMETI* (Bourc. & Muls.); Scl. & Salv. P. Z. S. 1867, p. 752.

Chyavetas (*Bartlett*).

22. *HELIOTHRIX AURITUS* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 979.

Cashiboya (*Bartlett*); Pebas (*Hauxwell*).

23. *POLYTMUS LEUCORRHUS*, Gould; Scl. & Salv. P. Z. S. 1867, pp. 584, 752; Gould, P. Z. S. 1871, p. 505.

Xeberos (*Bartlett*).

"Seeks its food from the blossom of the pine-apple, in company with the small *Pygmornis*."—E. B.

24. *CLYTOLÆMA AURESCENS*, Gould; Sclat. P. Z. S. 1857, p. 263; Scl. & Salv. P. Z. S. 1866, p. 194; 1867, pp. 752, 979.

Upper Ucayali, Chyavetas, and Chamicuros (*Bartlett*); Pebas (*Hauxwell*); Rio Javari (*Bates*).

Mr. Bartlett only obtained three specimens of this fine species; but Mr. Hauxwell's series contained a greater number of examples.

25. *HELIOMASTER LONGIROSTRIS* (Vieill.); Scl. & Salv. P. Z. S. 1867, pp. 752, 979.

Chyavetas, Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

26. *LEUCIPPUS CHLOROCERCUS*, Gould; Scl. & Salv. P. Z. S. 1866, p. 194; 1867, p. 979.

Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*).

27. *THAUMANTIAS FLUVIATILIS*, Gould; Scl. & Salv. P. Z. S. 1866, p. 194; 1867, pp. 752, 979.

Lower Ucayali, Yurimaguas (*Bartlett*); Pebas (*Hauxwell*).

28. *THAUMANTIAS BARTLETTI*, Gould; Scl. & Salv. P. Z. S. 1866, p. 194.

Upper Ucayali (*Bartlett*).

29. *CHRYSURONIA JOSEPHINÆ* (Bourc. et Muls.); *Scl. P. Z. S.* 1857, p. 263; *Scl. & Salv. P. Z. S.* 1867, pp. 752, 979.

Xeberos (*Bartlett*); Pebas (*Hauxwell*); Rio Javari (*Bates*).

30. *EUCEPHALA CÆRULEA* (Vieill.); *Scl. & Salv. P. Z. S.* 1866, p. 195; 1867, pp. 752, 979.

Lower Ucayali, Yurimaguas (*Bartlett*); Pebas (*Hauxwell*).

31. *HYLOCHARIS CYANEA* (Vieill.); *Scl. & Salv. P. Z. S.* 1866, p. 195; 1867, p. 752.

Nauta, Xeberos, and Chamicuros (*Bartlett*).

32. *HYLOCHARIS SAPPHIRINA* (Gm.); *Scl. & Salv. P. Z. S.* 1867, pp. 752, 979.

Xeberos (*Bartlett*); Pebas (*Hauxwell*).

33. *CHLOROSTILBON NAPENSIS*, Gould; *Scl. & Salv. P. Z. S.* 1867, p. 979.

C. daphne, *Scl. & Salv. P. Z. S.* 1866, p. 195 (?).

Nauta (*Bartlett*); Pebas (*Hauxwell*).

Fam. CYPSELIDÆ.

Four Swifts were obtained by Mr. Bartlett in Upper Amazonia—one true *Cypselus* and three Spine-tails (*Chætura*). Of these one *Chætura* only can be considered a characteristic Upper-Amazonian form, the others being more or less widely distributed.

1. *CYPSELUS SQUAMATUS*, Cassin; *Scl. & Salv. P. Z. S.* 1867, p. 752.

"I met with this little Swift in the towns of Xeberos and Chamicuros in small flocks."—E. B.

2. *CHÆTURA ZONARIS* (Shaw); *Scl. & Salv. P. Z. S.* 1867, p. 752.

"Seen in flocks about the mountains near Chyavetas."—E. B.

3. *CHÆTURA POLIURA* (Temm.); *Scl. P. Z. S.* 1870, p. 329.

Chætura brachycerca, *Scl. & Salv. P. Z. S.* 1867, p. 758, pl. 34.

"Xeberos and Chamicuros. Met with in flocks about the towns."—E. B.

4. *CHÆTURA SCLATERI*, Pelz. Orn. Bras. p. 56.

"I obtained only two specimens of this rare species at Chamicuros. It was found in company with *Ch. poliura*."—E. B.

I identify this Swift from v. Pelzeln's description. Natterer discovered it at Borba. I have recently obtained a second specimen from Ecuador (probably from the Rio Napo), which agrees with Mr. Bartlett's skin.—P. L. S.

Fam. CAPRIMULGIDÆ.

Seven Goatsuckers were obtained by Mr. Bartlett. Of these *Nyctibius longicaudatus*, *Chordeiles rupestris*, and *Hydropsalis trifurcata* are peculiar Amazonian species.

1. *NYCTIBIUS GRANDIS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 193.

"I obtained this specimen on the Upper Ucayali. The bird was perched on the dead stump of a tree in the river."—E. B.

2. *NYCTIBIUS LONGICAUDATUS* (Spix); Scl. P. Z. S. 1866, p. 128.

"I obtained an imperfect skin of this bird from an Indian Tambo at Yurimaguas."—E. B.

3. *CHORDEILES RUPESTRIS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 193.

"Lower Ucayali and whole of the Huallaga, where it breeds in colonies on the open sand banks. The eggs are placed on the sand without any nest whatever."—E. B.

4. *PODAGER NACUNDA* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 193; 1867, p. 978.

"Lower Ucayali and Santa Cruz. This bird is usually seen in pairs on the sand banks in company with *Chordeiles rupestris*."—E. B. Pebas (*Hauxw.*).

5. *ANTROSTOMUS PARVULUS* (Gould); Scl. & Salv. P. Z. S. 1867, p. 752.

A single example only obtained at Xeberos (*E. B.*).

6. *HYDROPSALIS TRIFURCATA* (Natt.); Scl. & Salv. P. Z. S. 1866, p. 193; 1867, p. 978.

"Upper and Lower Ucayali and Santa Cruz. This bird places its eggs amongst the cane on the banks of the river."—E. B. Pebas (*Hauxw.*).

7. *NYCTIDROMUS ALBICOLLIS* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 193; 1867, pp. 752, 978.

"Sarayacu, Upper Ucayali, Chamicuros, and Santa Cruz. This bird is always found in the dense forest, and lays its eggs on the dead leaves."—E. B.

Pebas (*Hauxw.*).

Fam. PICIDÆ.

Fifteen Woodpeckers were obtained by Mr. Bartlett. Four of these (*Picumnus castelnaudi*, *P. rufiventris*, *Celeus citreopygius*, and *C. grammicus*) are, so far as is known, peculiar to the Upper Amazonian district.

1. *PICUMNUS BUFFONI*, Lafr.; Scl. & Salv. P. Z. S. 1866, p. 196. Sarayacu, Upper Ucayali (*E. B.*).

2. *PICUMNUS CASTELNAUDI*, Malh.; Scl. & Salv. P. Z. S. 1866, p. 196.

Nauta and Upper Ucayali, a pair only obtained (*E. B.*).

3. *PICUMNUS RUFIVENTRIS* (Bp.); Scl. & Salv. P. Z. S. 1866, p. 196.

Sarayacu, a single example obtained (*E. B.*).

4. *CAMPEPHILUS ALBIROSTRIS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 196; 1867, p. 753.

Sarayacu, Lower Ucayali, Yurimaguas, and Chyavetas (*E. B.*).

5. *CAMPEPHILUS TRACHELOPYRUS* (Malh.); Scl. & Salv. P. Z. S. 1867, p. 753.

Yurimaguas and Chamicuros, only in the dense forest (*E. B.*).

6. *DRYOCOPUS LINEATUS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 196.

Upper Ucayali (*E. B.*).

7. *CELEUS JUMANA* (Spix); Scl. & Salv. P. Z. S. 1866, p. 196. Sarayacu, Chamicuros, and Santa Cruz (*E. B.*).

8. *CELEUS CITREOPYGIUS*, Scl. & Salv. P. Z. S. 1867, p. 758.

Yurimaguas (*E. B.*).

9. *CELEUS CITRINUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 196; 1867, p. 753.

Upper Ucayali, Xeberos, and Chamicuros (*E. B.*).

10. *CELEUS TINNUNCULUS* (Wagl.); Scl. & Salv. P. Z. S. 1866, p. 196.

Upper Ucayali (*E. B.*).

11. *CELEUS GRAMMICUS* (Malh.); Scl. & Salv. P. Z. S. 1866, p. 197.

Sarayacu (*E. B.*).

12. *CHLORONERPES HÆMATOSTIGMA* (Natt.); Scl. & Salv. P. Z. S. 1866, p. 196; 1867, p. 753.

Sarayacu, Xeberos, Chyavetas, and Chamicuros (*E. B.*).

13. *CHLORONERPES FLAVIGULARIS* (Bodd.).

Chamicuros (*E. B.*).

14. *CHRYSOPTILUS PUNCTIGULARIS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 197.

Chrysoptilus speciosus, Scl. & Salv. P. Z. S. 1867, p. 979.

Upper Ucayali (*E. B.*).

15. *MELANERPES CRUENTATUS* (Bodd.); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

" Sarayacu, Lower Ucayali, Chyavetas, and Chamicuros. Plen-

tiful in these localities. I obtained one egg of this species; it was of a pure white."—E. B.

Fam. MOMOTIDÆ.

Two Motmots only were obtained by Mr. Bartlett—the widely spread *M. brasiliensis* and *M. martii*. The latter ranges far north up to the Isthmus of Panama; at least, I cannot distinguish specimens from the latter locality from those of Eastern Peru.

1. *MOMOTUS BRASILIENSIS*, Lath.; Scl. & Salv. P. Z. S. 1866, p. 191.

"Upper Ucayali and Chamicuros. I also saw this species at Xeberos. It breeds in holes in the ground under low banks."—E. B.

2. *MOMOTUS MARTII*, Spix; Scl. & Salv. P. Z. S. 1867, p. 751. Cashiboya, Upper Ucayali, and Chyavetas (E. B.).

Fam. ALCEDINIDÆ.

The five species of *Ceryle* which Mr. Bartlett obtained in Eastern Peru are all of extended distribution.

1. *CERYLE TORQUATA* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 978.

"Upper and Lower Ucayali, and the whole of the Huallaga. The most common species of all this family on the Amazons and its tributaries. Always met with in large colonies about the steep clay banks. I met with this bird from the mouth of the Amazons to the highest points reached on the Marañon, Ucayali, and Huallaga. It is always in company with the following species. The nest is much deeper, being from 4 to 6 feet deep, with a large chamber sufficient for the young when nearly full-grown. Eggs pure white, four in number. The naked legs were of a reddish flesh-colour. Scales on the toes darker and rather slate-coloured."—E. B.

2. *CERYLE AMAZONA* (Lath.); Scl. & Salv. P. Z. S. 1867, p. 978.

"Nauta, Upper and Lower Ucayali, Santa Cruz, and whole of the Huallaga, and throughout the whole of the Amazonian region, breeding in considerable numbers on the steep banks of the river. This species is generally observed in the company of *Ceryle torquata*. On the approach of any intruder they fly up in numbers and keep up a loud and disagreeable chorus. The nest is generally placed in an extremely deep hole in a flat-faced bank; hence it is very difficult to obtain the eggs, which are four in number, of a pure white colour. The nest is composed of fish-bones and a few sticks; and the young remain in the nest until they are able to fly and provide for themselves. Legs and feet black. Irides nearly black, with a slight tinge of grey-brown."—E. B.

3. *CERYLE AMERICANA* (Gm.); Scl. & Salv. P. Z. S. 1867, p. 978.

"Nauta, Upper and Lower Ucayali, and Santa Cruz. This species and the following are solitary in their breeding-habits, selecting the lower and more secluded banks of lakes and small streams. These birds never breed twice in the same hole; but many other birds take to their deserted nests."—E. B.

4. *CERYLE INDA* (Linn.).

"This beautiful species is very rare on the waters of the Peruvian Amazons. During the four years I resided there I only obtained two specimens, which I shot in a small brook near Santa Cruz, on the Huallaga river. They are not found on the open waters, but in the densely covered small streams. The nest is in holes in the banks, as in the case of other Kingfishers. This species is extremely shy and difficult to obtain."—E. B.

5. *CERYLE SUPERCILIOSA* (Linn.); Scl. & Salv. P. Z. S. 1867, pp. 751, 978.

Chyavetas, one specimen obtained (*E. B.*).

Fam. TROGONIDÆ.

Of the seven Trogons met with by Mr. Bartlett, *Pharomacrus pavoninus* may be considered a local species. The others are mostly of wide distribution.

1. *TROGON COLLARIS*, Vieill.; Scl. & Salv. P. Z. S. 1866, p. 193.
Upper and Lower Ucayali, also seen at Chamicuros (*E. B.*).

2. *TROGON ATRICOLLIS*, Vieill.
Only three specimens obtained at Chamicuros (*E. B.*).

3. *TROGON MERIDIONALIS*, Spix.
Trogon ramonianus, Scl. & Salv. P. Z. S. 1866, p. 193.
Sarayacu, Lower Ucayali, and Chamicuros (*E. B.*).

4. *TROGON VARIEGATUS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 193.
Upper Ucayali (*E. B.*).

5. *TROGON VIRIDIS*, Linn.; Scl. & Salv. P. Z. S. 1866, p. 192; 1867, p. 752.
Sarayacu, Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

6. *TROGON MELANURUS*, Sw.; Scl. P. Z. S. 1857, p. 261; Scl. & Salv. P. Z. S. 1866, p. 193, 1867, pp. 752, 978.

Nauta, Upper Ucayali, Yurimaguas, Xeberos, and Santa Cruz (*E. B.*); Pebas (*H.*); Rio Javari (*Bates*).

7. *PHAROMACRUS PAVONINUS* (Spix).

"This Trogon, which I met with at Chamicuros and Santa Cruz,

is found, like all other species of this genus, in the dense forest in pairs. These birds resort to the same trees from day to day. They are very pugnacious, and are easily attracted by imitating their call-notes."—E. B.

Fam. GALBULIDÆ.

The remarkable generic form *Galbalcyrhynchus* is, I believe, peculiar to Upper Amazonia. It was originally described as from Bogota; but we have never met with it in collections from that locality.

1. *GALBULA ALBIROSTRIS*, Lath.; Scl. & Salv. P. Z. S. 1866, p. 192; 1867, p. 749.

Sarayacu, Xeberos, Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

2. *GALBULA TOMBACEA*, Spix; Sclater, P. Z. S. 1857, p. 262; Scl. & Salv. P. Z. S. 1866, p. 192, 1867, p. 978.

Sarayacu and Lower Ucayali (*E. B.*).

3. *GALBULA LEUCOGASTRA*, Scl. & Salv. P. Z. S. 1867, p. 978.

Pebas (*H.*); Rio Javari (*Bates*).

4. *BRACHYGALBA ALBIGULARIS* (Spix); Scl. P. Z. S. 1857, p. 262.

Rio Javari (*Bates*).

5. *BRACHYGALBA INORNATA*, Scl.; Scl. & Salv. P. Z. S. 1867, p. 978.

Pebas (*H.*).

6. *JACAMEROPS GRANDIS* (Gm.).

Chamicuros and Santa Cruz (*E. B.*).

Whether *Jacamerops isidori*, Deville (R. Z. 1849, p. 5), obtained at Pebas, is really distinct is perhaps doubtful. If so, both species occur in the same district.

7. *GALBALCYRHYNCHUS LEUCOTIS*, Des Murs; Sclat. & Salv. P. Z. S. 1866, p. 192; 1867, p. 978.

Sarayacu, Upper and Lower Ucayali, and Yurimaguas, but not common (*E. B.*).

Fam. BUCCONIDÆ.

Of the thirteen Bucconidæ several are species peculiar to this district, such as *B. picatus*, *B. pulmentum*, *Monasa nigrifrons*, and *Monasa peruana*. *Bucco macrodactylus* and *Monasa flavirostris* also occur in Bogota collections, but are probably brought from the Amazonian watershed.

1. *BUCCO COLLARIS*, Lath.; Scl. & Salv. P. Z. S. 1866, p. 751.

"Chyavetas and Chamicuros. Found more in the hilly and dry country, and always near the ground, hunting for beetles and other insects."—E. B.

2. *BUCCO MACRODACTYLUS*, Spix; *Scl. P. Z. S.* 1857, p. 261; *Scl. & Salv. P. Z. S.* 1866, p. 192, 1867, p. 751.

Sarayacu, Upper Ucayali, Yurimaguas, Xeberos, Chyavetas, and Chamicuros (*E. B.*); Rio Javarri (*Bates*).

3. *BUCCO HYPERRRHYNCHUS* (Bp.).

A single example of this fine species was obtained at Chamicuros (*E. B.*).

4. *BUCCO PICATUS*, *Scl. P. Z. S.* 1855, p. 194.

Chamicuros (*Hauw.*).

5. *BUCCO PULMENTUM*, Bp.; *Sclater, P. Z. S.* 1857, p. 262.

Rio Javari (*Bates*); Chamicuros (*E. B.*).

6. *MALACOPTILA FUSCA* (Lath.); *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas and Chamicuros (*E. B.*).

7. *MALACOPTILA RUFA* (Spix); *Scl. & Salv. P. Z. S.* 1866, p. 192.

Sarayacu and Santa Cruz (*E. B.*).

8. *NONNULA FRONTALIS*, *Sclater*; *Scl. & Salv. P. Z. S.* 1866, p. 192; 1867, p. 752.

Chyavetas, Chamicuros, and Santa Cruz (*E. B.*).

9. *NONNULA RUFICAPILLA* (Tschudi); *Scl. & Salv. P. Z. S.* 1866, p. 192.

Sarayacu and Lower Ucayali. All the species of this family are solitary in their habits (*E. B.*).

10. *MONASA NIGRIFRONS*, Spix; *Scl. & Salv. P. Z. S.* 1866, p. 192; 1867, pp. 752, 978.

Nauta, Sarayacu, and Lower Ucayali, common (*E. B.*): Pebas (*H.*).

11. *MONASA PERUANA*, Bp.; *Scl. P. Z. S.* 1857, p. 262; *Scl. & Salv. P. Z. S.* 1866, p. 192, 1867, p. 752.

Sarayacu, Upper Ucayali, Chyavetas, and Chamicuros, plentiful in these localities (*E. B.*).

12. *MONASA FLAVIROSTRIS*, Strickl.; *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas (*E. B.*).

13. *CHELIDOPTERA TENEBROSA* (Pall.); *Scl. & Salv. P. Z. S.* 1866, p. 192; 1867, p. 752.

“Upper and Lower Ucayali, Yurimaguas, Xeberos, Chyavetas, and Santa Cruz. This bird breeds in holes on the banks, about 2 feet

deep, and lays two beautifully polished white eggs, very much like those of the Kingfisher in shape and appearance."—E. B.

Fam. CUCULIDÆ.

The Cuculidæ are mostly wanderers and widely distributed. Only the *Neomorphus pucherani* can be regarded as a peculiar Amazonian form, out of the eight species met with.

1. CROTOPHAGA MAJOR, Linn.; Scl. & Salv. P. Z. S. 1866, p. 195.

Lower Ucayali, and Santa Cruz, found in flocks along the banks of the rivers and lakes (E. B.).

2. CROTOPHAGA ANI, Linn.; Scl. & Salv. P. Z. S. 1866, p. 195.

Nauta, Ucayali, and Santa Cruz, common throughout the country (E. B.).

3. PIAYA MELANOASTRA, (Vieill.); Scl. & Salv. P. Z. S. 1867, pp. 752, 758.

Chyavetas and Chamicuros (E. B.).

4. PIAYA MEHLERI, Scl. & Salv. P. Z. S. 1867, pp. 758, 979.

Piaya nigricrissa, Scl. & Salv. P. Z. S. 1866, p. 195.
Sarayacu and Chyavetas (E. B.); Pebas (H.).

5. PIAYA MINUTA, Vieill.; Scl. & Salv. P. Z. S. 1866, p. 195.

Piaya rutila, Scl. & Salv. P. Z. S. 1867, p. 979.
Sarayacu, rare in the country which I visited (E. B.); Pebas (H.).

6. COCCYZUS MELANOCORYPHUS, Vieill.; Scl. & Salv. P. Z. S. 1861, p. 195; 1867, pp. 752, 979.

Upper and Lower Ucayali, Chyavetas, and Chamicuros (E. B.); Pebas (H.).

7. COCCYZUS ERYTHROPHthalmus (Wilson).

Ucayali (Hauxwell; Mus. Brit.). See P. Z. S. 1870, p. 168.

8. NEOMORPHUS PUCHERANI.

Cultrides pucherani, Deville, Rev. Zool. 1851, p. 211; Des Murs, Voy. Castelnau, Oiseaux, p. 18, pls. 6 & 7.

A recent collection from Mr. Hauxwell (received by Mr. Janson, his agent) contains an adult pair and a nestling of this fine species. The sexes are exactly alike in plumage, and agree very fairly with the figure in Castelnau's 'Voyage.' The species is quite distinct from *N. rufipennis*, with which it was formerly believed to be identical. It has a narrow pectoral stripe like *N. geoffroyi* and *N. pucherani* (cf. Sclater, P. Z. S. 1866, p. 60).

Fam. RAMPHASTIDÆ.

Eleven species of Toucans were obtained by Mr. E. Bartlett in those parts of Upper Amazonia which he visited; and it is probable that one or two others occur within the district.

Pteroglossus humboldti, *P. beauharnaisi*, *Selenidera langsdorfi*, and *S. reinwardti* are, so far as I know, restricted to Upper Amazonia; the other species have rather a wider range.

1. *RAMPHASTOS AMBIGUUS*, Sw.; *Scl. & Salv. P. Z. S.* 1867, p. 752.

Chyavetas; a single specimen only obtained (*E. B.*).

2. *RAMPHASTOS INCA*, Gould; *Scl. & Salv. P. Z. S.* 1867, p. 752. Chyavetas (*E. B.*).

3. *RAMPHASTOS CUVIERI*, Wagl.; *Scl. & Salv. P. Z. S.* 1866, p. 195; 1867, p. 752.

Cashiboya, the whole of the Ucayali, Chyavetas, Chamicuros, and the Huallaga—the most common of the family and generally distributed (*E. B.*).

4. *RAMPHASTOS CULMINATUS*, Gould; *Scl. & Salv. P. Z. S.* 1866, p. 195; 1867, p. 752.

Sarayacu, Chyavetas, and Chamicuros, generally distributed and always in company with *R. cuvieri* (*E. B.*).

5. *PTEROGLOSSUS PLURICINCTUS*, Gould; *Scl. & Salv. P. Z. S.* 1867, p. 753.

Chyavetas (*E. B.*).

6. *PTEROGLOSSUS CASTANOTIS*, Gould; *Scl. & Salv. P. Z. S.* 1866, p. 195.

Sarayacu, Chamicuros, and Santa Cruz (*E. B.*).

7. *PTEROGLOSSUS HUMOLDTI* (Wagl.); *Scl. & Salv. P. Z. S.* 1866, p. 195; 1867, p. 753.

Sarayacu (*E. B.*); Rio Javari (*Bates*).

8. *PTEROGLOSSUS BEAUHARNAISI* (Wagl.).

“Chamicuros and Santa Cruz, but not common here. This curious bird appears to have a wide and extensive range on the southern shores of the Amazons. It was found by Mr. Bates at the mouth of the Solimoes, and as far south as Fonte Boa. I obtained my specimens in Chamicuros, but it is found also in the dense forest of Lamas and on the head-waters of the Huallaga. I heard it several times in the forest of Xeberos on my road to Chyavetas. It is only found in the dense forest, many miles from the larger rivers. The Indians of the Napo declared to me that they never saw this species in any part of the forest on that river, and were quite surprised to see the skins that I had preserved.”—*E. B.*

9. *PTEROGLOSSUS FLAVIROSTRIS*, Fraser; *Scl. & Salv. P. Z. S.* 1867, p. 753.

Xeberos and Chamicuros (*E. B.*); Rio Javari (*Bates*).

Mr. Gould, in the second edition of his Monograph, speaks of his

P. mariæ as having been transmitted by "Mr. Hauxswell from the Lower Amazon." This is probably a mistake for the "Upper Amazons," Mr. Hauxswell not having, so far as we know, collected on the lower portion of that river. But we cannot distinguish the so-called *P. mariæ* from *P. flavirostris*. Skins of this species from Bogota, the Upper Amazons, and Guiana seem to us inseparable. (Cf. Pelzeln's remarks, Orn. Bras. p. 237.)

10. *SELENIDERA LANGSDORFI* (Wagl.); Scl. & Salv. P. Z. S. 1866, p. 195.

Cashiboya, Chamicuros, and Santa Cruz (*E. B.*).

11. *SELENIDERA REINWARDTI* (Wagl.); Scl. & Salv. P. Z. S. 1867, p. 753.

Chyavetas (*E. B.*).

Fam. CAPITONIDÆ.

Three Barbets were obtained by Mr. Bartlett, all of which are, we believe, restricted to the Upper Amazonian district.

1. *CAPITO AURATUS* (Dum.).

Capito peruvianus, Scl. & Salv. P. Z. S. 1866, p. 195; 1867, p. 753.

C. amazonicus, Scl. & Salv. P. Z. S. 1867, p. 978.

Upper Ucayali, Xeberos, and Chamicuros (*E. B.*); Pebas (*H.*).

"Rather common at Chamicuros. To be found always on very high trees in flocks, in company with some of the Cœrebidæ, feeding on the different fruits. There is no doubt that these birds feed also on insects. While in Chamicuros the Indians brought me four young birds of this species, which I kept some time: I occasionally gave them locusts and spiders, which they eat voraciously, and upon which they appeared to thrive, also bananas and a little boiled meat at times; but having to leave them in charge of some Indians, they soon died. The note of this species is short, and resembles somewhat that of the Doves. I should say that the average number of eggs laid would be four, because the four birds brought to me were from one nest. The eggs are in colour white; they are deposited in holes in the trunks of trees."—*E. B.*

2. *CAPITO AUROVIRENS* (Cuv.); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

"Nauta, Sarayacu, and Yurimaguas. Common at Sarayacu. The bird, perched almost continually on the top of a tree, at intervals utters a short call. In doing so it bends forward and swells out its throat, and erecting its tail (after the manner of a Toucan when asleep) sends forth a melancholy and plaintive cry. These birds, in habits and general appearance, structure and mode of life, are closely allied to the Ramphastidæ."—*E. B.*

3. *CAPITO AURANTICOLLIS*, Scl.

Eubucco aurantiicollis and *E. hartlaubi*, Scl. P. Z. S. 1857, p. 267.

Capito auranticollis and *C. melanotis*, Scl. & Salv. P. Z. S. 1866, p. 196.

"Sarayacu and Santa Cruz. *C. melanotis* is the female of *C. auranticollis*; I obtained them in the same locality at the same time."—E. B.

Ucayali (*Hauw.*); Rio Javari (*Bates*).

FA . PSITTACIDÆ.

Specimens of twenty-one species of Parrots were obtained by Mr. Bartlett. Most of these have a rather wider range than the confines of Upper Amazonia; but the following may be considered species characteristic of the district, and not hitherto certainly known to occur elsewhere:—*Conurus weddelli*, *C. luciani*, *C. roseifrons*, and *C. souancæi*.

1. ARA MACAO (Linn.); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

"Lower Ucayali and Chyavetas. This fine species congregates in flocks of from ten to twelve, and keeps to the highest trees in the forest, feeding on palm-nuts and other hard seeds."—E. B.

2. ARA ARARAUNA (Linn.).

Chamicuros, rather more abundant than *Ara macao* (*E. B.*).

3. ARA SEVERA (Linn.); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 970.

"Upper and Lower Ucayali and the whole of the Huallaga. This species goes in large flocks, and feeds generally on the plantations of Indian corn, doing great damage."—E. B.

Pebas (*Hauw.*); Rio Javari (*Bates*).

4. CONURUS PAVUA (Bodd.).

"Santa Cruz; I only obtained two males and one female of this rare species."—E. B.

5. CONURUS WEDDELLI, Dev.; Scl. & Salv. P. Z. S. 1866, p. 197. Lower Ucayali and Santa Cruz; but not common (*E. B.*).

6. CONURUS LUCIANI (Natt.).

Conurus cyanopterus, Scl. & Salv. P. Z. S. 1867, p. 753.

Xeberos, Chyavetas, and Chamicuros (*E. B.*).

7. CONURUS ROSEIFRONS, G. R. Gray.

One of Mr. Bartlett's collections contained a single imperfect skin of this rare species, obtained from the Indians.

8. CONURUS MELANURUS (Spix); Scl. P. Z. S. 1857, p. 266.

Rio Javari (*Bates*); Pebas (*Hauw.*).

9. *CONURUS SOUANCEI*, Verr.; Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

Nauta, Xeberos, Chyavetas, Chamicuros, in flocks near the towns (*E. B.*).

10. *BROTOGERYS XANTHOPTERUS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 979.

"Nauta and Lower Ucayali. This species breeds in the white ants' nests, and is found in flocks about the banks of the rivers and towns. The eggs are white and from five to six in number."—*E. B.*

11. *BROTOGERYS JUGULARIS* (Deville); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

"Nauta, Upper and Lower Ucayali, Yurimaguas, and Chyavetas. This species, like the former, breeds in the white ants' nests."—*E. B.*

12. *BROTOGERYS TUI* (Gm.); Scl. & Salv. P. Z. S. 1866, p. 197.

"Nauta. The habits of this Parrakeet do not differ from those of the two former species."—*E. B.*

13. *CHRYSOTIS FESTIVA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 197.

"One example of this Parrot was obtained on the Lower Ucayali."—*E. B.*

14. *CHRYSOTIS FARINOSA* (Bodd.).

"Of this fine species I obtained five specimens at Chamicuros, the only place in which I ever saw it."—*E. B.*

15. *CHRYSOTIS AMAZONICA* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 753.

"Several specimens of this species were obtained at Chyavetas and Chamicuros."—*E. B.*

16. *CHRYSOTIS PÆCILORYNCHA* (Shaw); Scl. & Salv. P. Z. S. 1866, p. 567.

"Only one example of this species obtained at Nauta."—*E. B.*

17. *PIONUS MENSTRUUA* (Linn.); Scl. & Salv. P. Z. S. 1867, p. 753.

Xeberos and Chamicuros, found in small flocks (*E. B.*); Rio Javari (*Bates*).

18. *CAICA BARRABANDI* (Kuhl); Scl. & Salv. P. Z. S. 1866, p. 197; 1867, p. 753.

Nauta, Upper Ucayali, and Chyavitos, but not common (*E. B.*); Rio Javari (*Bates*).

19. *CAICA HISTRIO* (Bodd.); Scl. P. Z. S. 1857, p. 266.
Rio Javari (*Bates*).

20. CAICA MELANOCEPHALA (Linn.); *Scl. & Salv. P. Z. S.* 1867, p. 753.

Yurimaguas, Chyavetas, and Chamicuros (*E. B.*).

21. CAICA XANTHOMEROS, *Scl. P. Z. S.* 1857, p. 266.

Rio Javari (*Bates*).

22. UROCHROMA HUETI (Temm.); *Scl. & Salv. P. Z. S.* 1867, p. 759.

"Two examples of this beautiful species were obtained at Xeberos."—*E. B.*

23. PSITTACULA PASSERINA (Linn.).

"Found at Nauta, but not common in this locality."—*E. B.*

24. PSITTACULA SCLATERI, G. R. Gray; *Scl. & Salv. P. Z. S.* 1866, p. 197.

"A single female of this little Parrakeet was obtained at Sarayacu."—*E. B.*

Rio Javari (*Bates*).

Fam. CATHARTIDÆ.

1. GYPARCHUS PAPA (Linn.); *Scl. & Salv. P. Z. S.* 1867, p. 753.

Xeberos and Santa Cruz (*Bartlett*).

"Seldom seen except preying upon the carcass of a Crocodile on the river-bank or soaring in circles high in the air. The first specimen I obtained was accompanied by two young ones in their brown plumage."—*E. B.*

2. CATHARTES AURA, *Scl. & Salv. P. Z. S.* 1867, p. 753.

Chyavetas (*Bartlett*).

"Keeps in the forest in pairs, never approaching the towns and villages."—*E. B.*

3. CATHARTES ATRATUS.

"This Vulture is common throughout the country all the year round, more especially in the dry season on the sand banks, when the Peruvians are collecting and drying *Vacca marina* and fish."—*E. B.*

Fam. FALCONIDÆ.

1. IBYCTER AMERICANUS (Bodd.); *Scl. & Salv. P. Z. S.* 1866, p. 198; 1867, p. 753.

Upper Ucayali and Chyavetas (*Bartlett*).

"A very noisy species, found only in the dense forest."—*E. B.*

2. IBYCTER ATER, Vieill.; *Scl. & Salv. P. Z. S.* 1866, p. 198; 1867, p. 979.

Upper Ucayali (*Bartlett*); Pebas (*Hauxwell*).

Usually seen about the sand banks in company with the following species.

3. *MILVAGO CHIMACHIMA* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 198.

Upper Ucayali and Santa Cruz (*Bartlett*).

4. *MORPHNUS GUIANENSIS* (Daud.); Scl. & Salv. P. Z. S. 1867, p. 753.

Chyavetas and Yurimaguas (*Bartlett*).

"An inhabitant of the dense forest."—E. B.

5. *THRASAËTUS HARPYIA*.

"I saw this species flying over the tree-tops on the shores of the Marañon above Nauta."—E. B.

6. *HERPETOTHERES CACHINNANS* (L.); Scl. & Salv. P. Z. S. 1867, p. 753.

Yurimaguas (*Bartlett*).

