



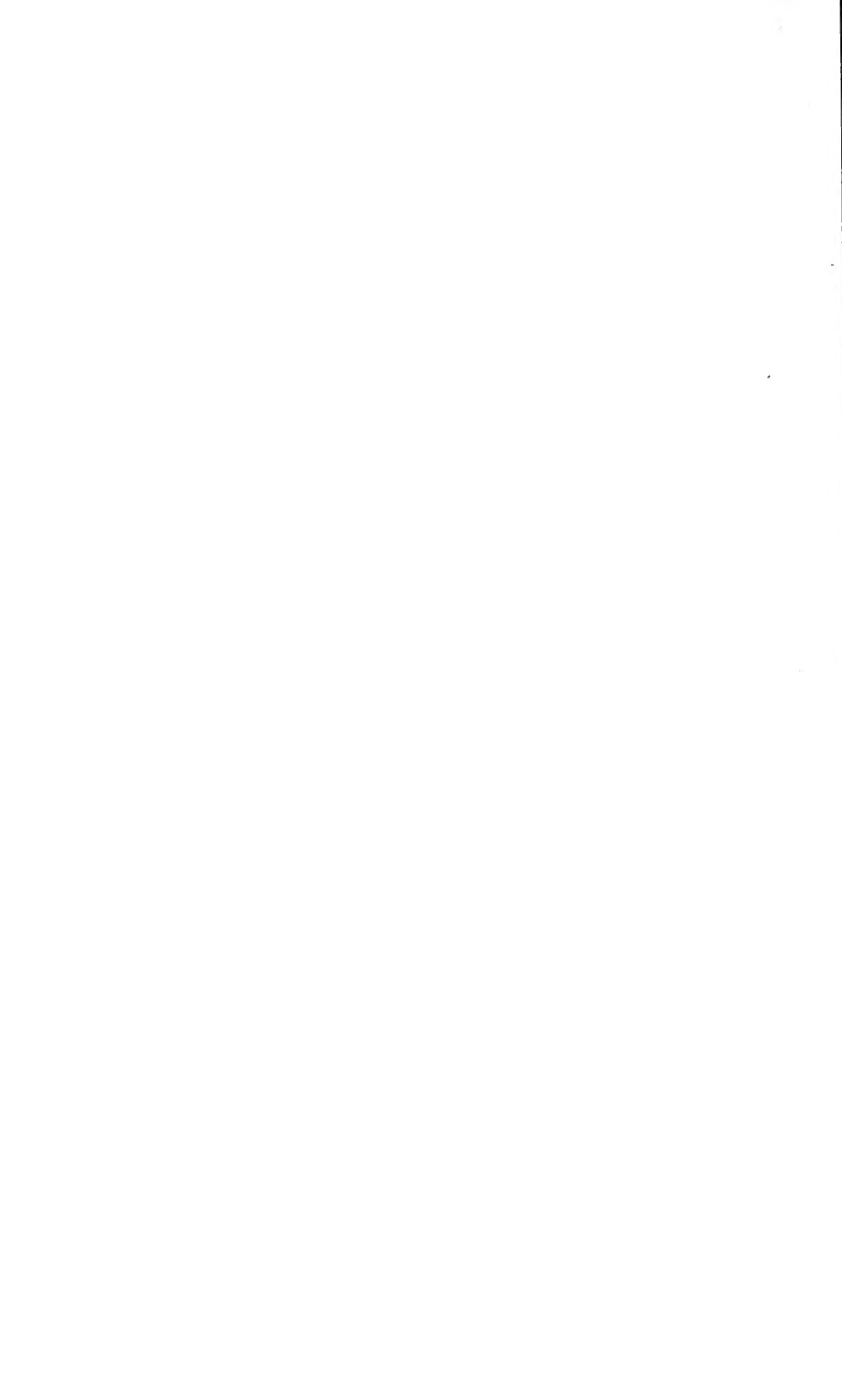
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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY, 8820

INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY. 39

(BEING A CONTINUATION OF THE 'ANNALS' COMBINED WITH LOUDON AND CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

CONDUCTED BY

ALBERT C. L. G. GÜNTHER, M.A., M.D., Ph.D., F.R.S.,
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AND

WILLIAM FRANCIS, F.L.S.

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VOL. IV.—EIGHTH SERIES.  
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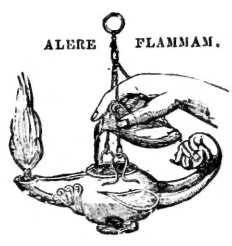
"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ:—ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomiâ in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; à verè eruditiss et sapientibus semper exulta; malè doctis et barbaris semper inimica fuit."—LINNÆUS.

"Quel que soit le principe de la vie animale, il ne faut qu'ouvrir les yeux pour voir qu'elle est le chef-d'œuvre de la Toute-puissance, et le but auquel se rapportent toutes ses opérations."—BRUCKNER, *Théorie du Système Animal*, Leyden, 1767.

. The sylvan powers
 Obey our summons; from their deepest dells
 The Dryads come, and throw their garlands wild
 And odorous branches at our feet; the Nymphs
 That press with nimble step the mountain-thyme
 And purple heath-flower come not empty-handed,
 But scatter round ten thousand forms minute
 Of velvet moss or lichen, torn from rock
 Or rifted oak or cavern deep: the Naiads too
 Quit their loved native stream, from whose smooth face
 They crop the lily, and each sedge and rush
 That drinks the rippling tide: the frozen poles,
 Where peril waits the bold adventurer's tread,
 The burning sands of Borneo and Cayenne,
 All, all to us unlock their secret stores
 And pay their cheerful tribute.

J. TAYLOR, *Norwich*, 1818.

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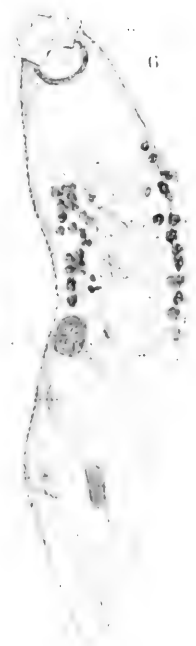
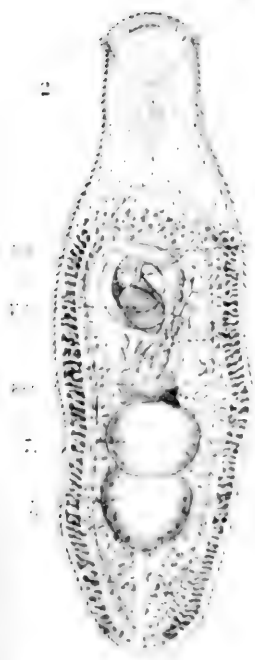
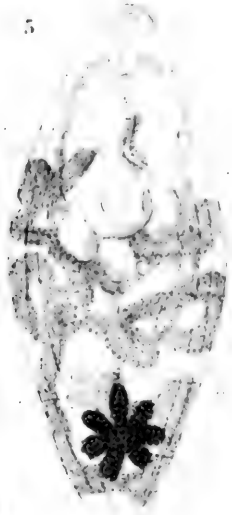
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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

"..... per litora spargite muscum,
Naiades, et circum vitreos considite fontes:
Pollice virgineo teneros hinc carpite flores:
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchyliis succo."
N. Parthenii Giannettazi, Eol. 1.

No. 19. JULY 1909.

I.—*A Contribution towards a Knowledge of the Entozoa of British Marine Fishes.*—Part II.* By WILLIAM NICOLL, M.A., D.Sc., Gatty Marine Laboratory, University of St. Andrews.

[Plate I.]

FOLLOWING the lines already indicated in the first part of this contribution, an attempt was made to obtain some of the less common fishes from St. Andrews Bay. At the same time several of the commoner species omitted from the first part were examined, and it is with these chiefly that the present paper deals. Altogether thirty species were examined; twelve of these were included in the first report, but several additions have to be made to the list of their parasites.

The fish to which attention was chiefly directed were the dragonet, gurnard, cod, catfish, and sprat. In each of the

* I have to thank the Government Grant Committee for enabling me to continue this work, which was begun under the Carnegie Trust Research Scheme.

first three eight different species of parasites were found, in the catfish seven, and in the sprat six. Amongst what may be considered as comparatively rare fish may be mentioned *Chimara monstrosa*, *Argentina sphyraena*, and *Mola mola*; and for the opportunity of examining these I am indebted to the kindness of Professor McIntosh.

About three-quarters (78 per cent.) of the total number of fish examined were infected with internal parasites of one kind or another, and of these by far the commonest were Trematodes (67 per cent.) and Nematodes (65 per cent.). Cestodes occurred only in 45 per cent., and the majority of these were scolices. Adult tapeworms were found in only 6 per cent., namely, in the cod, turbot, halibut, and sunfish. The rarity of adult tapeworms was noted in Part I., in which only 8 per cent. of the fishes were infected with them. They were found in *Cottus scorpius*, *C. bubalis*, *Gadus aeglefinus*, and *Bothus maximus*. From this it would appear that tapeworms occur only in the relatively larger fish; and the reason probably resolves itself into a matter of accommodation, the intestine of the smaller fish not being of sufficient size to contain the bulk of a full-grown tapeworm. Amongst the above-mentioned fish the only ones of small size are *Cottus scorpius* and *C. bubalis*, which are infected with *Bothriocephalus punctatus* fairly frequently; but the infection never reaches the extent that is so commonly met with in the turbot. In the smaller fish scolices are very prevalent, their numbers often being counted by thousands. It is in the Elasmobranchs that Cestodes come to maturity and are so plentiful; none of these are included in the present report.

Echinorhynchus were found on only four occasions, and in every case in rock-fish, namely *Liparis montagui*, *Ouos mustelus*, *O. tricirratus*, and *Gasterosteus aculeatus*.

Over thirty new records are noted in this paper, of which half are in Trematodes. Records new to British waters are much more numerous.

In Part I. reference was made to the work of Olsson and P. J. van Beneden on the Entozoa of North-Sea fishes. Odhner's work on Arctic Trematodes* only came to hand while the paper was in the press. Although not dealing exclusively with the Trematode parasites of fishes, Odhner's paper includes descriptions of many of the most important of these, and it is to him that we owe the first exhaustive accounts of such well-known species as *Proisorhynchus squa-*

* "Die Trematoden des arktischen Gebietes," in *Fauna Arctica*, iv. (1905) pp. 291-372.

matus, *Steringophorus furciger*, *Podocotyle atomon*, *Lepidapedon* (*Lepodora*) *rachiacum*, *Lecithaster gibbosus*, and *Derogenes varicus*. Since then Miss Lebour's work* on "Fish Trematodes of the Northumberland Coast" has appeared, and this is the most comprehensive attempt which has yet been made to deal with fish from British waters. Frequent reference will be made to both these works in the following notes.

One of the most remarkable contrasts between Miss Lebour's results and those obtained at St. Andrews is evidenced in the occurrence of *Podocotyle atomon*. Special notice was made of this species in Part I. Of all the common rock-fish at St. Andrews only two, the shanny (*Blennius pholis*) and the pogge (*Agonus cataphractus*) have not been found to harbour this parasite. Ten other species of rock-fish contain it as frequently as 71 per cent. On the Northumberland coast the frequency is only 3 per cent., *Cottus scorpius* being the sole host.

I have examined all the species of rock-fish with which Miss Lebour deals except *Onos cimbrius*, and have found *Podocotyle atomon* in every one of them. I have also had occasion to examine the rock-fish in the Firth of Clyde, and there the parasite was found in 57 per cent. There also it occurred very frequently in the saithe (*Gadus virens*) and lythe (*G. pollachius*), and, in addition, in the dab and plaice. In the case of the Northumberland coast we appear to be confronted with a local peculiarity, the explanation of which is not at present obvious. A point of interest lies in the fact that the rock-fish examined by Miss Lebour were not infected, with the exception of *Cottus scorpius*, with Trematode parasites of any kind. Several other Trematodes occur in the rock-fishes at St. Andrews, e. g. *Derogenes varicus*, *Hemiurus communis*, *Stephanochasmus baccatus*, and *Proisorhynchus squamatus*. Two of these were found by Miss Lebour in *Cottus scorpius*.

No case similar to that of *Blennius pholis* † has again been met with. The only three species from which no parasites were obtained were *Merluccius merluccius*, *Chimera monstrosa*, and *Gobius minutus*; but only one or two specimens of each of these were examined.

In the following list an attempt is made to indicate with what frequency and in what numbers the various parasites occur in each host. For that purpose figures are used as

* 'Northumberland Sea Fisheries Report' for 1907 (1908), pp. 23-67.

† Part I., Ann. & Mag. Nat. Hist. (7) xix. p. 68.

follows:— I.=rarely (under 10 per cent.); II.=occasionally (10–25 per cent.); III.=commonly (25–50 per cent.); IV.=frequently (50–75 per cent.); V.=very frequently (over 75 per cent.); 1=1 or 2 at a time; 2=less than 10; 3=less than 50; 4=50–100; 5=over 100. Thus IV. 2 will be taken to indicate that a parasite occurs frequently in numbers less than ten in each host, as in the case of *Podocotyle atomon*. The fish in this part are named according to 'A History of Scandinavian Fishes,' by Fries, Ekström, and Sundevall.

ACANTHOPTERYGII.

<i>Trachinus vipera</i> , Cuv. Lesser Weaver.		
<i>Ascaris capsularia</i> , Rud. (juven.).	III. 1.	Body-cavity.
<i>Cottus scorpius</i> , Bloch. Bullhead.		
<i>Stephanochasmus baccatus</i> , Nicoll.	II. 1.	Intestine.
<i>Hemiurus communis</i> , Odhn.	II. 1.	Stomach.
<i>Cottus bubalis</i> , Euphr. Father-lasher.		
<i>Hemiurus communis</i> , Odhn.	II. 1.	Stomach.
(= <i>H. appendiculatus</i> , mihi.)		
<i>Ascaris angulata</i> , Rud.	II. 1.	Intestine.
<i>Agonus cataphractus</i> (Linn.). Pogge.		
<i>Scolex polymorphus</i> , Rud.	II. 2.	Intestine.
<i>Ascaris</i> sp.	III. 1.	Intestine.
<i>Ascaris communis</i> , Dies. (juv.).	II. 1.	Body-cavity.
<i>Callionymus lyra</i> , Linn. Dragonet.		
(<i>Lebouria</i>) <i>alacris</i> , Lss.	III. 1.	Intestine.
<i>Zoogonoides viviparus</i> (Ols.).	IV. 4.	Intestine.
<i>Derogenes varicus</i> (Müller).	III. 1.	Intestine.
<i>Lecithaster gibbosus</i> (Rud.).	II. 1.	Intestine.
<i>Scolex polymorphus</i> , Rud.	III. 3.	Intestine.
<i>Ascaris</i> sp.	III. 1.	Stomach.
<i>Heterakis foveolata</i> , Rud.	II. 1.	Intestine.
<i>Trigla gurnardus</i> , Linn. Grey Gurnard.		
<i>Stephanochasmus triglæ</i> , Lebour.	II. 1.	Intestine.
<i>Derogenes varicus</i> (Müller) (juven.).	II. 1.	Stomach.
<i>Hemiurus communis</i> , Odhn.	III. 1.	Stomach.
<i>Hemiurus lühei</i> , Odhn.	II. 1.	Stomach.
<i>Gasterostomum triglæ</i> , v. Ben.	III. 2.	Intestine.
<i>Scolex polymorphus</i> , Rud.	II. 2.	Intestine.
<i>Ascaris</i> sp.	II. 1.	Intestine.
<i>Ascaris capsularia</i> , Rud. (juven.).	III. 2.	Peritoneum.
<i>Cyclopterus lumpus</i> , Linn. Lump-sucker.		
<i>Distomum</i> sp. (juven.).	I. 1.	Rectum.
<i>Scolex polymorphus</i> .	III. 5.	Stomach, cæca, and intestine.
<i>Ascaris</i> sp.	III. 2.	Cæca and in- testine.
<i>Ascaris capsularia</i> , Rud. (juven.).	III. 2.	Liver.
<i>Liparis montagui</i> , Donov. Montague's Sucker.		
<i>Scolex polymorphus</i> , Rud.	III. 2.	Intestine.
<i>Anarrhichas lupus</i> , Linn. Catfish.		
<i>Lebouria idonea</i> , Nicoll.	IV. 4.	Intestine.
(<i>Acanthopsolus</i>) <i>anarrhichæ</i> , sp. inq.	III. 3.	Intestine.

<i>Fellodistomum fellis</i> (<i>Olss.</i>)	V. 4.	Gall-bladder.
<i>Fellodistomum agnotum</i> , <i>Nicoll.</i>	IV. 2.	Gall-bladder and duodenum.
<i>Zoogonus rubellus</i> (<i>Olss.</i>)	V. 4.	Rectum and intestine.
<i>Zoogonoides viviparus</i> (<i>Olss.</i>)	III. 3.	Rectum and intestine.
<i>Scolex polymorphus</i> , <i>Rud.</i>	III. 3.	Intestine.
<i>Gasterosteus aculeatus</i> (var. <i>trachurus</i>), <i>Linn.</i>	3-spined	Stickleback.
<i>Ascaris</i> sp.	I. 1.	Intestine.
<i>Echinorhynchus acus</i> , <i>Rud.</i>	I. 1.	Intestine.
<i>Gastræa spinachia</i> (<i>Linn.</i>).	15-spined	Stickleback.
<i>Podocotyle atomon</i> (<i>Rud.</i>)	IV. 2.	Intestine.
<i>Centrozetes gunnellus</i> , <i>Linn.</i>		Gunnel.
<i>Hemiurus communis</i> , <i>Odhn.</i>	I. 1.	Intestine.
(= <i>H. appendiculatus</i> , <i>mih.</i>)		

ANACANTHINI.

<i>Gadus callarias</i> , <i>Linn.</i>		Cod.
<i>Derogenes varicus</i> (<i>Müll.</i>)	III. 1.	Stomach.
<i>Hemiurus communis</i> , <i>Odhn.</i>	III. 1.	Stomach.
<i>Gasterostomum gracilescens</i> (<i>Rud.</i>) (juv.)	I. 2.	Stomach.
<i>Bothriocephalus rugosus</i> , <i>Rud.</i>	II. 2.	Intestine.
<i>Scolex polymorphus</i> , <i>Rud.</i>	III. 4.	Intestine.
<i>Ascaris clavata</i> , <i>Rud.</i>	IV. 2.	Stomach and intestine.
<i>Ascaris capsularia</i> , <i>Rud.</i> (juv.)	IV. 3.	Liver and peritoneum.
<i>Ascaropsis morrhue</i> , <i>v. Ben.</i>	III. 3.	Œsophagus and stomach.
<i>Gadus merlangus</i> , <i>Linn.</i>		Whiting.
<i>Ascaris capsularia</i> , <i>Rud.</i> (juv.)	II. 2.	Peritoneum.
<i>Onos tricirratum</i> (<i>Brün.</i>)		Three-bearded Rockling.
<i>Podocotyle atomon</i> (<i>Rud.</i>)	IV. 1.	Intestine.
<i>Ascaris</i> sp.	IV. 1.	Intestine.
<i>Ascaris capsularia</i> , <i>Rud.</i> (juv.)	IV. 2.	Ad cæca.
<i>Echinorhynchus acus</i> , <i>Rud.</i>	IV. I.	Intestine.
<i>Onos mustelus</i> (<i>Linn.</i>)		Five-bearded Rockling.
<i>Podocotyle atomon</i> (<i>Rud.</i>)	V. 2.	Stomach, cæca, and intestine.
<i>Echinorhynchus acus</i> , <i>Rud.</i>	III. 1.	Intestine.
<i>Bothus maximus</i> (<i>Linn.</i>)		Turbot.
<i>Ascaris collaris</i> , <i>Rud.</i>	III. 1.	Stomach and intestine.
<i>Pleuronectes flesus</i> , <i>Linn.</i>		Flounder.
<i>Ascaris collaris</i> , <i>Rud.</i> (juven.)	III. 1.	Intestine.
<i>Pleuronectes limanda</i> , <i>Linn.</i>		Dab.
<i>Lecithaster gibbosus</i> (<i>Rud.</i>)	I. 1.	Intestine.
(= <i>Derogenes cacozelus</i> , <i>mih.</i>)		
<i>Ascaris capsularia</i> , <i>Rud.</i> (juven.)	II. 2.	Body-cavity.
<i>Hippoglossus vulgaris</i> , <i>Flem.</i>		Halibut.
<i>Lecithaster gibbosus</i> , <i>Rud.</i>	II. 1.	Intestine and rectum.
(= <i>Derogenes cacozelus</i> , <i>mih.</i>)		
<i>Hemiurus communis</i> , <i>Odhn.</i>	III. 1.	Stomach.
(= <i>H. appendiculatus</i> , <i>mih.</i>)		
<i>Bothriocephalus punctatus</i> , <i>Rud.</i>	II. 2.	Stomach, cæca, and intestine.

PHYSOSTOMI.

<i>Osmerus epulanus.</i>		
Lecithaster gibbosus, <i>Rud.</i>	II. 1.	Intestine.
Scolex polymorphus, <i>Rud.</i>	II. 3.	Intestine.
Ascaris sp. (juven.).	II. 1.	Intestine.
<i>Argentina sphyraena</i> , Linn. Argentine.		
Lecithophyllum botryophoron (<i>Olss.</i>)	IV. 3.	Intestine.
<i>Clupea sprattus</i> , Linn. Sprat.		
Derogenes varicus (<i>Müll.</i>) (juven.).	I. 1.	Cæca.
Lecithaster gibbosus (<i>Rud.</i>).	I. 1.	Intestine.
Hemiusurus lühei, <i>Odhn.</i>	II. 1.	Œsophagus, stomach, cæca, and intestine.
Scolex polymorphus, <i>Rud.</i>	I. 1.	Intestine.
Ascaris sp.	II. 2.	Stomach and intestine.
Ascaris sp. (juven.).	II. 2.	Peritoneum.
<i>Anguilla vulgaris</i> , Turt. Eel.		
Hemiusurus communis, <i>Odhn.</i>	III. 1.	Stomach.
(= <i>H. appendiculatus, mihi.</i>)		

PLECTOGNATHI.

<i>Mola mola</i> (Schneider). Sunfish.		
Dihemistephanus lydiæ (<i>Stoss.</i>).		Intestine.
Ancistrocephalus microcephalus (<i>Rud.</i>).		Intestine.
Anthocephalus reptans, <i>Wagener.</i>		Liver.

LOPHOBRANCHII.

<i>Syngnathus acus</i> , Linn. Pipefish.		
Scolex polymorphus, <i>Rud.</i>	IV. 2.	Intestine.
Ascaris sp. (juven.).	IV. 1.	Peritoneum.

Podocotyle atomon (Rud.).

Odhner, Fauna Arctica, iv. (2) p. 320.

Nicoll, Ann. & Mag. Nat. Hist. (7) xix. pp. 73-77.

Lebour, Northumberland Sea Fish. Rept. 1907, pp. 36-37.

Nicoll, Quart. J. Micr. Sci. liii. pt. 3, pp. 451-453.

To the list of British hosts of this parasite has to be added *Gastræa spinachia*. In one specimen of this fish half a dozen examples of the parasite were found. They agreed well with previous descriptions of the species, but the ova were particularly large, measuring $\cdot 085$ - $\cdot 093$ mm. in length and $\cdot 051$ - $\cdot 062$ in breadth. These are by far the largest ova I have yet observed in this species, and I was at first in doubt whether the specimens were really *Podocotyle atomon* or some allied species. No other differences of importance could be made out. The length of the specimens is 1.7-2.3 mm.; oral sucker $\cdot 14$ - $\cdot 16$ mm. in diameter; ventral sucker $\cdot 20 \times$

·25 mm.; breadth $\frac{1}{4}$ of the length; neck also $\frac{1}{4}$ of the length, and the posterior border of the second testis about the same distance from the posterior end of the body. Pharynx ·09 mm.; œsophagus ·105 mm.; excretory vesicle extending forward to anterior end of ovary. Ovary close in front of testes, trilobate. Receptaculum seminis immediately in front of ovary. Testes directly tandem or very slightly oblique, round, isodiametric; diameter ·20 mm.; separated by yolk-glands. Yolk-glands extending forward to posterior border of ventral sucker; not discontinuous at testes. Vesicula seminalis extending ·1–·17 mm. behind ventral sucker, i. e. about $\frac{1}{5}$ of length of body, or rather more than half the diameter of the ventral sucker.

From the above notes there can be little doubt that the specimens under consideration are actually *Podocotyle atomon*. A fact which might cause hesitation in admitting this identification is that Odhner has frequently found a closely allied species, *P. reflexa* (Crepl.) in *Gastrœa spinachia* (*Spinachia vulgaris*). According to Odhner, this species differs from *P. atomon* in being much more elongated, less flattened, and in having the suckers more nearly approximated. Other features noted by Odhner are the great prominence of the ventral suckers, the length of the œsophagus relative to the pharynx, the greater breadth of the testes, the greater length of the cirrus-pouch, the median position of the ovary, and the discontinuous condition of the yolk-glands. The majority of these characters, however, are of little value when dealing with such a species as *Podocotyle atomon*. It does not require a very extensive study to convince one that *Podocotyle atomon* is within certain limits a very variable species, and it is just in the above-detailed features that the variation occurs. No weight can be placed on the length of the œsophagus, for in *Podocotyle atomon* it may be shorter than the pharynx, or, as Miss Lebour notes, more than double its length, depending almost entirely on the state of contraction of the body. Again, the testes not infrequently exceed half the breadth of the body, and the ovary may be only very slightly, if at all, displaced from the middle line. The yolk-glands are extremely variable and may be entirely absent between the testes or may fill up a considerable part of the intertesticular space; further, they are fairly often discontinuous laterally at the level of the intertesticular space or the posterior testis. The cirrus-pouch may extend barely beyond the ventral sucker, or it may occasionally reach nearly halfway to the ovary. The extended condition of the body and the prominent pedunculated appearance of

the ventral suckers depend largely on the method of killing. Fresh water, for instance, causes the body to be much elongated and the ventral sucker to be raised on a well-marked pedicle. It also alters other relations, so that the neck becomes much shorter and the breadth of the body is decreased, while the thickness is greatly increased. In such a condition the parasite agrees much more closely with Odhner's description of *Podocotyle reflexa* than with his description of *P. atomon*. From this it appears that undue importance must not be attached to the elongated cylindrical shape, with projecting ventral sucker, as in *P. reflexa*, unless when dealing with specimens collected and preserved in a uniform manner. Under these conditions it may be safe to differentiate, as Odhner has done, species such as *P. reflexa* and *P. olssoni*, but at the same time it is probable that Odhner's definitions are too comprehensive. Certain features which he mentions are of undoubted specific value, and of these I should put most reliance on the breadth of the body, the length of the neck, and the length of the cirrus-pouch. In none of my specimens, it may be noted, is the breadth less than $\frac{1}{2}$ or the neck less than $\frac{1}{6}$ of the body-length.

Admitting the specific identity of *Podocotyle reflexa*, it is quite evident that my specimens from *Gastraea spinachia* are not identical with Odhner's specimens from the same host, for they are flattened; the neck is much longer and the breadth is greater than in that species. In addition the testes do not occupy more than half the breadth of the body, the cirrus-pouch extends only a short distance behind the ventral sucker, the ovary is on the right side, and the yolk-glands are in no case discontinuous at the level of the testes. In fact the specimens are absolutely typical examples of *Podocotyle atomon* apart from the large size of the ova.

An immature example of the same parasite was obtained from the intestine of *Onos tricirratus*, this making the twelfth British host of the species, all of these being rock-pool fish with the exception of the plaice, as recorded by Miss Lebour, and the flounder, as recorded by Johnstone. Three additional hosts which I have to record from the West Coast bring the total up to fifteen.

(*Lebouria*) *alacris*, Lss. (Pl. I. fig. 1.)

From *Callionymus lyra* a single specimen of a species which can only with very great doubt be identified with *Listomum alacre*, Lss. *, was obtained. It was 1.4 mm.

* Centralbl. f. Bakt. xxix. p. 401.

long; greatest breadth half the length. Oral sucker $\cdot 21$ mm. in diameter; ventral sucker $\cdot 32 \times \cdot 34$ mm., situated $\cdot 55$ mm. from the anterior end. Pharynx $\cdot 14 \times \cdot 11$ mm., prepharynx and œsophagus short. Ovary oval, immediately behind the ventral sucker on the right side, smaller than the testes. Testes immediately behind ovary, tandem. Yolk-glands not very voluminous, lateral, extending into neck as far as intestinal bifurcation; almost absent at level of ventral sucker; uniting behind testes. Genital aperture median, not far in front of ventral sucker. Cirrus-pouch short, not extending beyond the centre of the ventral sucker, containing a simple vesicula seminalis, a short ductus ejaculatorius, and apparently a definite pars prostatica. Ova $\cdot 082\text{--}\cdot 086 \times \cdot 040\text{--}\cdot 042$ mm.; blunt at both poles. Simple excretory vesicle extending forward to anterior testis.

Mr. Johnstone, of Liverpool, has allowed me to examine a small immature specimen of what appears to be the same species from *Callionymus lyra*, obtained in Luce Bay. I have also collected a considerable number of specimens from *Callionymus* in the Firth of Clyde. These appear to be the same species; a description of them will be published later.

This specimen agrees with Looss's description of *Distomum alacre* in several important particulars. The disposition of the genital organs is the same in both, although the yolk-glands are not so extensive in my specimen. They agree also in the size and situation of the ventral sucker. The most important differences are that my specimen is much broader, while the oral sucker and pharynx are much larger. In these respects it approaches nearer *Lebouria idonea*, *mili* *.

Looss seemed to hesitate in including *Distomum alacre* amongst the Allocreadiinæ, but there seems little doubt that it is really a member of this subfamily. It is most nearly related to the genus *Lebouria*, and it is only the somewhat anomalous structure of the cirrus-pouch which prevents its definite inclusion in that genus.

In the specimens from the West Coast the average length is $1\cdot 1$ mm., the breadth is $\frac{2}{3}$ of that, and the ventral sucker is situated exactly $\frac{2}{3}$ of the length from the anterior end. The diameter of the oral sucker is constantly $\frac{1}{4}$ of the body-length, while that of the ventral sucker is a trifle more than $\frac{1}{4}$. The ventral sucker is oval and its shorter diameter is not quite $\frac{1}{2}$ of the body-length. The pharynx is exactly $\frac{1}{2}$ of the body-length. In practically every one of these features

* Quart. J. Micr. Sci. liii. pt. 3, pp. 441-451, pl. ix. figs. 9-12.

the West-Coast specimens agree with my first specimen and differ correspondingly from Looss's description of *Distomum alacre*. They agree with the latter more closely in having the yolk-glands extending forward to the pharynx and the genital aperture slightly displaced from the middle line towards the left.

Stephanochasmus baccatus, Nicoll.

One specimen of a *Stephanochasmus* species was found in the intestine of *Cottus scorpius*, and although it does not entirely agree with my previous description of *St. baccatus**, it is the only species to which it can be referred. The most important point serving for identification is the fact that it possesses 28 cephalic spines in each row. Those of the anterior row are shorter than those of the posterior row, but their length is somewhat variable. The cuticular spines seem to be absent from a great part of the dorsal surface of the body.

The length of the specimen is 2·4 mm.; greatest breadth ·7 mm. The neck is 1 mm. long, which is considerably greater than in the first specimen, but may be accounted for by assuming a greater degree of extension. The diameter of the oral sucker is ·18 mm., of the ventral sucker ·31 mm. The prepharynx is ·22 mm. and the pharynx measures ·20 × ·19 mm. All these figures agree well enough with those already given. The testes are contiguous and have each a diameter of about ·3 mm. The second testis is about $\frac{1}{3}$ of the body-length from the posterior end of the body. The ovary is ·17 mm. in diameter, lying immediately in front of the anterior testis and ·4 mm. behind the ventral sucker. It is thus much nearer the sucker than in the previous example. The yolk-glands are slightly more extensive than before, but do not reach the level of the ventral sucker. The cirrus-pouch is comparatively short and does not extend beyond the ventral sucker to a greater distance than the diameter of the sucker (*i. e.* not more than $\frac{1}{10}$ of the body-length). The ova are larger than before, measuring ·101 × ·046 mm.

The specimens both from *Hippoglossus* and from *Cottus* were found in gut which had been preserved in formalin and not examined for parasites till some time afterwards. There was thus no opportunity of getting them in a properly extended condition, and this probably explains the somewhat different appearance which they present.

* Ann. & Mag. Nat. Hist. (7) xix. pp. 80-83, pl. ii. figs. 5-7.

Stephanochasmus triglae, Lebour*.

From the intestine of *Trigla gurnardus* † a single specimen of what can hardly fail to be this species was obtained. The species is exceedingly like *St. baccatus*, and, as far as can be made out, practically the only difference to which any importance can be attached is in the number of cephalic spines. Miss Lebour did not determine this number, but in the specimen under consideration it appears to be 50, *i. e.* 25 in each row. This difference of six spines may or may not be a feature of specific distinction; if not, the two species must be considered identical. After a careful examination of Miss Lebour's description and my own specimens the only other feature of difference to be found is in the extent of the yolk-glands, which reach the ventral sucker in *St. triglae* but stop short of it in *St. baccatus*. This, however, is a rather hazardous distinction.

The cephalic spines surround the oral sucker in two uninterrupted rows, and they measure .03 mm. in the anterior row and .035 mm. in the posterior row. In my specimen the spines in the posterior row, instead of being directed straight backwards, diverge slightly from the middle line, but this condition is probably accidental. The spines over the rest of the body appear to be more numerous and thickly set than in *St. baccatus*, and their distribution is possibly more extensive.

The length of the specimen is 2.9 mm., of which the neck comprises 1 mm.; the breadth is .6 mm. Diameter of oral and ventral suckers .20 mm. and .27 mm. respectively; prepharynx .32 mm. long; pharynx .17 × .15 mm.; œsophagus almost absent. Testes elongated oval, measuring .36 × .24 mm., not quite contiguous, separated by yolk-glands. Ovary .17 mm. in diameter, separated from testes by yolk-glands. Latter extend as far forwards as the posterior border of the ventral sucker. Cirrus-pouch not extending beyond the ventral sucker to a greater distance than the diameter of the sucker, as in *St. baccatus*. The specimen contained no ova.

Dihemistephanus lydiæ (Stossich).

(Pl. I. figs. 2, 3.)

Stossich, Boll. Soc. Adriat. xvii. (1896) p. 4, pl. i. fig. 1.

Looss, Centralbl. f. Bakt. xxix. (1901) pp. 605-606 & 628, fig. 6.

In the intestine of a sunfish (*Mola mola*), captured in the

* Northumberland Sea Fisheries Rep. 1907 (1908), pp. 47-48, pl. iii. figs. 3-4.

† In a recent note (Ann. & Mag. Nat. Hist. (8) iii. p. 246) this specimen was inadvertently referred to *Cottus scorpius*.

Firth of Forth and forwarded to Professor M'Intosh, a large number of specimens of this parasite were found. Stossich's original description of the species is incomplete and contains several errors, which were corrected by Looss's amended description. My specimens differ in a few particulars from those examined by Looss, and both on that account and on account of the comparative rarity of the species I shall give here a fairly full description of it.

My specimens are only half the size of Stossich's, measuring for the most part from 1.8 mm. to 2.4 mm. They are extended and flattened, but the neck is somewhat subcylindrical. The greatest breadth is a little more than $\frac{1}{4}$ of the length and occurs, as a rule, about the level of the ventral sucker, but in many cases it is as far back as the anterior testis. From this point the body narrows rapidly towards the anterior end, but behind the sucker it preserves a fairly uniform breadth, till near the posterior end, where it comes abruptly to a point; in some cases the posterior end is bluntly rounded. Almost the entire surface is covered with spines, which show much greater variations in size than is usual amongst spinous Trematodes. Over the greater part of the body they are long, curved, and sharp, with a fairly broad base, and, as usual, they are largest and strongest just in front of the ventral sucker. Forwards these large spines stop suddenly a little in front of the pharynx, and their place is taken by very much smaller spines of minute size. The large spines advance further forwards in the middle line and at the extreme edges of the body than elsewhere, so that the minute spines appear to be congregated in two lateral patches, united, however, in the middle line in front. Precisely the same arrangement occurs on the dorsal surface, although in this case the large spines are found a little further forward than on the ventral surface. In the latter point this differs from Looss's description. In the arrangement of the cephalic spines another difference must be noted. In addition to the two series described by Looss, a third one occurs in many, though not in all, of my specimens (Pl. I. fig. 3). This is situated on the dorsal surface a short distance behind the hind rows of large spines, and consists of a row of about 10 straight sharp spines, resembling the large spines, but only about half their size (length .025 mm.). It is hardly necessary to be reminded here that cephalic spines are only too prone to be knocked off and disappear without leaving traces of their existence. In the majority of my specimens the cephalic armature was incomplete. Such must have been the case in Looss's specimens, otherwise this third series of spines could not have

escaped notice, for they are prominent and distinct enough in the specimens in which they are present. The same applies to the ventral series of very small spines, which Looss describes as consisting of two rows of 5 and 6 in each. In some of my specimens these are entirely absent, and in the others they vary in number from 3 up to 15. In the specimen in which the maximum number was present there were 6 spines in the anterior row and 7 in the posterior row, and at each end of the series there was a single spine of the same size occupying a position neither in one row nor the other, but midway between the two. From this it is evident that it is a difficult matter to determine the exact number of the ventral series, and there may even be a doubt if it consists normally of a definite number. The arrangement of the largest spines is exactly as Looss has described, the spines being all of approximately equal length ($\cdot 04$ – $\cdot 05$ mm.) except the two terminal spines of the anterior row, which are a little shorter than the others. I find the number to be 18 in the anterior row and 17 in the posterior, but it is not easy to determine this exactly.

The oral sucker is terminal and measures $\cdot 19$ – $\cdot 22$ mm. in diameter, *i. e.* about $\frac{1}{10}$ of the body-length. It has a slight tendency towards a funnel-shape, but the margin is not necessarily rampart-like (*wallartig*) as Looss describes it. In almost all my specimens the ventral lip is thin and sharp, while the dorsal lip is thickened for the insertion of the large cephalic spines. Along with the spines this thickening extends round to the sides, and this gives the head a somewhat square shape in some specimens. The ventral sucker is situated at a distance from the anterior end varying with the degree of extension of the neck, but on an average it is about 1 mm.; in other words, the sucker lies a little in front of the middle of the body. It is a feeble, shallow, evidently degenerate structure. In most cases it lies level with the body-surface, but in some its edges are raised a little. It is always distinctly larger than the oral sucker, its diameter being $\cdot 22$ – $\cdot 27$ mm., and the sucker-ratio being approximately 6:7.

The prepharynx is about $\cdot 1$ mm. in length, but may be twice as long or entirely absent, according to the state of contraction. The pharynx has an average measurement of $\cdot 145 \times \cdot 10$ mm. The oesophagus is normally a trifle shorter than the pharynx. The diverticula are thin-walled and wide, extending quite to the posterior end of the body.

The ovary and testes are situated in the posterior half of the body, the post-testicular space being a little more than $\frac{1}{2}$

of the body-length. The testes are tandem, transversely ovoid, and measure about $\cdot 21 \times \cdot 26$ mm. In every case they are contiguous. The ovary lies immediately in front of the anterior testis, but displaced a little to the right side. It is also transversely ovoid, but is considerably smaller than the testes, measuring $\cdot 17 \times \cdot 12$ mm. There does not appear to be a receptaculum seminis. The yolk-glands are exceedingly well developed and very conspicuous. Neither Stossich nor Looss describes their disposition accurately. They are situated for the most part under the dorsal surface of the body, but a ventral fringe of uniform breadth extends from the posterior end of the body to a point a short distance in front of the ventral sucker. This fringe lies over the outer side of the intestinal diverticula, and nowhere throughout its whole extent crosses to the inner side of the diverticula. Dorsally the follicles are much more extensive. They fill the whole of the post-testicular space. Forwards they extend in towards the middle line and overlap the testes and ovary to a considerable extent. They thin out a little at the level of the uterus, but in front of the ventral sucker they again become voluminous and extend across the entire breadth of the body. Their anterior limit is the same as in the case of the ventral fringe. The common yolk-ducts are ventral and cross between the ovary and anterior testis, to unite in the yolk-reservoir.

The genital aperture lies close to the anterior border of the ventral sucker. It is not median in position, but is displaced a little to the left side. The genital sinus is of small size. The ductus ejaculatorius opens into it on the right side, the vagina on the left. The cirrus-pouch lies dorsal to the ventral sucker and invariably terminates at the posterior border of the latter. The anterior narrow part of the pouch is always bent more or less abruptly on the more swollen posterior part. The latter contains a single simple globular or ovoid vesicula seminalis, in close connexion with which is a comparatively large pars prostatica, also nearly globular in shape. Prostatic cells do not appear to be numerous, although the pars prostatica is filled with a large amount of secretion. The ductus ejaculatorius is short and fairly straight. The uterus occupies the space between the anterior testis and the genital aperture, confined by the intestinal diverticula on either side. Unlike the uterus in the genera *Echinostomum* and *Stephanochasmus*, it frequently forms several convolutions dorsal to the ventral sucker, so that Looss is not quite exact in saying that it is confined between the ovary and ventral sucker. The vagina is short and

muscular. The ova are thin-shelled, with blunt poles, the opercular pole being obliquely truncated. My measurements of the ova do not agree with those of Looss, for from a large number I find the average size to be $\cdot 066 \times \cdot 0365$ mm., the observed limits being $\cdot 060$ – $\cdot 072$ mm. for the length and $\cdot 032$ – $\cdot 040$ mm. for the breadth. Looss gives the breadth as $\cdot 047$ mm.

The genus *Dihemistephanus* is, as Looss remarks, most closely allied to *Stephanochasmus*. The shortness of the copulatory organs and the close proximity of the genital glands are not so weighty differences as Looss suspected, for since then two species of *Stephanochasmus* (*St. trigle*, Lebour, and *St. baccatus*, mihi) have been described which approach the condition in *Dihemistephanus lydie*. Of apparently greater importance are, apart from the cephalic armature, the shape and size of the pars prostatica and the extent and disposition of the yolk-glands. Together the two genera form a group which differs from the true Echinostominae in the possession of a terminal oral sucker with cephalic spines directly attached to its margin, the absence of a cephalic collar, and the possession of a large pharynx, which is situated nearer to the intestinal bifurcation than to the mouth.

(*Acanthopsolus*) *anarrhichæ*, sp. inq.

Under this provisional name I wish merely to mention a species which occurs in the intestine of *Anarrhichas lupus*. It has already been found and briefly described by Miss Lebour*. It is evidently a new species and almost undoubtedly the type of a new genus, but several important points in its anatomy require yet to be determined. I am not in a position to add anything to Miss Lebour's description, as my material consists of only a few immature specimens which were accidentally discovered amongst a collection of *Zoogonus rubellus* from the same host. Probably many specimens were overlooked in collecting, for the species is about the same size as, and bears much external resemblance to, *Zoogonus rubellus* and *Zoogonoides viviparus*, both of which were found together in large numbers in the intestine of the catfish.

With regard to the systematic position of this species, it approaches most closely, as Miss Lebour remarked, to *Acanthopsolus oculatus* (Levins.), but it possesses one or two features sufficient to exclude it from the genus *Acanthopsolus*.

* Northumberland Sea Fisheries Rep. 1907 (1908), pp. 51–53, pl. iii. figs. 6–8.

Together they form the nucleus of a subfamily the nearest relation of which appears to be not *Stephanochasmus*, as Odhner remarked in the case of *Acanthopsolus oculatus*, but the Lepocreadiinae. It is impossible to include them in the latter subfamily, but they are certainly nearly allied to it.

Stringophorus furciger (Olsson).

The occurrence of this species in *Lophius piscatorius*, as recorded by Miss Lebour, is probably fortuitous, the parasites being in all likelihood from some Pleuronectid fish swallowed by the Angler. In British waters the species appears to be entirely confined to the Pleuronectidæ and to be one of their most characteristic parasites.

Zoogonoides viviparus (Olsson).

In British waters this species has hitherto only been found in Pleuronectid fishes, in which it occurs in great abundance. I have found it quite as frequently and in as large numbers in *Callionymus lyra* and *Anarrhichas lupus*. In the North Sea I have also found it fairly frequently in *Pleuronectes cynoglossus* and *Drepanopsetta platessoides*, and in the Firth of Clyde in *Pl. flesus* and *Pl. microcephalus*. This makes a total of nine British hosts for the species.

The species is already so well known that no additional description is necessary. It seems necessary to insist, however, that the diameter of the ventral sucker is not twice that of the oral sucker, as both Odhner and Miss Lebour have it. In my specimens the ratio is almost constantly 3:2, the average sizes being .22 mm. and .145 mm. in a specimen of .9 mm. length.

With regard to the coloration, considerable variation seems to occur. The general body-colour is lemon-yellow, with numerous irregular splashes of brownish red, which is so intense that when a number of parasites are viewed together they appear to be of a dusky red colour. To me the parasite has never appeared of a bright red colour, as Miss Lebour describes it. Many specimens, however, seem to lack these red patches, and the doubt has often occurred as to whether the uniformly coloured specimens were really the same as the others; but no structural differences could be detected.

Van Beneden's *Distomum callionymi** is very probably *Zoogonoides viviparus*. The figures which he gives show some of the characteristic attitudes of that species, but otherwise they are unrecognizable.

* Mém. Acad. Roy. Belg. xxxviii. p. 53, pl. iv. fig. 3.

Zoogonus rubellus (Olsson). (Pl. I. fig. 4.)

Distoma rubellum, sp. n., Olsson, Lunds Univ. Årsskrift, iv. (8) p. 41, pl. iv. fig. 89.

Zoogonus mirus, sp. n., Looss, Centralbl. f. Bakt. xxix. pp. 439-442, fig. 6.

Zoogonus rubellus (Olsson), Odhner, Centralbl. f. Bakt. xxxi. pp. 59-61, fig. 1.

Zoogonus mirus, Lss., Goldschmidt, Centralbl. f. Bakt. xxxii. pp. 870-876, figs. 1-6.

This species has been hitherto recorded only from Labridæ, but I have found numerous examples in every specimen of *Anarrhichas lupus* in the rectum and lower part of the intestine. Three excellent descriptions already exist, but some doubt still remains as to whether *Z. rubellus* and *Z. mirus* are identical or not. A few differences of a minor nature occur in the accounts of the above-cited authors; my specimens agree best with Goldschmidt's description.

They are pale yellow in colour and of small size, measuring for the most part .75-1.0 mm. Externally they resemble *Zoogonoides viviparus* very much, but they are not so delicate as that species. The shape is elongated oval, the greatest breadth, about the level of the ventral sucker, being rather less than half the length. The whole surface of the body is covered with minute regular scale-like spines. The oral sucker is subterminal and globular, with a diameter of .115-.135 mm. The ventral sucker is flattened and usually isodiametric, measuring .135-.165 mm. In a number of specimens it is contracted and distorted as in Looss's figure. It thus appears smaller than the oral sucker and this may account for Looss's observation. It is situated exactly $\frac{2}{3}$ of the body-length from the anterior end. The configuration of the alimentary system conforms much more with Goldschmidt's representation than with that of Looss or Odhner. The prepharynx is not usually dilated and is rather shorter than the pharynx. The latter is oval and measures .10-.13 x .08-.09 mm. The œsophagus is comparatively of great length and extends right behind the ventral sucker before the bifurcation takes place. As a matter of fact, it is difficult to say where the bifurcation actually occurs, for dorsal to the ventral sucker the œsophagus expands considerably, and the diverticula arise from this expansion as two wide sacs. The exact point of bifurcation is thus not marked off with such distinctness as in most other species. The internal walls of the diverticula can always be seen uniting just behind the posterior border of the ventral

sucker, as in Goldschmidt's figure and my own. Both Looss and Odhner represent the diverticula as elongated sacs arising from a point in front of the ventral sucker; but in reality they are short, oval, club-like structures, the appearance of which is almost unique. Olsson's figure gives an indication of this.

The testes are two large globular bodies situated one on each side of the ventral sucker at the level of its posterior border. The ovary is situated further back near the ends of the intestinal diverticula, median in position and of globular or ovoid shape. The minute yolk-gland lies just in front of the ovary and the fairly large receptaculum seminis lies a little behind and to the right of the ovary. The genital aperture is situated at the left margin of the body on the level of the aperture of the ventral sucker. The cirrus-pouch is moderately large, retort-shaped, and extends barely beyond the posterior border of the ventral sucker. Its posterior part lies dorsal to the outer portion of the sucker, not, as Odhner and Goldschmidt represent it, entirely to the left side of the sucker, except in compressed specimens. It contains a bipartite vesicula seminalis, of which the posterior part is considerably the larger, a small but distinct pars prostatica, and a short ductus ejaculatorius, not lined by spines. The uterus is confined mainly to the space behind the ends of the intestinal diverticula and contains *Miracidia* in all stages of development. A full description of these is given by Looss and Goldschmidt.

Looss's *Zoogonus mirus* is in all probability identical with Odhner's *Z. rubellus*—at any rate, features sufficient to distinguish them are not at present apparent.

Derogenes varicus (Müller).

To the list of hosts in which I have already found this species must be added *Callionymus lyra* (frequently in the intestine), *Trigla gurnardus* (an immature specimen in the stomach), *Gadus callarias* (occasionally in the stomach), and *Clupea sprattus* (an immature specimen in the cæca). This brings the number of British hosts of this species up to 15 and it is still to be found in many others. Although evidently very widely distributed it very probably occurs most frequently in Pleuronectidæ and Gadidæ.

Lecithoster gibbosus (Rud.). (Pl. I. fig. 5.)

= *Derogenes cacozelus*, mihi, Ann. & Mag. Nat. Hist. (7) xix. pp. 90-91, pl. iii. fig. 10.

This was erroneously described as a new species from

Hippoglossus vulgaris and *Pleuronectes limanda* in Part I.* It was also met with in *Ammodytes tobianus*. To these have to be added *Callionymus lyra*, *Osmerus eperlanus*, and *Clupea sprattus*. With the whiting and grey gurnard, recorded by Miss Lebour, and *Belone vulgaris* by Johnstone †, there is now a total of nine British hosts for the species, but to that number I shall have shortly another five to add. It is thus a widely distributed species and does not appear to have a special affinity for any particular group of fishes. The most remarkable feature about this parasite is that, according to my experience, very rarely does more than one specimen occur in any host at one time. This does not accord with Miss Lebour's experience, but I have been struck with the curious circumstance on numerous occasions. Practically the only host in which I ever obtained more than a couple of specimens was the whiting in the Firth of Clyde. This is one of the hosts in which Miss Lebour found the parasite, so that it may be specially liable to infection.

Contrary to Miss Lebour, I find that the species has a distinctly red colour, which renders it easy to be picked out from the intestinal contents. The characters of the species are sufficiently well known to obviate the necessity for redescription. One feature, however, must be mentioned, which has apparently escaped notice by previous observers, and that is the peculiar character of the contents of the excretory vesicle. Though not aware of it at the time, I first remarked on this in the case of my specimen from *Ammodytes tobianus*. Two concentrically ringed bodies are there referred to, but as the specimen was unfortunately destroyed no further investigation of their nature was possible. Since then I have seen similar bodies several times in living specimens of *Lecithaster gibbosus* and usually in much greater numbers. They occur in all sizes from tiny specks to globules half as large as the testes, and the larger ones almost invariably appear as if they contained smaller concentrically arranged globules within them. For this appearance there seems no obvious explanation, but there can be little doubt that the bodies are really globules of excretory matter. At any rate, they are contained within the main excretory vessels and are evidently homologous with the much smaller and more uniform globules commonly met with in the excretory vesicle of many other Trematodes. They were certainly not present in every specimen, and they always disappear on

* For drawing my attention to the identity of this species I am indebted to Dr. Odhner, of Upsala.

† Trans. Biol. Soc. Liverpool, **xxi.** (1907) pp. 185-6, fig. 16 (*Distomon mollissimum*).

preservation, which may account for the fact that no previous mention has been made of them. In the living animal, however, they present one of the most striking features.

The average length of my specimens collected at St. Andrews is 1.4 mm. The ventral sucker is situated at a distance of about $\frac{3}{8}$ of the body-length from the anterior end. The diameter of the oral sucker is $\frac{1}{11}$ of the body-length and that of the ventral sucker rather more than $\frac{1}{8}$. The sucker-ratio is therefore approximately 2 : 3. Miss Lebour makes it 1 : 2, but in her drawing it is almost exactly 2 : 3. The diameter of the pharynx is usually $\frac{1}{20}$ of the body-length. The average size of the ova is $.021 \times .0145$ mm.

Hemiurus communis, Odhner.

In addition to the hosts already recorded for this species must be mentioned *Trigla gurnardus*, *Cottus scorpius*, and *Gadus callarias*. It was also erroneously recorded in Part I. as *Hemiurus appendiculatus* (Rud.) from *Cottus bubalis*, *Centronotus guernellus*, *Hippoglossus vulgaris*, and *Anguilla vulgaris*. This makes the number of British hosts twelve*, but there are at least another nine fishes in which I have found it. It thus rivals *Derogenes varicus* as the most widely distributed Trematode parasite of marine fishes. This is probably due to the fact that the larval stage of both is passed in some very common Crustaceans, most likely Copepods. Levinsen's discovery of the larva of *Derogenes varicus* in the Polychæt worm, *Harmothö imbricata*, has never been confirmed, so that much doubt must remain as to the correctness of his observation. Pratt's discovery of true Hemiurid larvæ in Copepods indicates that they are really the hosts in which to look for the early stages of *Hemiurus* forms.

A word may not be out of place here in reference to the recent proposal by Looss† to apply the terms *soma* and *abdomen* respectively to the body and appendicular part of appendiculate Distomes. The word abdomen has, apart from its classical meaning, a recognized and definite significance in the anatomical terminology not only of Vertebrata but also of Invertebrata, and it seems unreasonable to apply such a general and well-known term to a single, small, specialised part. Such a use of the term has no justification on anatomical grounds, for in only a certain proportion of cases does

* It is recorded by Johnstone as *Distomum appendiculatum* from the plaice, dab, and whiting.

† Zool. Anzeig. xxxi. (1907) p. 585.

even a small part of the viscera extend into the appendicular part, the true function of which remains unelucidated. The older term "appendix" is much more applicable; but if exception is taken to that it is not difficult to coin a word, e. g. *ecsoma* (the part out of the body), much more appropriate than *abdomen*. The term *introvert* seems quite as suitable as any, even although it is used to describe different special organs in various groups of animals.

Recent work may be considered to have fairly well established the specific characters of *Hemiurus communis*, but there are still one or two points on which absolute uniformity does not exist. The length of the soma is 1-3 mm. The average breadth is about $\frac{1}{4}$ of the length of the soma, greatest just before the junction with the ecsoma. The latter is at most $\frac{2}{3}$, frequently less, of the length of the soma. The neck (distance of the ventral sucker from the anterior end) is about $\frac{1}{3}$ of the length of the soma. These measurements have been agreed on by every observer, but in connection with the sizes of the suckers my results are at variance with those of others. Both Odhner and Miss Lebour* give the ratio as approximately 1 : 2, but I have never yet found a specimen in which the ventral sucker was twice as great as the oral sucker. I find the ratio always greater than 1 : 2 and often as much as 2 : 3. There is therefore no difference in this respect between *Hemiurus communis* and *H. lühei*. Wherein the difference between the two species really consists is that in *H. lühei* the suckers are proportionately much smaller than in *H. communis*. In the latter the diameter of the ventral sucker is about $\frac{1}{7}$ of the length of the soma, but it may be as small as $\frac{1}{9}$ or as large as $\frac{1}{6}$, depending to a great extent on the state of contraction. In *H. lühei* the ventral sucker rarely exceeds $\frac{1}{11}$ of the length of the soma. In *H. communis* the œsophagus is nearly equal to the pharynx in length. The genital sinus does not extend backwards as far as the ventral sucker; the pars prostatica is of moderate length. The vesicula seminalis is bipartite, thin-walled, and situated just behind the ventral sucker. The testes are placed immediately behind the vesicula seminalis, always more or less obliquely behind each other. The ovary is separated from the testes by $\frac{1}{4}$ of the length of the soma.

Hemiurns lühei, Odhner.

Hitherto this species has only been found in the herring

* In Miss Lebour's figure of *Hemiurus communis* the sucker-ratio is, by measurement, exactly 2 : 3.

and sprat, but I have to record its occurrence on at least one occasion in the stomach of *Trigla gurnardus*. It is rarely absent from the herring, but is more seldom found in the sprat, being present in only about 10 per cent. In the latter fish it is not confined to the stomach, but may be found in the œsophagus, cæca, and even the intestine.

It is readily distinguished from *Hemiurus communis* by the comparatively enormous length of the pars prostatica, but this does not serve to separate it from *H. appendiculatus*. The specific features of *H. lühei* are:—length of soma 1·5–3·5 mm.; average breadth $\frac{1}{6}$ of length; ecsoma not more than $\frac{1}{2}$ length of soma, frequently much less; neck not more than $\frac{1}{6}$ of soma. The limits $\frac{1}{2}$ – $\frac{1}{10}$ for the neck given by Odhner are certainly much too small, although they serve to emphasize the fact that the suckers are more approximated in *H. lühei* than in *H. communis* and *H. appendiculatus*. The diameter of the ventral sucker is $\frac{1}{2}$ – $\frac{1}{10}$ of the length of the soma, and it is thus relatively much smaller than in the other two species. The sucker-ratio is 3 : 5 in such a large number of my specimens that I am inclined to regard that as fairly constant and more accurate than the ratio which Odhner gives, namely 2 : 3. In some of my specimens it certainly reaches 2 : 3, but in others it falls as low as 1 : 2. Both divergences are probably due to contraction of one or other sucker. The œsophagus is almost entirely absent. The genital sinus extends back as far as the anterior border of the ventral sucker; the vesicula seminalis is bipartite, the anterior part being muscular, the other not, and it is situated far behind the ventral sucker (about $\frac{1}{4}$ of the length of the soma). The testes lie immediately behind the vesicula, and as the ovary lies at about the same level as in *Hemiurus communis* it follows that the genital glands are closer together than in that species.

Distomum sp.

From the rectum of *Cyclopterus lumpus* a small immature Distome was obtained, the identity of which I have not been able to determine. It was elongated, more pointed posteriorly than in front, and measured about ·5 mm. The body was entirely covered with spines. The oral sucker was slightly larger than the ventral sucker; the latter situated rather behind the middle of the body. Long prepharynx; small pharynx; small round sac-like excretory vesicle*.

* A number of specimens of the same form, again immature, have recently been found by my friend Mr. William Small. The species apparently belongs to the genus *Lepidapedon* (*Lepodora*), but its identity with either of the already known species of that genus is not evident.

Gasterostomum triglae, van Beneden. (Pl. I. fig. 6.)

Numerous examples of this species were frequently obtained in the intestine of *Trigla gurnardus*. They measured 1-3.5 mm. in length. A few immature specimens were also present under 1 mm. in length. Whether they are really identical with the *Gasterostomum triglae* of van Beneden* is doubtful.

The shape is somewhat more elongated than is usual in the genus, so that the breadth is only $\frac{1}{6}$ - $\frac{1}{5}$ of the length. The whole surface of the body, quite to the posterior end, is covered with numerous spines. These are large and strong about the middle part of the body, but decrease in size towards each end and particularly towards the hinder end.

The anterior sucker is subterminal and comparatively large, having a diameter of .23 mm. in a specimen 3 mm. long, *i. e.* $\frac{1}{13}$ of the body-length. It has a thick rim, but a shallow cavity. The posterior sucker (pharynx) is small and insignificant, measuring only .12 mm., *i. e.* almost exactly half the anterior sucker. It is round and is situated just behind the middle point of the body.

The most characteristic feature of the species is entirely omitted in van Beneden's figure. This is a peculiar fan-shaped structure surmounting and overhanging the anterior sucker. The upper surface of the structure is thrown into five ridges, with depressions between, all radiating from a point corresponding to the centre of the sucker. These ridges project over the dorsal edge of the structure and appear as small symmetrically arranged papillæ. The two corners of the edge overhanging the sucker also appear to be raised as papillæ, but they are not so prominent. The structure is thus seven-pointed, five of the points being dorsal and two ventral, overhanging the sucker. In none of my specimens, either in the living state or preserved, were the papillæ much extended, and indeed in some of them they were so small as to be almost invisible. This latter fact may account for van Beneden's failing to observe them. These papillæ are evidently homologous with the much more exaggerated tentacle-like papillæ of *Gasterostomum fimbriatum*.

The alimentary system consists of a short simple sac opening from the posterior sucker and directed forwards.

The testes are two fairly large round or oval bodies, situated, one directly behind the other, on the right side of the body and not far behind the posterior sucker. The cirrus-pouch is

* Mém. Ac. Roy. Belg. xxxviii. pl. iii. fig. 15.

comparatively short, not extending further forward than the middle of the posterior testis. Its structure does not appear to differ from that in the other species of the genus.

The ovary is situated a little in front of the anterior testis and almost on a level with the posterior sucker or even slightly in front of it. It is about the same size as each testis and is round or somewhat oval. The yolk-glands consist of two separate lateral groups of follicles, extending from the posterior sucker halfway towards the anterior sucker or a little further forwards. The yolk-ducts run down on each side and unite just behind the posterior sucker. The uterus is very extensive, occupying the greater part of the body from a short distance behind the anterior sucker. The ova are extremely numerous and for the most part of a rich brownish-yellow colour; they are regularly ovoid and of surprisingly uniform size, measuring $\cdot 035\text{--}\cdot 037 \times \cdot 021\text{--}\cdot 023$ mm.

The above description agrees to a certain extent with van Beneden's figure of *Gasterostomum triglae*. In his figure the yolk-glands are rather far forward, the genital glands are on the left side of the body, the anterior sucker is elongated, and the structure surmounting the sucker is not represented. The absence of this is sufficient to throw doubt on the identification of my specimens with *G. triglae*, van Ben., for the structure is usually so prominent in my specimens that it seems impossible that anyone could have missed seeing it. On the other hand, the similarity in internal anatomy and the fact that both come from the same host are suggestive of their identity. *Gasterostomum triglae*, van Ben., can hardly be considered a properly characterised species; all that van Beneden gives is a figure with not a word of description. It seems inadvisable, however, to create a new specific name for my specimens from *Trigla gurnardus*; further research will probably throw more light on their identity.

Gasterostomum gracilescens, Rud.

A large number of immature specimens of this species were found in the stomach of a cod. The latter is not regarded as a final host of this species, although it functions as an intermediate host for the encysted cercariae. Adult *Gasterostoma* have never been found in it. The specimens under consideration had probably come from some Gadoid fish ingested by the cod, and it is doubtful if they would have attained maturity in this host.

EXPLANATION OF PLATE I.

The following letters apply to all the figures:—

<i>BS.</i> Ventral sucker.	<i>PG.</i> Genital aperture.
<i>CB.</i> Cirrus-pouch.	<i>PP.</i> Pars prostatica.
<i>DR.</i> Yolk-reservoir.	<i>T₁, T₂.</i> Testes.
<i>DSt.</i> Yolk-glands.	<i>RS.</i> Receptaculum seminis.
<i>Ex.</i> Excretory vesicle.	<i>Ut.</i> Uterus.
<i>J.</i> Intestinal diverticula.	<i>Vg.</i> Vagina.
<i>KSt.</i> Ovary.	<i>VS.</i> Vesicula seminalis.
<i>Ov.</i> Ova.	

- Fig. 1.* (*Lebouria*) *alacris*, Lss. Ventral view. × 50.
Fig. 2. *Dihemistephanus lydiæ* (Stoss.). Ventral view. × 45.
Fig. 3. Ditto. Head, dorsal aspect. × 105.
Fig. 4. *Zoogonus rubellus* (Olsson). Ventral view. × 75.
Fig. 5. *Lecithaster gibbosus* (Rud.). Ventral view. × 50.
Fig. 6. *Gasterostomum triglæ*, v. Ben. Ventral view. × 30. *AS.*, anterior sucker. *PS.*, posterior sucker.

II.—*Descriptions and Records of Bees.*—XXI.
 By T. D. A. COCKERELL, University of Colorado.

Agapostemon sulcatulus, sp. n.

♂.—Length 8 mm. or slightly over.

In Crawford's table (Pr. Nebraska Acad. Sci. 1901, p. 158) it runs to E, but does not resemble *A. nasutus* or *A. rhopalocera*; except for the small size it runs to C, and runs out because the head and thorax are brilliant green, not at all blue, and the yellow band on the clypeus is without any sign of a tooth or projection. Form slender; scape black, with a broad yellow stripe in front; flagellum dull ferruginous beneath, black above. Wings perceptibly dusky, with a yellow or orange tint; stigma dull amber-colour, nervures dark fuscous. Metathorax above shining and very coarsely wrinkled, the area not defined; posterior face with strong sharp edges; first four trochanters yellow with a little black, hind trochanters black. Legs yellow, a large black patch on apex of hind femora and a small spot on middle ones; middle and hind tibiæ with a black band on outer side and a dark apical spot, anterior tibiæ with a dark mark behind. Abdomen with five yellow dorsal bands, that on first segment narrowed in the middle; venter with fuscous markings,

consisting of transverse bands on first four segments, dark only on fourth, a large triangular area on fifth, and the middle of sixth, the last being about evenly tripartite, the sides yellow; sixth segment with a delicate median sulcus on its apical half.

A. viridulus also occurs at Malcolm (*Oertel*), but that species has a keel instead of a sulcus on the last ventral segment and is much larger; it also has the anterior femora heavily marked with black behind, while in *sulcatulus* they are entirely yellow. Compared with *A. texanus* the new species is smaller, with the stigma not so red, and the markings on the legs and ventral surface of abdomen very different. Compared with *A. fasciatus* it is separated by the black basal half of the first abdominal segment, the colour of the trochanters, &c.

Hab. Malcolm, Nebraska, September (*Birkmann*).

The bees of Malcolm, collected by Mr. Birkmann in September, include both eastern and western types, the former preponderating. Some of the more interesting are:—*Anthophora walshii*, Cress. (at flowers of *Salvia*), *Melissodes boltonia*, Rob., *M. vernonia*, Rob., *Tetralonia cressoniana*, Ckll., ♀, var. with black flagellum (at flowers of *Salvia*), *Megachile emoryi*, Ckll., *Panurginus piercei*, Crawf.

Megachile mucida semimucida, subsp. n.

♀.—Length about 15 mm.

Hair of head black, except some pale ochreous between antennæ and on front; of thorax above and at sides pale ochreous, with a silky appearance, but on underside black; of abdomen pale ochreous above on first segment *and basal half of second*, otherwise, including the scopa, wholly black; hair of legs black, more or less reddish on inner side of small joints of tarsi; hind basitarsi broad and flat. Wings strongly infuscated. Mandibles 3-dentate; clypeus very densely punctured, with a median shining ridge, lower margin shining and crenulate.

♂.—Agrees well with Cresson's description of *M. mucida*, but the coxal spines are only moderately long, above each is a large patch of fox-red pubescence; the anterior femora are pale yellowish suffused with red, marked with black apically. Wings dusky throughout. Apical joint of antennæ somewhat dilated and flattened.

There is a strong general resemblance to *M. wootoni* and its allies, but, among other things, the dense black hair on

upper outer edge of the tarsal boat-like scale is distinctive, as also the rectangular notch at apex of abdomen. In the female the wholly black ventral scopa, black hair of cheeks, &c. are good characters.

Hab. Fedor, Lee County, Texas, March 27, 1909 (*Birkmann*).

Prosopis digitata fedorica, subsp. n.

♂.—Length about 4 mm.

Runs in my table of *Prosopis* ('Entomologist,' 1898, p. 186) to *P. subdigitata*, but differs as follows:—Supraclypeal mark large and broad, truncate and not at all elongated above; lateral marks with the upward finger-process very short, ending at same level as top of supraclypeal mark; sides of lateral marks forming an acute angle with orbit above, the point where they leave the orbit being lower than their upper edge mesad of the finger-like process; scape with a light yellow stripe; area of metathorax strongly rugose-wrinkled in the basal middle, but otherwise nearly smooth though dull, the sides very well defined by a curved sulcus. Flagellum dull ferruginous beneath; thorax wholly without light markings; markings of face very pale yellow. Wings greyish, iridescent. Legs with the yellow rather more extended than in *P. digitata*.

This is a southern member of the group of species or races called *P. digitata*, *subdigitata*, and *rudbeckiæ* (see 'Psyche,' June 1896, p. 31).

Hab. Fedor, Lee County, Texas, March 17, 1909 (*Birkmann*).

At the same time and place Mr. Birkmann took a variety of *P. georgica*, Ckll., smaller than the type, with the face-markings pale instead of bright yellow, and a black spot on the hind tibiæ within. This insect, which is easily known from *P. zizia* and its allies by the very narrow lower part of face, may stand as *P. georgica*, var. *lecana*, nov. The scape is broad, with the anterior half light yellow. It is interesting to find at one spot in Texas two forms of *Prosopis*, one a modified representative of a Rocky Mountain group, the other a variety or subspecies of a type belonging to the South-eastern States. At the same time and place there also occurred an example of *P. sayi*, Rob., a species characteristic of the Northern States east of the plains.

Robertsonella cratægina, sp. n.

♂.—Length $7\frac{1}{2}$ –8 mm.

Black, with white pubescence; abdominal segments 1 to 4 with conspicuous white apical hair-bands, that on 1 broadly interrupted; segments 5 and 6 conspicuously hairy; six ventral segments visible, the last strongly emarginate, the second concave and shining, the third with a patch of white hair on middle of apical margin.

This species is in nearly all respects like *M. gleasoni*, Titus, the only previously known member of the genus, but is considerably larger, and the second recurrent nervure ends much nearer to the apex of the second submarginal cell, while the basal nervure fails to reach the transverso-medial. The characteristic appearance of the face and antennæ and the fine sculpture are quite the same.

Hab. Lee County, Texas, March 15, 1907, and Fedor, April 14, 1901 (*Birkmann*).

It occurred at flowers of *Cratægus*.

Calliopsis coloratipes fedorensis, subsp. n.

♀.—Similar to *C. coloratipes*, but a little larger, and with the disk of the first abdominal segment quite densely beset with very minute punctures, very similar to those on the second (in *coloratipes* this part is smooth and shining, with a few scattered punctures). Eyes ochreous; clypeus with two broad black bars, not reaching the summit; lateral face-marks ending in a point above, their upper inner margin wavy; dog-ear marks represented by small spots; hair of vertex and thorax above pale fulvous.

I should consider this a distinct species were not the forms of the *C. coloradensis* group so variable. The insect is superficially very much like the S.-American *Parafriesia prinii* (Holmbg.).

Hab. Fedor, Texas, Sept. 21, 1897 (*Birkmann*).

At Fedor Mr. Birkmann also takes (April, June) *C. andreniformis*, Smith; the females rather large and less distinctly banded than usual.

Panurginus polytrichus, sp. n.

♂.—Length about 6 mm.

Black, head and thorax densely clothed with coarse dull whitish hair; thorax without light markings; pale colour of face confined to clypeus, which is broad, shining, and very pale yellowish, a sort of ivory tint; labrum and mandibles

black; head broad; antennæ rather short and stout, flagellum bright ferruginous beneath except at extreme base and apex; mesothorax and scutellum shining, rather feebly punctured; area of metathorax rugose basally; tegulæ shining pale reddish, fuscous anteriorly. Wings only faintly dusky, strongly iridescent, nervures and stigma ferruginous; first recurrent nervure meeting first transverse cubital or entering extreme base of second submarginal cell. Legs black, all the tarsi pale reddish, anterior tibiæ in front and mark on anterior knees pale yellow. Abdomen broad for a male, black, the hind margins of the segments broadly testaceous; sixth ventral segment broadly emarginate, the angles dentiform.

Compared with *P. cressoniellus*, Ckll., this is easily distinguished by the larger head, broad clypeus, pallid tegulæ, and other characters. Compared with *P. verus*, Ckll., it differs conspicuously by the shorter antennæ, red stigma, and other features. From *P. malvastri*, Sw. & Ckll., it is easily known by its smaller size, pallid clypeus, &c.

Hab. Fedor, Texas, April 16, 1903 (*Birkmann*); also Lee Co., Texas, April 10 (*Birkmann*).

Neopasites eamia, sp. n.

♂.—Length 6 mm.

Very robust; head and thorax very densely punctured, black, with only the mandibles and tubercles red; pale scale-like pubescence as usual; eyes very pale purplish grey; flagellum bright ferruginous beneath; scutellum moderately bigibbous; tegulæ bright orange-ferruginous. Wings dusky, nervures and stigma black, first r. n. meeting first t.-c. Knees, anterior and middle tibiæ, hind tibiæ at extreme base and apex, and anterior tarsi all red; middle tarsi reddish. Abdomen broad, of a fine deep red colour, the segments with a transverse median black cloud, practically absent on the first, becoming stronger towards the apex, and involving practically the whole of the sixth; apical plate large; pale pubescence forming subdorsal patches, but the spotting is not nearly so conspicuous as in *N. pulchellus* (Cress.).

Nearest to *N. heliopsis* (Rob.), but easily distinguished by the very robust form and the much redder abdomen.

Hab. Lee County, Texas, May 1908 (*Birkmann*).

Stelis birkmanni, sp. n.

♂.—Length about 6 mm.

Rather robust, black, with no light markings on the head,

thorax, or legs, but with very pale yellowish (ivory-coloured) bands, very slightly interrupted in the middle, on the first five abdominal segments; spurs dark. Wings infuscated, violaceous in the marginal cell and beyond, outer marginal field with crimson and green iridescence.

This looks almost exactly like *Microstelis fæderalis* (Smith), but differs in several important characters, as follows:—Second recurrent nervure meeting second transverse cubital; apex of third ventral segment with a median, oval, shining, button-like tubercle; band on first abdominal segment scarcely or not interrupted; flagellum entirely black.

Hab. Lee County, Texas, April 10, at flowers of *Phacelia*; collected by the Rev. G. Birkmann.

Osmia botitena, sp. n.

♀.—Length about 9 mm.

Rather robust, bluish green; head and thorax densely punctured, abdomen less densely; clypeus normal, rather projecting; mandibles 3-dentate; antennæ and tegulæ black. Wings broadly pale reddish smoky in marginal cell and on outer margin. Legs black, more or less tinged with blue-green, the anterior femora behind brilliantly coloured; hair on inner side of hind basitarsus pale orange; hair of head and thorax white; abdomen subfasciate, with white hair at sides of first two segments; ventral scopa yellowish white.