7. *SPIZAËTUS ORNATUS* (Daud.); Scl. & Salv. P. Z. S. 1867, p. 753.
Chyavetas (*Bartlett*).

8. *SPIZAËTUS TYRANNUS* (Max.).

"Rio Huallaga, near Santa Cruz; usually seen on the banks of the river feeding on fish."—E. B.

9. *BUTEOGALLUS NIGRICOLLIS* (Lath.); Scl. & Salv. P. Z. S. 1866, p. 198.

Sarayacu and Santa Cruz (*Bartlett*).

"Generally seen near small rivers looking after fish."—E. B. (*Cf.* Salv. Ibis, 1859, p. 216.)

10. *URUBITINGA ZONURA* (Shaw); Scl. & Salv. P. Z. S. 1867, p. 753.

Morphnus urubitinga, Scl. P. Z. S. 1857, p. 261.

Rio Javari (*Bates*); Chyavetas, Chamicuros, and Santa Cruz (*Bartlett*).

11. *URUBITINGA SCHISTACEA* (Sund.); Scl. & Salv. P. Z. S. 1866, p. 198; 1867, p. 979.

Morphnus schistaceus, Scl. P. Z. S. 1857, p. 261.

Rio Javari (*Bates*); Upper Ucayali, near Cashiboya (*Bartlett*); Pebas (*Hauxwell*).

12. *LEUCOPTERNIS SUPERCILIARIS*, Pelz.; Scl. & Salv. Ex. Orn. p. 75, t. xxxviii.

Santa Cruz (*Bartlett*).

"Only one specimen seen."—E. B.

13. *BUTEO PENNSYLVANICUS* (Wils.).

Chamicuros (*Bartlett*).

A very widely ranging species, specimens of which were also obtained by Mr. Bates on the Rio Javari (P. Z. S. 1857, p. 261).

14. *ASTURINA MAGNIROSTRIS* (Gm.); *Scl. P. Z. S.* 1857, p. 261 ; *Scl. & Salv. P. Z. S.* 1866, p. 198 ; 1867, p. 753.

Upper and Lower Ucayali, Xeberos, Chyavetas, Chamicuros, and Santa Cruz (*Bartlett*).

15. *MICRASTUR SEMITORQUATUS* (Vieill.); *Scl. & Salv. P. Z. S.* 1869, p. 365.

Santa Cruz (*Bartlett*).

16. *MICRASTUR MIRANDOLLII* (Schl.); *Scl. & Salv. P. Z. S.* 1867, pp. 753, 759 ; 1869, p. 365.

Chyavetas (*Bartlett*).

17. *MICRASTUR GILVICOLLIS* (Vieill.); *Scl. P. Z. S.* 1857, p. 261 ; *Scl. & Salv. P. Z. S.* 1866, p. 198 ; 1869, p. 368.

Rio Javari (*Bates*) ; Sarayacu, Chamicuros (*Bartlett*).

18. *ACCIPITER BICOLOR* (Vieill.); *Scl. & Salv. Ex. Orn.* p. 137, t. lxix.

Santa Cruz (*Bartlett*).

19. *HARPAGUS BIDENTATUS* (Lath.); *Scl. & Salv. P. Z. S.* 1866, p. 198 ; 1867, pp. 753, 979.

H. diodon, *Scl. P. Z. S.* 1857, p. 261 (*err.*).

Rio Javari (*Bates*) ; Upper Ucayali, Chyavetas, Chamicuros, and Santa Cruz on the Rio Huallaga (*Bartlett*) ; Pebas (*Hauzwell*).

The specimens procured by Mr. Bates on the Rio Javari doubtless belong here and not to *H. diodon* of the Atlantic wood-region.

20. *CYMINDIS CAYENNENSIS* (Gm.); *Scl. & Salv. P. Z. S.* 1866, p. 198.

Upper Ucayali (*Bartlett*).

21. *NAUCLERUS FURCATUS* (Linn.).

Chamicuros (*Bartlett*).

"I obtained only two specimens of this species, but saw it frequently in other localities catching flying ants with its feet as it skimmed the air."—E. B.

22. *ICTINIA PLUMBEA* (Vieill.); *Scl. & Salv. P. Z. S.* 1867, p. 753.

Chyavetas and Santa Cruz (*Bartlett*).

This species was also seen at Yurimaguas by Mr. Bartlett.

23. *GAMPSONYX SWAINSONI*, Vig.; *Scl. & Salv. P. Z. S.* 1867, p. 979.

Pebas (*Hauzwell*).

Fam. STRIGIDÆ.

1. *STRIX PERLATA*, *Scl. & Salv. P. Z. S.* 1867, p. 753.

Xeberos (*Bartlett*)

Mr. Bartlett also obtained the egg of this species at Nauta.

2. *CICCABA VIRGATA*.*Syrnium virgatum*, Cassin.*Syrnium* sp.?, Salv. P. Z. S. 1867, p. 753.*Syrnium zonocercum*, G. R. Gray in Mus. Brit.Chyavetas (*Bartlett*).

A young bird in yellow downy plumage with the wing-feathers and rectrices half developed. The latter show the bands of the tail to be just as in the common Central-American birds, to which species it doubtless belongs.

3. *PULSATRIX TORQUATA* (Daud.).Chamicuros (*Bartlett*).4. *SCOPS BRASILIANUS* (Gm.).*Scops choliba*, Scl. & Salv. P. Z. S. 1866, p. 198.*Scops*, sp.?, Scl. P. Z. S. 1857, p. 261.

S. usta, Scl. Trans. Z. S. iv. p. 265, t. 61; Scl. & Salv. P. Z. S. 1866, p. 198; Ex. Orn. p. 102.

Upper Ucayali, Cashiboya, Chamicuros, and Sarayacu (*Bartlett*).

Fam. PHALACROCORACIDÆ.

1. *PLOTUS ANHINGA* (Linn.).Yurimaguas (*Bartlett*).

"Also seen on the Ucayali and Marañon."—E. B.

2. *PHALACROCORAX BRASILIENSIS* (Gm.).Cashiboya, Upper Ucayali, and Santa Cruz (*Bartlett*).

"This species flies in large flocks from lake to lake; and sometimes hundreds may be seen, soon after sunrise, flying in a long line."—E. B.

Fam. PALAMEDEIDÆ.

1. *PALAMEDEA CORNUTA*, Linn.; Scl. & Salv. P. Z. S. 1866, p. 200.Upper Ucayali (*Bartlett*).

"I frequently saw this species about the lakes bordering the Huallaga."—E. B.

Fam. ANATIDÆ.

1. *CHENALOPEX JUBATUS* (Spix); Scl. & Salv. P. Z. S. 1866, p. 200.Lower Ucayali and Santa Cruz (*Bartlett*).2. *DENDROCYGNA AUTUMNALIS* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 200.Lower Ucayali (*Bartlett*).3. *DENDROCYGNA VIDUATA* (Linn.); Scl. & Salv. P. Z. S. 1866, p. 200.Lower Ucayali (*Bartlett*).

4. *CAIRINA MOSCHATA* (Linn.); *Scl. & Salv. P. Z. S.* 1866, p. 200; 1867, p. 979.

Upper and Lower Ucayali, and Huallaga (*Bartlett*); Pebas (*Hauvwell*).

Fam. ARDEIDÆ.

1. *ARDEA COCOI*, Linn.; *Scl. & Salv. P. Z. S.* 1866, p. 199; 1867, p. 979.

Upper and Lower Ucayali and Rio Huallaga (*Bartlett*); Pebas (*Hauvwell*).

"Universally distributed."—E. B.

2. *ARDEA AGAMI*, Gm.; *Scl. & Salv. P. Z. S.* 1866, p. 567; 1867, p. 754.

Nauta and Yurimaguas (*Bartlett*).

3. *ARDEA EGRETTEA*, Gm.

Herodias egretta, *Scl. & Salv. P. Z. S.* 1866, p. 199.

Upper and Lower Ucayali and Santa Cruz (*Bartlett*).

"Abundant on the sand banks and on the shores of lakes."—E. B.

4. *ARDEA CANDIDISSIMA*, Gm.

Garzetta candidissima, *Scl. & Salv. P. Z. S.* 1866, p. 199.

Ucayali and Santa Cruz (*Bartlett*).

5. *TIGRISOMA BRASILIENSE* (L.); *Scl. & Salv. P. Z. S.* 1866, p. 199; 1867, p. 979.

Tigrisoma brasiliense and *T. tigrinum*, *Scl. P. Z. S.* 1857, p. 268. Rio Javari (*Bates*); Upper Ucayali near Cashiboya and Santa Cruz (*Bartlett*); Pebas (*Hauvwell*).

6. *NYCTICORAX NÆVIA* (Bodd.).

N. gardeni, *Scl. & Salv. P. Z. S.* 1866, p. 199.

Upper and Lower Ucayali.

7. *NYCTICORAX PILEATA* (Lath.); *Scl. & Salv. P. Z. S.* 1867, p. 979.

Nauta and Santa Cruz (*Bartlett*); Pebas (*Hauvwell*).

8. *CANCROMA COCHLEARIA*, Linn.

"Seen on the lakes of Cashiboya."—E. B.

9. *BUTORIDES SCAPULATUS* (Licht.); *Scl. & Salv. P. Z. S.* 1866, p. 199.

Ucayali and Santa Cruz (*Bartlett*).

Fam. CICONIIDÆ.

1. *TANTALUS LOCULATOR*, Linn.; *Scl. & Salv. P. Z. S.* 1866, p. 199.

Upper Ucayali and Santa Cruz (*Bartlett*).

"Seen in flocks about the river-banks and on the tops of trees."—E. B.

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2. MYCTERIA AMERICANA, Linn.

Ucayali (*Bartlett*).

"I saw this species frequently on the Ucayali, and obtained a bird of the year changing its first brown plumage for the adult dress."—E. B.

Fam. PLATALEIDÆ.

1. PLATALEA AJAJA, Linn.; Scl. & Salv. P. Z. S. 1866, p. 200.

Lower Ucayali and Santa Cruz (*Bartlett*).

2. HARPIPRION CAYENNENSIS (Gm.).

Chamicuros (*Bartlett*).

"Visits the inland towns when the banks of the river are inundated."—E. B.

Fam. COLUMBIDÆ.

1. COLUMBA SPECIOSA, Gm.; Scl. & Salv. P. Z. S. 1867, p. 753.

Chyavetas and Chamicuros (*Bartlett*).

2. COLUMBA RUFINA, Temm.; Scl. & Salv. P. Z. S. 1866, p. 198.

Upper Ucayali and Chamicuros (*Bartlett*).

"Common at different seasons when certain fruits are ripe."—E. B.

3. COLUMBA VINACEA, Temm.; Scl. & Salv. P. Z. S. 1866, p. 198.

Upper Ucayali, Sarayacu, and Santa Cruz (*Bartlett*).

"A bird of solitary habits, and only seen perched on high trees near water, uttering its plaintive notes."—E. B.

4. LEPTOPTILA DUBUSI, Bp.; Scl. & Salv. P. Z. S. 1866, p. 198.

Sarayacu, Santa Cruz (*Bartlett*).

"Found in the plantations of bananas, feeding on the ripe fruit."—E. B.

5. CHAMÆPELIA AMAZILIA, Bp.; Scl. & Salv. P. Z. S. 1867, p. 753.

Xeberos (*Bartlett*).

6. PERISTERA CINEREA (Temm.); Scl. & Salv. P. Z. S. 1867, p. 753.

Xeberos, Chamicuros, and Santa Cruz (*Bartlett*).

"Found in the open campos and in plantations near towns."—E. B.

7. GEOTRYGON MONTANA (Linn.); Scl. & Salv. P. Z. S. 1866, p. 198; 1867, p. 753.

Upper and Lower Ucayali, Xeberos, Chyavetas, Chamicuros, Yurimaguas, and Nauta (*Bartlett*).

"Found in pairs feeding on the banks of rivers."—E. B.

Fam. TETRAONIDÆ.

1. ODONTOPHORUS STELLATUS, Gould; *Sci. & Salv. P. Z. S.* 1867, p. 753.

Chyavetas and Chamicuros (*Bartlett*).

"Always found in coveys of from ten to twelve birds. In the mountains in July I met with young birds just able to fly."—E. B.

Fam. CRACIDÆ.

1. PENELOPE BOLIVIANA, Reich.; *Sci. & Salv. P. Z. S.* 1870, p. 526.

Yurimaguas (*Bartlett*).

"I found this species in many localities, but only preserved one specimen."—E. B.

2. PIPILE CUMANENSIS (Jacq.); *Sci. & Salv. P. Z. S.* 1870, p. 529.

Santa Cruz (*Bartlett*).

3. CRAX GLOBULOSA, Spix; *Sci. & Salv. P. Z. S.* 1870, p. 515.

Mr. Bartlett's notes record *Crax alector* as met with on the Marañon and Rio Ucayali; but we have little doubt that *Crax globulosa* (of which the male is very like that of *C. alector*) was mistaken for it.

4. MITUA TUBEROSA (Spix); *Sci. & Salv. P. Z. S.* 1870, p. 520.

Chamicuros, and Loreto on the Marañon (*Bartlett*).

"Both this species and the preceding lay large white eggs, of a rough texture."—E. B.

5. NOTHOCRAX URUMUTUM (Spix); *Sci. & Salv. P. Z. S.* 1870, p. 519.

Rio Pastaza (*Bartlett*).

"I first saw this beautiful species of Curassow in a Peruvian's house at Santa Maria on the Huallaga, where it was running about along with the common fowls. The bird appeared to be lively and active, and would fight the dogs and fowls, driving them out of the house. A very curious circumstance is, that, when one of the hens commenced sitting, the bird would drive her off the nest and take her place. This I witnessed myself. The attempt at incubation, however, was not of long duration; for the Curassow destroyed the eggs, as I was informed afterwards by the owner.

"I ascertained that the bird came from the Rio Pastaza; and I believe it is not uncommon on that river, and throughout the dense forests on the north-west bank of the Amazons. I have often heard this bird in the middle of the night near Nauta.

"The Peruvians call it the '*Monte Pyu*.'

"The habits of this bird render it most difficult to obtain, from its living in holes or burrows in the ground. The Indians remain in the forest all night at the place where it is first heard. I was informed

by many of the Peruvians, whose word I could rely upon, that these birds come out at night, and ascend to the top branches of the lofty trees in search of food. The Indians are on the look-out, and shoot them just before sunrise as they are descending to return to their places of concealment, where they pass the day."—E. B.

Fam. OPISTHOCOMIDÆ.

OPISTHOCOMUS CRISTATUS.

"I obtained this bird at Cashiboya; but unfortunately the specimens were left behind.

"The *Opisthocomus* lives in colonies on the banks of the rivers and lakes. I obtained the eggs from several localities. The nests are composed of a few sticks loosely laid together on low bushes near the water."—E. B.

Fam. PSOPHIIDÆ.

PSOPHIA LEUCOPTERA, Spix.

Mr. Bartlett obtained specimens of a White-backed Trumpeter at Chamicuros, which was in all probability *Ps. leucoptera*, Spix. See our remarks P. Z. S. 1867, p. 592.

Fam. EURYPYGIDÆ.

EURYPYGA HELIAS (Gm.); Scl. P. Z. S. 1857, p. 268; Scl. & Salv. P. Z. S. 1866, p. 199; 1867, p. 979.

Rio Javari (*Bates*); Cashiboya (*Bartlett*); Pebas (*Hauxwell*).

Fam. ARAMIDÆ.

ARAMUS SCOLOPACEUS.

"Banks of the Ucayali."—E. B.

Fam. RALLIDÆ.

1. ARAMIDES CAYENNENSIS (Gm.); Scl. & Salv. P. Z. S. 1868, p. 447.

Aramides, sp., Scl. & Salv. P. Z. S. 1866, p. 200.

Lower Ucayali (*Bartlett*).

2. PORZANA CAYENNENSIS (Gm.); Scl. & Salv. P. Z. S. 1867, p. 754; 1868, p. 451.

Xeberos (*Bartlett*).

3. PORZANA HAUXWELLI, Scl. & Salv. Ex. Orn. p. 105, t. liii.; P. Z. S. 1868, p. 453.

Corethrura, sp.?, Scl. & Salv. P. Z. S. 1866, p. 200.

Porzana fasciata, Scl. & Salv. P. Z. S. 1867, pp. 979, 981.

Sarayacu (*Bartlett*); Pebas and Chamicuros (*Hauxwell*).

4. PORZANA CINEREA (Vieill.); Scl. & Salv. P. Z. S. 1868, p. 456.

P. exilis, Scl. & Salv. P. Z. S. 1866, p. 567.

Ucayali (*Bartlett*).

5. *HELIORNIS FULICA* (Bodd.); Scl. & Salv. P. Z. S. 1867, pp. 754, 979; 1868, p. 469.

Upper Ucayali and Chyavetas (*Bartlett*); Pebas (*Hauxwell*).

Fam. PARRIDÆ.

PARRA JACANA, Linn. Scl. & Salv. P. Z. S. 1866, p. 200.

Nauta and Santa Cruz (*Bartlett*).

Fam. CHARADRIIDÆ.

1. *HOPLOPTERUS CAYANUS* (Lath.); Scl. & Salv. P. Z. S. 1866, p. 199; 1867, p. 979.

Lower Ucayali and Santa Cruz (*Bartlett*); Pebas (*Hauxwell*).

2. *CHARADRIUS VIRGINICUS*, Bork.; Scl. & Salv. P. Z. S. 1866, p. 567.

Nauta (*Bartlett*).

3. *ÆGIALITIS COLLARIS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 199.

Upper and Lower Ucayali, Santa Cruz (*Bartlett*).

Breeds on the sand banks in company with *Chordeiles rupestris* and *Phaëthus magnirostris*, laying two, sometimes four eggs, smaller than but coloured similarly to those of our little Ring-Plover.

Fam. SCOLOPACIDÆ.

1. *MICROPALAMA HIMANTOPUS* (Bp.); Scl. & Salv. P. Z. S. 1866, p. 199.

Nauta (*Bartlett*).

2. *TRINGA MACULATA*, Vieill.; Scl. & Salv. P. Z. S. 1866, p. 199; 1867, p. 754.

Upper Ucayali, Xeberos, and Chamicuros (*Bartlett*).

3. *TOTANUS SOLITARIUS*, Wils.; Scl. & Salv. P. Z. S. 1867, p. 979.

Rhyacophilus solitarius, Scl. & Salv. P. Z. S. 1866, p. 199.

Nauta, Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

This species only visits the rivers after the breeding-season.

4. *TRINGITES MACULARIUS* (Linn.).

Chamicuros (*Bartlett*).

5. *TRINGITES RUFESCENS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 199; 1867, pp. 754, 979.

Upper Ucayali, Xeberos, Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

6. *ACTITURUS BARTRAMIUS* (Wils.); Scl. & Salv. P. Z. S. 1866, p. 567; 1867, p. 979.

Nauta and Chamicuros (*Bartlett*); Pebas (*Hauxwell*).

7. *HIMANTOPUS NIGRICOLLIS* (Vieill.); Scl. & Salv. P. Z. S. 1866, p. 567.

Upper Ucayali and Santa Cruz (*Bartlett*).

"I found this Stilt breeding near a shallow pool at Santa Cruz left by the subsidence of the river. It lays four eggs, which resemble those of the European species, but are somewhat darker in colour."—E. B.

8. *GAMBETTA FLAVIPES*.

Chamicuros (*Bartlett*).

"All the above-mentioned seven species are commonly met with in the towns at the rise of the rivers, there being no sand banks for them to rest on as in the dry season. They pass from south to north in September and October and return again in March and April. Whether any of them breed further south I am unable to say; but none of them, with the exception of *Himantopus nigricollis*, breed on the Upper Amazons."—E. B.

Fam. LARIDÆ.

1. *PHAETHUSA MAGNIROSTRIS* (Licht.); Scl. & Salv. P. Z. S. 1871, p. 567.

Thalasseus magnirostris, Scl. & Salv. P. Z. S. 1866, p. 200.

Sterna magnirostris, Scl. & Salv. P. Z. S. 1867, p. 979.

Lower Ucayali and Huallaga (*Bartlett*); Pebas (*Hauzwell*).

2. *STERNA SUPERCILIARIS*, Vieill.; Scl. & Salv. P. Z. S. 1866, p. 200, 1871, p. 571.

Lower Ucayali and Santa Cruz (*Bartlett*).

3. *RHYNCHOPS NIGRA*, Linn.

Rhynchops melanura, Scl. & Salv. P. Z. S. 1866, p. 201; 1867; p. 754; 1871, p. 566.

Lower Ucayali and Rio Huallaga (*Bartlett*).

Fam. CRYPTURIDÆ.

1. *TINAMUS GUTTATUS*, Pelz.

Chamicuros (*Bartlett*).

"This species is the '*Urcu-yutu*' of the Indians. Its eggs are coloured of a beautiful dark blue."—E. B.

2. *CRYPTURUS CINEREUS* (Gm.).

Chamicuros and Santa Cruz (*Bartlett*).

"This species is heard nearly everywhere, but seldom seen, owing to its habit of skulking about on the ground amongst tangled masses of bush. The eggs, of a polished texture and dark chocolate-brown in colour, are deposited in a nest on the ground. This Tinamou is called '*Yana-yutu*' by the Indians."—E. B.

3. *CRYPTURUS PILEATUS* (Bodd.).

Tinamus parvirostris, Scl. & Salv. P. Z. S. 1867, p. 724.

Chyavetas (*Bartlett*).

The single specimen brought home by Mr. Bartlett was named from

an example in the British Museum called *T. parvirostris* by Mr. Gray, but is by no means identical with the true *C. parvirostris* of Wagler, which resembles *C. tataupa* in coloration. Of Wagler's species we have three specimens.

4. *CRYPTURUS BARTLETTI*, sp. nov.

Supra ochraceo-brunneus, dorso toto et alis extus nigro transfasciatis, cervice postica murino-brunnea: pileo nigro, capitis lateribus fuscescentibus: subtus cervinus, ventre medio albo: hypochondriis et tectricibus caudæ inferioribus fusco undulatis: gula pure alba: remigibus supra nigricantibus, subtus cinereis, tectricibus inferioribus albis: rostro plumbeo, mandibula inferiore flavida: pedibus obscuris: long. tota 9, alæ 5·5, caudæ 1·5, tarsi 1·7 poll. Angl.

Hab. Peruvia orient.

Mus. S.-G. et Inst. Smithson.

Obs. Proximus *C. variegato*, sed rostro brevior et cervice undique non castanea.

Mr. Bartlett obtained specimens of this Tinamou at Santa Cruz de la Sierra. The collection of the Smithsonian Institution contains a single skin of the same bird, obtained by Prof. Orton at Pebas.

"Santa Cruz. 'Feri-ring' of the Peruvians. Eggs of a dull chocolate-brown."—E. B.

5. *CRYPTURUS ADSPERSUS* (Temm.).

Santa Cruz (*Bartlett*).

"This is the 'Punguana' or 'Fung-fung-fa' of the Indians. I only obtained a single example of it."—E. B.

March 18, 1873.

The Viscount Walden, F.R.S., President, in the Chair.

The following report by the Secretary on the additions to the Society's Menagerie during the month of February 1873 was read:—

The total number of registered additions to the Society's Menagerie during the month of February 1873 was 123, of which 2 were by birth, 22 by presentation, 25 by purchase, 73 by exchange, and 1 received on deposit. The total number of departures during the same period, by death and removals, was 85.

The most noticeable additions during the month were:—

1. Four Orange-bellied Parrakeets (*Euphema aurantia*, Gould, B. of Austr. v. pl. 39) from South Australia, purchased February 11th. These are the first examples of this beautiful *Euphema* that we have ever received alive.

2. A Red Tiger cat (*Felis aurata*, Temminck) from the Gold Coast of West Africa, presented on the same day by Mr. C. S. Salmon, late Acting Administrator of the Gold Coast, who states that it was

captured about six months ago about 30 miles from Cape-Coast Town.

Mr. Elliot* has lately proved, from a comparison of typical specimens, that Temminck's name, *Felis aurata*, belongs to this African species, and not to the Asiatic Golden Tiger cat, to which it has been usually referred, but which, in accordance with this view, has been named, in the Revised List of Vertebrates, *Felis moormensis* (ibid. p. 39).

Felis rutila is the name under which this African species is generally known, being that given to it by Mr. Waterhouse before this Society in 1842.

The present specimen belongs to a rather dark variety with beautiful rose-coloured spots, as will be seen from the accompanying sketch by Mr. Keulemans (Plate XXVII.).

3. Three female Scaup Ducks, presented by Mr. R. Swinhoe, F.Z.S., H.B.M. Consul at Ningpo, and received February 22nd.

Mr. Swinhoe has sent us an interesting notice of these Ducks, which he is inclined to refer to *Fuligula mariloides* of Vigors. This paper will be read at a subsequent meeting, when the skins of two of them, which we have lost since their arrival, will also be exhibited.

A communication was read from Dr. J. Macdonald, F.R.S., Staff-Surgeon R.N., containing descriptions of two Sharks taken off Flinders Island, Bass's Straits, during the voyage of H.M.S. 'Herald' in the South Seas.

During the voyage of this vessel systematic notes of the numerous Sharks and Rays obtained from time to time had been taken by the late Mr. F. M. Rayner, the surgeon of the ship, whilst Dr. Macdonald had made careful drawings of them for future reference. Mr. Rayner had also preserved the jaws, pieces of the skin, and the intestinal valve of every specimen. Indeed it had been fully intended to arrange the whole into a system, making as near an approach to a monograph of the cartilaginous fishes of the South-western Pacific as would be possible, without introducing genera and species which had not actually been seen. Circumstances, however, had interfered with this project; and Mr. Rayner's valuable preparations had been deposited in the Museum of the Royal Naval Hospital at Haslar, while the collection of drawings and the notes had been retained. From this source had been derived a short paper on *Galeocercus rayneri*, and another on *Heptranchus griseus*, already published in the 'Proceedings of the Zoological Society'†. The present paper contained descriptions, 1st, of a specimen of *Acanthias vulgaris* with a double-yelked ovum and two embryos, and of a species of *Galeus*, both obtained off Flinders Island, Bass's Straits.

The following papers were read:—

* P. Z. S. 1871, p. 759.

† See P. Z. S. 1868, pp. 368 & 371, pls. xxxii. & xxxiii.



J. G. Keulemans lith.

FELIS AURATA.

M. & N. Hachart. imp.

1. Note on the Gazelles of India and Persia, with Description of a new Species. By W. T. BLANFORD, C.M.Z.S.

[Received February 27, 1873.]

India is the extreme eastern limit in Southern Asia of the genus *Gazella*, this form being one of the numerous African types which, although occurring in the Indian peninsula, do not pass to the eastward of the Bay of Bengal. The Indian Gazelle, however, differs to an important extent in its distribution from the other Antelopes of the Indian plains. It extends less to the eastward in India, whilst recent researches have shown it to have a considerable extension to the westward in the countries bordering on India. This peculiarity in the distribution is also connected with the circumstance that, whilst the remaining antelopes of the Indian plains, viz. *Antelope cervicapra*, *Portax pictus*, and *Tetraceros quadricornis*, differ widely in specific and even in generic characters from any of their African allies, and are unconnected with the latter by any existing forms in the intervening tracts of Persia and Arabia, the Gazelle of India is only just specifically separable from the nearly allied species in Northern Africa, and cognate races extend throughout the intervening country of South-western Asia. The Nilgai, Four-horned Antelope, and Indian Antelope are, in fact, records of a time when India was connected with Africa across the now intervening ocean, whilst *Gazella bennetti* is in all probability a comparatively recent immigrant into Southern Asia.

In my recent journey through Baluchistan and Persia, I have obtained some fresh and interesting evidence as to the extension of the Indian Gazelle to the westward, and of the range in Southern and South-western Persia of the Persian Gazelle, *G. subgutturosa*. I have also procured from the edge of the Sistan desert a specimen (unfortunately only a female) of a form which, at the first glance, struck me as novel. Since returning to England, Sir Victor Brooke has confirmed my opinion that this belongs to an hitherto undescribed Gazelle, belonging to the type of *Gazella dorcas* and *G. bennetti*. I ought to add that I have for some years past, in India, paid particular attention to the range of *G. bennetti* in that country; and I shall endeavour in the present paper to give what is known on the subject.

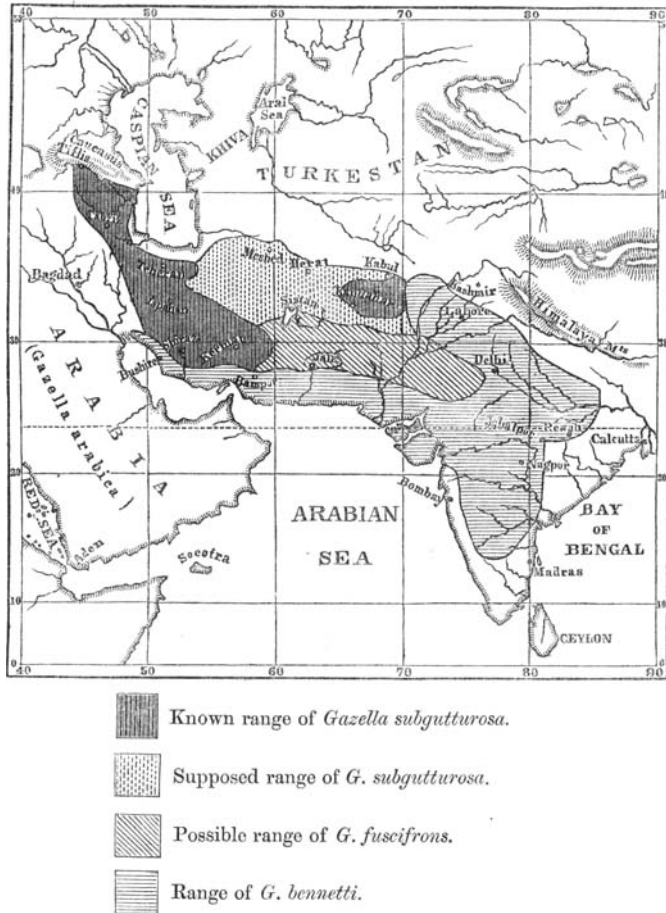
1. GAZELLA SUBGUTTUROSA.

The Persian Gazelle* is entirely restricted to the high land of Persia, and is, so far as I know, not found either on the plains of Mesopotamia or on the coasts of the Persian Gulf and Arabian Sea. It is pretty generally known that in Persia the land rises somewhat rapidly, at a distance usually of 100 to 150 miles from the sea, into ranges of mountains varying in height from 8,000 or 10,000 to 15,000 and even 18,000 feet, beyond which again, after passing

* For many details as to the distribution of this animal I am indebted to my friend Major St. John, R.E.

many broad valleys, separated by minor ridges, a central plain is reached at an elevation of about 3000 feet above the sea. *Gazella subgutturosa* inhabits especially the valleys and plains between the mountain-ranges from about 3000 to 7000 feet, ranging higher in summer and descending to lower elevations in winter, but keeping generally within the limits I have named. To what extent it extends over the central desert I am unable to say ; but it probably occurs presently to be described.

Map showing the known and supposed ranges of several species of Gazelle.



To the north-west this Gazelle is certainly found as far as Tabriz,

perhaps somewhat further. Its northern limit is ill known; but it is probably the Gazelle of Meshed and Herat. On the east it extends nearly to the frontier of India; it is common in parts of Afghanistan; and specimens from Kandahar exist in the Museum of the Asiatic Society in Calcutta.

2. GAZELLA BENNETTI.

The distribution of this Gazelle in India is the following. It is found throughout the Panjáb, North-west Provinces, Rajputana, Sindh (unless replaced in part by the next species), Kachh, Kathiawad, Gujrat, and the whole Bombay Presidency, with the exception of the western ghats and the low land or Konkan along the western coast south of the neighbourhood of Daman. It is also met with in the Narbada and Tapti valleys, Bandelkand, the Son valley, and Rewah, in the Nagpur and Chanda country, Berar, the Hyderabad territories, and other parts of Southern India, with the complete exception of the Malabar coast and the adjacent hills. Jerdon says it is found "throughout India in suitable localities, unknown in Lower Bengal and the Malabar coast," and leaves it to be inferred that the Gazelle is met with on the plains in the southern portion of the peninsula; but, according to Col. M'Masters ('Notes on Jerdon's Mammals,' p. 141), none are known to occur much south of the Krishna river; and Col. Douglas Hamilton, another good authority, assures me that this agrees with his own experience. Its eastern limit may be roughly drawn by a line from Dinapur to Jabalpur, and thence due south till it intersects the east coast of India*. It is, so far as I know, wanting in the Ganges valley east of Benares, in Eastern Behar, the Santal Parganahs, Chutia Nagpur, Birbhum, &c., Chhatisgarh, the Mahanadi valley, Orissa, Bastar, and the east coast generally north of the river Krishna†. The Nilgai, Four-horned Antelope, and Indian Antelope range to the east of this line, all being found in suitable localities nearly as far east as the longitude of Calcutta; and the last-named occurs in Lower Bengal, and even in the western confines of Assam. In short, the Gazelle inhabits the portions of India which I have elsewhere (J. A. S. B. 1870, vol. xxxix. pt. ii. p. 336) specified as the Panjab province, and the Gangetic and Deccan subprovinces of the Indian province, with the northern portion of the Madras subprovince; whilst it is wanting in the Bengal subprovince of the Indian province, in the provinces of Malabar and Eastern Bengal, and probably in the southern part of the Madras subprovince.

Hitherto *G. bennetti* has not, so far as I am aware, been known to range west of India; but in the course of my recent journey through Baluchistan I obtained a specimen of a Gazelle (a male) at Bampur, about 450 miles west of the Indian frontier, which appears to me undistinguishable from the Indian species. The coloration

* I may be in error as to the exact limit; but I think the above is a close approximation.

† Amongst other animals the range of which in India is, so far as I know, nearly coextensive with that of the Gazelle, are the two species of Sand-Grouse, *Pterocles exustus* and *P. fasciatus*, and the Indian Bustard, *Eupodotis edwardsii*.

is identical; and the horns only differ in being a little more curved backwards, and in the curve, as viewed from the front, being a little more lyrate. The differences, however, are insignificant. I have little doubt that I saw the same Gazelle (easily distinguishable even at a distance, by its colour, from *G. subgutturosa*) throughout the portion of Baluchistan which I traversed near the sea; and I think it highly probable that it is the same species which, as I am informed by Major St. John, is found along the whole north-east coast of the Persian Gulf to Bushire*. It appears most likely that the range of *G. bennetti* in this direction will be found nearly to correspond with that of *Coracias indica* and probably some other Indian forms, which appear to extend as far as the head of the Persian Gulf.

Blyth, in his 'Catalogue of the Mammalia in the Museum of the Asiatic Society (Calcutta),' and Jerdon, in his 'Mammals of India,' refer under *G. bennetti* to a *Gazella christii*, Gray; and Jerdon's remarks are so interesting that I extract them. He writes:—

"*Gazella christii*, Gray, from Sindh and Cutch, is said to be paler in colour, and with the horns more slender and smaller than in the Indian Gazelle, and with the points abruptly bent inwards. This is joined by Blyth to *G. bennetti*. I have seen one or two heads of Gazelles, considered distinct from the *Chikara*†, called 'the desert Antelope,' smaller and with the horns more bent forwards. I only looked on them at the time as a dwarf or stunted *Chikara*; but it is possible that there may be another species extending from Beloochistan across Sindh into the plains of Rajpootana, either *G. subgutturosa* or *G. christii*, if distinct from *G. bennetti*. Indeed Mr. Blyth, in a note p. 172 of his Catalogue (transposed with another on the opposite page), says, 'An animal marked *Gazella christii*, Gray, in the London United-Service Museum, appeared to me to be *G. subgutturosa*. It was labelled from Sindh, but might have been brought thither from beyond the passes.'"

So far as I have been able to find, no animal was ever described by Dr. Gray as *Gazella christii*‡. The name is mentioned as MS. in the Catalogue of the specimens of Mammalia in the British Museum, part. iii. *Ungulata furcipedes*, published in 1852, p. 63, as a synonym of *G. bennetti*. Whence Dr. Jerdon obtained his information as to the locality and characters of *G. christii*, I have not been able to learn; and Sir V. Brooke, who has an extensive knowledge of the subject, informs me that he has not met with the name elsewhere.

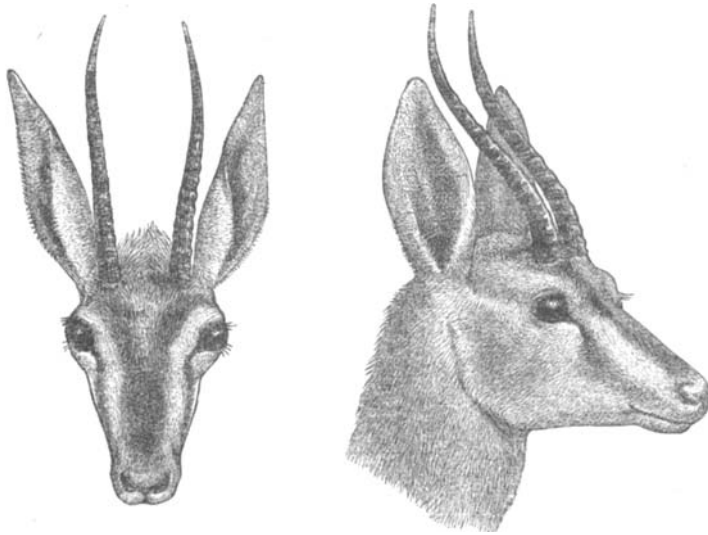
* Major St. John assures me that the Bushire species is certainly not *G. subgutturosa*, that it is a redder Gazelle than that is, and that the female has horns. There are Gazelles on one at least of the Persian-Gulf islands; but they are said to have been introduced from the Arabian coast.

† The Hindustani name for the Gazelle; more correctly *Chinkara*, but the *n* is nasal and often scarcely sounded.

‡ I at first thought this might have been a Sistan Antelope, named after Captain Christie, the first Englishman who traversed Sistan. But the name appears to have been given after Dr. Turnbull Christie, who presented specimens to the British Museum.

I, some years since, obtained heads of the Gazelle from Kachh, through Mr. A. B. Wynne of the Geological Survey, and I found them identical in all respects with those from Central India. Recently Dr. Stoliczka, in his "Notice of the Mammals and Birds inhabiting Kachh," J. A. S. B. 1872, vol. xli. part ii. p. 229, has also identified the Kachh Gazelle with *G. bennetti*. We may therefore, I think, safely dismiss all idea of *G. christii* being any thing distinct from *G. bennetti*. The specimen formerly in the United Service Institution's Museum appears to have been presented to some other museum when the small collection of zoological specimens formerly belonging to the Institution was dispersed; and I have not been able to trace it.

At the same time, the heads of Gazelles noticed by Jerdon with the horns more bent forward may possibly have belonged to the next species, which should in that case be looked for in the deserts of the Indus plains and Rajputana.



Head of *Gazella fuscifrons* ♀.

3. GAZELLA FUSCIFRONS, sp. nov.

G. cornibus fœminæ subobsolete annulatis, superne valde antice curvatis; dorso ochraceo; fronte et linea nigrescente a basi cornu utriusque antice producta nigrescentibus; regione nasali superiore maculaque elongata utrinque ad genas subnigris, facie reliqua isabellina; auribus extus isabellinis, intus albescentibus, dimidio superiore fusco marginatis; cetera similis G. bennetti.

Hab. circum Jalk, ad oram meridionalem desertorum Drangianam

(vel Sistan) a Gedrosia (Baluchistan) sejungentium. Forsan et in ipsa Drangiana invenienda.

Coloration.—Forehead black, mixed with brown, the black being purest at the base of the horns, and in two points descending about $1\frac{1}{2}$ inch from each horn towards the nose. A black patch about 2 inches long on the top of the nose (separated from the forehead-patch*? and) not extending to the nostrils. A mixed brown and black line from the anterior angle of the eye to the side of the upper lip. All round the eye (with the exception of the anterior angle) and a broad band from above the eye to the muzzle, including the nostrils, isabelline. A few long black hairs above the eye. Remainder of the face fawn-coloured. Ears isabelline-fawn exteriorly, dirty-whitish within, the upper half with a dark brown edge outside.

The general colour of the back is ochraceous, rather yellower than in the allied species. The tips of the hairs are of this colour, which may be specified as yellowish fawn, the whole basal portion being pale fawn-colour without any yellow. The centre of the back appears scarcely darker than the sides; the posterior edge of the dorsal colour on the rump is a little darker, but not much; and the margin of the fawn-colour is well defined everywhere against the white of the under parts. Tail and knee-brushes black; hair at the backs of the feet from the fetlock (metacarpal and metatarsal) joints to the hoof, and between the division of the toes in front, dark brown.

Fur.—The hair is both thicker and longer in the specimen before me than in skins of *G. bennetti* and *G. subgutturosa*. This may partly be due to the date (March 15) when the specimen described was shot—but not entirely, I think.

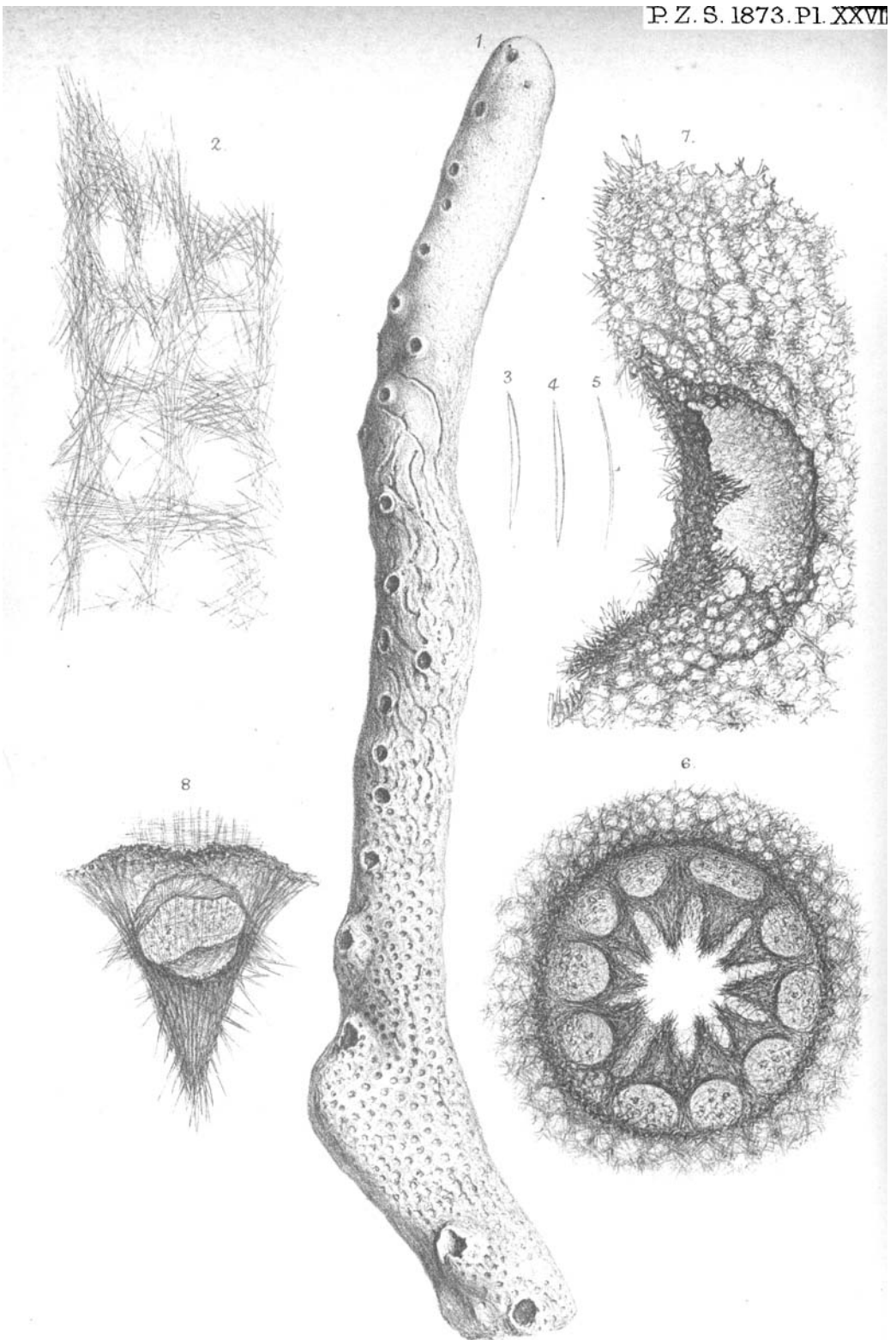
Horns.—The horns near the base are nearly parallel, and they only diverge very slightly throughout, curving a little inwards towards the tips. They gently bend backwards near the base, and then forwards, the anterior curve being steady, not sudden. Except at the extreme tip, they are distinctly though very bluntly ringed throughout.

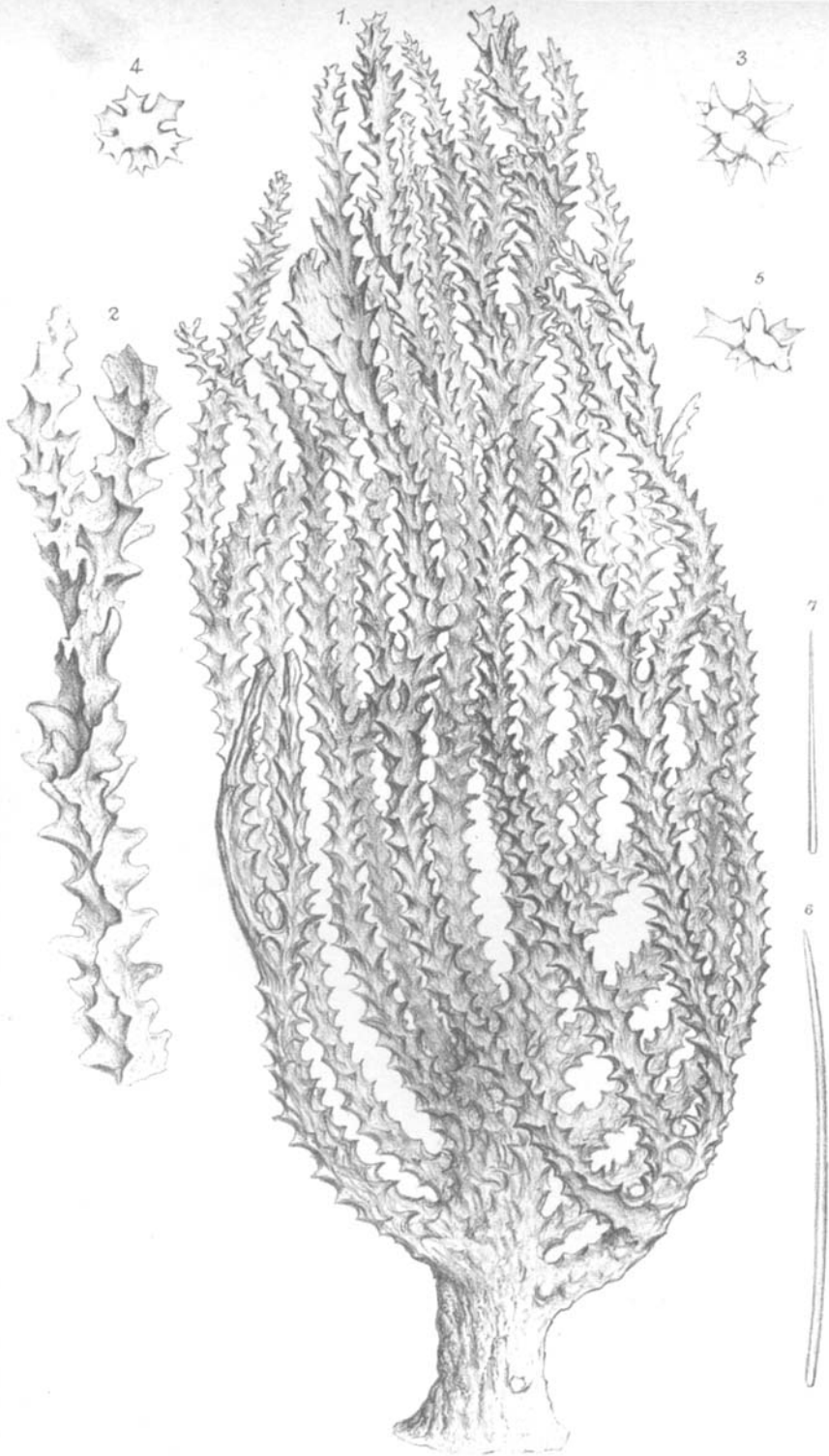
It may fairly be assumed that the curve in the male is similar, but more pronounced.

The following dimensions were taken on the body before skinning:—

	ft.	in.	ft.	in.
Length, nose to between ears	0	7		
Length, between ears to top of shoulder (with) . .	1	0		
Length, top of shoulder to insertion of tail	1	9		
Length of tail	0	6		
Length, hairs at end of tail	0	2		
<hr/>				
Total length from tip of nose to end of tail	4	0		
Length of ear measured from the orifice	0	5·6		
Breadth of ear laid flat	0	2·5		
Length of body from front of shoulder to rump	2	0		

* In the only specimen obtained, the hair on the face between the forehead and nose is much worn off; and perhaps in other specimens the dark forehead and nose-patches may be united or nearly so.

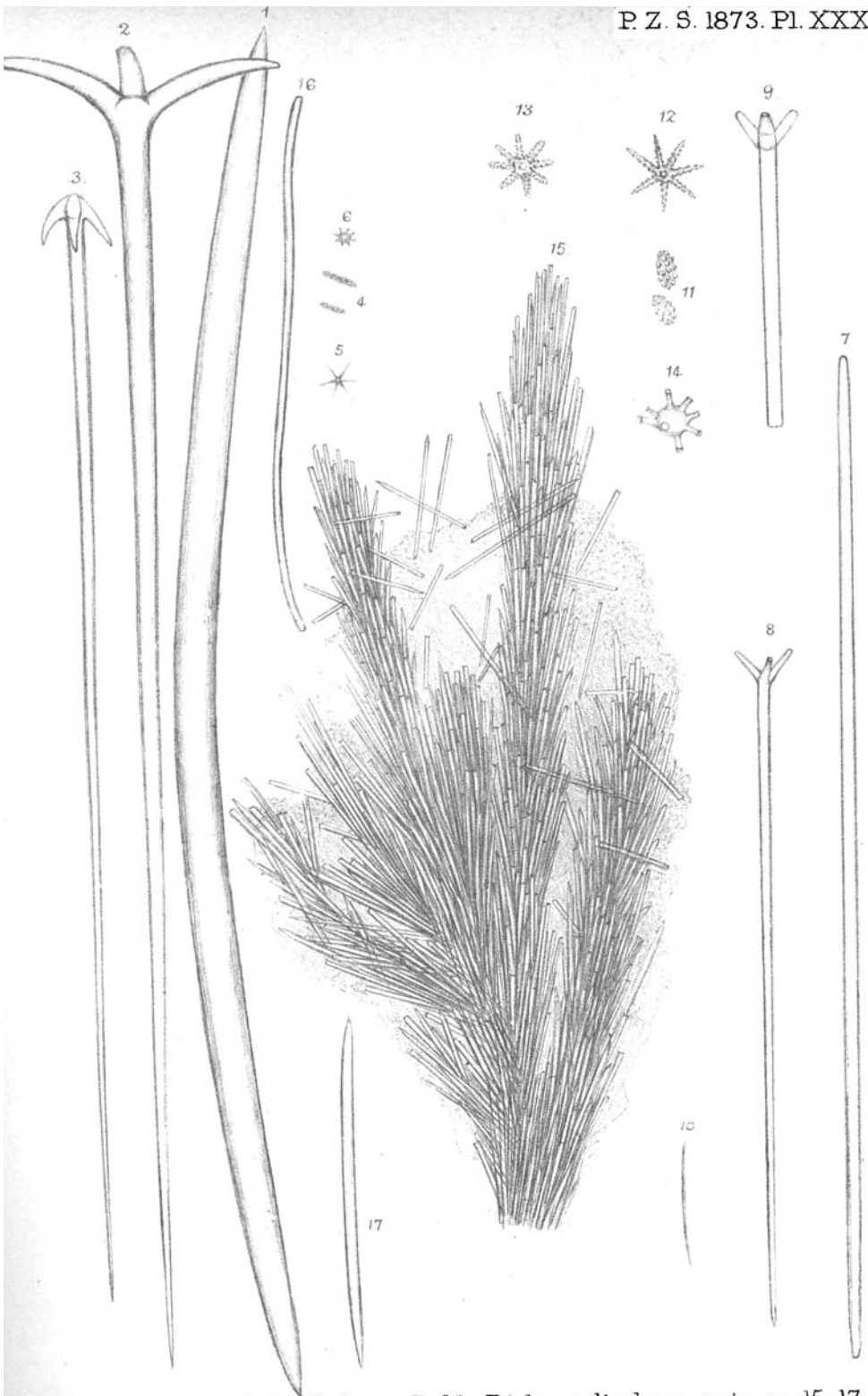




Dictyo cylindrus dentatus.

W. Lens Aldous del. et lith.

W. West & C^o imp.



Ecionemia acervus 1-6. *E. densa* 7-14. *Dictyocylindrus* setosus 15-17.
W. Lenz Aldous del. et lith. *W. West & Co. imp.*



Pachymatisma inconspicua 1-6. *P. contorta* 7-11. *Geodia parasitica* 12-15.
G. paupera 16-21. *Tethea hispida* 22-26.

	ft.	in.
Height at shoulder	1	11
Length of fore leg	1	4·5
Length from knee to fetlock (metacarpal joint)	0	6·5
Length from fetlock to end of toe	0	3·5
Length of hind leg	1	11
Length from hock to fetlock (metatarsal joint)	0	9·25
Length from fetlock to toe	0	3·25
Length of horn from base to point, measured in a straight line	0	7·25

This Gazelle is distinguished from *G. bennetti*, 1st, by colour. The face in the Indian Gazelle is nearly uniform rufescent fawn-colour, the parts which are black or blackish in *G. fuscifrons* being only a little darker than the rest in *G. bennetti*; the back also in the latter is more rufescent and less yellow, and the hairs are less dense. 2nd, by the greater length and more strongly marked annulation of the horns in the female, and by their well-marked curvation forwards towards the extremities. The horns in the female of *G. bennetti* are smaller than those of the male to a much more marked extent than in *G. dorcas*; the new species in this respect agrees probably with the African, and not with the Indian type.

From *G. dorcas*, *G. arabica*, and all allied forms the present species is also distinguished by the curvature of the horns and the coloration, especially of the face, none having such strong dark patches on the forehead and nose.

Of the habitat of this Gazelle nothing is known beyond what has been mentioned above. It has probably a wide extension throughout the deserts of Eastern Persia; and perhaps, as suggested above in referring to the notes by Dr. Jerdon on *Gazella christii*, it may extend into India. It probably, in Eastern Persia, inhabits the flat desert at a comparatively low elevation, whilst *G. subgutturosa* occurs along the bases of the hills and in the higher valleys.

2. Contributions to a General History of the *Spongiadæ*.

By J. S. BOWERBANK, LL.D., F.R.S., &c.—Part V.*

[Received January 3, 1873.]

(Plates XXVIII.—XXXI.)

ISODICTYA MIRABILIS, Bowerbank. (Plate XXVIII.)

Sponge virgultose. Surface smooth. Oscula simple, or very slightly elevated; margins thin, disposed laterally. Pores congregated in small pocilla, covered by a radial arrangement of ten conical sacculi, having their apices central and their bases marginal; pocilla and sacculi abundantly spiculous; porous areas arranged in shallow canaliculi, disposed in short irregular lines, more or less in accordance with the long axis of the sponge, bedded in a densely spiculous

* For Part IV. see *antèd*, p. 3.

matrix lining the canaliculi; spicula same as those of the skeleton. Dermal membrane pellucid, furnished with a unispiculous rete. Skeleton stout and strong; primary and secondary lines both multi-spiculous; spicula acerate, short and stout. Interstitial membranes pellucid, rarely spiculous; spicula acerate, slender, few in number. Gemmules membranaceous, round or oval.

Colour in the dried state light ochreous yellow, or pink in parts.

Hab. East Indies (*S. P. Pratt, Esq.*).

Examined in the dried state.

I received this remarkable sponge, with several others, from my late friend S. P. Pratt, Esq., to whom they were sent by his son from the East Indies. No part of the basal portion remains by which we might have judged of its natural size. In its present condition its colour is light ochreous yellow, with patches of rose-colour or pink on some parts of its distal end; and this tint penetrates considerably below the dermal surface. In its present state it is very firm and strong.

The inhalant system affords the most remarkable specific characters. It is elaborately constructed, and is unlike that of any other sponge with which I am acquainted. It consists of numerous pocilla, sunk beneath the dermal surface, each pocillum being covered by an elaborately constructed lid or shield, contained within a circular area or ring of closely packed spicula, from the inner margin of which are projected ten conical sacculi, their apices nearly meeting at the centre of the circular area. Many of these areas occur singly, slightly sunk beneath the dermal surface, while others are seen to be two, three, or more in linear arrangement, in short shallow canaliculi; and in some cases ten or twelve are disposed in a long and frequently curved or sinuous canal. The canaliculi do not form a connected system: each, whether short or long, is unconnected with the adjoining ones. The canaliculi are all lined with a thin continuous bed or matrix, composed of closely felted spicula, of the same size and form as those of the skeleton, in which the inhalant organs are imbedded, and which connects them with the others in that linear series. All the canals terminate with an inhalant area; and I have never seen an instance of either the lining matrix or the canal extending beyond the terminal inhalant areas.

The pocilla are nearly hemispherical; and the membranes of which they are constructed are abundantly strengthened by numerous spicula, of the same form and size as those of the skeleton, dispersed over the surface. The system of conical sacculi by which a pocillum is protected is also abundantly furnished with spicula, which are frequently projected from the apices of the cones into the open space between their terminations. The external surfaces of the conical sacculi are completely closed, and coated by closely packed spicula; but the basal portions of their inner surfaces are, for nearly half their length, open, as represented in fig. 8, as if a slice had been taken from each near the middle of its length, in a diagonal direction towards its base; so that it would appear that the conical organs are impervious to the external water, which enters the hemispherical basin

beneath, through the spaces between the apices of the conical organs. When the inner surface of this group of radiating organs is examined, the basal aperture of each is usually found to be completely open; but in some cases, as represented in one of them at *a*, fig. 8, there is what appears to be the remains of a closing membrane; it is, however, only in a very few cases that I have observed the remains of such an organ.

These singular radial organs are not present on the distal end of the sponge for about two inches of its length; and I examined this portion of it carefully in search of pores. I found the dermal membrane in a better state of preservation than on its proximal end, and its reticular structure well demonstrated. A few isolated pores in an open condition appeared at distant intervals; but many of these had more the aspect of orifices, by contraction of the membrane in drying, than of well-defined pores. I did not find any pores open in the pocilla beneath the radial coverings; but this is not surprising, as in dead sponges the general rule is to find them closed, and the exception is to find them open.

The gemmules are not numerous. I found one only in the section at right angles to the surface of the pocillum represented by figure 7; but in other cups taken from close to the proximal end of the sponge there were considerable numbers of them disposed on the inner surface of the membrane, and on the outer surfaces of the sacculi of the disk there were a few attached to those surfaces; but none were found within any of the conical sacculi, although their open mouths within the pocilla might have led us to expect to see some of them there. The gemmules are membranous, round or oval, semitransparent, and of a dark amber-colour, just such as we find in numerous other species of *Isodictya*. I searched in vain for them in the surrounding skeleton-tissues; but I found solitary ones only at distant intervals attached to the reticulations of more distant parts of the skeleton.

Since the above description was written, on looking over a collection of sponges I purchased of the late Mr. James de Carl Sowerby many years since, I found another specimen of the species. It is similar in form to the figured one, is an inch shorter, and has neither its natural base nor its apex, but is rather larger in its diameter. Its inhalant and exhalant organs are exceedingly like those of the type specimen; but the latter are rather large. In their anatomical characters, the two specimens are in perfect accordance.

DICTYOCYLINDRUS DENTATUS, Bowerbank. (Plate XXIX.)

Sponge ramose, pedicelled, pedicel short and stout; branches very numerous, ascending, culminating towards the apex of the sponge, occasionally dividing or inosculating, furnished abundantly with stout tooth-shaped processes. Surface smooth. Oscula simple, minute. Pores inconspicuous. Dermal membrane coriaceous, profusely furnished with dentato-cylindro-hexradiate retentive and defensive spicula; radii very short and stout; apices bi- or tridentate. Skeleton—spicula acute, long and rather stout, and rarely cylin-

drical. Interstitial membranes—spicula the same as those of the dermis, comparatively few in number.

Colour, dried, light ochreous yellow.

Hab. Nichol Bay, Australia (*Mr. George Clifton*).

Examined in the dried state.

This remarkable specimen of *Dictyocylindrus* is $17\frac{1}{2}$ inches in height, and its greatest breadth 7 inches; the branches appear all to have maintained their natural position, and several of them near the distal termination of the sponge are united by inosculation. The natural base has been preserved. The pedicel is stout and short, and it does not rise from the base quite 3 inches before it is resolved into numerous ascending branches, which divide dichotomously or trichotomously. Each of the branches is furnished with numerous stout compressed tooth-shaped processes, consisting of converging compressed masses of skeleton-spicula pullulating from the axial skeleton of the branch, and entirely enveloped by the coriaceous dermis. The most decisive specific character of this sponge is undoubtedly the singular forms of spicula that abound in the dermal membrane, the dentato-cylindro-hexradiate defensive and retentive spicula. The membrane is crowded with them in all parts. From the shortness of their radii allowing them to assume any imaginable position, when mounted for examination their normal form is not always to be readily recognized; but a careful observation soon establishes the true nature of their structure. In nearly all of them the number of the dental terminations of the radii vary; but the tridentate terminations appear mostly to predominate. Abnormal variations in the forms of these spicula are by no means infrequent.

The axial skeleton of the branches fills the whole of their diameter, and has all the characters of a true *Dictyocylindrus*. It is rather compactly constructed; and a few slender spicula, of the same form as those of the skeleton, are interwoven at various angles with those of the great ascending column. The true structure of this sponge can be exhibited only in a longitudinal section.

ECIONEMIA ACERVUS, Bowerbank. (Plate XXX.)

Sponge massive, pedicelled (?); surface even, minutely hispid. Oscula simple, dispersed, few in number. Pores inconspicuous. Dermal membrane furnished abundantly with subtuberculated fusiformi-cylindrical spicula, very minute and short. Connecting-spicula attenuato-expando-ternate, large, stout, and abundant, and with a considerable number of attenuato-recurvo-ternate spicula; shafts long, slender, and attenuated. Skeleton—spicula of axis fusiformi-acerate, very large and stout. Interstitial membranes—tension-spicula acerate, minute, and slender, numerous, and tuberculated fusiformi-cylindrical, short and stout, very minute, numerous. Retentive spicula subsphero-attenuato-stellate; radii few and very slender, and cylindro-sphero-stellate radii short and numerous; both forms very minute.

Colour in the dried state dark brown.

Hab. Fiji Islands (*Sir E. Home*). In the collection of the Royal College of Surgeons (see 'Catalogue of Porifera,' part i. 1860, p. 127, B. 170).

Examined in the dried state.

The form of this sponge is somewhat like that of a pear, the basal end being the smaller one. It is $2\frac{1}{4}$ inches in height, and $1\frac{1}{2}$ inch at its greatest diameter. The natural base of the sponge is not present. The fractured termination is nearly circular, and is $\frac{3}{4}$ of an inch in diameter; and there is every appearance of its having been supported, when perfect, on a short stout pedicel. The surface is armed with numerous minute acerate or fusiformi-acerate spicula, which project from it about one third or half their length at right angles to its plane. The surface of the sponge in its present state has a large number of orifices, produced by the contraction of the tissues; the true oscula visible are very small, of an oval form, not exceeding above a line in length and half a line in width, and are closed by the proper membrane of the organ. Immediately beneath the dermal membrane there is a thick stratum of membranous tissue and sarcode, in which the triradiate heads of the connecting-spicula are immersed. I could not detect in this stratum the slightest indication of the presence of gemmules. The dermal membrane is crowded with the subtuberculated fusiformi-cylindrical spicula; and very few indeed of the pores were in an open condition. Some of these appeared to have intermarginal cavities beneath them somewhat resembling those apparent in the dermal crust of *Geodia* and *Pachymatisma*; but I could not satisfactorily determine the fact of their existence, the tissues in which they are situated having been greatly disarranged by the contraction incurred by drying; under more favourable circumstances it is very probable that such intermarginal cavities will be found to exist.

This sponge exhibits in its structure very nearly the extremes in magnitude of the spicula. While those of the skeleton and connecting system are more than usually large and stout, the defensive ones and those of the membranous and sarcodous systems are unusually minute, and the stellate ones especially so, requiring a linear power of not less than 800 or 1000 to demonstrate their forms in a satisfactory manner: many of them do not exceed $\frac{1}{4000}$ inch in extreme diameter; and the fusiformi-cylindrical spicula average $\frac{1}{8000}$ in length by $\frac{1}{10000}$ inch greatest diameter.

The interstitial membranes are abundantly covered with sarcode, in which there are a vast number of spherical nucleated cells, varying in diameter from $\frac{1}{8000}$ inch to $\frac{1}{10000}$ inch.

ECIONEMIA DENSE, Bowerbank. (Plate XXX.)

Sponge massive or subcyathiform, sessile; surface sinuous and uneven, asperated. Oscula simple, dispersed. Pores inconspicuous. Dermal membrane thin, pellucid, abundantly spiculous; spicula tuberculated, subcylindrical, occasionally fusiform, short and minute. Skeleton-fasciculi numerous and large; spicula fusiformi-cylindrical, long and stout, variable in form and proportion. Connecting-spicula

attenuato-expando-ternate, rarely patento-ternate; radii short and stout, occasionally cylindrical. Interstitial membranes—tension-spicula acerate, small and slender, few in number, and tuberculated, subcylindrical, the same as those of the dermal membrane. Retentive spicula: attenuato-stellate, radii spinous; cylindro-sphero-stellate, radii spinous; and cylindro-sphero-stellate, radii short and spineless.

Colour, in the dried state, ochreous yellow.

Hab. Fiji Islands (*Sir Everard Home*). Museum Royal College of Surgeons. Catalogue of Porifera, part i. 1860, p. 127, B. 171.

Examined in the dried state.

This sponge, $2\frac{1}{4}$ inches in height and 2 inches greatest diameter, is massive but inclined to be cyathiform, and it has apparently been attached by its base to a small oval pebble. In the dried condition, the ternate heads of the connecting-spicula project beyond the surface of the dermal membrane, imparting an asperated sensation to the touch; this character, it is probable, would not exist in the living sponge.

In consequence of the destruction of the greater part of the dermal membrane, the oscula are not very readily to be distinguished; but the few that are apparent are small and simple in their structure.

The dermal membrane, when mounted in Canada balsam and examined with a power of 160 linear, appears almost opaque from the profusion of the tuberculated subcylindrical spicula with which it is furnished; they are irregularly but very closely packed in a single stratum on its internal surface; an average-sized one measured, length $\frac{1}{2}\frac{1}{4}\frac{3}{8}$ inch, diameter $\frac{1}{7}\frac{5}{6}\frac{0}{0}$ inch. When exceeding the ordinary size, they are frequently somewhat fusiform.