Closely related in all respects to *O. subfasciata*, Cresson (which I have from Plano, Texas, collected in June by Mr. E. S. Tucker), but the abdomen is conspicuously broader and the punctures on the posterior segments are not large and coarse as they are in *subfasciata*. In both the basal nervure falls a trifle short of the transverso-medial. The head in *O. botitena* is somewhat broader than long; in *subfasciata* the reverse is the case. Compared with *O. conjuncta*, Cresson, the new species is larger and much greener, with the abdomen longer and more strongly punctured. Compared with *O. pumila* it is larger, more brightly coloured, and has the second and third abdominal segments conspicuously constricted near the base, which is not at all the case in *pumila*.

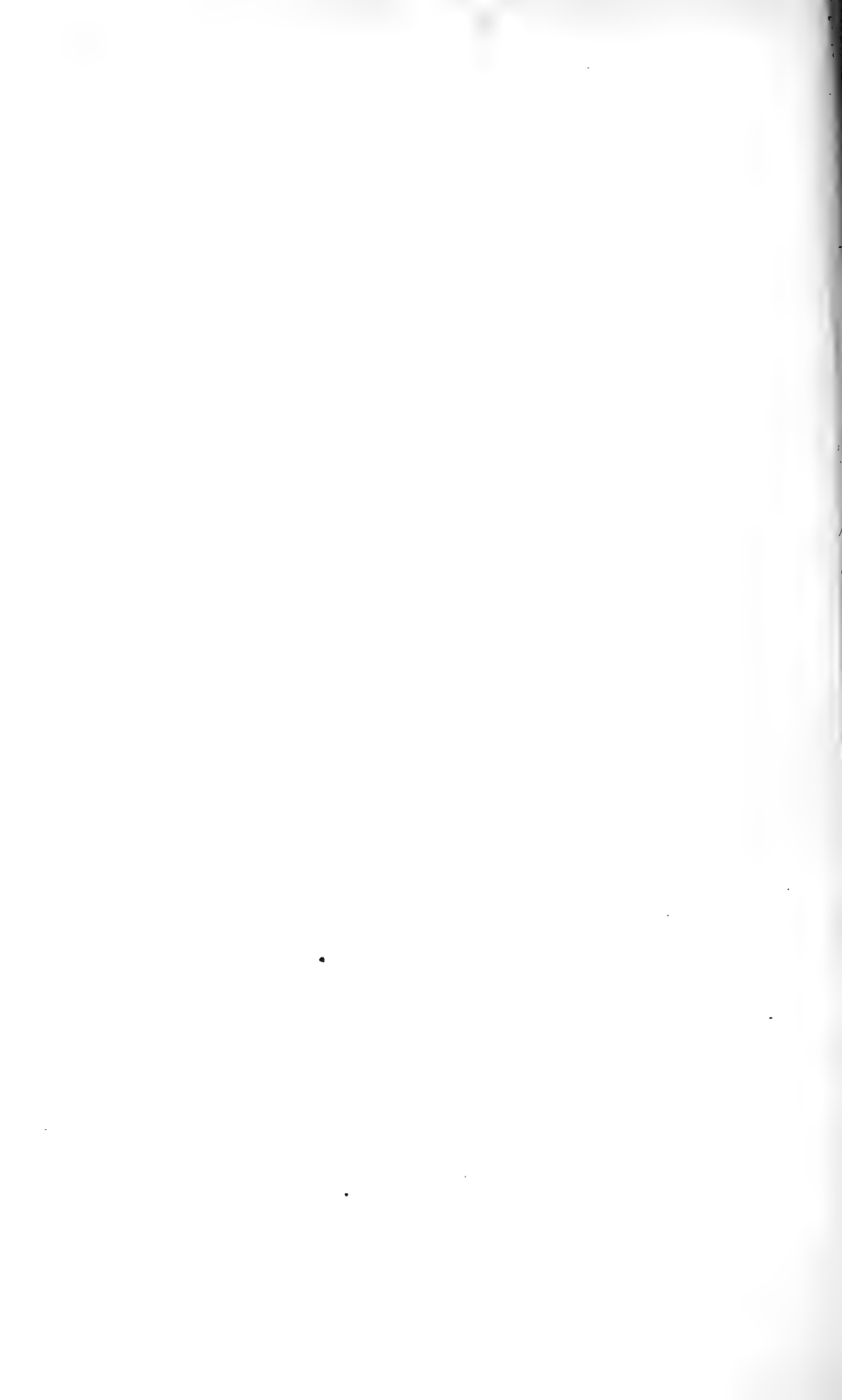
Hab. Lee County, Texas, April 23, 1906 (*Birkmann*, no. 99).

The name *botitena* (from the Malay) has reference to the white ventral scopa.









Augochlora sumptuosa bolliana, subsp. n.

♀.—Compared with true *A. sumptuosa*, Sm. (Florida, Robertson), the Texan form is smaller (anterior wing 7 mm.) and bluer, with the tarsi dark; hair on outer side of hind basitarsi blackish, on inner side not brightly coloured; basal area of metathorax longer, not so well defined, rather coarsely granular; head smaller and rounder. The abdomen has a dullish satiny surface, and the vibrissæ are very short, white, and inconspicuous. Hind spur pectinate, with few teeth.

Probably this will be separated as a distinct species when the males are known.

Hab. Lee County, Texas, June, 2 ♀ (*Birkmann*).

Named after the well-known collector who first took *A. sumptuosa* in Texas.

III.—On new and rare Crustacea from Scottish Waters.

By THOMAS SCOTT, LL.D., F.L.S.

[Plates II. & III.]

THE Crustacea described here were obtained in collections made by the fishery steamer 'Goldseeker' while carrying on work in the North Sea and adjacent waters under the direction of Professor d'Arcy W. Thompson, C.B., F.L.S., the representative for Scotland on the International Committee. I am indebted to Professor Thompson for permission to publish these notes.

AMPHIPODA.

Genus *EUSIROGENES*, Stebbing, 1904.

Eusirogenes propinquus, sp. n. (Pl. II. figs. 1-9.)

The genus *Eusirogenes* was established by the Rev. T. R. R. Stebbing in the year 1904 for an Amphipod which, while it agreed generally with *Eusirus*, Kröyer, differed in some important points, and among others in the structure of the gnathopoda*.

The form recorded here, of which only a damaged specimen was obtained, agrees very well with the characters by which

* T. R. R. Stebbing, "On Biscayan Plankton," Trans. Linn. Soc. ser. 2, Zool. vol. x. p. 15, pl. 2A (Nov. 1904).

Eusirogenes is distinguished, and I think undoubtedly belongs to that genus; but, as indicated below, it differs in some respects from the species described by Mr. Stebbing. Unfortunately *Eusirogenes dolichocarpus*, Stebbing, like the form mentioned here, was described from a single damaged specimen, and the author was unable to give so full a description of it as would have been desirable. Had the specimens in both cases been perfect, other differences besides those referred to might have been noticed.

In the specimen now recorded the cephalon was very imperfect and both pairs of antennæ were gone.

The mandibles, maxillæ, and maxillipeds, as shown by the drawings, are somewhat similar in structure to the same appendages in *E. dolichocarpus*.

The gnathopods are unequal in size, the first pair being somewhat larger than the second. In the first pair the basal joint is elongated and tapers towards the distal end, where it is only half as wide as at the proximal end; this joint is furnished with a few moderately long and slender bristles. The third and fourth joints are short. The carpus or fifth joint is elongated and slender, its length is equal to about four-fifths of that of the second joint; the superior margin of the joint is nearly straight, while the lower curves downward from both ends to form a small triangular process, the apex of which is rather nearer the proximal than the distal extremity and bears one or two moderately long and slender bristles. The distal half of the lower margin forms a shallow concavity to receive the large propodos when folded back upon the carpal joint. The propodos is about twice as long as broad, and with the outer and inner edges nearly parallel; the outer edge or palm terminates below in a distinct though small angular projection, from which springs a moderately long and stout spine; the dactylus is long and slender, slightly curved and finely serrated on the inner edge (fig. 4). The second pair of gnathopods, though smaller than the first, are somewhat similar to them in structure; in this pair, however, the second joint is narrow, with the margins nearly parallel, and provided with a number of marginal bristles; the carpal joint is rather longer than the second, and the bristles at the apex of the triangular process of the lower margin are more numerous; the propodos also differs from that of the first pair in that it expands and becomes rather wider posteriorly (fig. 5).

The remaining pereopods were imperfect, but appeared to be all elongated and slender as in *E. dolichocarpus*. The coxal plates of the gnathopods and of the first and second

pereiopods are slightly notched near the lower front angle, as shown in the drawing (fig. 5).

The last pair of epimeral plates are broadly rounded and have the posterior margin finely serrated (fig. 8). Uropoda imperfect.

Telson moderately elongated, the length being about twice the width at the proximal end, and tapering to the somewhat pointed but slightly cleft apex (fig. 9).

Hab. Station 53 (lat. $59^{\circ} 36'$ N., long. $70^{\circ} 0'$ W.), 1140 metres deep, Aug. 17th, 1906.

Remarks.—The specimen now recorded has a close general resemblance to *E. dolichocarpus*, but as it differs from that species in one or two points, I am inclined for the present to regard it as a separate though closely allied species. In *E. dolichocarpus* the postero-lateral angles of the third pleon segment (the last pair of epimeral plates) "are smoothly rounded, not serrate." In the 'Goldseeker' specimen the postero-lateral angles are also rounded, but the lateral margin is distinctly serrate. Moreover, in *E. dolichocarpus* the stem of the fifth joint of the second gnathopods is considerably wider than that of the first pair and is nearly two and a half times as long as the part which forms the cup for the propodos, whereas in the 'Goldseeker' specimen the stem of the fifth joint of the second pair, which differs little from that of the first, scarcely equals in length the part that forms the propodal cup.

Genus PARASCINA, Stebbing, 1904.

Parascina fowleri, Stebbing. (Pl. II. figs. 10-16;
Pl. III. figs. 16, 17.)

1904. *Parascina fowleri*, Stebbing, "Biscayan Plankton," Trans. Linn. Soc. ser. 2, Zool. vol. x. p. 21, pl. 2 B.

One or two specimens of this species occurred in the same gathering in which the *Eusirogenes* recorded above was obtained. *Parascina* has a general resemblance to *Scina*, but differs distinctly in the form of the first and second maxillæ and the maxillipeds and in the structure of the fifth pair of thoracic legs.

The two pairs of maxillæ consist of broad lamelliform plates, fringed with numerous fine hairs and furnished also with several marginal spines, as shown in figs. 11 and 12, Pl. II. The maxillipeds consist of two large hemispherical plates, the inner margins of which are nearly straight, while the opposite margins are broadly and evenly rounded but

with a shallow notch near the distal end; the inner margins and the distal end of the outer margins are fringed with moderately stout bristles. The inner plates, though also moderately large, are smaller than the outer ones; their outline is subtriangular, with the distal end broad and evenly but not very boldly rounded, and with a minute tooth-like process near the outer angle; the distal margin is also densely fringed with fine hairs; these inner plates are situated one behind the other on the same side as shown in the drawing (fig. 16, Pl. III.), and it is interesting to notice that Mr. Stebbing, in the work referred to above, shows these plates arranged in the same way as described here, which therefore probably is the normal position of them in this species—a position that does not seem to be usual among the Amphipoda.

The first and second gnathopoda are nearly alike, and they are both unprovided with chelæ. The end-joint bears three apical spines, the middle one being twice or three times longer than that on either side (figs. 13 & 14, Pl. II.).

In the fifth pair of thoracic legs (the third pair if the gnathopods are not counted) the basal joint is not armed with marginal teeth as in *Scina*, nor is the distal end produced into a spiniform process.

The third pair of uropods are moderately stout; the inner branch is about as long as the basal joint, the outer margin of this branch and the inner margin of the outer branch are both finely serrated. Telson small, subovate.

Parascina fowleri has also been recorded by Chevreux and Tattersall. Its occurrence at 'Goldseeker' Station 53 extends its distribution northwards considerably.

Genus CYSTOSOMA, Guérin-Ménéville.

Cystosoma spinosum (Fabr.).

A small specimen of *Cystosoma* scarcely 20 mm. in length was obtained in a gathering collected by the 'Goldseeker' in August 1907 at a depth of a little over 500 metres in lat. 60° 31' N., long. 3° 53' W., that is in the Faroe-Shetland Channel, but nearer Shetland than Faroe. A slight dorsal ridge extends from the cephalon to the base of the telson. Each segment has the posterior margin denticulate; the median dorsal tooth is of moderate size, but the other denticles are small, and they are more numerous on the margins of the pereion-segments. The specimen is devoid of colour and almost transparent. Tattersall records this species from

"50 miles N. by W. of Eagle Island, Co. Mayo." One female 50 mm. was obtained at 700 fathoms*. Rev. T. R. R. Stebbing remarks that *Cystosoma* has species which combine a length of 4 or 5 inches with the respectable breadth and depth of an inch in the amplest part of the head †. The specimen from the Faroe-Shetland Channel, judged by dimensions like these, must be regarded as "small."

COPEPODA-CALANOIDA.

Genus PSEUDOTHARYBIS, T. Scott.

Pseudotharybis dubius, sp. n. (♀).
(Pl. III. figs. 1-15.)

Body moderately stout, forehead rounded, rostrum small, last thoracic segment scarcely produced and rounded at the sides, abdomen and caudal rami short.

Antennule on the (?) left ‡ side composed of twenty-four joints, the first two stout, other joints small, but the eighth and the penultimate joints are rather longer than the others. The (?) right antennule is composed of eighteen joints, but is otherwise somewhat similar to the left; both are provided with several short sensory filaments (figs. 2 & 3).

Antennæ with the inner ramus considerably shorter than the outer, as in *Tharybis*, G. O. Sars.

Mandibles with the masticatory end truncated and armed with strong teeth, and the palp is moderately large and two-branched. Maxillæ nearly as in *Tharybis*.

First maxillipeds small, but armed with two moderately strong spiniform setæ and a number of stout bristles (fig. 8). Second maxillipeds somewhat similar to those of *Tharybis*, but the first basal joint is furnished with stout, curved, spiniform setæ on the inner distal angle in addition to several bristles (fig. 9).

In the first pair of swimming-feet the spines on the outer distal angles of the first and second joints of the outer branches are long and slender. The exterior marginal spines on the outer branches of the other three pairs are also moderately elongated, while the terminal spines are nearly one and

* "Pelagic Amphipoda of the Irish Atlantic Slope," Fisheries, Ireland Sci. Invest. 1905, iv. (1906) p. 17.

† 'A History of Crustacea,' p. 30.

‡ The antennules were dissected off and mounted ere the difference between them was observed, and there is some doubt as to which is right and which is left.

a half times the length of the joint to which they are articulated (figs. 10-13).

Fifth pair of thoracic feet short, moderately stout, and slightly asymmetrical (fig. 14). The inner distal angle of the penultimate joint becomes in the one ramus a small papilliform process, but not in the other. The end joints of both rami are furnished with a small spine near the middle of the outer margin and with three unequal terminal spines, the two inner spines being large and stout, and the outer as shown in the drawing.

Hab. Station 53 (lat. 59° 36' N., long. 7° 00' W.), 1140 metres, Aug. 17th, 1907. No males observed.

Remarks.—This species, like *Pseudotharybis zelandicus*, T. Scott, has a moderately close resemblance to *Tharybis*, G. O. Sars; but the structure of the fifth pair of thoracic feet in the female differs considerably and the first maxillipeds are also devoid of sensory filaments. The species now described also differs from *P. zelandicus* in several respects, *i. e.* in the asymmetrical antennules, in the armature of the second maxillipeds and of the first and fifth pairs of thoracic feet. One or two other though perhaps less prominent differences might be mentioned, but those referred to are sufficient to distinguish the present species from that previously described.

EXPLANATION OF THE PLATES*.

PLATE II.

Eusirogenes propinquus, sp. n.

Fig. 1. Mandible and palp. 2. Second maxilla. 3. Maxillipeds. 4. First gnathopod. 5. Second gnathopod. 6 & 7. First and second pereopods. 8. Last epimeral plate. 9. Telson.

Parascinus fowleri, Stebbing.

Fig. 10. Upper antenna. 11. First maxilla. 12. Second maxilla. 13. First gnathopod. 14. Second gnathopod. 15. First pereopod. 16. Third pereopod.

PLATE III.

Pseudotharybis dubius.

Fig. 1. Female, side view. 2. (?) Right antennule. 3. (?) Left antennule. 4. Antenna. 5 & 6. Mandible and palp. 7. Maxilla. 8. First maxilliped. 9. Second maxilliped. 10. One of first pair of swimming-feet. 11. One of second pair. 12. One of third pair. 13. One of fourth pair. 14. Fifth pair. 15. Abdomen.

Parascina fowleri, Stebbing.

Fig. 16. Maxillipeds. 17. Last pair of uropods and telson.

* The figures are drawn with a "Zeiss" camera and are all enlarged.

IV.—*Some common Crinoid Names, and the Fixation of Nomenclature.* By F. A. BATHER, M.A., D.Sc., F.R.S.

IN his paper "The Genus *Enerinus*" (Ann. & Mag. Nat. Hist. (8) iii. pp. 308–310, March 1909) Mr. Austin Hobart Clark opens with such pointed reference to my previous attempts at fixing the nomenclature of the crinoid genera involved that silence on my part might seem discourteous, or else to imply that I accepted all Mr. Clark's statements without demur. Since Mr. F. Springer has also taken up the question in an admirable paper ("A new American Jurassic Crinoid," Proc. U.S. Nat. Mus. xxxvi. pp. 170–190, pl. iv., 3rd March, 1909), I am at last persuaded to publish the following comments.

Mr. Clark makes the criticism that the name *Isocrinus* is not, as I said (1898), due to H. v. Meyer, but to L. Agassiz. He writes (1909, March, p. 308):—" *Isocrinus* was first proposed in 1836 (L. Agassiz, Mém. de Soc. de Sci. Nat. de Neuchâtel, i. p. 195, type *Isocrinites pendulus*, de (sic) Meyer, 1835, nomen nudum, = *Isocrinus pendulus*, von Meyer." I do not know whence Mr. Clark obtained either the spelling "*Isocrinites*" or the date "1835." In the British Museum copy of the memoir cited the words are "*I. pendulus* H. de M. (encore inédit)." Therefore, until v. Meyer (1837) published his description of *I. pendulus*, *Isocrinus* had no genotype, while its diagnosis was inadequate and incorrect: "Très-voisin des Pentacrines, dont il a la tige avec ses rayons simples. Les premiers articles des rayons du disque ne font pas saillie comme dans le genre *Pentacrinus*; en revanche, la partie supérieure de la tige est plus développée." But, apart from all this, Agassiz definitely assigned the name *Isocrinus* to "H. de Meyer," and was no doubt attempting to condense manuscript information supplied by that author. Had it not been for von Meyer's own paper (1837) the name *Isocrinus* would never have come up for discussion. How the generic name may be written and quoted by others is a matter of small importance. But the foregoing are the facts of the case.

Mr. Clark seems to hint at further ignorance on my part in reference to the names *Balanocrinus* and *Metacrinus*.

He says "*Balanocrinus* is not available for any genus of Pentacrinitidæ." It is admitted on p. 247 of my paper (1898) that "De Loriol has perhaps strained a point"; "but," I add, "nothing would be gained by contesting his action." The facts are these:—The name *Balanocrinus* occurs first in

Desor (1845, Bull. Soc. Sci. nat. Neuchâtel, i. p. 214) for "Pentacrinus ayant la face articulaire des anneaux de la tige crénelée sur son pourtour. Jusqu'ici on ne connaissait que des fragments de tiges de ce type. On en avait même distingué plusieurs espèces, les *Pentacrinus subteres* Münst. et *P. pentagonalis* Gldf.; mais on n'avait aucune idée des calices. M. Agassiz vient de découvrir, parmi les Crinoïdes du Musée de Bale, un calice en forme de gland, dont la base présente une articulation tout-à-fait semblable à celle du *Pentacrinus subteres*. Ce savant en a fait un genre à part, sous le nom de *Balanocrinus*, et il pense qu'on devra lui associer toutes les tiges qui présentent ce mode d'articulation." Is it not perfectly clear that, had the matter rested here, we should have been bound to adopt *Balanocrinus* Desor ex Agassiz MS., with genotype either *B. subteres* or *B. pentagonalis*? This, as it happens, is precisely what we all have done, the former species being taken as genotype. Why then does Mr. Clark say we are wrong? Because, as de Loriol has told us (1879, 'Crin. foss. Suisse,' pp. 163, 175, and 1888, 'Paléont. franç. Crin. jurass.' p. 295), the "calice en forme de gland" proved to be nothing but a stem-fragment of *Millericrinus* (? *M. mattheyi*), swollen owing to the attacks of a parasite. But this fragment, being neither described nor named by Agassiz, afforded no species to serve as genotype. It is true that the supposed discovery of a calyx led Agassiz to found his genus; but this quotation from Desor shows that the diagnostic character was derived from the joint-face of the stem. Clearly Agassiz thought he was dealing with a *Pentacrinus subteres*, and that species, if any, would have been his genotype. To try to avoid the natural conclusions from these undisputed facts requires more than legal subtlety and brings no advantage to anybody.

"*Metacrinus*," says Mr. Clark quite correctly, "was first diagnosed in 1882." I did not in 1898 give any other date, or any date at all, since I was not discussing *Metacrinus*. I did, however, take from the paper to which he refers (P. H. Carpenter, 1882, Bull. Mus. Comp. Zool. Harvard, x. p. 167) a statement as to the origin of the name. It may, nevertheless, be pointed out that Carpenter's reference to *Metacrinus* in that paper (1882) was rather in the nature of a passing allusion to Wyville Thomson's MS. name, and that no species was then described or even mentioned by name. Therefore in the Echinoderma volume of the 'Treatise on Zoology' (1900) it seemed more useful to refer the student to the complete description in the 'Challenger' Report of 1884.

Mr. Clark's statements concerning the name *Encrinus* involve more serious questions. Passing over various writers after 1758, he stops at Blumenbach (1779, 'Handb. d. Naturgeschichte'), and finds that the name must be applied to the ordinary *Pentacrinus asteria*, which is now generally called *Isocrinus* by writers on crinoids. This may be the correct inference, but it seems hard that the absurdity should have to be fathered on Blumenbach. That eminent naturalist professed to be writing a manual for the elementary student and the amateur rather than a complete systematic treatise, and in dealing with the recent Echinoderma, or Cartilaginea as he called them, he used only the commonly known names, *Echinus*, *Asterias*, and *Encrinus*. Had he been asked why he referred the *Isis asteria* of Linnæus to *Encrinus*, he would doubtless have replied in the words of John Ellis (1762, Phil. Trans. lii. p. 358), "As it comes nearest to the fossils called encrini, or lili lapidei [*sic*], I shall keep that name, and call it *Encrinus*, etc." But in the second part of the same work, in the Abschnitt 'Von den Versteinerungen,' we find "Die Encriniten und Pentacriniten" quite clearly distinguished, and it was with the latter alone that Blumenbach compared his *Encrinus asteria*. A few years later (1790, Voigt's Mag. f. d. neueste a. d. Physik, vi. Heft 4, pp. 1-17) he was severe on Hollmann for having confused *Pentacrinus* with *Encrinus*. Since the days of Lachmund (1669) the name *Encrinus* had been in constant use for the *Lilium lapideum* of the Muschelkalk, and it cannot be supposed that Blumenbach had the smallest intention of diverting it from this well-known use. To preserve this older meaning, however, we are compelled by the modern rules of nomenclature to find some instance of its application before 1779 and after 1758.

Mr. Springer (1909) and Mr. A. H. Clark (1908, Proc. U.S. Nat. Mus. xxxiv. p. 517) both refer to *Encrinus coraloides* Andreae (1763), but both have had the misfortune to quote Andreae incorrectly though diversely. The figures actually referred to by Andreae represent stem-fragments that cannot, in my opinion, be referred with certainty to any species or genus. If this is to be the basis of *Encrinus*, the name will simply disappear from actual use. To rescue it, something earlier and more intelligible must be sought for.

The desired application seemed to have been found in C. F. Schulze (1760, 'Betrachtung d. versteinerten See-sterne'); but Mr. Clark asks why I should take this and not take Schulze's *Decacnimos*, *Polyactinis*, and *Trisevdecacnimos* instead of the later *Antedon* and *Actinometra*. The simplest answer to this is that, whereas I have had occasion to go fully

into the history of *Encrinus*, I have made no serious attempt to deal with *Antedon* and *Actinometra*. Had I proceeded to the task of subdividing those genera—a task which I foreshadowed in the 'Annals' in 1891, but which has now been accomplished by Mr. Clark—then I should have attempted to revise the nomenclature. So far as possible I leave names alone until the need for publishing new facts involves more precise definition or discrimination.

Another reason is that in the case of *Encrinus* there is no possible room for doubt as to Schulze's meaning, because he gives excellent figures of the fossil usually known as *Encrinus liliiformis*. In the case of the other names few would be bold enough to say definitely to which species each of them refers.

But perhaps the truest reason is that I have long been aware of the facts recounted in Mr. Clark's paper and of others given in the more complete history just published by Mr. F. Springer (1909), and I saw that terrible difficulties would arise if Schulze's *Encrinus* were not accepted. Overwhelmed by the thought, I clutched at the first obvious straw, letting the rest of the bundle drift whither it would.

Of course I am prepared to accept the contention of those who have recently examined the work of Schulze (viz. A. H. Clark, 1908, "The Nomenclature of the Recent Crinoids," Proc. U.S. National Mus. xxxiv. 435-542; W. K. Fisher, 1908, "Necessary Changes in the Nomenclature of Starfishes," Smithsonian. Miscell. Coll. Quart. lii. 87-93; F. Springer, 1909, *op. cit.*; and others), and to admit that his names are not always binomial. Some are, but others are not. Binomial nomenclature was in the air, and to writers after 1758 I have generally given the benefit of the doubt. I did not pretend that Schulze used *Encrinus* with any trivial name attached, but I took the generic name alone, and as there was never any doubt to what it referred, it still seems to me as well established as, say, *Isocrinus* Agassiz, 1836, or *Metacrinus* Carpenter, 1882, both of them introduced in a similar manner (*i. e.* the names quoted from others), but without any described or figured species by which their far less complete or even less correct diagnoses could be interpreted. Except on the purely pedantic and arbitrary criterion of a consistent use of binomial nomenclature, *Encrinus* Schulze certainly has the advantage.

But, after all, nothing will ultimately be gained by blinking facts or seeking to escape from rules. Suppose we give up Schulze and face the consequences, of which Mr. Clark only shows us a few, but which, as Mr. Springer points out, are

many and disastrous whatever other solution we attempt. Then, much as I admire the learned argument and legal skill with which Mr. Springer invokes the doctrine of prescription, I consider that there is a danger in the introduction of such a principle as lapse of time. Who is to decide what period shall be set? And in such a case as the present it might be urged that the use of *Eucrinus* from Blumenbach to Lamarck should be weighed against the subsequent use from the days of J. S. Miller. When once rational argument is admitted to such a dispute the controversy may go on for ever. The simplest solution of the gordian knot was given once for all by Alexander. Let us dare on occasion to be no less arbitrary. But it will never do for each to act according to his own idea of what is "common sense," if only because sense in these matters never is common to all. The only possible alternative to strict following of rules is that zoologists should agree to accept as final the decision of some authority by them appointed. The vehicle for such authority already exists in the Nomenclature Committee of the International Zoological Congress, the only body that has any claim to represent either all branches of zoology or all nationalities.

If I may indicate a convenient form of procedure, I would suggest that those zoologists who wish to protect certain names should lay the complete facts of the case before the Committee, and should accompany their request for the retention of certain definite names in defiance of the Rules by the signatures of as many workers on the group affected as they can obtain. Due announcement of the proposed step should be made in certain widely circulated journals, and a reasonable time should be allowed for the reception of protests. The Committee should ultimately give its decision, and this decision should be published in the aforesaid journals. A summary of the labours of the Committee in this direction would of course be given from time to time in the publications of the International Zoological Congress.

Some of my zoological colleagues appear to mistrust the Nomenclature Committee of the International Congress. Should their opinion be widely shared, it might prove that zoologists at large would not agree beforehand to submit to the ruling of that Committee. As an alternative body, the International Congress of Academies may be suggested. This at present does not appear to number among its representatives many zoologists familiar with the problems of nomenclature, but it could no doubt appoint a committee with the necessary qualifications.

The precise style or mode of appointment of the desired authority does not greatly matter if only zoologists will agree to accept it. But that it should consist of experts will doubtless be conceded. The ruling may be arbitrary, but it must none the less be made with knowledge of all the circumstances of the case and of the results that will follow from it. It must be clearly understood that the decision is to be made, not because it is in accordance with the rules, but because it is to produce practical convenience.

There is nothing particularly novel in these proposals. A similar one was made in 'Natural Science' for April and May 1896 (pp. 218-220, 302), but though "regarded with favour in various influential quarters," nothing has yet been done to give it effect. And even the recent discussion at the British Association, though unanimous in its resolutions, has so far been barren in its results. The next steps appear to be, first to find out whether a sufficient number of leading zoologists are in favour of these proposals, the next to approach whichever of the two bodies mentioned may be agreed upon, with a request that it will undertake this added responsibility. This would be better done by some society or some group of naturalists than by a single worker known only to a few. Perhaps the British Association would appoint a small committee to collect opinions and formulate the request.

P.S.—To prevent misconception, it may be added that this paper was written before the receipt of Mr. Springer's widely distributed appeal. He, however, deals only with a particular question, capable, as I have here shown, of various answers. My object is to press for a solution of the general question.

V.—Notes on *Merlia normani*, Kirkp.

By R. KIRKPATRICK.

PROF. WELTNER, to whom I had sent, at his request, some specimens of *Merlia normani* which I had dredged up off Porto Santo Island, has recently published a notice* entitled "Ist *Merlia normani* Kirkp. ein Schwamm?"

The pressure of other work prevents me from giving here a full description of *Merlia* adequately illustrated; nor am I yet able to answer the question "What is *Merlia*?"—this inability partly being due, I think I may fairly say, to the

* Archiv für Naturg. 75 Jahrg. 1 Bd., 1 Heft, 1909, p. 139.

nature of the organism itself ; but, nevertheless, I beg to offer a few preliminary observations on the subject.

Towards the end of last year, Canon Norman sent me four little dried incrusting Polyzoa-like specimens which had been detached from a small mass of rock hooked up by a fisherman from 60 fathoms off Porto Santo Island. The specimens were covered with a yellow pellicle showing little conical prominences.

Below the pellicle was a white reticulate pattern with small polygonal meshes, and with little tubercles rising from the nodes of the network ; a few larger meshes present appeared to have resulted from fusion of two smaller ones.

A vertical section revealed a series of vertical tubes divided up by horizontal perforate partitions, the vertical walls being imperforate, but having longitudinal sutures. A surface view in balsam showed three flanges radiating out from below each tubercle to meet similar ones from neighbouring tubercles, a suture separating the opposing flanges ; further, I found what seemed to me to be a tuning-fork spicule with parallel tuberculated prongs (and therefore unlike a boring *Achlya*) imbedded in one of the tabulæ (Ann. & Mag. Nat. Hist. (8) ii. 1908, pl. xv. figs. 13, 14, 18). In the uppermost "cells" of this calcareous framework were bundles of very slender tylote spicules and raphide-like oxeas.

When acid was applied to the small scrap that could be spared, either these spicules were not included in the particle used for investigation, or they were washed away. I concluded* that the honeycomb structure had been made by a sponge ; and my opinion was strengthened later when I came across a wonderful— and indubitable—Pharetron sponge with a dermal armour composed of large thick calcareous plates or scales with tuning-fork spicules imbedded in them.

Partly in the hope of getting living specimens of *Merlia*, I decided to spend a winter vacation in Madeira and the neighbourhood. In January, accompanied by Senhor A. C. de Noronha, I visited Porto Santo Island. After dredging for nine days we succeeded in finding specimens of *Merlia* in 60 fathoms off the islet of Cima, near Porto Santo.

The living specimens were always in the form of little patches or crusts, about a centimetre, more or less, in area, and of a bright vermilion colour. The crust was quite smooth at first, and nothing else was seen but the smooth bright patch of colour ; but very soon the surface sank a little, and the tubercles and white network of the calcareous frame-

* Ann. & Mag. Nat. Hist. (8) ii. 1908, p. 510.

work became visible. On breaking a crust, the appearance presented was that of little square blocks of reddish-orange jelly in white porcelain-like "cells" or pots superposed one above the other, in from two to six storeys.

On examining the first thin sections made from a specimen decalcified by dropping alive into Flemming's solution, I realized that *Merlia* included siliceous as well as calcareous elements in its composition. A specimen decalcified whole presents a curious appearance, viz., of numerous closely packed but separate moniliform cylinders, about a millimetre or more in length, hanging down from a flat lamina. The lamina and the bulk of the layer of beads in the plane just below it compose the ectosome and choanosome of a siliceous sponge. All below the first layer is composed of hollow cylindrical cell-masses separated by very deep constrictions, and joined each to each merely by a narrow thread of tissue which had passed through the central hole, which is often, though not always, present in each tabula. The cells composing these masses are large, elongated, usually pyriform or fusiform cells applied like an epithelium, two or three cells deep, to the surface of the cavities of the calcareous honeycomb. A measured cell was $41\ \mu$ long, $10\ \mu$ broad at the inner end, and $3.5\ \mu$ broad at the outer end next the calcareous wall; the clear nucleus was $3.5\ \mu$ in diameter, and almost concealed by the crowd of deeply stained spheroidal granules each about $1\ \mu$ in diameter. Above, it was stated that the *bulk* of the uppermost layer of "beads" was composed of ordinary spongetissue; at the base of each of these upper beads is a layer of the large elongated cells, which rested on the upper surface of the highest tabula.

A surface view of a decalcified specimen shows, below the ectosome, node-like masses of soft tissue joined to each other by 5-7 radiating spokes; the nodes are the sponge-masses which dip into the upper spaces of the honeycomb, and the radii consist mainly of flagellated chambers lying between the surface-tubercles of the calcareous framework, the clear spaces between the radii being the gaps left by the dissolved tubercles. To what extent other tissues enter into the formation of the radii I have not yet discovered; but, in places, there can be seen, below the flagellated chambers, fusiform cells apparently in continuity with the cells on the surface of the uppermost tabulæ.

These large granular cells appear to be calicoblasts formed *in situ*, and not to be sponge "archæocytes" which have grown down into empty cavities—even to the fifth floor—of the calcareous honeycomb. The term "calicoblast" is here

used simply in a wide etymological sense, as a cell concerned either immediately or remotely in the formation of a calcareous skeleton.

In May I paid another short visit to Madeira and Porto Santo in the hope of finding larger specimens, and possibly some in reproduction. At Madeira, I saw, in the Seminario Museum, a dried specimen of an old and dead *Dendrophyllia* with a very large crust of *Merlia* upon it. The specimen had only recently been hooked up by a fisherman from 90 fathoms off Cape Garajau. On one portion of the crust were a few shallow circular depressions, about 450 μ in diameter and 150 μ deep, scattered among the ordinary meshes, which were only 180–200 μ in diameter, both kinds being barely visible to the naked eye. On the walls and floors of these larger meshes were 4 to 6 slightly developed radiating ridges; in fact, they presented some resemblance to extremely minute coral calices. Judging from the appearance and relations of the walls and ridges, these "calices" appear to have resulted from the fusion of several smaller meshes; at the bottom of some of them were sponge-spicules. These larger meshes may possibly not have any great significance, and be the result of extraneous influences, for there were numerous worm-tubes appearing level with the surface, and the presence of these might locally affect the growth of the vertical tubes in various ways.

Senhor Noronha and I took with us to C. Garajau the man who got the large specimen, but we were not successful in obtaining other examples. I spent three days at Porto Santo, and, just as I was leaving, a fisherman brought me a block of basalt hooked up from 90 fathoms, encrusted with a large patch of *Merlia* about 25 cm. in area; but unfortunately the specimen was dry, and I had no time to visit the spot whence it was obtained.

Prof. Weltner (*l. c. supra*) states that the calcareous framework reminds him of a stony coral. I, too, was struck with the resemblance of *Merlia* to a coral when I saw the specimen in the Seminario Museum.

Recent corals with tabulæ are found in three widely separate groups of corals, viz. Milleporidæ, Pocilloporidæ (*Pocillopora*, *Seriatopora*), and Helioporidæ.

The structure of *Merlia* resembles, in some respects, that of a Cænothecalian coral. The flanges, with fibrillar structure, radiating out to meet opposing flanges, from which they are separated by a suture, recall what is found in *Heliopora*.

If the larger meshes of the Seminario specimen are really coral calices, the ordinary meshes would be cænenchymal

tubules, and the masses of cells filling them would probably be ectodermal downgrowths as in *Heliopora* (G. C. Bourne, Phil. Trans. 1905, vol. 186 B, p. 455). But these are large assumptions to make, seeing that neither thread-cells nor zooids have yet been found.

Canon Norman has sent me a valuable reference to a paper by H. A. Nicholson and A. H. Foord, "On a new Genus of Devonian Corals," in Ann & Mag. Nat. Hist. 1886, (5) xvii.; pl. xvi. fig. 5 shows a tangential section of *Rhaphidopora* (*Chætetes*) *stromatoporoides* (Røemer), from the Middle Devonian of Gerolstein in the Eifel. The figure shows a polygonal reticulation with tubercles at the nodes and with tabulæ perforated at the centre and marked with radial sutural lines (cf. my figure, l. c. pl. xv. fig. 13). Some figures of *Monticulipora* also, in Nicholson's 'Palæozoic Corals,' notably pl. i. fig. 1, of *M. moniliformis*, show marked resemblances to *Merlia*. The walls of the tubules in *Merlia* are unilaminar, however, and neighbouring tubules have a single common wall (as in the Chætetidæ).

Prof. Weltner mentions in his paper that possibly the siliceous sponge is a "Raumparasit" on the calcareous structure and that the sponge might be found separate. At present I am doubtful as to the real significance of the association of these two elements in *Merlia*, and it would be premature to express a definite opinion. I think, however, that the association is by no means an accidental one. I have found the two together, with one unimportant exception, in all the material examined, *i. e.* in over one hundred specimens. In an extremely small and young specimen, forming a little red spot about a millimetre in area, the young and very slender calcareous meshes are covered over by the young sponge. The calcareous partner grows by the spreading of a thin basal expansion, and slender ridges extend along this floor from the nodes of the already-formed meshes, and meet so as to form the youngest meshes, which are at first incomplete polygons. The exception referred to above was that of an old crust of *Merlia*, dead and washed out, so that sponge-pellicle and spicules, which had very probably been present, had disappeared. I was surprised at not finding more specimens in this condition.

I have examined numerous other sponge incrustations, especially red ones, but have not yet found by itself the siliceous partner of *Merlia*.

The sponge on the surface of *Merlia* has a tough semi-transparent ectosome. I failed to detect oscules or ostia in

living examples, but found surface-openings in a specimen which had been dropped alive into Flemming's solution.

The canal-system somewhat resembles that of *Oscarella*, the flagellated chambers being oval and $33 \times 20 \mu$.

The skeleton is in the form of more or less isolated bundles of slender tyles and raphides. There is always at least one more or less vertical bundle in each node of sponge-tissue; sometimes several bundles form almost a floor on which the flagellated chambers rest. There are no special ectosomal spicules; microrhaphides which were originally described as possibly ectosomal are the ends of raphides which had been broken by the contraction of the sponge in drying.

The microscleres are very remarkable, being in the form of oval rings 45μ long, 30μ broad, and 3μ thick at the rim, with a keyhole sinus on the inner margin at each end of the long axis; in some a web-like expansion extends in from each lateral margin.

I had at first thought that the siliceous sponge was a Clavulid, but a suggestion made to me by Canon Norman that the oval rings might be of a similar nature to the sphærancoræ of *Melonanchora* is nearer the mark. For at the edge of a very young specimen I have found developmental phases of the rings in the form of contorted C-shaped bodies with the free ends crossing each other. From the fact that there is a knob on each side of one of the free ends, I conclude that these spicules are related to anisanchorate forms, rather than to sigmas and diancistra (see Lundbeck, Danish Ingolf Exp., Porifera, ii. p. 211); the keyhole sinuses, however, call to mind the notches in the diancistra of *Ilumacantha*. The axial canal is near the thick outer rim of the spicule. Sometimes six or seven rings follow one another in succession at short intervals and parallel—hence the specific name "*scalariformis*" given below. Possibly one of the functions of these spicules is to keep open the smaller canaliculi and lacunæ in this highly contractile sponge.

It is here assumed that the siliceous sponge on the surface of *Merlia* is an entity distinct from the calcareous framework. The sponge in question is placed in a new genus, to which I propose to give the name "*Noronha*," in honour of the distinguished Madeiran naturalist Senhor A. C. do Noronha, who treated me with never-failing kindness during my stay at Madeira and Porto Santo.

NORONHA, gen. nov.

Desmacidonidæ with a skeleton formed of more or less

separate bundles of tyles and rhabdides. Microscleres in form of oval rings.

Noronha scalariformis, sp. n.

Sponge incrusting. Tyles nearly straight, slender, 140μ long, 1.8μ thick; heads oval, $5 \times 2 \mu$. Rhabdides 80μ long, very slender, tapering to hair-like extremities, straight, or curved at one end. Microscleres, oval rings about 45μ long, 30μ broad, 3μ thick, with keyhole sinus on inner margin at each end of long axis.

The definition of *Merlia* itself must be emended in a future paper.

VI.—On a new Species and a new Subspecies of the Genus *Madoqua* and a new Subspecies of the Genus *Rhynchotragus*.

By R. E. DRAKE-BROCKMAN.

HAVING just completed an interesting journey along the western limit of the Somali country and through Abyssinia, I am able, by the help of my own collections and the material in the British Museum of Natural History, to throw a little more light on the distribution and local variations of several of the members of the genera *Madoqua* and *Rhynchotragus*. Passing from north to south through Somaliland and Eastern Abyssinia, we have as the most northerly species *M. saltiana* and a new species of *Madoqua* which I have described below as *M. cordeauxi*. South of these we soon come upon *M. phillipsi*, with its westerly subspecies *M. phillipsi hararensis* and the easterly or coast representative *M. phillipsi gubanensis*.

Still farther south of the *phillipsi* group we find *M. erlangeri* in Ennia Galla, together with a new subspecies of *Rhynchotragus*, *R. guentheri wroughtoni*.

As one travels south along the river Web, *M. swaynei* is ubiquitous until the junction of the rivers Ganale and Dawa, when *R. guentheri* takes its place, and continues westward towards L. Rudolf and L. Stephanie, where it is replaced by *R. guentheri smithii* and *R. cavendishi*, the largest of this genus.

Travelling in a south-easterly direction from the junction of the rivers Ganale and Dawa at Dolo, we meet near the coast *R. kirkii*, the most southerly representative of the Somali dik-diks.

(a) *Madoqua phillipsi gubanensis*, subsp. n.

This dik-dik is the coast or maritime representative of *M. phillipsi*. It is paler than *M. phillipsi* and the grizzling of the back extends on to the shoulders, sides, and hind-quarters. The underlying colour on the shoulders and hind-quarters, which is invaded by the grey grizzling, is pale cinnamon.

Down the centre of the back the grey grizzle is suffused with reddish fawn.

Hab. I obtained three specimens (skins, without head-skins) of this dik-dik on Guban, near the foot-hills of the Golis range of mountains, and I propose to name it *M. phillipsi gubanensis*.

Type. Skin only (without head-skin) of adult ♂ from Golis foot-hills, 35 miles south of Berbera. B.M. no. 9. 6. 1. 52.

(b) *Madoqua cordeauxi*, sp. n.

Very much larger than any of the Somali *Madoquæ*, but smaller than *M. saltiana*. Rather dark grey grizzling extending on to the shoulders, sides, and hind-quarters, the whole of the back being suffused with reddish fawn. The chest rather reddish buff, which extends only a short way on to the throat, unlike *M. phillipsi*, in which the chest-colour extends more or less the whole length of the underpart of the neck.

The legs are similar in colour to those of *M. phillipsi*, but get distinctly darker towards the shoulders and haunches.

The crest is dull rufous, with the fore crest somewhat grizzled with yellow, rufous, and black.

Measurements in the flesh:—

Head and body 572 mm.; tail, with terminal hairs, 38; height at shoulder 330. Weight 6 lbs.

Sex: male.

Hab. Dirre Dawa, Abyssinia. Altitude 3500 feet. July 23rd, 1908.

Two other specimens were obtained in the same locality by me, and I have taken B.M. no. 9. 6. 1. 50 as the type.

For this species I have much pleasure in proposing the name *Madoqua cordeauxi*, in honour of Capt. H. E. S. Cordeaux, C.B., C.M.G., H.M. Commissioner for the Somaliland Protectorate, whose interest in the fauna of Somaliland is well known.

Table of Skull-measurements.

A.—MADOQUA.									
	Basal length.	Back of orbit to gnathion.	Back of orbit to ant. alveolar edge.	Breadth between zygomatic arches.	Total length of skull.	Length of nasal bones.	Tip of nasal bone to gnathion.	Sex of Type.	Locality of Type.
1. <i>M. saltiana</i> , Blainv.	96	79	54	54	111	24	34	♂	skull, B.M. no. 69. 10. 24. 4. Anseba Valley, Abyssinia.
2. <i>M. cordlearii</i> , sp. n.	90	75	52	53	101	22	29	♂	Dirre Dawa, Abyssinia.
3. <i>M. sawneyi</i> , Thos.	81	67	45	49	92	17	29	♂	Bought at Berbera. ♂ skull, no. 96. 10. 8. 1. From Milmil.
4. <i>M. erlangeri</i> , Neum. ....	..	..	..	..	..	..	..	♂	Sheikh Hussein, Gallaland.
5. <i>M. phillipsi</i> , Thos.	84	70	50	51	98	19	27	♂	Dobwein, 40 miles S. of Berbera.
6. <i>M. p. hararensis</i> , Neum. ....	..	..	..	..	..	..	..	♂	Kumbi, Ennia Galla.
7. <i>M. p. gubanensis</i> , subsp. n. ..	..	..	..	..	..	..	..	♂	Guban, Golis foot-hills, 35 miles S. of Berbera.
B.—RHYNCHOTRAGUS.									
8. <i>R. kirikii</i> , Günth.	91	75	53	52	106	13	34.5	♂	Brava, Italian Somaliland.
9. <i>R. guentheri</i> , Thos.	95	78	53	50	110	17	42	♂	Central Ogaden, Somaliland.
10. <i>R. g. wroughtoni</i> , subsp. n. ..	95	79	55	55	111	13	43	♂	Foot-hills of Mt. Abul Kassim, Gallaland.
11. <i>R. hindei</i> , Thos.	93	80	57	54	109	18	34	♀	Kitui, British East Africa.
12. <i>R. guentheri smithii</i> , Thos. ..	103	86	58	56	120	14	47	♂	East of Lake Stephanie.
13. <i>R. cavendishi</i> , Thos.	104	87	62	58	124	22	37	♂	Lake Rudolf region.
14. <i>R. damarensis</i> , Günth. ....	..	86	59	..	..	22.5	33	♀	Omamm, Damaraland.
15. <i>R. thomasi</i> , Neum. ....	..	..	..	..	..	..	..	♂	Near Tisso (Kwa Meda), North Ugogo.

(c) *Rhynchotragus guentheri wroughtoni*, subsp. n.

Very similar in size to *R. guentheri*, but markedly different in colouring.

General colour dark yellowish grizzle, which fades but slightly as it extends on to shoulders, sides, and haunches. The grizzling ends abruptly underneath, where the chest and abdomen are pure white, unlike *R. guentheri*, in which the yellow grizzling fades somewhat gradually into the pale pinkish buff of the chest and abdomen. The crest is rather darker, as also are the muzzle and the legs, than in *R. guentheri*, while the ears are longer and broader than in any other except *R. cavendishi*. At first sight it looks not unlike *R. cavendishi*, but the skull-measurements soon separate the two.

For skull-measurements *vide* Table.

Hab. Foot-hills of Mt. Abul Kassim, Wabi River, Gallaland, Abyssinia, within 20 miles west of Sheikh Hussein. Altitude 3500 feet.

Type. Adult male. Shot Oct. 21st, 1908. B.M. no. 9. 6. 1. 39.

For this subspecies I propose the name *Rhynchotragus guentheri wroughtoni*, in honour of my friend Mr. R. C. Wroughton.

VII.—*Descriptions of new Genera and Species of New-Zealand Coleoptera.* By Major T. BROWN, F.E.S.

[Continued from vol. iii. p. 415.]

OTIORHYNCHIDÆ,

Nicæana infuscata.
Inophlæus quadricollis.
 — *lætificus.*
Proboscocœlus sculpturatus.
Drymaria cilipes.
Lyperobates virilis.
Hygrochus granifer.
Thesius inophlæoides.
Catoptes limbatus.

RHYPAROSOMIDÆ.

Phrynixus bicarinellus.
 — *ventralis.*
Amphiskirra umbricola.

Aræoscapus ardens.
 — *estriatus.*
Bradypatæ dilaticollis.
 — *interstitialis.*

HYLOBIIDÆ.

Stilboderma impressipennis.
Athor arcifera.

CYLINDRORHINIDÆ.

Sargon hudsoni.

ERIRHINIDÆ.

Erirehinus insignis.
 — *insolitus.*

Eirrhinus spadiceus.
 — castigatus.
 Eugnomus antennalis.
 — femoralis.
 Stephanorhynchus osculator.
 — morosus.

BELIDÆ.

Pachyura venusta.
 — violacea.

CRYPTORHYNCHIDÆ.

Aphocœlis versicolor.
 Psepholax denticostatus.
 Zeacalles lepidulus.
 Hatasu dorsale.
 Clypeolus cineraceus.
 Acalles fuscidorsis.
 — igneus.
 — altus.
 — albistrigalis.
 — præsetosus.
 — robustus.
 — flavisetosus.
 Sympedius rectirostris.
 Omœacalles perspicuus.
 Torilus griseicollis.
 Onias latisulcatus.
 — ornatus.
 Mesoreda sulcifrons.
 Kentraulax, gen. nov.
 Getacalles favosus.
 Bæorhynchodes cristatus.

ANTHRIBIDÆ.

Anthribus lewisi.
 — philpotti.

COSSONIDÆ.

Pentarthrum dubitans.
 — planicolle.
 Rhinanisus gracilis.
 — elongatus.
 — subconvexus.
 — suturalis.

CERAMBYCIDÆ.

Æmona sublineata.

LAMIIDÆ.

Somatidia websteriana.
 — heterarthra.
 — testacea.
 — sericophora.
 — lineifera.
 Hybolasius varipes.

EUMOLPIDÆ.

Eucolaspis plicatus.
 Atrichatus nitidulus.

CRYPTOCEPHALIDÆ.

Arnomus viridicollis.
 — signatus.

GALERUCIDÆ.

Luperus angularius.
 — scutellaris.
 — lewisi.
 — axyrocharis.
 — palialis.
 — asperellus.

Group Otiorhynchidæ.

Nicæana infuscata, sp. n.

Elongate, subovate, opaque, piceous; densely covered with depressed small round scales, pale chocolate and greyish, those of the former colour covering most of the dorsum, but intermingled with a few grey ones, which latter are most numerous near the sides and posterior declivity; the setæ are moderately slender and greyish principally; antennæ pale ferruginous, finely setose; legs fusco-testaceous, bearing greyish setæ.

Head and rostrum about a third shorter than thorax, the

squamæ and setæ greyish. *Thorax* nearly as long as broad, widest before the middle, apparently closely punctate. *Scutellum* small. *Elytra* elongate-obovate, slightly arcuate and hardly wider than thorax at the base, striate-punctate. *Tibiæ* a little flexuous, mucronate at the inner extremity. *Tarsi* moderately broad, their third joint dilated and lobed, claws small.

Antennæ robust; the scape gradually incrassate and attaining the front of thorax; funiculus longer than scape, basal joint stouter but hardly longer than second, neither elongated, 3-7 obovate; club oblong-oval, triarticulate. *Eyes* scarcely free from thorax, widely distant above, flat, longitudinally oval rather than rotundate. *Scrobes* foveiform, subapical, situated almost on the upper surface. Posterior *corbels* simple, without any external truncature.

Distinguishable by the infusate dorsum.

Length (rostr. incl.) $1\frac{3}{4}$; breadth $\frac{5}{8}$ line.

Hanmer, Canterbury. One from Mr. J. H. Lewis.

Inophlæus quadricollis, sp. n.

Ovate-oblong, opaque, densely covered with depressed, small, coppery squamæ, and with numerous decumbent squamiform setæ of a somewhat testaceous hue; antennæ and tarsi dark ferruginous.

Rostrum almost as long as thorax, with two broad longitudinal grooves separated by a well-defined carina. *Thorax* quadrate, slightly narrowed but not rounded in front; its dorsal furrow is broad and distinct throughout, between it and each side there is another broader, less regular, and more shallow impression, its close punctuation is quite concealed. *Scutellum* small. *Elytra* suboblong, nearly vertical and attenuate behind, shoulders oblique, so that the base barely exceeds that of the thorax; suture slightly elevated from the base to halfway down the declivity; third interstices distinctly elevated at the base, but flat behind the middle; the fifth very gradually raised backwards and terminating at the sides, on the summit of the posterior declivity, as large horizontal prominences; there is a similar protuberance in line with each of the third, but situated further back; the apices are obtusely produced singly; there are four series of punctures on each elytron, rather unequal in size, none approximated; the sides are inflexed and bear three series of punctures.

The *scape* attains the back of the eye. *Funiculus* sparingly

pilose, basal two joints almost equally elongate, 3-7 elongate-obconical. *Club* very elongate, rather narrow, triarticulate. *Ocular lobes* well developed. *Eyes* oblique, somewhat acuminate in front. *Tibiæ* flexuous, corbels of the posterior rather flat, but without any external truncature.

I. sternalis most nearly resembles this species, but the rostrum has a more sharply defined carina; the thorax is broader and more rounded near the front and appears more, though but slightly, narrowed towards the base; the posterior elytral prominences are more sharply defined, and there is tawny squamosity near the sides and behind; the apices are more prolonged, and joints 3-6 of the funiculus are almost oviform. The hind body is narrower. The corbels of the hind tibiæ have a very narrow external truncature.

Length (rost. incl.) 5; breadth 2 lines.

Invercargill. One specimen from Mr. A. Philpott.

Inophlæus latificus, sp. n.

Elongate, subdepressed, rufo-piceous, densely covered with round flattened scales of a reddish coppery hue, and with a few depressed but not coarse setæ; tip of rostrum and antennæ dark rufous; legs and tarsi rufo-piceous.

Rostrum slightly shorter than thorax, not obviously grooved, with a sharply defined central carina. *Scape* subclavate at apex, attaining the back of the eye. *Funiculus* with equally elongate basal two joints, 3-7 elongate-obconical. *Club* very elongate, opaque, and pubescent. *Head* moderately convex, with a linear impression along the vertex. *Thorax* only one-tenth broader than long, slightly broader near the front than elsewhere, a little obliquely narrowed in front, gradually and slightly narrowed behind, its median groove broad and distinct; near each side in front there is a broad oblique impression, its punctuation hidden; the greyish setæ are most numerous near the sides. *Scutellum* small, covered with yellowish scales. *Elytra* rather narrow, parallel-sided from the shoulders backwards, much narrowed behind, apices not prolonged but individually rounded; humeral angles oblique, their base not wider than that of the thorax; dorsum plane, but with a slight basal elevation of the third interstices; the fifth interstices gradually elevated backwards and appearing to limit the disk at the sides, they end abruptly and form obvious horizontal prominences; there are two more prominences nearer the suture, directed backwards on top of the hind declivity, which, as well as the

sides, bear some tawny squamæ; each elytron has four regular series of discoidal punctures, two series between the fifth interstice and lateral margin and three along the inflexed side.

Femora medially dilated, with a patch of yellow scales underneath; *tibiæ* flexuous and bearing erect yellowish setæ, the posterior corbels with a very narrow outer truncature.

This species, though very much like the preceding *I. quadricollis* and *I. sternalis*, may be identified by the narrower subparallel contour, more glossy and brightly coloured squamosity, and by the flatter disk and more definite sculpture of the elytra. The suboviform joints of the funiculus differentiate *I. sternalis*.

Length (rost. incl.) $4\frac{1}{2}$; breadth $1\frac{1}{2}$ line.

Southland.

This is another fine weevil from Mr. A. Philpott's collection.

PROBOSCOCÆLUS, gen. nov.

Body moderately elongate and convex, sparsely pilose, a little nitid.

Rostrum about as long as thorax, widely dilated or pterygiate in front, rather densely and finely setose underneath. *Scrobes* subapical, profound, foveiform, quite open and exposed above. *Head* short, as broad behind as front of thorax, narrowed anteriorly to width of rostrum. *Eyes* minute, quite lateral, distant from thorax, obliquely transversely oval, a little acuminate below. *Antennæ* robust and long; scape thick, setose, reaching backwards to base of thorax; funiculus 7-articulate, basal joint hardly twice as long as broad, joints 2-7 short and about equal; club stout, subrotundate, articulate. *Thorax* somewhat oviform, rather longer than broad, base and apex truncate, without distinct ocular lobes. *Scutellum* minute. *Elytra* slightly wider than thorax at base. *Legs* stout; *tibiæ* minutely bicalcarate at the extremity. *Tarsi* moderate, penultimate joint deeply bilobed but hardly at all dilated, densely and finely setose underneath.

Anterior *coxæ* prominent, contiguous, placed near the base of prosternum, which is deeply incurved in front; intermediate *coxæ* only slightly, the posterior very widely separated. *Metasternum* not abbreviated. *Abdomen* elongate, basal segment strongly curvate between the *coxæ*, second about as long as first, the frontal suture strongly sinuate,

third and fourth short, with straight deep sutures. The *corbels* of the posterior tibiae are without any external truncature, but are finely ciliate.

A rather singular genus as regards appearance and structure, yet most nearly related to such genera as *Trachyphlaeus* and *Aporolobus*. From the latter it may be at once distinguished by the approximated anterior coxæ, and from the former by the shining surface, cavernous scrobes, &c.

Proboscocælus sculpturatus, sp. n.

Rufo-castaneous or ferrugineous; thorax more rufescent than the elytra, these latter with two, sometimes three, piceous marks across them; tarsi and antennal club fulvescent; sparingly clothed with short, rather fine, suberect yellowish setæ.

Rostrum grooved along the middle, with a very slender carina along each side of that groove, without any triangular clypeal suture, rounded at the apex. *Thorax* slightly wider before the middle than it is elsewhere; its surface relatively coarsely and closely punctured. *Elytra* moderately coarsely striate-punctate, second and third interstices slightly raised behind.

Underside slightly nitid, pitchy red, distinctly punctate, with fine depressed yellowish setæ. Mandibular scar minute, as are also the parts of the mouth.

Length (rost. incl.) $1\frac{1}{4}$ – $1\frac{1}{2}$; breadth nearly $\frac{1}{2}$ line.

Canterbury College Botanical Station, at the junction of the Waimakariri and Broken River.

Three specimens of this interesting little weevil, found amongst decaying leaves on the ground, by Mr. J. H. Lewis.

DRYMARIA, gen. nov.

Body elongate, moderately convex, subopaque, finely and sparingly setose.

Rostrum stout, almost equalling the thorax in length, not pterygiate, nearly quite cylindrical. *Scrobes* foveiform near the apex, visible from above, prolonged backwards as broad grooves to the eyes. *Mandibular scar* minute. *Eyes* quite minute, with coarse facets, situated at the sides at the base of the rostrum, yet perceptible above. *Head* as wide as front of thorax, narrowed in front, globular below. *Antennæ* long and stout; scape with outstanding setæ, nearly attaining apex of thorax; funiculus 7-articulate, second joint almost

as long as first, 3-7 transverse; club short, subrotundate, indistinctly articulated. *Thorax* subcylindrical, without ocular lobes, base and apex truncate. *Scutellum* absent. *Elytra* oblong, their shoulders narrowed so as to be but little wider than thorax at the base. *Legs* moderately elongate; anterior tibiae only slightly mucronate at the inner extremity. *Tarsi* with slender grey hairs underneath, third articulation deeply lobed but not expanded, the minute atrophied joint visible between the lobes; terminal joint almost quite the length of the preceding three conjointly.

Prosternum subtruncate in front. Anterior *coxæ* prominent and contiguous, situated near the base of the prosternum; middle *coxæ* distinctly, the hind pair widely separated. *Metasternum* short, with a deep transverse groove before the hind *coxæ*. *Abdomen* elongate, basal two segments connate, without any evident suture, having a short groove at each side only, both broadly impressed; third and fourth segments well developed, not much abbreviated, with very deep straight sutures.

This genus without doubt belongs to the same series as *Protolobus*, *Trachyphleus*, and their allies so far as antennal structure and habits are concerned, but, with the exception of the undilated apical portion of the rostrum, it more nearly approaches the preceding genus *Proboscocalus*. From *Protolobus* it is clearly differentiated by the form of the scrobes, absence of ocular lobes, &c., and from *Aporolobus* by the unexpanded penultimate joint of the tarsi.

Drymaria cilipes, sp. n.

Castaneous, dark or pale; rostrum, antennæ, and tarsi reddish.

Rostrum not smooth, but without well-marked sculpture; it bears some fine yellowish setæ. *Scape* thick, with obvious erect setæ; funiculus finely pilose; club finely pubescent. *Head* convex, nearly smooth, but finely transversely strigose. *Thorax* about a third longer than broad, a little wider before the middle than elsewhere, slightly and gradually narrowed behind, its surface subrugose, with coarse irregular punctures. *Elytra* coarsely striate-punctate, four series on each elytron, the lateral punctuation more irregular; the interstices appear a little uneven, owing to the setæ. Anterior *tibiae* fringed along the inner edge with fine yellow setæ, the external setæ outstanding and rather coarse.

Underside coarsely punctate, a little shining, with short

setæ; basal ventral segments piceous, distinctly but less coarsely punctate, 3-5 reddish, nearly quite smooth.

Length (rost. incl.) $1\frac{3}{4}$; breadth nearly $\frac{5}{8}$ line.

Broken River (*Mr. J. H. Lewis*).

Three examples found amongst fallen leaves in the bush.

Lyperobates virilis, sp. n.

Subopaque; small chocolate-brown squamæ almost entirely cover the body; tarsi and antennæ piceo-rufous; club dull, with very minute greyish pubescence; scutellum yellow.

Rostrum with two broad shallow impressions extending from the eyes almost to the glabrous apex, but becoming indistinct apically; it is covered with depressed somewhat rufescent scales. *Thorax* about as long as broad, widest and obtusely prominent at each side, just before the middle; there is a broad almost rounded impression near each front angle in front; at the middle are two more elongate impressions, bordered by slight ridges; behind the middle there is a broader and shorter elevation with an impression on either side of it; these are nearly continuous with the frontal ones. *Elytra* of the same width as thorax at the base, the shoulders obliquely widened till reaching an obtuse lateral prominence just behind the middle thighs; the sides are then widely incurved, but are again dilated posteriorly, where the hinder part of the disk projects horizontally over the apical declivity; there are four small nodosities near the middle of the disk, two (more prominent) at the base, and two smaller ones near each side in line with the intermediate and posterior femora; they are indistinctly striate-punctate.

Differs from *L. asper* (2534) in coloration, in having much less rough-looking elytra, which, moreover, are of a different outline, it lacks the more distinctly defined ridge along the middle of the thorax, and the rostrum is slightly longer and differently sculptured.

Length (rost. incl.) 4; breadth $1\frac{3}{4}$ lines.

Mount Pirongia. One in my own collection.

Hygrochus granifer, sp. n.

Subopaque, piceous; antennæ and tarsi fusco-rufous, these latter and the funiculus shining; covered with slender, depressed, fuscous and coppery squamæ, and with some pallid or greyish setæ which are somewhat concentrated on the posterior nodosities.

Rostrum one-third shorter than thorax, indistinctly medially ridged, broadly biimpressed near the base. *Scrobes* oblique, deep and broad from the apex to behind the middle, squamose behind. *Head* short, not much broader than the rostrum. *Eyes* very prominent, obliquely oviform, quite lateral, just free from the thorax. *Club* large, ovate, subacuminate, indistinctly quadriarticulate, densely pubescent. *Thorax* of equal length and breadth, widest and obtusely prominent before the middle, base and apex truncate; disk a little uneven, having an impression near each front angle and another at each side of the middle in front; there is no definite punctuation, but there are several small shining black granules. *Elytra* subcordate, slightly obtusely prominent and widest behind the oblique shoulders; the base, however, hardly exceeds that of the thorax in width, their apical portion much narrowed; they are slightly uneven, with indistinct, coarse, more or less seriate punctures; there are two small obtuse basal elevations and four on top of the posterior declivity, those on the disk (about four on each elytron) are less definite; at the suture near the base there are several small black shining granules.

H. oculatus is most like this species, but has a longer and more cylindrical thorax, with a more definite continuous median ridge. In *H. oscitans* and *H. verrucosus* the two broad rostral grooves are separated by a well-marked carina extending from the apex to the eyes.

In this genus there are no ocular lobes or any distinct exterior truncature of the posterior corbels. The metasternum is very short, not being longer than the middle of the second ventral segment.

Length (rost. incl.) $2\frac{3}{4}$; breadth $1\frac{1}{8}$ line.

Mount Pirongia. One example in my own collection.

THESIUS, gen. nov.

Body suboblong, squamose.

Rostrum as long as thorax, nearly as broad as the head. *Scrobes* subapical, not prolonged towards the eyes. *Scapæ* attaining front of thorax. *Funiculus* elongate, 7-articulate. *Eyes* distant from thorax and each other, small, longitudinally oval, subtruncate below. *Thorax* subquadrate, without ocular lobes. Anterior *tibiæ* flexuous, mucronate; posterior corbels with double ciliæ, the truncate surface narrow. *Prosternum* moderately incurved in front. Anterior

coxæ contiguous. *Metasternum* short. Mandibular *scar* present.

The typical specimen partakes of the structure of *Platyomida* and *Inophlæus*, but cannot be located in either of these genera.

Thesius inophlæoides, sp. n.

Opaque, fuscous, densely covered with small, depressed, obscure squamæ intermingled with paler and brighter thick setæ; antennæ and tarsi ferrugineous.

Rostrum with a central but not sharply defined ridge. *Thorax* widest before the middle, distinctly narrowed anteriorly, truncate at apex, base slightly curvate; disk very uneven, with a basal and three frontal depressions and intervening elevations, all more or less irregular, its punctuation concealed. *Scutellum* small. *Elytra* oblong, much narrowed and declivous behind, distinctly wider than thorax at the base, their sides not quite straight, the shoulders being a little oblique and prominent; there are also two small nodiform prominences just behind the posterior femora; disk slightly transversely convex; there are two longitudinal basal elevations and a series of four nodosities on the summit of the posterior declivity, which is not at all flattened, being obtusely ridged along the suture; the dorsum is slightly uneven, with small inequalities, but the covering obscures all other sculpture, though some coarse irregular punctures are visible.

Scape dull, with some outstanding setæ, very gradually thickened, but not clavate, towards the extremity. *Funiculus* shining, finely and sparingly setose, second joint as long as the elongate basal one; 4-7 obconical, gradually decreasing in length, none elongate; club very elongate, oval, tri-articulate.

Underside fuscous, with fine greyish-testaceous vestiture.

Length (rost. incl.) $3\frac{1}{4}$; breadth $1\frac{1}{4}$ line.

Broken River. One.

Mr. J. H. Lewis has proved that hitherto our knowledge of the Coleopterous fauna of that district had been very meagre indeed.

Catoptes limbatus, sp. n.

Suboblong, opaque, fuscous; antennæ and tarsi reddish; squamosity dense, fine, and variegate; thoracic disk fuscous, the sides tawny grey; on each elytron from the base to top

of hind declivity the squamæ are chocolate-brown, those on the suture, however, are paler along their sides, and on the apices the colour is similar to that of the sides of the thorax; there are also some greyish setæ on some parts.

Rostrum about as long as thorax, slightly pterygiate, a little contracted medially, not ridged above, depressed between the antennæ, its apex red and slightly rugose. The *scape* attains the front of thorax. *Funiculus* sparingly pilose, basal two joints of equal length, third slightly longer than fourth, obconical; joints 4-7 rather short. *Thorax* of equal length and breadth, moderately convex, widest before the middle, with a distinct central groove. *Scutellum* small. *Elytra* rather wider than thorax at the base, very gradually curvedly narrowed backwards, third and fifth interstices moderately elevated, most prominent at the summit of hind slope, where the greyish setæ are somewhat concentrated; they are moderately striate-punctate.

Underside piceous, moderately closely punctate, covered with griseous scales and setæ. Prosternum deeply incurved. Basal ventral segment of about the same length as metasternum, broadly impressed behind.

The *ocular lobes* are well developed. *Scrobes* subapical, profound, open above. *Eyes* oblique, subacuminate in front. *Corbels* of posterior tibiæ not perfectly closed, there being a narrow interval between the inner and outer cilia.

The coloration, inter-antennal depression, the well-marked thoracic furrow, the elevated elytral interstices, and structure of the hind tibiæ render this species distinct.

Length (rost. incl.) 3; breadth 1 line.

Otara, Southland (*Mr. A. Philpott*). Two individuals.

Group Rhyparosomidæ.

Phrynixus bicarinellus, sp. n.

Elongate-ovate, fuscous; rostrum, antennæ, and tarsi rufescent; uneven, irregularly clothed with coarse, sponge-like, fusco-testaceous setæ, which form several crests.

Rostrum rather long, its anterior half nude, finely yet distinctly punctate, with two short yellow setæ at its apex; on the middle from the antennal insertion backwards there are two fine carinæ separated by a narrow well-marked groove; basal half squamose, slightly contracted, with a median crest before the eyes. *Antennæ* elongate, sparsely squamose; *scape* attains back of eye, it is rather slender, but clavate at the extremity; basal two joints of funiculus elon-

gate, almost equal, the first the stouter, 3-7 transverse, very slightly and gradually incrassate; club ovate, thickly covered with yellow hairs. *Eyes* large, but depressed. *Thorax* about a half longer than broad, narrower in front than at the base, but without any obvious constriction, the disk uneven, with a median basal depression; its sculpture consists of coarse irregular rugosities rather than punctures; there are two distinct crests at the apex. *Elytra* oviform, rather elongate; on each shoulder there is an elongate crest, a smaller one between it and the suture, and eight others of irregular form on each elytron; there are no well-marked striæ or punctures. *Legs* rough, of normal structure.

Underside fuscous, opaque, slightly uneven or asperate, with testaceous squamæ. *Prosternum* deeply incurved in front. *Metasternum* short. *Abdomen* with five segments, basal two of nearly same length at the sides, their suture not well defined in the middle, 3-5 on an abruptly lower plane, third and fourth very short.

Three distinguishing characters will be seen if carefully examined—the two bright yellow setæ on the tip of the rostrum, the well-marked groove between the carinæ, and the rather large depressed eyes.

Length (rost. incl.) $3\frac{1}{2}$; breadth $1\frac{1}{4}$ line.

Otira Gorge. One, found by Mr. J. H. Lewis.

Phrynixus ventralis, sp. n.

Opaque, nigro-fuscous, covered with testaceous sappy matter; rostrum, antennæ, and tarsi somewhat rufescent.

Rostrum slightly expanded before the point of antennal insertion, the middle punctate, with two slightly asperate costæ which do not reach the apex; there are two small yellowish crests on the middle and a longer median one near the base. *Thorax* rather longer than broad, not wider than the head in front, without distinct frontal crests, but with five or six irregular elevations, the most distinct being a pair close to the basal depression and one before these along the middle; its punctuation apparently very coarse, but finer in front. *Elytra* oblong-oval, scutellar region depressed, with two small basal elevations and an elongate crest on each shoulder; there are some other less definite ones, and several small black tubercles protrude here and there; each elytron has four series of large punctures which, on the posterior declivity, are transformed into striæ.

Antennæ elongate; scape slender, but distinctly knobbed

at the extremity, with fine yellow setæ, it attains the back of the eye; funiculus pubescent, gradually incrassate, basal two joints nearly equally elongate, the first slightly thicker. *Legs* normal.

Underside reddish; basal two ventral segments seemingly connate, but with an oblique series of coarse contiguous punctures from the centre to each side, denoting where the suture between them should be; accepting that line of demarcation, the second is longer than the first and appears depressed at the base; both are coarsely punctate; fifth finely punctured, third and fourth impunctate, with deep sutures.

Nearly allied to *P. tuberculatus* (1509), but with peculiar abdominal sculpture.

Length (rost. incl.) $2\frac{3}{4}$; breadth $1\frac{1}{2}$ line.

Riccarton, Canterbury. Two, found by Mr. H. Suter.

AMPHISKIRRA, gen. nov.

Body apterous, elongate, unequally convex, much contracted medially, sparsely clothed.

Rostrum arched, elongate, frontal half slightly expanded, the basal portion with a fine but well-defined carina, which becomes wider at the point of antennal insertion, but much finer beyond it. *Scrobes* foveiform at the middle, but prolonged, yet less deeply, towards the front of the eyes. *Antennæ* moderately long and slender. *Scape* slender and flexuous, clavate at the extremity, and attaining the back of the eye. *Funiculus* 7-articulate, the second joint quite as long as, but rather more slender than, the basal one, 3-6 suboblong, seventh slightly enlarged; club oval, not visibly articulated. *Eyes* free from thorax, situated quite at the sides in front, small, rather flat, distinctly faceted, longitudinally oval. *Head* short, much narrowed in front, globular below. *Thorax* about as long as broad, very much swollen or dilated at each side before the middle, base sharply truncate and submarginate, without ocular lobes. *Scutellum* absent. *Elytra* closely adapted to base of thorax, of the same width there, widest behind the middle. *Legs* moderately long; femora arched above; tibiæ somewhat flexuous, distinctly mucronate at the extremity. *Tarsi* rather short, basal joint scarcely perceptible from above, second transverse, third only slightly dilated, excavate above, but not lobate; terminal as long as all the preceding joints combined; claws small.

Prosternum slightly incurved in front. Anterior *coxæ*

slightly separated, the intermediate also prominent, rather widely separated. *Metasternum* very short. *Abdomen* elongate, second segment convex, on the same plane, and nearly as long, as the basal one; the suture between these is fine yet distinct, and oblique towards the sides; third and fourth not discernible, fifth roughly sculptured.