The skeleton-spicula are irregular in their size and proportions, and frequently have a sudden decrease of diameter at the distal termination two or three times their own diameter from the apex; and sometimes this contraction may be observed at both terminations of a spiculum.

The retentive spicula of the interstitial membranes afford excellent specific characters. The attenuato-stellate ones have their radii always more or less spinous: sometimes their apices only are thus armed; but in their fully developed state the spination extends over every part of them. There are two distinct forms of cylindro-sphero-stellate spicula:—one in which the central sphere is comparatively small, and which has the cylindrical radii spinous; the other in which the central sphere is largely produced, and the cylindrical radii are perfectly smooth. These varieties of sphero-stellate spicula are perfectly distinct and permanent, and never appear to graduate into each other. These stellate forms are very abundant, but they are not readily to be detected *in situ* without the section being immersed in Canada balsam, in consequence of the great density of the sarcodous tissues. They are mixed together and are irregularly dispersed on the interstitial tissues; and along with them

there are a few of the tuberculated subcylindrical spicula that are so abundant on the dermal membrane.

DICTYOCYLINDRUS SETOSUS, Bowerbank. (Plate XXX.)

Sponge fan-shaped, branching dichotomously, pedicel short; surface setose; setæ long and very numerous, usually simple, sometimes branching dichotomously, projected ascendingly, composed of numerous stout acerate spicula disposed in parallel lines. Oscula and pores inconspicuous. Dermal membrane pellucid, spiculous; spicula acerate, like those of the setæ, few, dispersed. Skeleton—spicula of the axis cylindrical, long, somewhat slender, and more or less flexuous. Interstitial membranes abundantly spiculous; spicula acerate, the same as those of the setæ, occasionally reticulating.

Colour, in the dried state, ochreous yellow.

Hab. Bere Regis, Devonshire (*Mr. John Quekett*). Museum Royal College of Surgeons. Catalogue of Porifera, part i. 1860, p. 118, B. 117.

Examined in the dried state.

The sponge is $5\frac{1}{2}$ inches high and 6 inches broad. It is of a thick and somewhat irregular fan-shape, and the whole of the sponge, excepting the short pedicel, is thickly covered with setæ, which are frequently as long as the diameter of the branch, and nearly equal in diameter throughout their whole length; they terminate rather obtusely, occasionally dividing dichotomously near the distal termination. The spicula of which they are composed are about half the length and twice the diameter of those of the skeleton-axis.

Where the spaces between the branching setæ are somewhat wide, the interstitial structures frequently assume very much the aspect of a Halichondroid reticulation; but towards the terminations of the setæ their spicula are dispersed on the interstitial membranes in the same manner as those of the dermal membrane.

I am strongly of opinion that the habitat assigned to *D. setosus* in the 'Catalogue of Porifera,' part i. 1860, p. 118, B. 117, is erroneous, and that the sponge there described is not a British species; and I believe that the habitat "Bere Regis" should have been applied to a specimen of *Dictyocylindrus hispidus* which Mr. Quekett informed me he had found on the coast of Devonshire. I saw specimens of that species in his possession, and I have one in my collection which he then presented to me. In accordance with these facts, I have, in my description of *D. hispidus*, vol. ii. p. 108, Monograph of British Spongiadæ, given his authority for the coast of Devonshire as a habitat of the species. It is most probable that the habitat "Bere Regis" should have been applied to the sponge B. 118, p. 119, of the Catalogue, which seems from the description to be a specimen of *D. hispidus*, Bow., or *Halichondria hispidus*, Johnston.

When I described and named the sponge *D. setosus* at the Museum of the Royal College of Surgeons, Mr. Quekett told me that the locality was unknown, and I entered it so in my MS. description; and he took notes regarding it from my description of it

at the time, from which it appears to me that the description of the sponge *D. setosus* in the museum was taken.

I have a perfect remembrance that at the time that I was working at the sponges in the museum there was no British species in the collection with which I was not previously well acquainted. I may also add that, although I have since examined numerous species of sponges from the coasts of Dorset, Devon, and Cornwall, I have never seen another specimen of *D. setosus* from those or any other locality.

PACHYMATISMA INCONSPICUA, Bowerbank. (Plate XXXI.)

Sponge massive, sessile; surface even, furnished sparingly with small acerate defensive spicula. Oscula unknown. Pores congregated. Dermal membrane spiculous; tension-spicula acerate, small; retentive spicula attenuato-stellate, small, and very abundant, and cylindro-stellate, minute, and few in number. Skeleton—radial immediately beneath the dermal crust for the length of the connecting-spicula, irregular beneath; spicula subfusiformi-acerate, stout and long. Connecting-spicula attenuato-super-expando-ternate, large and long, with very rarely slender porrecto-ternate or recurvoternate spicula. Interstitial membranes abundantly spiculous; retentive spicula acerate, flexuous, very long and slender; retentive spicula the same as those of the dermal membrane, very numerous. Ovaria spherical, depressed.

Colour, in the dried state, light fawn.

Hab. South Seas (*Sir Everard Home*).

Examined in the dried state.

This sponge is in the collection of the Royal College of Surgeons, London. It was brought, I believe, from the South Sea by Sir E. Home. It is nearly 3 inches in length. A section from the basal end at right angles to its long axis presented a figure approaching to an oblong of the dimensions of $1\frac{1}{4}$ inch by $\frac{3}{4}$ of an inch. The natural attachment of the sponge is not preserved; but there is every appearance of its having been a sessile species.

To the unassisted eye the surface appears smooth; but by the aid of an inch lens it is seen to be covered with minute puncta, indicating the intermarginal cavities beneath, and a few small acerate defensive spicula are projected for a short distance beyond the surface. When a thin section from the surface is immersed in Canada balsam, and viewed by transmitted light with a power of about 100 linear, the pores are seen to be congregated over the intermarginal cavities, and the pellucid membrane of the areas in which they are situated is furnished with a few small acerate tension-spicula, and it is crowded with the attenuato-stellate retentive spicula; but without the aid of Canada balsam the latter forms of spicula are invisible amidst the sarcode that lines the inner surface of the membrane.

The skeleton-structure immediately beneath the dermal crust of the sponge is quite as regularly radiate as that of a *Geodia*; and this

regularity does not extend beyond the length of the shafts of the connecting-spicula; all beneath that point to the centre of the sponge is entirely devoid of regularity. The intermarginal spaces and the interstitial membranes within them are crowded with the stellate retentive spicula; but below the terminations of the retentive spicula they were comparatively few in number, and in the inner and central parts of the sponge they are rarely, if ever, to be found. The retentive stellate spicula are of two descriptions. The attenuato-stellate ones are small and nearly uniform in size, a few large ones occasionally appearing among them. The cylindro-stellate ones are very minute, not exceeding one third or one fourth the diameter of the average-sized attenuato-stellate ones.

I did not succeed in finding the slender porrecto-ternate or recurvo-ternate spicula *in situ*; but a few fragments of each were found among the spicula obtained by the aid of nitric acid. By the same means also I detected the presence in the sponge of a few deltoid spicula.

PACHYMATISMA CONTORTA, Bowerbank. (Plate XXXI.)

Sponge branching; branches irregular, short, stout, anastomosing; surface undulating. Oscula simple, dispersed, small. Pores inconspicuous. Skeleton-spicula acerate, large and long, and occasionally acuminate, large and long. Connecting-spicula attenuato-patent-ternate, rare and very variable in size. Interstitial membranes—tension-spicula acerate, short and stout; retentive spicula attenuato-stellate, comparatively large, and attenuato-sphero-stellate, minute; radii more or less acutely conical. Ovaria obtusely oval, slightly depressed, component cuneiform spicula small and slender.

Colour, in the dried state, light brown.

Hab. Fiji Islands (*Sir Everard Home*). See Catalogue of Porifera in the Museum of the Royal College of Surgeons, part i. 1860, p. 126, B. 166.

The short branches of this sponge vary in diameter from 3 to 9 lines, and in the greater part of the sponge are so much anastomosed as to almost form an irregular mass. The surface is somewhat uneven and undulating; and in some of the most protected parts there are a few spicula that project from between the ovaria; but the specimen has so many fragments of parasitical sponges attached to it as to render the slight proofs of its hispid character doubtful. The oscula are few in number, and the largest was scarcely a line in diameter. I could not determine the characters of the pores, in consequence of the destruction of the dermal membrane by weathering or washing. The dermal crust of the sponge is hard and very compact, and in some parts attains a thickness of nearly a line. The radiating structure immediately beneath the dermal crust, so striking and characteristic in the greater number of the species of this genus, is in this species almost obsolete; and the irregular central portion of the interstitial tissues extends in many places quite to the inner surface of the dermal crust; while in other parts the

radial structure prevails in patches only, and the connecting-spicula are comparatively rare, and frequently in an imperfectly developed condition.

The skeleton is abundantly spiculous; the two forms, the acerate and acuate, are indiscriminately mixed in its structure; but the former prevail to a much greater extent than the latter ones.

The short stout tension-spicula of the interstitial structures are unusually large and strong; they are very numerous, and are irregularly dispersed on all parts of the membranes. The two forms of stellate retentive spicula are very abundant, and are irregularly dispersed over all parts of the membranes. The larger of the two, the attenuato-stellate ones, are very numerous; they vary to some extent in size and in the number of their radii; the one represented by fig. 11, Plate XXXI., is a very fully developed specimen. The minute sphero-stellate spicula also vary somewhat in their size and form, the radii in some being much more conical than in others; and they are very much more numerous than those of the larger form.

The sponge is evidently an adult specimen, as nearly all the ovaries are in the solid or exhausted condition, and very few immature ones were observed on the more deeply seated parts of the interstitial membranes.

GEODIA PARASITICA, Bowerbank. (Plate XXXI.)

Sponge sessile, coating; surface even or slightly nodose, smooth. Dermal membrane translucent, furnished abundantly with minute sphero-stellate spicula. Connecting-spicula attenuato-subpatentoternate, few in number. Oscula simple, dispersed (?), few in number. Pores congregated, porous areas abundantly furnished with small sphero-stellate retentive and defensive spicula; radii numerous, short, acutely conical. Skeleton-spicula fusiformi-acerate, large and stout, numerous. Interstitial membranes—tension-spicula fusiformi-acerate, small and slender; retentive spicula small, sphero-stellate, the same as those of dermal membrane, rather numerous. Ovaria globose, rather depressed.

Colour, in the dried state, light cream-yellow.

Hab. Unknown (*Mr. Thos. Ingall*).

Examined in the dried state.

I am indebted to my late friend Mr. Ingall for my knowledge of this species. It was originally, I believe, parasitical on the base of a coral. In its present condition it consists of fourteen fragments, the largest of which slightly exceeds half an inch in diameter; when entire it probably covered about $1\frac{1}{2}$ square inch; and the thickness does not appear to have exceeded $\frac{1}{4}$ of an inch in any part. The surface has evidently been uneven, with one or more nodular elevations. The surface is smooth, and there does not appear to have been any large or small spicula projected beyond it. A few oscula were apparent on the fragments, two of which were nearly one tenth of an inch in diameter; and on one fragment there was apparently the remains of a portion of a sunken area, which may

have had a small collection of oscula at the bottom of it originally ; but the dilapidated condition of the specimen allows of nothing more definite than a conjecture on the subject. The porous areas were not evenly dispersed over the surface ; and two or three small groups of them only were apparent, marked by the usual pitted appearance that indicated the presence beneath of the intermarginal cavities. On this portion of the specimen the dermal membrane was in a tolerably perfect condition, and contained an abundance of minute sphero-stellate spicula, like those of the interstitial membranes, in which they were also rather abundant. These minute organs are very characteristic of this species. The spherical centre of a fully developed one measured $\frac{1}{3400}$ inch diameter, and the spiculum between the extreme apices $\frac{1}{1500}$ inch. They are very similar in form to the sphero-stellate spicula of *Tethea lyncurium*, but are very much more minute, and the number of the radii is much greater ; but they resemble those of *T. lyncurium* very much in their conical form. I have not before found this form of spiculum in the sarcode of a *Geodia*. The diameter of a fully developed ovium was $\frac{1}{338}$ inch. The cuneiform spicula of which they are composed are large in proportion to the size of the ovium, and the distal extremities are much angulated.

GEODIA PAUPERA, Bowerbank. (Plate XXXI.)

Sponge massive, coating ; surface even, smooth. Oscula simple ; congregated in depressed areas. Pores congregated. Dermal membrane thin, pellucid. Connecting-spicula attenuato-expando-ternate, variable in size and proportions, rather few in number. Skeleton abundantly spiculous ; spicula fusiformi-acerate, comparatively small and short. Interstitial membranes—tension-spicula subfusiformi-acerate, small and slender ; retentive spicula cylindro-stellate, variable in size and structure, and very minute cylindro-stellate ; radii short and stout. Ovaria globose ; cuneiform spicula of adult specimens comparatively large, distal ends prominently angulated.

Colour, in the dried state, cream-white.

Hab. Unknown.

Examined in the dried state.

I am indebted to Mr. Jeremiah Slade for my knowledge of this species. It was purchased at a public sale of specimens of natural history from various localities. It is based on an irregular mass of coral, an *Astræa*, about 4 inches in diameter, on which has grown a specimen of *Gorgonia flabellum* and a compound tunicated mollusk ; the latter has very nearly covered the *Geodia*, which is about 2 inches in length, and rather exceeding an inch in breadth. The specimen has suffered much by maceration, and nearly the whole of the dermal membrane has been destroyed ; the little that remained was thin and translucent, but in such a condition as to afford no other specific characters. In sections made at right angles to the dermal surface, large intermarginal cavities were apparent, passing through the dermal crust from its outer to its inner surface, which is covered

by a thick layer of indurated sarcode. The distal ends of these organs are protected by an irregular fringe of small fusiformi-subacuate or acerate external defensive spicula. These conditions of the dermal crust and the intermarginal cavities unmistakably indicate the congregation of the pores on the dermal membrane.

The oscula are few in number; they are congregated in a slightly depressed area; the largest does not exceed the tenth of an inch in diameter. The connecting-spicula are comparatively small and few in number; they do not penetrate the dermal crust, but their ternate terminations are closely applied to the proximal surface of the stratum of indurated sarcode immediately beneath the dermal crust. The greater portion of them are subexpando-ternate; but some of them are nearly patento-ternate. They vary in length from about $\frac{1}{30}$ to $\frac{1}{8}$ inch. The fusiformi-acerate spicula of the skeleton are very numerous; they average $\frac{1}{28}$ inch in length, while the fusiformi-acerate tension ones, which are abundantly intermixed with them, seldom exceed $\frac{1}{100}$ inch in length.

The two forms of cylindro-stellate retentive spicula differ considerably in size. Two of them, imbedded closely adjoining each other in the interstitial membranes, measured from the distal extremities of their opposite radii as follows:—the largest one $\frac{1}{734}$ inch extreme diameter, the minute cylindro-stellate form $\frac{1}{3898}$ inch extreme diameter, while the radii in each were nearly of the same diameter. They do not appear to pass into each other by variations in the proportional length of the radii, but each variety seems to adhere to nearly the same dimensions; neither do they appear to occupy particular positions on the tissues, but are irregularly dispersed over the interstitial membranes.

The adult ovaries are perfectly globular, or very slightly depressed at the foramen; they measure $\frac{1}{462}$ inch in diameter; the cuneiform spicula of which they are composed are comparatively large, and the distal extremities are strongly developed and are very angular. Ovaria in all stages of development were present in abundance in all parts of the interior of the sponge. The structural peculiarities of the ovaries in this species are more than usually beautiful when viewed with a power of about 700 linear. The distal termination of each spiculum in the adult specimens presents an acutely angulated stellate appearance, closely resembling a five- or six-rayed star, the radii of which are acutely conical, cemented together by translucent siliceous, so that each ovarium resembles a beautiful crystal sphere, regularly ornamented with innumerable minute stellæ.

Many years have passed since I first examined this sponge, but I have never been fortunate enough to meet with another specimen.

TETHEA HISPIDA, Bowerbank. (Plate XXXI.)

Sponge sessile(?); surface strongly and thickly hispid. Oscula and pores inconspicuous? Dermis abundantly spiculous; spicula disposed at right angles to the surface, uniformly crowded together; superfusiformi-subovo-spinulate, very minute, forming a secondary series of defensive spicula. Primary series of defensive spicula super-

fusiformi-acuate or subovo-spinulate, very large and long. Skeleton. spicula superfusiformi-acuate and subovo-spinulate, large and long. Tension-spicula superfusiformi-subovo-spinulate, small, irregularly dispersed, numerous.

Colour, dried, light grey.

Hab. Portland, Maine, N. America (*Dr. Dawson*, M'Gill's College, Montreal).

Examined in the dried state.

I received a small slice of this sponge from Prof. Dawson. From the curve of the surface, this specimen appears to have been about an inch and a half in diameter. In its present state the hispidation of the surface is very strongly produced, and probably much exaggerated by drying; the spicula are comparatively very large and long—more so than those of the skeleton-fasciculi. The secondary series of defensive spicula are of the same form as those of the interstitial membranes, but not more than half their average size. The whole of the spicula are exceedingly fusiform, the middle of the shaft being frequently twice the diameter of the base of the spiculum. The ovo-spinulate character prevails more or less in all the spicula, but is more distinctly produced in those of the interstitial membranes and the secondary dermal defensive ones. In the deeply seated portions of the skeleton-fasciculi the ovo-spinulate character is very nearly or quite obsolete in some of the skeleton-spicula, and in others every gradation of its development may be traced up to its perfect production. No traces of reproductive organs could be detected on any part of the interstitial membranes.

The peculiarities of the organization of this sponge distinctly separate it from any other species with which I am acquainted.

DESCRIPTION OF THE PLATES.

PLATE XXVIII.

Isodictya mirabilis, Bowerbank.

Fig. 1 represents the type specimen, natural size.

2. A small portion of a section at right angles to the dermal surface, magnified 80 linear.
- 3, 4. Two of the short, stout acuate skeleton-spicula, magnified 123 linear.
5. One of the slender tension-spicula from the interstitial membranes, magnified 123 linear.
6. One of the inhalant pocilla, partially closed by the radial arrangement of conical sacculi, magnified 61 linear.
7. A section at right angles to the dermal surface of one of the inhalant pocilla, magnified 61 linear.
8. One of the conical sacculi of the inhalant areas, exhibiting the remains of a membrane, which probably occasionally closed the mouth of that organ, magnified 80 linear.

PLATE XXIX.

Dictyocyclus dentatus, Bowerbank.

Fig. 1 represents the type specimen, half the natural size.

2. One of the branches, natural size.
3. A side view of one of the dentato-cylindro-hexradiate retentive and defensive spicula from the dermal membrane, magnified 530 linear.

Fig. 4. An end view of one of the dentato-cylindro-hexradiate spicula, magnified 530 linear.

5. A malformed specimen of the dentato-cylindro-hexradiate form of spiculum, magnified 530 linear. Malformations of this spiculum are not uncommon.
6. An average-sized acuate skeleton-spiculum, magnified 80 linear.
7. One of the spicula from the interstitial membranes, magnified 80 linear.

PLATE XXX.

Ecionemia acervus, Bowerbank.

- Fig. 1 represents a fully developed fusiformi-acerate skeleton-spiculum, magnified 80 linear. These spicula vary to a very considerable extent in size.
2. A full-sized attenuato-expando-ternate connecting-spiculum, magnified 80 linear.
 3. A fully developed attenuato-recurvo-ternate connecting-spiculum, magnified 80 linear.
 4. Two of the subtuberculated fusiformi-cylindrical tension-spicula from the dermal membrane, magnified 530 linear.
 5. One of the subsphero-attenuato-stellate retentive spicula, magnified 530 linear.
 6. A minute cylindro-sphero-stellate retentive spiculum from the interstitial membranes, magnified 530 linear.

By an accidental omission, one of the minute and slender acerate tension and external defensive spicula was not figured as intended. Those spicula are identical in form with the one represented by fig. 10 in the present Plate, from *Ecionemia densa*, the only difference being that those of *E. acervus* are much less in both length and diameter.

Ecionemia densa, Bowerbank.

- Fig. 7 represents one of the fusiformi-cylindrical skeleton-spicula, magnified 80 linear.
8. One of the attenuato-expando-ternate connecting-spicula, magnified 80 linear.
 9. A portion of a larger specimen of an attenuato-expando-ternate connecting-spiculum, the radii of which are cylindrical, magnified 80 linear.
 10. One of the small and slender acerate tension-spicula, from the interstitial membranes, magnified 80 linear.
 11. Two of the tuberculated subcylindrical tension-spicula from the interstitial membranes, magnified 530 linear.
 12. An attenuato-stellate entirely spined retentive spiculum, magnified 530 linear.
 13. One of the cylindro-sphero-stellate entirely spined retentive spicula, magnified 530 linear.
 14. A cylindro-sphero-stellate retentive spiculum, radii spineless, magnified 530 linear.

Dictyocylindrus setosus, Bowerbank.

- Fig. 15 represents a portion of a terminal group of setæ, from the distal end of the sponge, with a small piece of the dermal membrane and its characteristic spicula, magnified 80 linear.
16. One of the flexuous cylindrical skeleton-spicula from the axis of the sponge, magnified 150 linear.
 17. An acerate spiculum from one of the setæ, magnified 150 linear.

PLATE XXXI.

Pachymatisma inconspicua, Bowerbank.

- Fig. 1. One of the subfusiformi-acerate skeleton-spicula, magnified 80 linear.
2. An average-sized superexpando-ternate attenuated connecting-spiculum, magnified 80 linear. These spicula vary greatly in their size and

amount of development of their radii, and also in the degree of their expansion.

- Fig. 3. One of the small acerate defensive spicula of the dermal surface, magnified 80 linear. This figure also represents the small acerate tension-spicula of the dermal membrane.
4. One of the long, slender, and flexuous acerate tension-spicula of the interstitial membranes, magnified 80 linear.
5. An attenuato-stellate retentive spiculum, from the interstitial membranes, magnified 530 linear.
6. One of the minute cylindro-stellate retentive spicula from the interstitial membranes, magnified 530 linear.

Pachymatisma contorta, Bowerbank.

- Fig. 7 represents a full-sized acerate skeleton-spiculum, magnified 80 linear.
8. An average-sized acerate skeleton-spiculum, magnified 80 linear.
9. One of the short, stout, acerate tension-spicula from the interstitial membranes, magnified 80 linear.
10. A fully developed attenuato-stellate retentive spiculum from the interstitial membranes, magnified 530 linear.
11. A very fully developed attenuato-sphero-stellate retentive spiculum from the interstitial membranes, magnified 530 linear.

Geodia parasitica, Bowerbank.

- Fig. 12 represents one of the large fusiformi-acerate skeleton-spicula, magnified 80 linear.
13. An average-sized attenuato-subpatento-ternate connecting-spiculum, magnified 80 linear.
14. One of the small and slender fusiformi-acerate tension-spicula from the interstitial membranes, magnified 80 linear.
15. One of the minute sphero-stellate retentive and defensive spicula from the dermal membrane, magnified 530 linear.

Geodia paupera, Bowerbank.

- Fig. 16 represents an average-sized skeleton-spiculum, magnified 80 linear.
17. A full-sized attenuato-expando-ternate connecting-spiculum, magnified 80 linear.
18. A small-sized attenuato-expando-ternate connecting-spiculum, magnified 80 linear. This-sized spiculum is not uncommon intermixed with the larger specimens of the same form.
19. One of the small subfusiformi-acerate tension-spicula from the interstitial membranes, magnified 80 linear. This form also represents the external defensive spicula of the porous areas.
20. One of the largest size of cylindro-stellate retentive spicula from the interstitial membranes, magnified 530 linear.
21. One of the minute cylindro-stellate retentive spicula from the interstitial membranes, magnified 530 linear.

Tethea hispida, Bowerbank.

- Fig. 22 represents a fully-developed skeleton-spiculum, magnified 80 linear. This figure also represents a small-sized primary defensive spiculum.
23. A young skeleton-spiculum, before it has developed its spinulate basal bulbous appendage, magnified 80 linear.
24. One of the minute superfusiformi-ovo-spinulate spicula of the secondary external defensive system, magnified 80 linear.
25. One of the same description of secondary external defensive spicula, magnified 250 linear. These figures 24 and 25 also represent the tension-spicula of the interstitial membranes.
26. A slender form of ovo-spinulate spiculum, occasionally intermixed with the other tension-spicula of the interstitial membranes, magnified 80 linear.

3. Remarks on Australian Crocodiles, and Description of a New Species. By GERARD KREFFT, F.L.S., C.M.Z.S.*

[Received February 17, 1873.]

About a year or two ago I sent to Dr. Gray the photograph of a Crocodile's skull, which he examined and considered to be undescribed. The name of *Tomistoma krefftii* was proposed for it; but I cannot find the description in any of the works at my disposal.

During the process of cleaning and bleaching the skull, it was injured by rats, and the end of the snout is now broken and some teeth lost; otherwise it is in tolerable condition, and appears to agree with *Crocodylus schlegelii*, as figured by De Blainville (Ostéographie, Atlas, vol. ii. pl. 5), with this difference, that the *mandibular symphysis* extends to the 15th tooth in *C. schlegelii*, and to the 6th tooth only in *T. krefftii* (Gray). There are 18, or perhaps 19, teeth above, and 15 teeth below, on each side, a notch being observed behind the 4th (or 5th) tooth, with a small pit for the lower canines.

* The following letter, referring to this paper, has been addressed to the Secretary by Dr. J. E. Gray, F.R.S. :—

SIR,—Mr. Krefft has just sent to me the photograph of a Crocodile from Australia, which he has named *Crocodylus johnsonii*, with the request that I would communicate to the Society some observations upon it.

The photograph is about 22 inches long, and represents the dorsal view of the animal.

There is no doubt that it represents a species of *Crocodylidae*, from the form of the cervical and nuchal shields; but in many respects the beak is similar to that of *Tomistoma*, the Bornean Gavial. The beak is more slender than in any typical Crocodile of the Old World that has occurred to me. It is somewhat like that of *Molinia intermedia*, from the Orinoco, figured in the Trans. Zool. Soc. 1869, vi. p. 151. f. 4, 5, and pl. 32. f. 4-6; but it differs from that species in the beak being more slender, not being swollen on the sides, or so broad and circular at the end, and also in the shields of the neck and back, which are very different.

In many respects the appearance of the animal, and the form of the beak, are much like (especially in the want of dilatation at the sides, and in the moderate breadth of the end) those of the African false Gavial, *Mecistops cataphractus*; but it has well-developed lateral cervical shields, which are wanting in all the African specimens I have hitherto observed; and one cannot understand how a West-African Crocodile can have been taken to or found in Australia.

Judging from the photograph, I believe it to be a new species of Crocodile; and the form, as far as I know, is peculiar to Australia.

I am, Sir,

Yours truly,

JOHN EDW. GRAY.

P.S.—I strongly suspect that the photograph of the head for which Mr. Krefft says I had proposed the name of *Tomistoma krefftii* belongs to *Crocodylus johnsonii*.

The examination of a photograph of the upper part of the head would induce one, on account of the slender conical form of the beak and the absence of large canine teeth, to consider it a species of *Tomistoma*; but the examination of the photographs of the skin, showing the eight cervical plates separated from the dorsal shield, and the short symphysis of the lower jaw, mentioned by Mr. Krefft, show that it is a Crocodile, and not a Gavial.

The 5th tooth, counting from this notch backwards, is the largest of the upper series ; below, the 4th tooth is the largest.

The genus *Tomistoma* is described as:—"Teeth $\frac{20}{18} \cdot \frac{20}{18}$, the mandibular symphysis extending to the 15th tooth, and the intermaxillary bone reaching to the 2nd canine." My specimen does not agree with this, and therefore it cannot belong to the genus *Tomistoma*. Of course, Dr. Gray could not know these facts, as he only had a photograph to go by ; and I remarked the difference only since the skin had been removed from the skull.

A few days ago I received a fine and perfect skin of another Crocodile from Cardwell, through the kindness of Mr. C. Bloxland, jun., of Ryde, on the Paramatta river ; and of this Crocodile, which I think is new to science, I shall give a short description.

CROCODILUS JOHNSONI, sp. nov.

Total length 7 feet, the head being 1 foot 4 inches. There are two groups of nuchal plates upon the neck, the first consisting of four disks of unequal size, divided by an interspace of about half an inch, the whole resembling in shape the figure ∞ .

The second group, divided from the first by about 2 inches, may be compared to a distorted rhombic figure. It consists of two large disks, rather square in shape above, of a smaller pair below (all touching each other), and of an outer pair, one on the right, the other on the left side. All the disks are strongly keeled.

A single disk forms the first dorsal row of plates, two disks the next, the third and fourth having four disks each ; after which follow two rows of six plates, and seven of eight, the outer ones being rather feebly keeled. The number of plates then diminishes again, there being two of six and four of four plates each, to the root of the tail. The total number of plate-rows from the posterior nuchal group to the base of the tail amounts to 19 in all. The tail is encircled by 29 bands up to the tip. The teeth number $\frac{19}{16} \cdot \frac{19}{16}$, the 10th above and the 12th below being the strongest. The hindermost teeth are short and conical, the rest being more elongate ; and all are flattened on the inner side. The first pair of lower front teeth fit into perforations in the upper jaw.

The narrowest part of the snout is contained nine times in its length from the nostrils to the eyes.

Colour dark greenish, with some broad spots on the side of the tail.

Discovered by Mr. Johnson, of Cardwell, Rockingham Bay, Queensland, and supposed to be adult.

Australian Museum, Sydney,
December 31, 1872.

4. Description of a New Moth, belonging to the Family
Saturniidae. By EDWARD BARTLETT.

The very fine Moth which I now exhibit was obtained in the interior of Madagascar, by Mr. T. Waters, who is collecting zoological specimens on the west coast or Mozambique Channel.

Mr. T. W. Wood (who has kindly made a most accurate drawing of the specimen, considering the damaged condition of the upper wings) informs me that he has carefully examined the tailed *Saturniidae* in the British Museum, and has found none which corresponds with it either in size or colouring. That which is most closely allied is *Tropæa leto*, a well-known East-Indian species. The present insect differs so much from its allies, not only in marking but in form, that it most probably represents a new genus. But the present specimen being deficient of antennæ, the species may be called *Tropæa mada-gascariensis* until we are in possession of other examples.

The measurement from the shoulder to the point of the tail is $8\frac{1}{2}$ inches; expanse of upper wings 8 inches.

The most extraordinary characteristic is the formation of the long delicate tail-like appendages to the hind wings, which have extremely narrow shafts, and are enlarged at the ends; their points have two spiral twists or folds, which give them a very graceful appearance.

There are four distinct eye-like spots near the centre of each wing.

The fore wings are of a very light buff colour, tinged with lemon-yellow, with the nervures brighter and rather conspicuous, they being of a pale rust-colour. The costal margin is dark brown, minutely dotted with greyish white, paler towards the apex. The ocellus is attached to the costal band by a very short band of the same colour, and it is nearly in the centre of the wing.

There is a blotch of red-brown, nearly black, at the apex.

There are also two distinct parallel rust-coloured transverse lines near the hind margin, which run from the inner margin to the apex; and there is a transverse bar near the base of the upper wing of a pale reddish brown, tinged with lilac, and almost divided into two by a whitish line. A black spot is in the centre of the ocellus, the outer half of which is pale buff, tinged with lemon, the inner half gradually shaded with dark brown from the spot inwards, with a light lilac semicircle separating it from the circle of rusty red; the outer margin of the ocellus is nearly a black circle.

The hind wings are also pale buff, tinged with lemon-yellow, with narrow blackish-brown marginal bands, which extend nearly to the points of the tails; these are of a bright red-rust on the central portion, their ends being enlarged and folded, very pale buff.

The ocellus is similar to that on the fore wings, but smaller and rather lighter in colouring, and nearly in the centre of the wing; the nervures are very faint.

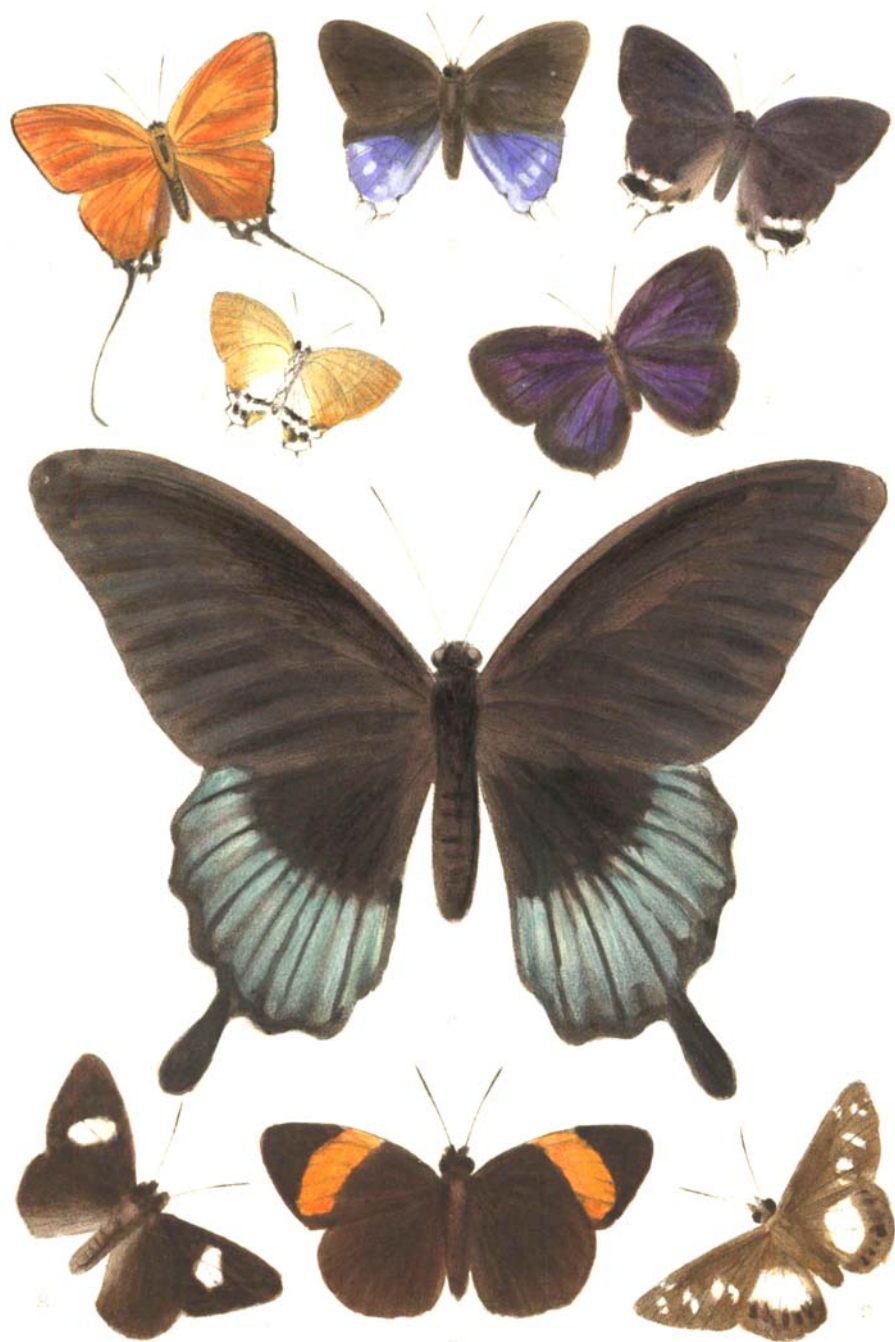
Head pale buff; thorax and abdomen bright orange-buff. Length $2\frac{1}{4}$ inches. A dark band across the front of thorax, corresponding in colour with the costal margins, and uniting with them at their bases.



E.Cooke. lith.

M & N Hanhart imp.

NEW BORNEAN BUTTERFLIES



F. Cooke.

M & N Hanhart imp.

NEW BORNEAN BUTTERFLIES.

5. A List of the Collections of Diurnal Lepidoptera made by Mr. Lowe in Borneo, with Descriptions of new Species. By HERBERT DRUCE, F.L.S., F.Z.S.

[Received February 13, 1873.]

(Plates XXXII. & XXXIII.)

These collections, of which I am unfortunately only able to give but a fragmentary account, were got together by Mr. Lowe during the years 1867, 1869, and 1872, and forwarded to this country. On their arrival they were offered to the collectors of this group of insects and in a great measure dispersed. Regretting that so much valuable information bearing upon the distribution of Butterflies should be scattered broadcast amongst various publications or altogether lost to science, I have made the following endeavour to gather together the names of such species as I could place specimens of in my own collection and study myself.

I hope to follow up this subject, and, as opportunity offers, to add to the present list; and I also hope that Mr. Lowe will continue his exertions, especially as the specimens sent home have proved to be in the finest possible condition.

The collections contained 301 species (29 of which I have described as new), representing 5 families, 8 subfamilies, and 84 genera. When they came into my hands they had been picked over by other collectors, and many fine species taken out.

For the sake of convenience I have followed Mr. Kirby's arrangement in his 'Catalogue of Diurnal Lepidoptera.'

Family I. NYMPHALIDÆ, Westw.

Subfamily I. DANAINÆ, Bates.

Genus HESTIA, Hübn.

1. *H. LEUCONOE*, Erichs. (*Idea*, L.), Nova Acta Ac. Nat. Cur. xvi. p. 283 (1834).

2. *H. HYPERMNESTRA*, Westw. Cab. Or. Ent. t. 37. 1 (1848). Borneo.

Genus IDEOPSIS, Horsf.

1. *I. DAOS* (Boisd.), Sp. Gén. t. 24. f. 3 (1836).

Genus DANAIS, Latr.

1. *D. PHILOMELA*, Zink. Nova Acta Ac. Nat. Cur. xv. p. 184, t. 16. f. 17 (1831).

2. *D. AGLEOIDES*, Felder, Wien. ent. Mon. iv. p. 398. n. 17 (1860).

Peninsula Malayica.

3. *D. JUVENTA*, Cram. Pap. Ex. ii. t. 188. B (1779).

Java.

4. *D. SIMILIS*, Linn. Mus. Ulr. p. 299 (1764) ; Clerck Icones, t. 16. f. 3 (1764).

5. *D. LOTIS*, Cram. Pap. Ex. iii. t. 230. E, D (1782).

Borneo.

Genus *EUPLŒA*, Fab.

1. *E. PHŒBUS*, Butl. P. Z. S. 1866, p. 270. n. 3.

Penang.

Smaller than any Penang specimen I have seen.

2. *E. OCHSENHEIMERI*, Luc. Rev. Zool. 1853, p. 315.

3. *E. MENETRIESII*, Feld. Wien. ent. Mon. iv. p. 398. n. 15 (1860).

Peninsula Malayica.

4. *E. CRAMERI*, Luc. Rev. Zool. 1853, p. 318.

5. *E. BREMERI*, Feld. Wien. ent. Mon. iv. p. 398. n. 16 (1860).

Peninsula Malayica.

6. *E. MÆSTA*, Butl. P. Z. S. p. 284. n. 49, f. 3 (1866).

New Guinea, Sumatra.

7. *E. MAZARES*, Moore, Cat. Lep. E. I. C. i. p. 127. n. 253 (1857).

Java.

8. *E. MULCIBER*, Cram. Pap. Ex. ii. t. 127. C, D (1779).

China, Coromandel.

9. *E. KADU*, Esch. Kotzeb. Reise, iii. p. 210. n. 15, t. 6. f. 15 *a, b* (1821).

10. *E. RHADAMANTHUS*, Fab. Syst. Ent. iii. 1. p. 42. n. 127 (1793).

Asia.

11. *E. ZONATA*, n. sp.

Male. Upperside: fore wing dark brown, with a long silky streak near the inner margin; hind wing light brown, darker at the base, with two rows of small white spots round the outer margin.

Underside: fore wing light brown, with a small white spot close to the apex, a blue spot between the costal and subcostal nervules, also one in the cell; an oblong white streak between the first and second median nervules: hind wing brown, paler at the posterior margin; one blue spot in the cell, six blue spots surrounding the outside between the nervules; white spots as above.

Female the same as the male, but paler in colour.

Exp. ♂ $3\frac{3}{4}$ inches, ♀ $3\frac{1}{2}$ inches.

Hab. Borneo. In coll. H. Druce.

Subfamily II. SATYRINÆ, Bates.

Genus LETHE, Hübn.

1. *L. EUROPA*, Fab. (*Pap. e.*), Syst. Ent. p. 500. n. 247 (1775).

Genus MELANITIS, Fab.

1. *M. LEDA*, Linn. (*Pap. l.*), Syst. Nat. i. 2. p. 773. n. 151 (1867).

Genus CÆLITES, Westwood.

1. *C. EPIMINTHIA*, Westw. Gen. Diur. Lep. p. 368. n. 2 (1851).
Borneo.
2. *C. EUPTYCHIOIDES*, Feld. Reise Nov. Lep. p. 499. n. 866 (1867).
Borneo.

Genus NEORINA, Westw.

1. *N. LOWII*, Doubl. & Hew. Gen. D. L. t. 61. f. 4 (1851).
Borneo.

Genus RAGADIA, Westw.

1. *R. CRISIA*, Hübn. Zutr. Ex. Schmett. f. 675, 676 (1832).

Genus MYCALESIS, Hübn.

1. *M. ORSEIS*, Hew. Ex. B. iii. *Myc.* t. 6. f. 36, 37 (1864).
Sumatra.
2. *M. LALASSIS*, Hew. Ex. B. iii. *Myc.* t. 6. f. 35 (1864).
Gilolo.
3. *M. MEDUS*, Fab. Syst. Ent. p. 488. n. 198 (1775).
Borneo.
4. *M. MNASICLES*, Hew. Ex. B. iii. *Myc.* t. 5. f. 32, 33 (1864).
Sumatra.
5. *M. TAGALA*, Feld. Reise Nov. Lep. t. 67. f. 7, 8 (1867).
Celebes.
6. *M. ANAPITA*, Moore, Cat. Lep. E. I. C. i. p. 232. n. 495 (1857).
Sumatra.
7. *M. FUSCUM*, Feld. Wien. ent. Mon. iv. p. 401. n. 27 (1860).
8. *M. AMENA*, n. sp. (Plate XXXII. fig. 1.)

Male. Upperside rufous brown; anterior wing with the costal margin dark brown, with one ocellus below the middle.

Underside dark brown; both wings crossed by a rufous band beyond the cell; posterior wing with a rufous band close to the base; anterior wing with four ocelli, the first and third minute, the fourth large;

posterior wing with seven, the first and fifth large, the others of equal size. Allied to *croatis*, Hewits.

Exp. $2\frac{1}{8}$ inches.

Hab. Borneo. In coll. H. Druce.

Genus ERITES, Westw.

1. E. ARGENTINA, Butler, Cat. Sat. B. M. p. 188. n. 5 (1868).

Labuan, Borneo.

2. E. ELEGANS, Butler, *l. c.* p. 147. n. 2, t. 2. f. 4 (1868).

Borneo.

Genus YPTHEMA.

1. Y. PANDOCUS, Moore, Cat. Lep. E. I. C. i. p. 235. n. 506 (1857).

Java.

2. Y. FASCIATA, Hew. Trans. Ent. Soc. ser. 3. vol. ii. p. 287. n. 12 (1865).

Sarawak.

Subfamily III. ELYMNINÆ, Herr.-Schäff.

Genus ELYMNIA, Hübn.

1. E. UNDULARIS, Drury, Ill. Ex. Ent. ii. t. 10. f. 1, 2 (1773).
East Indies.

2. E. NIGRESCENS, Butler, P. Z. S. p. 520, pl. 42. f. 1 (1871).
Sarawak.

3. E. HECATE, Butler, *l. c.* p. 520, pl. 42. f. 2 (1871).
Labuan.

4. E. LUTESCENS, Butler, Ann. Nat. Hist. ser. 3. vol. xx. p. 404, t. 9. f. 10 (1867).
Malacca.

5. E. LAIS, Cr. Pap. Ex. ii. t. 110. A, B (1779).
Java.

Subfamily IV. MORPHINÆ, Bates.

Genus AMATHUSIA, Fab.

1. A. PHIDIPPUS, Linn. Syst. Nat. i. 2. p. 752. n. 37; Cram. Pap. Ex. i. t. 69. A, B (1779).

Batavia.

2. A. OTTAMANA, Butler, Lep. Ex. t. 11 (1870).
Borneo.

Genus ZEUXIDIA, Hübn.

1. L. HORSFIELDII, Feld. Reise Nov. Lep. iii. p. 460, t. 62. f. 4 (1867).

Java.

2. *L. WALLACEI*, Feld. *l. c.* p. 461, t. 62. f. 3 (1867).
Borneo.

3. *L. AURELIUS*, Cram. Pap. Ex. ii. t. 168. A, B (1779).
Sumatra.

Genus *DISCOPHORA*.

1. *D. TULLIA*, Cram. Pap. Ex. i. t. 81.
China.

2. *D. CHEOPS*, Feld. Nov. Lep. iii. p. 463. n. 783 (1867).
Borneo.

Genus *CLEROME*, Westwood.

1. *C. ARCESILAUS*, Fab. Mant. Ins. ii. p. 28. n. 205 (1787).
Siam.

2. *C. PHAON*, Erichs. Nova Acta Acad. Nat. Cur. xvi. Suppl.
p. 401, t. 50. f. 1, 1a.

3. *C. STOMPHAX*, Westw. Trans. Ent. Soc. ser. 2. vol. iv. p. 186,
t. 21. f. 3, 4 (1858).
Borneo.

4. *C. BUSIRIS*, Westw. Trans. Ent. Soc. ser. 2. vol. iv. p. 187
(1858).
Malacca.

5. *C. GRACILIS*, Butler, Ann. Nat. Hist. ser. 3. vol. xx. p. 401,
8. f. 7 (1867).
Malacca.

Genus *THAUMANTIS*, Hübn.

1. *T. ODANA*, Godt. Enc. Méth. ix. p. 445. n. 16 (1823).

2. *T. LUCIPOR*, Westw. Trans. Ent. Soc. ser. 2. vol. iv. p. 173,
t. 19 (1858).
Borneo.

3. *T. NOUREDIA*, Westw. *l. c.* p. 175, t. 20 (1858).
Malacca.

Subfamily VIII. *NYMPHALINÆ*, Bates.

Genus *CETHOSIA*, Fab.

1. *C. HYPSEA*, Doubl. & Hew. Gen. D. L. t. 20. f. 4 (1847).
Borneo.

Genus *TERINOS*, Boisd.

1. *T. CLARISSA*, Boisd. Sp. Gén. i. t. 9. f. 4 (1836).

2. *T. NYMPHA*, Wall. Trans. Ent. Soc. p. 342 (1869).
Sarawak.

3. *T. FULMINANS*, Butler, Cist. Ent. i. p. 9 (1869).
Borneo.

Genus *CIRROCHROA*, Doubl.

1. *C. MALAYA*, Feld. Wien. ent. Mon. iv. p. 399. n. 18 (1860).
Peninsula Malayica.
2. *C. CALYPSO*, Wall. Trans. Ent. Soc. 1869, p. 339.
Borneo.
3. *C. FASCIATA*, Feld. Reise Nov. Lep. iii. t. 49. f. 9, 10 (1867).
Mindoro.
4. *C. SATELLITA*, Butler, Cist. Ent. i. p. 9 (1869).
Hong Kong.
5. *C. ORISSA*, Feld. Reise Nov. Lep. iii. t. 49. f. 7, 8 (1867).
Malacca interior.

Genus *CYNTHIA*, Fab.

1. *C. ARSINOË*, Cram. Pap. Ex. ii. t. 160. B, C (1779).
Amboina.

Genus *MESSARAS*, Doubl.

1. *M. ERYMANTHUS*, Drury, Ill. Ex. Ent. i. t. 15. f. 3, 4 (1773).
China.

Genus *ATELLA*, Doubl.

1. *A. EGISTA*, Cram. Pap. Ex. iii. t. 281. C, D (1782).
Amboina.

Genus *JUNONIA*, Hübn.

1. *J. LAOMEDIA*, Linn. Syst. Nat. i. 2. p. 772. n. 145 (1767).
2. *J. ORITHYIA*, Linn. Mus. Ulr. p. 278 (1764).
3. *J. IDA*, Cram. Pap. Ex. i. t. 42. C, D (1776).
Batavia.

Genus *RHINOPALPA*, Feld.

1. *R. POLYNICE*, Cram. Pap. Ex. iii. t. 195. D, E (1780).
Sumatra.

Genus *KALLIMA*, Westw.

1. *K. PARALEKTA*, Horsf. Cat. Lep. E. I. C. t. 6. f. 4 (1829).

Genus *DOLESCHALLIA*, Feld.

1. *D. BISALTIDE*, Cram. Pap. Ex. ii. t. 102. C, D (1779).

Genus *ERGOLIS*, Boisd.

1. *E. ARIADNE*, Linn. Syst. Nat. i. 2. p. 778. n. 170 (1767).

Genus AMNOSIA, Westw.

1. *A. DECORA*, Doubl. & Hew. Gen. D. L. t. 51. f. 4 (1850).

Java.

Genus CYRESTIS, Boisd.

1. *C. NIVEA*, Zink. Nova Acta Nat. Cur. xvi. p. 138, t. 14. f. 1 (1831).

2. *C. SERICEUS*, Butler, P. Z. S. 1865, p. 482. n. 3.

Borneo.

3. *C. RHARIA*, Westw., Horsf.; Moore, Cat. Lep. E. I. C. i. t. 3 a. f. 2 (1857).

Java.

Genus DIADEMA, Boisd.

1. *D. ANTILOPE*, Cram. Pap. Ex. ii. t. 183. E, F (1779).

Amboina.

Genus EURIPUS, Westw.

1. *E. HALITHERSES*, Doubl. & Hew. Gen. D. L. t. 41. f. 3 (1850).

Assam.

Genus PARTHENOS, Hübn.

1. *P. GAMBRISIUS*, Fab. Ent. Syst. iii. 1. p. 85. n. 264 (1793).

East India.

Genus LEBADEA, Feld.

1. *L. PADUKA*, Moore, Cat. Lep. E. I. C. i. p. 179. n. 365 (1857).

Borneo.

2. *L. MARTHA*, Fab. Mant. Ins. ii. p. 56. n. 555 (1787).

Siam.

Genus LIMENITIS, Fab.

1. *L. PROCRI*, Cram. Pap. Ex. ii. t. 106. E, F (1779).

China.

Genus PANDITA, Moore.

1. *P. SINORIA*, Feld. Reise Nov. Lep. iii. p. 425. n. 670 (1867).

Borneo.

Genus NEPTIS, Fab.

1. *N. HORDONIA*, Stoll, Cram. Pap. Ex. t. 33. f. 4-4 d (1791).

New Guinea.

2. *N. HELIODORA*, Fab. Mant. Ins. ii. p. 5. n. 516 (1787).

Siam.

3. *N. NATA*, Moore, Cat. E. I. C. i. p. 168. n. 346, t. 4 a. f. 6 (1857).

Borneo.

4. *N. VIKASI*, Horsf. Cat. E. I. C. t. 5. f. 2, 2 a (1829).
5. *N. ACERIS*, Lep. Reise, i. p. 203, t. 17. f. 5, 6 (1774).
6. *N. LEUCOTHOE*, Cram. Pap. Ex. iv. t. 296. E, F (1782).
Java, China.

Genus *ATHYMA*, Westw.

1. *A. LARYMNA*, Doubl. & Hew. Gen. D. L. t. 35. f. 1 (1850).
North India.
2. *A. KRESNA*, Moore, P. Z. S. 1858, p. 12. n. 6, t. 50. f. 4.
Sumatra.
3. *A. SUBRATA*, Moore, *l. c.* p. 13. n. 10, t. 51. f. 1.
Malayana.
4. *A. IDITA*, Moore, *l. c.* p. 16. n. 16, t. 51. f. 3.
Java.
5. *A. KANWA*, Moore, *l. c.* p. 17. n. 17, t. 51. f. 2.
Borneo.
6. *A. AMHARA*, n. sp. (Plate XXXII. fig. 2.)

Male. Upperside black, with a broad bluish-white band from the middle of the anterior wing to the inner margin of posterior wing; a narrow white broken band close to the outer margin of both wings; a long white streak and round spot in the discoidal cell.

Underside pale brown, with the white markings as above.

Allied to *idita*, Moore, but quite distinct.

Exp. $2\frac{1}{4}$ inches.

Hab. Borneo. In coll. H. Druce.

Genus *ADOLIAS*, Boisd.

1. *A. EVA*, Feld. Reise Nov. Lep. iii. p. 432. n. 692 (1867).
Luzon, Assam.
2. *A. TEUTA*, Doubl. Hew. Gen. D. L. t. 44. f. 2.
Sylhet.
3. *A. BELLATA*, n. sp. (Plate XXXII. fig. 3.)

Male. Upperside dark brown, with a transverse band of pale yellow spots crossing the middle of both wings.

Underside pale greenish brown; a row of small black streaks from apex of fore wing to anal angle; a round spot and a lunular black mark within the discoidal cell of fore wing.

Female. Upperside paler, with the transverse band of spots almost white.

Underside rufous brown, with the markings the same as the male.

Allied to *A. teuta*, Doubl., but quite distinct.

Exp. male $2\frac{3}{4}$ inches, female 3 inches.

Hab. Borneo. In coll. H. Druce.

4. *A. DUNYA*, Doubl. & Hew. G. D. L. t. 44. f. 3 (1850).
Northern India.
 5. *A. KANDA*, Moore, Trans. Ent. Soc. ser. 2. vol. v. p. 69. n. 13,
t. 4. f. 2 (1859).
Borneo.
 6. *A. PARTA*, Moore, Cat. Lep. E. I. C. i. p. 185. n. 373 (1857).
Borneo.
 7. *A. ZICHRI*, Butler, Cist. Ent. i. p. 6 (1869).
Borneo.
 8. *A. ANOSIA*, Moore, Cat. Lep. E. I. C. i. p. 187. n. 376 (1857).
N. India.
 9. *A. SURJAS*, Voll. Tijd. Ent. v. p. 200. n. 24, t. 12. f. 1 (1862).
Java.
 10. *A. LAVERNA*, Butler, Cist. Ent. i. p. 29 (1870).
Borneo.
 11. *A. VACILLARIA*, Butler, P. Z. S. 1868, p. 606. n. 44, t. 45. f. 1.
Borneo.
 12. *A. AMBALIKA*, Moore, Cat. Lep. E. I. C. i. p. 192. n. 386
(1857).
Borneo.
 13. *A. DIARDI*, Voll. Tijd. Ent. v. p. 188. n. 8, t. 10. f. 2 (1862).
Borneo.
 14. *A. BLUMEI*, Voll. l. c. p. 204. n. 30, t. 12. f. 3, 4 (1862).
Borneo.
 15. *A. COCYTINA*, Horsf. Zool. Journ. v. p. 67, t. 4. f. 3, 3*a* (1829).
Sumatra.
- Genus *TANAECIA*, Butler.
1. *T. VALMIKIO*, Feld. Reise Nov. Lep. iii. p. 434. n. 697 (1867),
Borneo.
 2. *T. LUTALA*, Moore, Trans. Ent. Soc. ser. 2. vol. v. p. 71. n. 17,
t. 6. f. 3 (1859).
Borneo.
 3. *T. LEVERNA*, Butler, Cist. Ent. i. p. 29 (1870).
Borneo.
 4. *T. VIOLARIA*, Butler, P. Z. S. 1868, p. 612. n. 11, t. 45. f. 8.
Singapore.

In this genus there are four new species ; but descriptions without figures would be useless.

Genus *SYMPHÆDRA*, Hübn.

1. *S. CANESCENS*, Butler, P. Z. S. 1868, p. 612, t. 45. f. 1.
Borneo.
2. *S. DIRTEA*, Fab. Ent. Syst. iii. 1. p. 59. n. 184 (1793).
Bengal.
3. *S. CYANIPARDUS*, Butler, P. Z. S. 1868, p. 616. n. 4.
Silhet.

Genus *EULACEURA*, Butler.

1. *E. OSTERIA*, Westw. Gen. D. L. p. 305. n. 19, note (1850).
Singapore, Java.

Genus *DICHORRAGIA*, Butler.

1. *D. NESIMACHUS*, Boisd. Cuv. Règne Anim. Ins. ii. t. 139 *bis*,
f. 1 (1836).

Genus *CHARAXES*, Ochs.

1. *C. ECHO*, Butl. Ann. Nat. Hist. ser. 3. vol. xx. p. 401, t. 8.
f. 5, 6 (1867).
Malacca.
2. *C. SCHREIBERI*, Godt. Enc. Méth. ix. Suppl. p. 825 (1823).
Java.
3. *C. ATHAMAS*?, Drury, Ill. Ex. Ent. i. t. 2. f. 4 (1773).
China.
4. *C. HEBE*, Butler, P. Z. S. 1865, p. 634. n. 46, t. 37. f. 3.
Sumatra.
5. *C. JALASUS*, Feld. Reise Nov. Lep. iii. p. 438. n. 714, t. 59.
f. 5 (1867).
Malacca.
6. *C. DELPHIS*, Doubl. Ann. Soc. Ent. Fr. 1843, p. 217, t. 7.
Silhet, Assam.
7. *C. POLYXENA*, Cram. Pap. Ex. i. t. 54. A, B (1779).
China.
8. *C. BORNEENSIS*, Butl. Lep. Ex. i. p. 16. n. 7, t. 6. f. 2 (1869).
Borneo.
9. *C. BAYA*, Moore, Cat. Lep. E. I. C. i. p. 207. n. 421 (1857).
Java.

10. C. HARPA, Feld. Reise Nov. Lep. iii. p. 444. n. 724 (1867).
11. C., n. sp., near *harpax*, Feld.
12. C., n. sp., near *marma*, Westw.
13. C., n. sp., near *hemana*, Butler.

Genus PROTHOE, Hübn.

1. P. FRANCKII, Godt. Enc. Méth. ix. Suppl. p. 825 (1832).

Family II. LEMONIIDÆ.

Subfamily I. LIBYTHÆINÆ, Bates.

Genus LIBYTHEA, Fab.

1. L. MYRRHA, Godt. Enc. Méth. ix. p. 171. n. 4 (1819).
2. L. ANTIPODA, Boisd. Bull. Soc. Ent. Fr. 1859, p. 157. n. 9.

Subfamily II. NEMEOBIINÆ, Bates.

Genus ZEMEROS, Boisd.

1. Z. EMESOIDES, Feld. Reise Nov. Lep. ii. p. 289. n. 373, t. 36. f. 9-11 (1865).

Malacca.

Genus ABISARA, Feld.

1. A. ECHERIUS, Stoll, Suppl. Cram. t. 31. f. 1, 1 A. B. (1790).
- China.

Genus TAXILA, Westw.

1. T. THUISTO, Hew. Ex. Butt. ii. *Tax.* t. i. f. 5, 6 (1861).
- Singapore.
2. T. ZEMARA, Butl. Ann. Nat. Hist. ser. iv. vol. v. p. 363 (1870).
- Sarawak.
3. T. OPHNA, Boisd. Sp. Gén. i. t. 21. f. 4 (1836).
 4. T. TANITA, Hew. Ex. Butt. ii. *Tax.* t. 1, text (1861).
 5. T. TELESIA, Hew. *l. c.* p. 89. t. 1. f. 1, 2 (1861).
- Sarawak.
6. T. TENETA, Hew. *l. c.* t. 1. f. 3, 4 (1861).
- Sarawak.

Family III. LYCÆNIDÆ.

Genus MILETUS, Hübn.

1. M. HORSFIELDI, Moore, Cat. Lep. E. I. C. i. p. 19. n. 3, t. 1a. f. 2 (1857).

Java.

2. *M. ZINKENII*, Feld. Reise Nov. Lep. ii. p. 284. n. 362, t. 35. f. 34 (1865).

Java.

3. *M. REGINA*, n. sp. (Plate XXXII. fig. 4.)

Upperside white. Anterior wing with the costal margin and the apical half dark brown. Posterior wing greyish round the outer margin.

Underside brown, thickly mottled with white. Posterior wing with two rufous bands beyond the cell.

Exp. $1\frac{1}{4}$ inch.

Hab. Borneo. In coll. H. Druce.

4. *M. NIVALIS*, n. sp.

Male. Upperside dark brown.

Underside white, speckled with pale brown. Anterior wing with six black spots close to the outer margin; posterior wing with five.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

Genus CUPIDO, Schrank.

1. *C. ALECTO*, Feld. Reise Nov. Lep. ii. p. 272. n. 333, t. 34. f. 23 (1865).

Amboina.

2. *C. SCHÆFFERA*, Esch. Kotzeb. Reise, iii. p. 216, t. 5. f. 25, *a b* (1821).

3. *C. ROXUS*, Godt. Enc. Méth. ix. p. 659. n. 142 (1823).

4. *C. TALMORA*, Butler.

Java.

5. *C. CELENO*, Cram. Pap. Exot. i. t. 31. C, D (1775).

Surinam?

6. *C. ARATUS*, Cram. Pap. Exot. iv. t. 365. A, B (1782).

Amboina.

7. *C. CNEJUS*, Fab. Ent. Syst. Suppl. p. 430 (1798).

East India.

8. *C. LACTURNUS*, Godt. Enc. Méth. ix. 660. n. 148 (1823).

9. *C. PACTOLUS*, Feld. Reise Nov. Lep. ii. p. 274. n. 337, t. 34. f. 1-3 (1865).

Amboina.

10. *C. CAGAYA*, Feld. *l. c.* p. 278. n. 347, t. 34. f. 11-13 (1865).

Luzon.

11. *C. ARUANA*, Feld. *l. c.* p. 278. n. 346, t. 34. f. 7, 8 (1865).

Aru.

Smaller than Felder's figure, but does not differ in any respect.

12. *C. CORNUTA*, n. sp. (Plate XXXII. fig. 5.)

Female. Upperside dark brown, with a broad white band crossing both wings from the discoidal cell to the abdominal margin.

Underside white; outer margins brown, with white lunular markings.

Exp. $1\frac{1}{4}$ inch.

Hab. Borneo. In coll. H. Druce.

13. *C. CÆRULEA*, n. sp. (Plate XXXII. fig. 6.)

Male. Upperside bright morpho-blue, with the outer margins bordered with black; two minute black lines at the anal angle.

Underside pale brown, crossed by four whitish lines from the costal margin to the anal angle. A large orange spot at the anal angle, with a black spot in the centre.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

14. *C. ALMORA*, n. sp. (Plate XXXII. fig. 7.)

Upperside pale brownish blue, with two black spots at the anal angle, and a narrow black line round the outer margin of posterior wing.

Underside very pale brown, streaked and mottled with white. Black spots as above.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

15. *C. ADANA*, n. sp.

Male. Upperside bluish white from the apex to anal angle of the fore wing, bordered with brown. A row of small black spots round the outer margin of posterior wing, the white lines showing through from the underside.

Underside light brown; both wings crossed by five broken white lines. An orange spot at the anal angle with a black centre.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

16. *C. ALUTA*, n. sp. (Plate XXXII. fig. 8.)

Upperside dark lavender-blue; outer margins brown.

Underside pale brown, both wings crossed by nine broken white lines; an orange spot at the anal angle, with a black centre.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

17. *C. ANGUSTA*, n. sp. (Plate XXXII. fig. 9.)

Upperside pale brown, slightly glossed with blue.

Underside pale yellow, thickly mottled with brown; two rows of black spots close to the outer margins of both wings.

Exp. $1\frac{1}{4}$ inch.

Hab. Borneo. In coll. H. Druce.

18. *C. AKABA*, n. sp.

Upperside greyish brown; outer margins darker.

Underside pale brown, with eight broken white lines crossing both wings, from the costal margin to the anal angle. A large black spot above the tail surrounded with orange.

Exp. $1\frac{1}{8}$ inch.

Hab. Borneo. In coll. H. Druce.

Genus *HYPOCHRYSOPS*, Feld.

1. *H. ELEGANS*, n. sp. (Plate XXXII. fig. 12.)

Upperside greyish blue. Anterior wing with the costal margin dark brown.

Underside pale brown. Anterior wing crossed beyond the cell by a rufous band, with a row of small black spots in the middle, and numerous metallic dots from the base to the costal margin. Posterior wing with two rufous bands, the first, with a row of black spots, below the middle, the second near the outer margin, with metallic streak crossing both the rufous bands; several metallic spots close to the base.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

Genus *APHNÆUS*, Hübn.

1. *A. FRIGIDUS*, n. sp. (Plate XXXII. fig. 10.)

Upperside brown. Posterior wing with the space above and beyond the black spot bright orange, with a minute streak of gold surrounding the black spot.

Underside pale yellow; outer margins rufous, with the transverse bands brown, traversed by spots and lines of gold; the orange markings as above.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

Genus *ILERDA*, Doubl.

1. *I. ? SUPERBA*, n. sp. (Plate XXXII. fig. 11.)

Upperside dark lilac-blue; costal and outer margins dark brown. Posterior wing with three orange spots close to the anal angle, and a narrow white line round the outer margin.

Underside pale brown. Anterior wing crossed near the middle by a rufous band: posterior wing with the apical half red, crossed by a broken blue line, with a row of black spots close to the outer margin; three orange spots at the anal angle.

Exp. $1\frac{1}{8}$ inch.

Hab. Borneo. In coll. H. Druce.

Genus *HYPOLYCÆNA*, Feld.

1. *H. ERYLUS*, Godt. Enc. Méth. ix. p. 633. n. 60 (1823).
2. *H. ETOLUS*, Fab. Mant. Ins. ii. p. 66. n. 620 (1787).
India.
3. *H. THECLOIDES*, Feld. Wien. ent. Mon. iv. p. 395. n. 3 (1860).

Genus *PSEUDODIPSUS*, Feld.

1. *P. SUMATRÆ*, Feld. Reise Nov. Lep. ii. p. 259. n. 306, t. 36.
f. 24-26 (1865).
Sumatra.
2. *P. BENGALENSIS*, Moore, P. Z. S. 1865, p. 773, t. 41. f. 9.
Bengal.

Genus *IOLAUS*, Hübn.

1. *T. VIDURA*, Horsf. Cat. Lep. E. I. C. p. 113. n. 45 (1829).
Java.
2. *T. CIPPUS*, Fab. Ent. Syst. Suppl. p. 429 (1798).
East India.
3. *T. MANTRA*, Feld. Wien. ent. Mon. iv. p. 396. n. 9 (1860).

Genus *SITHON*, Hübn.

1. *S. MARTINA*, Hew. Ill. D. L. Suppl. p. 3. n. 46, t. 2. f. 70,
71 (1869).
Borneo.
2. *S. MANEIA*, Hew. l. c. t. 12. f. 14, 15 (1863).
Singapore.
3. *S. FREJA*, Fab. Ent. Syst. iii. 1. p. 263. n. 19 (1793).
East India.
4. *S. THARIS*, Hübn. Zutr. Ex. Schmett. f. 883, 884 (1837).
5. *S. RAVINDRA*, Horsf. Cat. Lep. E. I. C. p. 117. n. 47, t. 1.
f. 11, 11 a (1829).
Java.
6. *S. SUGRIVA* Horsf., Cat. Lep. E. I. C. p. 105. n. 36, t. 1.
f. 10, 10 a (1829).
Java.
7. *S. LAPITHIS*, Moore, l. c. p. 48. n. 79 (1857).
Moulmein.
8. *S. MICEA*, Hew. Ill. D. L. Suppl. p. 6. n. 56, t. 3. f. 81
(1869).
Borneo.