Chamæpsephis makes the nearest approach to this genus in structure; the form, however, is altogether different. The medially swollen sides of the thorax are a quite exceptional feature in this group, so that but little difficulty will be experienced in its recognition.

Amphiskirra umbricola, sp. n.

Subopaque; rostrum red and a little shining; thorax obscure dark reddish; basal depression of elytra piceofuscous and a little shining, the rest of their surface slightly variegated, yellowish or dark brown; antennæ and legs fusco-testaceous.

Rostrum smooth near the extremity and bearing some soft subdepressed greyish setæ. *Thorax* subdepressed on the disk; its punctuation rather coarse, not dense, and quite irregular, with more or less rugose intervals; there is a short keel from the middle forwards and an impression near the base, neither very definite. *Elytra* a good deal rounded and distended behind the middle, so that they seem much narrowed towards the base, posterior declivity rounded but not vertical; a considerable area near the base is occupied by a broad depression; the general sculpture is not well marked, but there are three more or less evident striæ on each, with some unequal punctures; the interstices are rather broad and irregularly elevated; the basal depression is estriate, but has six or seven punctures; their clothing is setiform and irregularly distributed, and smeared with sappy matter, but appears to be yellowish.

Length (rost. incl.) $2\frac{1}{2}$; breadth $\frac{3}{4}$ line.

Otira Gorge (Mr. J. H. Lewis). A single specimen of this little weevil.

Aræoscapus ardens, sp. n.

Elongate, subovate, slightly nitid, pale rufo-castaneous; antennæ and tarsi rufescent.

Rostrum arched, elongate; in front of the antennal insertion, before the middle, somewhat convex or broadly ridged,

the basal portion with fine indefinite sculpture. *Head* grooved between the eyes, which are slightly oblique. *Scape* flexuous, slender, apically clavate, with minute, inconspicuous, depressed setæ. *Funiculus* sparingly pubescent, basal joint almost pyriform, seventh subquadrate, evidently larger than the preceding; club elongate, thick near the extremity, rather slender at the base, distinctly pubescent. *Thorax* as long as broad, a good deal narrowed anteriorly, slightly and gradually towards the base, from which a narrow depression proceeds towards the middle, its punctuation distinct but somewhat irregular; it bears short yellowish setæ. *Elytra* oviform, of the same width as thorax at the base, broadest near the middle; striate-punctate, interstices a little uneven, scutellar region depressed; they bear some minute yellowish setæ, but more conspicuous ones are so congregated as to form about twenty small patches.

Tibiæ flexuous, mucronate, with a series of minute setæ which form a fringe on the front face of the anterior and the hind part of the other pairs. The basal *ventral segment* across its front is depressed, the second is slightly flattened medially in front.

A rather brightly coloured species as compared with the others, and with slightly different eyes.

Length (rost. incl.) $1\frac{3}{4}$; breadth $\frac{5}{8}$ line.

Ngatira, near Rotorua.

Described from two specimens in my own collection, found about fourteen years ago.

Aræoscapus estriatus, sp. n.

Subovate, opaque, fusco-piceous; legs fusco-rufous; rostrum, antennæ, and tarsi rufescent; irregularly clothed with fine, depressed, yellow scales and squamiform setæ.

Rostrum arched, quite the length of thorax, the apical half very slightly expanded and indistinctly punctate, the basal portion broadly grooved and squamose along the middle, and with a fine carina at each side of the groove. *Thorax* about as long as broad, widest near the middle, rounded there, slightly more narrowed in front than at the base, which, as well as the apex, is truncate; it is a little uneven above, medially depressed at the base, its punctuation hidden; the scales are somewhat concentrated in places, so as to form a slightly raised elongate patch along the middle near the front, but with an almost bare space on each side of it and two patches on the apex. *Elytra* ovate, broadest

near the hind thighs, of the same width as thorax at the base; the scutellar region is depressed; they are without striæ or serial punctures; the squamosity is irregularly distributed and forms a series of small patches across the top of the posterior declivity, another just below it, and a pair before the middle of the disk, but nearer the sides than they are to the suture; none of these, however, are sharply defined. *Legs* stout, tibiæ a little flexuous but not distinctly mucronate.

Underside opaque, fuscous, with fine, decumbent, brassy setæ. Prosternum deeply incurved in front; anterior coxæ medially contiguous. Second ventral segment in the middle rather longer than the basal, with oblique lateral sutures, third and fourth very short, the terminal medially bi-impressed at the apex. *Funiculus* very slightly thickened towards the extremity, seventh joint larger than the preceding one; club distinctly pubescent; scape flexuous, clavate at apex.

This species may be readily identified by the absence of the usual serial punctures and striæ of the elytra.

Length (rost. incl.) 2; breadth $\frac{3}{4}$ line.

Otira Gorge. A single specimen found by Mr. J. H. Lewis.

Bradypata dilaticollis, sp. n.

Opaque, fuscous; legs fusco-rufous; the rostrum, antennæ, and tarsi red; unevenly clad with yellow squamiform setæ.

Rostrum arched, the frontal dilated portion with linear sculpture, the basal portion not distinctly ridged, but convex along the middle. *Thorax* rather broader than long, a good deal dilated medially at the sides; the surface uneven, its punctuation concealed by the depressed yellow scales, base and apex truncate. *Elytra* subovate, broadest near the middle, scarcely broader than thorax at the base; scutellar depression bordered at each side by a short elevation; there are no striæ or series of punctures visible on the dorsum, but on a denuded spot on the top of the hind declivity the suture appears smooth and convex, with a fine stria at each side of it; there are about a dozen more or less distinct squamose nodosities, and some minute tubercles or granular elevations above.

Tibiæ moderately mucronate and bearing coarse yellow setæ or scales. *Scape* flexuous, moderately clavate at the extremity, nearly glabrous. *Funiculus* sparingly pilose, first

joint stout, seventh nearly twice the bulk of the sixth; club ovate, solid.

A glance at the thorax is sufficient to distinguish this from *B. capitalis*. The eyes are a little further apart and the head is less pinched in behind the eyes than in the typical species. Near each side of the rostrum a very slender carina extends backwards from the point of the antennal insertion, but does not reach the eye.

Length (rost. incl.) $2\frac{1}{4}$; breadth $\frac{7}{8}$ line.

Southland. One from Mr. A. Philpott.

Bradypatæ interstitialis, sp. n.

Subovate, piceo-fuscous; scape rufous; funiculus and tarsi piceous; irregularly covered with greyish scale-like matter and yellow setæ.

Thorax studded with small granules. *Elytra* ovate-oblong, with shallow grooves formed apparently of large impressions, and with some minute granules; the longitudinal interstices narrow and somewhat elevated and interrupted, being composed evidently of series of granules.

Underside opaque, piceous, the basal and terminal ventral segments reddish, the first slightly more elevated than the second, broad, depressed between the coxæ, and with two large punctiform foveæ there and scattered punctures behind; the second short, nearly smooth, with five or six minute punctures only, third and fourth extremely short, fifth closely and finely sculptured, with a fovea near its extremity.

In general appearance and nodosities very similar to *B. capitalis*, with the exceptions detailed above.

Length (rost. incl.) 2; breadth $\frac{3}{4}$ line.

Canterbury College Botanical Station, at the junction of the Waimakariri and Broken River (*Mr. J. H. Lewis*).

Group *Hylobiidæ*.

STILBODERMA, gen. nov.

Small, subovate, moderately convex, sparsely clothed with slender hairs.

Rostrum stout, arched, subcylindrical. *Scrobes* visible above, profound, beginning before the middle and extending to the eyes; they are expanded below, so that only a narrow interval exists between them on the under surface. *Antennæ* rather short. *Scape* stout, clavate at apex, attaining the

lower and front part of the eye. *Funiculus* 7-articulate, basal joint thick; second slender at base, only half as thick as the first at the apex and nearly as long as that is; 3-6 small and transverse, seventh transverse, at least twice as stout as the preceding one. *Club* oblong-oval, stout, not perceptibly articulated. *Eyes* distinctly faceted, lateral, free from thorax, transversely oval. *Thorax* truncate at base and apex, without ocular lobes. *Scutellum* absent. *Elytra* subcordate. *Tibiæ* slightly expanded, with prominent, curved, external hooks, their inner extremity acutely produced. *Tarsi* slender, their soles almost without vestiture, having a few fine hairs only; basal joint slender at the base, as long as the terminal one; the penultimate a little expanded, excavate above at the apex, but not bilobed.

Prosternum indistinctly incurved in front. Anterior *coxæ* slightly separated, the intermediate not so far apart as the posterior. *Metasternum* short. *Abdomen* elongate, basal two segments large and almost equal, their suture slightly sinuous; third and fourth short, with deep sutures.

This differs from *Eiratus* in having almost contiguous anterior *coxæ*, unlobed penultimate tarsal joints, by the absence of the scutellum, and other details; it is, however, the most nearly related genus.

Stilboderma impressipennis, sp. n.

Glossy, infusate red; antennæ and tarsi fusco-testaceous, club darker and pubescent; the body sparingly clothed with inconspicuous slender hairs.

Rostrum finely sculptured. *Thorax* about as broad as long, a little narrowed anteriorly, moderately coarsely and closely sculptured. *Elytra* truncate and sharply defined at the base, their sides moderately rounded, rather abruptly narrowed at the extremity; broadly transversely impressed before the middle, rather coarsely striate-punctate, subcrenate on some parts; third and fifth interstices slightly elevated at the base, the summit of the posterior declivity slightly prominent but without callosities; their base slightly exceeds that of the thorax in width.

Underside shining, rufo-piceous, rather coarsely but not closely punctured (femora inclusive), and bearing a few fine hairs only.

Length (rost. excl.) 1; breadth $\frac{3}{8}$ line.

Canterbury College Botanical Station. Two specimens from Mr. J. H. Lewis.

ATHOR, gen. nov.

Body subcylindric, small, minutely squamose.

Rostrum nearly as long as thorax, arcuate, slightly dilated in front. *Scrobes* deep, beginning near apex, oblique, convergent underneath. *Eyes* transversely oval, situated at the sides of the head close to the thorax, widely separated above, depressed. *Scape* stout, attaining the eye, flexuous, gradually incrassate. *Funiculus* 7-articulate, basal joint as thick as the scape; joints 5-7 obconical, transverse, seventh largest. *Club* oval, not distinctly articulate. *Thorax* slightly constricted in front, base widely bisinuate, without well-marked ocular lobes. *Scutellum* minute. *Elytra* rather short, subcylindrical, rather wider than thorax at the base, simply rounded apically. *Femora* proportionally large and thick. *Tibiæ* also thick, flexuous, external terminal hook stout, the inner calcar also well developed. *Tarsi* pubescent underneath, very broad and short, penultimate joint with short lobes, the terminal remarkably small, with small claws.

Prosternum deeply incurved in front. Anterior *coxæ* large, contiguous; the intermediate slightly separated, posterior widely. *Metasternum* short. *Abdomen* of only moderate length, second segment not quite so large as the first, the suture sinuate, third and fourth abbreviated.

The only exponent of this genus is chiefly remarkable on account of the subcylindric outline, obtusely rounded elytral apex, broad tarsi, with their setose surface, the relatively thick legs, and deeply emarginate prosternum, all being characters which distinguish it from its congeners.

Athor arcifera, sp. n.

Opaque, variegate; fuscous, the legs and hind body sometimes a little rufescent behind and at the sides; tarsi and antennæ dark red, club piceous; the flattened squamæ are not easily seen and appear to be absent from the thoracic disk, but on the elytra pallid scales extend as far as the hind thighs and form a sort of arch from one shoulder to the other; the greater portion of the hind body is sometimes of a light chocolate hue; on the rostrum and sides of the thorax the squamosity is grey.

Rostrum apparently coarsely punctate. *Thorax* of nearly equal length and breadth, a little rounded laterally, evidently narrower in front than behind; coarsely, closely, and almost rugosely punctured. *Elytra* deeply sulcate, their punctures

most distinct near the sides; interstices apparently slightly rugose, under the microscope the fifth seem to have a series of minute granules.

Underside dull picceous, moderately coarsely punctured, the squamæ and slender setæ pallid.

Length (rost. incl.) $1\frac{1}{4}$; breadth $\frac{1}{2}$ line.

Broken River.

Another of the numerous discoveries made by Mr. J. H. Lewis. Four specimens.

Group *Cylindrorhinidæ*.

Sargon hudsoni, sp. n.

Elongate, moderately convex, subopaque, nigrescent; sparingly clothed with minute, inconspicuous, round greyish scales, those on the rostrum and sides of thorax more elongate and brighter, a few being viridescent and pink.

Rostrum a little shorter than thorax and half its width, with two ill-defined ridges starting from the interocular groove and extending obliquely forwards, and with a well-developed central carina; the surface rather finely punctured, more closely near the sides, the apical portion setose. *Thorax* about equal in length and breadth, its sides almost straight behind, obliquely narrowed near the front, apex slightly medially emarginate; surface uneven, with coarse irregular rugosities near the sides; the longitudinal furrow deep and broad, its punctuation rather fine and close on the middle, coarser near the sides and base. *Scutellum* indistinct. *Elytra* oblong, shoulders curvedly narrowed, yet distinctly wider than thorax at the base, obliquely narrowed and deflexed posteriorly, apices slightly divergent at the suture, but not prolonged; their surface rather finely and not closely punctured; each with six discoidal striæ having a few coarse punctures at the base; third and fifth interstices costiform, the former most prominent on top of the posterior declivity, but prolonged, though less elevated, to the extremity; the fifth terminates very abruptly, so as to appear nodiform behind; seventh moderately raised from behind each shoulder to the declivity, so as to form a thick margin.

Legs stout, with more brightly coloured scales than the elytra; posterior corbels simple, without any external truncature.

Underside a little shining, black, finely punctured; the sternum and basal ventral segments with somewhat rufescent

slender squamæ, basal segment rather longer than second, the intervening suture angulate medially; third and fourth equal, with straight sutures; fourth and fifth transversely depressed medially at the base.

When placed side by side with *S. carinatus* the difference in coloration is very apparent, that species appearing to be entirely of a peculiar slightly rufescent grey, the derm itself being invisible; whereas *S. hudsoni* appears to be nearly black, the squamosity being inconspicuous. In the former species the rostral carina is less distinct, the front of the thorax is not emarginate, the scutellum is well developed, the elytral striæ are finely punctured throughout, and the third interstices are quite as nodiform behind as the fifth.

Length (rost. incl.) 8; breadth 3 lines.

Mount Holdsworth, at an elevation of 4300 feet.

Named in honour of Mr. G. V. Hudson, who discovered it.

[To be continued.]

BIBLIOGRAPHICAL NOTICE.

Iowa Geological Survey. Vol. xviii. *Annual Report* 1907. Des Moines: Published for Iowa Geological Survey, 1908. Pp. i-xi, 1-291; pls. i.-xvi.

THE bulk of this Report is devoted to a most valuable dissertation on the Devonian Fishes of Iowa by Charles R. Eastman. Of great length and thoroughly exhaustive of the subject, it would be impossible here to give an adequate summary of its contents. In the introductory portion of his memoir the Author surveys that thorny problem the origin of the paired fins, wherein he favours the arguments of Dean and Cope as against Smith Woodward; and later he discusses the classification of the Arthrodira, reviewing the work of Continental savants, and, among British ichthyologists, Mr. C. T. Regan, Prof. Bridge, Dr. Traquair, and Mr. [sic] E. Ray Lankester.

There is much that is new in these pages, as might be supposed, and not a little that will afford matter for further debate. Perhaps one of the most remarkable things in the whole Report is the Author's asserted discovery of an actual fossil brain, in *Rhadinichthys deani*, sp. n. The substance of this brain, he tells us, "became transformed into calcium phosphate before decomposition set in, and whose walls in consequence are scarcely shrunken. This view is

further confirmed by the presence of nerve-fibres and blood-vessels, slightly enlarged in some cases . . . by the segregation of mineral matter, but coinciding in position with altogether similar nervous and vascular structures in modern Ganoids and bony fishes." He also found the "internal ear and its associated parts so preserved that "their like has never before been found in the fossil condition."

The text-figures, which are numerous, and the plates are alike marvellously good.

W. P. P.

MISCELLANEOUS.

Dates of the Parts of C. H. C. Burmeister's 'Genera Insectorum,'
1838-1846.

To the Editors of the 'Annals and Magazine of Natural History.'

GENTLEMEN,—As most copies of this little work are wrongly bound up, it may be useful to print this list of contents of the several parts from the analyses given in Wiegmann's 'Archiv der Naturgeschichte.'

- Heft 1 (1837). *Lystra* and *Phenax*, *Acocephalus*, *Bythoscopus*,
Eurymela.
2 (1838). *Selenocephalus*, *Coelidia*, *Eupelix*, *Jassus*.
3 (1838). *Ulopa*, *Doridium*, *Cephalelus*, *Ledra*.
4 (1838). *Gypona*, *Xerophlœa*, *Pediculus*.
5 (1840). *Paropia*, *Acropis*, *Opsomala*, *Thrips*, *Phlœo-*
thrips, *Heliothrips*.
6 (1840). *Eudinopsis* (? in 5 or 6), *Hypselogenia*, *Platy-*
genia (cannot find this, but probably 5
or 6).
7 (1841). Familia Xylophila, *Typhlocyba*.
8 (1845). *Fulgora*, *Pyrops*, *Euchirus*, *Ulopterus*.
9 (1845). *Trichophus*, *Hoplostomus*, *Rhagopteryx*.
10 (1846). *Copris*, *Heliocopris*, *Pelidnota*, *Trichius*, *Clasto-*
cnemis, *Trigonopeltastes*.

I do not know the dates of the two "Carton"—"Pediculina, *Phthirus*," which is an addition, and "*Lystra Phenax*" (4 pp. of small type), which seems to be a correction,—but I suggest they both date from the 10th Heft, 1846.

C. DAVIES SHERRORN.
"Index Animalium."

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 20. AUGUST 1909.

VIII.—*Rhynchotal Notes*.—XLVIII. By W. L. DISTANT.

HOMOPTERA.

Fam. Fulgoridæ.

Subfam. *Issinæ*.

The genera and species described and referred to in this paper are contained in the Rhynchotal collection of the British Museum.

GALAPAGOSANA, gen. nov.

Vertex longer than pronotum, triangular, longitudinally centrally carinate; face smooth, very obscurely carinate, angulate at base, triangularly excavate before clypeus, which is smooth; pronotum moderately short, convex in front, a little concave behind, with a longitudinal tuberculous ridge a little before the inner margins of each eye; mesonotum considerably longer than pronotum, discally flattened and obliquely depressed, centrally finely longitudinally sulcate, and the margins of the flattened surface on each side finely ridged; tegmina gibbously rounded at costal margin, broadly rounded at apices, which are slightly directed upwardly, clavus with transverse veins, a little gibbous near base,

remaining surface of tegmina reticulately veined; posterior tibiæ unspined.

Type, *G. rostrifer*, Butl.

A genus in shape resembling *Hypancyllus*, Fowl., which, however, is not an Issid, but a Flatid, very closely allied to *Cyphopterus*, Amyot.

Galapagosana rostrifer.

Issus rostrifer, Butl. Proc. Zool. Soc. Lond. 1877, p. 90.

Hab. Galapagos Archipelago; Charles Island (Brit. Mus.).

This species is not recorded in Melichar's 'Monographie der Issiden.'

Genus *Issus*.

Issus, Fabr. Syst. Rhyng. p. 99 (1803); Melich. Mon. Issiden, p. 184 (1906).

Type, *I. coleopteratus*, Geoffr.

Issus coleopteratus.

Cicada coleopterata, Geoffr. Hist. Ins. i. p. 418 (1764).

Issus coleopteratus, Melich. Mon. Issiden, p. 189 (1906) (for synonymy).

Issus bimacula, Walk. List Hom. ii. p. 364 (1851).

Although no locality is affixed to the type of Walker, he had subsequently placed an Algerian specimen with it. Stål (1862) pointed out that *I. maurus*, Walk., is also a synonym of *I. coleopteratus*, Geoffr.

Genus *Lollius*.

Lollius, Stål, Hem. Afr. iv. p. 209 (1866); id. Öfv. Vet.-Ak. Förh. 1870, p. 763.

Type, *L. australicus*, Stål.

Lollius vittatus.

Hysteropterum vittatum, Walk. Journ. Linn. Soc., Zool. x. p. 128 (1868).

Hab. New Guinea.

Lollius invarius.

Hysteropterum invarium, Walk. Journ. Linn. Soc., Zool. x. p. 128 (1868).

Hab. Mysol.

*Lollius minax.**Hysteropterus minax*, Walk. Journ. Linn. Soc., Zool. x. p. 127 (1865).*Hab.* Ceram.*Lollius morosus.**Hysteropterus morosus*, Walk. Journ. Linn. Soc., Zool. x. p. 125 (1868).*Hab.* Morty Island.*Lollius læve.**Hysteropterus læve*, Walk. Journ. Linn. Soc., Zool. x. p. 125 (1868).*Hab.* Ceram.*Lollius timidulus.**Hysteropterus timidulum*, Walk. Journ. Linn. Soc., Zool. x. p. 125 (1868).*Hab.* Ceram.*Lollius mouhoti*, sp. n.

Brownish ochraceous, mottled and spotted with piceous or fuscous; vertex with a large dark fuscous spot before each lateral margin; face fuscous brown, transversely piceous before clypeus, which is piceous, with its base ochraceous; pronotum finely speckled with fuscous brown; mesonotum with larger irregular fuscous-brown spots; body beneath paler and less darkly suffused than above; legs much mottled with fuscous brown; tegmina ochraceous, finely mottled with brownish, a large inner basal fascia to clavus, central longitudinal disk to corium, and small costal and apical marginal spots piceous; the dark discal coloration is broken near costa, exhibiting two ochraceous spots, one near middle and the other beyond it; vertex concave, about as long as broad, the anterior margin centrally a little angularly prominent, the lateral margins upwardly laminately ridged; face moderately concave at base, the basal angles acute, the lateral margins obliquely directed outwards for two-thirds their length and then inwardly oblique to clypeus, centrally carinate and becoming broadly bifurcately carinate at about one-fourth from base; pronotum with the anterior margin centrally roundly produced between the posterior areas of the eyes, the posterior margin a little subobliquely

recurved on each side; tegmina with the apical margins broad and truncate.

Long., incl. tegm., 13 mm.

Hab. Cambodia; Chantaban (*Mouhot*, Brit. Mus.).

Allied to *L. furcifer*, Stål.

MONIANA, gen. nov.

Vertex longer than broad, internally a little foveate, the margins ridged, the apical margin appearing prominent by the exposure of the base of face; face obliquely straightly widening towards clypeus, the disk strongly tricarinate, the central carination slender, straight, the sublateral carinations more robust and united at base; clypeus transversely ridged on basal area, beyond which it is centrally longitudinally ridged; pronotum short, anteriorly subconically produced between the eyes, the central disk subfoveately flattened; mesonotum with two oblique central carinations; tegmina laterally deflected, about one and a half times as long as broad, the apex roundly truncate, claval suture reaching apex of inner margin; legs moderate.

This genus, which is only represented in the National Collection by a badly-pinned specimen, is allied to *Lollius*, from which it differs by the totally different structure of the face.

Moniana andrewsi.

Issus (♀) *andrewsi*, Kirby, Monogr. Christmas Isld. p. 138 (1900).

Hab. Christmas Island.

Genus TYLANA.

Tylana, Stål, Rio Jan. Hem. ii. p. 67 (1862).

Type, *T. cristata*, Fabr.

Tylana composita.

Issus compositus, Walk. Journ. Linn. Soc., Zool. i. p. 152 (1857).

Hab. Borneo.

Tylana truncata.

Hysteropterum truncatum, Walk. List Hom., Suppl. p. 93 (1858);
Melich. Mon. Issiden, p. 154 (1906).

Hab. Java.

Tylana lineolata.

Issus lineolatus, Walk. Journ. Entomol. i. p. 308 (1862).

Hab. Australia, Moreton Bay (Brit. Mus.).

Tylana angustifrons.

Lollius angustifrons, Kirk. Rep. Exp. Stat. Haw. Plant. Assoc. Bull. i. pt. ix. p. 439 (1906).

? *Tylana conspurcata*, Melich. Mon. Issiden, p. 203 (1906).

Hab. Queensland; Kuranda (*Dodd*, Brit. Mus.).

Closely allied to *T. lineolata*, Walk.

Tylana acutipennis.

Lollius acutipennis, Kirk. Rep. Exp. Stat. Haw. Plant. Assoc. Bull. i. pt. ix. p. 439 (1906).

Tylana acutipennis, Melich. (part.) Monogr. Issiden, p. 200 (1906).

The British Museum possesses specimens collected by Mr. Dodd at Kuranda, Queensland, the locality given by Kirkaldy. Structurally and dimensionally these examples agree with Kirkaldy's description, but the colour is mostly virescent, or sometimes ochraceous, with the legs ochraceous, characters not mentioned in the somewhat short differential description.

Tylana confinis, sp. n.

— *confinis*, Walk., MS.

Ochraceous, mottled with brownish and fuscous; vertex with a few brownish speckles; pronotum with an anterior marginal line of dark punctures and a piceous suffusion at base; mesonotum with the basal angles broadly piceous, containing a small central pale spot; face and clypeus somewhat thickly finely speckled with fuscous; body beneath and legs ochraceous, posterior legs mostly piceous brown; abdomen beneath (excluding basal segment) finely speckled with brown; tegmina ochraceous, basal third of costal and subcostal area and the apical margin fuscous, extreme costal and apical margins finely spotted with piceous; vertex with the lateral margins strongly and sharply ridged; face concave, lateral margins ridged, base concave, tricarinate; outer margin of clavus a little darkly convexly nodulose near apex of mesonotum, costal margin obliquely widened for about one half from base and then straight to apex, which is broadly transverse; tibiæ strongly sulcate.

Long., incl. tegm., $8\frac{1}{2}$ mm.

Hab. Sumatra (*Wallace*, Brit. Mus.).

Tylana rudis, sp. n.

— *rudis*, Walk., MS.

Very pale brownish ochraceous; eyes greyish white; vertex and pronotum paler than the mesonotum and more or less speckled with pale brown; mesonotum with about six pale longitudinal ridges; pronotum with three somewhat obscure ridges, the central ridge straight, the two others oblique; body beneath pale ochraceous; face and legs thickly, abdomen more sparingly speckled with brownish; tegmina obscure greyish, darker on basal area, with the veins prominent and slightly tinted with reddish, the costal and apical margins finely spotted with brownish; face tricarinate, its base moderately concave; pronotum roundly produced anteriorly between the posterior area of the eyes, its basal margin a little rounded; tegmina widened on posterior half, its apical margin broadly subtruncate, its costal margin oblique to a little before middle and then nearly straight and slightly sinuate to apex, posterior claval margin gibbously rounded near base.

Long. $5\frac{1}{2}$ mm.

Hab. Malay Archipelago; Gilolo (*Wallace*, Brit. Mus.).

PARATYLANA, gen. nov.

Allied to *Tylana*, but with the vertex and face much narrower, the latter elongate, much longer than wide, slightly widened before clypeus, the lateral margins strongly ridged, and with a sublateral longitudinal ridge on each side which are more or less united near base and before clypeus; other characters generally as in *Tylana*.

Type, *P. herbida*, Walk.

The *Tylana laterata*, Melich., will be included in this genus.

Paratylana herbida.

Issus herbicus, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 121 (1868).

Tylana herbida, Melich. (part.) Mon. Issiden (Homopt.), p. 206 (1906).

Hab. Mysol.

Paratylana biplaga.

Issus biplaga, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 122 (1868).

Tylana herbida, Melich. (part.) Mon. Issiden (Homopt.), p. 206 (1906).

Issus semifascia, Walk., MS.

Hab. Morty and Aru.

Walker had previously described a species of *Issus* from Hong Kong as *Issus biplaga* (List Hom. ii. p. 367, 1851).

Paratylana dimidiata.

Issus dimidiatus, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 123 (1868).

Tylana herbida, Melich. (part.) Mon. Issiden (Homopt.), p. 206 (1906).

Hab. Mysol.

Paratylana bifascia.

Issus bifascia, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 123 (1868).

Tylana herbida, Melich. (part.) Mon. Issiden (Homopt.), p. 206 (1906).

Hab. New Guinea.

Paratylana picea.

Issus piceus, Walk. Journ. Linn. Soc., Zool. x. p. 123 (1868).

Tylana picea, Melich. Mon. Issiden, p. 205 (1906).

Hab. Aru, New Guinea.

NEOTYLANA, gen. nov.

Allied to *Paratylana* by the narrow face and vertex, but with the face obliquely directed inwardly, and not outwardly as in *Paratylana*. Vertex with the lateral margins strongly ridged; face nearly three times as long as broad, at base extended a little above the eyes, where it is very slightly narrowed, lateral margins strongly ridged, two central longitudinal ridges more or less meeting near base and apex; clypeus centrally ridged; pronotum anteriorly conically produced between the eyes, the basal margin centrally sinuate, the disk longitudinally depressed; pronotum tricarinate; tegmina short, broad, the costal margin convex, the apical margin obliquely truncate, posterior margin of clavus gibbously rounded near base.

Type, *N. marginalis*, Walk.

Neotylana marginalis.

Hysteropterum marginale, Walk. Ins. Saund., Hom. p. 46 (1858);
Melich. Mon. Issiden, p. 151 (1906).

Hab. Africa; "Cape Coast."

Genus NARAYANA.

Narayana, Dist. Faun. Brit. Ind., Rhynch. iii. p. 349 (1906)

Capelopterum, Melich. Mon. Issiden, p. 210 (1906).

Genus ISSOSCEPA.

Issoscepa, Melich. Mon. Issiden, p. 214 (1906).

Type, *I. nodipennis*, Germ.

Issoscepa mutilatus.

Hysteropterum mutilatum, Walk. List Hom., Suppl. p. 94 (1858).

Amphiscepa (?) *mutilatum*, Melich. Mon. Issiden, p. 154 (1906).

Hab. Amazons.

Genus NILALOHITA.

Nilalohita, Dist. Faun. Brit. Ind., Rhynch. iii. p. 358 (1906).

Type, *N. curculioides*, Dist.

Nilalohita lineata.

Issus lineatus, Walk. Journ. Linn. Soc., Zool. i. p. 154 (1857); Melich. Mon. Issiden, p. 315 (1906).

Hab. Borneo; Sarawak (*Wallace*). Singapore (*Ridley*).

MAHANORONA, gen. nov.

Head (including eyes) distinctly narrower than pronotum, vertex subquadrate, its margins ridged; face about twice as long as broad, its base rounded, not emarginate, strongly amplately rounded before clypeus, centrally longitudinally tricarinate, the carinations united at base, the two lateral carinations not reaching clypeus, the lateral margins ridged; clypeus centrally longitudinally carinate, its lateral margins laminately recurved; pronotum subangularly produced between eyes, where it is centrally longitudinally carinate; mesonotum slightly longer than pronotum, centrally longitudinally carinate, and with a curved carinate line commencing on each lateral margin at about one-third from base and meeting near the anterior margin; rostrum considerably passing the posterior coxæ; legs long, posterior tibiæ with five spines, anterior tibiæ not dilated; tegmina convexly oblique, a little longer than the abdomen, about twice as long as broad, the costal margin somewhat concavely sinuate near middle, radial vein bifurcating at a short distance from base, upper longitudinal vein bifurcating near middle; between the longitudinal veins, which are prominent, are situate a number of irregular transverse veinlets which give the tegmina a reticulate character.

Allied to *Nilalohita*, Dist., from which it differs by the tricarinate and basally rounded non-emarginate face, carinate clypeus, the non-dilated anterior tibiæ, and different venation to tegmina.

Mahanorona cowani, sp. n.

Body above brownish ochraceous, speckled and marked with black; vertex with two prominent black spots on each lateral margin; clavus with a prominent transverse black spot at about one-third from base; tegmina more densely spotted with black before and after middle, the latter more piceous than black; face black, the lateral margins and the two outer central carinations more or less spotted with ochraceous, the posterior margin broadly ochraceous; clypeus, rostrum, body beneath, and legs ochraceous, speckled and spotted with black or piceous; a large black spot on each side of prosternum and a similar spot on each side of metasternum; two annulations to anterior and intermediate coxæ, three more or less distinct annulations to anterior and intermediate femora and tibiæ, apex of posterior femora and all the tarsi more or less purplish brown or piceous; structural characters as in generic diagnosis.

Long., incl. tegm., 11 mm.

Hab. Madagascar; Mahanoro (*Cowan*, Brit. Mus.).

MINCOPIUS, gen. nov.

Head (including eyes) distinctly narrower than pronotum, vertex subquadrate, foveately depressed, the lateral margins ridged, the apex truncate; face about twice as long as broad, tricarinate, the central carination straight and robust, the lateral ones curved and not quite reaching base, basal margin angularly sinuate, posterior margin rounded before clypeus, which is broad and not carinate; pronotum moderately short, transverse, anteriorly subconically produced between the eyes, basal margin truncate, the posterior lateral angles slightly rounded; mesonotum longer than pronotum, broadly triangular, centrally finely carinate; rostrum almost reaching the posterior coxæ; legs moderately long, posterior tibiæ with two spines, anterior tibiæ distinctly compressed and dilated; tegmina convexly oblique, a little longer than the abdomen, the costal margin a little concavely sinuate near middle, radial vein bifurcating at a short distance from base, upper longitudinal vein bifurcating slightly farther on; the apical halves of tegmina possess numerous transverse veins, giving a subreticulate appearance.

This genus is allied to *Nilalohita*, Dist., from which it can be at once separated by the posterior tibiæ, which are armed with two, and not five spines.

Mincopius andamanensis, sp. n.

Brownish ochraceous, speckled and marked with darker brown; tegmina with the veins reddish and with some moderately indistinct angulate dark brown markings at and behind middle; clypeus black, its lateral margins flavous; sternum and base of abdomen pale and more stramineous than above, remainder of abdomen a little darker than above; legs speckled with castaneous; pronotum finely granulose; mesonotum centrally subtriangularly depressed; other structural characters as in generic diagnosis.

Long., incl. tegm., $8\frac{1}{2}$ mm.

Hab. Andaman Islands (*G. Rogers*, Brit. Mus.).

DINDINGA, gen. nov.

Head with eyes about as broad as pronotum, the eyes very large and long, directed backward and almost covering the whole lateral margins of the pronotum, vertex not extending beyond the anterior margins of the eyes, subquadrate, its lateral margins somewhat strongly ridged; face very much longer than broad, obliquely directed for a little more than half its length from base, and strongly and horizontally recurved to base of clypeus, very slightly wider towards apex than at base, the lateral margins strongly ridged; clypeus triangular; pronotum short, anteriorly triangularly produced between eyes, and with a central longitudinal impression; mesonotum a little longer than pronotum, centrally longitudinally impressed, the margins of the impression ridged; anterior femora flattened, laminately dilated both above and beneath for nearly their entire length; anterior tibiæ laminately and somewhat convexly widened beneath for nearly their entire length; intermediate femora simple; posterior femora much shorter than posterior tibiæ, slightly bent, widened apically; posterior tibiæ with two spines; tegmina longer than broad, the costal margin slightly but distinctly sinuate near middle, clavus extending to about middle of corium, claval vein not reaching apex, middle longitudinal vein bifurcating at about one-fourth from base, apical area somewhat thickly transversely veined.

Type, *D. oculata*, Dist.

Allied to *Prosonoma*, Melich., from which it differs by the

large eyes almost entirely covering the lateral margins of the pronotum, the two-, not three-spined posterior tibiæ, the different shape of the face, which, regarded from the sides, has a broad obtusely porrect appearance.

Dindinga oculata, sp. n.

Dull reddish; extreme apices of the anterior and intermediate femora, lower base of the anterior tibiæ, posterior tibiæ (excluding base and generally apex), and disk of sternum (more or less) pale greenish ochraceous; head with the vertex sometimes greenish ochraceous; pronotum and base of face more or less granulose; tegmina mostly rugulose between the veins, which are very distinct; other structural characters as in generic diagnosis.

Long. 8-9 mm.

Hab. Dinding Islands (*H. N. Ridley*, Brit. Mus.). Perak (*Doherty*, Coll. Dist.).

FORTUNIA, gen. nov.

Vertex a little less than twice as long as broad, directed obliquely downward, rugosely granulose above to a transverse carination between the eyes, behind which it is much less or very slightly granulose, and before which it is longitudinally tricarinate, the lateral carinations curved, the lateral areas large and flatly produced downward on each side; face small, almost horizontal; clypeus large, globose; rostrum very robust, reaching the intermediate coxæ; pronotum somewhat short, anteriorly convexly produced between the posterior areas of the eyes, granulose, centrally longitudinally carinate, the margins finely ridged; mesonotum slightly longer than the pronotum, granulose, tricarinate, the central carination straight, the lateral ones oblique; legs more or less longitudinally grooved, anterior tibiæ strongly grooved but not dilated, posterior tibiæ with two strong spines placed beyond the middle; tegmina convexly oblique, about twice as long as broad, thickly and coarsely reticulate, the costal margin concavely sinuate at about one-fourth from base, the upper longitudinal vein bifurcating near base, the radial vein bifurcating near middle.

Type, *F. byrrhoides*, Walk.

This genus is allied to *Prosonoma*, Melich., especially by the peculiar structure of the head; it differs by the non-dilated anterior tibiæ, the bispined posterior tibiæ, the centrally carinate pronotum and mesonotum, &c.

*Fortunia byrrhoides.**Issus byrrhoides*, Walk. List Hom., Suppl. p. 89 (1858).*Hab.* North China (*Fortune*, Brit. Mus.).

GENUS TRIENOPA.

Trienopa, Sign. Ann. Soc. Ent. Fr. (3) viii. p. 188 (1860).*Eriphyle*, Stål, Öfv. Vet.-Ak. Förh. 1861, p. 208.Type, *T. flavida*, Sign.*Trienopa retracta.*— *retractus*, Walker, MS.

A specimen thus labelled and derived from "Cape Coast" is in the British Museum. It has not been described by Walker, is allied to *longifrons*, Walk. (of which it is probably a pale variety), but is only represented by a single example in moderate condition.

It has nothing to do with the *Issus retractus*, Walk. (Journ. Linn. Soc., Zool. i. p. 152, 1857), from Borneo, which belongs to the genus *Tetrica*, Stål.

GENUS TETRICIA.

Tetrica, Stål, Hem. Afr. iv. p. 208 (1866); Dist. Faun. Brit. Ind., Rhynch. iii. p. 339 (1906).Type, *T. fusca*, Stål.*Tetrica retracta.**Issus retractus*, Walk. Journ. Linn. Soc., Zool. i. p. 152 (1857).*Hab.* Borneo.*Tetrica ovalis.**Issus ovalis*, Walk. Journ. Linn. Soc., Zool. i. p. 154 (1857).*Hab.* Borneo.*Tetrica literosa.**Issus literosus*, Walk. Journ. Linn. Soc., Zool. i. p. 154 (1857).*Hab.* Borneo.*Tetrica nanulum.**Hysteropterum nanulum*, Walk. Journ. Linn. Soc., Zool. x. p. 126 (1868).*Hab.* Morty Island.

Genus THABENA.

Thabena, Stål, Hem. Afr. iv. p. 208 (1866); id. Öfv. Vet.-Akad. Förh. 1870, p. 761; Melich. Mon. Issiden, p. 294 (1906).

Type, *T. ståli*, Melich.

Thabena patula.

Issus patulus, Walk. Journ. Linn. Soc., Zool. i. p. 153 (1857).

Issus iners, Walk. loc. cit.

Hab. Borneo.

Genus SARIMA.

Sarima, Melich. Hom. Faun. Ceylon, p. 78 (1903).

Type, *S. illibata*, Melich.

Sarima sinensis.

Issus sinensis, Walk. List Hom. ii. p. 367 (1851).

Hab. Hong Kong.

Genus TEMPSA.

Tempsa, Stål, Hem. Afr. iv. p. 208 (1866).

Type, *T. malaya*, Stål.

Tempsa angusta.

Issus angustus, Walk. List Hom., Suppl. p. 92 (1858).

Hab. Borneo.

Tempsa rogersi, sp. n.

Dull ochraceous; vertex with a piceous spot on each lateral margin; pronotum with two small central spots and a larger transverse spot on each side behind eyes piceous; mesonotum with three large piceous spots, one near each basal angle and one near apex; face brownish, the lateral margins paler, with piceous spots, the spots on each side before clypeus larger and oblique; anterior and intermediate femora annulated with castaneous brown before apex, the anterior and intermediate tibiæ annulated with castaneous brown near base and at apex; tegmina dull ochraceous, with the veins castaneous and with a series of small piceous spots on apical margin; vertex concave, with a very obscure central carination; pronotum with a central and mesonotum

with three carinations; face centrally carinate, the clypeus globose at basal area and very strongly centrally carinate.

Long. 10 mm.

Hab. Andaman Islands (*G. Rogers*, Brit. Mus.).

Genus EUPILIS.

Eupilis, Walk. Journ. Linn. Soc., Zool. i. p. 93 (1857).

Type, *E. albilineola*, Walk.

Eupilis hebes.

Eupilis hebes, Walk. Journ. Linn. Soc., Zool. i. p. 162 (1857).

— *gradiens*, Walk., MS.

Hab. Borneo.

A specimen from Sarawak labelled "*gradiens*, Walk.," is in the National Collection, but I can find no trace of its description.

Genus GERGITHUS.

Gergithus, Stål, Öfv. Vet.-Ak. Förh. 1870, p. 756, note.

Type, *G. schaumi*, Stål.

Gergithus niger.

Hemisphærius niger, Walk. Journ. Linn. Soc., Zool. i. p. 155 (1857);
Melich. Mon. Issiden, p. 76 (1906).

Hab. Malay Peninsula.

Genus HEMISPHERIUS.

Hemisphærius, Schaum, in Ersch & Gruber, Allg. Enc. Wissensch. Künste, i. p. 71 (1850).

Type, *H. coccinelloides*, Burm.

Hemisphærius lativitta.

Hemisphærius lativitta, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 130 (1868).

Hemiphila lativitta, Melich. Mon. Issiden, p. 57 (1906).

Hab. Morty Island.

Hemisphærius variabilis.

Hemisphærius variabilis, Butl. Ann. & Mag. Nat. Hist. (4) xvi. p. 98, t. iv. fig. 21 (1875).

Gergithus variabilis, Melich. Mon. Issiden, p. 65 (1906).

Hab. Japan.

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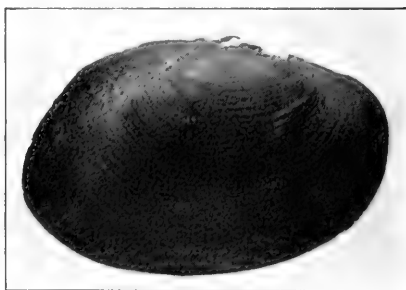
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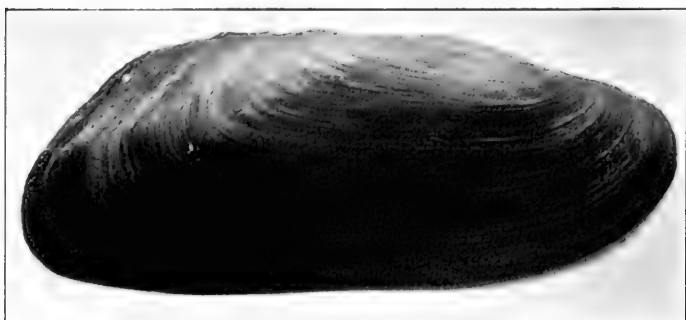
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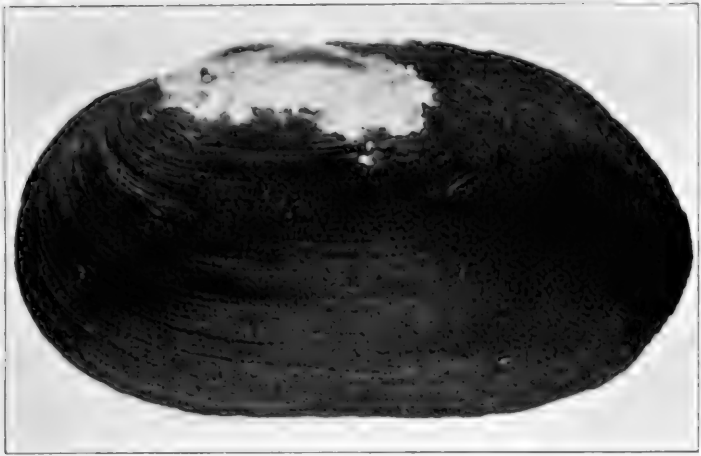
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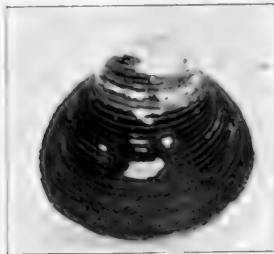
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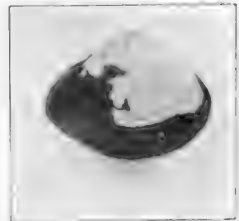
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MONGOLIANA, gen. nov.

Closely allied to *Hemisphærius*, but separated by the different structure of the face, which is a little longer than broad, with the lateral margins slightly convex and a little widened at middle (not obliquely widened from base to near clypeus as in *Hemisphærius*); the lateral margins are also inwardly bordered by a linear series of very small tubercles.

Type, *M. chilocorides*, Walk.

Mongoliana chilocorides.

Hemisphærius chilocorides, Walk. List Hom. ii. p. 379 (1851).

Gergithus chilocorides, Melich. Mon. Issiden, p. 67 (1906).

Hab. Hong Kong (Brit. Mus.).

Mongoliana recurrens.

Hemisphærius recurrens, Butl. Ann. & Mag. Nat. Hist. (4) xvi. p. 98, t. iv. fig. 20 (1875); Melich. Mon. Issiden, p. 85 (1906).

Hab. China; Fowchowfoo (Lay, Brit. Mus.).

IX.—New Land and Freshwater Shells from West Africa.

By H. B. PRESTON, F.Z.S.

[Plate IV.]

Ennea (Gulella) pallaryi, sp. n. (Fig. 1.)

Differing from *E. capitata*, Gld.* from Liberia, in its more conical form, slightly more contracted base, and in the last two whorls being much narrower; instead of bearing three teeth on the outer lip in addition to those on the columella and at the base, as in *E. capitata*, there are but two.

Alt. 11.75, diam. maj. 6.25 mm.

Aperture: alt. 2.75, diam. 2.25 mm.

Hab. Assinie.

In the year 1842 Reeve described in the Proc. Zool. Soc. a species *Achatina tincta*, which he figured in the same year in the 'Conchologia Systematica'; this shell, which he says was in the Cuming Collection, cannot now be found, and as

* Bost. Proc. i. p. 158 (1843).

it is probable that the late Mr. Cuming parted with it at a later date, it may be considered as lost; this figure has all the appearance of a young specimen of *A. variegata*, Lk., and is certainly not the same species as that figured later by Reeve in the 'Conchologia Iconica'*. This latter, though figured as *A. tineta*, and which is now in the British Museum, seems to be a varietal form of *A. weynesi*, Dautz.†. Pfeiffer ‡, misled by Reeve's later illustration, figured several specimens of what he took to be *A. tineta*, but his figures, though possibly belonging to the same species as that figured by Reeve in the 'Conchologia Iconica,' certainly have nothing to do with that figured in the first place by him in the 'Conchologia Systematica.' There are two other shells in the British Museum, one marked "*A. tineta*, var.," also from the Cuming Collection, and bearing locality "Fernando Po," and the other a poor specimen unnamed, but obviously belonging to the same species, with locality "Upper Congo"; these agree very fairly with the specimen now figured and described, and for which I propose the name of *Achatina lhotelleriana*.

Achatina lhotelleriana, sp. n. (Fig. 2.)

Shell oblong-ovate, obtuse, covered with a smooth yellowish-brown periostracum and painted with irregular transverse chestnut bands and flame-markings; upper whorls tinged with rose; whorls $7\frac{1}{4}$, flattened but inflated, sculptured with transverse lines of growth and very minute spiral striæ only visible with the aid of a lens, and showing minute granulation in places; sutures impressed, margined, slightly crenulate; columella bluish white, much twisted, descending vertically, obliquely truncate below, and spreading above into a parietal callus which reaches the upper margin of the whorl about 1 mm. behind the extremity of the outer lip; peristome thin, simple above, slightly reflexed below, tinged with reddish brown; aperture inversely auriform; interior of shell bluish, glossy.

Alt. 72, diam. maj. 39 mm.

Aperture: alt. 37, diam. 18 mm.

Hab. S. Antonio, left bank of Congo Delta.

Dreissensia bananaensis, sp. n. (Fig. 3.)

Shell slightly inequivalve, elongately subtrigonal, broad,

* Reeve, Conch. Icon. v. pl. xi. fig. 29.

† Ann. Soc. malac. Belgique, xxxiv. p. 27.

‡ Pfeiffer, Malak. Bl. xvi. 1869, p. 253, pl. i. figs. 1-4.

covered with a coarsely laminiferous reddish-brown periostracum; interior of shell whitish, gradually changing to dark blackish purple.

Long. 11, lat. 6.25 mm.

Hab. Banana Creek, Congo Delta.

Separable from *D. lacustris*, Morl.*, by its much broader and more trigonal form, its more laminiferous periostracum, and darker interior, which in *D. lacustris* is quite white.

Dreissensia gibberosa, sp. n. (Fig. 4.)

Shell inequivalve, mytiliform, rather sharply curved, broad in proportion to its length, covered with a dark brown laminiferous periostracum; interior of shell bluish white, stained in places with greyish brown and pencilled with longitudinal greyish-brown lines.

Long. 20, lat. 13 mm.

Hab. Assinie.

Differing from *D. ornata*, Morl., its nearest ally, in being much larger and smoother; the pencilled lines in the interior are also much coarser.

Unio (Nodularia) subnigra, sp. n. (Fig. 5.)

Shell oblong-ovate, covered with a dark brown periostracum, smooth centrally, but becoming laminiferous towards the margins, especially posteriorly; umboes moderately small, situated subcentrally; dorsal margin slightly arched; ventral margin gently curved; anterior side flattened, bluntly rounded; posterior side very obtusely angled; left valve bearing a cardinal jagged lamelliform tooth; anterior teeth wedge-shaped, with jagged edges; posterior teeth fine, elongate, smooth; interior of shell pale flesh-colour, changing towards the anterior and posterior margins to iridescent livid blue.

Long. 31.5, lat. 49 mm.

Hab. Lower Belgian Congo.

Mutela lhotelleriana, sp. n. (Fig. 6.)

Shell rhomboidal, slightly gaping at both sides, covered with an olive-green periostracum, marked with coarse irregular concentric lines of growth and indistinct radiate ridges, a minute oblique striate sculpture being apparent in places under a lens; umboes small, not prominent, situated very

* Morlet, Journ. de Conch. 1885, p. 32.

anteriorly; dorsal margin sloping; ventral margin nearly straight; anterior side flattened, rounded; posterior side tumid, somewhat rostrate, sloping above, rounded below; interior of shell pale livid flesh-colour.

Long. 35, lat. 88 mm.

Hab. Gaboon.

Spatha semicorrugata, sp. n. (Fig. 7.)

Shell oblong, solid, covered with a blackish-brown periostracum which is minutely wrinkled posteriorly, sculptured with rather coarse concentric lines of growth and corrugated on the upper portion of the posterior side; umboes small, situated somewhat anteriorly; ligament elongate, not prominent; dorsal margin slightly arched posteriorly, sloping anteriorly; ventral margin nearly straight; anterior side angled, bluntly acuminate; interior of shell rosy pink, iridescent, especially towards the margins.

Long. 51.5, lat. 87 mm.

Hab. Lower Congo.

Corbicula gabonensis, sp. n. (Fig. 8.)

Shell rotundly trigonal, somewhat inflated, chalky white, covered with a fine, polished, smooth, olive-green periostracum, sculptured with regular, somewhat distant, concentric ribs; umboes livid purple; ventral margin gently rounded; anterior side bluntly rounded; posterior side very slightly produced, rounded; cardinal teeth two in each valve, rather coarse; lateral teeth elongate, serrated; interior of shell livid purple.

Long. 22, lat. 23.25 mm.

Hab. Gaboon.

Galatea rubrotincta, sp. n. (Fig. 9.)

Shell subtrigonal, white, covered with a smooth brownish-olive periostracum, occasionally spotted with umber-brown and tinged, especially anteriorly, with rusty red, smooth, posteriorly radiately grooved, bearing a lunule on either side; umboes large and prominent; anterior side steeply sloping above, sharply rounded below; posterior side concave, abruptly sloping above, bluntly rostrate below; ventral margin gently rounded; teeth large, coarse, finely granular, somewhat lacerated, especially on the right valve; interior of shell pure white.

Long. 39, lat. 41 mm.

Hab. Congo Delta.

Fischeria globosa, sp. n. (Fig. 10.)

Shell irregularly trigonal, very much inflated, bluish white covered with a pale olive-green periostracum, marked with indistinct concentric lines of growth, which become wrinkled and more apparent posteriorly; umboes violet, large, prominent; ligament short, prominent; dorsal margin strongly arched; ventral margin sinuous; anterior side acuminate rounded; posterior side rostrate, angled; right valve bearing one squarish, slightly bifid cardinal tooth, a somewhat twisted posterior lateral and a very fine elongate anterior lateral tooth; left valve bearing two rounded cardinal teeth, the lateral teeth being almost obsolete on both sides; interior of shell bluish lilac, with a somewhat granular surface.

Long. 14, lat. 18 mm.

Hab. Congo Delta.

EXPLANATION OF PLATE IV.

- Fig. 1. *Ennea (Gutella) pallaryi*, sp. n.
 Fig. 2. *Achatina lhotelleriana*, sp. n.
 Fig. 3. *Dreissensia bananaensis*, sp. n.
 Fig. 4. — *gibberosa*, sp. n.
 Fig. 5. *Unio (Nodularia) subnigra*, sp. n.
 Fig. 6. *Mutela lhotelleriana*, sp. n.
 Fig. 7. *Spatha semicorrugata*, sp. n.
 Fig. 8. *Corbicula gabonensis*, sp. n.
 Fig. 9. *Galatea rubrotincta*, sp. n.
 Fig. 10. *Fischeria globosa*, sp. n.

X.—Four new Lamellicorn Coleoptera from the Oriental Region. By GILBERT J. ARROW.

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IN a recent part of the 'Annals' I published some notes upon African species of the genus *Sisypus*. Having at the same time examined such other types of the genus as are accessible to me, I now give a few notes upon Oriental species. These are not nearly so numerous as their African congeners, and the following is a complete list of those at present known:—

**bowringi*, White, Ann. & Mag. Nat. Hist. 1844, xiv.
 p. 423. Hong Kong.

- denticrus*, Fairm. Ann. Soc. Ent. France, 1886, (6) vi.
p. 320. Yunnan.
- **hirtus*, Wied. Zool. Mag. 1823, ii. 1, p. 24. S. India.
? *neglectus*, Gory, Mon. *Sisyphus*, 1833, p. 14, fig. 11.
? *prominens*, Walk. Ann. & Mag. Nat. Hist. 1859, (3) iv. p. 219.
**setosulus*, Walk. Ann. & Mag. Nat. Hist. 1858, (3) ii. p. 208.
- **indicus*, Hope, Zool. Misc. 1831, p. 22. N. India.
**caschmirensis*, Redt. Hügel's Kaschmir, 1848, iv. 2, p. 516.
- longipes*, Oliv. Ent. i. 3, p. 164, pl. xix. fig. 177. India.
minutus, Ent. Syst. 1792, i. p. 70.
**helwigi*, F., Ent. Syst., Supp. p. 35.
- morio*, sp. n. N. China.
- **subsicens*, Walk. Ann. & Mag. Nat. Hist. 1858, (3) ii.
p. 208. Ceylon.
- tarantula*, sp. n. Ceylon.
- thoracicus*, Sharp, Col. Hefte, 1875, xiii. p. 39.
Singapore.

I have marked with an asterisk those species of which I have been able to examine the types, some of them, by the kindness of Drs. Ganglbauer and Böving, sent to me for the purpose from the Vienna and Copenhagen Museums. Of the three Ceylon species of Walker the types of two are in the British Museum, *S. setosulus* being synonymous with *S. hirtus*, Wied., while *S. subsicens* is a smaller form, less closely setose, with the front angles of the thorax a little produced. The type of *S. prominens*, Walk., however, like the types of all the Coleoptera enumerated in the "Addenda" to Walker's paper of 1859, is undiscoverable, and its determination from the description being impossible, it must of necessity be treated as non-existent.

Sisyphus tarantula, sp. n.

Niger, capite prothoraceque leviter cupreis, lævis, subsericeus, supra ubique parce setosus, setis uncinatis, clypeo antice sat distanter bispinoso, capite punctato; pronoto vix punctato, angusto, convexo, medio lineato-sulcato; elytris subtiliter crenato-striatis; sterno distincte parce punctato; pedibus longissimis, femoribus quatuor posterioribus postice angulatim laminatis, posticis etiam

ibi tuberculo armato, tibiis quatuor posterioribus ante medium arcuatis, intermediis intus spino armatis, trochanteribus posticis longe spinosis.

Long. 11 mm.; lat. max. 6.5 mm.

Hab. Ceylon.

I have seen only two males, one in the British Museum and the other in Mr. George Lewis's collection and found by him in the dense jungle overhanging Balangoda (3500 feet alt.) in April 1882.

It is a large species, most resembling certain African *Sisyphi* with similar slender and grotesquely-shaped legs. It is like *S. quadricollis*, Gory, but the colour is different, the legs are still longer, and the middle and hind femora are dilated in the middle. The head and thorax are slightly coppery and the surface rather smooth, with separate hooked setæ.

Sisyphus morio, sp. n.

Niger, supra opacus, minutissime vix perspicue setosus, sat latus; capite granuloso, antice late bidentato; prothorace transverso, modice convexo, crebre punctato, angulis anticis prominentibus, posticis valde obtusis; elytris brevibus, granuloso-rugosis, leviter striatis; pygidio varioloso; corpore subtus nitido, punctato; femoribus quatuor posterioribus fortiter clavatis, trochanteribus posticis nodosis:

♂, femore postico subtus obtuse dentato, tibia postica valde arcuata, intus tuberculis 6-8 armata.

Long. 10-11 mm.; lat. max. 6.5-7 mm.

Hab. N. China: Ai-San, 30 miles W. of Che-foo (*M. P. Anderson*); Shan-hai-kwan (*F. M. Thomson*).

This is a rather large species, more massive than usual, and clothed only with microscopic, scarcely perceptible setæ. It is evidently related very closely to *S. denticrus*, Fairm., but is much larger, and the tooth to the hind femur of the male is not acute nor directed forward.

Drepanocerus runicus, sp. n.

Niger, subopacus, deplanatus, ovatus, prothoracis lateribus elytrorumque apicibus setis nonnullis instructis; capite rugoso, postice breviter 3-carinato, clypeo obtuse bidentato; prothorace sat lato, crebre punctato, acute 6-carinato, antice medio foveato; elytris punctato-striatis, singulo carina dorsali acuta arcuata, postico intus ducta, instructo:

♂, pronoto antice bicornuto, cornubus crassis parallelis fere conicalibus:

♀, prothoracis carinis duabus externis integris, simplice arcuatis, duabus internis brevibus posticis, duabus intermediis sinuatis antice bifidis.

Long. 3·5–4 mm. ; lat. max. 1·5–2 mm.

Hab. Upper Burma: Karen Hills, Asciiu Ghecu, 4200–4500 feet alt. (*L. Fea*, April 1888).

The type is in the British Museum, and there are other specimens of the same series in the Genoa Museum. It is a small, flattened, and rather smooth species, with the setæ restricted to the margins of the prothorax and the extremities of the elytra. The clypeus is not deeply emarginate. The pronotum is hollowed at the middle of the anterior half and bears three pairs of sharp and gracefully curved carinæ, the two inner ones on each side being bisinuous and intertwined. The elytra, besides the carinate outer margins, bear a pair of curved carinæ, which are wide apart anteriorly and almost meet at the apex.

Rhyparus nilgirensis, sp. n.

Rufo-piceus, haud nitidus, antennis flavibus, elongatus, parallelus; capite sat lato, undique punctato, medio bi-, postice quadricristato, clypeo antice recto, angulis acuminatis; prothorace longitudine fere ad latitudinem æquali, dense punctato, lateribus antice et medio fortiter dilatatis, carinis duabus medianis postice sat late divergentibus, intermediis ante medium interruptis, externis sinuatis; elytris modice longis, singulo valde et acute quadricostato, interstitiis utrinque grosse seriato-punctatis, costis duabus dorsalibus postice abbreviatis, prominentibus; pygidio medio carinato; metasterno medio fortiter sulcato, lateribus grosse punctatis.

Long. 4–5 mm.

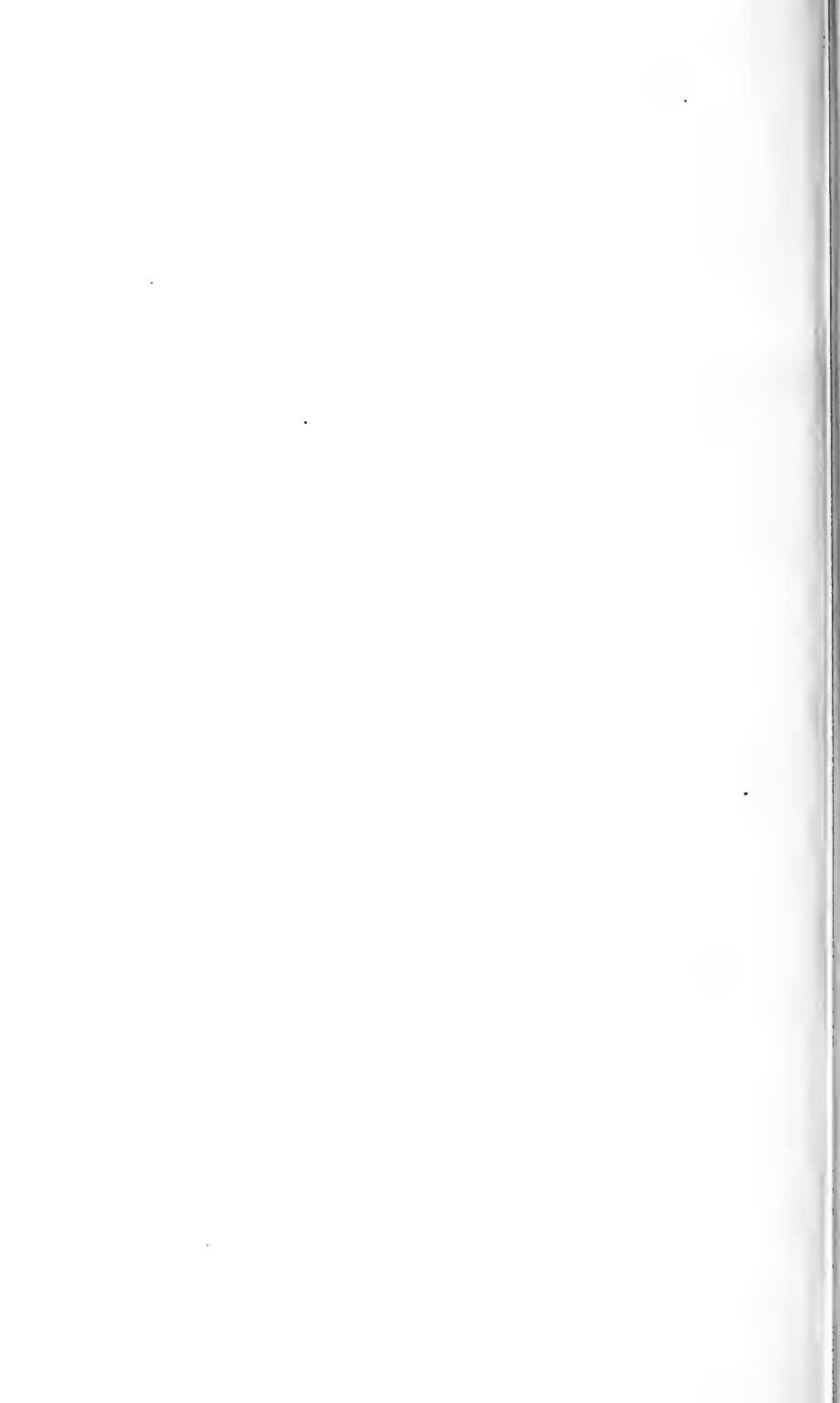
Hab. Nilgiri Hills, 3500 feet alt. (*H. L. Andrewes*).

Mr. Andrewes found several specimens in July 1908, which were attracted to light.

This is the only species of this curious genus of Aphodiidæ so far known from India, and the smallest known to me in the genus. It resembles *R. gracilis*, Arrow, but is less narrow in shape, the anterior angles of the thorax are sharper, and the second carina on each side extends a little beyond the middle. The specimens are of a pitchy-red colour and devoid of the earthy covering frequently present.



VOLUTA IRVINÆ



XI.—Notes on *Voluta norrisii*, *V. piperita*, *V. sophia*, and
Description of a new Species. By EDGAR A. SMITH.

[Plate V.]

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Voluta norrisii, Gray (nec auctorum).

Voluta norrisii (sic), Gray, Ann. Nat. Hist. vol. i. p. 414 (1838).

Voluta piperita, Sowerby, Proc. Zool. Soc. 1844, p. 150; Thes. Conch. vol. i. p. 199, pl. li. fig. 62 (1844); Reeve, Conch. Icon. vol. vi. pl. vii. figs. 16a, 16b (1849).

Scapha piperita, Gray, Proc. Zool. Soc. 1855, p. 56; List Moll. Brit. Mus. part i. Volutidæ, p. 10 (1855).

Voluta (*Scapha*) *piperita*, Angas, Proc. Zool. Soc. 1864, p. 51.

Voluta (*Vespertilio*) *piperita*, Tryon, Man. Conch. vol. iv. p. 87, pl. xxvi. fig. 60; Crosse, J. de Conch. 1871, vol. xix. p. 280.

Hab. Woodlark Island (*Angas*); New Georgia, Solomon Islands (*J. Brazier*, fide *Crosse*); Rubiana, Solomon Archipelago (*Petters*).

The original description by Gray of *Voluta norrisii* appears to have been overlooked by or inaccessible to nearly every writer upon the genus; even Gray himself apparently forgot that he had described a species under that name, for in 1855 he quoted it as of Sowerby. Sowerby did indeed describe a *Voluta norrisii* in 1844, which is the shell that has been always known under that name. It is, however, quite distinct from Gray's *norrisii*, which, moreover, is the same as *V. piperita* of Sowerby. The following is Gray's description:—" *Voluta norrisii* [sic!].—Greyish white, very minutely black dotted, with broad, black, wavy, irregular longitudinal streaks, with three bands with paler dots and streaks; nucleus blunt, upper part slightly crenated; last whorl subangular; mouth bright orange, with a white edge to the outer lip.

"*Inhab.* —? Cabinet, Mr. Norris.

"Very like *Voluta nervosa* [sic!], but the shell is minutely black dotted, the longitudinal streaks are broader, and the three dark bands are rather more towards the front of the shell; the hinder one occupies the whole of the spine [sic!, should be 'spire'] and hinder slope of the last whorl."

On comparing this description with the figures of *V. piperita* given by Sowerby and Reeve, it will at once be seen to agree perfectly with them—indeed, it must have been based upon the same shell from Mr. Norris's collection which was

described by Sowerby under the name of *V. piperita*, and at the time was unique.

Voluta macgillivrayi, Cox*, from Woodlark Island, is a light-coloured variety of the present species, and *V. ruckeri*, Crosse, is also regarded as a highly coloured form.

Voluta oblita, nom. nov.

Voluta norrisii, Sowerby (non Gray), Proc. Zool. Soc. 1844, p. 150; Thes. Conch. vol. i. p. 201, pl. li. fig. 65; Reeve, Conch. Icon. vol. vi. pl. vii. fig. 15.

Scapha norrisii, Sowb. (non Gray), Gray, Proc. Zool. Soc. 1855, p. 56; List Moll. Brit. Mus. part i. Volutidæ, p. 10 (1855).

Voluta (Vespertilio) norrisii, Tryon, Man. Conch. vol. iv. p. 86, pl. xxv. fig. 55.

Hab. Depuch Island (*Dring*); Nichol Bay (*Cox*); Montebello Islands (*T. H. Haynes*); Tien Tsin, Flying Foam Passage, and Camden Harbour (*Petterd*); King George's Sound (*Angas*). The last locality is doubtful.

This well-known species is the *Voluta norrisii* of all authors, but not the species described by Gray in 1838 under that name. It is closely related to *V. nivosa*, Lamarek, but is separable on account of the general tone of its coloration, usually shorter form, usually more strongly spinose coronation of the whorls, and much less distinct lineations on the transverse bands. These lines also, as a rule, are not so wavy. In the spaces between the lineated zones there is a mottling of brown or olivaceous markings, which does not occur in *V. nivosa*.

If we consider this shell a variety of *V. nivosa*, we must then, to be consistent, also unite with it *V. sophia*, Gray, which, with the exception of the rows of black spots and the white columellar folds, does not present any distinguishing features from the present species. Still the three forms, judging from the series of specimens which have been examined, are nearly always readily separable and have different geographical ranges. There is, however, a short coronated variety of *nivosa* which approaches very closely to some forms of *oblita*.

Voluta sophia, Gray.

Voluta sophia, Gray, Ann. & Mag. Nat. Hist. 1846, vol. xviii. p. 431; id. in Jukes's Voy. 'Fly,' vol. ii. p. 355, pl. i. figs. 1, 2 (1847); Reeve, Conch. Icon. vol. vi. pl. x. fig. 21 (1849); Sowerby, Thesaurus Conch. vol. iii. p. 270, pl. cclxi. fig. 132 (1864).

Voluta (Vespertilio) sophia, Tryon, Man. Conch. vol. iv. p. 87, pl. xxv. fig. 59 (1882); Crosse, J. de Conch. 1871, vol. xix. p. 279.

* Proc. Zool. Soc. 1873, p. 568, pl. xlvi. fig. 9.

Hab. Endeavour Straits and Port Essington, North Australia; Warrior Reef and Darnley Island (*Petterd*).

In the Proc. Zool. Soc. 1855, p. 63, and List of Volutidæ Brit. Mus. 1855, p. 20, Gray quotes this species as being figured in Stokes's Voy. in Australia, pl. iii. fig. 1. This certainly is a mistake, which evidently arose from the fact that the surname of the lady after whom the shell was named was Stokes, and this unfortunately was accidentally quoted instead of Jukes. Curiously enough there is a work by J. L. Stokes, 'Discoveries in Australia &c.,' published in 1846, the year in which this species was described.

Voluta irvinæ, sp. n. (Plate V.)

Voluta norrisii, var. *irvinæ*, Cox, MSS. in litt.

Shell oblong, subpiriform, rather ventricose, light salmon-red, with numerous white flecks forming three zones upon the body-whorl—one at the shoulder or upper end, one central, and the third anterior. There are two intermediate zones without white flecks, but marked with numerous longitudinal, irregular, wavy, dark brown lines. The upper zone is the broader, and falls rather above the middle of the whorl. Whorls 6, the first three forming a large nipple-like apex, noded above; the penultimate oblique and excavated above, then angled and coronated with about fourteen small short hollow spines; the body-whorl is also excavated above and has a similar coronation of about twenty spines; it is rounded at the shoulder below the spines; the concavity of these two whorls exhibits numerous radiating dark brown streaks of varying lengths; the anterior end and the fasciole of the body-whorl are marked with fine wavy red lines; aperture large, whitish within, becoming somewhat orange at the lip; the band of dark lines forms an obscure zone within at the middle; labrum not thickened, rather deeply sinuated at the suture; columellar folds four in number, white, prominent; extreme end of columella orange-red.

Length 110, diam. 60 mm.; aperture with the labrum 90 long, diam. 30 mm.

Hab. "From one of the many reefs off Rat Nest Island, off Fremantle in Western Australia" (*Dr. J. C. Cox in litt.*).

This remarkable shell was sent to Mr. J. H. Ponsoby by Dr. Cox, with the request that it might be described and placed in the British Museum. Mr. Ponsoby kindly handed on the specimen to me for examination and description.

Its nearest ally is *V. nivosa*, from which it differs in several characters. It is larger, the spire shorter, and the upper

part of the last two whorls is deeply channelled. The tubercles forming the coronation are hollow spines, and far more numerous, almost double the number of the nodosities in *nivosa*. The ground-colour is salmon-red and the white markings take the form of flecks or splashes rather than of spots and dots. The aperture is large and whiter within, and the columellar folds are white.

V. nivosa, *V. irvineæ*, *V. oblita* (= *norrisii*, auct., nec Gray), and *V. sophia* form a group of species which possess some features in common, namely, the radiating brown lines upon the spire, the coronated whorls, brown or reddish lineation on the anterior fasciole, and two transverse colour-bands, more or less lineated except in *V. sophia*, and they all exhibit white spotting or mottling upon the rest of the surface of the body-whorl. This is not seen in any of the published figures of *V. sophia*, but it does occur in some examples.

It becomes a question of regarding these four forms as distinct or as local races of one species with a wide geographical range upon the north and west coasts of Australia. *V. nivosa* and *V. irvineæ* are the two most southern forms, occurring off Swan River and as far north as Shark's Bay; *V. oblita* ranges further north, about the Dampier Archipelago, and *V. sophia* is restricted to the extreme north of the continent.

Mr. W. F. Petterd, who does not accord specific rank to *norrisii* (auct.) and *sophia*, Gray, has given the distribution of these forms and of *V. nivosa* (Journ. of Conch. vol. ii. p. 341).

XII.—*New African small Mammals in the British Museum Collection.* By OLDFIELD THOMAS.

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AMONG the following new animals special attention may be directed to the interesting new genus of Muridæ discovered by Dr. Hinde in the coast region of British East Africa, to the new *Taphozous* also sent by him from the same district, and to the new *Heterocephalus* from Somaliland, in connexion with whose descriptions I have ventured on some speculations about the dental formula in the group.

Taphozous hildegardeæ, sp. n.

An African representative of the Asiatic black-bearded *T. melanopogon*.