9. *S. TRAVANA*, Hew. *l. c.* p. 38. n. 38, t. 17. f. 59, 60 (1865).
Sumatra.

10. *S. JALINDRA*, Horsf. Cat. Lep. E. I. C. p. 109. n. 41 (1829).

11. *S. ESTELLA*, Hew. Ill. D. L. p. 31. n. 15, t. 16. f. 50, 51 (1863).

Sumatra.

12. *S. AUREA*, n. sp. (Plate XXXIII. fig. 1.)

Male. Upperside dark orange, with a silky spot at the end of the cell of anterior wing. Posterior wing with the anal angle, which is marked with two black spots, and the tail white with black centre.

Underside sooty brown, with the posterior half of the hind wing white, crossed by two broken black bands, the lower one slightly marked with blue. Allied to *orpheus*, Feld.

Exp. $1\frac{1}{8}$ inch.

Hab. Borneo. In coll. H. Druce.

13. *S. SCOPULA*, n. sp. (Plate XXXIII. fig. 2.)

Male. Upperside. Anterior wing dark brown, lighter at the outer margins, with a tuft of light-brown hair below the cell, close to the inner margin. Posterior wing light whitish blue, with the base dark brown; tails white.

Underside pale orange, with the abdominal half bluish white, with a black line below the middle; four black spots close to the outer margin.

Exp. $1\frac{1}{4}$ inch.

Hab. Borneo. In coll. H. Druce.

14. *S. PALLIDA*, n. sp. (Plate XXXIII. fig. 3.)

Male. Upperside dark purplish brown; outer margins black. Posterior wing: the abdominal margin greyish, with three white spots near the tails.

Underside pale rufous brown, white at posterior half of hind wing; a row of black spots from the anal angle to the anterior margin; a blue line above them, and a broken black band below the middle of the posterior wing.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

15. *S. VALIDA*, n. sp. (Plate XXXIII. fig. 4.)

Upperside dark brown; the apex of posterior wing white; the outer margin and tail black.

Underside bright orange, with the white markings as above; three black spots close to the apex, with a black line above. Allied to *lapithis*, Moore.

Exp. 1 inch.

Hab. Borneo. In coll. H. Druce.

Genus MYRINA, Fab.

1. *M. ALYMNUS*, Cram. Pap. Ex. iv. t. 331. D, E (1782).
Coromandel.

Genus DEUDORIX, Hew.

1. *D. DOMITIA*, Hew. Ill. D. L. t. 6. f. 6, 7 (1863).
Singapore.
2. *D. EPIJARBAS*, Moore, Cat. Lep. E. I. C. i. p. 32. n. 40 (1857).
N. India.
3. *D. TIMOLEON*, Stoll, Suppl. Cram. t. 32. f. 4 (1790).
China.
4. *D. ORSEIS*, Hew. Ill. D. L. p. 23. n. 20 (1863).
Sumatra.

Genus CURETIS, Hübner.

1. *C. TAGALICA*, Feld. Reise Nov. Lep. ii. p. 221. n. 240, t. 28.
f. 19, 20 (1865).
Luzon, Macassar.
2. *C. BARSINE*, Feld. *l. c.* p. 220. n. 239, t. 28. f. 16, 17 (1865).
Amboina.

Genus AMBLYPODIA, Horsf.

1. *A. NAKULA*, Feld. Wien. ent. Mon. iv. p. 395. n. 4 (1860).
2. *A. ADATHA*, Hew. Cat. Lyc. B. M. t. 4. f. 29-31 (1862).
3. *A. AUREA*, Hew. *l. c.* p. 8. n. 37, t. 8. f. 87, 88 (1862).
Sarawak.
4. *A. ATOSIA*, Hew. Ill. D. L. p. 9. n. 37, t. 2. f. 8, 9 (1863).
Sumatra.
5. *A. ALACONIA*, Hew. Ill. D. L. p. 14. n. 39, t. 3c. f. 52, 53 (1869).
Borneo.
6. *A. ABSEUS*, Hew. Cat. Lyc. B. M. p. 9. n. 40, t. 5. f. 51, 52
(1862).
Sylhet.
7. *A. APHIDANUS*, Cram. Pap. Ex. ii. t. 137. F, G (1779).
Surinam ? (*Cramer*).
8. *A. ANNIELLA*, Hew. Cat. Lyc. B. M. p. 10. n. 46, t. 8. f. 83, 84
(1862).
Singapore.
9. *A. ANARTE*, Hew. *l. c.* p. 5. n. 20, t. 3. f. 16, 17 (1862).
Makassar.

10. *A. AMPHIMUTA*, Feld. Reise Nov. Lep. ii. p. 232. n. 259, t. 29. f. 12 (1865).

Malacca.

11. *A. HYPOMUTA*, Hew. Cat. Lyc. B. M. p. 11. n. 52, t. 6. f. 63, 64 (1862).

India.

12. *A. LYCÆNARIA*, Feld. Wien. ent. Mon. iv. p. 396. n. 9 (1860).

Malacca.

13. *A. ACHELOUS*, Hew. Cat. Lyc. B. M. p. 7. n. 30. t. 5. f. 47, 48 (1862).

Singapore.

14. *A. ANUDA*, Hew. Ill. D. L. p. 14 a. n. 73, t. 3 a. f. 32 (1869).

Borneo.

15. *A. AMISENA*, Hew. Cat. Lyc. B. M. p. 13. n. 62, t. 7. f. 74-78 (1862).

Singapore.

16. *A. OLINDA*, n. sp. (Plate XXXIII. fig. 5.)

Upperside dark violet-blue, with the outer margins of the anterior wing brown.

Underside brown, crossed by numerous whitish lines ; three green spots at the anal angle.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

Family IV. PAPILIONIDÆ.

Subfamily PIERINÆ, Bates.

Genus PONTIA, Fabr.

1. *P. XIPHIA*, Fab. Spec. Ins. ii. p. 43. n. 180 (1781).

East India.

Genus TERIAS, Swainson.

1. *T. HARINA*, Horsf. Cat. Lep. E. I. C. p. 137. n. 63 (1829).

2. *T. HECABE*, Linn. Mus. Ulr. p. 249 (1764).

3. *T. TIBAHA*, Horsf. Cat. Lep. E. I. C. p. 136. n. 62 (1829).

4. *T. SARI*, Horsf. l. c. p. 136. n. 61 (1829).

5. *T. SILHETANA*, Wall. Trans. Ent. Soc. ser. 3. vol. iv. p. 324. n. 17 (1867).

Silhet.

Genus PIERIS, Schrank.

1. *P. CLEMANTHE*, Doubl. & Hew. G. D. L. t. 6. f. 3 (1847).

India.

2. *P. PACTOLICUS*, Butler, P. Z. S. 1865, p. 455. n. 1, t. 2. f. 1.
Borneo.

Genus *TACHYRIS*, Wall.

1. *T. CARDENA*, Hew. Ex. Butt. ii. *Pier.* t. 3. f. 17, 18 (1861).
Borneo.

2. *T. NATHALIA*, Feld. Wien. ent. Mon. vi. p. 285. n. 40 (1862).

3. *T. NEOMBO*, Boisd. Sp. Gén. i. p. 539. n. 148 (1836).
East Indies.

4. *T. LEPTIS*, Feld. Reise Nov. Lep. ii. p. 163. n. 136 (1865).
Java.

5. *T. NERO*, Fab. Ent. Syst. iii. 1. p. 153. n. 471 (1793).
Asia.

6. *T. ENARETE*, Boisd. Sp. Gén. i. p. 480. n. 61 (1836).
Moluccas.

Genus *DELIAS*, Hübn.

1. *D. PANDEMIA*, Wall. Tr. E. S. ser. 3. vol. iv. p. 346. n. 3, t. vi.
f. 4, 4 a (1867).
Borneo.

2. *D. HYPARETE*, Linn. Mus. Ulr. p. 247 (1764).
Java.

3. *D. SINGHAPURA*, Wall. Tr. E. S. ser. 3. vol. iv. p. 353. n. 29,
t. 7. f. 2 (1867).
Singapore.

Genus *PRIONERIS*, Wall.

1. *P. VOLLHENHOVII*, Wall. Tr. E. S. ser. 3. vol. iv. p. 386. n. 6,
t. 9. f. 3 (1867).
Sarawak.

2. *P. CORNELIA*, Voll. Mon. *Pier.* p. 5. n. 1, t. 2. f. 2 (1865).
Borneo.

Genus *ERONIA*, Hübn.

1. *E. VALERIA* Cram. Pap. Ex. i. t. 85. A (1779).
Java.

Genus *CALLIDRYAS*, Boisd.

1. *C. CROCALE*, Cram. Pap. Ex. i. pl. 55. C, D (1779).
East India.

2. *C. CATILLA*, Cram. Pap. Ex. iii. pl. 229. D, E (1781).
Coromandel.

Genus *DERCAS*, Boisd.

1. *D. GOBRIAS*, Hew. Tr. E. S. ser. 3. vol. ii. p. 246. n. 5, t. 16. f. 1 (1864).

Borneo.

Genus *HEBOMOIA*, Hübn.

1. *H. BORNEENSIS*, Wall. Tr. E. S. ser. 3. vol. iv. p. 396. n. 2 (1867).

Borneo.

Genus *IXIAS*, Hübn.

1. *I. UNDATUS*, Butl. P. Z. S. 1871, p. 252, pl. 19. f. 4.

Borneo.

Genus *ORNITHOPTERA*, Boisd.

1. *O. MIRANDA*, Butl. Lep. Ex. i. t. 1 (1869).

Sarawak.

2. *O. AMPHRYSUS*, Cr. Pap. Ex. iii. t. 219. A (1782).

Java.

3. *O. FLAVICOLLIS*, n. sp.

Male. Upperside : similar to *O. amphrysus*, from Java, but differs in the following respects :—The anterior wing is more elongated, with the yellow markings at the end of the cell much smaller ; the posterior wing rather paler in colour, with the black scollops and the black border much narrower. It is at once distinguished from all other species by its bright yellow collar. The neururation of the posterior wing differs slightly from *O. amphrysus*.

Female. Anterior wing sooty black, with all the veins broadly bordered with dusky white ; the marginal series of black spots on the posterior wing are much broader than in *amphrysus*, almost reaching the discoidal cell ; very like the posterior wing of *O. miranda*, Butl.

I have examined 35 males and 7 females of this species, and they do not differ in any respect.

Hab. Borneo. In coll. H. Druce and O. Salvin.

Genus *PAPILIO*, Linn.

1. *P. LAODOCUS*, De Haan, Verh. Nat. Ges. Ned. overz. Bez. p. 42, t. 8. f. 5 (1840).

Java.

2. *P. MACAREUS*, Godt. Enc. Méth. ix. p. 76. n. 144 (1819).

3. *P. RAMACEUS*, Westw. Tr. E. S. 1872, p. 95.

Borneo.

4. *P. KEROSA*, Butl. Ent. Mo. Mag. vi. p. 55 (1869) ; Lep. Ex. i. t. 13. f. 2 (1870).

Sarawak.

5. *P. ZANOA*, Butl. Ent. Mo. Mag. vi. p. 56 (1869) ; Lep. Ex. i. t. 13. f. 1 (1870).
Sarawak.
6. *P. JUDA*, Butl. Ent. Mo. Mag. vi. p. 56 (1869) ; Lep. Ex. i. t. 13. f. 3, 4 (1870).
Sarawak.
7. *P. CAUNUS*, Westw. Cat. Or. Ent. t. 9. f. 2, 2* (1848).
Borneo.
8. *P. NEPTUNUS*, Guér. Deless. Inde, ii. p. 69 (1843).
9. *P. DEMOLION*, Cram. Pap. Ex. i. t. 89. A, B (1779).
Java.
10. *P. POLYTES*, Linn. Mus. Ulr. p. 186 (1764).^{*}
11. *P. THESEUS*, Cram. Pap. Ex. ii. t. 180. B (1779).
12. *P. ALBINUS*, Wall. Trans. Linn. Soc. xxv. p. 49. n. 54, t. 5. f. 5 (1865).
New Guinea.
13. *P. HELENUS*, Linn. Mus. Ulr. p. 185 (1764).
China.
14. *P. NEPHELUS*, Boisd. Sp. Gén. i. p. 210. n. 24 (1836).
Celebes.
15. *P. BRAMA*, Guér. Rev. Zool. 1840, p. 43, t. 1. f. 3, 4.
16. *P. ARJUNA*, Horsf. Cat. Lep. E. I. C. t. 1. f. 14, 14a (1828).
Java.
17. *P. MEMNON*, Linn. Mus. Ulr. p. 193 (1764).
18. *P. NOCTIS*, Hew. P. Z. S. 1859, p. 423, t. 66. f. 5, 6.
Borneo.
19. { *P. NOCTULA* ♂, Westw. T. Ent. Soc. 1872, p. 90.
 P. STRIX ♀, Westw. l. c. p. 92. } Borneo.
20. *P. ANTIPHATES*, Cram. Pap. Ex. i. t. 72. A, B.
China.
21. *P. SAPEDON*, Linn. Mus. Ulr. p. 196 (1764).
22. *P. EURYPYLUS*, Linn. Mus. Ulr. p. 216 (1764).
23. *P. BATHYCLES*, Zink. Nova Acta Ac. Nat. Cur. xv. p. 157, t. 14. f. 6, 7 (1831).
24. *P. AGAMEMNON*, Linn. Mus. Ulr. p. 202 (1764).
25. *P. ARYCLES*, Boisd. Sp. Gén. p. 231. n. 51 (1836).
Java, Sumatra.

26. *P. EMPEDOCLES*, Fab. Mant. Ins. ii. p. 10. n. 94 (1787).
East India.

27. *P. PAYENI*, Boisd. Sp. Gén. i. p. 235. n. 58 (1836).
Java.

28. *P. LOWII*, n. sp. (Plate XXXIII. fig. 6.)

Male. Upperside sooty black: posterior wing from the middle to the outer margin ashy grey, crossed by the black nervules; outer margin and tails black.

Underside sooty black, with a row of large black spots round the outer margin of posterior wing, the lower half of which is speckled with a few greyish scales; dark red at the base of both wings. Allied to *ascalaphus*, Boisd., but very distinct. I have named this fine *Papilio* after its captor Mr. Low.

Exp. $4\frac{1}{2}$ inches.

Hab. Borneo. In coll. H. Druce.

29. *P. ACUTA*, n. sp.

Male. Upperside: the anterior wing brownish black, darker at the base, having streaks of darker colour between the nervules and in the discoidal cell; the posterior wing glossy black.

Underside: anterior wing the same as above; posterior wing deep black, with six red lunular spots along the outer margin, and at the anal angle there is a small spot of the same colour.

Female the same as the male.

Exp. male $3\frac{1}{4}$, female 4 inches.

Hab. Borneo. In coll. H. Druce.

Genus LEPTOCERCUS, Swainson.

1. *L. VIRESCENS*, Butl. Cat. Fab. p. 259 (1870).
Java.

Family V. HESPERIDÆ.

Genus CÆSYAPA, Kirby.

1. *C. THRAX* (Linn.), Syst. Nat. i. 2. p. 794. n. 260 (1767).

Genus ISMENE, Swains.

1. *I. CHUZA*, Hew. Ex. Butt. iv. *Ism.* t. 1. f. 4 (1867).
Sarawak.

2. *I. JAINA*, Moore, P. Z. S. 1865, p. 782.
Darjeeling.

3. *I. BENJAMINII*, Guér. Deless. Souv. Ind. ii. p. 79, t. 22. f. 2 (1834).

4. *I. ŒDIPODEA*, Swains. Zool. Ill. i. t. 16 (1820–1821).

5. *I. VITTA*, Butl. Trans. Ent. Soc. 1870, p. 489.
Borneo.

6. *I. SENA*, Moore, P. Z. S. 1865, p. 778.
Bengal.

7. *I. MURDAVA*, Moore, *l. c.* p. 784.
Darjeeling.

Genus *CARYSTUS*, Hübn.

1. *C. LADANA*, Butl. Trans. Ent. Soc. 1870, p. 502.
Borneo.

2. *C. ELIA*, Hew. Trans. Ent. Soc. ser. 3. vol. ii. p. 489. n. 9
(1866).
Sumatra.

Genus *PROTEIDES*, Hübn.

1. *P. PHANÆUS*, Hew. Desc. Hesp. p. 14. n. 24 (1867).
Sarawak.

Genus *ASTICTOPTERUS*, Feld.

1. *A. DIOCLES*, Moore, P. Z. S. 1865, p. 787.
Bengal.

2. *A. XANITES*, Butl. Trans. Ent. Soc. 1870, p. 510.
Borneo.

3. *A. ARMATUS*, n. sp. (Plate XXXIII. fig. 7.)

Male. Upperside dark purplish brown; anterior wing crossed
from the costal to the anal angle by a broad deep-orange band.

Underside the same as above; body brown.

Exp. 2 inches.

Hab. Borneo. In coll. H. Druce.

Genus *PLASTINGIA*, Butler.

1. *P. HELENA*, Butler, Trans. Ent. Soc. 1870, p. 511.
Borneo.

2. *P. CALLINEURA*, Feld. Reise Nov. Lep. iii. p. 513, t. 71. f. 9,
10 (1867).
Java.

3. *P. HIEROGLYPHICA*, Butl. Trans. Ent. Soc. 1870, p. 511.
Borneo.

Genus *PLESIONEURA*, Feld.

1. *P. FEISTHAMELII*, Boisd. Voy. Astr. Lep. p. 159, t. 2. f. 7.

2. *P. PRIA*, n. sp.

Upperside dark brown: anterior wing with a semitransparent
white band from the costal to the median nervule; a small white
spot close to the anterior angle.

Underside the same as above, but lighter in colour.

Exp. $1\frac{1}{4}$ inch.

Hab. Borneo. In coll. H. Druce.

3. *P. SIGNATA*, n. sp. (Plate XXXIII. fig. 8.)

Upperside dark chocolate-brown; anterior wing with a large bluish-white oblong spot in the middle, commencing in the cell and extending almost to the anal angle.

Underside as above.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

Genus TARACTROCERA, Butler.

1. *T. SAGARA*, Moore, P. Z. S. 1865, p. 792.

Bengal.

Genus ANTIGONUS, Hübn.

1. *A. PYGELA*, Hew. Desc. Hesp. p. 53. n. 6 (1868).

Borneo and Malacca.

Genus SATARUPA, Moore.

1. *S. AFFINIS*, n. sp. (Plate XXXIII. fig. 9.)

Upperside brown: anterior wing with a series of seven transparent irregular-shaped white spots; posterior wing white, with the base and broadly along the outer margin brown, with a row of black marginal spots.

Underside as above, but with the posterior wing whiter, and the marginal row of spots blacker.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

Genus TAGIADES, Hübn.

1. *T. JAPETUS*, Cram. Pap. Ex. iv. t. 365. E, F (1782).2. *T. STRIATA*, n. sp.

Upperside dark brown: anterior wing with eight minute transparent spots in a curved band close to the outer margin; one spot at the end of the cell: posterior wing crossed beyond the middle by a band of oblong black spots; the outer margin with three black spots; from the anal angle to beyond the middle white.

Underside: anterior wing the same as above; posterior wing bluish grey nearly to the base, with the black spots as above.

Exp. $1\frac{1}{2}$ inch.

Hab. Borneo. In coll. H. Druce.

DESCRIPTION OF THE PLATES.

PLATE XXXII.

- Fig. 1. *Mycalesis amœna*, p. 339.
 2. *Athyma amhara*, p. 344.
 3. *Adolias bellata*, p. 344.
 4. *Meletus regina*, p. 348.
 5. *Cupido cornuta*, p. 349.
 6. — *cœrulea*, p. 349.

- Fig. 7. *Cupido almora*, 349.
 8. — *aluta*, p. 349.
 9. — *angusta*, p. 349.
 10. *Aphnæus frigidus*, p. 350.
 11. *Ilerda superba*, p. 350.
 12. *Hypochrysops clegans*, p. 350.



G. Sowerby. lith.

M. & N. Hanhart. imp.

MADEIRAN SHELLS.



C Sowerby lith.

M & N Hanhart imp

MADEIRAN SHELLS.



G. Sowerby lith.

M & N Hanhart imp

MADEIRAN SHELLS.

PLATE XXXIII.

- Fig. 1. *Sithon aurea*, p. 352.
 2. — *scopula*, p. 352.
 3. — *pallida*, p. 352.
 4. — *valida*, p. 352.
 5. *Amblypodia olinda*, p. 354.

- Fig. 6. *Papilio lowii*, p. 358.
 7. *Astictopterus armatus*, p. 359.
 8. *Plesioneura signata*, p. 360.
 9. *Satarupa affinis*, p. 360.

6. On some Marine Mollusca from Madeira, including a new Genus of the *Muricidæ*, a new *Eulima*, and the whole of the *Rissoæ* of the Group of Islands. By the Rev. ROBERT BOOG WATSON, F.R.S.E., F.G.S.*

[Received February 3, 1873.]

(Plates XXXIV.—XXXVI.)

To the 127 species named by Mr. M'Andrew in his necessarily imperfect list of Madeiran shells published in 1854 I have added some 200 or 250 more, making about 400 in all. Of these, 80 or 90 are probably new.

I propose to publish the rest as may be convenient. In the mean time I begin with a somewhat remarkable new genus, a new *Eulima*, and the whole of the *Rissoæ* which I have noticed here.

Of species already described, some present peculiarities in their Madeiran forms worthy of notice.

The measurements I offer are somewhat elaborate, but may easily be passed over by those who will. I think some may find them very useful. They are the average resulting from very many tire-some observations.

I reject Latin in the descriptions. That language refuses to lend itself pliantly to such purposes; and no man's ease in its use, though of ready acquisition, enables him to throw individuality into his word-pictures.

CHASCAX, gen. nov., Watson.

(*χάρκαξ*, a gaper, so called from the immense open umbilicus in its snout-like base.)

Shell spindle-shaped, strongly umbilicated, longitudinally ribbed and spirally ridged, but without varices. *Epidermis* horny. *Mouth-edge* angulated. *Outer and inner lip* quite smooth. *Canal* long, narrow, and deep, bent a little to the left, but not at all reversed in front.

Operculum strong, horny; *nucleus* terminal, internally strengthened by a broad ridge all along the right margin.

I regret to propose a new genus, believing as I do that great wrong has thus been often done to true science, the reckless multiplication of genera causing a stumbling-block even more pernicious than that of species-mongering. But in this case there is no help for it. It is obvious that to no genus, as at present defined, can this mollusk be reduced; and both Mr. Gwyn Jeffreys and Dr. Fischer,

* Communicated by J. Gwyn Jeffreys, F.R.S., F.Z.S.

who have kindly examined it for me, assure me that it belongs to no known genus. From *Rapana* of Schumacher, which it resembles in its gaping umbilicus, it is well distinguished by its elongated spire and its claw-like operculum. The operculum of *Rapana* is of the *Purpura* type. The genus obviously falls under the family *Muricidae* as so well defined by Mr. Gwyn Jeffreys.

CHASCAX MADERENSIS, Watson. (Plate XXXVI. fig. 30.)

Body coloured a deep fuscous red.

Shell conical, spindle-shaped; as the shell lies on its mouth the periphery in the centre of the back is exactly in the middle of the shell's length, the line to the point of the base and that to the tip of the spire being equal; solid, angulated, rough, and opaque; ribbed and spirally ridged, no varices. With an enormous umbilicus. Outer and inner lip smooth, with a long, straightish, and open, but deep canal. Epidermis horny and brown.

Sculpture, 11 to 12 broad, low, rounded, irregular ribs, which scarcely appear above the suture or on the elongated base; near the mouth they are most broad, rounded, and flattened; higher up on the course of the whorl they become narrower and sharper; on the penultimate whorl there are nine. There is nothing approaching a varix or labial rib.

There are spiral ridges. In crossing the ribs, these are more or less thrown out into long, narrow, and sharp murications. Of these ridges there are two on the upper whorls, but on the body-whorl there are three, each accompanied below by its shadow; that of the highest one is double. On the elongated snout-like base there are five or six of these faint ridges or threads, one of them about the middle being a little stronger than the rest. Of the three strong ridges, the highest is remote from the suture, and forms a strongly marked shoulder; it is very decidedly the strongest of the three, the lowest being much the feeblest. Between this shoulder and the suture a few (three or four) very faint spiral threads appear. Besides all these the epidermis is sharply but coarsely wrinkled longitudinally with very slight microscopic spiral striulations.

Colour uniform: that of the shell itself is light brownish orange; but the persistent epidermis is rich yellow-brown.

Epidermis a strong, horny, close-fitting, adhesive membrane.

Spire long, rising in steps, contracting regularly but rapidly to a narrow, small, and very sharp apex.

Whorls 6 to 7, angular, sloping downwards from the suture with rather a longish shoulder, and from the point of the shoulder dropping perpendicularly, *i.e.* parallel to the axis of the shell. The upper whorls have no contraction on their lower side, as the suture runs close below the second spiral ridge; on the body-whorl, however, there is a great contraction below the third spiral ridge; and beneath this contraction the base advances downwards in a long and very little-attenuated snout, which includes the canal and the enormous umbilicus, round which the shell runs in a great fold.

Suture slight, rough, and (apparently) slightly channelled, some-

what oblique, descending towards the mouth-corner from the whole last quarter of the body-whorl.

Mouth bluish white, with a narrow dirty yellowish edge. In form small, deep, very slightly patulous: in the depth of the throat perfectly oval, but towards the outside angulated; this angulation is at the upper corner slight, but at the shoulder of the whorl more distinct. The mouth thus resembles an irregular bowl of a spoon, of which the canal forms the shank. Exclusive of the canal, it is rather more than one third of the shell's length (*i. e.* as 8 to 22).

Canal long, narrow, deep, and slightly excavated in under the left side; but its lips are not at all contracted. In its course it is scarcely curved; but in its general direction it bends a little to the left. It ends in a semicircular notch. It is not at all recurved.

Outer lip angulated, sharp, narrow, but strong; internally quite smooth; not at all reflected, but a little patulous. It leaves the body in a very straight, but slightly retreating line; where it meets the line of the first spiral ridge it turns angularly downwards with a very slight curving in towards the line of the shell's axis; just below the lowest ridge it again alters (slightly) its direction, so as to run more longitudinally and straight along the side of the canal: just at the extreme point it swells a very little outwards.

Inner lip quite smooth, expanded as a thickish glaze on the belly; it sweeps round there with a perfect oval curve. At exactly half its length it is deserted by the great fold of the base which encircles the umbilicus: from this point it still for $\frac{1}{4}$ inch pursues the same direction to the beginning of the canal; there it turns sharply, and throughout the rest of its course runs in slightly towards the axis of the shell, overhanging the canal. Its edge all along the umbilicus is very sharp.

Pillar broad above, below cut off diagonally so as to expose to the fullest the enormous circular umbilicus, which is almost as large as the mouth, and which extends up into the heart of the shell; it is lined throughout with the epidermis; within, it can be seen coiling spirally upwards, the thick margin slightly marked by the old ends of the canal.

Operculum thick, horny, black, and claw-like; nucleus at the lower point; surface scored from side to side with numerous slight concentric lines. Its interior side is polished, with many slight concentric lines on its inner margin and on its central flat, and with a broad, thick, rounded border extending from its apex along its outer margin. It is perfectly represented in all respects by the picture in Adams's 'Genera,' pl. xvi. fig. 4, *a, b*, except that, as seems generally the case in that work, it is turned upside down.

		Canal									
		Sh.	M. (left side)		7.	6.	5.	4.	3.	2.	1.
L...	2.2	1.2	.37	1.2		.45	.27	.17	.1	.05	.03
B...	1.1	.55	.14	.61	1.		.63	.38	.18	.1	.05

Of this mollusk I have found (besides an unmistakable and perfectly fresh fragment broken off by the dredge, in Funchal Bay)

only one specimen, which was dredged at Ponta de São Lourenço in 50 fathoms. By the time my men brought me the dredgings, though the animal was perfectly recognizable so far as colour went, it was yet so much decayed that it broke to pieces in the process of extraction; and to complete the misfortune, I have mislaid the lingual process, which I hastily put aside in spirits for preservation. The shell was so completely covered with a hard thick incrustation of lime as to leave no portion exposed. With great care I succeeded in cracking off this incrustation in small bits from the last whorl, leaving the epidermis quite fresh below. On the upper whorls this incrustation and the shell beneath were so honeycombed by minute annelids that both broke together, and obliged me to pause in my work; these annelids have also produced some warts on the interior of both the outer and inner lip, which look deceptively like irregular folds or teeth.

EULIMA PAIVENSIS, Watson. (Plate XXXVI. fig. 29.)

Shell conic-oblong, white, strong, rounded in all its lines, broadish in the base, blunt in apex.

Sculpture smooth, with the rounded lines of a thing cast, not cut. There are numerous but very faint lines of growth, and a doubtful suggestion of excessively microscopic, close-set, spiral scratches, best seen on the upper whorls; beneath all these, as in many of the *Eulimæ*, the whole texture of the shell can, under the microscope, be recognized as built up of longitudinal, microscopic, hair-like, anastomosing columns, each about $\frac{1}{1000}$ inch broad. The labial rib is strong and spread out.

Colour semitransparent bluish white, like very much watered milk, rendered brown by the presence of the animal. Behind the labial rib there are three rusty stains, which show a tendency to extend across the body-whorl as bands; the highest and strongest is just at the apparent marginal band below the suture; the second is at the periphery, the third on the base.

Spire elongated, conical, with its contour-lines not quite straight, but a little curved; apex blunt and somewhat incurved.

Whorls 7 to 8, very slightly rounded, of regular increase; the last is large.

Suture slight, not quite smooth, little oblique, remotely margined by the through-shining of the whorl above it.

Mouth pear-shaped, being oval below, intrenched on by the curve of the belly; pointed above, and very minutely channelled at the upper corner, deep.

Outer lip thick, but finely though roundly edged. Some six or eight concentric lines, which form the edges of the several accretions of which the lip is built up, may be traced one within the other. The lip retreats above, so as to form a very slight, shallow, and open sinus; below it advances a little, and has a free round sweep across the base.

Inner lip is spread in the form of a pad of enamel over the pillar, which it envelops completely, and extends upwards as a thick callus

across the body; in front it is crossed obliquely by a shallow open depression.

	Sh.	M.	8.	7.	6.	5.	4.	3.	2.	1.
L...	·159	·063	·069	·027	·023	·014	·01	·007	·004	·003
B...	·077	·049	·059	·066	·054	·039	·026	·019	·013	·006

Hab. Selvagens, shore.

By the specific name I have selected for it, I desire to acknowledge my obligations to the Baron do Castello de Paiva, to whom I owe it and all the other shells I possess from the Selvagens. They were procured by him from the men who annually visit these somewhat inaccessible islands for barrilha, orzella, and sea-birds. The Rev. R. T. Lowe has given a very interesting notice of the flora of the Selvagens in a little work published three years ago by Van Voorst; I regret that I can communicate so very little regarding their Mollusca. I may take the opportunity, however, of stating the fact, which has not, I think, been published as yet, that *Helix coronula*, Lowe, has been found (it has been communicated to me by the Baron de Paiva) in these islands, where previously the only land-shell known to exist was *H. ustulata*, Lowe, a species found nowhere else in the world; *H. coronula* has also been found by the Baron's collectors in Bugio (the Southern Deserta) and at Caniço, one of the nearest points in Madeira,—facts of great interest in connexion with the distribution of species, and serving to connect through their fauna Madeira and these little islands, which, as regards their flora, are, according to Mr. Lowe, more nearly related to the geographically more contiguous Canaries.

RISSEA LEACOCKI, Watson. (Plate XXXIV. fig. 1.)

Shell conic-oblong, solid, squarely tubercled, transparent, glossy. The two lines of the spire, from the periphery to the apex on the left side of shell, and from apex to extreme corner of mouth on the right, are perfectly straight, broken only by the square ditch-like sutures, while the basal line connecting these two is an unbroken curve; this arises from the fulness of the base and the thickness of the pillar.

Sculpture, longitudinal threads, 15 to 18, strong, oblique, traceable from whorl to whorl, disappearing on $1\frac{1}{2}$ whorl, running down almost to the very point of base; the last appears as a strong broad white labial rib. Spiral threads of about the same size cross these longitudinal threads, forming large knobs or tubercles at the intersections; these knobs are less strong on lower part of base, but are often traceable even on the spiral threads of the pillar, where they form the only representatives of the longitudinal threads, which die out in the interstices of the spiral threads on the base. Of these spiral threads there are eight or nine on the last whorl. Two additional but feebler ones generally appear between the three highest just before they reach the labial varix, which they all strongly cross, but stop short of the extreme edge of the mouth, leaving in advance of them a plain narrow margin; on the fourth and fifth whorls there

are three, on the third two (on this whorl both the longitudinal and spiral threads are smaller relatively to the size of the whorl than on the others). All these markings are abruptly cut off by a cross line, above which is the embryonic $1\frac{1}{2}$ whorl, having a series of quite independent spiral threads, four (on the extreme apex six) in number, and $\frac{1}{600}$ inch apart.

Besides these markings, the whole surface of the shell when very fresh may be seen to be covered with very faint and superficial spiral striations; but these are rarely visible. There are also a good many irregular and much coarser, but still very faint longitudinal markings. Both of these can be best seen on the labial varix; they produce a slight frosted appearance.

Colour yellowish or faintly brownish white, with two broad spiral bands of colour, the higher and broader extending from the suture, and including the two upper spiral threads, the lower including the two spiral threads below the periphery; between these two bands of colour one spiral thread with its intersectional knobs stands strongly out in the yellowish-white colour of the shell. On the penultimate whorl, the upper edge of the lower band of colour just shows in the suture; on the superior whorls the two upper spiral threads are coloured, the lower one is pale. The first two whorls are uncoloured. On the labial rib, the end of *each* spiral thread is coloured: when fresh, this colour is an exquisite brilliant crimson; but it soon fades to a ruddy brown. The whole pillar and the interior of outer lip are opaque white.

Spire elongated, conical, ending in blunt round point.

Whorls 5 to 6, almost perfectly flat, of very gradual increase. The extreme tip of the embryonic whorl is slightly turned in; so that the apex of the shell is formed by a somewhat more advanced part of the first whorl.

Suture straight, rather deep, and very strongly marked, being broad and trough-like; the underside of the trough is perpendicular to its bottom line, the upperside slopes in.

Mouth white, obliquely set, pear-shaped, flattened across the belly; small, with a slight sinus at the upper corner excavated out of the thickness of junction of outer lip and body, very slightly expanded towards the lower outer corner. No teeth within the lip.

Outer lip thickened by the strong labial rib; straight above, well rounded in its basal sweep; slightly sinuated from the forward advance of the lip at lower outer corner. On its forward edge the margin is pretty broad, flat or slightly hollowed into a groove, longitudinally striated, and bears a sharp projecting flange on its inner side forming the extreme mouth-edge. This flange takes its rise on the inner side of the sinus formed at upper corner of mouth, and sweeps all round, till at the point of the pillar it gradually coalesces with the outer lip-margin, and the two thus united become the edge of the pillar.

Inner lip white, thin, a very little reflected, slightly projecting from the thick and heavy pillar so as to leave a narrow chink, faintly continued across the body.

	Sh.	M.	6.	5.	4.	3.	2.	1.
L. . .	·117	·045	·05	·026	·018	·011	·007	·006
B. . .	·063	·034	·051	·056	·045	·03	·019	·011

Hab. Gorgulho, shore ; Santa Cruz, shore ; Selvagens, shore ; Ponta de São Lourenço, shore to 45 fathoms ; Piedade (Canical), 15 to 35 fathoms ; Funchal Bay, up to 50 fathoms ; Porto Santo, up to 50 fathoms.

My specimens from the Selvagens, given me by the Baron de Paiva, are very large and strongly tubercled from the strength of the longitudinal and spiral threads.

I strongly suspect that this is the same species as Signor Manzoni's *R. calathus* from the Canaries and Madeira. That certainly has teeth within the lip and is somewhat stumpier in form ; but these are both variable characters ; and in spite of the somewhat rubbed and bleached condition of the specimens (from Tenerife) of Manzoni's species, which I owe to the kindness of Mr. M'Andrew, I have recognized the characteristic markings on the embryonic shell as identical with those of my species.

That this species, at least, is distinct from *R. calathus* is a view in which I am supported by the opinion both of Mr. Gwyn Jeffreys and of the Baron Schwartz v. Mohrenstern. The two species have certainly some points of superficial resemblance, but differ in form, in texture, in colour, in threading both longitudinal and spiral, in the shape, make, and colour of the pillar, whole shape of mouth, constitution of outer-lip margin, and in markings of embryonic tip (?).

I have named the species after my friend Mr. Thomas Leacock, who has done much for the study of the Madeiran land-mollusks.

RISSEO CANCELLATA, da Costa. (Plate XXXIV. fig. 2.)

In M'Andrew's list.

Hab. Gorgulho, shore ; Ribeiro secco, 10 fathoms ; Santa Cruz, 10 to 15 fathoms ; Machico, 10 to 15 fathoms ; Piedade (Canical), 15 to 35 fathoms ; Ponta de São Lourenço, 25 to 45 fathoms ; Porto da Cruz, 50 fathoms ; Porto Santo, 50 fathoms ; Funchal Bay, 50 fathoms.

A European, Mediterranean, and Canary species.

The Madeiran form of this shell is smaller than the British, and the whorls are more angulated. The teeth within the mouth are fewer by a half than the number given for them by Mr. Gwyn Jeffreys (vol. iv. p. 9, Brit. Conchology) ; but this is a feature of very little specific value.

RISSEO AURANTIACA, Watson. (Plate XXXIV. fig. 3.)

Shell oblong, thick, not transparent, a little glossy, tubercled, rising in steps.

Sculpture, longitudinal ribs, on body-whorl 18 to 20, gently rounded, disappearing on base ; diminishing in number upwards on the whorls, and absent on the embryonic whorl ; each is about twice as broad as the interval between them.

Spiral threads 12 to 13, raised, rounded, shining; those on upper part of body-whorl are thrown out by the ribs into sharp points; they are generally pretty equally parted by spirally scratched interstices a little broader than themselves; on the base they are sometimes closer-set, and sometimes are followed by a kind of miniature of themselves occupying half the interstice. The spiral scratchings of the interstices are extremely minute; and though more distinct than in *R. moniziana*, they do not interfere with the gloss of the surface as they do in *R. crispa*; about six go to each interstice. There is a broad, thick, white labial rib, which is strongly scored across by the spiral threads; and between these the interstitial scratches are plainly shown; but all these disappear just short of the mouth, which is edged by a thin and narrow border in advance of the labial rib; this border is well scored longitudinally.

Colour orange (whence the name), with a slight dash of brown, in some cases paler, in others darker, but with little variety, and quite uniform in each specimen, except that sometimes, though rarely, the first whorl has a shade more of brown. The labial rib is whiter than the rest of the shell.

Spire long, very little contracted upwards, rising but slightly in steps, ending in a depressed round apex, which is always higher on the side where the extreme embryonic tip stands up.

Whorls 4 to 5, fully rounded, of regular increase.

Suture deep, little oblique.

Mouth very round, obtusely pointed above and encroached on by the belly; not open, except a little in front and on the pillar.

Outer lip much thickened by the labial rib, but on its extreme edge sharp and thin, slightly expanding below. Its exterior profile, as the shell lies on its back, is formed by the labial rib bearing as knobs the ends of the spiral threads.

Inner lip consists of the projecting edge of the outer lip, which sweeps continuously round; on the pillar it is a little reflected, and has there a sharp but little-projecting edge, with an umbilical chink behind it; this chink is generally small and narrow, but is sometimes open and trough-like. The callus which carries the pillar-lip across the belly is thin and closely united to the body; at its junction with the outer lip it seems always, in well-grown specimens, to project a little way out from the body to meet that lip.

	Sh.	M.	5.	4.	3.	2.	1.
L...	·080	·027	·033	·018	·013	·008	·007
B...	·042	·023	·03	·04	·03	·02	·013

Hab. Piedade (Canical), 15 to 35 fathoms; Ponta de S. Lourenço, 25 to 45 fathoms; Funchal Bay, up to 50 fathoms; Porto Santo, up to 50 fathoms.

I have named this shell from its colour.

RISOA STRIATA, Adams; var. LIRATA, Watson. (Plate XXXIV. fig. 4.)

Not in M'Andrew's list.

Hab. Gorgulho, shore; Selvagens, shore; Santa Cruz, shore to 15 fathoms; Machico, shore to 15 fathoms; Piedade (Canical), 15 to 35 fathoms; Ponta de São Lourenço, 25 to 45 fathoms; Funchal Bay, up to 50 fathoms; Porto Santo, up to 50 fathoms; Teneriffe (*vide* Jeffreys, Brit. Con. vol. iv. p. 38).

A coralline-crag, Arctic, Siberian, European, Mediterranean, Canary, and East North-American (*vide* J. G. Jeffreys, Ann. & Mag. Nat. Hist. 1872) species.

Is this Madeira species really the *R. striata* of Adams? There is much to justify its elevation into a distinct species. It can be unfailingly distinguished by the strong basal threads. The difference between them, however, I have sought to mark by calling this var. *lirata*.

There is a further variety existing equally among Madeiran and British forms of this species, which might be indicated by the var. called *candida* by Brown; only this var. is not "devoid of the longitudinal ribs" as *candida* is. It is more cylindrical, narrower, with whorls more fully rounded, and with a broader second whorl, and with a more spherical tip; compared with this the typical form is more conical, with an outline less interrupted by the sutures, somewhat shorter in proportion to breadth, and narrowing upwards more equally to a small rounded but depressed apex.

As in almost all species, a larger and a smaller form are also found.

I owe my Selvagens specimens to the kindness of the Baron de Paiva.

RISSOA COSTATA, Adams. (Plate XXXIV. fig. 5.)

Not in M'Andrew's list.

Gorgulho, shore; Selvagens, shore; Santa Cruz, shore to 15 fathoms; Machico, shore to 15 fathoms; Piedade (Canical), 15 to 35 fathoms; Ponta de S. Lourenço, 25 to 45 fathoms; Funchal Bay, up to 50 fathoms; Porto Santo, up to 50 fathoms; Teneriffe, *vide* M'Andrew.

A European, Baltic, Mediterranean, and Canary species.

The embryonic whorl of this shell is not "quite smooth," but carries distinctly the spiral striæ.

The Madeiran form, like that (*vide* Jeffreys, B. Con. iv. p. 23) found at Spezzia and Tenerife, is very small.

I owe my Selvagens specimens to the Baron de Paiva.

RISSOA CRISPA, Watson. (Plate XXXIV. fig. 6.)

Shell conic-oval, whorls rising above each other in steps, solid, translucent, somewhat glossy.

Sculpture: longitudinal ribs about 12, distant, narrow, ridge-like, not flexuous, but strongly bent from left to right; these become rather fewer upwards, and disappear on the first and second whorls; they lap up on the preceding whorls (without adhering to them), and nearly conceal the suture. On the body they hardly stretch below the periphery, being cut off in a broadish furrow, which runs

spirally round the base from the junction of the lip and the body-whorl; below this furrow is a strong spiral ridge, which takes its rise exactly from the upper corner of the mouth; below this ridge is another furrow, deeper and broader than the previous one. The labial rib is broad and thick, not notched as in *R. costata*, and is separated from the edge of the mouth by a sharp projecting flange.

Spiral threads, on last whorl above the basal furrow and ridge 7, on penultimate 5, on preceding whorl 3, on the top whorls none. These threads are clear and transparent, and form knots where they cross the longitudinal ribs; their interstices are exquisitely crisped (whence the name) with microscopic spiral striations, faintly crossed by longitudinal sinuous frettings. The $1\frac{1}{4}$ whorl is embryonic, cut off by a distinct longitudinal line, and carries five to six minute raised threads, between which in very fresh specimens there is some faint trace of the spiral striations.

Colour clear white, as if frosted, with more or less of an orange tinge. Embryonic whorls opaque white, caused by something in the interior of the whorl, not arising from the colour of the shell itself.

Spire rises in steps, rather short, ending in a small round projecting point, which is not formed by the extreme tip of the embryonic whorl, that tip being a little introverted or immersed.

Whorls 5 to 6, rounded, the last of rapid increase. The first is often broken; when present it appears strongly flattened or hollowed, and is thrown up on one side from the immersion of the tip.

Suture almost effaced by the upward extension of the longitudinal ribs, but between these deep, and behind them slightly channelled.

Mouth small, rounded oval; very bluntly pointed above; expanding at the lower inner corner.

Outer lip very thick, with 12 to 13 sharp knobs on its exterior profile, one of them, the end of the great basal ridge, being often very large. Along its whole sweep it is defined by a concentric ridge on its outer, and by another on its inner edge; between these ridges is a furrow-like excavation. It is slightly sinuated above. The labial varix is distinctly disjoined from the preceding whorl by the channel of the suture.

Pillar-lip extremely thick, scored across by four strong twisted ribs; its inner side is formed by the internal ridge of the outer lip, which is continued all round the mouth.

Operculum thin, yellow, striated with strongish lines and finer ones intermediate.

	Sh.	M.	5.	4.	3.	2.	1.
L...	·084	·032	·044	·017	·011	·007	·006
B...	·048	·025	·037	·042	·028	·017	·01

Hab. Gorgulho, shore; Monte de Piedade (Canical), 25 to 35 fathoms; Ponta de São Lourenço, 25 to 45 fathoms; Santa-Cruz Bay, 10 to 15 fathoms; Porto Santo, 50 fathoms; Funchal Bay, 50 fathoms; Teneriffe (M'Andrew's dredgings).

This species resembles *R. zetlandica*, but is broader; the spiral ribs are more numerous, and its apex is more flattened and lop-

sided. From *R. macandreae*, var. *spretæ*, it differs in being broader; its basal rib is much stronger; its longitudinal ridges are fewer, sharper, more nodulous, with broader interspaces; its spiral threads are finer and closer-set; the suture is interrupted by the longitudinal ridges; the apex is more truncated and lop-sided; outer lip is much thicker and externally knobbed; mouth is slightly more oblique; pillar-lip is scored by 3-4 instead of 2-3 twisted ribs. Mr. Jeffreys is inclined to consider this a variety of *R. macandreae*.

Rissoa gibbera, Watson. (Plate XXXIV. fig. 7.)

Shell. In outline almost a rectangle, with sides in the proportion of 3 to 4, the right slope of spire being parallel to base, and left slope to the edge of the mouth; solid, rising in steps with a huge umbilicus; dull.

Sculpture. Ribs strong, narrow ($\cdot 003$ broad), high, sharp, flexuous, rising above the suture in a pointed shoulder or hunch and dying out on the base; on lowest whorl about 12, including the enormous labial rib, one more and all straight on the previous whorl. The $1\frac{1}{2}$ whorl has none; and where they first begin to show they only appear on upper part of whorl below suture. The interspaces are from two to three times as broad as the ribs. Both interspaces and ribs are covered with longitudinal flexuous lines of growth, and with spiral scratches, both being excessively microscopic, superficial, and faint; they are best seen on labial varix. The $1\frac{1}{2}$ whorl has 6 to 8 faint spiral lines in the substance of the shell. The 2nd whorl has a slight spiral thread round its base above the suture; this thread sometimes appears on base of shell below periphery. On base a heavy spiral ridge projects downwards; it sweeps round the umbilicus, whose edge it forms, and at the point of the pillar is transformed uninterrupted into the huge labial varix.

Colour pure white to ruddy brown, often with a slight dusty bloom on the surface, and with four narrow bands slightly darker than the general tint, of which one close above and one close below periphery, one on base and one close to root of the basal ridge; on upper whorls two, one in lower suture, and one in middle of whorl. The embryonic $1\frac{1}{3}$ whorl is always lighter in colour than the shell; so, too, is the basal ridge and the labial varix, though the latter is stained by the spiral bands of colour.

Spire rising in strongly marked steps, ending in a blunt round top. The actual curve of the spire is deeply concave from the projection of the ribs on body-whorl; but the general impression produced by the two lines of the spire is that they meet at almost a right angle.

Whorls 4 to 5, well rounded; but, from the hunch-like shoulder on the ribs below suture, each whorl seems to swell out suddenly above and then to contract below; of regular increase until the last whorl, which is out of all proportion large. The extreme tip of the shell is turned in; and the apex is excavated, with a prominent margin.

Suture almost quite straight, deeply excavated behind the hunches of the ribs, and a little channelled.

Mouth almost disconnected from body-whorl; a very perfect oval, lying a little transverse to the length of the shell; scarce contracted across the belly, and hardly at all narrowed towards the upper corner; open; especially patulous below; surrounded by a heavy margin, with a pad at upper corner.

Outer lip enormously thrown out, from the form of the mouth, the thickness of the shell, and above all, by the great projection of the labial varix. This varix is thick, white, and scored by the longitudinal and spiral striolations, which, however, do not appear on the lip front. It is sinuated above, but not channelled below. At its junction with body-whorl it leaves a deep sharp narrow chink. It is roundly flattened on its front surface, and edged internally with a narrow, blunt, and slightly projecting flange, which sweeps round the whole mouth. This flange sometimes fails to project beyond the plane of the surface, and then merely forms a kind of shelf; sometimes it is followed deeper within the mouth by another shelf. Outside of this flange a slight marginal edging sweeps round parallel to the extreme outline of the varix.

Pillar-lip is formed internally by the labial flange, which here becomes a mere shelf, and externally by the marginal edging of the outer lip, which, sweeping round to the point of the pillar, splits off jaggedly from the labial varix, forms a sharp, narrow, and reflectedly projecting edge between the mouth and the huge and deep umbilicus, and hardly touches the body-whorl except to bury the umbilical ridge and to unite itself to the pad of the outer lip.

	Sh.	M.	5.	4.	3.	2.	1.
L.	·073	·026	·039	·014	·01	·006	·005
B.	·055	·026	·046	·045	·027	·022	·01

Hab. Gorgulho shore; Santa Cruz, 10–15 fathoms; Machico, 10–15 fathoms; Monte de Piedade (Canical), 15–35 fathoms; Ponta de São Lourenço, 25–45 fathoms; Porto Santo, up to 50 fathoms.

Mr. Gwyn Jeffreys says of this species, "A very beautiful and new species, allied to *R. costata*, Adams." The basal ridge and fossæ and the high, sharp, narrow ribs have some suggestion of a resemblance; but the short hunchy form (whence I have named it), the smooth surface, and prodigious umbilicus are far more elements of contrast. I doubt its being a *Rissoa*; but I have unfortunately never found the living animal, nor even met with the operculum.

RISSEO MACANDREWII, Manzoni. (Plate XXXIV. fig. 8.)

Hab. Funchal Bay, up to 50 fathoms; Cruz Point, 50 fathoms; Canary Islands (Manzoni, from M'Andrew's dredgings).

In some of its forms *R. macandrewi* greatly resembles some forms of *R. canariensis*; but the spire rises more in steps, the last three whorls are less attenuated, the ribs are wider-set, are broader, and fewer; the spiral scratchings are much more distinct. The heavy white labial rib and the absence of the brown stain either on this rib or on the tip of the apex are very distinctive. Manzoni's figure

(Journ. de Conch. 1868, pl. x. fig 1) has, on the whole, fairly caught the general character of this shell. The really bad features of the figure are:—the mouth, which fails to give the angulation at the junction of the pillar and the tip at the extreme base; the lip, which is represented as bevelled from the interior of the mouth outwards to the outside of the shell, whereas it is the inner margin of the lip which projects as a flange; and the spire, which is made to form an almost perfect cone instead of rising strongly in steps in consequence of the depth of the suture and the angular droop of each whorl below the suture.

I here subjoin *Rissoa spreta* as a mere variety of *R. macandrewi*. I have long held it to be a different species; and the two can be unfailingly distinguished, there being no connecting links. The general shape, the surface-sculpture, the form of the suture, of the apex, and of the pillar present slight differences; but the really strong points of distinction are the fosse on the base, the rounded swell of the whorls out of the suture, the more perfectly oval mouth without angulation on the base, and the absence of the distinctively white mouth and base. Beyond doubt it has a better claim to specific recognition than very many received species; and I am far from convinced that it will not ultimately be accepted as a distinct species. At the same time, after very careful study of a large number of these specimens, I do not feel quite certain that it really is a distinct species; and where any doubt exists it ought to weigh on the side of suppression, any thing being better than a multiplication of false species. Mr. Gwyn Jeffreys, too, holds my *R. spreta* for a mere variety of *R. macandrewi*; and what is, with me, stronger than all, I fail to find any difference in the embryonic whorls; and identity in the earliest development must outweigh much later diversity.

Var. SPRETA, Watson. (Plate XXXIV. fig. 9.)

Hab. Santa Cruz, 10–15 fathoms; Machico, 10–15 fathoms; Piedade (Canical), 10–15 fathoms; Ponta de S. Lourenço, 25–50 fathoms; Porto Santo, up to 50 fathoms.

This variety has some resemblance to *R. crispa*, but is not so hunchy, its spiral threads are not so close, the spiral striolations are not nearly so distinct, the spiral furrows and threads on the base are not nearly so strong, the longitudinal ribs are more numerous, not so sharp-topped, not so curved; above all, these ribs do not cross the suture to lap up on the previous whorl. The mouth lies more straight in the line of the shell's length.

RISSEO MONIZIANA, Watson. (Plate XXXIV. fig. 10.)

Shell conic-oval, thinnish, not glossy, frosted, transparent; whorls rising in steps.

Sculpture. Longitudinal ribs very rarely present on penultimate whorl, indistinct, rather irregular, narrow; somewhat oftener they appear on body-whorl very indistinctly below the suture, and even extend below the periphery, but generally, when seen at all, resemble faint irregular puckerings close below the suture. Labial rib is

strong relatively to thickness of shell, is cut off by a nick from previous whorl, is very sinuous relatively to plane of spire, is very faintly crossed by spiral threads.

Spiral threads on body-whorl 7-9, transparent, prominent. The first, nearest suture, always projects less than the others, and often disappears, as does also the second occasionally. The fifth is the prolongation of the suture. The seventh and eighth (sometimes it is the sixth and seventh, rarely the eighth and ninth) are parted by an interval deeper and wider than any of the others; hence a hunch on the base. The ninth merely encircles the pillar, and lies close to the outer left margin of the mouth. On the third and on lower part of the second whorls there are four of these threads; in the second whorl they are abruptly cut off; and above this, on the embryonic shell, they are replaced by six microscopic hair-like spirals. The interstices of the spiral threads are 3 to 4 times the breadth of the threads, and are delicately but very closely tooled with excessively minute undulated spiral scratches, of which about 4 go to $\frac{1}{1000}$ in. These cause the frosted appearance of the shell. When the longitudinal ribs are present, the threads in crossing them form faint knobs, and the whorl is cut into long narrow meshes.

Colour pure white, transparent on the threads, frosted in the intervals.

Spire rises in steps, is short, blunt, and truncated, the tip being turned in.

Whorls 4-5, well-rounded, with a sloping shoulder below the suture, of very regular increase.

Suture deep and very straight.

Mouth very open, large for size of shell, very triangular in consequence of the extreme straightness of the line across the body and from the flattening on the base.

Lip thick, with a sharp projecting flange on the inward side. At the outer lower corner it advances so much in front of the plane of the mouth as almost to form a sinus and a channel.

Inner lip projected (rather than reflected) on the pillar, so as to form a distinct umbilical groove or chink. Across the body it almost dies away, but reaches the outer lip, which throws out a slight pad to meet it.

	Sh.	M.	5.	4.	3.	2.	1.
L.	·068	·027	·034	·016	·009	·006	·002
B.	·043	·025	·033	·037	·025	·015	·007

Hab. Gorgulho, shore; Monte de Piedade (Canical), 15-35 fathoms; Ponta de São Lourenço, 25-45 fathoms; Funchal Bay, 50 fathoms; Porto Santo, 50 fathoms.

This species somewhat resembles *R. subcarinata* and *R. aurantiaca*. It differs from both in its broader form, whorls rising in steps, large spoon-like and triangular mouth, deeper suture, fewer and more rounded whorls, fewer spiral threads, the scrobicular parting of two of these on the base, the abrupt apex with in-turned tip, and its pure white colour.

Mr. Gwyn Jeffreys says of it, "certainly a new species, but closely allied to *R. watsoni*;" and he adds that it resembles also *R. tenera* of Philippi.

I have called it after my friend, that excellent island-naturalist Senhor João Maria Moniz.

Rissoa watsoni (Schwartz). (Plate XXXV. fig. 11.)

Shell conic-oblong, thin, transparent, rather brilliant, glossy; whorls rising somewhat in steps.

Sculpture. Spiral threads on body-whorl 9-10, prominent, rounded; first generally smaller than others; the second forms a kind of shoulder, and along with third and fourth is usually somewhat more prominent than the rest; the last winds close round the pillar. On the fourth whorl there are four of these threads; on the third and lower part of second whorl three. In second whorl these threads are abruptly cut off, and are replaced in embryonic shell by about eight non-transparent spiral furrows, parted by fretted ridges $\frac{1}{1500}$ inch broad. The interstices of the spiral threads are from two to three times the breadth of the threads, the three higher threads being somewhat wider apart than the others. In these interstices the surface is covered with microscopic spiral scratches, which, however, are neither sharp nor deep enough to interfere with the general glossiness of the shell. Very often these interstices are crossed longitudinally at unequal intervals by 20 to 25 faint ribs (sometimes no more than lines), which do not at all show upon the threads, and which die away at the periphery.

The labial rib is somewhat remote from the lip, is rather broad, and is very little raised.

Colour generally yellowish white, flecked along the spiral threads and also (near the suture) in the interstices with opaque white and brilliant ruddy brown patches, often passing over from this into uniform dull white or rich brown. The extreme apex never has a blackish tip.

Spire long, ending in a perfectly hemispherical top, of which the embryonic tip generally forms the very apex.

Whorls $4\frac{1}{2}$, not so much rounded as angulated by a sloping shoulder below the suture, most strongly marked on left side of shell; of regular increase.

Suture very strongly marked, but shallow, somewhat oblique.

Mouth very well rounded, its curve being only a little contracted across the body, very slightly expanded at lower inner corner.

Lip sharp and thin, scarce marked on outside by the spiral threads.

Inner lip very sharp, and so far reflected and projecting as it advances downwards as almost wholly to conceal the pillar, leaving a slight umbilical chink behind it. It is thinly continued across the body-whorl to meet the upper corner of the outer lip.

	Sh.	M.	5.	4.	3.	2.	1.
L....	·066	·027	·028	·017	·01	·007	·004
B....	·038	·025	·027	·035	·025	·016	·008

Hab. Gorgulho, shore (very rare); Piedade (Canical), 15–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Porto Santo, up to 50 fathoms; Santa Cruz, 10–15 fathoms; Machico, 10–15 fathoms; Porta da Cruz, up to 50 fathoms; Funchal Bay, up to 50 fathoms.

This species is accepted as new by Mr. Gwyn Jeffreys and by the Baron Schwartz.

From *R. moniziana* this species differs in that it is thinner, narrower, more pointed, more brilliant; the spiral threads do not present the same contrast with the interstices; these last are not so broad. The mouth is rounded and on the same plane, not of the strange, triangular, oblique spoon-shape it has in that other.

It certainly resembles the smooth and small variety of *R. canariensis*, in which the stain on the embryonic tip is often almost invisible; except in badly rubbed specimens of that species, however, some trace of that stain can be seen. Besides, this species as compared with *R. canariensis* is always narrower in proportion to length, is thinner, has the spiral threads more raised; and even when it has some trace of longitudinal ribs, these never show on the spiral threads. The labial rib, too, is by comparison quite insignificant.

From *R. aurantiaca* it differs in that it has fewer, higher, and more distant threads, and no regular, raised, longitudinal ribs.

A Sicilian *Rissoa* kindly sent me by the Marquis of Monterosato is quite certainly not this species. He has published the specific name above given.

RISSOA CANARIENSIS, D'Orbigny. (Plate XXXV. fig. 12.)

Not in M'Andrew's list.

Hab. Gorgulho, shore; Santa Cruz, shore to 15 fathoms; Machico, shore to 15 fathoms; Piedade (Canical), 15–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms; Porto da Cruz, up to 50 fathoms; Porto Santo, up to 50 fathoms. Semifossil, Canical beds. Tenerife, shore (*D'Orbigny*); 40–60 fathoms (*M'Andrew*).

This species presents several variations of form; but I am not struck by those, specially mentioned by Signor Manzoni, dependent on great differences in the proportions of the length and breadth of the shell. As in all the mollusks, some are larger than others, some are a little broader in proportion to length. The variety which departs most widely from the typical form is one uniform in colour, sometimes very light, sometimes dark chocolate, with the longitudinal ribs reduced to mere striæ and much diffused and the spiral threads also much lowered; in this form it resembles a small variety of *R. punctura*, from which, however, it is easily distinguishable, above all, by the embryonic apex.

I cannot but think that *R. philippiana*, Jeffreys, is only a striking and somewhat aberrant variety. It is identical with *R. canariensis* in the microscopic fretting of the whole surface, and especially in the microscopic markings of the embryonic whorl.

R. canariensis differs from *R. spreata* in having no fosse on the

base; from *R. macandrewi* in the number and narrowness of its longitudinal ribs, the greater depth of the suture, the greater swell of the whorls, the finer and more mucronated spiral threads, stain on apex and on lower lip corner; from *R. watsoni* in greater size, especially of upper whorls, stronger and more regular ribs, stain on apex; from *R. novarensis* in being smaller, less tumid, less brilliant, ribs much fewer, spiral threads fewer and more strongly marked on the ribs, spire rising in steps.

RISSOA NOVARENSIS, Watson. (Plate XXXV. fig. 13.)

Shell conic-oval, not rising in steps, somewhat solid, glossy, brilliant, subopalescent.

Sculpture. Longitudinal ribs, from 20 to 30, narrow, flexuous, about as wide as their intervals, diminishing in number on upper whorls and dying out on base. Labial rib thick and strong. Spiral threads on body-whorl about 14; they are slightly broader below than above periphery, where they are sometimes evanescent; they are about twice as broad as their interstices. Six of these usually appear on the penultimate whorl, but they become too indeterminate for counting. They are always most distinct in the rib-intervals; on the rib-crests they tend to evanesce. Besides these, the whole surface is covered with faint longitudinal lines; and on the upper whorls especially exceedingly fine microscopic spiral lines can sometimes be traced. On the embryonic $1\frac{1}{2}$ whorl about twelve closely and finely stippled spiral lines are visible.

Colour yellowish white, opalescent on ribs, with three broad irregular and interrupted bands or series of spots of a clear yellowish brown, darkest near the mouth. The first is below the suture, the second at the periphery, the third on base. The first and second tend to coalesce behind the labial rib, at which point the third series also expands, crossing the rib and staining the lower outer corner of the mouth, the whole outer edge of which has a tinge of brown. The belly is yellow, and the whole pillar and labial rib an opaque white. The tip of the embryonic shell is a rich deep chestnut-brown.

Spire a short broad cone, terminating in a blunt flattened apex in the centre of which the brown tip swells into sight.

Whorls 4 to 5, very much flattened so as to form a continuous straight slope from tip to periphery, of rather rapid increase.

Suture straight, shallow, narrow, but very distinct.

Mouth oval, very little pointed above, contracted on its outer upperside, but expanded on base.

Outer lip thickened by a heavy white rib, somewhat incurved above, and there bevelled off from the outside to a sharp edge, whereas on the base the bevelling-off is from the inside entirely. This labial rib lies a little way back from the edge; and beyond it the sharp mouth-edge is only scored by fine longitudinal lines.

Inner lip is barely detached from the pillar, so as to leave a slight chink; it is continued pretty thickly across the belly, and meets the outer lip in a rounded and somewhat padded angle.

	Sh.	M.	5.	4.	3.	2.	1.
L.....	·087	·037	·042	·02	·011	·007	·006
B.....	·055	·032	·042	·05	·033	·02	·013

Hab. Gorgulho, shore; Santa Cruz, shore to 15 fathoms; Machico, 10–15 fathoms; Piedade (Canical), 15–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms; Porto da Cruz, up to 50 fathoms.

From *R. canariensis* this species differs in its squat and conical form, in not rising at all in steps, in having more numerous and flexuous ribs, more numerous and less-marked spiral threads, and the tendency of these to disappear instead of to become mucronate on the crests of the ribs.

From *R. punctura* it differs in that it is much squatter, much more strongly sculptured, much more brilliant in colour, has fewer whorls, and terminates much more abruptly in a flattened and stained apex. The embryonic whorls are $1\frac{1}{2}$ (not $2\frac{1}{2}$) to 3; and their spiral lines are formed of approximate stippings, not, as in *R. punctura*, of remote tubercles.

The name was suggested by Baron Schwartz v. Mohrenstern, to whom I had sent the species for description. He wished in this way to recall the frigate 'Novara,' employed by the Austrian government on a scientific voyage round the world. The name is unfortunately not very appropriate, but is better than a new name, whose substitution might breed confusion, an already sadly prevalent misery in scientific nomenclature.

The species is accepted as unquestionably new by Baron Schwartz and by Mr. Gwyn Jeffreys.

Rissoa violacea, Desmarest. (Plate XXXV. fig. 14.)

In M'Andrew's list.

Hab. Porto Santo, up to 50 fathoms.

A subarctic, European, Mediterranean, and Canary species.

Mr. M'Andrew, in his 'List of Atlantic Mollusca,' has, through a slip of the pen, given this as *R. purpurea*.

Rissoa costulata, Alder. (Plate XXXV. fig. 15.)

Not in M'Andrew's Madeiran list.

Hab. Piedade (Canical), 25–35 fathoms; Ponta de São Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms; Porto da Cruz, up to 50 fathoms.

A European and Mediterranean species.

In accordance with the present received opinion I accept *R. violacea* and *R. costulata* as distinct species. Beyond question they can be distinguished: *R. costulata* is on the whole more drawn out altogether and in all its parts than the other; but the best mark of distinction is that it has the spiral striæ stippled with minute, equal, close-set, longitudinally elongated dots; while in *R. violacea* these pitted dots are much larger, are variable in size, are parted by broad flat bars, and are elongated across, *i. e.* in the breadth of the shell.

The whole of these differences, however, really resolve themselves

into the form and arrangement of the longitudinal bars, which, regardless of the line of the oblique ribs, score the whorls straight across.

Rissoa similis, Scacchi. (Plate XXXV. figs. 16 & 16 a.)

Not in M'Andrew's list.

Hab. Selvagens, shore; Porto Santo, shore to 50 fathoms; Machico, 10–15 fathoms; Santa Cruz, 10–15 fathoms; Piedade (Canical), 10–15 fathoms; Ponta de S. Lourenço, 25 fathoms; Porto da Cruz, 50 fathoms; Funchal, 50 fathoms.