Radio-metacarpal pouch distinct. Lower lip scarcely grooved. No gular sac in male or female; a well-marked blackish beard in the male, covering the whole under surface of the throat. Upper surface pale brown, the bases of the hairs white, their tips chocolate-brown. Lips and chin anterior to the beard pale brown. Belly white, a few hairs tipped with brown. Limbs pale brown. Upperside of antibrachial, interfemoral, and wing-membranes near the body also brown, the more distal part of wing-membrane whiter; underside of all membranes white, as is the fur on the membrane on each side of the body. Ears, feet, and tail about as in *T. melanopogon*.

Skull as in *T. melanopogon*, but rather larger, and the brain-case broader.

Dimensions of the type (measured on the spirit-specimen):—

Forearm 70 mm. (another ♂ 67·5, a ♀ 65·5).

Head and body 83; tail 22; ear 20; third finger, metacarpal 61, first phalanx 21·5, second phalanx 24; lower leg and foot (c. u.) 37·5.

Skull: greatest length 21·7; front of canine to back of m^3 9·2.

Hab. Mombasa district. Type from Rabai, 700'; others from Shimoni, sea-level.

Type. Adult male. B.M. no. 9. 6. 12. 7. Original number 613. Collected and presented by Dr. and Mrs. Hinde. Four specimens.

This is a most interesting species, as it represents in Africa the Asiatic black-bearded *T. melanopogon*, not known west of India proper. From this it is distinguished by its larger size, the greater extension over the throat of the black beard (more as in *T. theobaldi*), and its broader skull. No known African species are at all like it.

I have named the species in honour of Mrs. Hinde, who has so ably assisted in her husband's East-African collecting-work, and who has taken a special interest in bats.

Crocidura nanilla, sp. n.

Closely allied to *C. nana*, Dobs., of Somaliland, but even smaller. Colour and proportions about as in that animal.

Body slaty above, rather paler below; chin, hands, and feet white. Tail brown above, white below, smooth, finely ringed, well provided with longer bristles. No lateral gland perceptible in a female.

Skull smaller and with a shorter brain-case than in *C. nana*.

Teeth more delicate, the concavities on the posterior side of p^1 , m^1 , and m^2 deeper.

Dimensions of the type (measured on the spirit-specimen):—

Head and body 41 mm.; tail 31; hind foot 8.2; ear 6.3.

Skull: condylo-incisive length (to front face of incisors) 15; greatest breadth 6.8; height of brain-case 3.4; front of incisor to hinder corner of m^2 6.2.

Hab. Uganda (probably Entebbe).

Type. Female in spirit. B.M. no. 9. 7. 14. 1. Original number 856. Collected by Herr Simon.

This species shares with *C. nana* its exceedingly low flattened brain-case, that of the equally small *C. bottegi*, Thos., being very markedly higher.

The type specimen of *C. nanilla* has on one side an extra tooth behind the usual unicuspid of *Crocidura*, and so may be said to be a *Pachyura* on one side and a *Crocidura* on the other. But the extra tooth is abnormal in shape, not like that of *Pachyura*, and I have therefore disregarded it in allocating the species to its genus.

Heliosciurus undulatus dolosus, subsp. n.

Colour throughout, as compared with typical *undulatus*, duller and more smoky, the rusty or tawny replaced by smoky grey-brown. Upper surface dark coarsely grizzled grey, the hairs broadly blackish at base, then dull cream-buff, the narrow subterminal rings white. Under surface dull brownish, with a slight buffy suffusion. Front of arms to wrists and outer side of legs dark grizzled grey like body, inner sides dull brownish rusty; hands and feet dull grizzled ochraceous. Tail ringed greyish, without (at least at its base) any mixture of rusty, the hairs with 4 or 5 black rings and as many dull whitish ones.

Size apparently as in true *undulatus*, but no measurements available.

Hab. Mafia Island, off coast of German E. Africa.

Type. Adult male. B.M. no. 8. 6. 19. 3. Collected and presented by Stewart Walrond, Esq.

This Mafia squirrel is readily distinguishable from true *H. undulatus* by its generally darker tone and the replacement of the rufous colour by dull brownish. It has, in fact, a great resemblance, especially when viewed from below, to some of the members of the *H. rufobrachiatus* group. It may, however, be distinguished from these by the prominent white ticking of the upper surface, the differently coloured

feet, and by its geographical isolation, the nearest forms of *H. rufobrachiatus* being *H. r. nyansæ* of Kavirondo, Mount Elgon, &c., and *H. r. semlikii* of the Semliki and Entebbe.

Heliosciurus undulatus daucinus, subsp. n.

More rufous throughout than true *undulatus*. Whole of head of the same vivid rusty colour as the belly, though broken by a few black-tipped subterminally white-ringed hairs. Back strongly suffused with red, the hairs blackish brown for their basal 4 mm. only, then broadly orange-rufous nearly or quite to the subterminal buffy-whitish band, the extreme tips black. Arms and hands completely rusty from elbow and hind limbs from middle of tibiæ, the inner side of the latter of rather a deeper red than elsewhere. Tail-hairs, instead of being ringed throughout, with their basal three-fourths uniform brilliant orange-rufous, succeeded by a black subterminal and a cream-buff terminal band.

Skull as in true *undulatus*.

Dimensions of the type:—

Hind foot 54 mm.

Skull: greatest length 54; condylo-basal length 50; length of upper tooth-row 10.6.

Hab. Mombasa, Brit. E. Africa.

Type. Adult male. B.M. no. 80. 11. 30. 3. Collected by Sir John Kirk.

This squirrel is readily recognized by its red head and the nearly wholly red hairs of its tail.

The Heliosciurus gambianus Group.

An earlier name than *gambianus* is commonly used in connexion with this group of squirrels, namely Desmarest's *Sciurus annulatus*. But I am not prepared to accept it as determinable. The description* is not in the least diagnostic, no locality is recorded, and the type is no longer in the Paris Museum. *S. annulatus* may therefore have been any ring-tailed squirrel from any part of the world, and its arbitrary assignation to the present animal is only productive of confusion. It should therefore be set aside as indeterminate.

Of this group the following species at least appear to be recognizable:—

* Desm. Mamm. ii. p. 338 (1822).

H. gambianus, Og.—General colour sandy fawn, without suffusion of rufous; underparts white. *Hab.* W. Africa, Gambia to Nigeria.

H. isabellinus, Gray.—General colour darker grizzled grey-brown, a certain buffy suffusion both in the upper and ventral colours. *Hab.* Angola.

Dr. Ansonge obtained at Canhoca, N. Angola, a specimen agreeing closely with Gray's type of *isabellinus*, of which no exact locality had previously been recorded.

H. rhodesiæ, Wrought.*—Clear grizzled grey throughout, with scarcely any yellowish or buffy suffusion; under surface white; tips of tail-hairs prominently white. *Hab.* Northern Rhodesia and neighbouring parts of S.E. Congo State.

H. multicolor, Rüpp.—General colour richer and darker than in the western forms. Under surface more or less suffused with rufous, which sometimes covers the whole of the belly, inner side of limbs, and base of tail, and is sometimes restricted to the anal region. *Hab.* Abyssinia.

Allied to this, and, as I consider, subspecies of it, are Neumann's *H. kaffensis* and *abassensis*.

H. bongensis, Heugl.—Distinguishable from all other members of the group by its small size, its skull being conspicuously smaller than in *multicolor* and its nasals shorter. General colour pale grizzled sandy above, greyer on the sides, white below, the anal region tawny or ochraceous. *Hab.* Bahr-el-Gazal, ranging westwards to the Shari R.

The following four new forms may be described as subspecies of *H. multicolor* :—

Heliosciurus multicolor lateris, subsp. n.

General characters of true *multicolor*, but paler throughout.

Colour almost as in *H. bongensis*, the general tone clear greyish, with but little buffy suffusion. Belly and inner sides of limbs white, no buffy present, not even along the

* *Funisciurus annulatus rhodesiæ*, Wroughton, Mem. Manchester Soc. li. no. 5, p. 15 (1907).

outer edge of the forearms. Hands and feet greyish, becoming white terminally, without buffy. Tail ringed black and greyish white, its basal three inches below buffy along the middle line, but the remainder without buffy suffusion.

Skull and feet rather smaller than in true *multicolor*, markedly larger than in *bongensis*.

Dimensions of the type (measured in skin):—

Head and body 240 mm.; tail 240; hind foot (c.) 44.

Skull: greatest length 46.5; basilar length 35.5; zygomatic breadth 27; nasals 15.3; length of upper cheek-tooth series 8.6.

Hab. Lado.

Type. Adult female. B.M. no. 87. 12. 1. 35. Collected 16th February, 1884, and presented by Dr. Emin Pasha.

This is evidently a desert-squirrel, distinguished from true *H. multicolor* by its paler colour and from *H. bongensis* by its larger size.

Heliosciurus multicolor elegans, subsp. n.

External appearance quite as in pale, not strongly buffy, examples of true Abyssinian *multicolor*, although the intermediate forms *kaffensis*, *abassensis*, and *omensis* are so different. Upper surface grizzled grey, lightly suffused with buffy; under surface dull whitish; ears, edges of forearms, upper surface of hands and feet, and anal region buffy. Tail-hairs with the light rings strongly buffy proximally, buffy white terminally.

Skull markedly larger than in any other member of the group, the brain-case long and narrow; forehead flat; post-orbital processes widely expanded; teeth rather small in proportion.

Dimensions of type:—

Hind foot 48 mm.

Skull: greatest length 50.5; basilar length 39; zygomatic breadth 29.5; nasals 15.5; upper cheek-tooth series 9.2.

Hab. Mt. Elgon, British E. Africa.

Type. Adult female. B.M. no. 93. 2. 3. 12. Original number 5. Collected February 1890, and presented by F. J. Jackson, Esq.

Considering how different in appearance the forms are which occur between this and the true *multicolor*, it is curious how like it is to that animal; but its elongate skull, with long brain-case and squarely expanded postorbital processes, will readily distinguish it. Prof. Neumann obtained what is no doubt the same squirrel in Ussoga and Kibwezi.

Heliosciurus multicolor omensis, subsp. n.

General intensity of colour about as in true *multicolor*, but the buffy suffusion reduced on the upper surface and quite absent from the lower surface and limbs. Belly greyish white, a prominent pure white patch on the chest. Posterior flanks, hips, and hind legs markedly greyer than the back. Hands and feet grizzled grey, not buffy, darker than in *H. m. lateris*, and not lightening terminally as in that form. Tail-hairs throughout ringed with black and buffy, the tips prominently pure white.

Skull much as in true *multicolor*, that of the type unusually broad.

Dimensions of the type (measured in skin):—

Head and body 225 mm.; hind foot 44.

Skull: greatest length 48; basilar length 36.5; zygomatic breadth 29.7; length of upper cheek-tooth series 10.

Hab. Region of the Lower Omo. Type from Kum Dingani, just east of the north end of Lake Rudolph.

Type. Old female. B.M. no. 6. 11. 1. 24. Original number 118. Collected 24th July, 1905, by Ph. Zaphiro, and presented by W. N. McMillan, Esq.

The suppression of the buffy colouring from the body and limbs, with its retention on the tail-hairs, distinguish this form from its nearest allies; in the Lado *lateris* it is suppressed throughout.

H. m. kaffensis, Neum., geographically adjacent, is a strongly coloured form, with buffy-ochraceous feet. *H. m. abassensis*, Neum., is darker both above and below, has a darker muzzle, the hips little greyer than the back, the hands and feet dull buffy, and the light tips to the tail-hairs are less conspicuous.

I owe to the kindness of Profs. Matschie and Neumann the opportunity of examining typical examples of the two squirrels described by the latter.

Heliosciurus multicolor cœnosus, subsp. n.

General colour darker grey than in *multicolor* and without the buffy suffusion. Under surface dull soiled whitish brown, the belly not conspicuously lighter than the sides, and even the chest but little lighter. Hands and feet greyish buffy, the outer side of the forearms conspicuously buffy. Tail dark grizzled grey, without buffy suffusion, the tips of the hairs of the same dull whitish as their light rings.

Skull as in *multicolor*.

Dimensions of the type (measured in the flesh) :—

Head and body 283 mm. ; tail 283 ; hind foot 47.

Skull : greatest length 50 ; zygomatic breadth 30 ; length of upper cheek-tooth series 9.

Hab. R. Ubanghi. Type from the Roman Catholic Mission situated at 19° 30' E. on the Ubanghi ; another specimen from Koango, a little higher up the river.

Type. Old female. B.M. no. 7. 7. 8. 83. Original number 34. Collected 7th November, 1905, by Capt. Boyd Alexander, and presented by the Alexander-Gosling Expedition.

In this form buffy is present on the feet and not on the tail, the converse of the case in subsp. *omensis*. The general colour is much darker than in *lateris*, and the muddy-coloured belly is also distinctive.

Paraxerus jacksoni capitis, subsp. n.

Similar to true *jacksoni*, but colour paler and more greyish green on the body, and on the extremities ochraceous replaced by buffy, and buff by whitish. General colour above pale greyish olivaceous, indistinct light flank-lines generally perceptible. Under surface soiled whitish or creamy white, the corresponding part in true *jacksoni* cream-buff or buff. Upper surface of hands and feet yellowish buff instead of ochraceous buff. Tail with the terminal rings, when unbleached, similarly yellowish, as compared with ochraceous, buff.

Skull as in true *jacksoni*.

Dimensions of the type (measured in flesh) :—

Head and body 180 mm. ; tail (broken, in another specimen of similar size 187) ; hind foot 41 ; ear 21.

Skull : greatest length 43 ; condylo-basal length 40 ; upper tooth-row exclusive of p^3 7.

Hab. Nairobi Forest, British East Africa. Alt. 5600'.

Type. Old female. B.M. no. 0. 2. 1. 11. Collected 19th July, 1899, by Prof. H. J. Mackinder. Fourteen specimens examined.

The considerable number of squirrels hitherto referred to *P. jacksoni* proves to be readily divisible into two sets according to the intensity of the buffy or ochraceous suffused through their general colour, and on their under surfaces, feet, and tail. Specimens from Munisu and Smara, to the north and eastward of Kenia, agree precisely with the type in these respects, while the Nairobi series are all of the paler and more yellowish character above described.

It is to be noticed that in this animal, as in *P. aruscensis*,
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considerable bleaching takes place, especially on the tail, so that old hairs of *jacksoni* may have the colour of those of fresh *capitis*, while in the latter again the yellowish rings may bleach nearly to white.

Paraxerus ochraceus, Huet.

This species is characterized by having an indistinct whitish line on the flanks and by its under surface (especially its throat) being whitish, as compared with the entire absence of a flank-line and the buffy or ochraceous under surface of *P. aruscensis* and its allies.

The type came from Bagamoyo, and to the typical race I assign a specimen from Mrogoro, Usagara, about 100 kilometres inland, which was obtained and presented by Emin Pasha. This specimen has the yellowish-ochre tinge on the back and the "jaune d'ocre pur" on the upper surface of the feet described in the type, and Mrogoro is so near Bagamoyo and on the trade-route to the interior (so that the type may even have been brought from Mrogoro) that I have no hesitation in making this reference, even though the next form comes from a locality that, like Bagamoyo, is on the coast. The latter does not, however, agree nearly so well with Huet's description.

Paraxerus ochraceus salutans, subsp. n.

Like true *ochraceus* in general characters, but the colour above more olivaceous, the yellowish reduced throughout. Hands and feet dull grey, mixed buffy or ochraceous buffy, not the clear rich ochraceous found in the typical form. Throat and chest pale buffy whitish. Tail-hairs tipped with buffy.

Skull and teeth rather larger than in true *ochraceus*.

Dimensions of type (measured in skin):—

Head and body 172 mm.; tail 158; hind foot (wet) 38; ear (wet) 15.

Skull: greatest length 40·5; condylo-basal length 36·3; upper tooth-series exclusive of p^3 6·2.

Hab. Dar-es-Salaam, coast of German East Africa.

Type. Adult male. B.M. no. 79. 11. 12. 10. Collected by Sir John Kirk. Two specimens.

Paraxerus ochraceus electus, subsp. n.

General colour of the same rather greyish olivaceous as in *P. o. salutans*, but the grizzling far finer, owing to the light

rings on the dorsal hairs being about 1·2 mm. in breadth as compared with about 1·8 mm. in that animal and in the typical *ochraceus*. Light lateral stripes barely perceptible. Throat whitish. Feet of same greyish buff as in *salutans*. Tail-hairs tipped with whitish or creamy instead of ochraceous buff.

Skull and teeth as in *P. o. salutans*.

Dimensions of the type :—

Hind foot 38 mm.

Skull: greatest length 38·3; condylo-basal length 35·6; upper tooth-row, exclusive of p^3 , 6·5.

Hab. Elgeyo, Brit. E. Africa.

Type. Adult male. B.M. no. 99. 8. 4. 58. Collected 1st August, 1896, and presented by F. J. Jackson, Esq., C.B.

This inland form has but little trace of the light lateral band characteristic of *P. ochraceus*, but its whitish throat shows its relationship to be with that species rather than with *P. aruscensis*.

It may be noticed that in the closely allied unstriped species *P. aruscensis*, Pag., there is a distinct seasonal change of colour, specimens killed February to April being a much greyer colour than those killed in the latter half of the year. A specimen from Mt. Elgon killed in February agrees in every detail with some from near Mombasa killed at the same date, while others from the latter region killed in July are as dark in colour as August specimens from Kilimanjaro. The change is probably due rather to the bleaching of the ochraceous ends of the hairs towards whitish than to any real difference in the colour of the hairs when first erupted.

The variation in the size of the teeth, especially of p^4 , in these squirrels is very noticeable. It seems to be partly individual, and partly due to age, the oblique wearing of the teeth causing them to appear of much greater diameter in old specimens.

BEAMYS, gen. nov.

External characters murine. Claws small. Feet short. of medium length, practically naked, very finely ringed.

Skull in general outline somewhat like that of *Saccostomus*, but very different in details. Supraorbital edges square, not ridged. Anterior zygomatic plate scarcely developed, its front edge slanting. Palatal foramina short and narrow, their posterior end barely behind the level of the front edge of the zygomatic plates; in *Saccostomus* the latter comes opposite the middle of the foramina. Posterior edge of palate

close behind back of m^3 , the mesopterygoid fossa broad. Bullæ rather small.

Incisors of medium development, their front surface flat, ungrooved. Molars, so far as the enumeration of cusps is concerned, as in *Saccostomus* and other Dendromyinae, with the important exception that the postero-internal cusp of m^1 (the x cusp) found in certain genera of Murinae—e. g. *Thamnomys*—is here also present, the cusp-formula of the three laminae of m^1 being therefore the unique one of 2.3.3, *Mus* having 3.3.2, *Thamnomys* 3.3.3, ordinary Dendromyinae 2.3.2.

Individually the teeth are highly cuspidate, the cusps well separated and distinct. On both m^1 and m^2 the postero-internal and postero-external cusps are united to each other by an enamel ridge passing round behind the main middle posterior cusp. M^3 consists of two simple distinct transverse laminae.

Below, the teeth have well-developed supplementary external ridges, and both m_1 and m_2 have distinct median posterior supplementary cusps.

This genus is readily distinguished by the above characters from any previously described. Its possession of only two cusps on the anterior lamina of m^1 separates it from the great mass of African Muridæ, which have three, while from those which have two it is equally distinguished by having three cusps on the third lamina. Its general characters are also quite distinctive, and it is not easy to say to which of the older known genera it is most nearly allied. Perhaps *Saccostomus* is the nearest, but the differences are so great that the alliance is very remote.

Externally the animal may be at once recognized by its curious naked white-tipped tail of medium length, neither shortened as in *Saccostomus*, *Steatomys*, and *Malacothrix*, nor lengthened as in other members of the group. The feet are particularly short, and therein contrast with those of *Deomys* and other aberrant African genera.

Beamys hindei, sp. n.

Size that of a medium *Mus*. Fur soft and fine; hairs of back about 10 mm. in length. General colour, so far as can be made out on a spirit-specimen, very much that of *Saccostomus campestris*, uniform greyish or greyish brown above, pure white below. Ears not large, laid forward, in a spirit-specimen, they only just reach the posterior canthus of the eye, rounded, almost naked, greyish.

Forearms, hands, and feet white. Claws, both fore and hind, small; pollex with a nail; soles naked, with six prominent pads; fifth hind toe, without claw, reaching to the end of the first phalanx of the fourth. Tail about as long as the head and body, very peculiar in shape and structure; its top, sides, and under surface flattened, with sharp edges, its lower side broader than its upper, so that its section is like that of a truncated pyramid. Basal half-inch hairy like the body, the remainder practically naked, the few fine hairs not hiding the skin; dermal rings excessively fine, 22-24 to the centimetre in the middle of the tail, not divided into separate scales, but apparently simple transverse folds in the skin. In colour the tail is grey basally and white terminally, the two passing into each other by a series of coarse mottlings, the grey predominating on two-thirds of the upper and one-third of the lower surface. Mammæ 2-2=8.

Dimensions of the type (measured on the spirit-specimen):—

Head and body 106 mm.; tail 100; hind foot 20·7; ear 16.

Skull: greatest length 33; basilar length 26·5; zygomatic breadth 15·5; nasals 11·2; interorbital breadth 4·9; palatilar length 15·2; diastema 10·5; palatal foramina 4·7; upper molar series 5·1.

Hab. Taveta, Coast region, British East Africa. Alt. 2000'.

Type. Subadult female. B.M. no. 9.6.12.23. Original number 615. Collected 26 June, 1908, and presented by Dr. S. L. Hinde.

This interesting animal forms a striking addition to the many mammalian discoveries made by Dr. and Mrs. Hinde in British East Africa. Their continued help has been of vital service to the National Museum, and the finding of such a distinct new genus is a fitting reward for the benefits they have rendered to us.

Heterocephalus dunnii, sp. n.

Size about as in *H. glaber*. External characters about as usual, the tail rather short in proportion.

Skull with the muzzle very large in proportion to the size of the brain-case, to support the large incisors. Nasals broad, little narrowed behind. Zygomata thick and very boldly expanded, as much anteriorly as posteriorly, so that each zygoma forms a segment of a circle, instead of their being far more expanded behind than in front. Lower jaw with short low coronoid, as in *phillipsi*.

Incisors enormously thick and large, far heavier than in any other member of the group. Cheek-teeth three in number above and below, as in *glaber*, but very small, as in *phillipsi*; the posterior one much the smallest.

Dimensions of the type (very old), measured in the flesh :—

Head and body 115 mm.; tail 35; hind foot 18.

Skull: condylo-basal length 23; condyle to incisor-tip 26; greatest breadth 18.5; nasals 7.5 × 5; intertemporal breadth 5.5; greatest mastoid breadth 12.5; combined breadth of upper incisors 3.0; diastema 7.7; palatilar length 11.3; length of upper tooth-series 2.9.

Hab. Wardairi, Central Somaliland.

Type. Aged female. B.M. no. 4. 5. 9. 23. Original number 141. Collected 31 January, 1904, and presented by Maj. H. N. Dunn, R.A.M.C.

This species is based on the specimen referred in 1904*, with great doubt, to *Fornarina phillipsi*, of which it was thought it might be a very old individual, with the incisors enormously developed, and three cheek-teeth present—either as an abnormality or the last tooth erupted in old age. But additional specimens of *H. glaber*, immature and old, since received from Dr. Drake-Brockman, show that no such development of the incisors occurs in old age in that animal, and I am now convinced that the present form is quite distinct.

H. dunni is of special interest, as with the dental formula of *Heterocephalus glaber* it has the low coronoid process and small-sized cheek-teeth of *Fornarina phillipsi*, and is therefore intermediate between the two. Younger specimens will, however, be needed before a decided opinion can be expressed as to its general position and the bearing its characters have on the distinction of *Fornarina* from *Heterocephalus*.

I may take this opportunity to express an opinion about the homologies of the teeth of *Heterocephalus* and the allied genera forming the family Bathyergidæ, a matter of great interest, but of extreme difficulty, owing to the way in which the teeth succeed each other, and their resemblance *inter se*, so that homologization by form is not possible.

The key to the situation is clearly the genus *Heliophobius*, in which the full dentition consists of no less than six teeth, *i. e.* P. 2. 3. 4, M. 1. 2. 3. All six are, however, almost

* Ann. & Mag. Nat. Hist. (7) xiv. p. 104 (1904).

never found in place in a skull, owing to the falling out of the anterior ones before the posterior ones come up, so that not a single skull in the considerable Museum collection has six teeth, the best specimen (No. 90. 6. 8. 30) having five and an empty alveolus behind in which the sixth was to be developed. But it is not clear that this sixth tooth (m^3) is always developed, and I therefore argue that it is the first tooth of the set to be suppressed, all the more that its situation on the root of the great incisors reduces its freedom of development and use. Next to this it might be argued, for the same reason, that m^2 had disappeared; but I prefer to consider, although without real proof, that p^2 is the next to be suppressed, as in quite young specimens, with unworn teeth, it is smaller than the one next it, while in equally young *Georychus* the two anterior teeth are practically equal in size. From this, therefore, cutting off a tooth at each end of the series, it would follow that in the 4-toothed members of the family, *Georychus* and *Bathyergus*, the formula is P. 3. 4, M. 1. 2.

Then in *Georychus*, of its four teeth, it is always the last which is the smallest, and this is situated quite on the large incisor-root, so that there seems no doubt that it is this tooth, m^2 , which is the next to disappear, leaving the three-tooth formula of *Heterocephalus* as P. 3. 4, M. 1.

And then again, for the same reasons and even more indubitably, it is the last of these, m 1, which disappears to leave the extremely specialized reduced formula of *Fornarina phillipsi**: P. 3. 4, M. 0.

It is therefore interesting to notice that while *Fornarina* shares with *Hydromys* the extreme reduction to two cheek-teeth, these are not homologous, those of *Fornarina* being P. 3. 4, and of *Hydromys* M. 1. 2.

Put into tabular form the tooth-formulæ of the group would be as follows:—

<i>Heliophobius</i> :	I. $\frac{1}{1}$, P. $\frac{2.3.4}{2.3.4}$, M. $\frac{1.2.3}{1.2.3}$	$\times 2 = 28$.
<i>Bathyergus</i> :	I. $\frac{1}{1}$, P. $\frac{3.4}{3.4}$, M. $\frac{1.2}{1.2}$	$\times 2 = 20$.
<i>Georychus</i> :		
<i>Heterocephalus</i> :	I. $\frac{1}{1}$, P. $\frac{3.4}{3.4}$, M. $\frac{1}{1}$	$\times 2 = 16$.
<i>Fornarina</i> :	I. $\frac{1}{1}$, P. $\frac{3.4}{3.4}$	$\times 2 = 12$.

* One more recently received specimen of *phillipsi* has a small third tooth above, i. e. m^1 , a fact which, in conjunction with the annexant characters of *H. dummi*, makes the validity of the genus *Fornarina* very doubtful.

These suggestions about the homologies are of necessity only provisional, and are quite likely to be modified when a microscopical study of embryonic specimens of the group indicates with certainty which teeth have rudimentary milk-predecessors, no functional milk-teeth having as yet been observed.

XIII.—*A new Gibbon from Annam.*

By OLDFIELD THOMAS.

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AMONG the collections which have been obtained in recent years in Annam by Dr. and Mrs. Vassal there occurs a Gibbon which appears to be quite distinct from any previously described. I propose to name it in honour of Mrs. Vassal, to whose help much of her husband's success in obtaining interesting animals has been due.

Hylobates gabriellæ, sp. n.

A black species without light frontal band, but with a conspicuous buffy gular patch.

General colour as in *H. leucogenys*, Ogilb.*, the ground-colour similarly deep black, but instead of the light throat and whisker-mark being white and extending up on each side to the level of the eyes, it is deep yellowish buffy and barely rises on each side above the angle of the mouth. Its hairs are soft and woolly, instead of being so stiff as to form a definite outstanding fringe; it is broader below, and, passing under the throat, entirely isolates the black chin from the black of the cheeks and chest.

Skull larger than that of *H. agilis*, *H. lar*, and other Gibbons in the Museum Collection, which, however, does not contain the skull of *H. leucogenys*. In fact the skull of *H. gabriellæ* is almost as large as that of a Siamang. In shape it is most like that of *H. leuciscus*, but the temporal constriction is deeper and the orbits more outstanding.

Skull-dimensions (those of the skin being of no value):—

Greatest length 116 mm.; basal length 83; zygomatic breadth 76; breadth across outside orbits 66·5; breadth of

* Figured by Sclater, P. Z. S. 1877, p. 680, pl. lxx.

brain-case 65; greatest mastoid breadth 73; palate length 45; length of upper premolar-molar series 27·2.

Hab. Lang-Bian, near Nha-trang, Annam. Alt. 1500'.

Type. Adult male. B.M. no. 8. 11. 1. 1. Collected 10th June, 1908, by Dr. Vassal.

This striking Gibbon seems to be only related to the *H. leucogenys* of Siam, and from that may be distinguished by the yellow throat and check-patch and other characters above mentioned.

XIV.—Notes on the Forficularia.—XVII. *On new Species, a new Genus, and new Synonymy.* By MALCOLM BURR, D.Sc., F.E.S.

THE material for the following notes is taken from various sources. Two new species, one requiring a new genus, were taken in Central Africa by the expedition of Adolph Friedrich, Archduke zu Mecklenburg; these form part of the material obtained on this expedition, communicated to me for determination by Dr. H. Schubotz. The full account of the collection will be eventually published in the 'Ergebnisse' of the Expedition.

Psalis cincticollis, Gerst.

Brachylabis cincticollis, Gerst. (1883) p. 44.

Anisolabis cincticollis, Borm. (1900¹) p. 43; Kirby, (1904) p. 19.

Psalis cincticollis, Burr, (1902²) pp. 255 & 257.

Psalis? *picina*, Kirby, (1891) p. 516.

Psalis picina, Borm. (1900¹) p. 38; Kirby, (1904) p. 14 (nec Borelli).

? *Forficula rufescens*, Pal.-Beauv. (1805) p. 35, Orth. pl. i. fig. 2.

? *Forficesila rufescens*, Serv. (1839) p. 24.

Pronotum postico vix ampliatum, fere parallelum; antennae fortiores; segmentis haud clavatis, subcylindricis, 3 sub-brevi, 4 et 5 quam 3 brevioribus, colore fusco-castaneo; elytra et alae longa, fusco-fulva; pedes fulvi; forceps ♂ asymmetricus.

	Adult.		Nymph.	
	♂.	♀.	♂.	♀.
Long. corporis..	12-13·5 mm.	10-11 mm.	15 mm.	18·5-19 mm.
„ forcipis ..	2 „	2 „	2 „	2·75-3 „

Of medium size.

General colour deep blackish chestnut.

Antennæ with 20 segments, dark brown; segments 1 and 2 orange, and one or two apical segments white; basal

segment rather long; third cylindrical, about half as long as the first; fourth about $\frac{3}{4}$ as long as third, that is, half as long again as broad; fifth a little longer than fourth; sixth and seventh about as long as third, the rest gradually lengthening, the segments near the apex being a little longer than third; all the segments are cylindrical or subcylindrical.

Head rather tumid, smooth, deep orange or reddish; sutures not very distinct; eyes prominent.

Pronotum rather narrow, a little longer than broad, widened posteriorly, a little shade narrower than the head and distinctly longer than broad; deep chestnut in the centre, shading to fulvous behind and at the sides; median sulcus distinct, prozona feebly tumid.

Elytra ample, smooth, about twice as long as the pronotum, varying from dull dirty yellow to black, with a more or less distinct orange spot at the shoulder.

Wings prominent, yellow, almost the whole of the disk occupied by a large dark chestnut or black spot.

Feet orange; femora rather short; tarsi rather long.

Abdomen deep chestnut to nearly black; somewhat dilated, very slightly narrowed at the apex in the ♂, decidedly so in the ♀; glandular folds obsolete; sides of segments 5-9 in ♂ acute, finely punctulate.

Last dorsal segment ♂ ample, transverse, rectangular, with a strong median depression; with a sharp depressed carina along each side; posterior margin truncate, slightly tumid over the roots of the forceps; in ♀ narrowed, the lateral keels obsolete. Penultimate ventral segment ♂ ample, rounded; in ♀ more broadly rounded.

Pygidium ♂ ♀ hidden.

Forceps with the branches in the ♂ stout, subremote, trigonal, straight in basal half, tapering abruptly about the middle, then arcuate and slightly upturned, the right branch a little more strongly hooked than the left; in ♀ bluntly trigonal, contiguous and straight, gently curved at the apex.

Nymph.

The nymph is very different in appearance; the colour appears to be generally darker, the pronotum less widened posteriorly; the elytra are free, about half as long as the pronotum, and expose a triangular patch of the mesonotum like a scutellum at the anal angle; they are abruptly truncate, and the yellowish shoulder-spot is indicated; the metanotum is somewhat dilated prior to the unfolding of the wings, yellowish in colour, the posterior margin deeply

sinuate; the abdomen is formed as in the adult and in the ♂ shows the acute sides of the fifth to ninth segments; the last dorsal segments are formed as in the adult.

West Africa: Victoria (*Gerstaecker*); Gambia (*Kirby*); Congo, Stanley Pool (c. m.); Liberia (c. m.); Upper Congo, Mawauli in March (*Schubotz*); "La côte occidentale d'Afrique" (*Mus. Hope, Oxford*).

Gerstaecker's type of *Brachylabis cincticollis* has been kindly lent me by Dr. Mueller of Greifswald, and is discussed by me in a previous paper (1909²) pp. 255 & 257. The specimen is a female, and as the elytra are short but free it seemed to be adult. Further material from the Upper Congo agrees perfectly with the type and shows the sexual characters well; but the inflated appearance of the metanotum suggests immaturity, and a comparison with undoubted specimens of *Psalis picina*, Kirby, shows no true specific distinctions. True, the latter is somewhat smaller, but the material which I have examined is old and dry and the abdomen shrunken, while the additional specimens are fresh; from Liberia I have received both forms together, and now there remains no doubt whatever in my mind that *Psalis picina* of Kirby is the adult of *Brachylabis cincticollis* of *Gerstaecker*; the latter name has the prior right, and consequently must stand.

Very probably *Forficula rufescens* of Palisot de Beauvais is the same thing.

The colour varies considerably; the two adult males in the Hope Collection are of varying shades of dirty yellow; a fresh female from Liberia is almost black.

Eparchus cruentatus, sp. n.

Opisthocosmia forcipata, var., Burr (nec Haan), (1897⁴) p. 316; (1899⁵) p. 260; Borm. (1900²) p. 95.

Statura minore, gracili; colore nigro, capite pronotoque rubris, elytris alisque rufo-fuscis, pedibus testaceis: forcipis brachia ♂ basi subcontigua, gracilia, subrecta, parallela, in tertia parte longitudinis supra dente verticali forti armata; dehinc ovato-arcuata, margine interno dente forti acuto armata; ♀ typica.

	♂.	♀.
Long. corporis	7.5-9 mm.	8-9 mm.
,, forcipis	2.5 ,,	4.5 ,,

General colour dull black or reddish black, feet testaceous.

Head brick-red, smooth, sutures not visible, two very small depressions between the eyes.

Antennæ with 12-13 segments, dull blackish, with segments 9 and 10 whitish.

Pronotum brick-red, as wide as the head, subquadrate, the anterior border truncate, sides parallel, hinder margin and angles rounded, blackish brown, the sides paler.

Elytra ample, dark reddish brown, smooth.

Wings ample, with yellowish suture.

Feet testaceous, bright or brownish yellow, the tibiæ sometimes darker.

Abdomen distinctly dilated about the middle, especially in the ♂, and strongly attenuated apically; lateral pliciform tubercles very strong, black; colour dark reddish brown or blackish.

Last dorsal segment ♂ ♀ strongly narrowed apically and sloping, the hinder border with two obtuse small tubercles and a faint median depression, the border itself somewhat strengthened.

Penultimate ventral segment ample, rounded, covering the ultimate segment.

Pygidium not visible.

Forceps with the branches ♂ subcontiguous at the base, rounded, almost straight and contiguous for two-thirds their length, then arcuate, including an oval area; at the end of the first third the branches, seen from the side, are bent upwards and armed at this point with a very strong and sharp vertical tooth; at the second third, at the beginning of the oval area, armed on the inner side with a stout and sharp tooth. In the ♀ typical of the genus, simple, straight, slender, and unarmed.

Lombok: Sambalun, 4000 feet, April 1896, and Sapit, 2000 feet, March 1896 (*Fruhstorfer*, c. m.). Sangir (*Doherty*, c. m.).

This species was formerly regarded by de Bormans and myself as a variety of *E. forcipatus*, Haan, with which it has no relation.

The brick-red head and pronotum are very distinctive, but this may not be a constant feature. The strong vertical spine of the forceps distinguishes it from the allied *E. burri*. The apically decidedly arcuate forceps separate it from *E. tenellus*.

These three species are probably local races of one "super-species," but the differences appear to be quite constant.

Hypurgus kuhlgatzi, sp. n.

Hypurgus, sp. n., Burr, (1907⁶) p. 487.

Colore fusco-castaneo; alæ abbreviatæ; abdomen segmentis 5-9

lateribus acute reflexis; forcipis brachia ♂ basi haud contigua, divergentia, ante apicem arcuata, intus dentata. ♂ ♀.

	♂.	♀.
Long. corporis . . .	11·5 mm.	10·5 mm.
„ forcipis . . .	3·5 „	3 „

Size medium; colour dull brown, dark chestnut or blackish.

Antennæ with about 10 segments, all long and slender, brown.

Head smooth, brown to black.

Pronotum subquadrate, truncate anteriorly, sides subconvex, and slightly rounded posteriorly, depressed, sides reflexed, dark brown, the sides paler.

Sternal plates yellowish, narrow; metasternum very short, smooth, dull yellowish brown, indistinctly banded with darker on each side.

Wings abbreviated.

Feet slender, yellowish brown.

Abdomen ♂ narrow at the base, then steadily dilated to the sixth segment, which is the broadest, then narrowed towards the apex. The sides of all the segments are convex in ♂, but the fifth to eighth are decidedly sharp, depressed, almost carinate, the ninth almost hidden by the eighth. The ♀ is very gently dilated before the apex and then attenuate, the sides simple.

Last dorsal segment ♂ smooth, slightly wider than broad, posterior margin gently convex; in ♀ simple, narrow, and sloping.

Penultimate ventral segment ♂ very short and broad, slightly convex, exposing the last; in ♀ narrowed.

Pygidium ♂ a minute compressed tubercle, in ♀ hidden.

Forceps with the branches cylindrical; in ♀ subcontiguous at the base, smooth, and steadily diverging for about two-thirds their length, then bent upwards and boldly arched inwards, the points attenuate and meeting; before the apex there is a strong tooth on the inner margin and one (or more?) feebler ones. In ♀ single, slender, contiguous, and straight.

♂ ♀.

Africa: Togo (1 ♀, *Conradt*, in c. m.; 1 ♀, *Deutsch. Ent. Nat. Mus.*); Togo, Bismarckburg, 23/iii./93, 1 ♂, 1 ♀, in c. m. and *Mus. Berl.*); Kamerun (1 ♀, *Deutsch. Ent. Nat. Mus.*).

This species is named in honour of my friend Dr. Kuhl-gatz, formerly assistant in the Zoological Museum of Berlin.

It is the species of which the female is referred to in an earlier paper (Burr (1907^a)), where the fourth antennal segment

is described as being a little shorter than the third. The additional material shows that this is not the case.

Opisthocosmia nieuwenhuisi, sp. n.

Statura minore, gracili; fusco-castanea, pronoto albo-imbato; forcipis brachia ♂ basi valde remota, basi ipso sat fortia, divergentia in tertia parte basali, gracilia, elongata, arcuata, apicem versus fere recta; margine interna denticulata; apice ipso incurva. ♂. ♀ ignota.

	♂.
Long. corporis	8 mm.
„ forcipis	6 „

Rather small, of slender build; general colour dark chestnut.

Antennæ (six segments remain) brown, rather thick; third segment short and fourth half as long again, fifth twice as long as the third.

Head dark, blackish chestnut, smooth, sutures indistinct.

Pronotum dark chestnut, the sides white, slightly wider than long, truncate anteriorly; the sides gently rounded, posterior margin widely rounded.

Metasternal lobe narrow, scarcely wider than long.

Elytra ample, long, smooth, well rounded at the shoulders, dull reddish brown.

Wings long, brown, with a yellow band along the suture.

Feet yellowish, not very long, first tarsal segment above half as long again as the third.

Abdomen deep chestnut-brown; each segment blackish at its base, rather coarsely punctulate.

Last dorsal segment with a pair of compressed tubercles at each angle, very broad; posterior margin somewhat rounded and flattened between the tubercles at the exterior angles, this flattened part with three rather tumid elevations.

Pygidium very short, broad, obtuse.

Forceps with branches very remote at base, rather thick at the base itself, but attenuate and slender for the rest of their length, diverging at first and strongly arcuate in the basal third, then gradually approaching, meeting about the apical third, and straight, the apices curved in; there are two or three small but sharp teeth on the inner margin before the branches meet. ♂. ♀ unknown.

Borneo: Mahakhair (leg. Dr. Nieuwenhuis, 1894, and 1 ♂ in Mus. Leyden.).

Somewhat resembles *D. sansibaricus*, but considerably

smaller and distinguishable by the generic characters; the forceps are of the same type, but differ in detail.

Placed provisionally in this genus.

Forficula riffensis, sp. n.

Statura majore et robusta; pronotum subæque latum ac longum; elytra nigra; alæ breves, fulvæ; pygidium breve, latum, apice truncatum; forcipis brachia per dimidium longitudinis dilatata, hac parte angulo recto terminata. ♂. ♀ ignota.

	♂.
Long. corporis	14-16.5 mm.
„ forcipis	5-10.5 „

Of large size and powerful build.

Antennæ with 11 segments; third rather short, subclavate, fourth almost as long as third, fifth and rest longer than third; cylindrical, grey-brown.

Head large, smooth, tumid; sutures visible, but faint, deep red, shading to blackish in the middle.

Pronotum about as broad as long; anterior border and sides quite straight, posterior margin well rounded, reddish chestnut.

Elytra broad, truncate apically, smooth, barely twice as long as the pronotum; dull black, with a small ill-defined reddish spot at the shoulders themselves (this is sometimes obsolete).

Wings short, scarcely protruding, yellow.

Feet yellowish.

Abdomen deep blackish red, very finely punctulate.

Last dorsal segment short and very broad, posterior margin truncate, with two convex, tumid, depressed elevations in the middle.

Pygidium very short, broad, rectangular, truncate.

Forceps with the branches stout, depressed, red-brown, finely pitted, unarmed; inner margin dilated and depressed through about half their length, the edge straight and finely crenulate, ending not in a tooth but in a right angle, beyond which, attenuate, smooth, and arcuate.

Marocco (3 ♂ in c. m.).

I received three males, two macrolabia and one cyclolabia, of this fine species from Messrs. Staudinger and Bang-Haas, labelled "Marokko."

The short yellow wings and smooth elytra make a good contrast, and it is easily recognizable.

It differs from *F. ruficollis* in the square pronotum, longer dilation of the forceps, and colour.

It is more closely allied to *F. tomis* and *F. robusta*, but

differs from both in colour and in the quadrate pygidium (obtuse in *F. tomis* and *F. robusta*). The forceps are almost the same as in these two species.

Forficula ignota, sp. n.

Statura mediocri; colore rufo et castaneo; pygidium elongatum, apice truncatum; pronotum sublatius quam longius; forcipis braccia subrecta, elongata, margine interno prope basin per quartam partem longitudinis laminato, hac parte dente acuto terminata. ♂. ♀ ignota.

	♂.
Long. corporis	11.5 mm.
„ forcipis	9.5 „

Of medium size; general colour red and chestnut.

Antennæ reddish brown; eight segments remain, the first clubbed and relatively short, fourth nearly as long as the third, fifth a little longer than the third, all cylindrical.

Head clear brick-red, tumid, smooth, the sutures indistinct.

Pronotum slightly broader than long, sides and anterior margin quite straight, posterior margin gently rounded, reddish chestnut.

Elytra ample, quite smooth, yellowish brown.

Wings prominent, yellowish brown.

Feet reddish chestnut; tarsi paler, slender.

Abdomen deep claret-red, densely and very finely punctulate, lateral tubercles very distinct.

Last dorsal segment transverse, more coarsely punctulate, with smooth patches, deep red, the posterior margins and angles black; posterior margin truncate, with a median depression, with tumid sides.

Last ventral segment rounded.

Pygidium prominent, more than twice as long as broad, slightly constricted before the apex, which is truncate.

Forceps with the branches elongate, nearly straight, depressed only near the base, the inner margin in the basal quarter depressed, with a laminate sharp plate with straight, finely denticulate edge, terminating abruptly in an acute-angled sharp tooth; beyond this the branches are elongate, unarmed, smooth and very gently arcuate.

? South Europe (*C. D. E. Fortnam*; type, 1 ♂ in Mus. Hope, Oxon.).

This only specimen which I have seen is a single male in the Hope Museum labelled "C. D. E. Fortnam 1876, ? S. Eur."

It is a very distinct species, well characterized by the form

of the prominent pygidium ; the pronotum is scarcely wider than long ; in coloration and general form, except in pygidium and forceps, it resembles *F. auricularia*. The specimen is a *macrolabia* form, the elongation of the forceps being very pronounced ; the lamination of the forceps is also very distinctive.

Spongiphora schubotzi, sp. n.

Statura minore ; colore rufescenti ; clytra acute-carinata ; pygidium ♂ breve, apicem versus angustatum, apice ipso subsinuato ; forcipis brachia ♂ remota, gracilia, arcuata.

	♂.	♀.
Long. corporis.....	10.5 mm.	9 mm.
„ forcipis	3 „	2 „

Of small size and slender build ; general colour tawny red, not pubescent.

Antennæ tawny, with 16 cylindrical segments, fourth nearly as long as third.

Head subquadrate posteriorly, tumid, the sutures replete, red-brown ; eyes sinuate, black.

Pronotum slightly broader than the head, square, the angles rounded and lateral margins very slightly convex.

Prosternum subparallel, gently narrowed posteriorly.

Mesosternum as broad as long, rounded posteriorly.

Metasternum rather broad, the lobe transverse and truncate.

Elytra smooth, tawny, about one and a half time as long as the pronotum, truncate, the costal fold marked with a strong, prominent, sharp carina.

Wings not developed.

Feet slender, tawny ; femora rather thick ; tarsi slender ; second segment minute, cylindrical, first and third equally long, slender, with a few bristles, but not strongly pubescent.

Abdomen parallel, depressed, smooth, light red ; glandular folds prominent.

Last dorsal segment ♂ transverse, smooth, truncate posteriorly ; in the middle of the segment, on each side of the faint median suture, there is a small black crested tubercle ; posterior margin truncate ; in ♀ similar, but a little narrower, the tubercles absent.

Penultimate ventral segment ♂ ♀ ample, square, the angles rounded.

Pygidium ♂ short, broad, trapezoidal, narrowed apically, the posterior margin subsinuate ; ♀ short, parallel, truncate.

Forceps with the branches depressed, slightly dilated near

the base, with a minute obsolete tooth near the middle; ♀ subcontiguous, rather broad at the base, rapidly tapering, straight and parallel.

Central Africa: Rugege Forest, at about 6000 feet, in August; 2 ♂, 1 ♀, 1 nymph (*Schubotz*).

This is a very remarkable species; in appearance and general structure it approaches very closely the West-African forms *Sp. rubra*, Bor., also *Sp. tuberculata*, Bor., but is sharply distinguished by the strong, keen, and well-developed keel of the elytra. The only members of the Labiidæ hitherto known with keeled elytra are the South American, very distinct, genus *Strongylopsalis*, Burr, the aberrant *Labia tenuipes*, Burr, also from South America, and the Oriental and Australian genus *Nesogaster*, Verh., none of which approaches the species in question. In spite of its close structural resemblance to the other African forms quoted, the keel of the elytra is so altogether distinctive and striking a feature that a new genus, if not a new subfamily, must be erected for it when this group is revised.

It is interesting to note that the keel of the elytra is distinctly visible on that organ when only partly developed in the nymph stage.

Spongiphora gestroi, sp. n.

? *Spongiphora tripunctata*, Burr (nec Borelli), (1908¹²) p. 179.

Statura mediocri; glabra, colore nigro, pallido-variegato; pronotum transversum; pygidium ♂ tumidum, apice excisum, lobulis acutis; forcipis brachia ♂ basi remota, robusta, incurva.

	♂.	♀.
Long. corporis	8-9 mm.	8-9 mm.
„ forcipis	1.75-2 „	1.5-2 „

Not pubescent; size medium; general colour black, varied with paler.

Antennæ with 13 segments, blackish, paler at the apex; third segment cylindrical, not very long; fourth cylindrical, rather thick, about half as long as third; fifth and rest nearly as long as third, rather thick, subcylindrical.

Head rather broad, subsinuate posteriorly; eyes rather large and prominent; black.

Pronotum as broad as the head, a little broader than long, and slightly widened posteriorly; sides straight, anterior margin convex, posterior gently rounded; black, with a rather broad whitish border posteriorly extending up the sides.

Elytra ample, smooth, not very long; dull dark chestnut.

Wings ample, blackish, with a large straw-coloured spot.

Femora rather thick, blackish at the base, yellow at the apex; tibiæ and tarsi yellow, the latter slender.

Abdomen depressed, elongate, subparallel, smoother, dark reddish chestnut, the sides blackish.

Last dorsal segment ♂ transverse, rectangular, depressed in the middle, tumid over the roots of the forceps; in ♀ similar but narrowed.

Pygidium ♂ short, tumid, broad, nearly vertical; apex emarginate, with two strong sharp-pointed lobes; ♀ small, quadrate.

Forceps with the branches in ♂ remote at the base, dark red, stout, trigonal and straight for about half their length, gently arcuate and rather depressed in the apical half; inner margin denticulate in basal half, somewhat excavate in apical half; thick, the points suddenly attenuate and hooked; in ♀ straight, simple, contiguous.

West Africa: Congo, Ibambo, December 1905, 2 ♀ (*Ribotti*, Mus. Genoa) (c. m.).

I have pleasure in dedicating this species to Dr. R. Gestro, who has most indulgently placed at my disposal the wealth of the rich collection of the Civic Museum of Genoa, including numerous types of de Bormans and Borelli.

The Genoa Museum contains two females, which I provisionally and with hesitation referred to *S. tripunctata*, Bor.; but an examination of the type of that species and further material received, including two males, shows that it is quite distinct from that species, but very closely allied to *L. fœe*, Dubr. In coloration and structure it approaches *L. fœe* very closely, but it is a little larger, the antennal segments more cylindrical, the fourth a little shorter, the pronotum less strongly transverse; the colour less deep black and more reddish, the feet differently coloured, the points of the pygidium less sharp, the forceps less arcuate, much stouter, especially in the apical half; finally, *L. fœe* is a Papuan, *S. gestroi* a West-African species.

ARCHIDUX, gen. nov.

Generi *Neolobophora* simillimum genus; differt elytris carina percurrenti instrictis, tarsorum segmento 2 longiori et angustiori, capite læviori, suturis obsoletis.

This genus is erected for a single species, *Archidux adolfi*, sp. n. It scarcely differs from *Neolobophora*; indeed, if it had come from South America instead of Africa, I should

never have erected a new genus for its reception. Its occurrence in Central Africa, the smooth head, slightly different tarsi, and stronger keels of the elytra are the only distinguishing characters that I can find.

The sternal plates are, as in *Neolobophora*, rather short and broad; mesosternum rounded; metasternum with short, truncate, transverse lobe.

Archidux adolfi, sp. n.

Glaber, ater, lævis; capite, antennis pedibusque interdum fulvo; elytra carinata, subquadrata; alæ abortivæ; pygidium ♂ breve, conicum, apice bituberculatum; forcipis brachia ♂ remota, gracilia, cylindrica, dente uno armata.

	♂.	♀.
Long. corporis	13-14.5 mm.	12.5-14.5 mm.
„ forcipis	8-13 „	5.5-7 „

Size medium; smooth; general colour dull black.

Antennæ with 14 segments, dull brown, all cylindrical; third about half as long as first; fourth a little shorter than third, the rest longer.

Head smooth, tumid, sutures obsolete; black or reddish; eyes prominent.

Pronotum a trifle narrower than the head, square, dull brown or black, smooth.

Elytra abbreviated, smooth, dull black or deep brown, with a distinct costal keel running to the end of the elytra; posterior margin obliquely truncate; anal angle feeble; sutural margin decidedly shorter than the costal; a short transverse scutellum exposed.

Wings absent.

Feet long and slender; femora scarcely thickened, all black, or dull brown, blackened at the apex; tibiæ long and slender, yellowish or black; tarsi long and slender, the first segment decidedly longer than the third.

Abdomen dull black, smooth, scarcely dilated, glandular folds very prominent.

Last dorsal segment ♂ smooth, transverse, with a single median impressed point; slightly tumid over insertion of the forceps; in ♀ similar, but narrowed posteriorly.

Penultimate ventral segment ♂ ♀ obtusely rounded.

Pygidium ♂ short, thick, tapering, the apex emarginate, with two sharp lobes like tubercles; in ♀ very short, globose.

Forceps with the branches ♂ remote at base, slender, cylindrical, and very long, almost straight; inner margin finely denticulate for about half their length, where there is a

small but sharp tooth; in ♀ subcontiguous, slender, straight, gently arcuate at apex.

Central Africa (*Archduke Adolf Friedrich*).

The resemblance of this earwig to the species of the Neotropical genus *Neolobophora* is really extraordinary, but, apart from the generic characters given above, the locality is enough to distinguish them; even the pygidium and forceps are strikingly similar.

Note on the Genus *Sphingolabis*, Borm.

Genus SPHINGOLABIS (Bormans).

Sphingolabis, Bormans, (1883) p. 59; nec (1893), nec (1894); Kirby (nec Verhoeff, nec auctt.).

Apterygida, Borm. (nec Westw.) (1900¹) p. 115 (partim).

Sparatta, Borm. (nec Serville) (1884) p. 183.

Chaetospasia, Karsch; Borm. (1900¹) p. 75, et auctt.

Chaetospasia, Karsch, = *Sphingolabis*, Borm.

Type of *Sphingolabis*, Borm.: *Sphingolabis furcifera*, Borm. (1884¹) p. 194, = *Sparatta semifulva*, Borm. (1884) p. 18.

Type of *Apterygida*, Westw.: *Apterygida albipennis*, Meg., apud Charp. (1825) p. 68.

Type of *Chaetospasia*, Karsch: *Chaetospasia inornata*, Karsch, (1886) p. 88.

Type of *Sparatta*, Serv.: *Sparatta pelvimetra*, Serv. (1839) p. 52.

The genus *Sphingolabis* has had a chequered history. Erected in 1883 by de Bormans for *Sphingolabis furcifera*, Borm., from Sumatra, it was wrongly assumed by that author and by most others to coincide with *Apterygida*, Westw.: that is to say, to remove from the old genus *Forficula* all those species in which the forceps of the male were not dilated strongly near the base—that is to say, Dohrn's Group I. of *Forficula*.

Discussing the genus in a later work, (1894) p. 406, de Bormans writes:—"Sauf ce caractère [*i. e.* the form of the forceps] *il ne diffère en rien* du genre *Forficula* . . . par conséquent, *il est malheureusement impossible de savoir si une femelle isolée appartient à l'un ou à l'autre de ces deux genres.*" And he adds:—"Le genre *Sphingolabis* a pour type européen *Sph. albipennis*, Meg., Charp."; and further: "il renferme parmi les exotiques: *Sph. teniata*, Dohrn, *percheroni*, Guér., *californica*, Dohrn, *serrata*, Serv., *luteipennis*, Serv., *arachidis*, Yers., = *wallacii*, Dohrn."

In those days it was not recognized that the above species forms a decidedly heterogeneous group. In (1899) p. 255, I showed that if we regarded *furcifera*, Borm., and *albipennis*,

Meg., as congeneric, the name *Sphingolabis*, Borm., must fall in favour of *Apterygida*, Westw., and consequently the latter name was adopted by de Bormans in his monograph (1900¹).

In (1902) p. 197, the now dormant name of *Sphingolabis* was revived by Verhoeff for *sansibarica*, Karsch, but incorrectly, as by this very definition of the genus he excludes *furcifera*, Borm., which de Bormans named as the type!

In (1884¹) p. 183, de Bormans described a Sumatran species under the name *Sparatta semifulva*, which he removed in (1900) p. 75 to *Chaetospania*. In (1905³) p. 495, I showed that *Sparatta semifulva* was nothing else than the female of *Sphingolabis furcifera*, which is described a few pages further on in the same paper. An examination of the types in the Leyden Museum later fully confirmed this view.

We consequently find that *Sphingolabis furcifera* is unconsciously recognized by de Bormans as being related to *Sparatta* and *Chaetospania*—that is, as having no connection with *Forficula* or *Apterygida*; in fact, the second tarsal segment is simple and cylindrical.

But in the meantime Karsch had established the genus *Chaetospania*, (1886) p. 87, for a Madagascan species, *Ch. inornata*, which I am unable to discriminate generically from *Sphingolabis*—that is to say, I can find no good generic character on which to separate *Ch. inornata*, Karsch, from *Sph. furcifera*, Borm.; the genus *Chaetospania* accordingly falls as a synonym of *Sphingolabis*, which includes, in addition to its type *S. furcifera*, most of those species which have since been ranged in *Chaetospania*.

New Synonymy.

Carcinophora robusta, Scudder, = *Psalis gagatina* (Klug).

No one has ever entertained a very decided opinion as to what *Ps. gagatina* really is. A consideration of the brief description given by Burmeister, (1838) p. 753, shows no distinction from *Carcinophora robusta*, Scudd. (1876) p. 305, except that the wings are abbreviated in the latter: this is a valueless feature. Borelli's specimens from Ecuador, (1903) p. 1, show the intermediate stage. The specimen figured by de Bormans, (1893) pl. i. fig. 5, has spots on the elytra; this is probably referable to *P. americana*, Beauv., or *P. pulchra*, Rehn. The largest specimens recorded by Borelli from Costa Rica, (1906³) p. 3, have a small yellow spot on the edge of the elytra; this represents the transition to *P. americana*.

The identity of *Psalis colombiana*, Borm. (1882) p. 61, pl. ii. fig. 2, has never been questioned.

Chætospania juppiter, Burr, = *Spongiphora nitidipennis*, Borm.

Dr. R. Gestro having kindly communicated me the type of *Spongiphora nitidipennis*, Borm. (1894) p. 382, I am able to establish the identity of *Chætospania juppiter*, Burr, (1900²) p. 94. The actual type of de Bormans from Burmah is a poor specimen. The individuals described later by him, (1900²) p. 455, from Sumatra are finer. There is no structural difference. I have specimens also from Perak and Java.

Spongiphora geayi, Burr, = *Spongiphora insignis* (Stål).

Spongiphora geayi, Burr, (1904) p. 295, is certainly identical with *Sp. insignis*, Stål, (1855) p. 349. The pygidium is rather hidden and the forceps somewhat different in detail in the original specimen.

Labia myrmeca, Burr, = *Labia fasciata*, Borm., = *Labia nigrella*, Dubr.

Labia myrmeca, Burr, (1908³) p. 96, is of a dark red colour rather than deep black; the wings are abortive, the elytra shorter and spotted rather than banded, but otherwise it agrees with de Bormans' type of *Labia fasciata*, (1894) p. 387, of which it is obviously only a variation*.

Opisthocosmia erroris, Burr, = *Opisthocosmia forcipata*, Haan.

Haan's figure shows small orange spots at the shoulders of the elytra, which are missing in my type. Otherwise *O. erroris* agrees perfectly with the description and figure of *O. forcipata*, Haan. The form of the forceps is very distinctive. The synonymy is as follows:—

Forficula forcipata, Haan, (1842) p. 243, pl. xxiii. fig. 11.

Opisthocosmia forcipata, Dohrn, Scudder, de Bormans, and Kirby (nec Burr!).

Opisthocosmia lugens, Burr, (1900²) p. 101 (nec Bormans!).

Opisthocosmia erroris, Burr, (1904²) p. 308; (1907³) p. 100, pl. iv. fig. 2.

My record of *O. forcipata*, Haan (see Burr, (1900²) p. 63), refers to *O. burri*, de Bormans (apud Burr, (1903¹) p. 267).

* When the pale bands are obsolete, it is *L. nigrella*, Dubr., (1870) p. 370, of which I have seen the type, with that of *L. fasciata*, in the Genoa Museum.

Spongiphora rubriceps, = *Proreus fuscipennis* (Haan).

I have not actually examined Haan's type, but I have carefully considered descriptions and figures with my own type of *Spongiphora rubriceps*, Burr, (1900²) p. 89, and I consider them identical; the specimens recorded by me in the same paper (p. 100) under the name of *Apterygida borneensis* are only a *macrolabia* form of the same earwig. I have given elsewhere, (1908⁴) p. 50, the true synonymy of *Sphingolabis borneensis* of de Bormans.

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XV.—*On some new Species of Birds from Katanga, Congo Free State.* By S. A. NEAVE, M.A., B.Sc.

I HAVE found the following apparently new species among the birds in my collection made during 1907 in the Katanga region of the Congo Free State.

Trochocercus vivax, sp. n.

T. similis T. bivittate, sed plaga alari alba nulla; corporis lateribus grisescentibus, pectore et abdomine albis; rostro cyanescenti-

corneo, apice fusciscente; pedibus cyanescenti-grisicis; iride brunnea.

Long. tot. c. 6.1 poll., culm. 0.7, alæ 2.75, caudæ 3.2, tarsi 0.75.

Hab. Katanga, S.E. Congo Free State.

Criniger sylvicultor, sp. n.

C. similis C. cabanisi, sed supra pallidior, gutture et pectore toto pallide sulfureo-flavis; præpectore olivascento sulfureo lavato; rostro fusciscenti-corneo, subtus pallidior; pedibus pallide grisescensibus; iride olivascenti-griseo.

Long. tot. c. 7.0 poll., culm. 0.85, alæ 3.65, caudæ 3.6, tarsi 1.05.

Hab. Katanga.

Calamonastes katangæ, sp. n.

C. similis C. cinereo, sed brunnescentior; pectore et abdomine albidis; gula albida, fusco variegato; gutture summo et præpectore cineraceo, fasciam latam formantibus; rostro nigro; pedibus flavescensibus carneis; iride rufescens brunneo.

Long. tot. c. 4.1 poll., culm. 0.55, alæ 2.3, caudæ 1.7, tarsi 0.8.

Hab. Katanga.

Dryodromas pearsoni, sp. n.

Similis *D. rufifronti* et cauda nigra; reatricibus ad apicem cinereis, pileo ferrugineo; dorso rufescens brunneo; uropygio et supracaudalibus cinerascensibus; subtus alba, gutture et præpectore pallide cervino tinctis; hypochondriis cinereis distinguenda; rostro brunnescenti-corneo, mandibula pallide carnea; pedibus brunnescenti-carneis; iride flavicanti-brunnea.

Long. tot. c. 4.1 poll., culm. 0.45, alæ 2.0, caudæ 2.0, tarsi 0.65.

Hab. Lufupa River, Western Katanga.

Dedicated to Dr. Arthur Pearson, Principal Medical Officer to the Tanganyika Concession Ltd., Kambore.

XVI.—*Descriptions of new Genera and Species of New-Zealand Coleoptera.* By Major T. BROUN, F.E.S.

[Continued from p. 71.]

Group *Erirhinidæ*.

Erirhinus insignis, sp. n.

Subovate, moderately elongate, nitid, sparsely clothed with fine yellowish hairs, which are somewhat concentrated on

spots behind; variegate, femora and thorax rufo-fuscous, the base and apex of the latter fusco-testaceous; tibiæ and rostrum testaceous; elytra rufo-fuscous, but with the following testaceous marks, a small portion of the second interstice continued along the basal margin, bent at the shoulder and prolonged backwards, a small spot at the side behind, the suture and apex, and four or five spots above; antennæ and tarsi reddish.

Rostrum arched, moderately slender, not twice the length of thorax; smooth in front, with two series of fine punctures above and one along each side. *Thorax* rather broader than long, a good deal narrowed but not constricted in front; rather closely, very distinctly, and somewhat rugosely punctured. *Scutellum* minute. *Elytra* broader than thorax at the base, their sides gently curved, gradually narrowed posteriorly, more strongly near the extremity; moderately coarsely striate-punctate.

Antennæ slender, implanted just before the middle. *Eyes* subrotundate, depressed. *Ocular lobes* absent. *Femora* unarmed; tibiæ stout, flexuous, mucronate at the extremity.

Underside fuscous, prosternum feebly incurved, third and fourth ventral segments shorter than second.

Agrees in structure with the European *E. acridulus*, but only half its bulk and otherwise dissimilar. Not like any described New Zealand species.

Length (rost. excl.) $1\frac{1}{4}$; breadth $\frac{5}{8}$ line.

Dunedin. One from Mr. T. Chalmers many years ago.

Erirhinus insolitus, sp. n.

Subopaque, variegate; thorax sparingly, elytra more evidently, clothed with fine yellow hairs; rufo-fuscous, with some dark spots on the elytra, rostrum and tibiæ rufescent, femora almost piceous, antennal club opaque, piceous, with grey pubescence.

Rostrum distinctly but irregularly punctate behind the middle. *Thorax* a third broader than long, more narrowed in front than behind; moderately coarsely and closely punctured, with rugose intervals, but with a linear central space smooth. *Scutellum* minute. *Elytra* slightly rounded laterally, gradually narrowed backwards from before the middle, very little wider than thorax at the base; punctate-striate near the suture to the extremity, striate-punctate towards the sides; interstices with fine serial punctures and appearing rugose; the coloration much, but irregularly, variegated.

Antennæ inserted between the middle and apex, basal joint of funiculus stout, second much more slender and shorter, 3-7 small and moniliform; club stout, ovate, apparently, but not distinctly, quadri-articulate.

Like *E. insignis*; the hind-body longer, much less attenuate posteriorly, differently clothed and sculptured, the variegation ill defined. The thorax is longer and more rugosely sculptured. The eyes are placed more on the upper part of the head. The thighs are more inflated, punctate, and emarginate underneath near the extremity. We have no other species like it.

Length (rost. excl.) $1\frac{1}{2}$; breadth $\frac{5}{8}$ line.

Otago. From the same source as the preceding one.

Erirhinus spadiceus, sp. n.

Subnudus, bearing only a few inconspicuous minute setæ; a little shining, rufo-castaneous, the tip of the rostrum, and the club, piceous.

Rostrum moderately coarsely and irregularly punctured, but nearly smooth in front. *Thorax* widest near the middle, slightly more rounded in front than behind, its length and breadth nearly equal; distinctly and moderately closely punctured. *Scutellum* small. *Elytra* widely incurved at the base and a little broader than the thorax, gradually narrowed backwards; striate punctate, quite striate behind; interstices plane, with fine serial punctures.

Legs robust; femora arched above; tibiæ a little flexuous, mucronate, the two hind pairs short. *Antennæ* slender, inserted between the middle and apex of the rostrum; basal joint of funiculus stout, joints 4-7 bead-like, seventh a little broader than preceding one; club large, articulate, with some yellowish pubescence.

Underside reddish, punctate. Prosternum slightly incurved. Front coxæ contiguous, the intermediate slightly separated. Metasternum short, broadly depressed, as are also the basal two ventral segments, the second distinctly shorter than first, third and fourth well developed, fifth broadly impressed.

Distinguishable at once by the unicolorous, almost glabrous surface.

Length (rost. excl.) $1\frac{5}{8}$; breadth nearly $\frac{3}{4}$ line.

Mount Maungatua, Otago. One from Mr. S. W. Fulton.

Erirhinus castigatus, sp. n.

Slender, slightly shining, uniformly fulvescent, antennal club fuscous; sparingly clothed with minute greyish hairs.

Rostrum finely punctate, indistinctly carinate, obviously longer than thorax, almost quite parallel-sided, only slightly arched. *Eyes* subrotundate, free from thorax, not prominent. *Thorax* about as long as broad, evidently narrower in front than behind; finely but quite distinctly and not closely punctured. *Scutellum* minute. *Elytra* elongate, wider than thorax at base, gradually narrowed backwards, distinctly and regularly striate-punctate.

Legs moderately slender; tibiæ slightly mucronate at the extremity; third tarsal joint with elongate lobes. *Antennæ* inserted near the apex; scape slender, but a little clavate near the extremity, basal joint of funiculus stout, seventh rather broader than sixth.

Underside shining, similar to the upper surface in colour.

Another concolorous, easily recognisable species, unlike any other as yet found here.

Length (rost. excl.) 1; breadth $\frac{3}{4}$ line.

Mount Maungatua, Otago. Another of Mr. S. W. Fulton's discoveries, a single specimen only.

Eugnomus antennalis, sp. n.

Opaque, variegate, fusco-rufous, antennæ and tarsi rufocastaneous.

Rostrum stout, not twice the length of thorax, slightly constricted medially so that the scrobes are visible above; densely and coarsely punctate, not distinctly carinate, with slender yellow hairs. *Head* broadly depressed between the widely separated and prominent eyes, clothed and sculptured like the rostrum, but also with numerous pale yellow scales around the eyes. *Thorax* evidently broader than long, very slightly constricted at apex, closely punctate, with slender fulvous hairs on the disk, but covered with pale yellow squamæ at the sides. *Scutellum* oblong. *Elytra* evidently wider than thorax at the base, very slightly and gradually narrowed towards the hind thighs, more strongly behind these, apices subtruncate; punctate-striate, the interstices minutely punctured and slightly asperate, there are two series of minute granules in the sutural striæ near the base, where the hairs are coarser and of a brighter yellow than elsewhere, there are also a few scales on the shoulders; they are irregularly maculated with dark fuscous, and between the hind thighs this colour predominates, on the posterior declivity the inner four interstices are reddish, the third, on each elytron, is quite pallid and abruptly bent forwards at the apex, the fourth and sixth end within the pale zone, are

slightly raised, and quite fuscous. *Pygidium* much exposed, testaceous, finely and closely punctate. Front *femora* dilated and with a minute denticle below, the others angulate and dentate, the posterior most strongly.

Antennæ rather stout; basal joint of funiculus quite half the length of the others conjointly, second also elongate but slender, 3-7 small; club large, opaque.

E. nubilans most nearly approaches this species, which, however, is larger, with a shorter thorax, more exposed pygidium, more abruptly enlarged club, and differently formed funiculus.

Length (rost. incl.) $2\frac{3}{4}$; breadth 1 line.

Karori, Wellington. One example from Mr. G. V. Hudson.

Eugnomus femoralis, sp. n.

Elongate, castaneo-rufous, clothed with rather fine inconspicuous grey hairs, the sides of thorax and the posterior portion of elytra with grey setiform scales. Underside with similar scales and pubescence; club fuscous.

Rostrum a little dilated in front, irregularly punctured. *Scapæ* attaining back of eye. *Thorax* rather narrow, distinctly and closely punctured. *Elytra* rather elongate and narrow, yet broader than thorax at the base; striate-punctate, interstices finely rugose. *Femora* emarginate below near the extremity, but not dentate or conspicuously angulate.

A uniformly coloured, rather elongate species near *E. fervidus*, differently clothed, with the thorax and hind-body narrower, and without the common angulation of the femora.

Length (rost. incl.) 2; breadth $\frac{5}{8}$ line.

Waitakerei Range. Six specimens in my own collection.

Stephanorhynchus osculator, sp. n.

Variagate, densely covered with obscure greyish and fuscous squamæ without forming regular spots, the elytral suture fusco-rufous behind; antennæ also infuscate red, but with the basal joint of the funiculus fuscous.

Rostrum laterally compressed, strongly ridged from the antennal insertion to the eyes, the head broadly depressed and bicristate, so that when looked at sideways there appears to be a deep gap in line with the eyes. *Thorax* rather broader than long, much narrowed anteriorly, with one constriction behind, and another before, the middle; its surface uneven, with two small median tubercles. *Elytra*

widest at the base, humeral angles slightly prominent and oblique, apex bituberculate; the usual large elevations between the hind thighs are obliquely flattened towards the suture, there are also numerous small elevations so that the punctuation is very irregular. The *femora* are dilated, the posterior more strongly angulate and dentiform underneath than the intermediate, the anterior less so.

Antenna inserted near the apex; second joint of the funiculus shorter and more slender than the first, and nearly twice as long as the third; 4-7 moniliform; club elongate, quadri-articulate, its intermediate joints subquadrate, the basal as long as the second but curved towards its base, the terminal small and conical.

In *S. curvipes* the second joint of the club is twice the length of the first; this, therefore, at once separates the two species. In *S. tuberosus* the head and rostrum are similar, but the elytra are nearly concolorous, much less asperate, with more prolonged apices, and the insect itself is much larger.

Obs.—Two varieties of *S. tuberosus* occur on the Waitakerei Range, Auckland, and another at Greymouth, this last being labelled *S. aper* in my cabinet.

Length 2-2½ (rost. incl.); breadth ¾ line.

Tararua and Rimutaki Ranges. Mr. G. V. Hudson.

Stephanorhynchus morosus, sp. n.

Robust, covered with dull, slightly variegated, griseo-fuscous, minute scales and setæ.

Rostrum somewhat laterally compressed and ridged behind, thus leaving an obvious gap between its base and the lateral ridges on the head, these latter are deeply and widely separated, and the inter-ocular depression is distinct. *Thorax* considerably narrowed anteriorly, constricted near the apex and behind the middle, with two small median prominences. *Elytra* twice as broad as thorax at the base, unusually broad, moderately narrowed behind, apices not at all spiniform or prominent; they are striate-punctate, but the sculpture is interrupted, or hidden; the pair of post-median prominences are well developed, and there are ten or twelve small tubercular elevations or nodosities, chiefly near the shoulders, sides, and apex. *Legs* dark and minutely speckled. *Funiculus* slender, basal joint distinctly stouter and somewhat longer than second, the last three small and reddish; club elongate, opaque, 4-jointed.

Quite distinct from all but *S. tuberosus*, and differing

from it in the longer head, broader and shorter hind-body, simple elytral apices, and more sombre appearance.

Length (rost. incl.) $3\frac{3}{4}$; breadth $1\frac{1}{2}$ line.

Mount Arthur. One from Mr. T. F. Cheeseman.

Group *Belidæ*.

Pachyura venusta, sp. n.

Elongate, subcylindrical; brilliant æneo-viridis, sides of thorax and elytra somewhat rufescent, the head near the eyes and apical margin of thorax metallic red, rostrum purple, legs and antennæ fusco-testaceous.

Rostrum rather shorter than head and thorax combined, slightly and gradually dilated anteriorly; minutely and distantly punctured near the apex, the base more distinctly yet finely, each puncture with a minute grey seta; antennal insertion close to the base, prominent. *Head*, eyes included, almost as broad as the middle of thorax, a little narrower behind; its surface closely granulate-rugose. *Eyes* large, broadly longitudinally oval. *Antennæ* elongate, second joint shorter than first and nearly as stout, joints 3-5 rather slender and elongate, nearly equal to one another, 6 and 7 shorter, 8-10 evidently longer and broader and more infusate, 11th slightly longer than 10th; these terminal four joints may be termed the club. *Thorax* about as long as broad, its sides slightly rounded near the middle, more narrowed in front than behind; there is an ill-defined central line, its sculpture seems like that of the head but is not quite as coarse, or it may be termed punctate with rugose or granulate intervals, either term may be accurate according to the point of view. *Scutellum* rather small. *Elytra* cylindrical, very slightly dilated at the shoulders, not at all posteriorly; basal margin obliquely truncate towards the suture; they are transversely striate-punctate, interstices convex but somewhat irregular; like the head and thorax they are scantily clothed with slender, inconspicuous, greyish hairs.

A second specimen, found at Clevedon, has a rather longer rostrum, and the elytra are a little broader behind than near the shoulders; this I consider is the female. The elytra are $\frac{7}{8}$ of a line in width.

P. sumptuosa may be distinguished by its larger size, more curvate anterior tibiæ, by the slight basal depression of the thorax and the one behind the scutellum, as well as by the

four patches of white hairs on the elytra. The fourth antennal joint is longer.

♂. Length (rost. incl.) 3; breadth $\frac{3}{4}$ line.

Howick. One individual in my own collection.

Pachyura violacea, sp. n.

Body only slightly nitid, violaceous, sparingly but evenly clothed with fine but quite distinct greyish hairs, tip of rostrum rufescent, antennæ and legs light brown, claws nearly black.

Rostrum short, distinctly punctured near its base. *Head* widest near the front, moderately closely but not very coarsely punctured, with slightly rugose intervals. *Thorax* a little transverse, narrower in front than behind, base bisinuate; there is a very fine stria along the middle, its punctuation is rather finer than that of the head. *Scutellum* moderately large and rounded. *Elytra* subcylindrical, being slightly narrowed behind the shoulders only, closely and distinctly punctured and, on some spots, somewhat transversely rugose, but without the elevations and deep transverse striæ of *P. metallica*, *P. sumptuosa*, and others.

Most nearly resembles *P. rubicunda*, which has two small protuberances at the tip of the rostrum.

Length (rost. incl.) $2\frac{1}{2}$; breadth $\frac{3}{4}$ line.

Karori, Wellington. Taken off young Totara tree. Mr. G. V. Hudson, one specimen.

P. pilosa, variety of *P. rubicunda*.—This differs from my typical examples in having darker elytra so covered with grey hairs that the surface appears greyish. The apical prominences on the rostrum are quite distinct.

Helensville. One in my own collection.

Group Cryptorhynchidæ.

APHOCÆLIS, gen. nov.

Body broad, oviform, convex, covered with scales and short erect setæ.

Prosternum broadly excavate, as in *Psepholax*, but with more sharply defined lateral borders in front of the coxæ. *Mesosternal lamina* very short and transverse before the coxæ, the suture between it and the metasternum quite straight. Intermediate *coxæ* as widely separated as the posterior. Second *ventral segment* much abbreviated, very short, third and fourth very short, like those of an *Acalles*, with deep

sutures, 3-5 on a lower plane than the basal two, but on the same level as the epipleura. *Femora* notched and grooved near the extremity and with a denticle underneath. *Tarsi* with almost glabrous soles, having only a few fine hairs at the sides, but with more along the front of the third joint.

Should be interposed between *Psepholax* and *Oreda*. At once differentiated from the former by the widely separated middle coxæ, by the absence of any raised triangular mesosternal process, and the abbreviation of the intermediate ventral segments; from the latter by the absence of any well-limited pectoral canal. *Psepholax femoratus* (852) is closely allied to *Aphocælis*, and if sternal structure and wide separation of coxæ be considered as of generic importance, Dr. Sharp's *Psepholax simplex* (854) must ultimately become the type of a distinct genus also.

Aphocælis versicolor, sp. n.

Rostrum rather shorter than thorax, considerably dilated in front for two-thirds of its whole length below; the scrobes therefore appear deep and open and are quite visible from above; they begin near the apex and extend to the eyes. *Scape* very short and stout, barely attaining the eye. *Funiculus* thick, much longer than the scape, 7-articulate, basal joint obconical, not much longer than broad; second about as large as the first, more slender at the base; 3-7 transverse. *Club* short, ovate. *Head* broad. *Eyes* subrotundate, but slightly acuminate in front, moderately prominent, distant from the thorax and each other. *Thorax* bisinuate at the base, broader than long, much contracted in front, closely punctured, covered with fuscous and dark greyish squamæ; without ocular lobes, its apex emarginate. *Scutellum* absent. *Elytra* short, a little broader than thorax, rounded and nearly vertical behind; they are distinctly striate, but the punctuation is concealed by the squamosity; third interstices a little elevated, most evidently on top of the posterior declivity, but not nodiform there; at the base they bear minute black crests. *Tibiæ* rather finely setose, mucronate, the anterior slightly flexuous, the others prolonged at the outer extremity and armed with a distinct median tooth externally.

The derm seems to be pitchy red, but the variegated dark and greyish squamæ entirely cover the surface. The elytra on some parts appear to be studded with minute black tubercles. The rostrum is dull piceous, punctate, with a distinct inter-antennal groove: its apex is nearly vertical

and smooth, and bears four little clusters of fine yellow setae.

Length (rost. incl.) $2\frac{1}{2}$; breadth $1\frac{3}{4}$ line.

Otira Gorge. One individual found by Mr. J. H. Lewis.

Psepholax denticostatus, sp. n.

Conver, subovate, widest near the middle, opaque; sparingly covered with small yellowish-grey scales and setae, these latter more elongate and conspicuous on the sides near the base of the elytra; piceous, tarsi and antennae pitchy red.

Rostrum longer than head, broad, nearly plane; at the point of antennal insertion, near the apex, broader below than above; nearly smooth in front, with close rugose sculpture like that of the head, which, at the base, is medially depressed and nearly twice the breadth of the rostrum. *Thorax* nearly twice as broad as it is long, much narrowed, but not constricted, towards the front, which is obviously emarginate medially, base subtruncate; it is rather feebly impressed behind along the middle, the surface appears closely punctate or granulate according to different points of view, the pale squamæ are somewhat concentrated near the sides. *Scutellum* small, subrotundate. *Elytra* of same width as thorax at base, slightly broader near the middle, rather gradually yet considerably narrowed posteriorly; on each elytron, near the suture, there is a ridge which is broad at the base, somewhat compressed and more elevated near the middle, but becoming obsolete behind; this ridge has granular sculpture near the base, but on the middle there are three or four compressed dentiform prominences; the second ridge is much less elevated, with granular or minute tubercular sculpture; behind it is more sharply defined, and is there covered with fine yellowish scales; the third resembles the first, but does not extend quite as far back; the fourth is indistinct as far as the middle, but behind is exactly similar to the second, though not reaching back as far; the suture along the hind slope is like the second ridge; the intervals may be termed irregular striæ, even those along the side are not distinctly punctured.

Anterior femora dilated and angulate, but not distinctly dentate, underneath; the posterior laterally compressed and curvate; front tibiæ a little flexuous, rather thicker above than at the extremity; the intermediate evidently shorter, densely squamose, with a dentiform projection near the extremity; the posterior squamose, somewhat arched.

Scape short, gradually incrassate; funiculus finely pubescent, basal joint short and stout, joints 3-7 transverse, gradually becoming broader; club large, oblong-oval.

Underside rather finely punctate, with depressed greyish setæ; third and fourth ventral segments nearly nude.

The old *P. sulcatus* is described as having six ribs on each elytron, with punctated intervals. Its scutellum is quite elongate, like that of *P. granulatus*, but in *P. denticostatus* it is small and nearly rotundate; this, therefore, is a good distinguishing character. With the exception of *P. coronatus* the sexes have not been satisfactorily determined.

♂. Length (rost. incl.) $3\frac{1}{4}$; breadth $1\frac{5}{8}$ line.

Karori, Wellington. One from Mr. G. V. Hudson.!

Zeacalles lepidulus, sp. n.

Body very convex, subovate, covered with small, depressed, tawny squamæ; a few more elongated erect white ones near the sides and apex of the elytra and a few short, erect, coarse infusate setæ; it is infusate red, with red tarsi and antennæ.

Rostrum red, longitudinally sculptured, apical portion finely punctate. *Thorax* about as long as broad, a good deal but very gradually narrowed anteriorly; apex obtusely rounded, very slightly depressed in front, its punctuation obscured by the elongate squamæ. *Elytra* cordate, rather short, their sides and apex vertical, very slightly broader than thorax at the base, considerably broader before the middle, gradually yet a good deal narrowed posteriorly; they are rather abruptly elevated near the base and apparently striate; on top of the posterior declivity there are two well-developed nodosities, two less elevated but more elongate ones at the base, and three or four smaller ones near the sides; the grey scales are most perceptible on the sides near the base; there are also a few dark specks here and there. *Legs* stout, bearing coarse greyish setæ. *Tarsi* finely setose underneath, third joint expanded, grooved or excavated above, but not perceptibly lobed; claws very small.

Scape short, slender at the base, gradually thickened. *Funiculus* elongate, first joint stout, second and third slender and moderately elongate, the former the longer of the two, 4-7 obconical and gradually incrassate; club oval, triarticulate.

Larger than the four previously described species, and distinguished therefrom by the elytral nodosities. The lobes

of the third tarsal joint are very short in all these four species; in this one they are quite obsolete.

Length (rost. excl.) $1\frac{1}{4}$; breadth $\frac{3}{4}$ line.

Totara, Southland (*Mr. A. Philpott*); one individual.

HATASU, gen. nov.

Robust, convex, suboblong, squamose.

Rostrum rather shorter than thorax, moderately broad, subparallel. The *scrobe* begins before the middle and extends to the lower and front part of the eye. *Scape* almost straight, only slightly incrassate, attaining the front of the eye. *Funiculus* 7-articulate, basal two joints elongate, second evidently the longer; third rather longer than broad; 4-7 subquadrate, the seventh larger than the preceding one; club elongate-oval, quadriarticulate. *Eyes* just free from thorax, lateral, hardly convex, distinctly faceted, truncate in front. *Thorax* conical, somewhat prolonged over the head; deeply emarginate behind the eyes, obtusely rounded and with vibrissæ just below them when the rostrum is extended forwards. *Scutellum* absent. *Elytra* closely adapted to the base of thorax, the shoulders slightly porrect, a little widened behind the middle.

Legs stout and elongate. *Femora* grooved at the extremity, but not distinctly angulate or dentate below. *Tibiae* flexuous, with prominent terminal spurs. *Tarsi* with fine dense pubescence underneath, not in the least spongy; third joint moderately expanded, deeply and widely excavate above, emarginate at apex, but without distinctly projecting lobes.

Pectoral canal deep, not extending beyond the back part of the anterior coxæ, and limited behind by the strongly elevated border of the mesosternum, which is in contact with the front coxæ. Intermediate and posterior *coxæ* widely separated. *Metasternum* short. *Abdomen* narrowed behind, second segment, at the sides, about as long as the first, the frontal suture sinuate; third and fourth moderately short, conjointly, quite as long as the second, all the sutures well marked.

At once distinguishable from *Acalles* by the abbreviated pectoral canal and from *Dendrostygnus* and *Tychanopais* by the unarmed femora and different scrobe, which in these genera starts nearly from the apex.

Hatasu dorsale, sp. n.

Opaque, black; antennæ dark red; tarsi piccous; squamosity black, infusate or tawny; the last hue predominates along the sides; legs more or less maculate.

Rostrum closely and rugosely punctate in front, with fewer punctures and a few scales behind; it is dull black. *Antennæ* with greyish hairs, the club densely pubescent. *Thorax* as long as it is broad, its sides nearly straight behind, distinctly but not abruptly narrowed anteriorly; disk nearly plane, with an elongate impunctate space along the middle; tawny scales form a central streak at the base, its apex is not crested, but appears cleft at the middle; along the centre it is of a sooty colour; along the sides some short, erect, coarse setæ are mingled with the tawny scales; its punctuation is concealed. *Elytra* suboblong, nearly vertical, and much narrowed behind; along the middle of the dorsum it is dull black, with very few minute, rounded, flattened, tawny scales; on each side of the suture there are two series of coarse, almost foveiform, distant punctures, the sides are foveate, with squamose elevated intervals, so as to seem tuberculate; there are four dark squamose elevations on top of the posterior declivity; the third interstices are more or less irregularly elevated and blackish, and the apex bears several small nodosities and punctures.

Underside dull black, covered with pale brown or greyish scales, so that no punctures are visible.

Length (rost. excl.) $3\frac{3}{4}$ - $4\frac{1}{2}$; breadth $1\frac{3}{4}$ - $2\frac{1}{4}$ lines.

Broken River. I am indebted to Mr. J. H. Lewis for my pair of specimens.

CLYPEOLUS, gen. nov.

Rostrum as long as thorax, very gradually narrowed backwards, the nearly smooth, subcordate, clypeal portion well delineated. *Mandibles* not porrect, vertical in front. *Scrobes* deep, quite lateral, extending from behind the middle to the front of the eyes. *Scape* flexuous, slender, very gradually incrassate, rather short, attaining the front of the eye. *Funiculus* elongate, second joint evidently longer than the elongate basal one, third longer than fourth; seventh moniliform, rather broader than sixth. *Club* ovate, acuminate, triarticulate. *Head* moderately broad. *Eyes* widely separated above, quite lateral, subcuneiform, acuminate in front. *Thorax* bisinuate at base, abruptly contracted anteriorly, with feeble ocular lobes. *Scutellum* sunken or absent. *Elytra* of same width as thorax at base, much narrowed and nearly vertical behind. *Femora* long and thick, medially dentate, grooved near the extremity. *Tibiæ* flexuous, with robust apical spurs. *Tarsi* slender, finely setose underneath, third joint moderately expanded and lobed.

Pectoral canal deep, extending to middle of intermediate

coxæ. Basal ventral segment very little longer than second, its suture slightly medially incurved behind, third and fourth only moderately abbreviated, fifth biimpressed.

Allied to *Tychanus*, differentiated therefrom by the well-defined clypeus, perpendicular front face of mandibles, &c.

Clypeolus cineraceus, sp. n.

Compact, robust, subovate, piceous, densely covered with grey, yellowish-grey, and pale brown scales; antennæ and tarsi pale ferruginous.

Rostrum subparallel, moderately finely and closely punctured, the clypeal portion nearly smooth. *Thorax* of the same width as elytra at the base, one-fifth broader than long, abruptly narrowed and depressed in front, its apex truncate and a little prominent, but not distinctly crested, having only a few coarse erect setæ; its surface closely punctate, most of the squamæ yellowish grey, the basal portion somewhat flattened backwards and bearing a short pale ridge in front of the scutellum, which it conceals; the erect scales are congregated at the sides. *Elytra* slightly wider behind the posterior femora than elsewhere, much narrowed and declivous behind, with coarse punctures not disposed in regular series; their basal portion more or less infusate, the third and fifth interstices somewhat prominent there, the suture alongside the sunken scutellum slightly raised and bearing a few minute shining granules; the squamosity from the shoulders to the posterior declivity is greyish; there are two widely distant nodosities at the summit of the declivity, and between each of these and the shoulder there are three or four smaller prominences.

Underside thickly covered with griseous and infusate scales.

Length (rost. excl.) $2\frac{3}{4}$; breadth $1\frac{1}{2}$ line.

Broken River. A single specimen from Mr. J. H. Lewis.

Acalles fuscidorsis, sp. n.

Subovate, robust, compact, densely squamose, variegate, dark fuscous and infusate grey; antennæ and tarsi red.

Rostrum stout, parallel, covered with tawny scales, apparently a little asperate in front, with a squamose ridge along its basal portion; it is of about the same length as the thorax. *Head* broadly depressed. *Thorax* an eighth broader than long, much narrowed anteriorly and projecting over the head, apex emarginate, with coarse squamæ, but not

distinctly crested there; the disk seems flattened, but is slightly ridged along the middle, squamosity fuscous, almost black near the sides; these, however, are pallid; the erect squamiform setæ are nearly black. *Elytra* as wide as thorax at the base, but becoming a little wider behind the middle; they are a good deal narrowed but not quite vertical behind; from the base four (two on each elytron) flexuous ridges extend towards the posterior declivity; the enclosed space is darker than the sides or apex; on top of the declivity there are two rather distant, somewhat rounded, moderately prominent crests; the sides are more or less uneven, but the darker basal area is nearly plane; they are coarsely striate-punctate apparently. *Legs* squamose, variegated; femora widely notched below near the extremity, and bearing coarse setæ, so as to appear subdentate near the middle; third tarsal joint expanded, but with very short lobes, pubescent underneath.

Antennæ implanted just behind the middle; scape squamose, very gradually thickened, reaching the front of the eye; funiculus sparsely setose, rather long, basal two joints equally elongate, third distinctly longer than broad, five to seven bead-like; club opaque, ovate, densely pubescent.

The elytral disk appears unusually short, partly owing to difference in colour and rather long posterior declivity.

Length (rost. excl.) $2\frac{3}{4}$; breadth $1\frac{1}{2}$ line.

Invercargill. The description is drawn up from a unique specimen mounted on cardboard by Mr. A. Philpott.

Acalles igneus, sp. n.

Convex, subovate, densely squamose, variegate; basal half (but not the sides) of elytra and a median spot on base of thorax black; remainder of surface covered with fiery red scales, some coarse and depressed, others more elongate and erect; these are intermingled with very few greyish ones here and there; the rostrum and legs also bear more or less rufescent squamæ; antennæ testaceous.

Rostrum of about the same length as thorax, stout, expanded towards the eyes, finely medially carinate in front. *Thorax* about as long as broad, more narrowed in front than behind, its punctuation entirely hidden by the squamosity. *Scutellum* absent. *Elytra* convex, subcordate, obviously striate. *Legs* robust. *Scape* gradually incrassate, attaining the eye; funiculus 7-articulate, basal joint thick, 6 and 7 transverse, the latter the broader; club triarticulate, stout, ovate. *Ocular lobes* absent.

Length (rost. excl.) 1; breadth $\frac{1}{2}$ line.

Broken River, Canterbury. Mr. J. H. Lewis secured two specimens; the one retained by him is even brighter, quite scarlet in fact. The fiery squamosity is distinctive.

Acalles altus, sp. n.

Compact, very convex, subovate, rough, densely covered with obscure greyish scales; antennæ and tarsi fulvescent; rostrum pitchy red.

Rostrum thick, gradually narrowed towards the middle, where the antennæ are inserted. *Scape* reaching backwards to the eye; funiculus 7-articulate, basal joint nearly as thick at apex as the scape, second more slender, nearly twice the length of third; seventh distinctly broader than the preceding ones; club ovate, triarticulate. *Thorax* rather longer than broad, much but not abruptly narrowed anteriorly, its frontal portion depressed; across the front of the basal portion are erect scales which almost form a pair of crests; it projects over the head, but is much shorter below. *Head* globose underneath, but distinctly depressed above between the eyes; this flattened part is blackish. *Elytra* very slightly wider than thorax at the base, short and subovate, and quite vertical behind: when examined from the side they are seen to be on an abruptly higher level than the thorax; they are also convex transversely; on the summit of the hind declivity there is a pair of prominent crests, there is also a less prominent one on each side, but not so far back. *Legs* stout and scaly.

Underside covered with greyish scales, all the coxæ almost equally widely separated. Pectoral canal deep and broad; its raised margins extend almost to the front of the intermediate coxæ. Metasternum abbreviated, so that the middle and hind coxæ nearly touch each other. *Abdomen* punctate, basal two segments on a higher plane than the short third and fourth, the second apparently very short.

The thorax doubtless is punctate and the elytra striate-punctate, but as the specimen may be needed afterwards in its natural condition, I have not spoilt it by scraping.

Like *A. cristatus* (1276), more sombre of aspect, with less obvious and fewer crests, and distinguished by the interocular depression. No doubt a new genus will ultimately be formed for these two species.

Length (rost. excl.) 1; breadth $\frac{2}{8}$ line.

Broken River. From Mr. J. H. Lewis.

Acalles albistrigalis, sp. n.

Subovate, moderately convex, piceous; antennæ flavescent; tarsi infuscate red; covered with depressed dark or obscure greyish scales and numerous coarse erect setæ, without distinct elevations or crests.

Rostrum short and broad, obviously shorter than thorax. *Antennæ* inserted at, or immediately in front of, the middle of rostrum; the scape only moderately thickened apically, barely reaching the eye; funiculus indistinctly pubescent, basal joint stout, second and third rather slender and elongate, 5-7 short; club ovate, articulate, pubescent. *Eyes* rather flat, coarsely faceted. *Thorax* evidently longer than broad, gradually narrowed anteriorly, its frontal portion a little depressed; at its base there are two longitudinal streaks formed by whitish scales; the base is sharply truncate. *Elytra* short, subcordate, slightly wider than thorax at base. *Legs* stout, bearing erect, coarse, squamiform setæ.

A carefully denuded specimen shows that the derm is slightly glossy, that the thorax, in proportion to its small size, is coarsely and very closely punctured, and that the elytra have, on each, two well-marked sutural striæ, the sculpture beyond being regularly striate-punctate.

This, one of the smallest species of *Acalles*, may be identified by its short rostrum and the relatively long thorax with its pair of whitish basal streaks.

Length (rost. excl.) $\frac{3}{4}$; breadth $\frac{3}{8}$ line.

Broken River (Mr. J. H. Lewis); two specimens.

Acalles aterrimus, sp. n.

Convex, subovate, sparingly clothed with erect setæ; black; antennæ red, tarsi rufo-piceous.

Rostrum stout, slightly and gradually narrowed towards the middle, its sculpture longitudinal but irregular, with a few yellowish-grey scales at the base. *Scape* flexuous, gradually incrassate, implanted just behind the middle and just attaining the eye. *Funiculus* nearly glabrous, basal joint stout, second rather shorter and much more slender, 4-7 small and about equal. *Club* ovate, dark, with grey pubescence, indistinctly triarticulate. *Thorax* longer than broad, subconical, moderately narrowed and a little depressed in front; this frontal portion slightly shining, with less numerous and finer but very distinct punctures; the basal portion

closely and very coarsely punctured, a little depressed longitudinally in the middle, its base truncate; it bears some erect infuscate setæ at the sides. *Elytra* subcordate, of the same width as the thorax at the base, widest near the middle, apex much narrowed and nearly vertical; they have series of relatively coarse punctures, coarser at the sides than at the suture, and becoming striate behind; the interstices beyond the second row of sutural punctures appear somewhat elevated from base to apex; there are no squamæ, only a few coarse erect setæ. *Legs* stout, coarsely setose, apical hooks of the tibiæ well developed.

Underside black; basal ventral segments coarsely but not closely punctured, second barely half the length of the first, the suture indistinct; third and fourth very short, with deep sutures; fifth reddish, minutely sculptured. Pectoral canal profound, its raised hind margin extending to the middle of intermediate coxæ. Metasternum very short. There are no distinct ocular lobes.

The plain black colour, absence of squamosity, and rather long medially depressed thorax are distinctive characters.

Length (rost. excl.) $\frac{3}{4}$ -1; breadth $\frac{3}{8}$ line.

Broken River (*Mr. J. H. Lewis*). Two examples, the smaller one probably the male.

Acalles præsetosus, sp. n.

Minute, rather broad, subovate, without crests or inequalities, covered with pale sappy matter and erect, coarse, squamiform setæ of a greyish-yellow colour, and at the base of the thorax with two elongate patches of minute, rounded, cream-coloured scales; antennæ and tarsi red.

Rostrum stout, gradually narrowed medially, with many depressed greyish scales which are perceptibly separated from each other. *Thorax* apparently longer than broad, widest behind the middle, gradually narrowed towards the front, base truncate; the surface punctate and studded with erect scale-like setæ. *Elytra* slightly wider than thorax at the base, moderately short and broad, only a little broader near the middle than elsewhere, rounded and nearly vertical behind, distinctly striate-punctate, their clothing similar to that of the thorax. *Legs* stout, almost as coarsely setose as the body. *Tarsi* with fine, white, brush-like soles, their third joint moderately dilated, with well-developed lobes.

A. albistrigalis is a rather smaller and narrower insect, with altogether different vestiture, yellow antennæ, and with

a triangular notch at the base of the elytra, indicating the presence of a scutellum, which, however, as in this species, could not be detected.

Length (rost. excl.) $\frac{7}{8}$; breadth $\frac{1}{2}$ line.

Invercargill (*Mr. A. Philpott*); one only.

Acalles robustus, sp. n.

Compact, convex, subovate, robust, pitchy black; antennæ and tarsi ferruginous, irregularly squamose and setose.

Rostrum stout, longer than thorax, gradually and slightly narrowed backwards, punctate and longitudinally rugose. *Antennæ* scantily pubescent; the scape just attains the eye; basal two joints of funiculus equally elongate, 3-7 small; club ovate, articulated, pubescent. *Eyes* oblique, acuminate in front. *Thorax* rather short, subconical, a little constricted in front, moderately finely and closely punctured; a flat space along the middle, broad behind but narrower in front; is covered with depressed fuscous scales and is bordered with darker erect ones, its sides more or less squamose, but not crested. *Scutellum* absent. *Elytra* ample, subcordate, widest before the middle, much narrowed but not vertical behind, slightly broader than thorax at the base; rather bare along the middle, with two series of narrow elongate impressions along each side of the suture; on each elytron, before the middle, there are four dark, squamose, but not very prominent elevations, one being on the shoulder, two near the base, the fourth a little further back; a slightly curved squamose ridge extends from near the middle thigh to the summit of the declivity, but does not reach the third interstice; the sides and posterior declivity are covered with scales, a few being paler than others; all, however, are infuscate. *Legs* stout, bearing dark scales and outstanding coarse setæ.

Underside opaque, fusco-niger, with yellowish-brown squamæ; second ventral segment shorter than the first, both rather finely sculptured, fifth rather closely and moderately coarsely punctured; pectoral canal between the middle coxæ limited by elevated margins. *Femora* grooved underneath, the anterior somewhat angulate but not dentate.

There can be but little difficulty in identifying this rather large species.

Length (rost. excl.) $2\frac{1}{2}$; breadth $1\frac{3}{8}$ line.

Mount Te Aroha. Two in my own collection.

Acalles flavisetosus, sp. n.

Oblong-oval, moderately convex, without appreciable inequalities of surface; rufo-fuscous; rostrum slightly shining picco-rufous; the body densely covered with small, round, depressed, yellowish-grey scales, and rather short but not coarse decumbent yellow setæ, which, on the elytra, form regular series on the interstices.

Rostrum finely punctate, nearly nude, base squamose, the apex with a few erect yellow setæ; it is slightly and gradually narrowed towards the middle; there is a distinct contraction or notch at each side of the base. *Eyes* of normal shape. *Scape* moderately slender, just touching the eye. *Funiculus* with yellowish pubescence, first joint stout and but little longer than second; third to seventh gradually thickened; club ovate, articulate. *Thorax* contracted in front, feebly sinuate, and depressed at the base; with an indistinctly raised line along the middle, apparently closely but not coarsely punctured. *Scutellum* deeply sunk or absent. *Elytra* oblong, slightly broader than thorax at the base, a good deal narrowed but not quite perpendicular behind, coarsely striate-punctate. *Femora* grooved underneath; tibiæ uncinata and setose; tarsi with brush-like, not spongy, soles.

Pectoral canal deep, limited between the intermediate coxæ by strongly elevated margins. *Metasternum* rather broadly depressed. *Abdomen* on the same plane as the epipleura, second segment in the middle quite half the length of the first, intervening suture quite straight, third and fourth short; underside clothed with yellowish scales.

This species may be identified by the absence of superficial inequalities, almost uniform coloration, and by the basal margin of the thorax being depressed and densely covered with small yellow scales; this last peculiarity I have not noticed in other species.

Length (rost. excl.) $1\frac{3}{4}$; breadth $\frac{7}{8}$ line.

Broken River (*Mr. J. H. Lewis*); a single specimen.

Sympedius rectirostris, sp. n.

Compact, convex, subovate, variegate, densely squamose; antennæ and tarsi ferrugineous.

Rostrum about as long as thorax, not arched, its basal half slightly expanded towards the eyes and bearing grey squamæ, the apical portion nearly nude and smooth. *Thorax* much, but not abruptly, narrowed anteriorly, with a pair of prominent light brown or testaceous crests at the apex; this

frontal portion depressed, so that the basal part appears to be abruptly elevated and marginate with short erect scales; the discoidal squamosity is fuscous and overlapping, thus concealing the punctuation; the lateral squamæ are paler. *Scutellum* small. *Elytra* apparently striate, but their whole sculpture is rendered indistinct by the overlapping scales, most of which are dark, but paler on the third and fifth interstices, which look like interrupted ridges, the inner being most distinct; near each side, in line with the hind thighs, some greyish scales are concentrated; they are of the same width as the thorax at the base, but curvedly narrowed behind. *Tarsi* setose, penultimate articulation twice as broad as the second, transverse, with very short lobes.

A veritable *Sympedius*, agreeing in most respects with *S. testudo* (889), but only about half its bulk, with the rostrum straight. The basal joint of the funiculus is incrassate, but does exceed the slender second in length; the antennal insertion is exactly at the middle of the rostrum. It differs from *S. lepidus* (1683) in appearance and coloration; that species, however, has more slender tarsi, more abruptly dilated third joints, and more slender terminal ones; the antennæ are stouter and are implanted just before the middle.

Length (rost. excl.) $1\frac{3}{8}$; breadth $\frac{3}{4}$ line.

Otara, Southland. One sent to me by Mr. A. Philpott in November 1894.

OMÆACALLES, gen. nov.

Body compact, convex, subovate, broadest at the middle and tapering towards both extremities, squamose. *Legs* elongate and rather slender; tibiæ straight, uncinatè at apex. *Scapæ* rather slender, incrassate apically, barely reaching the eye. *Funiculus* 7-articulate, basal two joints obconical, of nearly equal length, neither elongate; 3-6 rather longer than broad, almost moniliform, seventh transverse; club ovate. *Eyes* depressed, subtriangular, truncate below and nearly so behind. The *scrobes* extend from the middle of the rostrum to the eyes.

Pectoral canal deep in front, continued between the vertical lateral borders of the mesosternum in front of the middle coxæ, and extending as a smooth sloping surface as far as the truncate suture of the short metasternum, and not bounded there by any raised hind margin. Basal *ventral segment* medially flattened, with the intercoxal suture quite straight, rather larger than the second, which slopes backwards to the level of the abbreviated third and fourth.

The sternal structure differentiates this genus from *Acalles* and its allies.

Omæacalles perspicuus, sp. n.

Piceous, without nodosities; rostrum, antennæ, and tarsi red; legs somewhat rufescent; the body densely clothed with variegated scales and erect setæ.

Rostrum arched, moderately slender, rather longer than thorax, subparallel, nearly glabrous, finely punctate. *Thorax* as long as broad, a good deal narrowed anteriorly, moderately coarsely and closely punctured; covered with flat scales, mostly tawny brown, some blackish near the base, with a greyish or testaceous streak along the middle in front; the coarse erect setæ are chiefly pale testaceous grey. *Scutellum* absent. *Elytra* but little broader than thorax at the base, curvedly narrowed backwards, apparently regularly punctate-striate; the squamosity like that of the thorax, with numerous irregular dark specks; the suture at the apex is testaceous; the fourth interstices, near the middle, bear distinct grey spots; the setæ also are variegated.

Legs with coarse erect pale setæ, but near the knees dark spots occur. Femora darkly grooved near the apex.

Length (rost. excl.) $1\frac{3}{4}$; breadth $\frac{7}{8}$ line.

Waitakerei Range, Auckland. Described from three specimens in my own collection.

TORILUS, gen. nov.

Body compact, squamose. *Thorax* bisinuate at the base, so that the obtuse posterior angles appear to cover the shoulders. *Scutellum* distinct. *Elytra* cordiform, of the same width as the thorax at the base.

Rostrum arched, moderately broad, gradually narrowed towards the middle, rather less expanded at the apex than near the eyes, just in front of these slightly notched at each side. *Palpi* short, rigid and porrect. *Scrobes* invisible above, extending from before the middle, below the surface, to the lower and front part of the eyes, deep throughout their whole length. *Scape* flexuous, rather slender, moderately incrassate towards the extremity; it does not attain the eye. *Funiculus* 7-articulate, basal joint remarkably short, hardly more than half the length of the second, which is slender and elongate; third and fourth a little longer than broad; seventh transverse, evidently broader than the sixth; club ovate, not very perceptibly articulated. *Eyes* acuminate

in front. *Femora* long and stout, grooved and angulate, and medially dentiform underneath. *Tibiæ* rather short, with stout terminal hooks. *Tarsi* setose below, penultimate joint only moderately dilated and lobed.

Pectoral canal extends to just behind the middle coxæ, limited by elevated borders. *Metasternum* very short, so that the posterior coxæ almost touch the intermediate. Basal *ventral segment* twice the length of the second, the suture between them medially angulate; third and fourth moderately short.

The principal distinguishing characters are the unusually short basal joint of the funiculus, the constriction at the base of the rostrum, the overlapped humeral angles, and dentate femora.

Torilus griseicollis, sp. n.

Conver, subovate, opaque, piceous; rostrum pitchy red, antennæ and tarsi ferrugineous; thorax covered with yellowish-grey scales, the elytra with dark variegated squamæ.

Rostrum slightly longitudinally rugose and punctate, with pale brown scales at its base. *Club* pubescent, similar to the funiculus in colour. *Thorax* a third broader than long, its frontal half much, but not very abruptly, contracted, its extreme apex pale brown; near the middle there are two small crests; an ill-defined carina extends from the base to beyond the middle; the inflated sides bear pale reddish-brown squamæ, and near the middle of the base there are a few dark ones; the punctuation is hidden. *Scutellum* small, piceous. *Elytra* broadest near the middle, much narrowed and nearly vertical behind, their sides inflexed; when looked at sideways they are seen to be most elevated near the thorax; they are striate-punctate; the basal portion is uneven, a series of small brown crests almost forms a curve from one side to the other, but is least distinct near the suture, on the summit of the posterior declivity. Unabraded specimens may be more variegated, and probably have a more definite arcuate area on the hind-body.

Underside clothed with depressed greyish scales; third and fifth ventral segments infusate.

Length (rost. excl.) $1\frac{3}{4}$; breadth 1 line.

Broken River. Described from a specimen found by Mr. J. H. Lewis.

ONIAS, gen. nov.

Rostrum shorter than thorax, subparallel. The *scrobes* begin at or just before the middle of the rostrum and extend along the sides, below the upper surface, to the eyes. *Scape* subclavate for half of its length, slender near the base, attaining the eye. *Funiculus* 7-articulate, first joint thick, second of similar form and length but more slender, 3-6 gradually decrease in length, seventh short and transverse; club ovate. *Thorax* without ocular lobes, rather longer than broad, base bisinuate. *Scutellum* absent. *Elytra* cordate, as wide as thorax at the base. *Femora* simple, long and stout, grooved near the extremity. *Tibiæ* short, flexuous, uncinatæ. *Tarsi* slender, nearly glabrous underneath, with only a few fine setæ on their third joint.

Pectoral canal limited between the intermediate coxæ by elevated borders. *Metasternum* short. Basal *ventral segment* broadly rounded between the coxæ, its apical suture quite straight; it is about double the length of the second; third and fourth, conjointly, as long as the second; the terminal narrow, depressed at each side.

Differentiated from *Tylodes*, *Acalles*, and their nearest allies by the nearly glabrous soles of the tarsi, abdominal structure, hair-like vestiture, &c. *Metacalles* has a long rostral canal, the base of the thorax is truncate, and the abdomen differs.

Onias latisulcatus, sp. n.

Convex, subovate, piceous; apex of rostrum distinctly red; tibiæ ferruginous; antennæ testaceous or rufescent; clothed with minute dark fuscous and paler squamæ and numerous outstanding setæ.

Rostrum longitudinally sculptured and punctate, squamose near the base, smooth but not definitely carinate along the middle. *Thorax* rather longer than broad, widest just behind the middle, more, yet only gradually, narrowed in front than behind; coarsely and closely punctured, broadly channelled along the middle, and with a very slender carina or smooth line in the middle of the depression; at each side of this a few paler scales almost form spots. *Elytra* strongly rounded laterally, much narrowed, and nearly vertical behind; they are rather short; with series of oblong punctures along the middle, so as to appear regularly striate-punctate there; this area, from the base to the middle, is bordered by

a ridge formed by suberect testaceous or pale brown scales, on each shoulder there is usually a shorter dark one; there is also a transverse pale spot at each side in line with the hind thigh; the lateral punctuation is coarse, sometimes foveiform. The legs bear numerous dark outstanding setæ.

Underside dull piceous, with rather coarse punctures; in each of these there is a depressed, elongated, yellowish scale; the fifth ventral segment is rufescent and broadly depressed at each side.

♂ ♀. Length $\frac{7}{8}$ — $1\frac{1}{8}$ (rost. excl.); breadth $\frac{1}{2}$ — $\frac{5}{8}$ line.

Broken River (Mr. J. H. Lewis). Another of his numerous discoveries amongst fallen leaves and twigs.

Obs.—1424 must be removed from *Acalles*, so as to become known as *Onias sentus*.

Onias ornatus, sp. n.

Convex, medially contracted, opaque, piceo-rufous; rostrum entirely shining pitchy red; tarsi and antennæ pale ferruginous; clothing variegate, pale brick-red and blackish, the long erect setæ numerous, very conspicuous on the legs as well as the body, and quite fuscous.

Rostrum finely and distantly punctate in front, longitudinally sculptured behind, with a few fusco-testaceous squamæ at the base. *Thorax* about a fourth longer than broad, evidently broadest behind the middle, gradually narrowed anteriorly, more strongly and obliquely towards the base; rather coarsely and closely punctured, nearly bare and a little shining at the apex and along the middle; the pale reddish elongated squamæ somewhat concentrated along each side of the broad, yet long, central depression. *Elytra* only about a fourth longer than the thorax, much wider at and before the middle than at the base, so that the body seems much contracted at the middle; they are almost vertical behind; they are striate-punctate; at the base, near the suture, there are two short elevations, composed of elongate slightly rufescent squamæ; along the sides and on the back the scales are shorter, but of similar colour, but there is a blackish, slightly raised, squamose spot on each shoulder, another further back and nearer the suture, one on the suture at the middle, and two on each side of the summit of the posterior declivity, the inner one the larger.

Easily distinguishable from *O. latisulcatus* by the brighter and more rufescent vestiture, by the thorax and elytra being appreciably broader near the middle; the scales are more

elongate on the thorax, and there is no carina in the median depression, &c.

Underside piceous, with greyish-yellow setiform scales; basal ventral segment broadly depressed, deeply and coarsely but not closely punctured; the intervals densely and very minutely sculptured, the fifth slightly rufescent, its punctuation rather shallow; it is not visibly depressed at the sides.

Length (rost. excl.) 1; breadth quite $\frac{1}{2}$ line.

Broken River (*Mr. J. H. Lewis*).

Mesoreda sulcifrons, sp. n.

Elongate, suboblong, convex, piceo-rufous; densely covered with somewhat elongate scales, dark brown, tawny, or nearly white.

Rostrum rather longer than thorax, moderately slender, parallel, hardly at all arched above; apical portion with a few fine punctures and slender hairs, but appearing nude; the basal portion closely punctured and covered with tawny scales. *Thorax* a good deal contracted and a little depressed in front, distinctly and very closely punctate, the intervals narrow and somewhat rugose; most of the squamosity dark, but with a large grey patch near each hind angle; there is a narrow longitudinal median ridge; the apical scales are slightly raised, but do not form distinct crests; its base is strongly bisinuate. *Scutellum* greyish. *Elytra* oblong and of about the same width as the thorax till near the apex; they are striate, with numerous minute punctures on the interstices, which seem more or less rugose; the sutural area from the base to near the middle bears many white squamæ with slightly elevated, broad, fuscous borders; pallid scales also form a sort of interrupted arch behind the basal area, and extending from one shoulder to the other; there is a transverse patch on the hind declivity; the rest of their surface is covered with dark or tawny squamæ and short, coarse, erect setæ.

Antennæ rather slender; scape nearly glabrous; funiculus elongate, basal joint subpyriform, joints 2-7 gradually incrassate, seventh very transverse, so that the long articulated club is not very obviously marked off. *Femora* laterally compressed, notched near the extremity, but not distinctly dentate below. *Tibiæ* slightly flexuous, the two hind pairs slightly prominent externally near the base and extremity. *Tarsi* with greyish setæ.

Differentiated from *M. orthorhina* (1625) by an elongate

inter-ocular depression, by the thoracic ridge, the basal elevations on the elytra, more slender antennæ, and variegated squamosity.

♀. Length (rost. excl.) $2\frac{1}{4}$; breadth $1\frac{1}{8}$ line.

Timaru; one found by Mr. W. L. Wallace amongst leaves on the ground and another from Mr. A. Philpott, of Invercargill.

KENTRAULAX, gen. nov.

Rostrum stout, shorter than thorax, contracted medially. *Scrobes* deep, quite exposed above, beginning just before the middle and extending to the lower and front part of the eyes. *Antennæ* short and stout. *Scape* thick, gradually incrassate, but not clavate at the extremity; it does not reach the eye. *Funiculus* 7-articulate; basal joint obconical, not elongate; joints 2-7 gradually becoming thicker, transverse; the triarticulate oviform club not at all distinctly marked off. *Thorax* with rounded sides very abruptly contracted, but not depressed in front; base bisinuate, without ocular lobes. *Scutellum* distinct. *Elytra* oblong, of the same breadth as thorax, gradually and slightly narrowed posteriorly. *Femora* deeply notched and grooved near the extremity. Anterior *tibiæ* with a stout median mucro at its front face, and also angulate at the inner and outer extremities. *Tarsi* with brush-like soles, third joint expanded, its lobes narrowly separated. *Eyes* quite truncate in front.

Pectoral canal not deep, rather narrow between the front coxæ, not limited behind by the triangular mesosternal process, which has prominent front angles, the mesosternum itself being broadly depressed in front of the coxæ from one side to the other; the canal borders are not at all sharply defined laterally, being, indeed, thick and broad, and, near the front, each side bears a strong, remarkable, spiniform protuberance.

In *Oreda notata* the rostral canal is deep and limited throughout by elevated borders, the mesosternal process being in contact with the front coxæ, which are widely separated; the cavity is very deep and extends behind the anterior coxæ.

In *Aldonus* the canal terminates at the thickly pubescent hind face of the prosternum, and the broad depressed frontal portion of the mesosternum intervenes between its broad process and the flattened area between the anterior coxæ.

Kentraulax should be placed near these two genera, but is distinguished from both by the conspicuous protuberance at

each side of the rostral canal. The middle and hind tibiæ are medially angulate externally and prolonged at the outer extremity, the former most distinctly, so that their structure is somewhat similar to that of *Psepholax*.

The genus is instituted for the more systematic location of *Oreda murina* (864), which now becomes *Kentraulax murina*.

Getacalles favosus, sp. n.

Convex, suboblong, opaque, rough; densely covered with variegated, small, depressed, and some elongated upright squamæ, yellowish brown or testaceous, the darker colour predominates, the lighter form crests and cover the suture of the elytra from behind the middle to the apex; antennæ and tarsi ferruginous.

Rostrum moderately arched, parallel, thick, quite as long as thorax, constricted near the eyes, closely punctate, covered with rufo-fuscous scales almost to its apex. *Thorax* in front only about half the width of the basal portion, depressed and obtusely prominent, but not distinctly crested there; the larger basal part with two small pale crests near the front and two near the middle further apart, its sides rough, with pale outstanding squamæ. *Scutellum* very distinct, greyish. *Elytra* with thick humeral angles projecting beyond the base of the thorax; with coarse irregular punctures or foveæ and irregularly formed, slightly raised intervals, so as to appear somewhat favose; they bear about twenty more or less evident crests or nodosities, the most conspicuous being situated behind the middle. *Legs* roughly squamose.

Underside squamose, pale brown, the sides of the terminal segments blackish.

In *Tychanus*, the nearest ally, the rostral canal extends to the middle of the intermediate coxæ, where it is deep or cavernous; but in this species the hind part has a frontal slope, so that the tip of the rostrum cannot penetrate below the margin of the mesosternal process. The ventral segments are on two distinct planes, the terminal three being sunk below the level of the epipleura; the basal segment is more than double the length of the second in the middle, its hind suture is much sinuate, nearly vertical, and as densely squamose as its upper surface; third and fourth moderately short.

The *scape* is slender, flexuous, and a little incrassate towards the extremity. The *funiculus* is longer; second joint more slender than, but almost as long as, the first;

joints 3-7 gradually thickened. *Club* quadriarticulate, basal joint as large as the following three combined; in *Tychanus* it is triarticulate.

Distinguished from the other species by its very asperate hind body and pallid suture.

Length (rost. excl.) $1\frac{3}{4}$; breadth $1\frac{1}{8}$ line.

Ligar's Bush, Papakura. Two specimens in my own collection.

BÆORHYNCHODES, gen. nov.

Body very convex, nearly as high behind the middle as it is broad; compact, oval, squamose.

Rostrum elongate, rather slender, almost quite parallel-sided. *Mandibles* distinct. *Scrobes* lateral, beginning at the middle and extending to the eyes. *Head* short, on a rather higher plane than the rostrum, smooth and subglobular below. *Eyes* large, finely faceted, subtruncate in front. *Scape* slender, almost attaining the eye. *Funiculus* elongate, basal joint stouter and a little longer than second; joints 3-7 gradually incrassate. *Club* elongate-oval. *Thorax* conical, without ocular lobes. *Elytra* subcordate, closely adapted to base of thorax, bisinuate, and only slightly wider at the shoulders than the base of thorax.

Legs moderately long but stout; tibiæ thickly mucronate at extremity. *Tarsi* setose above; basal two joints scantily clothed, third densely clothed with grey hairs underneath; basal two joints moderately slender, third rather widely expanded, deeply excavate above, but with very short lobes.

Pectoral canal deep, wide in front; its raised margins extend to hind part of the intermediate coxæ. *Metasternum* short, somewhat uneven, and on a higher plane than the ventral segments. *Abdomen* with five segments, the first on a higher level than second, and, in the middle, nearly the length of the following two combined; third and fourth each shorter than second, yet not much abbreviated; 2-4 with deep sutures; fifth subconical.

Very similar to *Euthyrhinus*; the scrobes, however, are not abbreviated, and do not extend to the lower surface of the rostrum; the sternal canal differs, and the elytral apices are not acuminate. In *Rhynchodes* the scrobe attains the eye (which is more pointed in front) and begins before the middle; the scape consequently is proportionately longer, the rostrum differs, and so does the pectoral canal. *Bæorhynchodes*, in fact, is intermediate between the genera cited.

Bæorhynchodes cristatus, sp. n.

Subopaque, nigro-picceous; the legs, rostrum, and antennæ rufo-picceous.

Head apparently impressed between the eyes, with slender dark grey squamæ. *Rostrum* finely punctate, with some slender hairs near the base, not distinctly carinate. *Thorax* much narrowed, but not abruptly constricted in front, with two erect crests just over the head and an indistinct one at the middle of each side; there is a depression before the scutellum; the surface distinctly but not coarsely or closely punctured; its squamosity decumbent, disposed irregularly, and nearly as dark as the derm. *Scutellum* distinct, nearly white. *Elytra* sharply limited or marginate laterally and rufescent; sides inflexed, asperate, and with fovea-like impressions; each elytron has four series of about ten deep elongate depressions, which can hardly be called punctures, and do not form striæ, all being plainly separated; the lateral or fifth series are very coarse; on the suture, at the middle, there is a well-marked dark crest; in front of this, on the suture only, whitish scales extend to the scutellum; interstices finely punctured; the squamæ are dark but not coarse, are nearly concolorous, and do not entirely cover the surface; the posterior declivity is not quite vertical.

Legs with short grey and blackish setæ; femora not deeply notched below; intermediate tibiæ thickened and arched just below the knees, the others nearly straight. The upper vestiture of the tarsi is remarkable, the third joint of the anterior bearing coarse outstanding setæ.

Length (rost. excl.) $2\frac{1}{2}$; breadth $1\frac{1}{2}$ line.

Broken River. Unique. Although not showy, this species is, to me, a very attractive little weevil. Mr. J. H. Lewis discovered it.

Group Anthribidæ.

Anthribus lewisi, sp. n.

Nigrescent, tomentose, variegate; the front of rostrum greyish or pale tawny; scutellum and a spot in front of it white; two small basal crests on the elytra and five or six smaller spots near the sides tawny; along the elytral suture there are six dull intensely black marks, and about as many more nearer the sides; the pygidium is greyish; legs of a chocolate hue, with a grey spot on the middle and another at the extremity of the tibiæ.

Rostrum shorter than thorax, flat and a little expanded in

front. *Antennæ* inserted medially below the sides; second joint almost as stout as, but longer than, the exposed portion of first; 3-5 elongate and nearly equal; 6-8 rather shorter, but more incrassate at apex; club moderate, basal joint longest and subtriangular, second transverse, terminal short, oval. *Eyes* oblique, entire, oval, and prominent. *Thorax* scarcely broader than long, a little narrower in front than behind, only moderately rounded laterally; its punctuation not distinct; at the sides there are a few small granules; there is a crested prominence on the middle; the carina is near the base at the middle, but further from it at the sides; posterior angles not sharply defined. *Elytra* slightly uneven above, distinctly broader than thorax at the base, apices obtusely rounded; they have series of small punctures, which are more or less interrupted by the small crests.

A. browni has the eyes lateral and longitudinally oval, instead of being oblique and more on the upper part of the head; the rostrum is longer and evidently narrower; the basal thoracic carina differs, and the antennæ are longer, with more elongated joints. *A. bullatus* is its nearest congener.

Length (rost. incl.) $2\frac{1}{4}$; breadth $\frac{7}{8}$ line.

Broken River. One individual, discovered by Mr. J. H. Lewis, whose name has been given to it.

Anthribus philpotti, sp. n.

Rostrum in front as broad as the head, excluding the eyes, feebly incurved; the back covered with grey hairs. *Thorax* transverse, its sides strongly rounded, distinctly and closely punctate, clothed chiefly with dark hairs, but with a narrow grey streak near the base; the carina fine, medially angulate, distant from the basal margin and bent forward at the sides; there are two small apical crests. *Scutellum* small, grey. *Elytra* wider than thorax at the base, oblong, parallel, finely but distinctly striate-punctate; each elytron bears a large basal prominence, a smaller one behind the middle, and two still smaller on top of the posterior declivity, the inner the larger of the two; the clothing consists of greyish, brown, and dark hairs, so intermingled that no definite spots are formed; each shoulder is covered with greyish-yellow pubescence, and thus appears conspicuous. *Legs* and tarsi pubescent, variegate, testaceous, and fuscous.

Antennæ as long as the body, inserted in foveiform cavities at the sides; basal two joints stout and of the same length, the first with distinct grey pubescence; third about a third longer than fourth, clavate at the extremity; joints 4-9 also

elongate, ninth gradually thickened, tenth only slightly longer than broad, eleventh oviform; they are fusco-testaceous. *Eyes* prominent, transverse, evidently emarginate in front. General ground-colour piceous.

Its systematic position is near *A. lanuginosus* (968).

Length (rost. incl.) $1\frac{3}{4}$; breadth $\frac{3}{4}$ line.

Invercargill. One specimen on cardboard submitted for identification by Mr. A. Philpott, after whom I have named it.

[To be continued.]

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

June 16th, 1909.—Prof. W. J. Sollas, LL.D., Sc.D., F.R.S.,
President, in the Chair.

The following communications were read:—

1. 'The Carboniferous Limestone of County Clare.'

By James Archibald Douglas, M.A., B.Sc., F.G.S.

The district with which this paper deals forms the westernmost limit of the great central Carboniferous Limestone plain of Ireland.

The limestone floors nearly the whole of Eastern Clare, from the southern shore of Galway Bay to the banks of the Shannon. This area, for the purposes of description, is divided into two main districts.

The whole of the northern region is formed by a vast elevated plateau of Upper or Viséan Limestone, with a surface more than 100 square miles in extent, which rises on the north and east in steep terraced cliffs, but to the south-west dips gently below the so-called 'Coal-Measure' Series. The surface of this plateau is formed of bare rock, devoid of vegetation and presenting the typical appearance of a Karst landscape. The rainfall is considerable, but is nearly all carried off by subterranean channels.

The southern district presents a totally different aspect. The high ground is no longer formed of limestone: that on the east being formed by Old Red Sandstone and Silurian rocks, that on the west by Coal-Measures. The older formations appear as two anticlinal flexures with a north-easterly trend, forming the mountains of Slieve Aughty and Slieve Bernagh, between which lies a broad syncline of Carboniferous Limestone. The margin of this syncline is formed by Tournaisian shales and limestone, the successive zones

of which can be traced round its outcrop, while the Viséan limestones occupy the core. Much of the country is obscured by drift, chiefly derived from the underlying rocks.

A study of the limestone-fauna shows that the Geological Survey boundary between the Upper and Lower Limestones corresponds with the transition from a Tournaisian to a Viséan fauna; the Lower Limestone cannot, however, be separated from the underlying shales; and the Middle or 'Calp' Limestone contains a fauna distinct from that of the Upper or Burren Limestone, although they are not separable on lithological grounds. An account is given of the zones recognized in County Clare, and a correlation made with the sequence in other British localities.

The Old Red Sandstone is succeeded, to all appearance conformably, by a thin series of sandy shales containing brachiopods characteristic of the *Cleistopora*-Zone, at the base of which a band is found containing abundant Modioliform lamellibranchs. The *Zaphrentis*-Zone is well developed, the *clathratus*-subzone forming the top of the Lower Limestone-Shales, and the *konincki*-subzone the lower stratified limestone.

The most remarkable portion of the whole sequence is included in the *Syringothyris*-Zone, which is represented by massive grey and white mottled limestones with a luxuriant molluscan fauna, large cephalopods being especially abundant. These beds show evidence of deposition in shallow water, affording further proof of a mid-Avonian period of upheaval. The fauna is compared with that of the Waulsortian phase of Belgium. The incoming of a Viséan fauna is well marked at the base of the *Seminula*-Zone; in the middle of this zone occurs an important bed of oolitic limestone, with abundant gasteropods. The *Dibunophyllum*-Zone attains a thickness equal to that seen in the Midland area. D_1 is chiefly characterized by the abundance of simple *Dibunophylla*, *Cyathophyllum murchisoni*, Clisiophyllid Lithostrotions, and *Productus latissimo-giganteus*; D_2 by the occurrence of *Lonsdalia* and *Cyathophyllum regium*; and D_3 by the abundance of Zaphrentids, *Caninia*, and Densiphyllids, and the apparent absence of Clisiophyllids and Lithostrotions.

An account of the chief fossil localities, under the headings of the separate Baronies, is then given, and the paper concludes with palæontological notes.

2. 'A New Species of *Sthenurus*.' By Ludwig Glauert, F.G.S.

In a large collection of remains of extinct Marsupial mammals from the Mammoth Cave, Margaret River (Western Australia), the Author recognized several mandibles of a new kangaroo of the genus *Sthenurus*. He now communicates a detailed description of one specimen, and shows that the new species most nearly resembles *Sthenurus oreas* (De Vis) and *Sth. atlas* (Owen).

3. 'Some Reptilian Remains from the Trias of Lossiemouth.'

By D. M. S. Watson, B.Sc.

The fore limb of *Ornithosuchus woodwardi* is shown in a specimen in the Manchester Museum. It is small, only about one-half the size of the hind leg. The scapula is much expanded at both ends, and is indistinguishably fused with the coracoid. The latter bone is pierced by a large foramen. The humerus is a slender bone, somewhat twisted, but not much expanded at the ends; it has a distinct ectepicondylar groove. The ulna is very broad at the proximal end, but narrows distally; its proximal portion forms a thin plate of bone. The radius crosses the ulna, its proximal end lying entirely in front of it, while the distal ends of the two bones lie side by side. The carpus cannot be made out. Only metacarpals 1, 2, and 3 are functional; but a possible representative of 4 lies closely pressed to the back of the other three. Both phalanges of digit 1 are preserved, the last being a strong claw.

Ornithosuchus is restored as an animal walking on all fours, with the head carried rather low. The proportions are identical with those of *Ætosaurus*.

A description is given of the skeleton of a very small reptile, interesting as recalling *Ætosaurus* in its armour, and because it shows the whole of the animal except the tail.

4. 'Some Reptilian Tracks from the Trias of Runcorn (Cheshire).'

By D. M. S. Watson, B.Sc.

Very little information exists as to the tracks of the smaller reptilia of the Trias, although several types of footprints have been described from isolated examples. Four types of tracks which occur on the slab of sandstone from Weston Point, described in 1840 by Dr. Black, are discussed in this paper. They belong to forms generally included in the Rhynchosauroid types and to the footprint I, Beasley.

Both pes and manus are impressed in three of the cases, the other being so small that it is doubtful whether the manus would have made a recognizable impression if it did touch the ground.

Footprint A 2, Beasley, has a manus very similar to the pes, but showing some traces of the palm.

Footprint A 8, spec. nov., has five toes in the pes connected by a web. The manus is also five-toed, but corresponds to some extent to I, Beasley. There is a well-marked tail-streak in the track.

E, Beasley, which is very similar to I, really has five digits, the fifth being directed backwards and only just touching the ground.

A very small footprint is described as A 9.

It is suggested that some of these prints may quite well belong to such Thecodonts as *Ornithosuchus*.

5. 'The Anatomy of *Lepidophloios laricinus*, Sternb.'

By D. M. S. Watson, B.Sc.

A specimen of *Lepidophloios laricinus*, found in one of the coal-balls of Lancashire, shows the internal structure. The species is new, and is of the ordinary lepidodendroid type, but is remarkable for the great size and strength of the corona and the leaf-traces.

Lepidophloios acadianus, Dawson, which is identical with *L. laricinus*, appears to differ in its internal structure, in having still stronger protoxylem-points and leaf-traces.

Lematophloios crassicaule, Corda, which is *L. acerosus*, L. & H., appears to resemble greatly the Lancashire specimen of *L. laricinus* in its structure, and is quite distinct from the specimen of the same form described by Cash & Lomax.

Lepidodendron fuliginosum, Will., a structural species, appears to include a specimen the external structure of which corresponds with *Lepidophloios acerosus*, *Lepidodendron obovatum*, *L. aculeatum*, and *Sigillaria discophora*. Under these circumstances, it is proposed to take no account of the impression-species in considering the synonymy of the structural specimens, and *vice versa*. When the exterior of a structural specimen is actually known, it may be referred to by the name of the structural species, with that of the impression-species added in brackets.

MISCELLANEOUS.

Burmeister's 'Genera quaedam Insectorum.'

REFERRING to Mr. Sherborn's notes in the last number of the 'Annals,' on the dates of publication of this work, and having in my library parts 1 to 9 in the original wrappers as issued, as well as a complete copy in the original boards, I am able to make some corrections and clear up the questions upon which he is in doubt.

Thrips and *Phlœohrips* were issued in part 6 (not in 5). *Eudinopus* was also issued in this part.

Platygenia, which he states he cannot find, was issued in part 7.

Phthirus was issued in part 4, and the "Carton" is a correction, not an addition as he states, and with *Lystra* and *Phenax* "Carton" must have been issued in part 10 as he suggests.

A titlepage bearing "Vol. i. Rhynchota," 1838, with the Preface dated October 1837, was issued in part 1; but, as other orders were included in the later parts, another titlepage, with "Rhynchota" omitted and dated 1838-1843, was issued with the last part, and this should be taken as the correct date of publication, 1837 being the date the Preface was written.

Each of the ten parts comprised four plates with the corresponding text.

O. E. JANSON.

July 3rd, 1909.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 21. SEPTEMBER 1909.

XVII.—*A Revision of the Australian Species of the Genus Scolia.* By ROWLAND E. TURNER, F.Z.S., F.E.S.

AUSTRALIA is not very rich in species of *Scolia*, but as there has been some confusion in the naming and as to the sexes, I think a revision may be useful. Probably more species will yet be discovered in the *Discolia* group, for which I have had least material available, but my material in other groups has been very extensive. In addition to the series in the British Museum, I have been able to use the fine series sent by Mr. H. M. Giles from Western Australia and my own collection from Queensland. The divisions into genera and subgenera are more convenient than natural, the neururation, on which the division is founded, often differing in the most nearly allied species. I have been obliged to sink the name *Elis* used by Saussure for the species with two recurrent nervures, seeing that the Fabrician definition of *Elis* is almost certainly taken from a male *Plesia*. The name must therefore be used for *Plesia*, Jur., over which I think it has priority, and not for the genus to which it is usually applied and for which *Campsomeris*, Lep., must be used.

Outside the genus *Scolia*, taken in the wider sense, the family Scoliidæ is represented in Australia by a single species of *Tiphia*, which, as far as I know, only occurs in tropical Queensland, and by a considerable number of species of *Anthobosca*, a genus now entirely confined to the continents

of the Southern Hemisphere, but which is apparently identical with a fossil genus *Geotiphia*, recently described by Cockerell from North America; showing that the genus had a much more extensive range in the past. I look on the genus as in some respects a link between *Scolia* and the Thynnidæ, and think it not improbable that it is older than either of those groups. The genera *Myzine* and *Plesia* are entirely absent from Australia and the single species of *Tiphia* is evidently a Malayan immigrant.

Individuals of some of the species of *Scolia* are very numerous and several of the species seem to range over almost the whole continent. *Dielis radula* and *formosa* are the commonest species in Queensland. The paucity of species is probably due to the absence of natural barriers and to their suitability for a dry climate; whilst their powers of flight are not limited, as in the case of the Mutillidæ and Thynnidæ, by the necessity for an apterous female being carried by the male.

Key to the Australian Species of *Scolia*.

- ♀ ♀.
- A. Fore wing with one recurrent nervure.
- a. Three closed discoidal cells *Liacos insularis*, Sm.
- b. Two closed discoidal cells Genus *Scolia*.
- a². Three cubital cells Subgenus *Triscolia*.
- a³. Black, third abdominal segment spotted with yellow.
- a⁴. Vertex with a transverse yellow band *S. frontalis*, Sauss. (typical).
- b⁴. Vertex without a yellow band. *S. frontalis*, st. *obscuriceps*.
- b³. Entirely black *S. frontalis*, st. *nicoladonii*.
- b². Two cubital cells Subgenus *Discolia*.
- a³. Entirely black *S. soror*, Sm.
- b³. Vertex marked with yellow *S. verticalis*, Fabr.
- B. Fore wing with two recurrent nervures ..
- a. Three cubital cells Genus *Campsomeris*.
- a². Three closed discoidal cells Subgenus *Trielis*.
- b². Two closed discoidal cells.
- a³. Wing dark fusco-violaceous.
- a⁴. Entirely black *C. anthracina*, Burm.
- b⁴. Third abdominal segment spotted with yellow. . . . *C. anthracina*, var. *consanguinea*, Sauss.
- b³. Wings flavo-hyaline, abdomen banded with orange.
- a⁴. Second and third dorsal segments with large orange lateral spots . . *C. gilesi*.
- b⁴. Second and third dorsal segments evenly banded with orange.
- a⁵. The orange bands narrow and basal *C. zonata*, Sm.
- b⁵. The bands very broad, the second and third segments narrowly black at the apex.

- a*⁶. The whole disc of the mesonotum punctured. *C. flavidula*, Sm.
- b*⁶. The disc of the mesonotum with a smooth area. *C. flavidula*, st. congener.
- b.** Two cubital cells Subgenus *Dielis*.
- a*². Black, with fasciæ of white pubescence at the apex of abdominal segments *C. carinifrons*.
- b*². Abdomen banded with yellow.
- a*³. First dorsal segment entirely black *C. radula*, Fabr.
- b*³. First dorsal segment marked with yellow.
- a*⁴. Second recurrent nervure complete. Abdominal bands broad and yellow *C. formosa*, Guér.
- b*⁴. Second recurrent nervure incomplete. Abdominal bands narrower and orange *C. subopaca*.
- ♂ ♂.
- A.** Fore wing with one recurrent nervure.
- a.* Three closed discoidal cells *Liacos insularis*, Sm.
- b.* Two closed discoidal cells. Genus *Scolia*.
- a*². Three cubital cells Subgenus *Triscolia*.
- a*³. Third dorsal segment spotted with yellow, sides of the pronotum yellow *S. frontalis*, Sauss. (typical).
- b*³. Third dorsal segment spotted with yellow, pronotum wholly black *S. frontalis*, st. *obscuriceps*.
- b*². Two cubital cells Subgenus *Discolia*.
- a*³. Entirely black.
- a*⁴. Second ventral segment tuberculate at base *S. commixta*.
- b*⁴. Second ventral segment not tuberculate.
- a*⁵. Pubescence black *S. soror*, Sm.
- b*⁵. Pubescence cinereous *S. pygmaea*, Sauss.
- b*⁵. Vertex marked with orange *S. verticalis*, Fabr.
- B.** Fore wing with two recurrent nervures Genus *Campsomeris*.
- a.* Three cubital cells. Subgenus *Trielis*.
- a*². Three closed discoidal cells. *C. ferruginea*, Fabr.
- b*². Two closed discoidal cells.
- a*³. Wings dark fusco-violaceous.
- a*⁴. Entirely black *C. anthracina*, Burm.
- b*⁴. Third abdominal segment spotted with yellow *C. anthracina*, var. *consanguinea*, Sauss.
- b*³. Wings hyaline or flavo-hyaline. Abdomen banded with yellow.
- a*⁴. Thorax immaculate, bands of abdomen orange *C. zonata*, Sm.
- b*⁴. Thorax usually spotted on scutellum at least, bands of abdomen pale yellow.
- a*⁵. Median segment marked with yellow *C. flavidula*, Sm.
- b*⁵. Median segment entirely black *C. gilesi*.
- b.* Two cubital cells Subgenus *Dielis*.
- a*². Three basal abdominal segments banded narrowly with yellow.

- a*³. Scutellum and postscutellum marked with yellow, ventral segments 2 and 3 banded with yellow *C. subopaca*.
*b*³. Thorax and ventral segments entirely black *C. gracilis*, Sauss.
*b*². Six basal segments at least banded with yellow.
*a*³. Clypeus entirely yellow.
*a*⁴. Seventh segment banded with yellow *C. radula*, Fabr.
*b*⁴. Seventh segment black entirely *C. carinifrons*.
*b*³. Clypeus yellow with a small black spot in the middle; seventh segment entirely black *C. formosa*, Guér.

Genus LIACOS, Guér.

Subgenus DILLACOS, Sauss. et Sichel.

Liacos insularis, Sm.

Scolia insularis, Sm. Journ. Proc. Linn. Soc., Zool. iii. p. 153 (1858), ♂.

Hab. Mackay, Q.; Cairns, Q.

Female specimens from Queensland are a little more sparsely punctured on the thorax than Ké specimens, but otherwise do not differ. Males from the two localities show no difference. The species also ranges into the Solomon Islands, specimens from that locality having been recorded by Kirby as *Diliacos dubia*, Sm. The latter species described by Smith from Ceram does not appear to differ sufficiently from *insularis*, if Kirby's identification of the female is correct.

Genus SCOLIA, Fabr.

Subgenus TRISCOLIA, Sauss. et Sichel.

1. *Scolia frontalis*, Sauss.

Scolia frontalis, Sauss. Mém. Soc. phys. et hist. nat. Genève, xiv. p. 38 (1854), ♂ ♀.

Scolia coronata, Sm. Cat. Hym. B. M. iii. p. 112 (1855).

Hab. Adelaide, S.A.; New South Wales; Eastern Queensland.

The typical form from Eastern Australia has a yellow band on the vertex of the female and the sides of the pronotum yellow in the male. But in specimens from Port Darwin these yellow markings are absent in both sexes, the insects being entirely black with the exception of the yellow spots on the third abdominal segment. For this form I propose the name *S. frontalis*, st. *obscuriceps*. The spines of the

hypopygium in the male are rather longer in Port Darwin specimens than in the typical forms, but specimens from the east coast are not quite constant in this respect. *S. nicoladonii*, D. T., = *laviceps*, Kirby, must I think stand as another race distinguished by the absence of all yellow markings. The forms will stand:—

1. *Scolia (Triscolia) frontalis*, Sauss., st. *frontalis*, Sauss.
Eastern Australia.
2. *Scolia (Triscolia) frontalis*, Sauss., st. *obscuriceps*,
st. nov. Port Darwin.
3. *Scolia (Triscolia) frontalis*, Sauss., st. *nicoladonii*, D. T.
South-western Australia.

Subgenus DISCOLIA, Sauss. et Sich.

1. *Scolia soror*, Sm.

Scolia soror, Sm. Cat. Hym. B. M. iii. p. 96. n. 50 (1855).

Scolia cyanipennis, Lepel. Hist. nat. Insect. Hym. iii. p. 524 (1845)
(nec Fabr.).

Scolia viridipennis, Sm. Cat. Hym. B. M. iii. p. 96. n. 52 (1855).

Hab. Eastern Australia, Adelaide to Cairns.

2. *Scolia pygmæa*, Sauss.

Scolia pygmæa, Sauss. Ann. Soc. Entom. France, (3) vi. p. 217
(1858), ♂.

Hab. South-western Australia.

This may prove to be a geographical race of *soror*, Sm., but the sculpture differs. The tubercle at the base of the second ventral segment of *soror* does not seem to be a good distinguishing character, as it is not present in any specimen I have seen. Probably Saussure confused two species under *soror*. In the present species the pubescence is cinereous, not black as in *soror*.

3. *Scolia verticalis*, Fabr.

Scolia verticalis, Fabr. Syst. ent. p. 356 (1775).

Scolia tuberculiventris, Sauss. Mém. Soc. phys. et hist. nat. Genève, xiv.
p. 47 (1854), ♂.

Hab. The whole of the southern and eastern portions of Australia from Perth to Cooktown; probably also the north and north-west.

The type is a male and is an unusually large specimen and has the spines of the hypopygium much longer than is usual in this species. But comparison of a long series shows

that this is a very variable character, so I conclude that there is only one species of *Discolia* in Australia with a transverse orange band on the vertex. The tubercle at the base of the second ventral segment is always well marked in this species.

4. *Scolia commixta*, sp. n.

? *Scolia soror*, Sauss. et Sich. Spec. gen. *Scolia*, p. 126 (1864) (nec Smith).

♂. Clypeus convex, sparsely punctured, truncate at the apex. Scape finely punctured; antennæ about as long as the thorax and median segment combined, much shorter than in *soror*. Head sparsely punctured; the front below the anterior ocellus raised, smooth and opaque immediately below the ocellus, then closely punctured, longitudinally and very finely striated between the antennæ, the striated portion divided by a longitudinal sulcus which extends on to the punctured portion. Thorax sparsely and not very coarsely punctured, the mesonotum smooth in the middle and to the posterior margin; the median segment more closely and coarsely punctured at the apex. Abdomen closely punctured, more sparsely in the middle of the segments than on the sides; the first segment very broad, not constricted or depressed at the apex, the second ventral segment with a tubercle in the middle at the base.

Shining black, with black pubescence. Wings very dark fuscous, with strong blue and purple gloss.

Length 18 mm.

Hab. Port Darwin (*J. J. Walker*).

Easily distinguished from *soror* by the short antennæ and the tubercle on the second ventral segment.

Genus CAMPSOMERIS, Lepel.

Subgenus TRIELIS, Sauss. et Sich.

1. *Campsomeris anthracina*, Burm.

Scolia anthracina, Burm. Abh. naturf. Ges. Halle, i. pt. 4, p. 16 (1853), ♂ ♀.

Elis (Trielis) consanguinea, Sauss. Mém. Soc. phys. et hist. nat. Genève, xiv. p. 50 (1854), ♂.

Scolia bimaculata, Sm. Cat. Hym. B. M. iii. p. 115 (1855), ♂.

I cannot see that *consanguinea* is more than an aberration in which there is an orange spot on each side of the third dorsal segment. This is the usual form of the male: specimens which are wholly black seem to be rare; but the female is very rarely marked with the orange spots. All the males

I have seen without the orange spots are from South-west Australia and have the first abdominal segment broader than in Eastern specimens; but I can find no difference in the female. Should the difference between the males prove to be entirely local, *consanguinea* might stand as a subspecies.

Hab. Eastern Australia, Adelaide to Toowoomba; Swan River, W.A.

2. *Campsomeris flavidula*, Sm.

Scolia flavidula, Sm. Cat. Hym. B. M. iii. p. 115 (1855), ♀.

Elis (Trielis) liturata, Sauss. et Sichel, Spec. gen. *Scolia*, p. 143 (1864), ♀.

Elis (Trielis) australensis, Sauss. et Sichel, Spec. gen. *Scolia*, p. 144 (1864), ♂.

Hab. South Australia.

st. congener, nom. nov.

Elis (Trielis) flavidula, Sauss. et Sichel, Spec. gen. *Scolia*, p. 143 (1864), ♀ (nec Smith).

This is distinguishable from the typical form by a smooth shining area on the disc of the mesonotum, and the colour of the wings, which in some specimens are flushed with purple at the apex. I have only seen one male and cannot be sure whether Saussure's description of *australensis* applies to the typical form or the present.

Hab. South-west Australia.

3. *Campsomeris zonata*, Sm.

Scolia zonata, Sm. Cat. Hym. B. M. iii. p. 116 (1855), ♂ ♀.

Hab. Sydney, N.S.W. (*Froggatt*); Woodford, N.S.W. (*G. A. Waterhouse*); Kuranda, Q. (*Turner*).

The orange bands on the dorsal abdominal segments are at the base in both sexes. In a female specimen from Kuranda the band on the third segment is almost obsolete, though well developed in other specimens from the same locality.

4. *Campsomeris gilesi*, sp. n.