This is a most troublesome species, and would afford any species-monger ample exercise. But on a large collection of specimens it is impossible to establish even well-marked varieties, so variable and interchangeable are the peculiarities of form, sculpture, and colour. On the whole, however, there are two distinct varieties—one ribbed, the other smooth (var. *levis*), the former being relatively longer and broader than the other. These varieties are found quite promiscuously intermingled, only that I found the clearest, brightest, and on the whole most aberrant specimens of the var. *levis* among drift seaweed on the clean sandy shore of Porto Santo.

Mr. Gwyn Jeffreys (Brit. Conch. vol. iv. p. 37) regards this species as a small variety of *R. costulata*, to which I would gladly have united it here if I could have convinced myself that that or the others of that unsatisfactory group had any better right than this species of Scacchi to separate recognition. In their present hopeless state I prefer to leave them alone.

Rissoa albugo, Watson. (Plate XXXV. fig. 17.)

Shell conic-oblong, peculiar as being slightly spindle-shaped, from the last half whorl being contracted in its breadth and drawn out in length, glassily transparent, thin, smooth, and glossy.

Sculpture. One distinct but very fine and shallow spiral furrow, like a scratch, shows itself just below the periphery but above corner of lip, and runs round to very edge of lip in front; below this the whole base is covered with a series of very faint equally distanced spiral lines about $\frac{1}{1000}$ inch apart, very rarely visible; above periphery a series of still fainter and more minute spiral lines can sometimes be seen, as it were, in the substance of the shell: the whole surface is covered with very faint, flexuous, longitudinal lines of growth; these alone are traceable on upper whorls.

Colour, when fresh, transparent glassy white, with a yellowish tinge, dotted with minute, $\frac{1}{300}$ -inch square, crimson, angular dots, arranged in series of spirals 10 to 20 in number, about as numerous above the spiral furrow as below it; these are sometimes arranged at such regular intervals in the successive spirals as to form perfect squares; in other specimens they become, above the periphery, longitudinally confluent in pairs so as to form couples of little longitudinal crimson lines (about twelve couples on last whorl, fewer on preceding), somewhat irregular, interrupted, and flexuous; each pair are parted from the next set by a space somewhat broader than

that occupied by the lines. Sometimes these longitudinal lines are interrupted, and a sudden return is made to the spiral-dot arrangement; sometimes, after one, two, or three spiral lines of dots, the longitudinally confluent lines are reverted to. On the base there is much less tendency to this longitudinal confluence of the dots. Round the pillar they are entirely absent; and this part has always some tendency to be milky white. On the first two whorls these dots are also absent, but two or three series appear on third whorl. In some cases these dots remain projecting when the rest of the surface has weathered off. Besides these crimson dots, and quite independent of them, there appears at the periphery of each whorl a single series of much larger ($\frac{1}{200}$ -inch square), opaque (not opalescent nor transparent) white spots (whence the name). They are oval or circular, not irregular or indefinite in outline; ten or twelve go to each whorl. Their lower edge is exactly cut off by the spiral furrow. In the fourth and fifth whorls they lie quite above the suture. They seem much less superficial than the crimson dots; but it is they which efface those when they interfere with one another. When the shell is no longer fresh, the crimson of the dots fades to a ruddy brown, and the glassy transparency of the shell becomes troubled; but some trace of the white spots can generally be discovered to the last. The tip of the shell is opaque white, with no trace of brown stain on embryonic whorl.

Spire elongated, regularly contracted, ending in a blunt, round, and slightly depressed apex.

Whorls $5\frac{1}{2}$, a little angularly rounded; the spiral furrow on base produces a very slight carination just below periphery.

Suture straight, broad, and shallow.

Mouth small, irregularly quadrangular, caused by the great length and extreme straightness of the pillar, by the angularity of its junction with the body and still more with the outer lip, by the great straightness of the outer lip and its tendency to a slight angulation at its outer and lower corner, and, finally, by the flatness of the basal line. In the young shell these characteristics, though traceable, are not so strongly pronounced as in the old.

Outer lip sharp, thin, straightish, contracted rather than expanded, at lower corner a little more extended and opener, across base flattened and slightly patulous, joining pillar at a distinct angle.

Inner lip straight, sharp-edged, slightly bevelled back rather than reflected on the long and straight pillar, where it forms a slight and very shallow umbilical chink; it leaves the pillar a little angularly, and is continued across belly to join outer lip, which it reaches at almost a right angle.

	Sh.	M.	6.	5.	4.	3.	2.	1.
L...	·09	·036	·037	·022	·014	·009	·005	·003
B...	·05	·031	·032	·047	·035	·022	·014	·007

Hab. Gorgulho, shore; mouth of Ribeiro Secco, Funchal, 10 fathoms; Santa Cruz, 10-15 fathoms; Machico, 10-15 fathoms; Piedade (Canical), 15-35 fathoms; Ponta de S. Lourenço, 25-45

fathoms; Porto Santo, 50 fathoms; Funchal Bay, 50 fathoms; Cruz Point, 50 fathoms. Semifossil in the Caniçal beds. Teneriffe.

Baron Schwartz von Mohrenstern, in a letter (April 1868) to Mr. Gwyn Jeffreys, says of this, "probably a variety of your *R. picta*." With this view Mr. Gwyn Jeffreys does not agree, considering it unquestionably "a new and good species." From *R. picta* it may be distinguished easily, being longer and narrower in proportion, apex blunter, whorls rounder, suture deeper, base contracted, mouth quadrangular, pillar straight and long, texture of shell and whole system of coloration utterly different.

The shell it is most liable to be confounded with is a smooth and attenuated variety of *R. similis*; but that shell has a blunter (*i. e.* broader) and flatter apex, spire rather more contracted, mouth larger and less quadrangular, and both shouldered and sinuated above, is not flattened on base, nor angulated at junction of lip and pillar; shell less glassy; tip of embryo stained with blackish brown, its colour never crimson but always brown, not in minute dots but in continuous zigzag lines, often dying out but never breaking into minute regular dots on base. The white spots, too, are more elongated, more indefinite, being shaded off at edges; connected, too, with a system of longitudinal ribs, of which there is in that species always some, though often faint, trace.

From Mr. M'Andrew I have received two specimens of a *Rissoa* marked by him "n. s.?" but so much bleached as barely to present any trace either of the crimson dots or of the white spots, but which I am satisfied belong to this species, whence I have added *Tenerife* to the localities where it has been found.

RISSEO PICTA, Jeffreys. (Plate XXXV. fig. 18.)

Not in M'Andrew's list.

Hab. Gorgulho, shore; Santa Cruz, shore; Seixal, shore; Selvagens, shore; mouth of Ribeiro Secco, 10 fathoms; Piedade (Caniçal), 15-20 fathoms; Ponta S. Lourenço, shore and 45 fathoms; Funchal Bay, 50 fathoms; Porto Santo, up to 50 fathoms.

R. picta is longer and narrower than *R. depicta*, has no labial varix, the spiral striæ are much more indistinct and more like one another, the whorls are more flattened, the spire is longer, and the tip of the shell has no stain.

Than *R. concinna* it is longer, narrower, more compressed in the whorls, different in sculpture and in colouring.

From *R. cingillus*, which the banded form much resembles, it differs in being greatly smaller even than the young of that species, having the same number of whorls; it is not at all pointed on the extreme point of the base, which that species when young always is; and the lowest band lies much higher up on the base and never discolours the pillar.

RISSEO CONCINNA, Monterosato. (Plate XXXV. fig. 19.)

Not in M'Andrew's list.

Hab. Gorgulho shore; Santa Cruz, shore to 15 fathoms; Machico,

10–15 fathoms; Piedade (Canical), 15–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Porto Santo, up to 50 fathoms; Porto da Cruz, 50 fathoms; Funchal, up to 50 fathoms.

I have no doubt this is the *Cingula concinna* of Monterosato, whose figure is admirable, and his description, though short, characteristic; one specimen of his species, kindly sent me by him, I have also compared. Is the species really distinct from *R. semistriata*? My impression is that they are the same; and in this I am fortified by the opinion of Mr. Gwyn Jeffreys. Still the two species are unquestionably distinguishable. *R. concinna* is smaller, more in steps, when mature thicker, hunchier altogether, lip more thickened internally, pillar thicker, point of it more hunchy, mouth smaller and rounder, lines of growth more distinct, the supersutural striæ on upper whorls more distinct, spots of colour more broken. None of these are strongly marked features, but may serve in the mean time to justify our acceptance of the distinction into two species of these forms, the responsibility of the distinction resting with the Marquis. What relation does this species bear to *R. callosa*, Manzoni? My belief is that they are probably the same; but neither from his description nor from his figure, nor even from the specimens kindly sent me by Mr. M'Andrew, do I find myself able to arrive at any certainty. If they are the same, Manzoni's name must claim priority.

There are at least two very marked varieties of this species, one being much thinner, more in steps, and somewhat more elongated than the other; but the two forms are so perfectly linked by intermediate bonds as to defy distinction. There are also great differences in size. Some thus approach *R. depicta*, from which they differ, however, in this, that in this species the longitudinal striæ are weaker than in *R. depicta*, the white of the base round the pillar is smaller and less opaque, the red spots are less brown, but, above all, the embryonic tip shows neither the microscopic striæ nor the dark brown stain of that species.

The other very small variety resembles *R. pulcherrima*, but is distinguishable by its whole form and by the spiral striæ of the surface.

RISSEA DEPICTA, Manzoni. (Plate XXXV. fig. 20.)

Cingula maculata, Monterosato.

Rissoa punctifera, Watson, MS.

Hab. Gorgulho, shore; Machico, 10–15 fathoms; Piedade (Canical), 15–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Porto da Cruz, 50 fathoms; Funchal Bay, 50 fathoms; Teneriffe (M'Andrew's dredgings, *fide* Manzoni). Sicily: Palermo, shore; Trapani, coralligenous sand (*fide* Monterosato).

Baron Schwartz v. Mohrenstern marked this species as "not determined, but seems a variety of *R. semistriata*, Mont." Mr. Gwyn Jeffreys adopts the same view. It is easily distinguishable by its labial varix and thicker lip, want of any angulation at the lower inner corner of mouth, presence of one furrow on body-whorl much stronger than the others, droop of upper corner of mouth below line of this furrow, the peculiarity of the spiral striations as *above*

(not below) the suture, but best of all by the spiral striæ on embryonic whorl and by the dark point on the tip. In this respect it resembles *R. novarensis* and *R. canariensis*, but cannot possibly be confounded with them.

I have felt the greatest hesitation in the identification of this species. After examining a specimen of *Cingula maculata*, Mont., kindly sent me by the Marquis de Monterosato, I was on the whole persuaded that his species and mine from Madeira are really the same. But *maculata* is a specific name already appropriated by Brown to *R. inconspicua*, a fact which makes it an undesirable one for another species unless there be no escape. But is Manzoni's name, which I have adopted as being earlier, really preferable? As to his description I am really unable to say what it suits, as his *R. callosa* and *R. depicta* want individuality; and the specimens kindly sent me by Mr. M'Andrew of these two species have not helped me much. Still, on the whole, from the descriptions and from the specimens, I infer:—first, that there are two species to be identified; secondly, that among specimens in my possession bearing the names of the two species are some specimens which *most probably* belong to the same species as my specimens from Madeira (which I had proposed to call *R. punctifera*, from their black-pointed tip). Hence I infer that this is probably the species which Manzoni meant to describe under the name *R. depicta*, and that the name indicates the bleached condition of the specimens which served for his description—a fact which will explain his statement that the species is “dépourvue de toute espèce de taches.” In the end, it has been for me a choice of evils; but a mistaken identification, if it should so prove, is less injurious than a false manufacture of a new species. I therefore, noting the difficulty, call my Madeiran species by the name of Manzoni's species from Teneriffe, leaving at the same time my MS. name in case it should ultimately be wanted.

RISOA PULCHERRIMA, Jeffreys. (Plate XXXVI. fig. 21.)

Not in M'Andrew's list.

Hab. Gorgulho, shore; Santa Cruz, 10–15 fathoms; Machico, 10–15 fathoms; Piedade (Canical), 15–35 fathoms; Ponta S. Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms; Porto Santo, up to 50 fathoms.

I give this species as *R. pulcherrima* on the authority of Mr. Gwyn Jeffreys; but for his judgment and in the absence of actual specimens I should have found the descriptions and figures, so far as I know them, too unlike the Madeira form, which is smaller, longer and narrower, contracted at the mouth, and with an open shallow suture.

RISOA PERMINIMA, Manzoni. (Plate XXXVI. fig. 22.)

Shell conic-oval, short, thinnish, with a suffused brown horny transparency.

Sculpture smooth, with close-set slightly bent microscopic lines of growth.

Spiral threads on the base 5-6, very faint and shallow; the lowest two close to the pillar are sometimes a little stronger than the others; of these a very doubtful trace sometimes appears above the periphery. On the upper part of the whorls near the suture a multitude of very sharp, minutely microscopic, superficial spiral frettings are visible. The $1\frac{3}{4}$ whorls are embryonic, and have an independent set of very fine, microscopic spiral lines, about seven in number.

Colour fundamentally a yellowish white, of a horny transparency; but in fresh shells this is so tinged with a suffused rich chestnut that the fundamental colour only shows through on the base (where it appears as a broad band) and, somewhat less purely, in a band above the periphery, which band is visible on the penultimate whorl, but disappears higher up, so that the upper whorls are of a uniform pale chestnut. There are thus on the body-whorl a chestnut band close to the suture, a narrow clear band below this, a broad chestnut band at the periphery, and a clear whitish band occupying the whole base except the centre and belly-lip, which are stained with a deeper and richer chestnut than any other part except the suture behind the lip, which is also very dark. In the dead shell this chestnut has a great tendency to fade. In rare instances (two among some hundreds) these chestnut bands on the body-whorl show a tendency to break up into spots, large and squarish near the suture, longer and inclined to part in the middle in the peripheral band. In the full-grown shell the lip-edge is generally occupied by a broad clear white band.

Spire short and above the body-whorl attenuated, terminating in a small but blunt round top. The contour-lines of the right and left sides of the shell are very dissimilar, the right being very flat, while the left is immensely arched.

Whorls 4-5, slightly rounded; the last is disproportionately large and ventricose.

Suture a mere scratch, being the less distinct from the extent to which the lower whorl laps upon that which precedes it; defined by a remote (generally) dark brown line, produced by the shining through of the preceding whorl.

Mouth oval, across the belly a good deal flattened, above very slightly, but at last very sharply pointed, large and a little patulous all round.

Outer lip thin, transparent white (though sometimes the brown bands advance up to the very edge), with a free continuous sweep all the way round.

Inner lip stained with intense brilliant chestnut; on the umbilicus a little reflected, so as to leave behind it a very narrow but not shallow chink; carried across the belly by a rather thickish callus, which is a little bevelled outwards.

Operculum extremely thin and smooth, with scarcely any trace of circular divergent lines, but with one strong longitudinal line parallel to the inner margin.

	Sh.	M.	5.	4.	3.	2.	1.
L.....	·05	·025	·026	·013	·006	·003	·001
B.....	·033	·021	·021	·027	·017	·009	·004

Hab. Gorgulho, shore ; Santa Cruz, 10–15 fathoms ; Machico, 10–15 fathoms ; Piedade (Canical), 15–35 fathoms ; Ponta de S. Lourenço, 25–45 fathoms ; Porto Santo, up to 50 fathoms.

This species extremely resembles *R. pulcherrima*, with which I at first associated it, till Mr. Gwyn Jeffreys's practised eye discerned the difference in some specimens I had sent him. The two are unquestionably different. They are most easily distinguished by the former being spotted, while this is banded ; but as I have two specimens of this species in which the bands have broken somewhat into spots, the rich chestnut stain at the centre of the base and on the belly-lip must be noted. Its difference from the little-known species *R. cossuræ*, Calcara, specimens of which I owe to the kindness of the Marquis de Monterosato, requires particular notice. Put together, they cannot be confounded ; of nearly the same size, they differ very much in form. *R. cossuræ* is comparatively small in the base and last whorl, minute in mouth, stumpy in spire and apex, second and third whorls broad, all the whorls closely rolled together ; its colour is crimson, not chestnut. The central spot on base and belly-lip is much larger in *R. cossuræ* ; the spiral scratches on the whorls are more distinct ; there are no sharp frettings below the suture. On the embryonic whorls I failed to distinguish any microscopic lines, which in *R. perminima* are easily seen. *R. cossuræ* (if the mouth be excepted) suggests a minute *R. cingillus*, while *R. perminima* approaches *R. pulcherrima*.

Compared with *R. fulgida*, which in colour it somewhat resembles, this is much longer and narrower. The whorls are not nearly so rounded ; suture not at all deep ; spire attenuated ; apex more pointed ; mouth not round, but oval and pointed above ; and there is an umbilical chink. Mr. Gwyn Jeffreys regards this species as the *R. perminima* of Manzoni.

RISSOA ABJECTA, Watson. (Plate XXXVI. fig. 23.)

Shell conic-oblong, small, white, opaque, rather strong, with complete peristome.

Sculpture. Longitudinal lines of growth a little bent, microscopic, with here and there a line somewhat stronger than the rest. Spiral frettings minutely microscopic, very faint and superficial. The first two whorls, which are embryonic, seem to have a few spiral lines or scratches.

Colour opaque yellowish or creamyish white, quite uniform except that the embryonic whorls are rather yellower.

Whorls 5–6, flattened, but slightly rounded, with a very faint tendency to angularity below. The two embryonic whorls are very markedly smaller than the third, out of the middle of which they rise as a little cone, which seems to be truncated in consequence of the excessive minuteness of the extreme tip.

Suture rather straight, thread-like, slightly channelled.

Mouth oval, smallish, scarcely contracted on the belly, slightly pointed above.

Outer lip gently rounded, not patulous, sharp but not thin.

Inner lip reflected on the pillar, leaving behind it a narrow but deepish umbilical chink; carried across the belly by a distinct callosus, the edge of which projects free from the body-whorl. The two lips meet at somewhat more than a right angle.

	Sh.	M.	6.	5.	4.	3.	2.	1.
L. . . .	·071	·029	·031	·019	·011	·006	·003	·001
B. . . .	·039	·024	·025	·036	·026	·017	·009	·003

Hab. Funchal Bay, 50 fathoms.

Of this species I have found only one specimen, and it probably a dead shell, though perfectly fresh. It may be a true Madeiran species; but I confess I should not be surprised were it to prove a *Hydrobia* introduced in ballast. In the mean time I have put it here among the *Rissoæ*, believing that it is a new species, and perceiving nothing to exclude it from such fellowship.

RISSEO GLABRATA, von Mühlfeld. (Plate XXXVI. fig. 24.)

Not in M'Andrew's list.

Hab. Gorgulho, shore; Seixal, shore; Santa Cruz, shore; Ponta de São Lourenço, shore and 25–45 fathoms; Piedade (Canical), 25–35 fathoms.

My specimens, from deep water, of this species are very few. It lives abundantly on the shore beneath sheltered stones below high-water mark. In spite of its smallness it is not difficult to find, its white colour making it conspicuous on the black lava-stones of the beach. It is best got by clearing off the loose upper shingle till one reaches the less movable (but not very deep-lying) under layers, where one also finds *R. picta*, *R. Leacocki*, *Odostomia turrita*, *Pedipes afra*, *Marinula (Auricula) æqualis*, Lowe, *Melampus exiguus*, Lowe, and other shells.

Of the animal, Baron do Castello de Paiva, in his 'Monographia Molluscorum Insularum Maderensium,' says "Corpore toto albo, pellucido, tentaculis brevissimis, pede oblongo." His "var. *a. duplo minor*" may, I think, be suppressed. A difference of form, however, such as he alludes to as "Subvar. Testa minus ampla . . . apertura strictiore" is found, dependent on the greater contraction of the outer lip.

From the description (probably) and from the figure (certainly) of *R. (Cingula) balteata* I infer that Signor Manzoni has made a new species out of the Atlantic form of *R. glabrata**, needlessly as I believe—an opinion supported "certainly" by Mr. Gwyn Jeffreys, who has examined Signor Manzoni's specimens of *R. (Cingula) balteata*. Mr. M'Andrew, from whom Signor Manzoni procured his specimens, has kindly sent me three examples of this species. Of these three, *two* are *R. glabrata*, and one is my species *R. lineta*. I should have preferred suppressing that name of mine and adopting *R. balteata* as perhaps intended for it, if it had been possible to take the description and, still more, the figure of that species as in any way applicable to my *R. lineta*.

* He gives *R. glabrata*, Mühl., indeed, as found in Madeira, but he does this only as quoting from Baron de Paiva, who refers for it to me.

RISSEO SABULUM, Cantraine. (Plate XXXVI. fig. 25.)

Not in M^r Andrew's list.

Hab. Gorgulho, shore; Porto Santo, shore; Selvagens, shore; Piedade (Canical), 15-35 fathoms; Ponta de São Lourenço, 25-45 fathoms.

There is great difficulty about the identification of this species. Weinkauff (Conchylien des Mittelmeers) and Petit de la Saussaye (Moll. d. Mers d'Europe) do not mention it. (Why?) Baron Schwartz v. Mohrenstern holds the Madeira shells I sent him to be Cantraine's species. Mr. Gwyn Jeffreys (*in litt.*) rejects this identification. For myself, *if* some shells procured from a dealer really come, as they profess, from the Mediterranean, *and* are, as is most probable, *R. sabulum* (by obvious error they were ticketed *R. glabrata*), no doubt remains. Even to the microscopic markings this Mediterranean species and my one from Madeira are identical. But *is* this Mediterranean species the *R. sabulum* of Cantraine? His description is painfully vague, and is further in many points quite inapplicable. The shell is not "subrimata" nor "corneo-cinerascente;" the suture is not "submarginata;" the mouth is not "alba," nor is the lip "obtusum" nor "intus marginatum." On the whole, however, rather than risk falling into species-mongering, I prefer to believe that his description was meant for this Mediterranean species; and in that case I have no doubt that my Madeiran species is, as I have called it, the *R. sabulum* of Cantraine.

On the shore at the Gorgulho I found this species plentifully living among the stony seaweeds which cover the rocks, and among which *Cardita calyculata*, *Saxicava rugosa*, *Rissoa pulcherrima*, and *R. perminima*, along with a *Sipunculus (johnstoni?)* and other creatures find refuge in great numbers. At Porto Santo the same was the case.

In my dredgings I only met with stray dead specimens. From the Selvagens I found one or two specimens among other species obtained on the shore, and which were given me by Baron do Castello de Paiva.

Mr. Jeffreys considers this the type of Von Mühlfeld's *R. glabrata*, and says it is abundant throughout the Mediterranean. In that case the identifications of Mühlfeldt's species by other writers are erroneous; for the two species are certainly distinct.

RISSEO LINCTA, Watson. (Plate XXXVI. fig. 26.)

Shell oblong, subcylindrical, obtuse, rather strong, glassily transparent, and glossy, as if licked (*lincta*).

Sculpture. Lines of growth rounded in outline, straight, very slight, cross the whorls.

Spiral striolæ can be seen with good light under the microscope, excessively minute, flexuous, superficial, and impressed (not scratched). It is their superficiality rather than their closeness which makes them so difficult to see. They are not unlike (only much finer than) the very minute striolæ between the striæ of *R. striata*. Three flatly rounded spiral threads encompass the pillar, and appear faintly on

the edge of the basal lip. The lowest is the strongest; and above the highest and feeblest there is some faint trace of others on the whole body-whorl. The embryo whorl is quite smooth.

Colour. Pure transparent white, with sometimes a yellowish tinge; opaque when shell not quite fresh.

Spire elongated, ending rather abruptly in a blunt point.

Whorls 4-4½, well rounded, long, of gradual increase in length and breadth.

Suture oblique, deep.

Mouth rather large, projecting, and open; almost a semicircle from the free advance from the body and full sweep of outer lip, along with the great straightness of the line of the inner lip across the belly. Bluntly pointed above, and a little so below at point of pillar.

Outer lip sharp and thin, slightly detached from body, and a very little and openly sinuated, thrown well and roundly out from the line of the body, a little projecting beyond the plane of its surface below, fully arched across base, and joining point of pillar in an angulation. The point of the pillar is very doubtfully, if at all, excavated.

Inner lip blunt and rounded, very slightly projecting on pillar, so as to leave a open and shallow umbilical trough, bounded externally by the lowest basal thread. It crosses the body in a very straight line, carried across by a shelf-like and not very narrow callus, and advances a little way out from the body to join the outer lip at almost a right angle.

	Sh.	M.	5.	4.	3.	2.	1.
L.	·059	·024	·025	·016	·01	·006	·003
B.	·029	·021	·023	·026	·02	·013	·007

Hab. Santa Cruz, 10-15 fathoms; Funchal Bay, up to 50 fathoms; Teneriffe.

Of this species I have only found five specimens: probably, like *R. tenuisculpta*, it belongs to the deeper sea. The operculum I have not seen; and in the absence of that distinguishing feature, the very slight excavation at the point of the pillar seems too indeterminate to require the classification of this shell with *Rissoina*, though I doubt its continuing among the *Rissoæ*.

Of three specimens of *R. balteata* (Manzoni) sent me by Mr. M'Andrew, one is this species (*R. lincta*), the other two are certainly *R. glabrata*, Mühlf. From Mr. M'Andrew's specimen, therefore, I have added "Teneriffe" as an additional locality for this species. Its presence, however, among specimens of so-called *R. balteata* led me further to inquire carefully whether it was not this species which Signor Manzoni meant to describe under that name. But it is impossible to think that this was the case: his description is quite inapplicable to *R. lincta*; his figure is still more so; and, finally, he does not give *R. glabrata* at all as found at the Canaries. Now, as I have specimens of *R. glabrata* taken at Teneriffe by Mr. M'Andrew, it is obvious that the species I regard as *R. glabrata* he reckons a distinct species and describes under the name of *R. balteata*.

RISSEA CORIACEA, Manzoni. (Plate XXXVI. fig. 27.)

Hab. Santa Cruz, 10–15 fathoms; Machico, 10–15 fathoms; Piedade (Canical), 25–35 fathoms; Ponta de S. Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms.

There are two pretty-well-marked varieties of this species, of which the one is larger in all its proportions, but distinctly longer relatively to breadth, with half a whorl more, thinner, more delicate, more contracted in lower part of each whorl. The other variety, from which Signor Manzoni's description and figure have been taken, is more frequent; it is a stumper shell, with sometimes a tendency to a very slight thickening and rounding-over of the outer lip.

Mr. Gwyn Jeffreys suggests that this should perhaps be classed under *Fossarus*. Signor Manzoni confesses the difficulty he felt as to its true place. It is certain that *R. tenuisculpta* and this species must go together, probably in the end to fall under a new genus, for the satisfactory establishment of which data are still wanting.

RISSEA TENUISCULPTA, Watson. (Plate XXXVI. fig. 28.)

Shell cylindrically oblong, thin, glossy, transparent, colourless.

Sculpture. Longitudinal lines of growth few, faint, hair-like. Spiral scratchings about $\frac{1}{2000}$ inch apart, a little irregular and unequal, slightly fretted but not at all cancellated, very superficial, quite as distinct on the upper whorls as on the base. On embryonic whorl they are replaced by another set of spirals, about $\frac{1}{1000}$ inch apart and slightly deeper-seated (*i. e.* less on surface) and stronger. The point of junction of these two series is very faintly marked early in second whorl.

Colour uniform yellowish white.

Spire elongated, cylindrically conical, ending in a blunt round tip, which is a little inverted.

Whorls 5, probably 6 in fully adult shell, of very gradual and regular increase, very well rounded.

Suture little oblique, deep, but open.

Mouth a very perfect oval, only a little intrenched upon and flattened across the belly, and very slightly and bluntly pointed above; open.

Outer lip thin but not sharp, a very little separated from the body, with a slight tendency to form a sinus above, advancing and slightly expanded towards its outer lower corner, but not really channelled on the base.

Inner lip sharp, a little advancing, so as to leave a very small umbilical chink, continued thinly across the belly, and projected a very little out from the body, so as to join the outer lip.

	Sh.	M.	5.	4.	3.	2.	1.
L....	·074	·029	·029	·018	·012	·007	·006
B....	·034	·023	·023	·03	·022	·016	·011

Hab. Ponta de S. Lourenço, 25–45 fathoms; Funchal Bay, up to 50 fathoms.

Mr. Gwyn Jeffreys says that this is the same as one of the deep-

sea species obtained by him in the 'Porcupine' dredgings in the North Atlantic and Mediterranean. I have accordingly accepted the excellent name which he had already attached to his undescribed specimens. It seems to be the only new species I have found here which has yet been met with in these deep-sea dredgings.

Its connexion with *R. coriacea*, Manzoni, is obvious and interesting. The whole texture of the shells, from their embryonic state onwards, indicates that whatever the place ultimately assigned to the one, must be shared by the other. Manzoni suggests *Odostomia* as its possible genus; but the untwisted or regular apex negatives that idea. Until something is known of the animal, the species may well remain among the *Rissoa*. To coin a new genus for it at present would only be to multiply an evil which is already well-nigh unbearable.

BARLEEIA RUBRA, Mont.

I add this species on the authority of Manzoni, who, in his 'Mémoire sur les *Rissoa* des îles Canaries et de Madère,' says he has many specimens from Madeira. For myself, I have not met with it here, and have serious doubts of its existence in Madeira.

In addition to the above, the following species have presented themselves. They may belong to the island; therefore I enumerate them; but my specimens have, I think, been brought in ballast. They are all dead shells, and were dredged in Funchal Bay. Now, apart from the indigenous land- and freshwater-shells which, drifted out to sea, not unfrequently turn up in the dredge, I have there found, of land-shells quite certainly foreign, the following:—*Pisidium amnicum*, *P. fontinale*, var. *henslowana*, *Neritina fluviatilis*, *Bythinia tentaculata*, *Valvata piscinalis*, *V. cristata*, *Planorbis albus*, var. *draparnaldi*, *P. complanatus*, *Limnæa peragra*, and *Assimineæ grayana*.

Such a list makes me hesitate to accept the following for Madeira.

RISSEO MONTAGUI, Payr.

One young specimen.

This is a fossil species of the Upper Tertiary and a living Mediterranean species, which, beyond the Straits of Gibraltar extends (*fide* M'Andrew) northwards as far at least as Cape S. Maria, the southern point of Portugal. South of the Straits it seems unknown.

RISSEO INCONSPICUA, Alder.

One specimen.

An Upper-Tertiary fossil, and living (*fide* Jeffreys) from Norway to the Canaries, including the Baltic and the Mediterranean. My solitary specimen is young and fresh. It may prove to belong to Madeira; but the species in itself seems to me too questionable to be of much interest, save as a variety of that hopeless polymorphic group which includes half a dozen British and endless foreign species.

Rissoa parva, da Costa.

Two specimens.

An Upper-Tertiary fossil. Living, its distribution is like that of the last. My two specimens are old and broken.

Hydrobia ulvæ, Pennant.

Distribution, fossil and living, like the last.

I have found a dozen and a half of young bleached and broken shells, such as ballast-boats would probably pick up on a flat shore.

Besides these, two other species require mention:—

Rissoa coronata, Scacc. MS., quoted by Philippi, vol. ii. p. 127.

This species is not uncommon here, but is undoubtedly not a *Rissoa*, but, as Philippi hints, a *Scalaria*, whether *S. scacchi*, Hörnes, as Weinkauff (vol. ii. p. 238) asserts on the authority of Hanley, or *S. macandrewi*, Forbes, MS., = *S. crossilabrum*, Sowerby (*Thesaurus Conchyliorum*), as Mr. Gwyn Jeffreys (*in litt.*) assures me.

Rissoa cingillus.

Mr. Gwyn Jeffreys (Brit. Conch. vol. v. p. 208) has given Madeira on my authority as a locality for this species. I had never meant to say so, but merely to inquire whether *R. picta*, Jeff., might not possibly be an aberrant variety—a question which we were ultimately agreed must be answered in the negative.

EXPLANATION OF THE PLATES.

PLATE XXXIV.

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| Fig. 1. <i>Rissoa leacocki</i> , p. 365. | Fig. 7. <i>Rissoa gibbera</i> , p. 371. |
| 2. ——— <i>cancellata</i> , p. 367. | 8. ——— <i>macandrewi</i> , p. 372. |
| 3. ——— <i>aurantiaca</i> , p. 367. | 9. ——— <i>macandrewi</i> , var. <i>spreti</i> ,
p. 373. |
| 4. ——— <i>striata</i> , var. <i>lirata</i> , p. 368. | 10. ——— <i>moniziana</i> , p. 373. |
| 5. ——— <i>costata</i> , p. 369. | |
| 6. ——— <i>crispa</i> , p. 369. | |

PLATE XXXV.

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| Fig. 11. <i>Rissoa watsoni</i> , p. 375. | Fig. 16 a. <i>Rissoa similis</i> , var. <i>levis</i> , p. 379. |
| 12. ——— <i>canariensis</i> , p. 376. | 17. ——— <i>albigo</i> , p. 379. |
| 13. ——— <i>novarensis</i> , p. 377. | 18. ——— <i>picta</i> , 381. |
| 14. ——— <i>violacea</i> , p. 378. | 19. ——— <i>concinna</i> , p. 381. |
| 15. ——— <i>costulata</i> , p. 378. | 20. ——— <i>depicta</i> , p. 382. |
| 16. ——— <i>similis</i> , p. 379. | |

PLATE XXXVI.

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| Fig. 21. <i>Rissoa pulcherrima</i> , p. 383. | Fig. 26. <i>Rissoa lineata</i> , p. 387. |
| 22. ——— <i>perminima</i> , p. 383. | 27. ——— <i>coriacea</i> , p. 389. |
| 23. ——— <i>abjecta</i> , p. 385. | 28. ——— <i>tenuisculpta</i> , p. 389. |
| 24. ——— <i>glabrata</i> , p. 386. | 29. <i>Eulima paivensis</i> , p. 364. |
| 25. ——— <i>sabulum</i> , p. 387. | 30. <i>Chaseax maderensis</i> , p. 362. |