♀. Clypeus very coarsely longitudinally rugose; the apical margin depressed and smooth, very broadly rounded, almost transverse. Scape smooth above, sparsely punctured beneath. Head shining, sparsely punctured, a large smooth area behind the ocelli, the posterior margin more closely punctured; the sides of the clypeus, front above the base of the antennæ, and the posterior margin of the head clothed

with long fulvous pubescence. Thorax and median segment coarsely punctured and clothed with fulvous pubescence, the pubescence beneath grey; a large, smooth, shining area on the disc of the mesonotum narrowly continued to the posterior margin; the middle of the scutellum broadly smooth; the median segment shorter than the postscutellum and bluntly produced on the middle of the apical margin. Abdomen very sparsely punctured, the sides of the segments thinly clothed with long grey hairs; segments 2-5 with an apical fringe of long golden hairs, shorter and paler on the ventral surface. Apical segment longitudinally rugose, with a few very short, stiff, golden hairs.

Black; the second, third, and fourth dorsal segments with a yellow apical band; a large orange-yellow spot on each side of the second and third dorsal segments, sometimes joining in the middle; the spines of the tarsi ferruginous, the pubescence on the legs grey. Wings flavo-hyaline, flushed with purple at the apex of the fore wings; nervures ferruginous.

Length 29-35 mm.

♂. Clypeus almost transverse at the apex, very slightly rounded. Antennæ very stout, the eight apical joints strongly arcuate beneath; head and thorax punctured, a small smooth area on the disc of the mesonotum, the pubescence long, close and grey, light fulvous on the mesonotum; the median segment shorter than the postscutellum, with an obscure longitudinal carina. Abdomen shallowly and not very closely punctured, the punctures large; the fourth segment finely and closely punctured at the base, the apex of the seventh segment smooth.

Black; the clypeus, a minute spot on the postscutellum, a broad transverse band emarginate anteriorly in the middle close to the apex of the second and third dorsal abdominal segments, a transverse band broadest in the middle on the fourth and fifth segments, a narrow transverse band interrupted in the middle on ventral segments 2-5, and a spot on each side of the second and third ventral segments dull yellow; tegulæ testaceous brown. Wings flavo-hyaline; nervures ferruginous. Some specimens have a yellow band on the first segment. The first abdominal segment is broad. The third cubital cell is strongly narrowed on the cubital nervure, more strongly in the male than in the female.

Length 24 mm.

Hab. Perth, W.A. (*H. M. Giles*), 8 ♀, 3 ♂; Sydney, N.S.W. (*Froggatt*), 1 ♀.

This species seems to have been confused with *australensis*, Sauss., which I take to be the male of *flavidula*, Sm., and not

of this species, the markings given in the description of *australensis* agreeing better with the smaller species. The markings on the male of the present species vary considerably, some specimens having the anterior margin of the pronotum narrowly yellow. A specimen from Kelmscott, W.A., has a small yellow spot on the scutellum and the anterior and intermediate femora and the anterior tibiæ beneath marked with yellow, but in the other specimens I have seen the legs are entirely black. The female from Sydney has the tibiæ and tarsi dark ferruginous.

5. *Campsomeris ferruginea*, Fabr.

Scolia ferruginea, Fabr. Syst. ent. p. 355 (1775), ♀.

Scolia fulva, Gray, Griffith Anim. Kingd. xv. p. 516 (1832), ♂ ♀.

Hab. Cooktown, Cairns, Q. ; Port Darwin.

This is not a true *Trielis*, there being an extra discoidal cell as in *Liacos*, but there are two recurrent nervures; the difference in neuration between this species and other Australian *Trielis* consisting in the presence of a transverse nervure connecting the two recurrent nervures and thus forming an extra cell.

Subgenus *DIELIS*, Saus. et Sichel.

1. *Campsomeris radula*, Fabr.

Tiphia radula, Fabr. Syst. ent. p. 354. n. 5 (1775), ♀.

Scolia septemcincta, Fabr. Syst. ent. p. 356. n. 10 (1775), ♂.

Elis (Dielis) sabulosa, Saus. Ann. Ent. Soc. Franc. p. 235 (1858), ♀.

Scolia (Dielis) intrudens, Sm. Trans. Ent. Soc. London, p. 241 (1868), ♀.

Hab. North Queensland, Mackay to Cooktown (*Turner*); Strelley River, N.W. Australia (*Giles*); Champion Bay, W.A. (*Du Boulay*); Port Darwin (*J. J. Walker*).

The male has no black spot on the clypeus and has all seven dorsal abdominal segments banded with yellow. On the ventral surface the yellow band at the apex of the third segment is produced upwards in the middle so as nearly to reach the base of the segment, but this latter mark is not quite constant. There is a similar mark on the second ventral segment, both in this species and in *formosa*, Guér., but the latter species never has the mark on the third segment so much developed as is usual in *radula*; *formosa* always has a small black spot in the middle of the clypeus and the seventh segment is not marked with yellow.

2. *Campsomeris formosa*, Guér.

Scolia formosa, Guér. Voy. 'Coquille,' Zool. ii. p. 252, 1830 (1839), ♀.
Elis tasmaniensis, Sauss. Mém. Soc. phys. et hist. nat. Genève, xiv.
 p. 61 (1854), ♀.
Elis (Dielis) formosa, Sauss. et Sich. Spec. gen. *Scolia*, p. 209 (1864),
 ♀ ♂.

Hab. Australia.

Apparently spread over the whole continent. Female specimens from North Queensland have the wings feebly suffused with fuscous and the black marks on the abdomen more extensive than in specimens from Southern and Western Australia. The male is very like that of *radula*, but differs as noticed under that species.

3. *Campsomeris carinifrons*, sp. n.

♀. Clypeus almost smooth, with two parallel longitudinal carinæ close together on the apical half, the apical margin depressed. Head smooth and shining, with a few scattered punctures on the vertex and a longitudinal frontal sulcus which does not reach the anterior ocellus; the front round the base of the antennæ and the sides of the clypeus densely clothed with very long white pubescence. Pronotum, post-scutellum, and median segment closely and coarsely punctured; the mesonotum and scutellum more sparsely punctured, the middle of the mesonotum and the apex of the scutellum smooth; the anterior margin of the pronotum, the pleuræ, and the median segment rather thinly clothed with white pubescence. Abdomen shining, the segments sparsely punctured at the base and apex, smooth in the middle and at the extreme apex; dorsal segments 1-4 and ventral segments 2-5 with a close fringe of white pubescence. Apical dorsal segment rugose with short black setæ, with an acute spine on each side near the apex. The radial cell does not project much beyond the second cubital cell.

Black; the mandibles and the apex of the clypeus fusco-ferruginous. Wings flavo-hyaline at the base, fusco-hyaline with a blue flush at the apex, darkest beyond the radial cell, nervures ferruginous brown.

Length 13-17 mm.

♂. Very similar to the same sex in *C. radula* and *C. formosa*, but the clypeus is entirely yellow as in *radula*, without the small black spot which distinguishes *formosa*; the seventh dorsal segment is not marked with yellow as in *radula*, and the yellow markings on the ventral surface are similar to those of *formosa*.

Length 10-13 mm.

Hab. Queensland, Mackay to Cape York ; Port Darwin ; Central Australia. 7 ♀, 4 ♂.

Very near *C. de mijerei*, Cam., from New Guinea, but is rather differently punctured, and the nervures in Cameron's species are black. They will probably prove to be geographical races of the same species.

4. *Campsomeris subopaca*, sp. n.

♀. Clypeus punctured at the sides, smooth in the middle, opaque, very broadly rounded at the apex. Head rather closely punctured, the area round the ocelli almost smooth, the punctured spaces covered with short, coarse, fulvous pubescence. Thorax closely punctured, more sparsely on the middle of the mesonotum and scutellum, clothed with fulvous pubescence, closely on the pronotum and sides of the mesonotum, more sparsely elsewhere ; the surface of the posterior truncation of the median segment smooth. Abdomen opaque above, shining beneath, with a few scattered punctures ; segments 2-5 with an apical fringe of fulvous hairs, paler beneath than above, the apical segment rugose with fulvous setæ.

Black ; mandibles and femora fusco-ferruginous ; tibiæ and tarsi ferruginous ; dorsal segments 1-4 with a transverse apical band of orange, broad on the three basal segments, narrow on the fourth ; ventral segments 2-3 with a narrow, short, transverse yellow band on each side on the apical margin. Wings flavo-hyaline, slightly clouded with fuscous beyond the apex of the radial cell ; nervures ferruginous. The second recurrent nervure is incomplete and does not reach the cubital nervure.

Length 27 mm.

♂. The form and sculpture are very similar to *formosa* ♂, but the scutellum and postscutellum are more closely punctured. As in the female, the second recurrent nervure is incomplete, not reaching the cubital nervure.

Black ; the abdomen strongly glossed with blue ; clypeus (except a triangular black spot on the middle), the outer margins of the eyes narrowly, the inner margins as high as the emargination of the eye, the pronotum, the base of the tegulæ, a short line above the tegulæ, a large spot on each side of the scutellum, a transverse band on the postscutellum, a rather narrow transverse band at the apex of dorsal segments 1-3 (often interrupted on the third segment, and on the second and third ventral segments), the femora beneath, the anterior tibiæ above and the anterior tarsi yellow. Wings

fusco-hyaline, darkest on the costa, nervures black. Pubescence pale fulvous above, greyish beneath, black on the sides of the abdomen, close on the median segment, sparse elsewhere.

Length 17-22 mm.

Hab. Cairns, Q. 8 ♂, 2 ♀.

Allied to *C. iris*, Lep., and still more closely to *Scolia culta*, Sm., from New Guinea. In the latter species, however, the second recurrent nervure is entirely absent. This species shows the artificial nature of the division by neurulation in *Scolia* and its near allies, the most nearer related species being placed in a different genus.

5. *Campsomeris gracilis*, Sauss.

Elis gracilis, Sauss. Mém. Soc. phys. et hist. nat. Genève, xiv. p. 62 (1854), ♂.

I have not seen this species.

XVIII.—*Descriptions of some new Species of the Genus Delias from North New Guinea, recently collected by Mr. C. E. Pratt.* By Sir GEORGE H. KENRICK, F.Z.S. &c.

[Plates VI. & VII.*]

Delias fuliginosus, sp. n. (Pl. VI. figs. 1 & 1 a.)

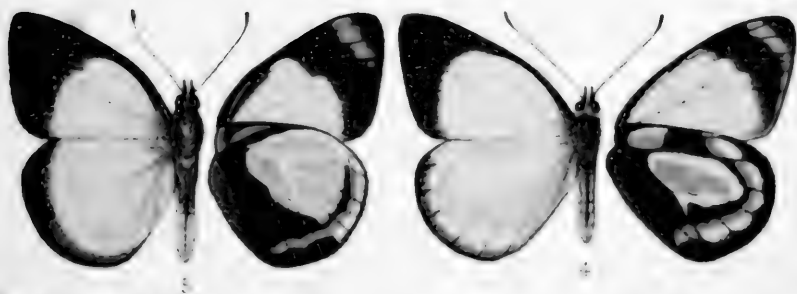
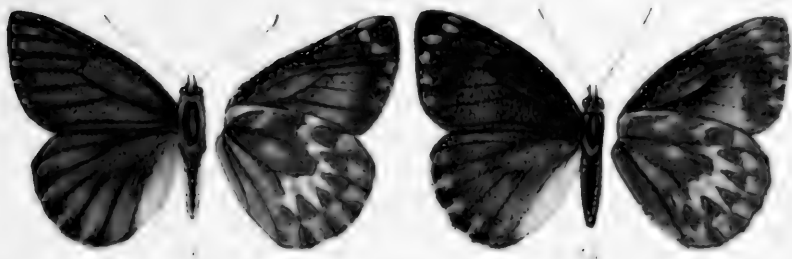
♂. Head, palpi, legs, and antennæ black; thorax and palpi with long grey hairs; abdomen above black, below pale, the whole powdered with yellow scales.

Upperside of both wings black, with the exception of the fold of the hind wings, which is very pale yellow; the whole powdered with sulphur-yellow scales, through which the nervures stand out dark; fringes of fore wings black, with a few yellow scales; fringes of hind wings sulphur-yellow.

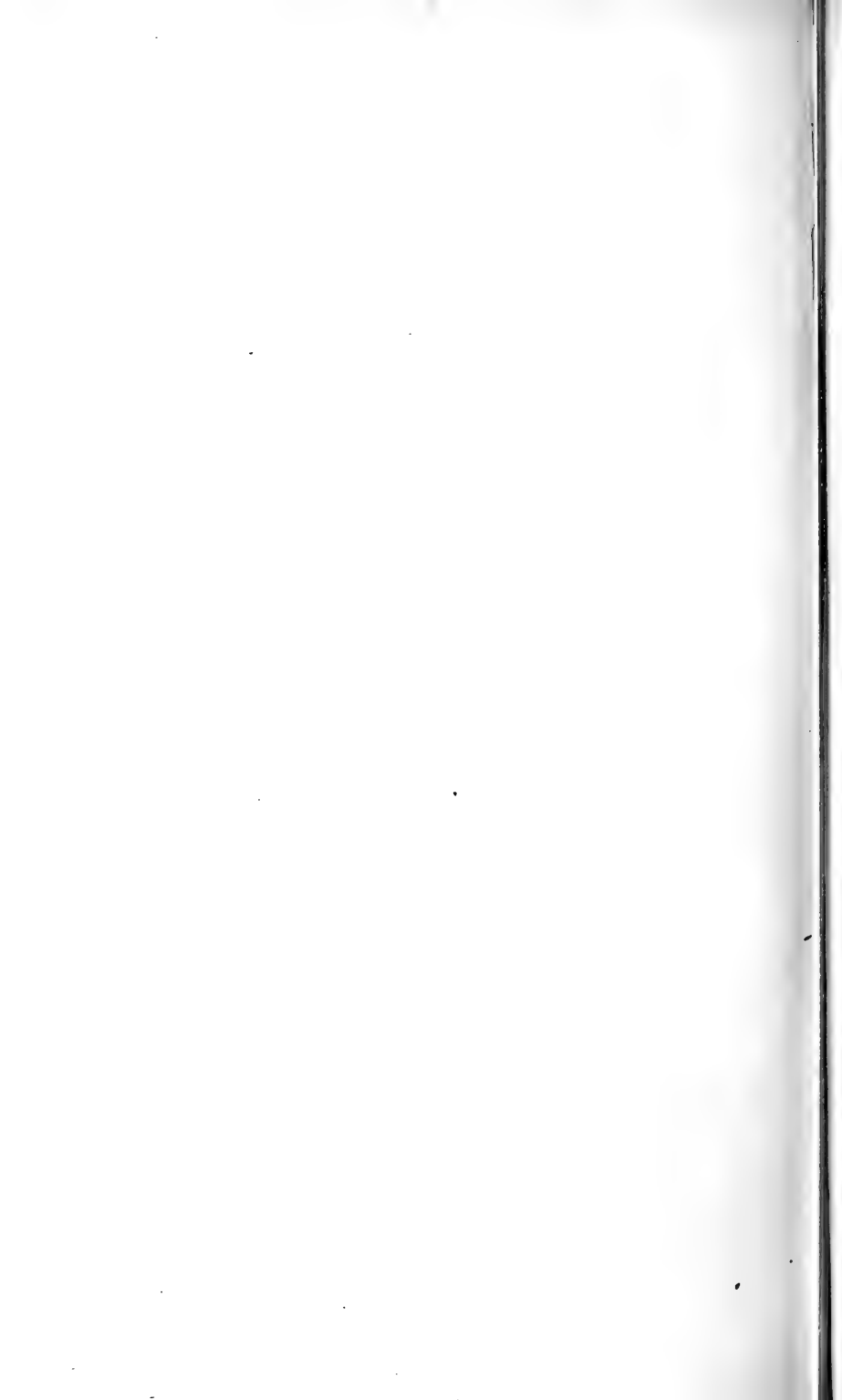
Underside: fore wings dark grey, with a few white scales, an irregular band of yellow spots triangularly placed on costa beyond cell and reaching over two-thirds of the hind margin.

Hind wings black; a small basal yellow costal spot, from which extends a narrow white streak about halfway along the costa, where it develops into an irregular white band

* [We are indebted to Sir George H. Kenrick for the copies of the coloured plates illustrating this and the following paper.—EDS.]



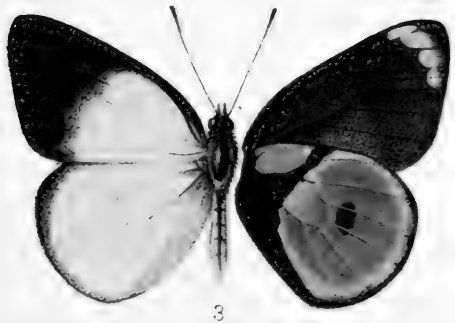
Figures of New *Bropalocera* from *Trich*, New Guinea.





1

2



3



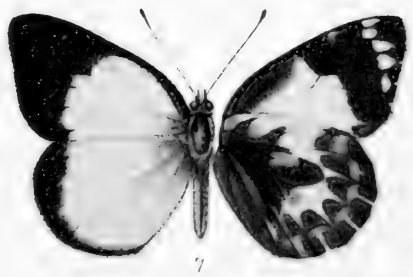
4



5



6



7

E. C. Knight del. et lith.

West Newman del.

Figures of New *Rhopalocera* from Dutch New Guinea.



across the wing, with points along each nervure. In this band are five yellow spots; between this and the body are two yellow spots, one in the cell and one between this and the costa, also a streak of yellow along nervure 1 *a* and six marginal subtriangular yellow spots.

Expanse 50 mm.

The female differs in having white apical spots on the upperside of fore wings, an indication of a dark spot at end of cell, and a darker border. In the hind wings, as also in the fore, there is a trace of a broad paler (inclined to yellowish) transverse band beyond the cells, which is quite marked in one specimen.

Hab. Momi, 4000 feet, November and December.

Delias pratti, sp. n. (Pl. VI. fig. 2.)

♂. Head, palpi, legs, and antennæ black, with black hairs; thorax dark, with bluish-white hairs, which extend to base of abdomen and the base of hind wings; abdomen mostly white.

Upperside: fore wings sooty, with faint bronze reflections.

Hind wings: the upper half as fore wings, the portion below the cell dead white, and a few white scales on the border. Fringes of both wings black.

Underside: fore wings sooty, with a few white scales on inner margin and a band of irregular yellow spots across the apex.

Hind wings black; a narrow white costal band, below which is a semielliptical yellow patch; nearly the whole of the disk up almost to the hind margin is occupied by a bronze circular patch, in the midst of which is an irregular transverse black spot just beyond the cell; there are a few white scales at the angle.

Expanse 58 mm.

Hab. Warmasin, 6000 feet, November and December.

Delias heroni, sp. n. (Pl. VI. fig. 3.)

♂. Differs from *pratti* in the fore wings being broader and shorter; the upperside is black, without bronze reflections; four-fifths of the cell and three-quarters of the inner margin is white; in the hind wings the whole is white, with a black patch at the apex, tapering rapidly into a narrow black border.

Underside: the white occupies half the fore wings, and there is a distinct black patch at the end of the cell.

The hind wing has no white costal streak, a smaller yellow

costal patch at the base, and the black spot double, of quite a different shape, and horizontal, and the whole colour blacker; the large duller bronzy patch is different in shape.

Expanse 50 mm.

Hab. Momi, 4000 feet, November and December.

Delias bakeri, sp. n. (Pl. VI. fig. 4.)

♂. Head, legs, palpi, and antennæ black; thorax black, but the hairs on the underside are distinctly brown, those on the upperside being of the usual bluish white. Abdomen grey above, white beneath.

Upperside: fore wings white, with a narrow black costal border and a large black apical patch tapering to the angle, the white area bounded by a convex line.

Hind wings white, with a narrow indefinite black border. Fringes of both wings black.

Underside: fore wings white as above, with black apical patch coinciding with upperside; in the middle of this is a band of quadrate tapering yellow spots, six in all; these run into a fine subterminal white line.

Hind wings black; the basal patch does not reach the body and is pear-shaped, yellow, with white on the upper edge; beyond this is a large pear-shaped white blotch covering most of the cell, and with a longitudinal yellow stripe through it. Beyond this edging the black border is a vermilion narrow band starting from the costa and sweeping round the white patch, but not touching it. It terminates near the angle and is followed by a white band, broken up by the black nervures; the fold is powdered with white and yellow scales.

Expanse 54 mm.

Hab. Warmasin, 6000 feet, November and December.

The female is slightly larger (58 mm.), has broader borders of black on both wings, with the white less distinct, and three faint white dots near the apex of the fore wings.

This insect is near to *iltis*.

Delias kummeri ligata, Roths.

I have a female differing on the upperside in the heavier black border of the fore wings and a distinct border on the hind wings, the upper half of which has a sharp-cut internal margin, whilst below the lower part of the cell and radial area is suffused with lemon-yellow.

Expanse 34 mm.

Delias dixeyi, sp. n. (Pl. VI. fig. 5.)

♂. Head, palpi, legs, and antennæ black; hairs on thorax, legs, and palpi yellow; hairs on upperside of thorax bluish white; abdomen white.

Upperside: fore wings white, with narrow black costal border and black apical patch extending broadly to the angle.

Hind wings similar, the black margin wide at first, but narrowing down to angle; fringes black.

Underside: fore wings black, the white patch does not quite coincide with the upperside; near the apex are three yellow quadrate spots and one dot.

Hind wings black; the basal patch, which is lenticular and does not reach the body, is dark red; there is a narrow white exterior band beginning halfway along the costa and terminating abruptly halfway towards the angle below vein 4; inside this is a narrow red band reaching nearly to the angle; there is a large subtriangular central patch of very pale yellowish.

Expanse 52 mm.

Hab. Warmasin, 6000 feet, November and December.

This seems near to *kummeri*.

Delias bothwelli, sp. n. (Pl. VI. fig. 6.)

♂. Head, palpi, legs, and antennæ black; hairs on underside of thorax golden, on upperside bluish white.

Upperside: fore wings black, with rounded white patch extending only to end of cell.

Hind wings similar, but the white covers most of the wing, leaving a broad margin on the outside.

Underside: fore wings, the white patch reaches the end of cell, which is marked by a strong dash, and there is also a longitudinal streak of black within the cell; the boundary of the white patch is not so well defined as on the upperside; the apical patch is crossed by an irregular tapering yellow band, which might be described as composed of four spots.

The hind wing is best described as pale straw-yellow, the restricted base and the fold rich golden yellow. It is followed by a black streak along the costa, then comes a lenticular whitish mark, and then a distinct black band from the body to the middle of the costa; after a short interruption this is continued as a narrow marginal black border as far as the angle; from the angle and at right angles to the inner margin starts a broadish black band, edged externally with scarlet, but this does not reach the costa.

This insect, described from a single example, seems to be intermediate between *cruentata* and *kummeri*.

Expanse 46 mm.

Hab. Warmasin, 6000 feet, November and December.

Delias caroli, sp. n. (Pl. VII. fig. 1.)

♂. Head, legs, palpi, and antennæ black; thorax black, with black hairs beneath and bluish-white hairs above; abdomen mostly white, with bluish-white hairs at base and at base of hind wings.

Upperside: fore wings white, with narrow black costal border and large apical patch bounded by end of cell and continuing obliquely to angle.

Hind wings white, with undefined black border tapering from costa to angle; fringes black.

Underside: fore wings black, with narrow white band along the inner margin, and four apical white spots fading into a narrow white subterminal line.

Hind wings black, with lenticular scarlet basal patch ending in a white dot on costa; a single minute red spot at end of cell near to nervure 5; a narrow scarlet subterminal band from costa to angle, split up by the black nervures, each surrounded by a few white scales; a patch of white scattered scales between the angle and the base.

The female is similar, but the white is slightly suffused with yellow, and the upperside of the abdomen is yellow, while the black margin of the hind wing is wider.

Near to *bornemanni*, but differs in the position and form of the red band on the hind wings.

Expanse 58 mm.

Hab. Warmasin, 6000 feet, November and December.

Delias rothschildi, sp. n. (Pl. VII. figs. 2 & 6.)

♂. Very close to *microsticta*; the male differs in the white of the upperside being yellower, the black border of the hind wings much wider.

On the underside of the hind wings the conspicuous red basal patch is replaced by yellow, the orange spots on the margin are not present, and the three oblique yellow streaks and the yellow spot at the angle are also absent.

Expanse 52 mm.

Hab. Momi, 4000 feet, November and December.

The female of the above corresponds with a form of female of *microsticta* sent home by Mr. Meek, but I believe undescribed, differing from this very much as the male differs.

Upperside: fore wings white, with heavy apical black patch.

Hind wings white, with heavy black border.

Underside: fore wings white, suffused with yellow, which extends beyond the cell to a sharply defined transverse angulated boundary of the black apical patch; in this are six yellow spots of different size; there is a costal black band and a transverse black mark at end of cell.

Hind wings black; a minute yellow basal patch; an irregular transverse tapering band reaching nervure 2 white with yellow marks.

Five small yellow spots are arranged as a subterminal line. The black ground-colour has bronzy reflections.

This may be a variety of *microsticta*, but it is very constant.

Delias castaneus, sp. n. (Pl. VII. fig. 3.)

♂. Head, palpi, antennæ, legs, and thorax black, with black hairs below and a few scattered bluish scales; hairs on upperside grey; abdomen white, with bluish-white hairs which extend to the base of hind wings.

Upperside: fore wings white, with narrow black costal border and large black apical patch, the boundary ill-defined.

Hind wings white, with narrow black ill-defined border extending over one-third of margin.

Underside: fore wings black, with white inner margin and the principal nervures white; an oblique yellow patch at apex, constricted below the middle.

Hind wings jet-black, the basal patch scarlet and extending along one-third of the costa, edged above with yellow; the greater part of the disk is occupied with a sulphur-yellow circular patch, in the midst of which is a large bright chestnut patch, through which run the yellow nervules; outside the end of the cell is an irregular black patch surrounded by a thin yellow line.

Female very similar, but, as usual, with the black border deeper than the male, especially in the hind wings; the white slightly suffused with yellow. Fringes of both wings black.

Expanse 60 mm.

Hab. Warmasin, 6000 feet, November and December.

Delias jordani, sp. n. (Pl. VII. fig. 7.)

♂. Head, palpi, antennæ, and legs black, with grey scales and black hairs; thorax black, with bluish-white hairs above and brown and bluish hairs below.

Upperside : fore wings white, with black costal border and large apical black patch, the division between fairly but not sharply defined.

Hind wings very similar, the marginal black border not well defined. Fringes of fore wings black, of hind wings black and white.

Underside : fore wings black, a large white patch extends from inner margin to near the end of the cell, the remainder of which is filled with dark grey ; below the cell the patch extends beyond the cell, but not quite so far as the angle ; a band of five transverse spots occurs before the apex, the one on the costa is yellow, the others are white.

Hind wings black, the fold powdered with orange scales.

Basal patch very small, Indian yellow ; a narrow white costal band expands into an irregular transverse band, reaching nervure 2, but constricted and nearly divided in the middle ; along the nervures this white band extends in a series of sharp points.

Beyond this is a band of six irregular yellow spots, the four lower ones being connected to the costa by narrow white lines. There is an interrupted white marginal line, and the fringes of the hind wings are mostly white.

Across the disk are three ill-defined yellow spots.

Expanse 57 mm.

Hab. Momi, 4000 feet, November and December.

I have not been able to discover any deviation from the neururation common to all members of this genus, nor is the amount of variation considerable among the species sent home. It will be noticed that the greater number come from the higher locality and that for the most part the insects do not occur in both localities ; but this would require further confirmation from the collector.

The localities are in the Arfak Mountains, in the north-east of Dutch New Guinea, not far from the Equator. M. L. M. d'Albertis visited the neighbourhood about 1872, but does not appear to have collected many butterflies.

All the types are in my collection.

The measurements are taken by measuring the costa from the thorax to the apex and doubling it.

EXPLANATION OF THE PLATES.

PLATE VI.

Figs. 1, 1 a. Delias fuliginosus, ♂ & ♀.

Fig. 2. Delias pratti, ♂.

- Fig. 3. *Delias heroni*, ♂.
 Fig. 4. — *bakeri*, ♂.
 Fig. 5. — *dixeyi*, ♂.
 Fig. 6. — *bothwelli*, ♂.

PLATE VII.

- Fig. 1. *Delias caroli*, ♂.
 Fig. 2. — *rothschildi*, ♂.
 Fig. 3. — *castaneus*, ♂.
 Fig. 4. *Candalides arfaki*, ♂.
 Fig. 5. *Hypochrysoptis wendisi*, ♀.
 Fig. 6. *Delias rothschildi*, ♀.
 Fig. 7. — *jordani*, ♂.

XIX.—*Descriptions of Three new Species of Rhopalocera from North New Guinea.* By G. T. BETHUNE-BAKER, F.L.S., F.Z.S.

[Plate VII. figs. 4 & 5.]

Morphotenaris kenricki, sp. n.

♀. Upperside: both wings pure snow-white. Primaries with the cell up to the costa deep sooty black, the whole of the interspace to the termen between veins 2 and 3 extending up well towards vein 4 and down to the inner margin well before the tornus bright chestnut; the black does not extend beyond the cell.

Underside as the upperside, but, in addition, there is a postmedian row of small black ocellated spots, with white pupils sometimes only just traceable and pale straw-coloured irides, the latter absent on the primaries. Primaries with three or four of these spots above the tawny chestnut patch in a straight line. Secondaries with five spots curved parallel with the termen, that between veins 6 and 7 the largest; both these rows show through the upperside distinctly.

Expanse 138 mm.

Hab. Arfak Mountains, 4000 feet, November and December.

Type in Coll. G. H. Kenrick.

This species is near *schoenbergi*, and may possibly be a local form; but it is so distinct as to necessitate a name, and when the male is discovered it may prove to be a good species.

Candalides arfaki, sp. n. (Pl. VII. fig. 4.)

♂. Both wings pure white, slightly greyish at the base. Primaries with the apex very broadly intense black, extending two-thirds to the cell, nearly halfway down the costa, and right down the termen almost into the tornus; fringes black: secondaries greyish along the abdominal fold, with the underside markings showing through; fringes white, finely interrupted at the veins, black at the tornus, with white extremities.

Underside: both wings white, with greyish-brown markings. Primaries with base greyish to over half the cell; costa greyish brown; a brown line closing the cell; a very broad curved, brown, transverse band from about vein 10 to vein 2 or just beyond, tapering somewhat on each side; the precise width and area of this band differ slightly in the series before me; beyond this the ground is irrorated with whitish fine scales, broadly at the apex, tapering finely along the termen to vein 2; termen finely brown, intersected at the veins; fringes brown. Secondaries restricted chocolate-grey at the base, with a small brown basal spot below vein 8 (sometimes absent); a very irregular broad subbasal band of brown, widest on the abdominal margin, where it is almost confluent with the postmedian band, which extends along the margin to meet it; cell closed by a brown line; postmedian band composed of confluent quadrangular spots, the third projected much outwards, fourth inwards, fifth and sixth inwards again, generally ending in the angle of vein 2; seventh outwards, eighth a broad dash all along the abdominal margin; a row of subterminal internervular spots; termen finely brown; fringes white, intersected at the veins.

Expanse 34 mm.

Hab. Warmasin, 6000 feet; Momi, 4000 feet; Arfak Mountains; in November and December.

Type in Coll. G. H. Kenrick.

This species is a near ally of my *C. meeki*, from Ougarra, British New Guinea.

Hypochrysoys wendisi, sp. n. (Pl. VII. fig. 5.)

♀. Both wings orange-yellow. Primaries with apical area black to the cell and extending along the costa basewards well below the termination of the cell; termen broadly black, extending somewhat along the inner margin; the

yellow area is thus terminated outwardly in a deep curve: secondaries with a broad blackish stripe below the costa terminating just short of the apex; a trace of a black subterminal spot on veins 1 a, 2, and 3.

Underside: both wings paler than above, especially the primaries, the blackish areas showing through as deep rusty red. Primaries with a fine silver line along the upper margin of the cell, below which is a rusty dash; one or two short, faint, silver, transverse dashes in the cell; three small silver spots in a triangle beyond the cell; a subterminal row of fine internervular silver dashes from the apex to vein 2; the black of the upperside does not show through at all below this vein. Secondaries: base of costa rusty red; a broad deep rusty-red stripe below the costa right into the apex; on its upper margin are two creamy-white spots above the cell, the outer one the larger of the two; beyond these is a pale bluish-silvery small spot, followed just above the apex by a whitish spot; cell filled in with deep rusty red, intercepted near the base with a white mark, and further out with a white inverted V-shaped mark, followed outside the cell by another similar white mark; below the angle of vein 2 is a bright red quadrangular mark, edged finely with bluish silver, and beyond this with creamy white; nearer the base than this is another double red spot on the inner margin, edged with silver and black; the posterior series of spots is resolved into a confluent red band, edged laterally with creamy white, very deeply angulated outwards between veins 3 and 4; the spot between veins 2 and 3 reaches nearly to the angle of the latter and has a central cream spot; along vein 1 a is a red dash extending outwards and edged finely with black and silver, followed by a broad spot to vein 1 edged with black and silver; termen broadly pale reddish, more marked at the tornus, with a double internal fine edging of black and creamy white, and having a central line of bluish silver, interrupted at the veins; termination of veins 1 a, 2, and 3 black.

Expanse 48 mm.

Hab. Wendisi, Geelvink Bay.

Type in Coll. G. H. Kenrick.

On the upperside this species has some resemblance to *H. chrysargyra*, Grose-Smith, but the underside is totally dissimilar.

XX. — *Descriptions of new Freshwater Fishes discovered by Mr. G. L. Bates in South Cameroon.* By G. A. BOULENGER, F.R.S.

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Mormyrops batesianus.

Depth of body 6 times in total length, length of head 5 times. Head $1\frac{1}{2}$ times as long as deep, with curved upper profile; snout rounded, projecting a little beyond the mouth; width of mouth a little greater than length of snout; teeth truncate, 16 in upper jaw, 18 in lower; eye in anterior third of head, its diameter $2\frac{1}{2}$ times in length of snout or interorbital width. Dorsal 30, $\frac{4}{5}$ length of anal, originating nearly twice as far from end of snout as from base of caudal. Anal 45, originating a little in advance of dorsal (8th ray corresponding to first dorsal). Pectoral $\frac{1}{2}$ length of head. Caudal rather small, densely scaled, with rounded lobes. Caudal peduncle twice as long as deep, half length of head. 102 scales in lateral line, $\frac{18}{19}$ in transverse series on body, 25 in transverse series between dorsal and anal, 18 round caudal peduncle. Uniform dark brown above, a little lighter beneath.

Total length 280 mm.

Closely allied to *M. masuianus*, Blgr.

A single specimen from Assobam, Bumba River. The Bumba River unites with the Ja at Molundu, where the two form the Ngoko, which name is given to the river between Molundu and the Sanga, an affluent of the Congo. Examples of five further Mormyrids were obtained by Mr. Bates at Assobam:—*Petrocephalus simus*, Sauv., *Marcusenius kingsleyæ*, Gthr., *Myomyrus macrodon*, Blgr., *Gnathonemus petersii*, Gthr., and the following new *Mormyrus*.

Mormyrus bumbanus.

Depth of body $4\frac{1}{3}$ times in total length, length of head $4\frac{2}{3}$ times. Head $1\frac{1}{4}$ times as long as deep, with strongly curved upper profile; snout short, $\frac{2}{3}$ postorbital part of head; teeth small, very feebly notched, 5 in upper jaw, 8 in lower; eye moderate, $\frac{1}{2}$ length of snout, $\frac{2}{3}$ interorbital width. Dorsal 62, originating above base of ventral, 3 times as far from end of snout as from base of caudal, $2\frac{2}{3}$ times as long as anal. Anal 25, originating a little nearer head than base of caudal. Pectoral obtusely pointed, $\frac{3}{4}$ length of head. Caudal with

acutely pointed lobes, as long as head, greater part covered with scales. Caudal peduncle 3 times as long as deep, $\frac{3}{4}$ length of head. 93 scales in lateral line, $\frac{24}{26}$ in transverse series on body, 32 in transverse series between dorsal and anal, 16 round caudal peduncle. Brown above, silvery white beneath.

Total length 225 mm.

Intermediate between *M. macrophthalmus*, Gthr., and *M. ovis*, Blgr.

A single specimen from the Bumba River at Assobam.

CHAMPSOBORUS, gen. nov. Characinidarum.

Snout elongate, pointed; mouth large; upper jaw movable upwards; maxillary very small, not hidden under the pre-orbital when the mouth is closed; both jaws with a single series of bicuspid teeth, the laterals compressed, the anterior more conical and canine-like. Greater part of cheek covered by the suborbitals; nostrils near the eye, close together, separated by a valvular flap; gill-membranes narrowly united to isthmus. Body elongate, compressed. Scales small, strongly ciliated; lateral line straight, along the middle of the side; a small scaly process at base of ventral. Dorsal with 18 rays, above the ventrals; anal with 14 rays; adipose dorsal fin small.

Allied to *Mesoborus*, Pellegrin, but with a single series of teeth in both jaws.

Champsoborus pellegrini.

Depth of body $4\frac{1}{2}$ to 5 times in total length, length of head 3 times. Head 3 to $3\frac{1}{4}$ times as long as broad, feebly rugose above; snout about $1\frac{1}{2}$ times as long as eye, as long as post-ocular part of head; mouth not extending quite to below anterior border of eye; 25 or 26 teeth on each side of upper jaw, 22-24 in lower; the two teeth at the symphysis of the upper jaw the longest; naked part of cheek about half width of suborbital. Gill-rakers rudimentary. Dorsal III 16, originating well in advance of ventrals, equally distant from eye and from root of caudal, longest ray about half length of head. Anal III 11. Pectoral about $\frac{2}{3}$ length of head. Caudal nearly entirely covered with small scales, deeply forked, lobes rounded. Caudal peduncle about $1\frac{2}{3}$ times as long as deep. Scales 90-98 $\frac{14-15}{14-15}$, 10-11 between lateral line and ventral. Yellowish, with rounded brown spots, the largest of which form a series along the lateral line; three

blackish streaks across the dorsal; large symmetrical black markings on the caudal; all these markings very similar to those of *Paraphago rostratus*.

Two specimens, 60 mm. long, were found by Mr. Bates in the Bumba River at Assobam. A larger specimen (110 mm.) from the Ubanghi, preserved in the Congo Museum at Tervueren belongs to the same species. I had previously referred it to *Mesoborus crocodilus*.

Clarias jaensis.

Depth of body about 6 times in total length, length of head $3\frac{1}{2}$ to $3\frac{3}{4}$ times. Head $1\frac{2}{5}$ times as long as broad, smooth or very feebly granulate above; occipital process obtusely pointed; frontal fontanelle sole-shaped, $\frac{1}{6}$ length of head; occipital fontanelle small, in advance of occipital process; eye very small, 4 to $4\frac{1}{2}$ times in length of snout, $7\frac{1}{2}$ to 8 times in interorbital width, which equals width of mouth and $\frac{1}{2}$ length of head; band of præmaxillary teeth 6 times as long as broad; vomerine teeth granular, forming a crescentic band which is as broad as the præmaxillary band; nasal barbel $\frac{1}{2}$ to $\frac{3}{5}$ length of head; maxillary barbel not quite as long as head, reaching middle of pectoral fin; outer mandibular barbel $\frac{2}{3}$ to $\frac{4}{5}$ length of head, inner $\frac{1}{2}$ to $\frac{3}{5}$. 23 gill-rakers on anterior arch. Clavicles hidden under the skin. Dorsal 85-90, its distance from occipital process $\frac{1}{3}$ length of head, its distance from caudal 2 diameters of eye. Anal 65-70, its distance from caudal $1\frac{1}{2}$ to 2 diameters of eye. Pectoral not quite $\frac{1}{2}$ length of head, the spine smooth and $\frac{2}{3}$ the length of the fin. Ventral $1\frac{1}{3}$ times as distant from caudal as from end of snout. Caudal a little less than $\frac{1}{2}$ length of head. Dark brown above, white beneath.

Total length 450 mm.

To be placed between *C. platycephalus*, Blgr., and *C. carsoni*, Blgr.

Two specimens from the Ja River at Bitye.

XXI.—*Description of a new Lizard of the Genus Acanthodactylus from Syria.* By G. A. BOULENGER, F.R.S.

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DURING a recent collecting-trip to Syria, M. Henry Gadeau de Kerville brought together a large and interesting series of Reptiles, which he has submitted to me for identification,

and of which a selected set has been presented by him to the British Museum. Among them are examples of a new *Acanthodactylus*, which, being the largest of the genus, I propose to call

Acanthodactylus grandis.

Snout short, either obtuse or rather pointed; nostril in the centre of a very pronounced swelling. Form heavy, limbs short. Four supraoculars, first and fourth often broken up; subocular not reaching the lip, resting on the fourth and fifth or fifth and sixth upper labials; temporal scales granular, not keeled; 4 or 5 conical scales form a denticulation in front of the ear. Dorsal scales very small, convex, not keeled, hardly enlarged on the posterior part of the back; 58 to 64 scales across middle of body. Ventral plates not or but little broader than long, forming very oblique longitudinal and angular transverse series, the latter containing 16 or 18 (rarely 14) plates in the middle of the body. Collar free and strongly toothed. Præanal scales small and subequal. Hind limb reaching the axil or the shoulder; foot not or but little longer than head; fingers and toes short, the former surrounded with four series of scales and lamellæ, the latter with three; lateral denticulation feeble, the projecting pointed scales much shorter than the diameter of the corresponding part of the toe. 16 to 24 femoral pores on each side. Upper caudal scales feebly keeled, lower smooth. Greyish or fawn-colour above, with at least traces of 8 longitudinal series of dark spots on whitish streaks; the dark spots form transverse bands on the tail; sides of head with more or less distinct vertical dark bars; lower parts white, tinged with yellow on the limbs and tail.

	mm.
Total length of male	265
From snout to vent	103
" " " fore limb	40
Length of head (to ear)	24
Width of head	20
Fore limb	33
Hind limb	53
Foot	25
Tail	162

Several specimens were obtained at Jerud and Ataïbé, east of Damascus, and near Khan Agach, between Damascus and Kutaïfé.

XXII.—*Systematic Notes on Coleoptera of the Clavicorn Families.* By GILBERT J. ARROW.

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THE following notes have been made at various times during several years past and are now published in order that the synonymy may be included in the forthcoming 'Catalogus Coleopterorum.'

Silphidæ.

Silpha superba, Kraatz, 1876, is *S. cælestis*, Dohrn, 1875.

Silpha tetraspilota, Hope, 1835, is *S. rufithorax*, Wied., 1823.

Silpha formosa, Cast. (= *chloroptera*, Cast.), is not synonymous with *S. tetraspilota*, Hope, as given in the Munich Catalogue.

Silpha discicollis, Brullé, appears in that Catalogue as a synonym of *S. cayennensis*, Sturm, but from the figure and description that seems hardly possible. *S. cayennensis* has a transversely oval pronotum, with a small dark spot in the centre.

Silpha melanura, Hope, Gray's 'Zoological Miscellany,' 1831, p. 21, is omitted from the Catalogue. It is a very well-marked species, rather resembling *S. punctulata*, Oliv.

Silpha cæruleoviridans, Dohrn, 1885, is *S. micans*, F.

Ptomascopus carbunculus, Lewis, is *L. morio*, Kraatz, 1877. Mr. Lewis was deceived by his specimens bearing the locality "Amazons." This is certainly incorrect.

Necrodes osculans, Vigors, has a very extended distribution. The British Museum contains specimens from South India, Sarawak, Woodlark I., and Queensland.

Necrodes brevicollis, sp. n.

Niger vel piceus, antennis concoloribus, clava vix dilatata; prothorace valde transverso, lateribus arcuatis, basi fere recto, omnino subtiliter punctato, lateribus opacis; elytris crebre punctatis, acute costatis, postice attenuatis:

♂, elytrorum angulis apicalibus arcuatis, femore postico incrassato, subtus acute dentato, tibia postica fortiter arcuata, intus post medium dentata.

Long. 15-17 mm.; lat. max. 6-6.5 mm.

Hab. N. India.

The British Museum contains several specimens of this new species from India, one of them collected previous to 1848 by Capt. Boys. Two others are labelled Penang, which is perhaps incorrect. The insect is very like *N. nigricornis*, Har., but differs by the toothed hind tibiæ and rounded apical angles of the elytra in the male and the more transverse prothorax, with straight hind margin, in both sexes.

Necrophorus latefasciatus, Lewis, described from Japan, is the European *N. investigator*, Zett., which occurs also in Manchuria, Saghaliën, Pekin, &c.

Several species of *Necrophorus* were described by J. Gistel in his 'Naturgeschichte des Thierreichs,' published in 1848 for the use of schools (!) and not unnaturally overlooked by systematists. The descriptions are fragmentary and the synonymy offers considerable difficulty. The genus *Oxelytrum* in that work, with three supposed new species, refers to *Silpha cayennensis*, Sturm, and the allied *S. analis*, Chev., both of earlier date, but the precise attribution of the names is uncertain.

Nitidulidæ.

Lordites glabricola, Cand., 1861, is (*Nitidula picta*, Macl. Annulosa Javanica, 1825, p. 40.

The genus *Megauchenia* of Macleay, described in the same work, has been overlooked. *M. setipennis*, Macl., the type of which, together with the others described in the work, is in the British Museum, is *Ischana elongata*, Erichs., Germ. Zeits. 1843, p. 288. Both generic and specific names are therefore superseded by Macleay's.

Axyra setosa, Murr., very cursorily characterised in the Ann. & Mag. Nat. Hist. 1867, xix. p. 170, has not been included in the Munich Catalogue, and *Nitidula picea*, Bohem., referred to the same genus by Murray, has not been catalogued as such. *A. setosa*, Murr., differs from *A. elongata*, Murr., and *A. picea*, Bohem., by the closer and finer sculpture of its elytra, its rugose prothorax, and less flattened appearance, due to the absence of the wide lateral margins of thorax and elytra present in all the other species. A margin is formed at the posterior part of the elytra, however, by the pinching in of their central part. The body is 7.5 mm. long in the unique type.

In reviewing the genus *Platychora*, Murray (*l. c.* p. 175) mentioned a species "*P. deplanata*, Boh., from Natal." In the Munich Catalogue this is figured, by a curious mistake, as *Platychora deplanata*, Murr., Old Calabar. So far as I know, it has never been characterised. It is quite differently sculptured to the other species, the punctures being less evenly distributed. The prothorax and elytra are shining along their median part and moderately finely punctured, but the puncturation becomes much coarser towards the sides, where there is a clothing of stiff grey hairs, which form rows at the sides of the elytra. The head is finely and closely punctured and the pygidium is rugosely punctured and setose. There are broad margins to the prothorax and elytra. Length 7 mm.

Temnochilidæ.

Two different insects have been united under the name of *Gymnochila squamosa*, Gray. That described and figured by Gray is an Australian *Leperina*, since described as *L. decorata*, Erichs., and the type of Hope's genus *Lepidopteryx*, which antedates by four years the name *Leperina*. The species described by Murray under the same name in the *Ann. & Mag. Nat. Hist.* 1867, xix. p. 335, is the common African *Gymnochila varia*, F.

Lophocateres nanus, Olliff, is not distinguishable from the widely-distributed *L. pusillus*, Klug.

Cucujidæ.

Mr. Blackburn has been misled in declaring *Ipsaphes mærosus*, Pascoe, a synonym of *Platysus obscurus*, Erichs. As to the advisability of merging the two genera I am inclined to agree with him, in spite of a considerable difference in the form of the head; but the two species are so different that it is obvious Mr. Blackburn does not know Pascoe's insect, which is not only entirely different in colour but double the size and quite differently proportioned. I am surprised, however, that Mr. Blackburn has rejected *Ipsaphes bicolor*, Olliff (which he seems to have rightly identified), from the genus. The tarsi of this (the types of both species of *Ipsaphes* are in the British Museum) are quite different from those of *Cucujus*, all but the last joint being very short and of equal length. Olliff's species differs little from Pascoe's, except in the differently coloured and relatively shorter abdomen and elytra.

Lamophlæus breviceps, Sharp, is *L. reitteri*, Grouv.

Telephanus gracilis, Sharp, Biol. Centr.-Am., Col. ii. pt. 1, 1899, p. 553, is antedated by *T. gracilis*, Schauf., Nunq. Otiosus, 1890, iii. p. 600. It may be called *T. sharpi*.

The genus *Hymæa*, described by Pascoe in 1869 as belonging to the Heteromera, is a curious form allied to *Psammæchus*. Pascoe was deceived by the heteromerous tarsi of the male.

Colydiidæ.

Colobicus conformis and *parilis*, Pasc., are the same species, which seems to have been divided by Pascoe mainly on account of the different habitat of his types, which are from Lombok and Batchian respectively. The range of the species is far greater than the describer seems to have thought possible, and I have gathered together a series from Damma I., Ceram, Mysol, Timor, Lombok, Batchian, Borneo, Andaman Is., Penang, Assam, Hong Kong, and North Australia.

Xuthia siccana, Pasc., has an exactly similar distribution, and I am unable to distinguish from it *X. maura* and *X. rufina* of the same author, nor can I recognize the genus *Xuthia* as distinct from *Bitoma*. The African species *B. rufipes*, Kolbe, is very closely related to *B. siccana*.

B. latiusculus, Fairm., is a species of *Neotrichus*.

A North American insect was described as *Nematidium filiforme* by Leconte in March 1863, and the same name was used by Pascoe for an Amazonian species in April of the same year. Dr. Sharp's discovery of the localisation of the species of the genus in Central America seems to preclude the possibility of Leconte's and Pascoe's being the same, and it will be well to change the name of the latter to *N. pascoei*.

The name *Pycnocephalus* used by Dr. Kraatz in 1895 for a genus allied to *Sosylus* was previously used by Dr. Sharp in 1891, and must be changed. It may be called *Cephalopycnus*.

The specimens which Dr. Sharp has described in the Biol. Centr.-Amer., Col. ii. pt. 1, 1895, p. 488, under the name of *Lithophorus succineus*, Pasc., do not belong to the species actually described by Pascoe, who confused two different forms under that name. Pascoe quotes as localities Rio and Para, but, while he labelled as his type a specimen from Rio, his description does not apply to that, but to the different species

from Para, from which place he examined and labelled an example in the British Museum. This, the only one from that locality, I regard as the real type. Other specimens in Pascoe's collection were brought from Ega, while two were labelled Rio by him, probably in error. In this species the prothorax has only very slight rudiments of dorsal costæ and the elytra bear widely interrupted, instead of continuous, carinæ. In that described by Dr. Sharp from Central America there are strongly elevated ridges upon the prothorax, which is rather longer and less wide at the front margin, and the ridges upon the elytra form continuous costæ. I propose to call this *L. ornatus*, the name at first intended for it by Dr. Sharp. The type is from Paso de San Juan, Mexico. I cannot distinguish from this the form labelled "type" by Pascoe.

Bothrideres musivus and *merus*, Pasc., both belong, in my opinion, to *B. vittatus*, Newm., and *B. lobatus*, *B. versutus*, and *B. servus*, Pasc., also form a single species. The types of all these are in the National Collection.

Bothrideres simplex, incidentally mentioned in the Biol. Centr.-Amer., Col. ii. pt. 1, 1895, p. 489, is not, as Dr. Sharp supposed, a species described by Pascoe and must therefore be called *B. simplex*, Sharp. It is from Rio de Janeiro.

Pycnomerus sophoræ, Sharp, is the species described long previously as *Lycus depressiusculus*, White*.

The specimens from Panama (with the exception of one from Tolé), referred to *Ethelema sobrina*, Sharp, in the description of that form, belong in reality to another species which I describe here :—

Ethelema gracilis, sp. n.

Nigra, omnino setosa; elytris post medium griseo-fasciatis, postice fuscis; prothorace valde convexo, marginibus lateralibus depressis, vix denticulatis, angulis posticis obsoletis.

Long. 3·5–4 mm.

Hab. Panama: Chiriqui, Bugaba, David, Tolé.

The prothorax is very convex, with the lateral margins depressed and not distinctly serrated, and the hind angles are rounded off. The elytra are decorated with a band of grey scales behind the middle, enclosing a dark spot on each side, and the part lying behind this band is dark.

* It may be mentioned here that *Lycus retractus*, Walker, is a species of *Ptilinus*.

E. luctuosa, Pasc., has almost the same markings, but the prothorax is flatter and more quadrate.

In *E. sobrina*, Sharp, the grey scales are more evenly distributed, forming no definite band. There is no difference between the species in the nature of the clothing, as supposed by Dr. Sharp.

Adimeridæ.

The genus *Adimerus*, described by Dr. Sharp in 1894 and forming this family, is *Monelus* of Horn, dating from 1882. Horn discovered only one small joint, instead of two, between the basal and claw joints of the tarsus. Five species in all have now been recognized, viz.: *M. guttatus*, Lec., *lecontei*, Fleut., *crispatus*, Sharp, *setosus*, Sharp, and *dubius*, Sharp.

Byrridæ.

Cyphonicus, Sharp, is synonymous with *Byrrinus* of Motschulsky.

Erotylidæ.

The name *Episcaphula* was introduced by Crotch for a mass of species which he distinguished in no way from the previously existing *Plagiopisthen*, Thomson, to which a part at least belong, and until a fresh division is made it seems necessary to regard the two names as synonymous.

Engis annulatus, Macl., is a species of *Micrencaustes* and not a synonym of *Episcaphula oculata*, Lac., as Crotch believed. Lacordaire, notwithstanding Mr. Gorham's remark to the contrary (Proc. Zool. Soc. 1889, p. 614), expressed the opposite opinion. The specimen figured by the latter (pl. lxi. fig. 2), although identical in its marking with the true *annulata*, Macl., is so extremely different in shape that it seems impossible that it is really the same. A similar pattern is shared by a number of Javan Erotylidæ, of which the following is yet another.

Episcapha pavo, sp. n.

Nigra, dense punctata, pubescens, singulo elytro flavo bi-annulato, annula prima ad marginem anticam, intus et postice paulo dentata, secunda ad apicem fere producta, sed ad margines vix attingente; antennis longitudine ad caput et prothoracem conjunctim æqualibus.

Long. 12 mm.; lat. max. 5.5 mm.

Hab. Java.

It is not very slender and the antennæ are only of moderate

length. The black spot at the base and apex of each elytron is almost exactly round, but the enclosing yellow rings are minutely produced along the elytral margins and the anterior one is also toothed towards the suture and the apex.

The readiest positive means of distinguishing *Episcapha fortunei*, Crotch, and *E. taishoensis*, Lewis, has not been pointed out. In the former the eyes are rather close and in the latter they are wide apart. Both species seem to exist in China and Japan.

Megalodacne chinensis, Crotch, is also very similar, but has the second joint of the antenna longer and the lateral margins of the pronotum thicker.

Mycotretus tigrinus, Oliv., is distinct from the Central American species described and figured under that name by Mr. Gorham, in Biol. Centr.-Amer., Coleopt. vii. 1887, p. 48. The latter may be called *M. centralis*. Besides the differences noted by Mr. Gorham, it is a rather more massive species and the metasternum, which is well punctured in *M. tigrinus*, is very smooth.

The Mexican form recorded as *Mycotretus sobrinus*, Guér., by Mr. Gorham in the same work must similarly be distinguished from that Brazilian species. It is much smaller, relatively shorter, the knees blacker, and the abdominal lines more marked. It may be called *M. distinguendus*.

Amblyopus rubens, Hope (Gemm. & Har.), is a species of *Neotriplax* very near *N. lewisi*, Crotch, but larger and with longer antennæ.

Amblyopus præpositus, Walk. (Gemm. & Har.), is *A. cincipennis*, Lacord., and not *A. vittatus*, Oliv.

Triplax brouni, Pasc., belongs to the genus *Cryptodacne* and is exceedingly near *C. synthetica*, Sharp, from which it seems to differ in its smooth elytra.

Aulacochilus subrotunda, MacL., appears to be the same as *A. 4-pustulatus*, F., as Lacordaire believed, but Macleay's two specimens are of a peculiarly narrow form.

Prepopharus spilotus, Gorb., is a species of *Morphoides*.

Hoplaspis of Motschulsky, according to a specimen from Bakewell's collection which I believe to be a cotype, is a Tenebrionid of the genus *Arrhenoplita*. There can be no doubt, I think, that Motschulsky was mistaken in regarding all the tarsi as five-jointed.

XXIII.—*Two new Mammals from N. Australia.*

By OLDFIELD THOMAS.

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A FURTHER small collection of Mammals from Kimberley, N. Australia, has been received from Mr. J. P. Rogers, and among these there is a *Hydromys* which appears to be new, and an example of the true *Peradorcas concinna* which shows such characters as to compel me to distinguish the specimens from Arnhem Land in the British Museum which had previously borne that name.

Hydromys chrysogaster caurinus, subsp. n.

General characters of the Queensland *H. c. reginæ*, THOMAS & DOLLMANN, but the colour much clearer grey, without yellowish or fulvous suffusion.

General colour above blackish grey, the light element in the colour dull white, not fulvous. Under surface dull creamy white, not sharply defined laterally. Top of muzzle blackish. Inner side of forearms creamy; hands with the digits dull creamy white, a dark brown patch on the wrist and centre of metacarpals; hind legs and feet dark brown throughout. Tail black for its basal three-fifths, its terminal five inches white.

Skull as usual.

Dimensions of the type (measured in flesh) :—

Head and body 284 mm; tail 272; hind foot 61; ear 20.

Skull: condylo-basal length 59; greatest breadth 30; palatilar length 27.3; diastema 16.5; palatal foramina 6.2; upper molar series 8.8.

Hab. Parry's Creek, near Wyndham, E. Kimberley, N.W. Australia.

Type. Adult female. Original number 34. Collected 29 October, 1908, by J. P. Rogers.

This water-rat is of a much clearer and less yellowish grey than any other *Hydromys*. It has the light underside characteristic of the Eastern forms and is probably most nearly allied to the North Queensland *H. c. reginæ*, but is paler throughout.

The length of the white tail-tip of the type is unusual, but Dr. Collett records* that a specimen from the Mary River, N. Australia, presumably of the same race, has only about an inch of the tail white, so that this character would seem to be variable.

* P. Z. S. 1897, p. 323.

Peradorcas concinna canescens, subsp. n.

Essential characters as in true *concinna*, but instead of the ground-colour being rich rusty, scarcely modified by the longer greyish-white hairs, it is a dull rufous, heavily overlaid, in fact practically hidden, by the broad greyish sub-terminal bands and blackish tips of the longer hairs. The general colour is therefore a grizzled *Bettongia*-like tone, quite unlike that of true *concinna*. Crown greyish brown. Arms and legs greyish, with scarcely a tinge of buffy. Behind the shoulder a dark patch, succeeded by a lighter one, and a light hip-mark; all more prominent than in *concinna*, though even in that animal there is an indication of these markings, which are usual in the *Petrogale* group.

Skull rather smaller than in the available examples of *concinna*, but whether this is due to age is not at present clear.

Dimensions of the type:—

Head and body (c.) 400 mm.; tail 325; hind foot 101; ear 41.

Skull: basal length 64; greatest breadth 42.5.

Hab. Arnhem Land, N. Territory. Type from Nellie Creek. Other specimens from Mary R. (*Dahl*).

Type. Adult male. B.M. no. 4. 1. 3. 58. Original number 1164. Collected 13 February, 1903, by J. T. Tunney. Presented by the Hon. W. Rothschild.

The Arnhem-Land specimens of *Peradorcas* have been referred by Dr. Collett* and myself † to *P. concinna*, of which the type specimen, collected on the "N.W. Coast of Australia" by Lieut. Emery, is in the British Museum. This type is in a very faded condition, and it is only now, on the receipt of a fresh example from near Wyndham, Kimberley, collected by Mr. J. P. Rogers, that I am able to verify that the colour of *concinna* is really ferruginous, as stated by Gould and Waterhouse, and that the much greyer Arnhem-Land animal is a different form.

It may be noted that this fresh specimen of *concinna*, although very old, with the incisors worn down, is still continuing to produce additional molars at the back of its tooth-row, a characteristic pointed out when I founded the genus *Peradorcas*.

* P. Z. S. 1897, p. 325.

† Nov. Zool. xi. p. 226 (1904).

XXIV.—Six new Species of *Aotus*.

By GUY DOLLMAN, B.A.

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WHILE working out the collection of *Douroucoulis* contained in the British Museum I have found six forms that appear to belong to hitherto undescribed species, of which I now give descriptions.

Aotus roberti, sp. n.

Related to *Aotus azarae*, Humb., but much yellower in colour and with a larger skull.

Size and general proportions similar to *A. azarae*. Hair rather harsh and long, measuring about 40 mm. in length on the back. General colour of upper surface of body, limbs, hands, and feet greyish buff (near putty-colour no. 4, 'Repertoire de Couleurs'); sides of body rather greyer than back. Black markings on head similar in arrangement to those of *A. azarae*, but the lateral stripes are rather indistinct and tend to spread out posteriorly. Under surface of body buff-coloured (yellowish buff no. 3, 'Repertoire de Couleurs'). Undersides of limbs very similar in colour to belly, but rather greyer. Upper surface of tail a rich tan-colour at base, distal half blackish. Underside of tail similar to upper surface, only the basal region is darker in colour, approaching chestnut.

Skull rather larger than that of *A. azarae*, especially the orbital region; nasals and palate broader.

Dimensions of the type (measured in flesh):—

Head and body 330 mm.; tail 350; hind foot 90; ear 26.

Skull: greatest length 64; basilar length 43.7; zygomatic breadth 40.5; greatest breadth across orbital region 43.6; condylo-basilar length 48; palatilar length 17; length of upper tooth-row, from front of first premolar to back of last molar, 15.

Hab. Serra da Chapada, Matto Grosso, Brazil. Altitude 2700 feet.

Type. Adult female. B.M. no. 3. 7. 7. 14. Collected 28th September, 1902, by Alphonse Robert. Presented by Mrs. Percy Sladen.

Though closely allied to *A. azarae*, the dissimilarity of the skulls of the two forms, together with the differences in colour, necessitate this Brazilian species being considered quite distinct from the more southern form.

Aotus nigriceps, sp. n.

Allied to *Aotus boliviensis*, Elliot, but having the head-stripes much broader and continued back further on the crown; skull with much smaller orbits.

Size as in *A. boliviensis*. General colour of back greyish olive, rather darker in the mid-line, where the grey is suffused with a buff-coloured tint. Flanks and upper sides of limbs dull grey. Backs of hands and feet dark brownish black. Lateral head-stripes black, rather broad and extending back on to the posterior part of the crown. Median stripe diamond-shaped, extending back almost as far as the lateral stripes, but not uniting with them. Light marks above eyes white, speckled with black. Under surface of body and limbs yellowish (ochre-colour no. 1, 'Repertoire de Couleurs'). Tail very similar to that of *A. boliviensis*, but rather darker towards the tip.

Skull much narrower across orbital region than that of *A. boliviensis*.

Dimensions of the type (measured in skin) :—

Head and body 380 mm. ; tail 387 ; hind foot 88.

Skull: greatest length 63.4 ; basilar length 41 ; zygomatic breadth 39 ; greatest breadth across orbital region 44 ; condylo-basilar length 47 ; palatilar length 18 ; length of upper tooth-row, from front of first premolar to back of last molar, 15.

Hab. Chanchamayo, Peru. Altitude 3000 feet.

Type. Adult male. B.M. no. 5. 11. 2. 2. Collected in February 1904 by C. O. Schunke.

Ten other specimens from Chanchamayo have been examined, and they all agree with the type in the arrangement of the black head-stripes and the possession of small orbits, characters that justify this Peruvian form being considered distinct from the Bolivian species.

Aotus senex, sp. n.

Similar to *Aotus boliviensis*, Elliot, as regards the head-stripes, but with a pure black tip to the tail and a very much smaller and narrower skull.

Hair of medium length, measuring about 30 mm. long on the back. General colour of back greyish buff, darker down the middle (brown-pink no. 1, 'Repertoire de Couleurs'), becoming paler and greyer on the flanks and upper side of limbs. Individual hairs of back black at base ; terminal half of hairs composed of four alternate rings of buff and black. Head-stripes black and very narrow ; lateral stripes on head

not extending back beyond the forehead. Median stripe very narrow at anterior end, spreading out into a diamond-shaped mark on the forehead. None of the stripes united at their posterior terminations. Light marks above eyes very broad and white. Under surface of body yellowish (mars-yellow no. 1, 'Repertoire de Couleurs'). Underside of limbs similar in colour to belly, becoming greyish towards the extremities, especially the hind limbs. Basal portion of tail reddish (tan-colour no. 1, 'Repertoire de Couleurs'), becoming black towards the middle, from which point to the tip the tail is completely black.

Skull much narrower across the orbits than that of *A. boliviensis*.

Dimensions of the type (measured in skin):—

Head and body 380 mm.; tail 390; hind foot 86.

Skull: greatest length 65; basilar length 40; zygomatic breadth 36.6; greatest breadth across orbital region 41.4; condylo-basilar length 45.4; palatilar length 17; length of upper tooth-row, from front of first premolar to back of last molar, 15.

Hab. Pozuzo, Peru. Altitude 2400 feet.

Type. Subadult female. B.M. no. S. 6. 17. 6. Collected by L. Egg in March 1905. A second specimen from the same locality is quite similar to the type.

This species is sharply marked off from *A. boliviensis* by its much narrower skull, and from *A. nigriceps* by the black head-stripes being wholly confined to the forehead, not spreading on to the crown of the head.

Aotus gularis, sp. n.

Allied to *Aotus trivirgatus*, Humb., but having the black head-stripes continued back on to the neck in the form of a well-marked V.

Size and general characteristics as in *A. trivirgatus*. Hair of medium length, measuring about 23 mm. long on back. General colour of back buffy brown (snuff-brown no. 1, 'Repertoire de Couleurs'), speckled with black and silvery white, paling to greyish buff on the flanks and upper sides of limbs. Backs of hands and feet dark brownish black, sprinkled with buff. Stripes on head blackish brown, broad and well-defined. Lateral stripes continued back on to the neck, where they meet one another, forming a V-shaped mark on the crown and neck. Median stripe rather broad on the forehead, becoming narrower on the crown, where it extends back to meet the two lateral stripes at their common point of

union. Light marks above eyes buff-coloured, turning to a rich brownish buff on the top of the head. Under surface of body pale buff (yellowish buff no. 1, 'Repertoire de Couleurs'); throat and chin dirty grey. Under sides of limbs greyish buff. Basal portion of tail reddish (brownish terra-cotta no. 1, 'Repertoire de Couleurs'), washed over with black, gradually becoming blacker towards the tip, where it is almost wholly black.

Skull similar in size to that of *A. trivirgatus*; teeth a little larger, especially the last molar.

Dimensions of the type (measured in skin):—

Head and body 360 mm.; tail 310; hind foot 72.

Skull: greatest length 63·4; basilar length 40·5; zygomatic breadth 40; greatest breadth across orbital region 42·5; condylo-basilar length 45; palatilar length 16; length of upper tooth-row, from front of first premolar to back of last molar, 15.

Hab. Mouth of the Rio Coca, Upper Rio Napo, Ecuador.

Type. Adult female. B.M. no. 0. 6. 3. 1. Collected in June, 1899, and presented by Mr. W. Goodfellow. In addition to the type, the Museum possesses another specimen referable to this new form, also from the Upper Rio Napo.

The well-defined V-shaped marking on the head, extending back on to the neck, and the grey-coloured throat constitute sufficient grounds for considering these two specimens to represent a distinct species.

Aotus lanius, sp. n.

A mountain form allied to *Aotus trivirgatus*, Humb., but readily distinguished by its long thick coat and the broad indistinct head-stripes.

Hair of back very long, measuring about 60 mm. in length. General colour of back and upper surfaces of limbs reddish brown (burnt umber no. 1, 'Repertoire de Couleurs'), speckled with buff, rather greyer on flanks. Individual hairs of back brownish-slate colour at base, this colour extending for about half the entire length, followed by two buffy-brown rings, with a black one between them, the hairs terminating in a long black tip. Backs of hands and feet brownish black, speckled with buff. Head-stripes brownish, rather indistinct, and not extending back beyond the forehead. Median stripe broad, spreading out on the forehead into a fan-shaped mark. Light marks above eyes buffy. Under surface of body pinkish buff (apricot no. 1, 'Repertoire de Couleurs'), getting paler on the flanks. Throat and chin

greyish buff. Basal half of tail similar in colour to back, distal portion brownish black and rather bushy.

Skull with large heavy teeth.

Dimensions of the type (measured in skin) :—

Head and body 365 mm.; tail 350; hind foot 82.

Skull (occipital region broken): basilar length 40·8; zygomatic breadth 38·8; greatest breadth across orbital region 41·6; condylo-basilar length 46; palatilar length 17·5; length of upper tooth-row, from front of first premolar to back of last molar, 16.

Hab. Mountains of Tolima, Colombia. Altitude 6000 feet.

Type. Adult female. B.M. no. 90. 2. 22. 4. Collected and presented by Mr. R. B. White. In addition to the type, the Museum received three other specimens of this species from Mr. White, all from the Tolima Mountains.

These long-haired *Douroucoulis* undoubtedly represent a mountain form, which, though resembling *A. trivirgatus* in some respects, is easily differentiated by its long hair and broad indistinct head-stripes.

Aotus microdon, sp. n.

A small-toothed form, allied to the foregoing species.

Hair of back soft and rather long, measuring about 38 mm. in length. General colour of back brownish orange (between tan-colour no. 2 and bistre no. 3, 'Repertoire de Couleurs'), paling to a brownish yellow (snuff-colour no. 2, 'Repertoire de Couleurs') on the flanks and upper surfaces of limbs. Individual hairs of back slaty brown at base, paling to a greyish ring in the middle, the colour then changing to buff and orange (tan-colour no. 2, 'Repertoire de Couleurs'), the hairs terminating in a black tip. Backs of hands and feet reddish brown. Head-stripes brownish, rather indistinct and continued back on to the hinder part of the head, though not meeting one another posteriorly. Light marks above eyes yellowish white, becoming richer in colour on the crown, where they gradually pass into the brownish-orange colour of the neck. Under surface of body, throat, and limbs buffy (yellowish buff no. 3, 'Repertoire de Couleurs'). Tail at base reddish (tan-colour no. 2, 'Repertoire de Couleurs'), distal portion black.

Skull resembles that of *A. lanius*, only the teeth are smaller.

Dimensions of the type (measured in skin) :—

Head and body 394 mm.; tail broken; hind foot 80.

Skull: greatest length 61·5; basilar length 39; zygomatic

breadth 39·5; greatest breadth across orbital region 41; condylo-basilar length 44; palatilar length 16; length of upper tooth-row, from front of first premolar to back of last molar, 14.

Hab. Macas, Ecuador.

Type. Adult. B.M. no. 72. 4. 30. 4.

The small teeth, brown hands and feet, and the arrangement of the head-stripes indicate that this southern form, though closely related to *A. lanius*, must be looked upon as a distinct species.

XXV.—A new Species of *Presbytis*, allied to *P. rubicundus*.

By GUY DOLLMAN, B.A.

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Presbytis ignitus, sp. n.

Size and general proportions similar to *Presbytis rubicundus*, Müll., but much lighter in colour, and having the frontal region of the skull dome-shaped.

Upper surface of body and limbs a uniform reddish colour ("dull brick-red no. 4," Repertoire de Couleurs), the long hair on the neck slightly paler. Backs of hands and feet very similar in colour to body, not black as in *P. rubicundus*. Underside of body and limbs rather lighter than upper surface ("dull brick-red no. 2," Repertoire de Couleurs). Tail, throughout its entire length, similar in colour to back.

Skull with a high dome-shaped forehead, presenting a marked contrast to the flat skull of *P. rubicundus*, where the forehead hardly rises above the level of the supraorbital ridges. Cranium rather shorter; nasals broader and much flatter.

Dimensions of the type (measured in skin):—

Head and body 600 mm.; tail 750; hind foot 160.

Skull: greatest length 94; zygomatic breadth 72; greatest breadth across orbital region 62; basilar length 59; condylo-basilar length 67; palatilar length 27; width of palate, behind second premolar, 20; length of upper tooth-row from front of first premolar to back of last molar 23·5.

Hab. Mount Mulu, Baram, Sarawak, North Borneo. Altitude 1000 feet.

Type. Adult female. B.M. no. 94. 6. 2. 31. Collected

October 1893, and presented by Dr. Charles Hose. In addition to the type, the Museum possesses seven other specimens referable to this new species, all from Sarawak.

This North Bornean form differs so greatly from *P. rubicundus*, both as regards colour and skull-characters, that it must be considered specifically distinct from the Southern species.

XXVI.—*Descriptions of new South-American Arctianæ.*

By the Hon. WALTER ROTHSCHILD, Ph.D.

IN 'Novitates Zöologicæ,' vol. xvi. (1909), I described some 118 new species of Arctianæ, and the present paper is a continuation of the same work. The bulk of the species were collected by S. M. Klages and the late G. R. Ockenden.

1. *Ammalo helops* (Cram.).

In vol. iii. of the 'Catalogue of Lepidoptera Phalænæ' Sir George Hampson has united under *Ammalo helops* (Cram.) the following:—*A. helops* (Cram.), *A. fervidus*, Walk., *A. megapyrrha*, Walk., *A. chrysogaster*, Walk., and *A. impunctus*, Grote, to which he afterwards added *trujillaria*, Dogn. The latter is quite a distinct species. It now remains for me to discuss the five names treated as synonyms by Sir George. The figure of Cramer clearly shows an insect which has on the fore wing a large red patch in the cell and four or five other patches of red beyond it. The types of *chrysogaster* and *megapyrrha* are both without any such marks, thus agreeing with Grote's *impunctus*. *A. fervidus* is a similar insect, but of an orange-rufous colour all over except the usual yellow and black banded abdomen. Thus we find two distinct types, one with red patches on the disk and one without; but it appears to be a fact that by far the larger number of specimens from Mexico and Central America have no patches, therefore I have come to the conclusion that these ought to be regarded as a separate subspecies under the name of *A. helops megapyrrha*, Wlk.

2. *Ammalo klagesi*, sp. n.

♀. Palpi, pectus, head, thorax, and basal and terminal segments of abdomen brick-red; rest of abdomen sooty black. Antennæ, tibiæ, and tarsi fuscous. Wings dull

fuscous brown, with a purple sheen in some lights ; base of both pairs of wings brick-red.

Length of fore wing $3\frac{1}{2}$ mm.

Hab. Fonte Boa, Upper Amazon, August 1906 (*S. M. Klages*).

3. *Ochrodota similis*, sp. n.

♀. Differs from *pronopites*, Druce, in the tegulæ being brown like the patagia, the frons dirty yellowish brown, not white, the basal pale area of fore wing being brown, with twelve whitish spots, not whitish irrorated with brown lines and spots, and in having two large white spots in cell and on costa beyond the pale basal area. The apical patch of whitish yellow irrorated with brown is absent, and is replaced by a costal and subcostal white spot one-fourth from apex and three small white subapical spots. On the hind wing a broad, ill-defined, fuscous band extends from apex to anal angle beyond the cell.

♂. Differs from female in the light spots being much smaller and hind wings darker.

Length of fore wing, ♀ 16, ♂ 11-13 mm.

Hab. Fonte Boa, Upper Amazon, July 1906, and Codajos, Upper Amazon, April 1907 (*S. M. Klages*). 13 ♂♂, 23 ♀♀.

4. *Ochrodota tessellata*, sp. n.

♂. Head and thorax pale buff ; palpi and vertex of head buffy white ; tibiæ and tarsi of first two pairs of legs buffy white, banded with slate-grey ; hind pair of legs buffy white ; tegulæ with central pale rufous dot and patagia with broad rufous central stripe. Basal third of fore wing pale buff, a number of rufous rings ; this basal area is bordered by a broad rufous-chestnut transverse band ; remaining two-thirds of fore wing greyish lavender, irrorated with brownish marks ; near the apex is a buff patch, bordered with chestnut and streaked with rufous. Hind wing buff, margined with fuscous. Abdomen buffish ; a central line and last three segments and antennæ fuscous.

♀. Similar to male, but irrorations on fore wing whitish and more distinct.

Length of fore wing, ♂ 12, ♀ 16 mm.

Hab. Fonte Boa, Upper Amazon, July 1906 and 1907 (*S. M. Klages*) ; Rio Huacamayo, Carabaya, 3100 feet (dry season), June 1904 (*G. R. Ockenden*). 5 ♂♂, 2 ♀♀.

5. *Ochrodota brunnescens*, sp. n.

♂. Palpi and frons fuscous brown; vertex and tegulæ buff, with rufous spots; patagia fuscous, with rufous border; thorax fuscous; abdomen fuscous, except first two segments, which are whitish; antennæ whitish fuscous. Basal third of fore wing buff, with ill-defined rufous rings and spots; rest of fore wing brown, irrorated with dark chestnut; near apex is a buff patch marked with rufous. Hind wing buffy greyish white, washed with fuscous towards margin.

♀. Larger than male; basal and subapical buff areas almost obliterated by the coalescing of the rufous markings; thorax, abdomen, and hind wings fuscous brown.

Length of fore wing, ♂ 12, ♀ 16 mm.

Hab. Aroewarwa Creek, Maroewym Valley, Surinam, April 1905, and Fonte Boa, Upper Amazon, June 1907 (*S. M. Klages*). 11 ♂♂, 1 ♀.

6. *Ochrodota atra*, sp. n.

♂. Palpi and head deep brown; tegulæ, patagia, and thorax brown-black, with small indistinct orange marks; abdomen brown-black; antennæ dark fuscous. Fore wings brown-black, costa more brown; basal fourth and a subapical patch orange-buff, blotched with rufous brown. Hind wings brown-black.

Length of fore wing 12 mm.

Hab. La Oroya, Rio Inambari, S.E. Peru, 3100 feet, March 1905 (wet season) (*G. R. Ockenden*). 2 ♂♂.

7. *Ochrodota affinis*, sp. n.

♀. Similar to *pronapides* and *similis*. Wings and body uniform sooty fuscous; pale basal and subapical areas of allied two species only indicated by a white dot near base of cell and some buffish subapical spots.

♂. Smaller, and pale dots and spots larger.

Length of fore wing, ♀ 16, ♂ 11 mm.

Hab. Fonte Boa, Upper Amazon, June, August, and September 1906 (*S. M. Klages*); Codajos, Upper Amazon, April 1907 (*S. M. Klages*). 3 ♂♂, 6 ♀♀.

8. *Tessellarctia distincta*, sp. n.

♂. Palpi, antennæ, tegulæ, and head pale fuscous grey; patagia and thorax dull whitish buff. Fore wing rufescent

buffy clay-colour, above inner margin a dark brown longitudinal semioval patch, bordered with buffy white, outer three-fourths of inner margin broadly buffy white; a buffy-white submarginal line along outer margin; a subapical dark brown patch joined to an oblique irregular band, almost connecting this to the patch above inner margin; this band is bordered on each side by a broken white line. Hind wing dull orange-fuscous, with sooty irregular bands and blotches. Abdomen brown.

Length of fore wing 14 mm.

Hab. Fonte Boa, Upper Amazon, September 1906 (*S. M. Klages*). 5 ♂♂.

9. *Pachydota rosenbergi*, sp. n.

♂. Similar to *albiceps*, Walk., but differs in the head being whity buff, the discal and transverse darker band of fore wing being double, not treble, the discal hyaline area on hind wing being less extended than in continental specimens of *albiceps*, and in the abdomen being black, with a row of yellow spots on each side.

Length of fore wing 23 mm.

Hab. Paramba, W. Ecuador, 3500 feet (*W. Rosenberg*). 1 ♂.

10. *Carathis klagesi*, sp. n.

Palpi dark brown; pectus orange-buff; first two pairs of legs orange-buff, banded with brown; head and thorax pale buff, tegulæ and patagia narrowly edged with brown; thorax with central chocolate line; abdomen pale buff, darker towards apex. Fore wing whitish yellow, covered with a network of chocolate lines from the costa across apical two-fifths of cell to outer angle; a broad band of chocolate-brown, joined obliquely from its centre to the costa by another narrower and irregular band. Hind wing hyaline buff, with some indistinct brownish patches near the margin.

Length of fore wing 16 mm.

Hab. Fonte Boa, Upper Amazon, May 1906 (*S. M. Klages*). 8 ♂♂.

11. *Carathis australis*, sp. n.

♂. Head and antennæ fuscous; collar and tegulæ buff; patagia chocolate-brown, outer third buff, with brown streaks. Fore wing buff, with network of chocolate, three-fourths of the wing covered with a large wedge-shaped chocolate patch, narrowest on inner margin; two buff patches running from

costa into cell in this chocolate area. Hind wing greyish hyaline brown.

Length of fore wing 22 mm.

Hab. St. Catharina, Brazil.

12. *Baritius sannionis*, sp. n.

♂. Palpi crimson, bordered with brown outside; head and tegulæ golden yellow, with a central black dot in latter; patagia and thorax brown, variegated with crimson and yellow; antennæ brown; abdomen crimson, last segment golden. Fore wing rufous brown, slightly irrorated with yellow; base yellow, with two crimson dots, then a transverse band of crimson spots bordered with yellow; discal and postdiscal areas with three or four irregular bands of crimson spots bordered with yellow; a row of minute crimson dots in a black marginal line. Hind wing hyaline rose with golden wash.

Length of fore wing 10–13 mm.

Hab. La Oroya, R. Inambari, S.E. Peru, Oct. 1904 (wet season) (*G. R. Ockenden*); Fonte Boa, Upper Amazon, June 1906 (*S. M. Klages*). 3 ♂♂.

13. *Baritius flavescens*, sp. n.

♂. Pale yellow; antennæ yellow, with a dark patch two-fifths from the point; head and thorax yellow; abdomen pale brownish orange. Fore wing buffy yellow, irrorated with brown; an antemedial, transverse, brown irregular band, forked on costa; an oblique postmedian brown band from costa to above outer angle; a subterminal brown spot above vein 5. Hind wing golden hyaline buff.

Length of fore wing 14 mm.

Hab. Fonte Boa, Upper Amazon, August 1906 (*S. M. Klages*). 1 ♂.

14. *Baritius eleutheroïdes*, sp. n.

♂. Similar to *eleuthera*, Stoll, but wings much narrower and all brown markings wider, more irregular, and the outlines less defined. Hind wings entirely salmon-pink.

♀. Similar, but larger.

Length of fore wing, ♂ 14, ♀ 18 mm.

Hab. Fonte Boa, Upper Amazon, August 1906 (*S. M. Klages*); La Oroya, R. Inambari, 3100 feet, S.E. Peru (wet season), March 1905 (*G. R. Ockenden*); Aroewarwa Creek, Maroewym Valley, Surinam, April 1905 (*S. M. Klages*);

La Union, Rio Huacamayo, Carabaya, 2000 feet (wet season), Nov. 1904 (*G. R. Ockenden*); Manaos to Yutobi River (*M. Stuart*). 43 ♂♂, 5 ♀♀.

15. *Baritius venata*, sp. n.

♀. Head and thorax buffy yellow, with pale red spots; antennæ fuscous yellow; abdomen dirty brick-red. Fore wing buffy yellow, all veins broadly marked out in pale brick-red; basal half of wing irregularly blotched with fuscous and dotted with black; a transverse postmedial fuscous line, dotted with black; a marginal and submarginal row of black spots between the veins. Hind wing rosy red.

♂. Similar, but much brighter and darker.

Length of fore wing, ♀ 18, ♂ 19 mm.

Hab. Aroewarwa Creek, Maroewyn Valley, Surinam, March 1905, and Fonte Boa, Upper Amazon, May 1906 (*S. M. Klages*). 1 ♀, 2 ♂♂.

16. *Baritius schausi*, sp. n.

♀. Nearest to *marmorea*, Schaus. Head and thorax yellow, variegated with reddish brown; abdomen dull crimson, first and last two segments yellow; antennæ yellow. Fore wing purplish brown, irrorated with yellow; numerous irregular transverse bands of dull yellow spots, with pale brick-red centres; a submarginal white line. Hind wing hyaline, pale opalescent salmon.

Length of fore wing 21 mm.

Hab. Caparo, Trinidad, Dec. 1905 (*S. M. Klages*). 3 ♂♂, 1 ♀.

17. *Pelochyta affinis*, sp. n.

♂. Nearest to *cinerea*, Walk., but head, tegulæ, and patagia orange. Fore wing with strong violet sheen and two postmedial dark patches. Base of hind wings salmony orange. Abdomen salmon-orange, last three segments with central black dots.

Length of fore wing 25 mm.

Hab. Lita, Ecuador (*Flemming*). 2 ♂♂.

18. *Elysius pseudodryas*, sp. n.

♂. Allied closely to *dryas*, Cram. Head, thorax, and antennæ deep black-brown; abdomen yellow above, with two dorso-lateral lines of black spots; the first five segments densely clothed with long orange-salmon hairs. Fore wings

deep black-brown, with a very strong blue-purple sheen, and irrorated with greyish yellow; at apex of cell a group of yellow-grey dots and spots. Hind wing pale hyaline salmon, basal third densely clothed with orange-salmon hair; marginal band of wing fuscous, only slightly wider at apex and much narrower than in *dryas*. There is in the British Museum a female with rose-pink hind wing and first abdominal segments from Rio Grande do Sul; but this has an extra wide marginal band to the hind wings.

Length of fore wing 25 mm.

Hab. La Orova, R. Inambari, Carabaya, 3100 feet, Nov. and Dec. 1905 (wet season) (*G. R. Ockenden*). 1 ♂.

19. *Elysius ammaloides*, sp. n.

♂. Palpi, head, and thorax orange-brown mixed with fuscous; antennæ fuscous brown; abdomen orange-buff, with indistinct black rings. Fore wing purplish mauve, strongly irrorated with brown; a pinkish-salmon spot near apex below vein 10. Hind wing orange-buff, washed with salmon.

♀. Similar.

Length of fore wing, ♂ 26, ♀ 28 mm.

Hab. R. Huacamayo, Carabaya (dry season), 3100 feet, June 1904 (*G. R. Ockenden*); Fonte Boa, Upper Amazon, May 1906 (*S. M. Klages*). 3 ♂♂, 2 ♀♀.

20. *Elysius atrobrunnea*, sp. n.

♂. Similar to *atrata*, Feld., and *terra*, Druce, but larger and paler. Head and tegulae orange; thorax brown; antennæ brown; abdomen blackish, basal segment orange, a lateral line of orange and a narrow orange ring on fifth segment. Fore wing sooty brown. Hind wing pale sooty grey-brown, hyaline area indistinct.

Length of fore wing 32 mm.

Hab. Merida, Venezuela (*Briceño*). 1 ♀.

21. *Elysius magnifica*, sp. n.

♂. Nearest to *cingulata*, Walk., but much larger. Palpi, head, and thorax blackish crimson; antennæ brown; first two segments of abdomen rosy carmine, the second one with a blackish narrow band; anal segment chestnut, washed with carmine; remaining segments above black, with golden-yellow rings; below, pectus crimson, abdomen chestnut; legs fuscous brown. Fore wing deep rufous chocolate, covered with a network of orange-brown hair-lines; base

carmine, with a golden and a brown spot; beyond base is a patch of orange irrorated with red, in the cell and on the disk are several indistinct ill-defined patches paler than the ground-colour of the wing, being of a dull orange-brown. Hind wing rosy carmine.

Length of fore wing 46 mm.

Hab. Tinguri, Carabaya, 3400 feet, August 1904 (dry season), and La Oroya, Rio Inambari, 3100 feet, S.E. Peru, April 1901 and Sept. 1904 (dry season) (*G. R. Ockenden*). 6 ♂♂.

22. *Elysius terranea*, sp. n.

♂. Pectus, legs, palpi, head, and thorax uniform mummy-brown; antennæ fuscous brown; abdomen mummy-brown, but paler than thorax, owing to longer hairs being tinged with yellow. Fore wing bright mummy-brown, irrorated with buff streaks, a round buff spot at apex of cell. Hind wing hyaline greyish buff, washed with clay-brown towards margins; along abdominal margin wing broadly clothed with yellow hairs.

Length of fore wing 28 mm.

Hab. La Oroya, Rio Inambari, Peru, 3100 feet (dry season) (*G. R. Ockenden*). 1 ♂.

23. *Ischnocampa floccosa*, sp. n.

♀. Nearest to *sordida*, Feld. Palpi brownish grey; head and antennæ pale yellowish grey; collar dull orange; thorax yellowish grey, powdered with darker grey; abdomen sooty black, last segment greyish buff. Fore wing buffy grey, densely irrorated with greyish brown at apex of cell; a strongly angulated brown band from costa to vein 4; a black dot in cell; from apex of cell almost to submarginal area wing covered with sooty-brown cloud. Hind wing, basal three-fourths hyaline, outer fourth buffy grey irrorated with greyish brown.

Length of fore wing 19 mm.

Hab. La Oroya, Rio Inambari, S.E. Peru, 3100 feet (dry season), Sept. 1904 (*G. R. Ockenden*). 1 ♀.

24. *Opharus aurantiacus*, sp. n.

♂. Pectus orange; legs orange, spotted with fuscous; palpi orange, last joint black; head and thorax orange, with black dots; antennæ brown; abdomen orange-buff, clothed with orange-salmon hairs. Fore wing orange-yellow, densely

irrorated with rufous transverse lines, one-fourth from base a transverse rufous band from costa to inner margin; in cell a silver dot in chocolate patch. Hind wing salmon, washed with yellow.

Length of fore wing 34 mm.

Hab. Chanchamayo, January to September 1901 (*W. Hoffmanns*). 1 ♂.

25. *Hemihyalea ochracea*, sp. n.

♀. Palpi, legs, head, and thorax clayish ochraceous buff; abdomen salmon-pink, first and last segments clayish buff. Fore wing clayish ochraceous buff, irrorated with minute black streaks; on costa and disk a number of patches and ill-defined bands of creamy buff. Hind wing pale hyaline salmon, apex buff.

Length of fore wing 32 mm.

Hab. Volcano de Chiriqui, 5000-9000 feet (*Watson*). 1 ♀.

26. *Hemihyalea testacea*, sp. n.

♀. Legs testaceous buff, washed with carmine on inner surface; antennæ rufous; head and thorax testaceous buff; abdomen deep carmine, sides and tip of last segment pale buff. Fore wing testaceous buff, slightly hyaline owing to thin scaling. Hind wing hyaline at abdominal margin, broadly salmon-carmine.

Length of fore wing 31 mm.

Hab. Jalapa, Mexico. 1 ♀.

27. *Hemihyalea tristis*, sp. n.

♀. Frons white; vertex and thorax rufous clay-brown, the latter with a few whitish hairs; abdomen dull brownish rose, tip sooty brown and white. Fore wing dull rufous brown strongly hyaline, apex of cell with black line, beyond cell an ill-defined zigzag indistinct orange-brown band. Hind wing pale hyaline brownish clay-colour.

Length of fore wing 27 mm.

Hab. Agualani, Carabaya, 9000 feet (wet season), March 1905 (*G. R. Ockenden*). 1 ♀.

28. *Hemihyalea brunnescens*, sp. n.

♂. Pectus rufous brown mixed with crimson; palpi brown, third segment whitish; first two pairs of legs dull white, clay-brown inside; frons dull white; rest of head

rufous brown, collar and shoulders white; thorax rufous brown; abdomen pale crimson; antennæ rufous brown. Fore wing hyaline, costa, inner margin, and outer fifth of wing rufous brown, the latter bordered on inside by a paler band. Hind wing hyaline with greyish-brown border. In one specimen pectus, head, and thorax are rufous grey.

Length of fore wing 25-31 mm.

Hab. Agualani, Carabaya, 9000 feet (dry season), Aug. 1905, and Tinguri, Carabaya, 3400 feet (dry season), Aug. 1904 (*G. R. Ockenden*); Bogota Town, March. 3 ♂.

29. *Hemihyalea fusca*, sp. n.

♂. Pectus rosy crimson, strongly mixed with brown; legs black-brown; palpi, head, antennæ, and thorax dark brown; abdomen rosy crimson. Fore wing hyaline, costa, outer and inner margins very dark brown. Hind wing hyaline, with brownish-white border, along the abdominal margin broadly clothed with rose hairs.

Length of fore wing 28-33 mm.

Hab. Agualani, Carabaya, 9000 feet, Dec. 1905 (wet season), and Rio Huacamayo, Carabaya, 3100 feet (dry season), June 1904 (*G. R. Ockenden*).

30. *Amastus hampsoni*, sp. n.

♂. Palpi and head black; collar crimson; tegulæ black, with orange hind margin; patagia black, with orange band; thorax and antennæ black; abdomen above crimson, last segment grey-brown, a lateral band of grey spots margined with black and dotted with orange. Fore wing rufous brown shaded with various paler shades of brown, an antemedial lunate sooty black band, followed by a medial broad wedge-shaped patch of same colour reaching from costa nearly to vein 1, beyond cell a chain of clayish-brown spots with sooty margins, between this chain and outer margin a zigzag rufous-buff line and between the preceding transverse markings much rufous-buff clouding. Hind wing hyaline clayish buff.

Length of fore wing 37 mm.

Hab. Paramba, Ecuador, Jan. to May 1897 (*W. Rosenberg*). 1 ♂.

31. *Amastus pseudocollaris*, sp. n.

♀. Pectus orange; legs and palpi sooty brown; head white; collar orange-rufous; tegulæ white with orange-

rufous hind margin; patagia white with orange-rufous central band; abdomen above orange, with a lateral row of whitish and black streaks, underside of abdomen dirty white, with two rows of orange spots. Fore wing cinnamon-hazel, somewhat paler on each side of veins, disc crossed by three almost obliterated blackish bands. Hind wings hyaline brownish buff, passing into hazel towards the margins.

Length of fore wing 35 mm.

Hab. Chiriqui, Panama. 1 ♀.

32. *Amastus steinbachi*, sp. n.

♂. Legs rufous clay-brown; pectus maroon-crimson; head white; tegulæ white anteriorly, maroon-crimson posteriorly; patagia white, with a central black band, with which is a rufous spot and a white line; thorax maroon-crimson, with central white line; abdomen above crimson, last three segments but one clay-brown with white edges, tip of last segment scarlet. Fore wing dirty orange-brown, traversed by a number of indistinct, blackish, greyish and whitish bands, almost as in *maculicineta*, Hmps. Hind wing hyaline buffy grey.

Length of fore wing 28 mm.

Hab. Tucuman, 3580 feet, Jan. and Feb. 1905 (*J. Steinbock*). 2 ♂♂, 1 ♀.

33. *Amastus drucei*, sp. n.

♂. Legs, head, and antennæ rufous mummy-brown; collar orange; thorax rufous mummy-brown; abdomen above orange, below mummy-brown. Fore wing chestnut-brown, a darker lunate spot at apex of cell, basal three-fifths washed with cinnamon, a cinnamon zigzag line crossing the wing beyond this area. Hind wing hyaline whitish brown.

Length of fore wing 25-27 mm.

Hab. Santo Domingo to Limbani, Carabaya, 3000-9000 feet, June 1904 (dry season) (*G. R. Ockenden*). 3 ♂♂.

34. *Amastus dognini*, sp. n.

Pectus brown mixed with rose; head and thorax greyish brown; antennæ brown; abdomen dirty coral-red. Fore wing mummy-brown; at apex of cell a large patch darker brown surrounded with cinnamon, beyond the cell a zigzag cinnamon transverse narrow band, beyond which the wing is much covered with cinnamon scales. Hind wing hyaline grey-buff, darker near abdominal margin, fringe brown.

Length of fore wing 24 mm.

Hab. Santo Domingo to Limbani, Carabaya, 3000-9000 feet, June 1904 (dry season) (*G. R. Ockenden*). 1 ♂.

35. *Amastus rufescens*, sp. n.

♂. Head and antennæ rufous brown; vertex and thorax dull salmon-rose, strongly mixed with deep brown; abdomen dirty salmon. Fore wing deep chestnut-brown, slightly powdered with yellowish scales, at apex of cell a blackish patch, beyond cell an orange-brown transverse wavy narrow band. Hind wing hyaline buff, margined with brown.

Length of fore wing 27 mm.

Hab. Agualani, Carabaya, 9000 feet (dry season), July 1905 (*G. R. Ockenden*); Peru. 3 ♂♂.

A specimen marked "Peru" has the transverse band almost absent and the patch at the end of cell replaced by two black dots.

36. *Halisidota nigrescens*, sp. n.

♀. Antennæ rufous; head and thorax sooty black; abdomen sooty brown. Fore wing sooty brownish black; from outer angle to costa a zigzag transverse buff line. Hind wing hyaline grey-buff.

Length of fore wing 31 mm.

Hab. Agualani, Carabaya, 9000 feet (wet season), Dec. 1905 (*G. R. Ockenden*). 3 ♀♀.

37. *Halisidota ockendeni*, sp. n.

♀. Allied to *semifulvus*, Druce. Head and thorax greyish cream-colour; abdomen brownish drab-grey. Fore wing hyaline, irrorated and spotted sparsely with black; costa, inner margin, and outer one-fifth of wing brownish buff, mottled with dull brown. Hind wing hyaline greyish buff.

Length of fore wing 28 mm.

Hab. Agualani, Carabaya, 9000 feet (wet season), Dec. 1905 (*G. R. Ockenden*). 1 ♀.

38. *Halisidota affinis*, sp. n.

♂. Very near *ingens*, H. Edwards. Head brownish sooty black; antennæ orange-rufous; thorax mixed sooty brown-black and whitish grey; abdomen greyish drab-brown. Fore wing sooty black crossed by five irregular bands of white patches, fringe of outer margin chequered black and

white. Hind wing hyaline whitish, more grey towards abdominal margin, brown spot in cell and one at apex.

Length of fore wing 25 mm.

Hab. Huatuxco, Vera Cruz. 1 ♂.

39. *Halisidota hyalinipuncta*, sp. n.

♂. Frons white mixed with black hairs and with a chevron-shaped black mark; vertex greyish black; thorax black, splashed and mixed with creamy white, inner side of patagia orange-buff; abdomen orange-buff above, densely clothed with sooty hairs, last segment sooty grey. Fore wing sooty black, densely irrorated with creamy white, a number of basal patches, costal patches, and a transverse row of submarginal patches creamy white; disc of wing occupied by four irregular transverse bands of large hyaline patches. Hind wing hyaline white, yellowish at base.

Length of fore wing 23-27 mm.

Hab. Agualani, Carabaya, 9000 feet (wet season), Dec. 1905 (*G. R. Ockenden*). 4 ♂♂.

40. *Halisidota punctata*, sp. n.

An extremely variable insect; I take as type that form of which I have five specimens more or less alike.

♂. Palpi sooty black-brown; head cream-white; antennæ sooty brown with paler tips; thorax sooty brown powdered with yellow, shoulders and centre cream-white; abdomen sooty brown, with creamy anal tuft. Fore wing sooty brown powdered with yellow, basal one-third with three small and one large cream spot, the latter running into wing from costa, from costa across and beyond apex of cell a large irregular cream patch, a postmedian transverse band of seven or eight large and small cream patches, from apex to vein 1 an almost coalescent series of large irregular cream blotches. Hind wing pale fuscous, centre and outer margins cream-colour. The opposite extreme has the thorax and fore wing so densely powdered with yellow as almost to appear olive golden brown; costa of fore wing evenly spotted with yellow-cream, disc of wing spotted with small dots of the same colour, a submarginal line of cream spots and the fringe chequered cream and brown. Hind wing cream slightly washed with grey, fringe chequered cream and brown.

Length of fore wing 20-22 mm.

Hab. Santo Domingo, Carabaya, 6500 feet, Nov. 1901 and March, June, October, November, and December 1902 (*G. R. Ockenden*). 8 ♂♂.

41. *Halisidota pseudocarye*, sp. n.

♂. Very near *H. carye*, Harr., but much paler. Pectus, palpi, head, and thorax pale creamy buff; the inner edges of patagia and abdomen dark buff. Fore wing creamy buff irrorated with rufous cinnamon scales and with five irregular transverse lines of semihyaline creamy spots and streaks much less conspicuous and smaller than in *carye*; a pale cinnamon-brown oblique streak from costa to end of vein 2, and a similar one from apex of cell to end of vein 6; inner margin rufous cinnamon. Hind wing hyaline cream-colour.

Length of fore wing 19 mm.

Hab. Nogales, Arizona (*Oslar*). 2 ♂♂.

42. *Halisidota terranea*, sp. n.

♂. Allied to *huaco*, Schaus, but with narrower and blunter wings, much stouter body and much longer antennæ. Pectus, palpi, head, and thorax pale yellowish cream-buff; antennæ pale fuscous; abdomen pale fuscous. Fore wing pale cream-buff, slightly irrorated and sparingly dotted with fuscous brown. Hind wing cream-buff, densely clothed with pale fuscous hairs, a wide margin fuscous. Some specimens show hardly any irroration or dotting on the fore wing, while others are rather heavily so marked.

Length of fore wing 17.5–20 mm.

Hab. Fonte Boa, Upper Amazon, July to October 1906 and July and August 1907 (*S. M. Klages*); Coca, Rio Napo, June to August 1899 (*W. Goodfellow*). 14 ♂♂.

43. *Halisidota oblonga*, sp. n.

♂. Palpi, head, and tegulæ dirty brown mixed with golden buff; patagia golden buff; centre of thorax brownish; antennæ dull brown; abdomen orange-buff. Fore wing elongated, orange-buff, irrorated, clouded, and blotched with dirty mauve cinnamon fuscous. Hind wing hyaline orange-buff, with two cinnamon spots at apex.

Length of fore wing, ♂ 27, ♀ 31 mm.

Hab. Santo Domingo, Carabaya, 6000 feet, July 1902 (dry season), and Oconeque, Carabaya, 7000 feet (dry season), July 1904 (*G. R. Ockenden*). 7 ♂♂, 2 ♀♀.

44. *Halisidota setosa*, sp. n.

♀. Pectus, head, and thorax sooty buff; antennæ brownish; abdomen brownish buff, ending in an enormous cushion-

pad of buff hair. Fore wing very elongate and narrow, pale whitish buff, sparingly irrorated with brownish marks, round cell a number of ill-defined sooty-brown patches, from apex inwards run three brown spots. Hind wing pale buff, a brownish dot near anal angle.

♂. Similar, but much smaller.

Length of fore wing, ♀ 21, ♂ 14-16 mm.

Hab. La Oroya, Rio Inambari, Peru, 3100 feet (dry season), Sept. 1904; La Union, Rio Huacamayo, Carabaya, 2000 feet (wet season), Dec. 1904, and Tinguri, Carabaya, 3400 feet (wet season), Jan. 1905 (*G. R. Ockenden*). 17 ♂♂, 2 ♀♀.

45. *Halisidota oruboides*, sp. n.

♂. Has been usually mixed up with *oruba*, Schaus, but quite distinct. Palpi, frons, and antennæ pale brown; frons sulphur-yellow, with central brown stripe; thorax sulphur-yellow, with central stripe and mark on patagia brown; abdomen golden buff. Fore wing sulphur-yellow, irrorated with brownish-rufous lunules, from base to apex a broad rufous-brown band, a chocolate spot above this band in cell. Hind wing hyaline buff, slightly opalescent.

Length of fore wing, ♂ 16-21, ♀ 22 mm.

Hab. Santo Domingo, Carabaya, 6500 feet (wet season), and (dry season) July and Nov. 1902, and Tinguri, Carabaya, 3400 feet, August 1904 and Jan. 1905; La Oroya, Rio Inambari, S.E. Peru, 3100 feet (wet season), Oct. 1904 (*G. R. Ockenden*). 19 ♂♂, 1 ♀.

46. *Halisidota similis*, sp. n.

♂. Similar to *oruboides*, but has fore wing much narrower, longer, and more pointed.

Antennæ brown; head and thorax buff tinged with brown; abdomen golden buff. Fore wing buff, slightly irrorated with brown and dotted with the same colour; a band of brown runs from apex to base and two brown spots at apex of cell. Hind wing hyaline buff.

Length of fore wing 17-19 mm.

Hab. Fonte Boa, Upper Amazon, Aug. 1907 (*S. M. Klages*). 6 ♂♂.

47. *Paranerita aurantiipennis*, sp. n.

♂. Frons yellowish grey; vertex golden yellow; thorax greyish mauve; abdomen golden orange. Fore wing, basal two-fifths obliquely bright mauve, darker anteriorly and

irrorated with a deeper colour and marked with red, anterior three-fifths golden yellow; in the apical half a large blotch of the same colour as basal portion of wing, joined thereto by a narrow band of the same colour. Hind wing golden orange.

Length of fore wing 16 mm.

Hab. Fonte Boa, Upper Amazon, July 1906 (*S. M. Klages*).
1 ♂.

48. *Paranerita odorata*, sp. n.

♂. Resembles *sithnoides*, but has a distinct androconial patch on fore wing. Palpi and vertex lemon-yellow; thorax purplish grey-brown; abdomen scarlet, last segment pale yellow. Fore wing: basal half obliquely purple-brown washed with rose, a basal streak of scarlet, an androconial patch between cell and vein 2, rest of wing yellow; a large apical spheroid patch purple-brown, bordered at costa with scarlet. Hind wing hyaline buff.

Length of fore wing 11 mm.

Hab. Fonte Boa, Upper Amazon, May 1906 (*S. M. Klages*).

49. *Paranerita purpurascens*, sp. n.

♂. Head and palpi crimson; vertex yellow; thorax mauve-purple, variegated with crimson; abdomen dull scarlet with whitish tip. Fore wing: basal half obliquely mauve-purple variegated with crimson, a yellow dot in crimson circle on vein 1; outer half yellow, with large apical spheroid patch of mauve-purple variegated and bordered with crimson. Hind wings hyaline orange-buff, washed with pale crimson.

Length of fore wing 11 mm.

Hab. Fonte Boa, Upper Amazon, June 1906 (*S. M. Klages*).
2 ♂♂.

50. *Ischnocampa sordidior*, sp. n.

♂. Palpi and antennæ pale brown; head greyish buff; collar orange; thorax grey-brown with a darker admixture; abdomen sooty black, tip brown. Fore wing sooty brown, sprinkled somewhat with yellow scales and with a deep violet sheen; outer one-seventh yellowish, powdered with brown. Hind wing hyaline sooty black.

Length of fore wing 18 mm.

Hab. La Oroya, Rio Inambari, Peru, 3100 feet (dry season), Sept. 1904 (*G. R. Ockenden*). 1 ♂.

51. *Halisidota cinnamomea*, sp. n.

♀. Pectus, palpi, head, antennæ, thorax, and abdomen greyish cinnamon-brown. Fore wing cinnamon rufous, basal half dotted irregularly with cinnamon-buff, apical half clouded and mottled with cinnamon-buff. Hind wing hyaline buffish-colour.

Length of fore wing 29 mm.

Hab. Rio Huacamayo, Carabaya, 3100 feet (dry season), June 1904 (*G. R. Ockenden*). 1 ♀.

52. *Halisidota baritioides*, sp. n.

♂. Palpi, head, and antennæ brownish buff; thorax buff, strongly mixed with brown and red; abdomen buff, strongly washed with salmon-crimson. Fore wing bright buff, spotted and reticulated with rufous brown, larger spots in cell and between veins 6 and 7 and subapically of the same colour. Hind wing salmon-crimson.

Length of fore wing 18 mm.

Hab. Fonte Boa, Upper Amazon, Sept. 1906 (*S. M. Klages*). 1 ♂.

53. *Halisidota flavescens*, sp. n.

♀. Palpi, head, and thorax golden buff; abdomen golden buff, with tufts of orange-buff down the centre dorsally. Fore wing golden buff, inner margin brown, a brown dot at end of cell, a few scattered indications of brown dots on disc. Hind wing hyaline cream-colour, yellowish towards abdominal margin.

Length of fore wing 24.5 mm.

Hab. Sonora, New Mexico, Sept. 1-10 (*Poling*).

54. *Halisidota albipuncta*, sp. n.

♀. Palpi, head, and thorax brownish orange-buff; abdomen golden buff. Fore wing brownish orange-buff, reticulated and irrorated somewhat faintly with reddish brown, a brown irregular spot at base of cell and at apex of cell a large silver spot, from the costa to inner margin across apex of cell a transverse broad brown line, inner margin brown. Hind wing hyaline white.

Length of fore wing 22 mm.

Hab. Pereira, Cauca Valley.

55. *Halisidota nubilosus*, sp. n.

♂. Nearest to *testacea*, Rothsch., but much larger. Palpi, frons, and antennæ dull brown; vertex of head and thorax yellowish buff washed with a darker shade, two brown dots on tegulæ; abdomen golden buff. Fore wing pale buff strongly irrorated and clouded with rufous mummy-brown, from base to apex a darker brown band, five or six dark brown spots on costa and submarginally at outer margin. Hind wing pale buff, basal half obliquely clothed with yellow hairs, indistinct brownish blotches at apex.

Length of fore wing 25 mm.

Hab. Santo Domingo, Carabaya, 6000 feet (wet season), Feb. 1902; Oconeque, Carabaya, 7000 feet (dry season), July 1904; and La Oroya, Rio Inambari, Peru, 3100 feet (dry season), Sept. 1904 (*G. R. Ockenden*). 6 ♂♂.

56. *Halisidota hoffmannsi*, sp. n.

♂. Very similar to *terranea*, Rothsch., but larger. Palpi, frons, and antennæ dull brown; vertex of head and thorax greyish buff, tegulæ and patagia with central brown dots; abdomen pale fuscous. Fore wing pale brownish buff, from apex obliquely across seven-eighths of the wing to vein 1 runs an earthy brown band, which becomes wider distally from apex (at apex it is 1 mm. wide, at vein 1 9 mm. wide), at apex of cell two black spots, the lower three times as large as the upper, a submarginal row of brown dots. Hind wing buff, almost entirely covered with a brownish-grey wash, except from costa to vein 6 and three or four spots at outer margin.

Length of fore wing 23 mm.

Hab. Pozuzo, Dept. Huanuco, Peru (*Hoffmanns*). 1 ♂.

On pages 35 and 36 'Novitates Zoologicæ,' vol. xvi. (1909), I described *Areomolis basalis* and *Areomolis ockendeni* as new species. These two turn out not to belong to the genus *Areomolis*, but are two species of *Neritos*; and while *ockendeni* is a new species, *basalis* turns out to be *Neritos steniptera*, Hmsn.

57. *Halisidota bombycina*, sp. n.

♂. Legs buff; pectus brownish buff washed with pink; head, thorax, and antennæ brownish buff; abdomen testaceous buff, two basal segments strongly washed with pink. Fore wing: outer one-fifth, costa, and inner margin buff; disc semihyaline buff, strongly irrorated with brown scales; the

outer one-fifth slightly powdered with dark scales. Hind wing hyaline buff.

Length of fore wing 23 mm.

Hab. Limbani, Carabaya (dry season), 9500 feet, May 1904 (*G. R. Ockenden*). 1 ♂.

58. *Halisidota anapheoides*, sp. n.

♀. Has much the appearance of the African genus *Anaphe*. Legs brownish buff; coxæ dull pink; head and thorax brownish buff; abdomen clay-buff, washed with pink; antennæ fuscous. Fore wing semihyaline buff; nervures strongly marked and bordered with rufous brown; outer margin and three or four patches on costa rufous brown. Hind wing pale hyaline buff, darker and more rosy near abdominal margin.

Length of fore wing 26 mm.

Hab. Volcano de Chiriqui, 5000-9000 feet (*Watson*). 1 ♀.

59. *Opharus albotestaceus*, sp. n.

♀. Pectus and legs deep buff; head, antennæ, and thorax buffish testaceous, with two or three black dots on patagia; abdomen buff, greyer towards base. Fore wing greyish buff, with four transverse bands of whitish square or oblong spots and numerous fuscous dots and spots. Hind wing hyaline greyish buff.

Length of fore wing 24 mm.

Hab. La Vuelta, Caura River, May 1903 (*S. M. Klages*). A large series of females.

60. *Opharus albescens*, sp. n.

♀. Legs whitish, banded with buffish grey; pectus buff; head, antennæ, and thorax testaceous white, a black dot in centre of thorax and on each side of the patagia; abdomen dirty buff with brown lateral spots. Fore wing testaceous white, seven brownish small spots on costa and disc in basal third of wing, a large blackish-brown patch at apex of cell. Hind wing hyaline whitish grey, splashed with darker grey at apex and near margin.

Length of fore wing 28 mm.

Hab. Maripa, Caura River (*S. M. Klages*). 1 ♀.

61. *Hyperthæma hoffmannsi*, sp. n.

♂. Pectus, head, thorax, and abdomen crimson, slightly

tinged with yellow; antennæ fuscous. Fore wing: basal one-third crimson, a large silvery white patch reaching from inner margin to vein 7, toothed on outside and surrounded with a black ring, rest of wing greyish brown, all nervures and costa for four-fifths from its base crimson, a diamond-shaped white patch beyond apex of cell. Hind wing hyaline white, edged with greyish brown.

♀. Similar, but hind wing sooty brown, only hyaline white at base.

Length of fore wing, ♂ 15.5, ♀ 17 mm.

Hab. Teffé, Amazons, June 1906, and Allianca, below San Antonio, Rio Madeira, Nov. & Dec. 1907 (*W. Hoffmanns*); Teffé, Amazons, Oct. 1907 (*M. de Mathan*). 1 ♂, 2 ♀ ♀.

62. *Automolis multicolor*, sp. n.

♂. Pectus orange; legs greyish white; frons dark blackish grey; vertex and tegulæ orange, thorax orange with black and white central spot; patagia orange, bordered in front with white; abdomen deep crimson; antennæ fuscous with yellowish tips. Fore wing: basal half chocolate-brown washed with olive-yellow, near base a transverse slate-grey band veined with white, beyond the middle a broad transverse slate-grey band from costa to angle of inner margin veined with white, two white spots between the two bands on costa; rest of wing chocolate-brown and tinged slightly with yellow. Hind wing: costal two-fifths testaceous orange, rest deep crimson.

Length of fore wing 14 mm.

Hab. Potaro, British Guiana, February 1908 (*S. M. Klages*). 2 ♂ ♂.

63. *Automolis virescens*, sp. n.

♂. Pectus and frons orange; legs verditer-green, tarsi banded with fuscous; vertex greenish yellow; antennæ dark grey; thorax orange; tegulæ and patagia green; abdomen greenish orange-buff. Fore wing hyaline green, from base broadly on both sides of vein 1 and along inner margin verditer apple-green, costal margin and costa brownish orange. Hind wing hyaline, abdominal area broadly yellow-buff.

♀. Larger: thorax bright green; abdomen washed strongly with green. Fore wing entirely verditer apple-green, only edge of costa yellow; hind wing hyaline greenish.

Length of fore wing, ♂ 16, ♀ 21 mm.

Hab. Santo Domingo, Carabaya (dry season), 6500 feet, April 1902 (*G. R. Ockenden*). 2 ♂ ♂, 1 ♀.

64. *Automolis felderi*, sp. n.

♀. Similar to *tybris*, Stoll. Pectus, head, antennæ, and thorax white, a central thoracic spot yellow; edges of tegulæ and patagia buffish grey; abdomen orange-buff above, white below, a central line of white dots above. Fore wing: costal edge white from base to one-fifth from apex, a basal yellow dot, rest of wing buffy grey, a large irregular postmedian hyaline patch reaching from costa to vein 3 and 9 millimetres wide. Hind wing hyaline pale buffy grey, abdominal area yellow.

Length of fore wing 25 mm.

Hab. Colombia (ex Felder Coll.).

65. *Ochrodota funebris*, sp. n.

♂. Pectus buff; legs sooty brown; palpi sooty brown; antennæ fuscous; head and thorax sooty brown; abdomen above sooty black, below buff. Fore wing sooty brown, faintly irrorated with a paler shade; a white spot at base of costa and two minute white dots on costa and subcostal vein one-fifth from apex. Hind wing sooty black.

Length of fore wing 15-16 mm.

Hab. Pozuzo, Huanuco, 2940-3250 feet (*W. Hoffmanns*).
2 ♂♂.

66. *Baritius peculiaris*, sp. n.

This remarkable species belongs to the *pyrrhopyga* group.

♂. Legs, pectus, head, antennæ, and thorax velvety black; abdomen above black, last segment golden yellow, last but one crimson, two basal segments below buff. Fore wing transparent hyaline, a black streak at apex of cell; base, costa, nervures, apex, outer and inner margin black. Hind wing hyaline transparent, nervures, costa, and margins black, a black patch at anal angle.

Length of fore wing 21 mm.

Hab. Merida, Venezuela (fide *Fruhstorfer*). 1 ♂.

67. *Pelochyta bicolor*, sp. n.

♀. Nearest allied to *nigrescens*, Dogn. Whole insect sooty brown; two dots at base of antennæ and the last four abdominal segments above rosy carmine.

Length of fore wing 20 mm.

Hab. Santo Domingo, Carabaya (dry season), 6000 feet, June 1902 (*G. R. Ockenden*). 1 ♀.

68. *Pelochyta atra*, sp. n.

♂. Pectus orange, with two black central spots; first joint of palpi orange, rest sooty black; legs, head, and thorax fuliginous, three spots on head and two each on tegulæ and patagia deep black; antennæ fuscous; abdomen above deep fuliginous, extreme tip and under side orange. Fore and hind wings deep sooty brownish black, with violet gloss.

♀. Similar, but much larger and paler.

Length of fore wing, ♂ 19, ♀ 27 mm.

Hab. Santo Domingo, Carabaya, 6500 feet (wet season), Dec. 1902, and La Oroya, Rio Inambari, S.E. Peru (wet season), 3100 feet, Oct. 1904 (*G. R. Ockenden*). 4 ♂♂, 3 ♀♀.

69. *Pelochyta brunnescens*, sp. n.

♂. Pectus orange, with two large black patches; palpi orange-grey, with two large black spots on outside; head and thorax sooty brown, with five black spots on head and one on each tegula; abdomen above black, first four segments clothed with long brownish hairs; below orange, a double lateral row and two big ventral spots black. Fore and hind wings sooty brown.

♀. Similar, but much larger; hind wing hyaline buff, outer margin and nervures only sooty brown. Some males are also paler, with lighter hind wings, and four anal abdominal segments banded yellow.

Length of fore wing, ♂ 18-27, ♀ 21-33 mm.

Hab. Santo Domingo, Carabaya, 6000 feet, June 1902 (dry season) and Jan. 1902 (wet season); Oconeque, Carabaya (dry season), 7000 feet, July 1904; Limbani, Carabaya (dry season), 9500 feet, April 1904, and La Oroya, Rio Inambari, Peru, 3100 feet (dry season), Sept. 1904 (*G. R. Ockenden*); Pozuzo, Huanuco (*W. Hoffmanns*); Paramba, Ecuador; Chiriqui, Panama. 20 ♂♂, 6 ♀♀.

70. *Elysius castanea*, sp. n.

♂. Pectus brown, orange anteriorly; legs, palpi, head, and antennæ dull chestnut-brown; collar narrowly orange; thorax brown; abdomen above black, segments narrowly edged with yellow; a broad lateral band of orange and last segment orange; underside deep brown. Fore wing deep brown, variegated with irregular paler clouds. Hind wing deep brown, yellowish along abdominal margin.

Length of fore wing 22 mm.

Hab. Rio Huacamayo, Carabaya (dry season), 3100 feet, June 1904 (*G. R. Ockenden*). 5 ♂♂.

71. *Elysius fuliginosus*, sp. n.

♂. Similar to *carbonarius*, Dogn., but hind wing still more reduced in size and white instead of sooty grey-brown.

♀ also has white hind wings.

Length of fore wing, ♂ 25, ♀ 26 mm.

Hab. Huancabamba, Cerro de Paseo (*E. Beittger*); Santo Domingo, Carabaya (wet season), 6500 feet, Dec. 1902 (*G. R. Ockenden*); Oxapampa, N. Peru; Rio Tanampaya, Bolivia, 1904 (*Garlepp*). 4 ♂♂, 2 ♀♀.

72. *Elysius tricyphoides*, sp. n.

♂. Resembles a female *Tricypha*, but has longer and narrower wings. Pectus brown, orange in front; head creamy white; collar orange; antennæ and thorax brown; abdomen blackish brown, sides and last segment orange. Fore wing pale grey-brown; a blackish stigma at apex of cell and a brown, zigzag, transverse line at one-sixth from outer margin running from costa to vein 1. Hind wing brown-grey.

♀. Similar, but sides of abdomen and last two segments more extended orange.

Length of fore wing, ♂ 19, ♀ 21 mm.

Hab. Fonte Boa, Upper Amazon, Sept. 1906 (*S. M. Klages*); La Oroya, Rio Inambari, Peru (dry season), 3100 feet, Sept. 1904 (*G. R. Ockenden*). 2 ♂♂, 2 ♀♀.

73. *Elysius pseudotricypha*, sp. n.

♂. This is still more like a *Tricypha* in appearance, as it has similar short broad wings. Pectus orange, with two black spots; legs and palpi dark brown; head yellow; collar orange; antennæ and thorax dark brown; abdomen above black, orange at tip, below orange, with central row of black patches. Fore wing grey-brown; a premedian and a median broad transverse band of darker brown, the latter forked from vein 3 to costa; a premarginal zigzag brown line. Hind wing sooty black.

Length of fore wing 18 mm.

Hab. Aroewarwa Creek, Maroewym Valley, Surinam, April 1905 (*S. M. Klages*). 2 ♂♂.

74. *Syntarctia fasciata*, sp. n.

♂. Differs from *ænone*, Butl., by having on the fore wing a basal, subbasal, postmedian, submarginal, and marginal

broad transverse bands of grey-brown, and the discocellular stigma is a large blackish patch.

Length of fore wing 14 mm.

Hab. Fonte Boa, Upper Amazon, July 1906 (*S. M. Klages*).
3 ♂♂.

75. *Syntarctia russus*, sp. n.

♀. Pectus whitly brown; head and thorax pale russet-brown, irrorated with darker scales; antennæ russet pale brown; abdomen whitly brown. Fore wing pale russet-brown, crossed by numerous zigzag fuscous lines and by a zigzag premedian and median fuscous band. Hind wing pale hyaline brownish.

♂. Smaller.

Length of fore wing, ♂ 14, ♀ 16 mm.

3 ♂♂, 2 ♀♀.

76. *Opharus fasciatus*, sp. n.

♀. Near to *Opharus astur*, Cram. Pectus whitish; head grey, with black dot between antennæ; antennæ brown; thorax pale grey, tegulæ and patagia dotted with black; abdomen above orange, with central and two lateral rows of black spots, basal two segments clothed with yellowish-grey hairs, below buff. Fore wing brown, crossed by four wavy bands of broad white patches; fringe spotted with white. Hind wing hyaline grey, margins darker.

Length of fore wing 29 mm.

Hab. Valencia, Venezuela. 1 ♀.

77. *Ischnocampa griseola*, sp. n.

♂. Pectus, legs, antennæ, head, thorax, and abdomen grey; vertex of head and collar orange. Fore wing pale grey, powdered densely with brownish-grey scales; a black discocellular dot, and beyond it a zigzag, transverse, dark grey, narrow band. Hind wing hyaline slate-grey.

Length of fore wing 15.5 mm.

Hab. Newcastle, Jamaica. 1 ♂.

78. *Neritos abdominalis*, sp. n.

♂. Legs grey; pectus, palpi, and head orange; thorax grey; abdomen above, basal half blackish grey, rest orange, below entirely orange. Fore wing grey, nervures whitish;

a cloudy ill-defined white spot below and beyond disocellulars. Hind wing brownish grey.

Length of fore wing 13 mm.

Hab. Fonte Boa, Upper Amazon, May 1906 (*S. M. Klages*). 1 ♂.

79. *Neritos steinbachi*, sp. n.

♀. Pectus and legs grey; antennæ fuscous; head and tegulæ orange; thorax and abdomen grey. Fore wing grey, nervures darker. Hind wing dark grey.

Length of fore wing 12 mm.

Hab. Buenavista, East Bolivia, 750 metres, Aug. 1906–April 1907 (*J. Steinbach*). 1 ♀.

XXVII.—*Note on the Genus Smithia*, Maltzan.

By EDGAR A. SMITH, I.S.O.

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THE genus *Smithia* was founded by the late Baron II. von Maltzan* for a remarkable marine shell from the Island of Goree belonging to the family Turritellidæ. Its peculiarity consists in the whorls being uncoiled in corkscrew fashion. Otherwise it agrees in the character both of the shell and operculum with *Turritella* and *Mesalia*. Maltzan compared it with *Eglisia*, but that genus is said to have a paucispiral operculum, whereas in *Smithia* it is concentric and multispiral.

It has been pointed out by the late Dr. E. von Martens† that the generic name *Smithia* had previously been employed in zoology by Edwards and Haime (1851), Saussure (1855), and Mabile (1879).

The Museum having recently acquired a specimen of this curious shell, it has become necessary to invent a new generic name. I would have liked to return the Baron's compliment, and to propose *Maltzania*; but that appellation having already been employed in Reptilia by Dr. O. Bœttger, I would suggest *Callostracum* as suitable for the designation of this most interesting genus.

* *Nachrichtsblatt deutsch. malak. Gesell.* 1883, p. 97, fig.

† *Zool. Record*, 1883, Mollusca, p. 46.

XXVIII.—Notes on some South-American Mammals, with Descriptions of new Species. By OLDFIELD THOMAS.

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THE identification of some mammals which have been received from Western Colombia, collected by M. G. Palmer, and from Santa Catherina, collected by W. Ehrhardt, has resulted in the following notes and descriptions.

Vampyressa pusilla and its Allies.

Wagner's *Phyllostoma pusillum* was placed by Peters and Dobson in *Chiroderma*, then by myself in *Vampyrops*, in which, on account of its special dental formula, I considered it to represent a peculiar subgenus, *Vampyressa*, since raised to a genus by Miller.

One species only has been hitherto known, a native of South Brazil, and our knowledge of it rests mainly on the account given by Peters* of a specimen in the Leyden Museum which he states to agree absolutely with Wagner's type, an immature example. In his recently published posthumous 'Plates of Chiroptera' † he gives an admirable figure of the Leyden specimen, which for present purposes we should accept on his authority as typical.

The British Museum contains six specimens of *Vampyressa* from the western side of the Andes, and these prove to belong to two species, neither of which can be assigned to *V. pusilla*.

Vampyressa nymphæa, sp. n.

Size comparatively large, slightly larger than *V. pusilla*, considerably larger than *V. thyone*. General colour smoke-grey, rather lighter below. Facial stripes conspicuous and strongly marked, the upper ones running back to behind the ears. Area round eye blackish.

Skull largest of the genus, its shape as figured by Peters in *V. pusilla*.

Teeth quite differently shaped to those of *pusilla*. P^4 rounded, triangular in section, without the conspicuous postero-internal concavity shown in Peters's plate. M^1 barely as broad as long, with a broad rounded-quadrangular

* MB. Ak. Berl. 1866, p. 395.

† Mus. Zool. Berl. Chiropt. pl. xii. a. figs. 10-15 (1906).

internal lobe; very different to the much broader than long, internally pointed tooth figured by Peters. M^2 also tending rather towards a quadrangular shape, not so distinctly triangular as in *pusilla*. M_1 longer than broad, instead of the converse, with one high antero-external cusp and a broad posterior basal ledge.

Forearm 36 mm.

Skull: greatest length 21; basal length 16.5; zygomatic breadth 12.2; mastoid breadth 10.5; palate length 10; front of upper canine to back of m^2 7.5.

Hab. Novita, Rio S. Juan, Chocó, W. Colombia. Alt. 150'.

Type. Adult male. B.M. no. 9. 7. 17. 40. Original number 135. Collected 28th November, 1908, by M. G. Palmer.

This species is so different from *V. pusilla* in the shape of its teeth as to induce a doubt as to whether it is rightly referred to this genus. Unfortunately the upper incisors, anterior premolars, and posterior lower molars are missing in the only specimen, but, judging from the shape and number of the alveoli, no further material differences besides those above mentioned seem to occur in these missing teeth. In any case, it is not an *Artibeus*, as shown by the structure of the teeth; its dental formula is that of *Vampyressa*.

Vampyressa thyone, sp. n.

Size comparatively small. Colour above whitish brown anteriorly, uniform pale brown posteriorly, very much as in *Mesophylla macconnelli*, which we have received from this same region. Under surface paler brown. Facial streaks short and inconspicuous, though present, area round eye pale brown.

Skull similar to that of *V. pusilla*, but smaller. Teeth like those of that animal in shape, except that both the anterior premolar and the posterior molar in the upper jaw are wider transversely and shorter antero-posteriorly, the difference in the last-named tooth being especially noticeable.

Forearm of type 32 mm.

Skull: greatest length 19; basal length 15.3; zygomatic breadth 11; mastoid breadth 9.5; palate length 9.2; front of canine to back of m^2 6.1.

Hab. (of type). Chimbo, near Guayaquil, Ecuador. Alt. 1000'. Other specimens from Chocó, W. Colombia.

Type. Adult male in alcohol. B.M. no. 97. 11. 7. 77. Collected 30th April, 1897, by W. Rosenberg. Presented by Oldfield Thomas.

This species is readily distinguishable from *V. pusilla* by its smaller size, the forearm of the adult specimen described by Peters having been 35 mm. in length, and its skull, measured on the plate, 20 mm. The narrow transverse shape of the last upper molar is also distinctive and quite uniform in the five examples of *V. thyone* before me.

BASSARICYON.

Dr. Allen has recently* described a second Central-American species of this genus, apparently being considerably influenced to do so by his taking the Panama specimens figured by Huet† as practically topotypical of *B. gabbi*, whose original locality was Talamanca, S.E. Costa Rica.

But Huet's did not come from the north of Panama in the sense of the part of Panama State nearest towards North America, which would be adjacent to Talamanca, but from near the town of Panama, a very different place; for Prof. Trouessart has kindly examined the original registers at my request, and finds that the entry runs:—"Village de Caimito, province de Chorreo [not Correo, as misprinted by Huet], un peu au nord de Panama." Allowing for the bad writing of M. Boucard, the collector, Prof. Trouessart thinks "Chorreo" means "Chorrera," a place quite close to Panama City.

Dr. Allen assumes that no more specimens of *Bassaricyon* have been collected than those referred to in literature, forgetting that he had seen additional specimens during his last visit to the British Museum.

As a matter of fact, the Museum now contains eight examples belonging to the genus, and these appear to me to belong to three types:—

1. Skull rounded, with very convex frontal profile. General colour less fulvous, more greyish or brownish.

B. gabbi (and possibly *B. richardsoni*).

Hab. Nicaragua, Costa Rica, and N.W. Panama. Examples from Chiriqui in the Museum Collection may be taken as representative, that locality being really very near to Talamanca.

2. Skull rounded. General colour strongly fulvous.

B. medius, sp. n.

Hab. Central Panama to Western Colombia.

* Bull. Am. Mus. N. H. xxiv. p. 662 (1908).

† N. Arch. Mus. (2) v. p. 1, pl. i. (1883).

3. Skull comparatively flat and low. Colour fulvous.

B. alleni.

Hab. Venezuela to Peru, the most southern locality being Chanchamayo.

The differences in the shape of m^3 and of the mandibular coronoid process, originally used by myself in describing *B. alleni*, prove to be too variable to be of much service.

Bassaricyon medius, sp. n.

General colour fulvous, varying from a dull fulvous quite like that of *B. alleni* to a more tawny fulvous like that of Huet's figure. Under surface buff. Face, as usual, greyer, the contrast not sharply defined. Ears more or less grizzled with blackish. Tail long, well haired, with a suppressed indication of brown and fulvous annulation running throughout its length, as is the case in the other members of the genus; some hairs at its extreme tip white.

Skull distinctly of the more rounded type observable in the Chiriqui specimens of *B. gabbi*, but not quite so strongly marked, rather smaller and less powerfully marked than in that animal. Frontal outline convex; brain-case swollen, interorbital space slightly convex, not flattened; muzzle smaller and lighter than in *B. gabbi*. Teeth in general characters like those of *B. gabbi*, but the molars rather smaller. Throughout the genus, however, the shape of the teeth proves to be rather variable and of less use as a character than has been supposed. One example even has a triangular m^3 on one side and a subquadrangular one on the other.

Dimensions of the type (measured in the flesh):—

Head and body 352 mm.; tail 435; hind foot 72; ear 34.

Skull: greatest length 81; condylo-basal length 75; zygomatic breadth 51; interorbital breadth 16·8; breadth of brain-case 35; palatal length 42·5; combined length of upper molars 13·2; front of canine to back of m^3 28·3.

Hab. Jimenez, mountains inland of Chocó, W. Colombia. Alt. 2400'.

Type. Adult male. B.M. no. 9. 7. 17. 10. Original number 54. Collected 16th April, 1907, by M. G. Palmer. Three specimens.

The considerable difference in colour *inter se* among these three specimens from Jimenez and again between the two that we have from Chiriqui shows that slight differences in coloration cannot be made the basis of specific distinction in this genus.

Sciurus (Microsciurus) palmeri, sp. n.

Like *S. (M.) mimulus*, Thos., in almost every respect, with the one important exception that the ornamenting black of the upper surface, which in *mimulus* consists of a line down the back, is here represented by black on the face and muzzle.

General colour above blackish brown, profusely ticked with buffy; no dorsal dark line. Under surface with the throat and chest ochraceous rufous, rather more rufous than the tawny ochraceous of *mimulus*; belly mixed ochraceous and brownish; outer side of hips more ochraceous. Centre of face, over a triangular area extending from the tip of the nose to just in front of the ears, deep glossy black in the most typical specimens, though in some individuals it is ticked with buffy and more brownish. Cheeks brownish ochraceous. Hands and feet brown, becoming rich ochraceous on the digits. Tail-hairs mixed black and ochraceous.

Skull a little larger than that of *mimulus*, but otherwise similar.

Dimensions of the type (measured in the flesh):—

Head and body 145 mm.; tail 126; hind foot 38; ear 13.5.

Skull: greatest length 40.3; basilar length 30; zygomatic breadth 24; length of upper tooth-series exclusive of p^3 6.1.

Hab. Chocó, Western Colombia. *Type* from Sipi, Rio Sipi, Rio San Juan. Alt. 150'.

Type. Adult female. B.M. no. 9. 7. 17. 25. Original number 123. Collected 24th September, 1908, by Mr. M. G. Palmer. Eight specimens.

This well-marked species, which I have named in honour of its discoverer, who had already done good collecting work in Nicaragua, is readily recognizable by the blackening of its forehead and muzzle, which seems to take the place of the black dorsal line in its nearest ally the Ecuadorean *S. (M.) mimulus*.

Ecomys catherinæ, sp. n.

Size largest of the genus. Fur soft and thick; hairs of back about 13 mm. in length. General colour above some shade of fulvous, but the specimen has been discoloured and probably rendered more strongly fulvous by spirit. Under surface soiled whitish, not sharply defined laterally, the hairs slaty for four-fifths their length, their tips dull buffy whitish—in most *Ecomys* the belly-hairs are white to their roots. Head, arms, and legs grey. Hands brown on the middle of

the metacarpus, the sides and the fingers white; feet white, a brownish patch on the metatarsus. Tail-hairs wholly brown above and below, scarcely lengthened at tip.

Skull with the usual rounded shape found in *Æcomys*, but the supraorbital ridges are unusually developed and pass back as strongly marked ridges across the parietals; nasals narrow. Anteorbital plate of zygoma more developed than is usual in *Æcomys*, more as in *Oryzomys*, projecting about $1\frac{1}{2}$ mm. in front of the upper bridge. Palatal foramina short, broad, widely open. Molars strong, quadrangular.

Dimensions of the type (measured in spirit):—

Head and body 132 mm.; tail 166; hind foot 30; ear 20.

Skull: greatest length 34; basilar length 26.5; zygomatic breadth 17; nasals 11; interorbital breadth 6.2; breadth across parietal ridges 12.7; palatilar length 15; palatal foramina 6×3.1 ; upper molar series 5.2.

Hab. Joinville, Santa Catherina, S. Brazil.

Type. Adult male. Original number 30. Collected by W. Ehrhardt.

This is a most interesting species on two accounts. Geographically it forms a great extension of the known range of the group, no bush-rats, *Æcomys* or *Rhipidromys*, being known from South Brazil and no *Æcomys* nearer than Matto Grosso, unless the peculiar "*Rhipidromys*" *rufescens* of Rio Janeiro should prove to be a member of this genus.

Then in its structure *Æ. catherinæ* is abnormal in that its zygomatic plate is as developed as in ordinary *Oryzomys*, thus showing that this character is not so constant as I had supposed it to be. The external characters are distinctly those of the bush-living *Æcomys*, notably the short broad feet, with proportionally long hallux and fifth toe, and the well-haired unicolor tail. The tail in all true *Oryzomys*, owing to their living on the ground, is white or whitish underneath, at least proximally, while in all the bush-rats it is wholly dark above and below.

The Groups referred to the Genus Oxymycterus.

Ever since I described, in 1897*, the aberrant *Oxymycterus lanosus* and Dr. Allen named the still more aberrant *O. apicalis* † it has been obvious that the genus ought to be divided into three, corresponding respectively to the typical *Oxymycteri* and to the two species above mentioned.

Considering how different the animals are externally, it is

* Ann. & Mag. Nat. Hist. (6) xx. p. 218.

† Bull. Am. Mus. N. H. xiii. p. 224 (1900).

curious how few tangible characters can be drawn from the skulls, while the teeth, as is the usual difficulty in the *Akodon-Oxymycterus* group of genera, give practically no help at all.

The following are the three genera I propose to recognize:—

Oxymycterus, Waterhouse.

Fore claws elongated, fossorial; nail of pollex narrow, pointed. Muzzle long, mobile. Tail much shorter than head and body (about two-thirds).

Skull with a long muzzle, the nasals produced forwards in old specimens and expanded anteriorly, so as to make a more or less trumpet-shaped opening, their posterior end anterior to the front of the orbit. Zygomatic plate narrow, slanting, its anterior edge sloping all the way down to its junction with the maxilla. Brain-case large, smooth, rounded, contrasting with the long slender muzzle.

Range. Brazilian region, extending westwards into Peru and south to La Plata. Not known north of the Amazon.

Type. *O. nasutus*, Waterhouse. Other species: *O. rufus*, Desm.*, *hispidus*, Pict., *juliacæ*, All., *rostellatus*, Wagn., *quæstor*, Thos., *delator*, Thos., *inca*, Thos., &c.

Lenoxus, gen. nov.

Form normal, rat-like, muzzle not specially elongated. Fore claws of moderate size, not fossorial; nail of pollex not pointed. Tail about the length of the head and body.

Skull more normal in shape, and though the muzzle is long, it is broad and heavy proximally and tapers distally; nasals not expanded anteriorly, but reaching posteriorly behind the front edge of the orbit. Interorbital region swollen, rounded. Zygomatic plate narrow as in all this group, but its anterior edge turns vertically downwards before uniting with the maxilla. Brain-case not large in proportion to the muzzle. Interparietal well developed.

* I had been disposed to demur to the common reference of Desmarest's *Mus rufus* to *Oxymycterus*, as this was based solely on the "Rat roux" of the French edition of Azara, and there the animal is said to have a somewhat blunt nose, being even compared to the European Water-Vole. But the precise agreement of Azara's description with examples of *Oxymycterus* from this region both in proportions and colour now makes me think that the nose of his specimen, which was preserved in spirit and then half dried up, must have got contracted or distorted, perhaps through pressure against the sides of the bottle. Azara's "Hocicudo" of the Spanish edition is unquestionably an *Oxymycterus*, and his opinion that the two were the same species may be accepted as correct.

Range. Peru (Inambari River).

Type. *Lenoxus apicalis* (*Oxymycterus apicalis*, Allen).

As I noticed in 1901*, this striking species has none of the peculiar appearance characteristic of *Oxymycterus*, and there is no doubt it should form a distinct genus.

Microxus, gen. nov.

Form normal, mouse-like, or rather *Akodon*-like. Muzzle not elongate. Fore feet normal, not fossorial, the claws small and the pollical nail not pointed. Tail shorter than head and body.

Skull like that of a small *Akodon*, except for the characteristic narrow zygomatic plate; smooth and rounded, without ridges, the muzzle of normal size and shape; nasals not expanded anteriorly, extending posteriorly to the line of the front of the orbit.

Range. South America, from Bogota to Straits of Magellan.

Type. *Microxus minus* (*Oxymycterus minus*, Thos., 1901).

Other species: *M. bogotensis* (*Akodon bogotensis*, Thos., 1895), *M. lanosus* (*Oxymycterus lanosus*, Thos., 1897), and *M. iheringi* (*Oxymycterus iheringi*, Thos., 1896).

That the first three of the species assigned to this genus had a special inter-relationship was indicated when *M. minus* was described in 1901†. Their skulls are remarkably similar to each other. On the other hand, *M. iheringi* is less typical, showing a distinct tendency towards the peculiar characteristics of *Oxymycterus*.

Good figures of skulls representing all three of the genera of this group now recognized have been published by Dr. Allen in his fine work on the Mammals of Southern Patagonia ‡.

Oxymycterus angularis, sp. n.

Allied to *O. hispidus*, but with shorter tail and with a curved, almost angular, front edge to the zygomatic plate.

Size and colour about as in *O. hispidus*, as represented by a series from Espiritu Santo. The upper surface dull bistre-brown, becoming rather warmer on the posterior back, where the light rings on the hairs, buffy anteriorly, become more ochraceous. Sides rather lighter. Under surface dark greyish, the tips of the hairs buffy. Ears, hands, and feet

* Ann. & Mag. Nat. Hist. (7) vii. p. 189 (1901).

† Tom. cit. p. 184.

‡ Rep. Princeton Exp. iii. pt. i. pls. ix, & x. (1905).

uniform dark brown. Tail shorter than in the *Espiritu Santo hispidus*, blackish brown throughout.

Skull like that of *O. hispidus*, with the curious exception that the anterior zygoma-root, which in *hispidus* has the typical *Oxymycterus* character of being very narrow, with a slanting and slightly curved—almost straight—front edge, has here a distinctly curved edge, so that its outline is more as in ordinary Cricetines, or at least as in *Lenoxus* *.

Dimensions of the type (measured in the flesh):—

Head and body 160 mm.; tail 100; hind foot 30; ear 21.

Skull: length of nasals 14; palatilar length 14; upper tooth-row 5.6.

Skull of another specimen: greatest length 36.3; condylo-basal length 33; zygomatic breadth 17; nasals 13.8 × 4.4; interorbital breadth 7.1; breadth of brain-case 15.3; palatilar length 14.4; palatal foramina 8.1; length of upper molar series 5.6.

Hab. São Lourenço, near Pernambuco. Alt. 30 m.

Type. Adult male. B.M. no. 3. 10. 1. 56. Original number 1706. Collected 14th August, 1903, by A. Robert. Presented by Oldfield Thomas. Five specimens.

Except for its rather shorter tail, this *Oxymycterus* does not appear to differ externally from *O. hispidus*, but in the characters of its zygoma-root it forms an exception to all the members of the genus, more resembling *Lenoxus*, to which, however, its general appearance and long fore claws show that it has no real relationship.

Oxymycterus judex, sp. n.

A large dark rufous species, with large brain-case.

Size largest of the S.-Brazilian species. General colour, in a spirit-specimen, dark coppery rufous, the back blacker, the sides more rufous, the belly dull tawny rufous. Ears, hands, feet, and tail dark brown, without rufous tinge. Claws particularly long and powerful. Hind feet large and heavy, the fifth sole-pad small and inconspicuous, the sixth very large.

Skull large and heavy, with large brain-case, this being conspicuously larger in proportion to the muzzle than it is in the Parana *O. quæstor*. Thus the brain-case, measured from antero-external to postero-external corner, is 15.7 mm. in length, while it is only 14.5 in *O. quæstor*, whose muzzle is

* Not so strongly curved as in the *Lenoxus apicalis* figured by Allen, but quite as in a rather younger example in the British Museum collection.

of nearly equal length. Muzzle heavy, the nasals raised and broadened anteriorly. Zygomatic plates of normal *Oxymycterus* shape.

Dimensions of the type (measured on the spirit-specimen):—

Head and body 152 mm.; tail 129; hind foot 34·5; ear 22·5.

Skull: greatest length 42; basilar length 31·5; zygomatic breadth 17·6; nasals 16·2 × 4·5; interorbital breadth 6·8; breadth of brain-case 16·4; palatilar length 15·5; diastema 10·1; palatal foramina 8·8; upper molar series 5·8.

Hab. Joinville, Santa Catherina.

Type. Adult male. Original number 21. Collected by W. Ehrhardt. Five specimens examined.

This species appears to be most nearly allied to *O. questor*, but is distinguished by its larger size and much larger brain-case.

Loncheres medius, sp. n.

A species intermediate between *L. thomasi* and *L. dasythrix*.

Size markedly less than in *L. thomasi*, Ihering, greater than in *L. dasythrix*, Hensel. Fur thickly spinous, the spines about an inch long on the back, rather less than a millimetre broad. General colour above cinnamon-brown, below dull pinkish buff, the bases of the hairs slaty; transition on the sides of the belly quite gradual; a slight but variable amount of white in the gular and inguinal regions. Spines slaty, tipped with black. Ears and the tufts round them black. Hands and feet whitish brown. Tail long, its basal two inches coloured and furred like the body, the remainder well-haired, uniformly dark brown.

Skull very similar in structure to that of *L. thomasi*, but conspicuously smaller. Larger than in *L. dasythrix*.

Dimensions of the type (measured in the flesh):—

Head and body 230 mm.; tail 240; hind foot 40; ear 17.

Skull: greatest length 53·5; basilar length 42·2; zygomatic breadth 25; nasals 16·5; interorbital breadth 11·2; palatilar length 22; diastema 11·6; length of upper molar series 13.

Hab. (of type). Roça Nova, Serro do Mar, Parana, S. Brazil. Alt. 1000 m. Another specimen from Joinville, Santa Catherina.

Type. Adult female. B.M. no. 3. 7. 1. 84. Original number 864. Collected 18th September, 1901, by A. Robert. Presented by Oldfield Thomas.

In the British Museum there are examples of three species of *Loncheres* from S. Brazil, distinguished from each other

mainly by size. The largest, *L. thomasi*, Ihering, from the island of São Sebastião, São Paulo, was originally described as a *Mesomys*, because the type had no tail, but was later on erroneously referred by its founder to *L. nigrispina*. It is, however, much larger and differently coloured. The smallest, *L. dasythrix*, Hensel, is represented by one of the original typical skulls from Rio Grande do Sul, and two dealers' specimens from the island of Santa Catherina. The present intermediate species occurs in Parana and the mainland of Santa Catherina.

From all these three Wagner's *L. nigrispina* would appear to be distinguished by its sharply defined light underside, with the fur light to the base, which is mentioned both in the original description and in my notes on the type in Vienna. In size it only equals, or but little exceeds, the smallest of the above-mentioned species, *L. dasythrix*. The type was collected at Ypanema, São Paulo.

Echimyus laticeps, sp. n.

In 1902 the British Museum received from Mr. W. Foster topotypical examples from Paraguay of the rare *Echimyus spinosus*, Desm. *, and on their arrival I naturally compared them with a specimen bearing the same specific name which had been collected at Lagoa Santa, Minas Geraes, by Reinhardt, determined by Winge †, and acquired by exchange from the Copenhagen Museum.

The two animals were obviously entirely distinct, but as in his great work on the Mammals of Lagoa Santa, Dr. Winge had referred to a "*Loncheres laticeps*, Lund," which he stated to be the same as *E. spinosus*, I let the matter rest, considering *laticeps* available for the Lagoa Santa species.

But now, on again referring to the genus, I find that Lund appears ‡ never to have described his "*Loncheres laticeps*," which therefore was, and still is, a *nomen nudum*, although it has many times been referred to in synonymies. In my search for a description I have been materially assisted by

* *El espinoso*, Azara. The names *spinosus*, Desm., *rufa*, Licht., and *brachyurus*, Wagn., were all originally based on Azara's Paraguayan animal, whatever they were afterwards transferred to by other writers.

† As "*Mesomys*" *spinosus*. I follow Dr. Allen's admirable paper clearing up the much embroiled nomenclature of the genera of this group (Bull. Am. Mus. N. H. xii. p. 257, 1899). The real *Mesomys* was identified by me in a later paper (Ann. & Mag. Nat. Hist. (7) xv. p. 590, 1905).

‡ Dr. Winge has been good enough to confirm my belief in the absence of any description.

Dr. Knud Andersen, to whom the Danish literature on the subject is familiar.

But in case a description should turn up, and in any event to keep these synonymies approximately correct, I have thought it advisable to use the specific name *laticeps* for the Lagoa Santa animal, although it is, of course, given under my own responsibility and authorship. It is also not unsuitable, as, owing to the large bullæ with projecting meatus, the posterior part of the skull is decidedly broader than in *E. spinosus*.

The two species may be readily distinguished as follows:—

A. General colour drab-brown, quite without rufous.

Belly white, fairly sharply defined laterally.
Hands and feet brown, with lighter digits;
feet longer in proportion to size of skull; claws
less developed. Tail shorter, brown above,
slightly lighter below.

Bullæ of normal size; muzzle broad and heavy;
palatal foramina short, broadly oval; posterior
palatal notch extending to middle of m^2 .
Incisors very large and heavy.

Hab. Paraguay and South Brazil (Santa
Catherina)

E. spinosus, Desm.

B. General colour coarsely grizzled rufous and black,
blacker on the back, becoming strongly rufous
on rump. Under surface dull whitish or buffy,
not defined laterally. Hands dull whitish, their
claws long and powerful; feet proportionally
shorter, mixed brown and white. Tail longer,
brown with a slightly rufous tone.

Bullæ abnormally large; muzzle comparatively
light; palatal foramina narrow, elongate;
posterior palatal notch only extending to
opposite the front of m^3 ; incisors compara-
tively weak.

Hab. Lagoa Santa, Minas Geraes *E. laticeps*, Thos.

The following are the dimensions of the specimen selected as the type, some measurements of *E. spinosus* being placed in brackets:—

Head and body (on skin, probably shrunk) 200 mm.;
tail 72; hind foot 29; longest fore claw (above) 7.5,

(*E. spinosus*, measured in flesh: head and body 221;
tail 67; hind foot 35; ear 21; longest fore claw 5.5).

Skull: greatest length 49 (50); basilar length 39.5 (40.2);
zygomatic breadth 28 (29); interorbital breadth 11.7 (11.8);
greatest posterior breadth, on meatus 25 (23); palatilar
length 19 (18.2); palatal foramina 5.7×2.7 (4.5×3.5);
bullæ 16×10.5 (exclusive of meatus) (13×8.2); upper
molar series 9.2 (9.2).

Hab. Lagoa Santa, on the Rio São Francisco, Minas
Geraes.

Type. Adult female. B.M. no. 88.1.9.11. Number 595 of the Copenhagen Museum. Collected 13th June, 1851, by Prof. Reinhardt. Received in exchange from the Copenhagen Museum.

Members of this interesting genus are excessively rare in museums, and, so far as I am aware, no other examples of the true *E. spinosus* have been recorded.

Besides the type of *E. laticeps*, the British Museum contains three specimens of *E. spinosus* from Paraguay, and three more have recently come, collected by Herr W. Ehrhardt at Joinville, Santa Catherina.

XXIX.—*Remarks on the Species of the Genus Rheinardtius.*

By D. G. ELLIOT, D.Sc., F.R.S.E., &c.

ARGUS OCELLATUS was founded upon a presumable tail-feather of some unknown bird contained in the collection of the Paris Museum. The name was a MS. one, bestowed by the late Jules Verreaux, but never published by him, and the first description given of the feather was one by myself in the *Ann. & Mag. Nat. Hist.* 1871, viii. p. 119. For many years this feather remained in the bird-gallery of the Paris Museum as sole representative of some unknown but evidently extraordinary species, and when, early in 1880, a complete example of a long-tailed pheasant-like bird was brought from Annam, resembling as regards its tail-feathers the one so long in the Museum, the name *ocellatus* was conferred upon it and a new generic term *Rheinardtius* created for it, and under that name the species has been known up to the present time.

One naturalist, however, evidently did not believe in the identity of the specimen called at present *Rheinardtius ocellatus* with the feather so long in the Museum, for in the 'Bulletin de la Société Zoologique de France' Mons. Maingonnat named the Annam examples *Argus rheinardti*.

While very familiar with the long feather in the Paris Museum, of which a plate containing a full-size figure is given in my 'Monograph of the 'Phasianidæ,' I had not until lately had an opportunity of examining the Annam bird and comparing it with the feather called *Argus ocellatus*; but this, through the kindness of M. Trouessart, I have now been able to do, for the single feather, while no longer

exhibited in the gallery of the Paris Museum, is still carefully preserved. My material for making this comparison was ample, for, in addition to two very fine mounted specimens, there were a dozen or more loose feathers brought by the collector.

I was at once impressed by the difference between these feathers, for while the long tail-feathers of the birds from Annam measure $5\frac{1}{2}$ inches in width, that of the *R. ? ocellatus* only measures 4, the length being about the same. The latter feather does not have the pale grey on both sides of the shaft, so conspicuous on the feathers of the Annam species, this part being much darker, more of a leaden hue, while the small spots are pale clay-colour, not white; these are correctly represented on the plate in the Monograph, although in the description in the 'Annals' they were erroneously stated to be white, an error caused from writing the description in London without having the feather before me. On account of the feather being so much narrower, the two rows of large dark red spots with black centres occupy a much larger space on the feather, nearly half of the entire width of each web, and the red on the inner web is often in irregular lines and blotches; this is also very correctly shown in Mr. Wolf's drawing in the Monograph. In fact, this is in every way a very faithful representation of the original, except in two particulars: the shaft is too large, it being really about the size of those in the feathers of the Annam birds, and also too red, at least as it is now in the original, which is a pale red (it may have faded), a very different colour indeed from the shaft of the other species. The general appearance of the *R. ? ocellatus* feather is a kind of pale greyish-brown, spotted on both webs with small pale clay-coloured dots, surrounded with black, and with large red spots with black centres covering nearly half the width of both webs from the shaft; the rest of the web to the margin is brownish-red, frequently displayed in irregular lines and blotches. It will thus be seen that, while in some respects there is a similarity in the markings of these feathers when compared, yet in their general appearance they are very different, and, in my opinion, represent two very distinct species. Of these one, from an unknown locality, will remain, if it is correct to include it in the same genus, as *Rheinardtius ocellatus*, while the other, from Annam, must be known by the unfortunate tautological name of *Rheinardtius rheinardtius*.

XXX.—*Descriptions of apparently new Species and Subspecies of Monkeys of the Genera Callicebus, Lagothrix, Papio, Pithecus, Cercopithecus, Erythrocebus, and Presbytis.* By D. G. ELLIOT, D.Sc., F.R.S.E., &c.

THE various species and subspecies described in this paper are all, with one exception, contained in the magnificent collection of Primates in the British Museum. Some of these new forms I saw in my previous investigations of the collection, but did not describe them at the time, preferring to wait until additional material, if it existed, could be examined in continental museums.

With his usual kindness and generous method of acting towards a colleague, my friend Mr. Oldfield Thomas repeated the desire he expressed on a former occasion that I should describe any example I considered to be unknown; and it is in fulfilment of this wish that I appear as the author of this paper.

The collection of Primates in the British Museum, under the wise management of Mr. Thomas, as Head of the Department of Mammals, has increased materially during the past two years, and in numerous genera in the number of species and examples is probably the richest in the world, and so offers the most favourable opportunities for critical investigation.

The types, with one exception, the numbers of which are given in this paper, will be found in the collection, for future examination.

I desire, in conclusion, to express my thanks to Mr. Thomas for his kindness and assistance afforded me in my by no means easy task.

Family Cebidæ.

GENUS CALLICEBUS.

Callicebus panulatus, sp. n.

Type locality. Andoas, on the Pastasa River, Ecuador.

Gen. char. Fur very long, thick, and fluffy; mantle uniform colour, distinct from back; arms from elbows, hands, feet, and legs above knees uniform colour.

Colour. Forehead grizzled ochraceous, the hairs black, with ochraceous tips, this being the dominant colour; crown and occiput rich cinnamon-rufous, this colour produced by the tips of the hairs; mantle uniform tawny ochraceous, extending behind shoulders; middle of back dark hair-brown,

grading into tawny ochraceous on the rump; flanks dark grizzled brownish grey; hairs on ears, cheeks, arms from elbows, hands, legs from above knees, feet, inner side of limbs, chin, throat, and under parts of body rich dark burnt sienna; tail very long, grizzled white and black, the orange-buff of the basal portion of the hairs showing through, darkest at base, and the tip buff; the rest of the tail is tawny ochraceous like the rump.

Measurements. Total length 850 mm.; tail 520 (skin). Skull: occipito-nasal length 29·1; zygomatic width 40·6; palatal length 29·1; length of nasals 9·3; length of upper molar series 14·2; length of mandible 41·3; length of lower molar series 15·8.

Type. Adult, in British Museum, no. 80. 5. 6. 14.

This species differs in many ways from all the others in the genus. It is the only one of the *cuprea* style with a uniformly coloured mantle, and one so long and thick as to resemble a mane. The red on arms and legs extends much higher than in any other species. A single specimen was procured by Mr. Buckley at Andoas.

GENUS LAGOTHRIX.

Lagothrix thomasi, sp. n.

Type locality. Callanga, Cuzco, Peru. Altitude 1500 m.

Colour. Head in front of ears seal-brown; upper parts of body, flanks, and arms to elbow grizzled grey and ochraceous, the hairs being ochraceous at base and ringed with black and white, and tipped with white; dorsal line blackish; hairs on back of neck ochraceous, with a single broad subterminal black band and white tip, causing this part to be darker than the rest of the upper parts, excepting the dorsal line; forearms and legs grizzled black and tawny, the hairs being tawny, with subterminal black bar and white tip; hands and feet black, the hairs with tawny tips; inner side of arms and legs and central portion of chest and abdomen black; tail above and basal portion beneath grizzled grey and ochraceous like back, remainder beneath black.

Measurements. Size quite equal to that of *L. lagotricha*. Skull: occipito-nasal length 98 mm.; hensel 88·4; zygomatic width 79·4; intertemporal width 59·4; palatal length 39·6; length of nasals 10·7; length of upper molar series 24; length of mandible 78; length of lower molar series 38·5.

Type. Adult, in British Museum, no. 98. 11. 6. 2.

This is a larger monkey than the next species, *L. ubericola*, and fully equal in size to *L. lagotricha*. The type is an old individual with the teeth greatly worn and blackened. It is much darker than *L. ubericola*, and the base of the hairs ochraceous instead of buff. There are none of the blue and silver-grey hues so characteristic of *L. lagotricha*, and the red of *L. canus* is absent altogether.

It gives me great pleasure to name this fine species after my friend Oldfield Thomas, Esq., Curator of Mammals in the British Museum, who presented the type to the Institution.

Lagothrix ubericola, sp. n.

Type locality. Barrigudo River Jurua, Upper Amazon.

Geogr. distr. Upper Amazon, Rio Solimoens, and Rio Jurua to Peru.

Gen. char. Colour pale; hair soft, rather short, buff at base.

Colour. Top of head to nape, inner side of hands, and feet black; upper parts of body and arms to elbows grizzled wood-brown, with a reddish tinge on rump and thighs, the hairs being buff at base, with a subterminal black ring and whitish tips; outer side of forearms iron-grey; top of leg to knee iron-grey, when the colour becomes blackish brown, the hairs with yellow tips on the fingers and toes, which are black; flanks and sides of abdomen yellowish brown; chest and middle of abdomen black; hairs of tail above like upper side of legs, tawny ochraceous with black and white rings and white tips, beneath rufous brown at base, rest black.

Measurements. About the size of *L. lagotricha*, but more slender. Skull: total length 116·6; occipito-nasal length 103; zygomatic width 65·7; intertemporal width 59·5; palatal length 30; breadth of brain-case 61·5; length of nasals 10·6; length of upper molar series 25·2; length of mandible 69; length of lower molar series 29.

Type. Adult, in British Museum, no. 3 9. 1. 3.

The type is full-grown, but not an old animal, and differs greatly from *L. lagotricha*; and as the young of that species resembles the adult, this one cannot be considered as representing the same species. The locality of the type is south of the range of *L. lagotricha*. It is a much more slender animal, and its very bright colour, a grizzled wood-brown, makes it conspicuously different from all the other members of the genus.

Family Cercopithecidæ.

Subfamily CERCOPITHECINÆ.

GENUS PAPIO.

Papio tessellatum, sp. n.

Type locality. Mulema, Ankole, Uganda, East Africa.

Colour. Hairs throughout on head, neck, and body seal-brown, with a broad subterminal darkish cream-colour band and black tip. This gives a chequered appearance to the coat, as on the surface the cream-colour and black only appear. Arms mostly dark cream-colour, the black tips of the hairs forming distinct lines on the upper and lower side; wrists and hands black, a small tawny patch on the back of the latter; legs dark cream-colour mixed with black, the latter showing chiefly on the lower inner side; feet black; tail cream-colour, the hairs being seal-brown on basal half, remainder cream-colour to tip; upper part of throat and sides of the head greyish white; face black.

Measurements. Total length 1400 mm.; tail to end of hair 500; foot 210. Skull: occipito-nasal length 170; hensel 158; zygomatic width 131.1; intertemporal width 60.9; palatal length 94; length of nasals 80; width of brain-case 85.6; length of upper molar series 58.3; length of upper canines 43.1; length of mandible 150; length of lower molar series 66.

Type. Adult male, in British Museum, no. 5. 4. 3. 1.

The type and a young animal from Rogoro which I consider to be of the same species are in the collection of the British Museum. The type is a very large animal, and its rather unusual distribution of colours serves to make it quite conspicuous when placed with other species of the genus. The type was obtained by Col. G. Delmé Radcliffe, and the Rogoro example by C. S. Betton, Esq. The facial region of the skull equals in length that of the brain-case; the rostrum is broad and the nasals are rounded and raised above the plane of the nose; lateral pits large and deep posteriorly; a small process on the frontal ridge over each orbit near posterior end of nasals, curving downward and inward, and pointed; teeth large; upper canines very long and sharply pointed.

Papio nigeriæ, sp. n.

Type locality. Ibi, Northern Nigeria, West Africa.

Gen. char. General colour mottled black and cream; size

large; skull compared with that of *P. heuglini* from the Sudan has the ridges on sides of rostrum less elevated; rostrum much narrower, being 39.2 to 46.2 mm.; septum between orbits much narrower, 13 to 15.3 mm.; lateral pit not so deep; palate narrower; teeth much smaller and the length of molar series shorter by nearly half the length of posterior molar of *P. heuglini*.

Colour. General colour of top of head, upper parts, and sides to rump mixed black and cream-colour, the latter most prominent, the hairs being purplish brown, with two bands of cream-colour and black tip. The purple under colour shows through the cream and black, producing a grey shade; hairs on rump and lower back have bands of ochraceous, giving this part a reddish hue; face and chin naked, black; throat greyish; chest similar to back; abdomen like rump, bands ochraceous; arms like back to below elbows, when the black predominates to the wrists and hands, which are almost entirely black; legs redder, being tawny on thighs and growing lighter to the ankles, which are buff-yellow; feet black; tail cream-colour and olive mixed, the former colour predominating. Callosities large, colour lost in the skin.

Measurements. Size equal to *P. porcarius* or *P. doguera*. Skull: occipito-nasal length 161 mm.; hensel 153; zygomatic width 133; intertemporal width 60.9; palatal length 97.5; width of brain-case 86.4; length of nasals 81.1; length of upper molar series 53.9; length of mandible 168; length of lower molar series 71.1.

Type. Adult, in British Museum, no. 7. 7. 8. 12.

This is a very large dark baboon, the pelage exhibiting a mixture of cream-colour and black, with purple under colour showing, and grading into the tawny hue of lower back and legs. The skull shows the most trenchant characters and is markedly different from its probably nearest ally in its shorter tooth-row and smaller teeth. Two specimens are in the collection.

Papio brockmani, sp. n.

Type locality. Dirre Dawa, Somaliland, East Africa. Altitude 3500 feet.

Gen. char. Colour very different from *P. abyssinicus*; inclined to reddish, no grey on mane. Skull, compared with one of *P. abyssinicus* obtained by Rüppell, has a shorter facial region; rounded zygomatic arches, not squared as in the other; straight tooth-rows and smaller teeth; outer edge of lacrymal from orbital ridge to root of zygoma straight,

not flaring outward at bottom as in the skull of the allied species; rostrum broader posteriorly; palate of equal width throughout its length; orbital ridge straight, not depressed in centre; septum narrower; orbits more circular.

Colour.—*Adult male.* Face flesh-colour; callosities red; forehead covered with black hairs banded with white, this colour rising in the shape of a pyramid and coming to a point on the crown of the head; hairs on cheeks and sides of head long, stiff, very dense, rising upwards in enormous tufts above the head, yellowish white at base, grading into buffy at tips; hind-neck and mantle pale reddish brown, with a band of white, succeeded by a subterminal one of black, and tip silvery white; towards the lower back the colour darkens into cinnamon annulated with bands, and with tips of a paler cinnamon; upper part of rump ochraceous buff, paler than the mantle; lower rump and base of tail silvery white; hairs on sides of lower jaw long, dense, yellowish white; throat more sparsely covered with hairs of same colour; chest dark grey, hairs banded with black and white and tipped with white; abdomen ochraceous; arms and hands like forehead, grizzled, hairs banded with black and white, and grizzled reddish, hairs banded with reddish brown and white; tail grizzled russet and white, tuft russet.

Measurements. Total length 1322 mm.; tail 572; foot 188; ear 59 (collector). Skull: total length 180·4; occipito-nasal length 147·9; hensel 125·7; intertemporal width 56·6; width of brain-case 80; length of rostrum 91·2, width of rostrum posteriorly 46·6; zygomatic width 119·7; palatal length 76·8; length of nasals 52·1; length of upper molar series 44·6; size of last upper molar, crown, 10 × 8·5; length of mandible 136·1; length of lower molar series 57; size of last molar, crown, 13·5 × 8·5.

Type. Adult male, in British Museum, presented by Dr. D. Drake-Brockman. No. 9. 6. 1. 1.

The type is a very fine specimen of an adult male. As shown by the description, it differs in many ways from the Abyssinian Hamadryas, and also from the Arabian, as the latter seem to be nearer the Abyssinian species than to the present one. The pale reddish mantle and parti-coloured rump of ochraceous buff and silvery white causes it to be very conspicuously different when placed among other examples of Hamadryas baboons. The type was procured by Dr. D. Drake-Brockman, after whom I have great pleasure in naming it.

GENUS PITHECUS.

This genus *Pithecus* was established by I. Geoffroy St. Hilaire and Cuvier in 1795 in the 'Magasin Encyclopédique.' In this paper seven genera were named, *Pithecus* being the fourth, as follows:—"Genre IV^e Macaque. *Pithecus*. Museau assez court, angle facial de 50°; tête aplatie; une crête sus-cilière; 5 dents molaires; queue allongé, non prenante; des abayoues, le plus souvent des callosités. Les guenons de Buffon à museau court et nez déprimé; quelques uns de ses babouins; *S. veter, silenus, faunus, cynomolgus, sinica*, &c." This volume, being rather rare, has been consulted by comparatively few naturalists of the present time, and it has been contended by some that the paper was never really published, in spite of the fact that when cited the page number was given. Fortunately some copies of this volume of the 'Magazine' are to be found, and in London, known to me, is one in the British Museum, and another in the Natural History Museum, South Kensington. It is fortunate that *Pithecus* can thus be authenticated, and the barbarous term *Macaca*, which had in some instances been employed, be relegated to the list of synonyms.

Pithecus littoralis, sp. n.

Type locality. Kuantun, Province of Fokein, China.

Gen. char. General hue tawny olive and black; tail short, bushy; fur loose, long, soft.

Colour. Top of head and hind-neck mummy-brown speckled with ochraceous buff; upper parts tawny olive and black, grading into uniform russet on the rump; arms to elbows tawny olive, paler than the back; lower arms and hands olive-brown, speckled with yellow; outer surface of thighs russet; legs and feet buff, with an olive tinge; sides of head tawny olive; long brown and black stiff hairs over eyes on the brow, inclining upward and outward on each side; entire under parts and inner side of limbs yellowish grey; tail above at base dark russet, darker than rump, remainder brownish black; beneath buff-yellow; face flesh-colour, covered sparsely with blackish-brown hairs.

Measurements. Total length 810 mm.; tail (imperfect) 200; from another specimen with complete tail (no. 7. 3. 3. 5) to end of hairs 280. Skull: total length 118.6; occipito-nasal length 102.7; hensel 79.3; zygomatic width 83.7; intertemporal width 46; width of brain-case 64.2; length of nasals 19.8; palatal length 45.5; length of upper molar

series 33.2; length of mandible 85.4; length of lower molar series 37.

Type. Adult female, in British Museum, no. O. 5. 8. 1.

There are three examples of this species in the British Museum, all females, but agreeing in the texture and colour of fur, two from Kuatun, and the third from the menagerie of the Zoological Society in Regent's Park, erroneously attributed to Cashmere. Both the Kuatun examples have lost a portion of their tails, but the third specimen has a tail of normal length. In general colouring this species resembles *P. tcheliensis*, Milne-Edwards, = *P. lasiotis*, Gray; but the great distance intervening between the habitats, nearly the entire width of China, does not permit the supposition that they can belong to the same species. I can only regard it as the coast representative of the Szechuen species *P. lasiotis*, of which *P. tcheliensis* is the female. The male of this new form when obtained will probably be darker in colour.

Pithecus brachyurus, sp. n.

Type locality. Island of Hainan.

Gen. char. Tail not half the length of body and head; similar in colour to *P. rhesus*, but smaller, with a shorter tail and very different cranial characters.

Colour. Top of head, nape, hind-neck, and upper parts of body to rump speckled black and russet; rump dark orange-rufous; arms and hands speckled blackish and buff, hairs grey on basal half, this colour giving a dominant tone; flanks and legs ochraceous, unspckled; long stiff black hairs on superciliary line; sides of head yellowish grey, some black hairs on cheeks forming a short line beneath eyes; face flesh-colour, becoming blackish on lips, which are sparsely covered with short white hairs; chin, throat, and under parts of body to anal region yellowish white; hairs about scrotum and anal region orange-rufous, like rump; inner side of legs yellowish; feet brownish grey; tail above speckled blackish brown and ochraceous, beneath paler.

Measurements. Total length 730 mm.; tail 220; foot 135. Skull: total length 116.1; occipito-nasal length 100; intertemporal width 46.3; breadth of brain-case 60.6; hensel 78.3; zygomatic width 81.8; length of nasals 25; palatal length 42.3; length of upper canines 21; length of upper molar series 29.8; length of mandible 82.2; length of lower molar series 36.6.

Type. Adult male, in American Museum of Natural History, New York, no. 27.577.

This Macaque, while having a general resemblance to *P. rhesus* of India, differs in various ways from that species. The tail is much shorter and the colouring on the rump and about the scrotum much brighter. The cranial characters differ widely. The orbital ridge is rounded, not depressed and flattened, and consequently there should be an absence of the scowling look so often seen in adults of *P. rhesus*. Another character that instantly attracts the eye is the greater width and lateral swellings of the rostrum of the Indian species, the Hainan animal having a rather long rostrum for its width, with the sides descending rather abruptly from the nasals. The orbits of *P. brachyurus* are circular, those of the allied species oblong; the brain-case of the Hainan Macaque is somewhat more bulging posteriorly and the palate is deeper and narrower; the bullæ are shorter and wider, while the tooth-rows of upper jaw are nearly straight and the teeth much smaller; the mastoid width much less, and the mandible having proportionately greater depth and less expansion at coronoid processes. This comparison is made between two skulls of males of about the same age.

Several specimens of this Macaque were received by the American Museum in a collection from the Island of Hainan. On examining the specimens in New York I was satisfied that they represented a species distinct from *P. rhesus*, but not having any examples of that animal for comparison, I preferred to wait until the two species could be brought together. Dr. Allen selected three which the Museum forwarded to me in London, and after comparing these with skins and skulls of *P. rhesus* in the British Museum, the distinctness of the Hainan Macaque was demonstrated.

Pithecus validus, sp. n.

Type locality. Cochin China, exact locality unknown.

Gen. char. Body stout, heavy; limbs short; tail not quite so long as the body. Skull with facial region almost as long as the brain-case; rostrum longer than wide; palate long and narrow; tooth-rows straight; sagittal crest present; second upper molar largest; last lower molar with prominent posterior cusp; mandible heavy, comparatively massive for its length; canines stout.

Colour. Middle of crown, nape, line over eyes, and line on sides of head black speckled with buff; rest of crown and entire upper parts Prout's brown washed with olive, grading to raw umber on sides and arms, and all speckled with buff;

outer side of thighs olive speckled with buff; rump and legs below knees greyish olive speckled with buff; sides of head and neck olive-grey; under parts of body and inner sides of limbs greyish white; feet olive-brown speckled with buff; tail above black on basal half, grading into blackish brown on the rest, beneath pale yellowish olive; face flesh-colour.

Measurements. Total length 1030.3 mm.; tail 365; foot 125 (skin). Skull: total length 125.3; occipito-nasal length 103.6; hensel 84.9; zygomatic width 82.5; facial length 78.9; width of brain-case 57; greatest width of rostrum 38; length of nasals 35.5; palatal length 50.7; length of upper molar series 30.2; length of mandible 93.2; length of lower molar series 36.9; depth of jaw beneath second molar 23.8.

Type in British Museum, no. 81. 6. 30. 2.

The unique type of this very unusually coloured Macaque is stated to have come from Cochin China, no particular locality in that country being specified. In its peculiar brown and olive-yellow speckled fur it more nearly resembles the long-tailed species *P. irus* of the Malay Peninsula, Burma, &c., but is a much more powerful animal, has not any reddish brown on the head, and a much shorter tail; in fact, it does not resemble closely any described species of Macaque at present known to me.

Pithecus alacer, sp. n.

Type locality. Bliah, northern point of Kundur Island.

Gen. char. General colour much paler than the examples from Singapore and Bintang Islands, approaching nearer to those from Karimon Island, but paler; skull and teeth more like the dark Macaque from Singapore Island. Fur long, soft; tail as long as body. Tooth-rows straight. Eyelids flesh-colour.

Colour. General colour hazel on dorsal region, grading to raw umber or tawny olive on sides, the hairs on back being grey at base, then blackish brown, and then banded with black and tawny ochraceous, while the hairs on flanks are grey, banded with ochraceous buff; the hairs on head and nape are black at base, then orange-ochraceous, and tipped with black; narrow line above eyes grizzled grey; numerous stiff black hairs behind the grey line, the longest hairs standing out from the head on each side; face and cheeks covered with very short grey hairs; sides of head yellowish white, hairs long and directed forward and upward; upper side of arms and hands cream-buff, the hairs being purplish,

with cream-buff tips; upper side of thighs like back; rest of legs yellowish grey; feet olive-brown; under parts of body and inner side of limbs yellowish white; tail above black, speckled with white for three-fourths the length, and then grading into hair-brown, tuft at tip bistre, beneath pale reddish brown; eyelids and patch over eyes flesh-colour.

Measurements. Total length 794 mm.; tail 361; foot 125; ear 33 (collector). Skull: total length 110·6; occipito-nasal length 92·7; hensel 72·7; intertemporal width 41·1; zygomatic width 72·8; greatest width of brain-case 58; palatal length 73·5; length of nasals 24·8; length of upper molar series 26·1; length of mandible 79; length of lower molar series 33.

Type in British Museum, no. 9. 4. 1. 36.

This Macaque exhibits an entirely differently coloured pelage from the Singapore species, and one much nearer to the Kuruman and Sumatran forms, while the skull in its characters is closer to the Singapore animal. In colour it is reddish brown, duller in hue than the Macaques from either of the islands above named. The affinities of these monkeys from the various islands of this archipelago are rather difficult to understand, and why their colouring should be similar in Kundur and the islands to the south as far as Sumatra, and the cranial characters should so nearly agree with the Singapore species, separated as it is by intervening islands inhabited by an allied but different form, is difficult to explain. It would be practically useless to theorise upon this condition of things, although in ornithology a similar state of affairs exists among some genera of birds in the Eastern Archipelago, such as *Pitta*; but in the case of the Macaques these animals are probably in process of change influenced by their insular habitats, though these islands are but short distances apart, and it is rather difficult to appreciate how great these influences may be. At present we only know that material differences do exist, and of such importance as to compel us to regard the individuals from the various islands as possessing characters so unreconcilable with each other as to prevent us from believing them all to belong to one and the same species.

Pithecus karimoni, sp. n.

Type locality. Monos, eastern coast of the island of Karimon.

Gen. char. Similar in colour to *P. fascicularis* of Sumatra, and its skull nearer to that species than it is to those of

the Macaques from Kundur or Singapore, its neighbours. Facial portion of skull shorter than brain-case; teeth large; tooth-rows curved very slightly; second and third molars much longer than first in both jaws; orbital ridge broad and long; rostrum short and broad; brain-case broad and rounded. Pelage moderately long, smooth; tail about equal in length to body; forehead above eyes to hair flesh-colour.

Colour.—*Male.* General hue tawny ochraceous, reddish on head and neck, dorsal region darkest and becoming more yellow on the sides, the hairs on back being purplish grey at base, then banded with tawny ochraceous and black, and the hairs on flanks yellowish grey banded with white; outer side of arms grizzled grey, hairs being grey banded with black and cream-buff; hands and fingers black, covered with yellowish-white hairs; outer side of thighs like back, legs bluish grey; under part of body and inner side of limbs greyish white; tail grizzled black and white above, brownish grey beneath; feet brownish grey.

Young females are lighter in colour, some being a pale reddish hue.

Measurements. Total length 206 mm.; tail 432; foot 152; ear 35 (collector). Skull: total length 111.6; occipito-nasal length 92.5; hensel 75.2; zygomatic width 76.9; intertemporal width 38.7; width of brain-case 54.7; greatest width of rostrum 38.4; length of rostrum 40; palatal length 41.7; length of nasals 17.5; length of upper tooth-row 27.7; length of mandible 79.7; length of lower tooth-row 35.6.

Type in British Museum, no. 9. 4. 1. 34.

This Macaque, while resembling its relative in colour of pelage from Kundur next to it on the south, agrees in its cranial characters with those of *P. fascicularis* from Sumatra, a rather inexplicable fact in both cases of this species and the one from Kundur skipping the island nearest to it, and agreeing more nearly in the cranial characters with the species farthest from it on the north and south.

Pithecus latus, sp. n.

Type locality. Island of Tingi, South China Sea, off south-east coast of Malay Peninsula.

Gen. char. Colour similar to, but paler than, that of *P. karimoni* and its allies; tail longer than head and body. Skull with facial length nearly equal to that of brain-case; teeth moderately large, canines very long; bony crest for

nearly the entire length of brain-case; tooth-rows slightly curved; last lower molar nearly one-third longer than second molar, and with six well-developed cusps.

Colour. Forehead flesh-colour. General hue wood-brown, with a reddish tinge, brightest on head, where the hairs are purplish on basal half, then banded with ochraceous, the bands lighter in hue on lower back and rump, where they become cream-buff; space above eyes flesh-colour (yellowish in skin), stiff black hairs on edge of forehead; nose and lips covered with very short iron-grey hairs; sides of crown and head whitish grey; hairs turning upwards in front of ears; outer side of arms and hands greyish cream-colour; legs whitish grey; feet brown, covered with whitish-grey hairs; chin broccoli-brown; rest of under parts and inner side of limbs yellowish white; tail above black on basal half, remainder bluish grey, beneath pale drab-grey.

Measurements. Total length 975 mm.; tail 550; foot 129 (collector). Skull: total length 114.7; occipito-nasal length 98.8; hensel 76.3; zygomatic width 80.3; intertemporal width 41.4; width of brain-case 57.7; length of rostrum 41.6; width of rostrum, beneath orbit 32.1, at jaw 39.1; palatal length 42.9; length of nasals 18.1; length of upper molar series 30; length of canines 25.2; length of mandible 87.4; length of lower molar series 68.7.

Type. Adult, in British Museum, no. 9. 4. 1. 21.

This is a much paler Macaque than any of the other island forms described, with pale yellowish-grey arms and whitish-grey legs. The general colour of the top of head and nape at a little distance is ochraceous, contrasting rather strongly with the reddish wood-brown of the back. The skull is rather large and heavy, more like that of *P. fascicularis* of Sumatra than of any of the Macaques described from the other islands. Two specimens from Tioman Island, north of Tingi, are much darker in colour, but as they present no cranial difference from Tingi skulls, I have not separated them, though the colouring of the fur is quite different.

Pithecus dollmani, sp. n.

Type locality. Changi Island, off south-eastern part of Singapore Island.

Gen. char. Resembling in colour the next species, *P. bintangensis*, but much larger and with different cranial characters. Skull longer and heavier; width across orbital ridge greater; intertemporal width greater; brain-case

longer and broader; zygomatic arch less rounded anteriorly; rostrum wider than long; incisor teeth much larger; tooth-rows curved, not straight; basioccipital much wider; lower molars smaller; ascending ramus of mandible wider; upper and lower tooth-rows much longer.

Colour. Patch above eyes flesh-colour. General hue burnt umber, as in *P. bintangensis*, and hairs banded in the same way with tawny ochraceous; top of head redder than in the species compared, the arms more thickly speckled with yellow and the legs much paler, a smoke-grey instead of iron-grey; tail black above, silvery grey beneath; rest of pelage like *P. bintangensis*.

Measurements. Total length 977 mm.; tail 573; foot 135; ear 34 (collector). Skull: total length 110·8; occipito-nasal length 94·2; hensel 78·5; zygomatic width 73·2; intertemporal width 42·1; greatest width of brain-case 57·1; length of orbital ridge 53·9; greatest width of rostrum 35; length of rostrum 35·9; length of nasals 24; palatal length 39; length of upper tooth-row 29·1; length of mandible 79·2; length of lower tooth-row 37·4.

Type in British Museum, no. 9. 4. 1. 20.

With the exception of a redder head and hind-neck and paler legs, the present species and the one from Bintang Island resemble each other in colour; but *P. dollmani* is a larger and finer animal and has very different cranial characters, as shown above.

It gives me much pleasure to name this handsome Macaque after Mr. G. Dollman, Assistant in the Mammalogical Department of the British Museum, who has been of the greatest aid to me in my investigation of the Primates in the collection of the Institution.

Pithecus bintangensis, sp. n.

Type locality. Sungei Biru, north-east part of island of Bintang.

Geogr. distr. Islands of Bintang and Batam.

Gen. char. General hue dark burnt umber; facial region three-fourths the length of the brain-case; septum very narrow; outer edge of zygomatic arch straight, sloping slightly inward posteriorly to root of zygoma; greatest width of rostrum equal to its length; tooth-rows straight; teeth of moderate size; width of palate about equal throughout its length; brain-case balloon-shape, much constricted at intertemporal region, bulging posteriorly.

Colour.—*Male.* Patch above eyes flesh-colour; general

hue above burnt umber on head and upper parts, the hairs being slate-grey and banded on apical half with tawny ochraceous and black; narrow line over eyes blackish grey; numerous long stiff black hairs standing erect over forehead, producing an indistinct black line on each side; nose covered with short grizzled black and white hairs; sides of face buffy, sides of head from below ears and on cheeks with long greyish hairs banded with white and projected forward, forming bushy whiskers; outer sides of arms and thighs iron-grey, hairs banded with cream-buff; legs below knees iron-grey; under parts and inner side of limbs greyish white; hands and feet iron-grey, speckled with cream-buff like limbs; tail above black, sparsely speckled with white, beneath silver-grey.

Female. Upper parts russet, speckled with cream-buff; arms and hands blackish, speckled with cream-buff; thighs like back, legs olive-grey; feet and toes black, covered with grey hairs; tail like that of the male.

Measurements. Total length 964 mm.; tail 508; foot 117.5; ear 29 (collector). Skull: total length 105.5; occipito-nasal length 85.5; hensel 73.5; zygomatic width 72.5; intertemporal width 37.1; width of brain-case 54.9; length of orbital ridge 45.4; greatest width of rostrum 38.5; length of rostrum 38.5; length of nasals 24.4; palatal length 44.6; length of upper tooth-row 26.7; length of mandible 80.8; length of lower tooth-row 35.

Type in British Museum, no. 9. 4. 1. 23.

There is a great difference in the colouring of the sexes of this species, the female being much lighter and redder, and this difference is exhibited in very young males, which are as dark as the adult males. This species appears also to be a resident of Batam Island. Unfortunately only females were procured there, but they closely resemble the females from Bintang Island. Of course, adult males, when obtained, may possess different cranial characters, and possibly also coloration, for it seems to be the fact, so far as our material enables a judgment to be formed, that the various islands possess distinct forms; but at present the examples are not sufficient for a decision to be arrived at, and we must regard the examples from the two islands as the same.

GENUS CERCOPITHECUS.

Cercopithecus insolitus, sp. n.

Type locality. Northern Nigeria.

Gen. char. Reddish brow-band; upper parts black speckled.

Colour. Hairs on forehead ochraceous rufous and black over nose, where it is deepest in colour, paler towards sides; superciliary stripe beneath the red line black, but rather indistinct at sides; head black, speckled on crown with ochraceous, slightly paler than the frontal band; hairs over temples black, rather long, directed backward and passing over the ears; hair on cheek directed backward under and behind ears, black speckled with yellow; occipital region with but very few yellow speckles; entire upper parts of body greyish black, minutely spotted with cream-buff; flanks greyish black, faintly speckled with white; arms and hands black, unspeckled; legs black, speckled with cream-buff on upper part of thighs, and with white lower down to ankles; feet black; chin, throat, chest, anal region, inner side of arms to elbows, and thighs to knees whitish yellow; abdomen grey, with a yellow tinge; tail above at base like back, grading into black speckled with white, and then into jet-black on apical fourth; beneath yellow, speckled at base, then profusely speckled with white, causing the midway section to appear quite grey; tip black.

Measurements. Total length 1060 mm.; tail 680; foot 115. Skull: brain-case broken; only the rostrum, zygomatic arches, and mandible remaining. Width of orbits at inner edge 43.4; length of nasals 14.3; zygomatic width 55.4; palatal length 24.6; length of mandible 24.3.

Type in British Museum, no. 62. 7. 17. 3.

The type is a young animal, but quite different in appearance to any of the known species, so different, in fact, that it is difficult to assign its proper place in the genus, for, like *C. phoesti*, it does not seem to have any near allies. The unique type was obtained in Northern Nigeria by the expedition under Dr. Baikie.

Cercopithecus tantalus griseistictus, subsp. n.

Type locality. Bambara, Welle River, Monbuttu Country, Central Africa.

Gen. char. Similar to *C. t. budgetti* on upper parts, but hands and feet grizzled grey, with fingers and toes silvery grey.

Colour. Face and chin black, paler around eyes; nose, fore part of cheeks, lips, and chin covered with short black hairs; broad white brow-band of stiff erect hairs, with a narrow line in front between eyes of stiff black hairs; some long stiff black hairs from corner of eyes directed backward and lying between whiskers and hair of head; top of head,

the hairs are black from root and tipped with ochraceous, this being the dominant colour on head; back of neck and upper parts of body grey, speckled with yellow and black; dorsal line, lower back, and rump darker, speckled with black and buff; shoulders like upper back; outer side of arms and hands, legs, and feet grey, speckled with black and white; the arms near shoulders and thighs near hips speckled with yellow and black; whiskers very long, extending beyond and hiding the ears, yellowish white, some of the upper hairs banded with black on apical portion; sides of neck, throat, and entire under parts of body and inner side of limbs greyish white; scrotum surrounded by rufous hairs; flanks paler than upper parts, hairs speckled with yellow and black; tail above speckled yellow and black for half the length, rest broccoli-brown; no tuft. Iris brown.

Measurements. Total length 1290 mm.; tail 720; foot 135 (skin). Skull: total length 113.2; occipito-nasal length 95.5; intertemporal width 44.7; hensel 40.5; zygomatic width 77.5; breadth of brain-case 56.4; length of nasals, 21.2; palatal length 40.3; length of upper molar series 27.8; length of canines 21.3; length of mandible 82.1; length of lower molar series 34.6.

Type in British Museum, no. 7. 7. 8. 2.

This race resembles *C. t. budgetti* in the colouring of the upper parts, but differs in having the grey hands and feet of *C. tantalus*. From the latter species it differs in cranial characters. When two old male skulls are compared, that of the present race is seen to be much longer in every way: wider orbits and brain-case, but narrower rostrum; intertemporal width greater; nasals much longer; zygomatic width greater; palate longer; tooth-rows of both jaws longer by the width of the first premolar; and bullæ much longer and more elevated. In fact, the cranial characters are so different it is not worth while to compare them. The upper parts, as in *C. t. budgetti*, are much darker than in *C. tantalus*.

Cercopithecus rubellus, sp. n.

Type locality. Fort Hall.

Gen. char. General hue reddish, no white on under parts.

Colour. Brow buffy white, black on lower edge; face brownish black; hairs on upper lip to below eyes, and chin, black; top and back of head speckled black and ochraceous, latter colour most prominent; entire rest of upper parts of body tawny, with rather indistinct black speckling, tawny

being the prevailing hue; flanks paler, a rather bright ochraceous of uniform shade; no annulations; outer side of arms above elbows mixed grey and cream-buff; forearms pale grey, with black annulations on hairs; outer side of legs grey, with tawny hairs intermingled near hips, and black annulations on hairs; side of head, whiskers (which are directed backwards, covering ears), throat, inner side of arms, and legs pinkish buff; abdomen and anal region cream-buff; tail above tawny and black, like back, growing darker and merging into black on apical portion, beneath rufous patch at root, then ochraceous grading into tawny at tip; hands and feet black.

Measurements. Total length 1260 mm.; tail 740; foot 150 (skin). Skull: total length 92.2; occipito-nasal length 81.8; intertemporal width 44.7; hensel 65; zygomatic width 67.6; breadth of brain-case 53.8; length of nasals 16.4; palatal length 30.9; length of upper molar series 22.6; length of upper canines 16; length of mandible 68.2; length of lower molar series 30.

Type in British Museum, no. 6. 2. 1. 1.

The general appearance of this species is that of a reddish monkey, quite different in colouring from its paler relatives of the *C. centralis* style. It is nearer to the animal from Portuguese East Africa, which has been accepted as representing *C. rufoviridis*, but differs from that species in its pinkish-buff whiskers, throat, and general colour of the under parts and in its jet-black hands and feet.

A number of specimens from Fort Hall are in the British Museum. Unfortunately there are no skulls of the *C. c. johnstoni* specimens, so I can make no comparison between it and the present species.

Cercopithecus pogonias pallidus, subsp. n.

Type locality. Gaboon, West Africa.

Gen. char. Similar to *C. greyi*, but paler beneath, no uniform black on rump, hairs speckled like back to root of tail.

Colour.—Female. Forehead like that of *C. greyi*; upper parts of head, hind-neck, and between shoulders redder, speckled buff-yellow and black, the buff-yellow being the dominant colour and giving the tone to all this part; upper parts of body to tail much redder, speckled ochraceous rufous and black, becoming darker towards root of tail, where the speckling is less; flanks grey, speckled on apical half of hairs with yellow and black; outer sides of arms and

hands black, speckled with cream-colour; legs pale grey, speckled with white; feet, posterior half speckled grey and white, anterior half and toes black; whiskers yellowish grey, annulated at tips with black and yellow; tail above black, beneath yellowish with black mixed and grading into black towards the tip; ear-tufts buff.

Measurements. Total length 1295 mm.; tail 705; foot 115 (skin). Skull: total length 90; occipito nasal length 78.3; intertemporal width 37.6; hensel 54.8; zygomatic width 56.2; width of brain-case 51.1; length of nasals 16.5; palatal length 31; length of upper molar series 23; length of mandible 56.3; length of lower molar series 26.7.

Type in British Museum, no. 86. 6. 7. 2.

The specimens from the Gaboon are much paler than those from the Benito River, even when examples of the same sex are compared. The head, upper part of back, legs, and under parts of body are much paler in their several colours, and the dorsal region is paler and brighter, appearing more red, and there is an absence of clear black at root of tail, the speckling of the back continuing to the tail. There exist several points of difference in the character of the crania, which if sustained by a number of individuals would be sufficient to give to this form specific rank. On comparing the skull of the type with that of a female from the Benito River, the great difference in the superior outline is at once observed. In the Gaboon skull there is an abrupt rise of the frontal from the posterior base of the orbital ridge, with a gradual curve to the fronto-parietal suture, and the line then descends rapidly to the interparietal suture, and then drops at a more than a 45° angle to the occiput. The skull of the Benito River female has a flat frontal, on a line with the orbital ridge and descends much more rapidly from the fronto-parietal suture to the occiput; the anterior portion of the nasals in the type is nearly at a right angle to the posterior portion, the projecting forward occurring about midway the length, causing the narial opening to be horizontal save for its anterior third; the rostrum of the Gaboon specimen is narrower, the palate narrower and deeper, the molar series longer by the width of a tooth; zygomatic arches of a different shape, those of the Benito River examples are straight for nearly their whole length, while those of the type curve inward rapidly anteriorly. Even comparing the skull of a male from the Benito River with that of the type of *C. p. pallidus* the much higher elevation of the frontal bone in the latter is remarkable, and the more prominent anterior portion of the nasals is conspicuous.

Cercopithecus sticticeps, sp. n.

Type locality. N'dongo-leti, on the Upper Ubangui River, Central Africa.

Gen. char. No solid black on top of head or hind-neck, all speckled.

Colour. Band of rather stiff hairs standing upright over the eyes, black banded with white; top and sides of head, back and sides of neck, upper parts of body and flanks speckled buff and black; chin and throat greyish white; under parts smoke-grey, apical half of hairs banded with black and white; tail at base speckled buff and black like back, then for rest of basal half above speckled black and white, beneath at base black, faintly speckled with white, rest of basal half paler, more of a brownish hue; apical half above and beneath jet-black; large white spot on nose.

Measurements. Total length 1345 mm.; tail 830; foot 125. No skull.

Type in the British Museum, no. 7. 7. 8. 5.

A single specimen obtained by the Alexander-Gosling Expedition; it differs markedly from *C. nictitans* in having no solid black hairs on the head or neck, and in having them speckled with buff and black instead of white and black, and, in certain lights, in having a greenish tinge on the dorsal region. The sex of the specimen is not known.

Cercopithecus silaceus, sp. n.

Type locality. South bank of the Loangwa River, Angoniland, British East Africa.

Geogr. distr. Loangwa River to Angola, West Africa.

Gen. char. General hue yellowish green speckled with black, and yellow on the flanks with distinct black speckling.

Colour. Greyish white brow-band mixed with black on hairs over nose and at each end; hairs on forehead standing upright, speckled with black and tawny, the latter being the prevailing colour; dorsal region from nape to tail speckled black and buff-yellow, the black being equally prominent with the lighter colour, especially on dorsal line from between shoulders and on lower back and rump, making these parts darker; back beneath shoulders on either side of the dorsal line, and flanks, buff-yellow, annulated and tipped with brownish black, the lighter colour, however, predominating to the extent of giving all these parts a yellowish appearance; shoulders darker than flanks, but not so dark as

dorsal line, the hairs speckled ochraceous and black; outer side of arms and legs grey, speckled on arms above elbows and on thighs with cream-colour and black, and on fore-arms and legs below knees with black and white; wrists and hands black, speckled with white; feet grey and black speckled, toes brownish black with some white hairs intermingled; whiskers long, directed backwards hiding the ears, cream-colour annulated with black; face, lips, and chin covered with short brownish-black hairs; sides of neck, throat, inner side of limbs, and entire under parts white; tail above for three-fourths the length speckled cream-colour and black, rest jet-black, underside with a rufous patch at root, rest whitish grey, becoming buff on apical part, the extreme tip only being black.

Measurements. Total length 1190 mm.; tail 730; foot 125. Skull: total length 1032; occipito-nasal length 87; intertemporal width 42.9; hensel 72; zygomatic width; 72.9; width of brain-case 57.5; length of nasals 16.1; palatal length 38.3; length of upper molar series 25; length of upper canines 15.5; length of mandibles 74.7; length of lower molar series 30.8.

Type in British Museum, no. 7. 1. 11. 1.

There are three specimens of this species in the British Museum—one from the east bank of the Loangwa River, collected by Mr. S. A. Neave at an altitude of 2000 feet, and one from Limondi on the boundary between the English and Portuguese territories; and one from north Basilimdo Chiyaka District, Angola, West Africa, collected by Dr. F. C. Wellman. They closely resemble each other, and give the impression of a yellow monkey speckled on head, middle of back, and rump with black, but the annulations rather indistinct on flanks. By having the red patch beneath the tail at the root, the species evinces a relationship to *C. pygerythrus*, but it bears no resemblance whatever to that animal in its general coloration, and, in fact, is far too much of a yellowish hue to be compared with any other species of the genus. It doubtless is a dweller in the forests on the watershed from the Loangwa westward to Angola. It is a large thick-set animal, with rather short limbs and long tail.

GENUS ERYTHROCEBUS.

Erythrocebus formosus, sp. n.

Type locality. Uganda, particular locality not given, East Africa.

Gen. char. Similar to *E. pyrrhonotus*, but with a much darker rump and tail; more black on shoulders, and under parts of body buff-pink with a yellow line down centre instead of white.

Colour. Head, face, and cheeks like *E. pyrrhonotus*, with white patch on end of nose; the black brow-line is not distinct between the eye and ears, and turns up over the crown from the outer corner of the eyes as in the allied form; top of head foxy red; head above ears, nape and hind-neck, and shoulders ochraceous buff, hairs yellow-tipped; lower back to rump and flanks pinkish, hairs tipped with yellow, this colour giving a yellow hue to all the upper parts; rump vinaceous rufous, grading into bay at tail and hips; sides of neck and chest lemon-yellow, some hairs tipped with black; outer side of arms lemon-yellow; inner side of arms and the hands white; under parts of body buff-pink, with a yellow line down centre of belly; chin, throat, and centre of chest white, this hue narrowing to a point on lower part of chest as it is encroached upon by the lemon-yellow colour from each side; outer side of thighs in front to knees like rump, on sides pale yellow, below knees the legs and feet are white; inner side of thighs and legs greyish white; tail bay, slightly paler at tip.

Measurements. Total length 1410 mm.; tail 740; foot 145 (skin). No skull.

Type in British Museum, no. 9. 2. 21. 2.

This is a large species resembling *E. pyrrhonotus* on upper parts, except on rump, which, with the tail, is much darker, in fact quite a different colour; the thighs also are not like those of its relative, and the sides of neck and arms are lemon-yellow, quite different from the grey chest and yellowish-white arms of the allied species; the under parts of the body are altogether different, a colour difficult to describe, but which I have called "buff-pink."

The only species of *Erythrocebus* dwelling near *E. formosus* is *E. baumstarki* from Masai Land, but as that animal has no black on brow or head it cannot even be comparable with the present species.

Erythrocebus albigenus, sp. n.

Type locality. Egyptian Soudan, exact locality not known.

Gen. char. Black brow-band extending from corner of eye to crown, not to ear; thighs mostly white; hairs on hind-neck and shoulders very long, mane-like.

Colour.—*Adult male.* Face and nose black; narrow line on edge of upper lip white; black brow-band mixed with white over eyes, turning upwards at corner of eyes and encircling the crown; no black line from eyes to ears; crown foxy-red, rest of head and hind-neck tawny ochraceous, hairs with a subterminal yellow band and black tips; dorsal region dark ochraceous rufous, becoming a bright bay on flanks and rump; hairs tipped with golden, only occasionally one with a black tip; shoulders covered with long black hairs annulated with cream-colour; sides of face white; whiskers and sides of neck white tinged with yellow; inner and outer sides of arms white; upper part of thighs near hips bright bay like rump, rest of thighs and legs on inner and outer sides white; feet yellowish white; chin, throat, and chest white; middle of abdomen pale yellow; tail above bay, beneath yellowish white.

Measurements. Total length 1070; tail imperfect 430; foot 140 (flat skin). Skull: total length 135; occipito-nasal length 114; intertemporal width 47.3; hensel 94.7; zygomatic width 80; breadth of brain-case 59.3; length of nasals 25.2; palatal length 47.7; length of upper canines 34.7; length of upper molar series 29.7; length of mandible 81.8; length of lower molar series 36.6.

Type in British Museum, no. 8.6.15.1.

This species is distinguishable from *E. poliophæus* by having white forearms, no black line from eye to ear, and the unspckled deeper colour of the upper parts of the body and rump. The skull is much longer and narrower, the second molar larger, the last molar and second premolar smaller than the corresponding teeth in *E. poliophæus*.

GENUS PRESBYTIS.

Presbytis nudifrons, sp. n.

Type locality. Bejalong, Sarawak, North-east Borneo.

Gen. char. Bare spot on forehead similar to that of *P. frontata*, but divided in the middle by a line of short black hairs running through forehead to end of nose, these hairs growing towards each other from each side and forming a low ridge where they meet; crest equally long throughout its length from forehead to nape, the hairs turned forwards; no brown colouring on any part of the pelage. Skull without the high forehead of *P. frontata*, the frontal being only slightly raised, and the superior outline posteriorly descending rapidly to the occiput.

Colour. Face flesh-colour, forehead orange-yellow; eyelids black; line of short black hairs across forehead and down nose; hairs on upper lip and cheeks black, those from the latter very long and extending to the neck; hairs from corner of the eyes and those from forehead black, very long and directed backward on sides of the head joining on temples; hairs on centre of head to nape very long, erect, directed forward forming a crest, sepia in front, grading to slate-grey on hind-neck; entire upper parts and sides of body slaty grey; outer side of arms to below elbows like upper parts; forearms, hands, legs, and feet black; throat white; under parts of body brownish grey; inner side of arms to below elbows, and inner side of legs to near ankles, greyish white, darkest on legs below knees; tail above and beneath black at base, remainder silvery grey tinged with brown.

Measurements. Total length 1170 mm.; tail 645; foot 160 (skin). Skull: total length 98·5; occipito-nasal length 87·7; intertemporal width 48·1; heusel 38·9; zygomatic width 71·8; width of brain-case 55·5; length of nasals 12; palatal length 26·7; length of upper molar series 25; length of upper canines 16; length of mandible 15·9; length of lower molar series 29.

Type. Adult male, in British Museum, no. 4. 2. 9. 1.

This species is found on the opposite side of Borneo from that in which *P. frontata* dwells. It has a squarish, not triangular bare place on the forehead, but divided in this species by a line of short hairs. In colour the two forms are entirely different; none of the adults or young in the British Museum of *P. frontata* exhibit the colouring of the present species.

Presbytis melamera, sp. n.

Type locality. Cadu Ciaung, Bhamo, North Burma.

Gen. char. Resembles *P. obscura*, but legs uniformly sooty or blackish brown; hair long, thick, soft; head without crest.

Colour. Long hairs on forehead directed upward and forward, and with hairs on cheeks framing the face, black; hair on back of neck long, extending on to the back, drab-grey, but not forming a conspicuous patch as in *P. obscura*; dark hairs on head and back mingling with the light ones; top of head, sides of body and rump, shoulders and outer side of arms and legs to wrists and ankles, blackish brown; dorsal region more reddish brown and paler than the flanks;

whiskers long, blackish brown, hairs with pale tips; chin white: under parts, inner side of arms and thighs sparsely covered with whitish hairs; inner side of legs below knees similar to upper parts but paler; tail blackish brown at base grading into greyish brown, and with a white patch at base of tail beneath; face brownish, with space around eyes apparently red; cheeks and sides of upper lip covered with black hairs; upper lip in the centre beneath nose covered with short white hairs.

Measurements. Total length 1210 mm.; tail 750; foot 150 (skin). Skull: total length 91·5; occipito-nasal length 80·3; intertemporal width 43·5; breadth of brain-case 56·8; hensel 60; palatal length 27·1; length of nasals 10·8; length of upper molar series 26·1; length of mandible 64·4; length of lower molar series 32·3.

Type in the British Museum, no. 88. 12. 1. 64.

This monkey, which resembles somewhat *P. obscura*, is easily distinguished from it by having the thighs coloured like the upper parts of the body, by the absence of a conspicuously defined nuchal patch, and by the dark tail. The hair is much less silky in texture, and more suitable for the less temperate climate of the more northern region in which it dwells. The unique type was procured by L. Fea, and presented to the British Museum by the Marquis Doria.

Presbytis nubigena, sp. n.

Type locality. Keka, Malacca.

Gen. char. Eyelids, lips, and chin flesh-colour, face brownish black. General colour very dark above, top of head black; under parts light; hair radiating from a central point on the crown; short occipital crest.

Colour. Long black hairs on forehead directed outward; top of head black, hairs greyish and white at base; neck and entire upper part of body, outer side of arms, Prout's brown, wrists and hands black; outer side of thighs greyish white; from hips to below knees on middle of thighs runs a brownish-black line, much mixed with brownish-grey hairs near hips, feet blackish; hairs from eyes across temples seal-brown; whiskers beneath these hairs yellowish grey; sides of neck, chin, throat, inner sides of arms and legs, under parts of body and flanks greyish white; tail Prout's brown on basal half, grading into blackish brown for the remainder.

Measurements. Total length 1190 mm.; tail 700; foot 180. Skull: total length 90; occipito-nasal length 74·2; intertemporal width 40·8; breadth of brain-case 54;

hensel 62.2; zygomatic width 67.6; length of nasals 11.5; palatal length 30; length of upper molar series 27.9; length of mandible 68.4; length of lower molar series 31.9.

Type in British Museum, no. 79.11.21.595.

Several specimens of this species from the southern part of Malacca are in the British Museum, resembling each other in colour, much darker than examples from the Straits Settlements and lower part of the Peninsula, and more like *P. obscura*, but without the nuchal patch and not so dark in colour. These examples had gone heretofore under the name of *albocinereus*, Desmarest; but that supposed species was stated to be on the upper parts, including "épaules, flanes, face externe du haut des bras et des cuisses, d'un gris clair; milieu du dos d'un gris un peu plus foncé," which in no wise describes any Sumatran *Presbytis* I have ever seen, and comes nearer to *P. aygula* from Java than any other. Eydoux and Souleyet in their work on the voyage of the 'Bonite' describe and figure a monkey under the name of *albocinereus*, Desmarest, but which agrees in no respect with the description that author gives of his species, and is evidently the *Semnopithecus obscurus* Reid described in 1837, four years previously. These authors state that Desmarest's specimen was still in the Paris Museum, but as they do not say it was the original of the figure in their plate, they must have had it drawn from another specimen, not the type. Now, rather in contradiction of Messrs. Eydoux and Souleyet, comes forward Isidore Geoffroy Saint Hilaire, who, in his Catalogue of the Primates, 1851, p. 12, under *Semnopithecus obscurus* makes the following statement regarding the *S. albocinereus* of Eydoux and Souleyet: "Décrits et figurés dans la relation du voyage de la Bonite sous le nom de *Sema. albocinereus* les Auteurs ayant cru retrouver dans cette espèce le *Cercop. albo-cinereus* de M. Desmarest, espèce établis sans doute par suite d'une confusion de notes, et qui est à retrancher." The italics are mine. No mention, of course, is made, after the above statement, of any specimen which had served as Desmarest's type being in the Museum, as he did of others throughout his catalogue that were still in the collection, and if it had been preserved he would certainly have known it, and we must therefore presume that Messrs. Eydoux and Souleyet erred when they stated that the type of *albocinereus* was in the Museum. The matter then resolves itself into this, that Desmarest's description of *albocinereus* does not apply to any known species of monkey in Sumatra, nor can it, with any certainty, be given to any monkey from any other locality, and is therefore, in the absence of any

type, indeterminable, and the name *albocinereus*, if not dropped from our list, must remain in abeyance until some Sumatran monkey is found answering to the description given by Desmarest. Schlegel in the 'Museum des Pays-Bas,' Singes, p. 12, made an attempt to revive the name, but unfortunately mixed different species from Malacca and Sumatra in his comparisons, and failed to produce an animal resembling *albocinereus*, Desmarest. Failing, therefore, to acquire the right to bear the name given by Desmarest, certain Malaccan forms heretofore passing under the name of *albocinereus* will have to be christened anew, of which the first is the dark monkey from Southern Malacca, and another, the next species, from the southern end of the Peninsula, which leads on to the island forms called respectively *P. rhionis* and *P. cana*.

Presbytis dilecta, sp. n.

Type locality. Selangore.

Gen. char. Hairs radiating from a point on the forehead; general hue of body pale; thighs white with dark stripe from near hip over knee to ankle; tail moderately long.

Colour. Brown superciliary stripe turning backward over temples at corner of eyes; face black; eyelids apparently flesh-colour; crown greyish brown, hairs whitish at base; occiput, hind-neck, upper parts of body, shoulders, outer side of arms to elbows and flanks, drab; outer side of forearms greyish brown, grading into black on wrists; an indistinct purplish-grey stripe on flanks above the greyish white; thighs white tinged with grey and with a brown stripe from near hip over knee to near ankle, darkest at knee, where it is blackish brown, gradually fading away toward hip and ankle; ankles and feet black; chin, sides of neck, throat, inner side of limbs, and under parts of body greyish white; tail above like back, grading into dark brown with whitish hairs intermingled on apical half, beneath greyish white at root, remainder like upperside.

Measurements. Total length 1120 mm.; tail 620; foot 150 (skin). Skull: total length 89.5; occipito-nasal length 77.7; intertemporal width 43.5; hensel 58.7; zygomatic width 70.3; breadth of brain-case 50.3; length of nasals 69; palatal length 25.2; length of upper molar series 21.2; length of mandible 54.2; length of lower molar series 27.

Type in British Museum, no. 89. 5. 14. 1.

This is a pale species of a drab colour with very white thighs both on outer and inner sides. It differs from

P. rhionis in its pale legs and general colour of the upper parts, and from *P. cana* by lacking the pale occipital crest and black legs.

Presbytis margarita, sp. n.

Type locality. Lang Bian, Annam.

Colour. Forehead covered by long, stiff, erect black hairs; whiskers directed backwards, long, extending far beyond the ears, greyish white; space around eyes pale, apparently flesh-colour in life; rest of face black, with a line of whitish hairs on upper lip; a bar of silvery white hairs goes on each side of the head from above and behind ears to the occiput, where they meet and form a point at the nape; top of head, entire upper parts of body, outer sides of arms to elbows, and legs from hips to ankles, except from edge about knees which is black, bright bluish silvery grey, the hairs being bluish grey from the root and tipped with silvery white; forearms, hands, and feet jet-black; chin, throat, under parts of body and inner side of arms and legs sparsely covered with white hairs; flanks paler silvery grey than the upper parts; tail silvery grey.

Measurements. Total length 1315 mm.; tail 775; foot 127 (skin). Skull: total length 91.6; occipito-nasal length 77; intertemporal width 40.1; width of brain-case 52.4; hensel 56; zygomatic width 61.5; length of nasals 11.6; palatal length 28.6; length of upper molars series 27.7; length of mandible 61.4; length of lower molar series 32.3.

Type in British Museum, no. 8. 11. 1. 5.

This is a very handsome monkey with its brilliant pearl-grey shining pelage, quite different from any other species of the genus. The colouring varies greatly according to the light, which sometimes casts shadows on the grey that are almost black in their intensity. The unique type was obtained in Annam by Dr. Vassal.

Presbytis crepuscula, sp. n.

Type locality. Mooleyit, British Burma. Altitude 5000 feet.

Gen. char. Hair on head long, but no elevated crest; colour pale; tail long; stiff hairs above eyes, erect in the centre, standing out at right angles on sides.

Colour. Eyelids and upper lip flesh-colour; forehead and temples black; rest of head above, nape and hind neck, shoulders and arms to elbows on outer side, entire upper

parts of body and flanks drab-grey, palest on dorsal line and darkest on flanks, where in certain lights the hair becomes a drab without the grey tint, varying, however, as the light falls upon it; forearms, in the type, a very old male, on outer side dark greyish brown, on inner edge the arms are covered with russet hairs that extend downward over the hands, faded from the original black; feet brownish black, but overlaid with russet hairs; space above eyes, eyelids, and upper lip flesh-colour, probably orange-yellow in life; face black, covered with short black hairs; whiskers long, extending beyond the ears, black, grading into drab-grey towards the tips; chin whitish; inner side of arms olive-grey tinged with buff; under parts of body greyish white tinged with buff; tail above brownish olive-grey, beneath olive-grey.

Measurements. Total length 1160 mm.; tail 620; foot 150 (skin). Skull: occipital region gone; intertemporal width 45.1; zygomatic width 81.4; breadth of brain-case 60; length of nasals 11.5; palatal length 32.7; length of upper molar series 27.1; length of upper canines 19.4; length of mandible 75; length of lower molar series 33.7.

Type in British Museum, no. 85. 8. 1. 11.

There are two specimens in the British Museum, both males and from the same locality, but the type alone has russet hairs on the arms, hands, and feet. The other male is a beautiful drab-grey above and on the limbs, with hands and feet brownish black, this colour extending slightly on outer side of forearms above the wrist; the tail is silver-grey with a slight olive tinge. The russet hairs seen on the type are probably the result of age. It is a very handsome species in its attractive Quaker dress.

Presbytis crepuscula wroughtoni, subsp. n.

Type locality. Pachebon, Siam.

Gen. char. Forehead and temples not black; hands and feet not jet-black; upper parts generally paler than *P. crepuscula*, more silvery.

Colour. Space above eyes and lips flesh-colour; rest of face blackish brown; a line of stiff black erect hairs above eyes; top and sides of head wood-brown; whiskers reaching beyond ears wood-brown; hind-neck, upper parts of body, and arms to elbow silvery drab-grey, varying in depth according as the light falls upon it, but always paler and of a different hue from *P. crepuscula*; forearms brownish grey, grading at wrist into blackish brown on hands speckled with

whitish from tips of hairs ; legs paler silvery drab-grey, the outer edge over knees brownish ; feet blackish brown ; tail silvery grey on basal half, grading into brownish grey for the remaining portion to tip ; chin, throat, and abdomen white ; rest of under parts, chest, and inner side of limbs dark drab-grey.

Measurements. Total length 1250 mm. ; tail 800 ; foot 150 (skin). Skull : total length 90 ; occipito-nasal length 88.5 ; intertemporal width 67.2 ; length of nasals 10.2 ; palatal length 25.7 ; length of upper molar series 25 ; length of upper canines 15.3 ; length of mandible 65.5 ; length of lower molar series 31.1.

Type in British Museum, no. 61. 10. 8. 1.

This race resembles *P. crepuscula*, but is easily distinguished by its brown head and the lighter more silvery hue of the fur.

I have great pleasure in naming this race after Mr. R. C. Wroughton, well known for his papers in conjunction with Mr. Oldfield Thomas on African and Asiatic mammals.

Presbytis lania, sp. n.

Type locality. Chumbi Valley, Thibet.

Gen. char. Hair long, thick, woolly, inclined to gather in masses, especially on upper back and shoulders ; size large.

Colour. Head and hind-neck yellowish white ; sides of head pure white ; upper part of back and shoulders sepia ; flanks and upper part of arms pale brownish grey ; upper parts of legs paler, more silvery grey ; hands black ; chin, throat, under parts of body, and inner side of limbs yellowish white ; tail above like back, paler, more whitish beneath.

Measurements. Size about the same as *P. schistacea*. Skull : total length 125.3 ; occipito-nasal length 102.7 ; intertemporal width 50.8 ; breadth of brain-case 73.5 ; hensen 88.3 ; zygomatic width 102.5 ; length of nasals 12 ; palatal length 49.3 ; length of upper molar series 44.4.

Type in British Museum, no. 9. 7. 16. 1.

The unique type of this new form was lately received by the British Museum, through the Bombay Natural History Society, from Chumbi, Thibet. It is a female, with the feet and most of the tail wanting. It is remarkable for its woolly coat, quite unlike the pelage of *P. schistacea*. It probably represents a species dwelling among the higher mountains to the north of the Himalaya, whose coat has been modified to enable the animals to successfully withstand

the low temperature of those elevated regions. The skull is generally larger than that of a female of *P. schistacea*. It is broader across the orbits, and the orbits themselves are much larger and the orbital ridges greatly arched; the rostrum is broader at base, the palate is longer and its roof flatter; the orbital ridge more prominent, and the depression of the frontal beneath the ridge much greater, and the brain-case is broader. Unfortunately the posterior portion of the skull of *P. schistacea* is lacking and a comparison posterior to the pterygoids cannot be made; the skull of *P. lania* indicates a larger animal, but it is impossible to say, with the imperfect material known at present, whether this is an individual trait or a specific character.

XXXI.—*Description of a new Species of Monkey of the Genus Cercopithecus.* By D. G. ELLIOT, D.Sc., F.R.S.E., &c.

Cercopithecus insignis, sp. n.

Type locality. Congo Forest, West Africa.

Gen. char. Fur long, loose, rather fluffy; tail long; colours bright.

Colour. Broad brow-band, cheeks, and whiskers (the latter reaching to behind ears) yellow; face blackish; nose bluish white; lips covered with white hairs; top of head to nape, band across back at base of neck, shoulders, arms, hands, front of thighs from hips over knees, and feet black; entire upper parts from neck to tail, flanks, and under parts from throat to vent, and inner side of thighs dark orange; tail at base reddish brown, grading into black on apical half; chin and upper part of throat white.

During a late visit to the Antwerp Zoological Gardens I saw this monkey, and recognized at once that it represented a new species, quite unlike any of the genus *Cercopithecus* known. I then stated my opinion to M. L'Hoest, the Director, who, in the most generous spirit, requested me to describe it, and I regret very much that, on account of a *Cercopithecus l'hoesti* existing to-day, I am unable to name this fine species after him; but I take this opportunity to thank him for the facilities given me to examine the fine series of Primates in the Gardens.

C. insignis, as the description shows, is a beautiful animal,

quite unlike any other, but probably has a greater affinity for *C. moloneyi*, but is very different from that species. It was very active and constantly in motion, making a careful description difficult. M. L'Hœst informed me that it came from the Congo, but could give no exact locality.

XXXII.—*Descriptions of new Genera and Species of New-Zealand Coleoptera.* By Major T. Broun, F.E.S.

[Concluded from p. 161.]

Group *Cossonidæ*.

Pentarthrum dubitans, sp. n.

Subcylindrical, subopaque, sparingly clothed with slender inconspicuous greyish hairs; piceous, legs and antennæ rufo-piceous.

♂. *Rostrum* more than half the length of thorax, moderately broad for two-thirds of its length, very obviously constricted midway between the antennal insertion (just behind the middle) and the eyes; its punctuation rather close and distinct and becoming twice as coarse between the eyes; vertex smooth and shining and sharply limited in front, so that the eyes are quite prominent behind. *Scapæ* short, stout, and thickened at the extremity; funiculus longer, second joint very slightly longer than third; joints 3-5 short and gradually incrassate, so that the suboblong club is not well marked off. *Thorax* one-third longer than broad, gradually narrowed anteriorly, obtusely rounded near the base, sharply constricted near the apex, which is smooth in front but closely and finely punctate behind; disk convex, rather coarsely and closely punctured, rather more closely and finely near the base. *Scutellum* small, smooth. *Elytra* parallel-sided, posterior margins distinct and thick but not explanate; they are distinctly punctate-striate throughout, the punctures rather close yet distinctly separated; interstices narrow, with minute distant serial punctures. *Legs* stout; tarsi narrow, third joint not lobate or expanded, claws minute.

♀. *Underside* shining, coarsely but not closely punctured, with some slender yellowish hairs; metasternum with a rather fine median groove; basal ventral segment only slightly impressed, its hind suture indistinct, the base of

segments 3-5 so punctured as to appear serrate in front. *Rostrum* almost as long as that of the male, more than half its thickness, cylindric, more sparingly and finely punctured, not perceptibly constricted behind; antennal insertion behind the middle.

P. porcatum, Sharp, differs in having the thoracic constriction distant from the apex, by the absence of pubescence and interstitial punctures, &c. In *P. antennale*, also from the neighbourhood of Invercargill, the male may be distinguished by the yellow hairs on the elytra, which may be seen with any good lens, by the rather longer and narrower rostrum not being abruptly and deeply constricted, by the slightly more expanded apical margins of the elytra, and by the more slender scape. The female has the rostrum longer, the antennæ more shining red; the thorax is more finely punctate at the apex, so that there is no smooth space there, and the elytral margins are broader behind. *P. crassellum*, from Picton, a female, has a rather thicker rostrum, shorter scape, and broader elytral margins. These are the nearest allies.

Length $1\frac{7}{8}$; breadth quite $\frac{3}{8}$ line.

West Plains, Invercargill. Mr. A. Philpott.

Pentarthrum planicolle, sp. n.

Elongate, subdepressed, nearly glabrous, moderately nitid; piceo-rufous, elytra and legs paler, almost brick-red.

Rostrum half the length of thorax, gradually and slightly contracted behind, a little arched above; distinctly, finely, and not closely punctured, with a narrow smooth space near the middle; the head similarly sculptured but smooth behind. *Eyes* rather small, not prominent, lateral. *Antennæ* medially inserted; scape rather long, slightly flexuous, incrassate at extremity; funiculus stout, joints 2-4 about equal, fifth obconical; club oblong-oval, pubescent, articulate. *Thorax* rather longer than broad, broadly rounded, briefly narrowed at base, more gradually towards the front, which is constricted at the sides only; disk somewhat flattened and obsolete impressed along the middle, its punctuation not coarser than that of the head in front, rather coarser but not at all close near the middle, much closer at the sides. *Scutellum* small, smooth. *Elytra* somewhat wider than thorax at the base, very gradually and slightly narrowed posteriorly, apical margins not dilated; distinctly but not coarsely punctate-striate, the sutural striæ most evident; interstices moderate, with minute serial

punctures and, in some lights, appearing slightly rugose. *Legs* moderately stout; tarsi with slender grey setæ, third joint a little dilated and bilobed.

Var. Rostrum, thorax, and femora piceous, elytra picco-rufous; thorax not all impressed along the middle.

T. punctirostre has more prominent eyes, its rostrum is broader throughout and more densely sculptured, its thorax is quite evidently impressed medially, the body is entirely darker and bears perceptible greyish pubescence. *P. brevi-rostre* has a parallel-sided opaque rostrum and distinctly shorter hind-body, and the frontal constriction causes a distinct transverse impression on the thorax. The elytral sculpture is very similar to that of *P. planicolle*, but the insect itself is smaller, $1\frac{1}{8}$ line; it is, nevertheless, the nearest ally.

♂. Length $1\frac{3}{8}$; breadth $\frac{3}{8}$ line.

Southland. One male sent by Mr. A. Philpott.

Rhinanisus gracilis, sp. n.

Slender, depressed, elongate, sparingly clothed with slender inconspicuous yellowish hairs, moderately shining; ferrugineous, base of elytra more or less dark fuscous, antennæ and tarsi paler red.

Rostrum shorter than thorax, moderately stout, narrowed behind, very distinctly and finely punctured in front; scrobes deep, oblique, beginning just before the middle. *Head* as broad as front of thorax, distinctly and closely punctate, the back shining and apparently smooth. *Eyes* subrotundate, rather large but not prominent, coarsely faceted, distant from the thorax and each other. *Thorax* evidently longer than broad, its sides moderately rounded, a good deal narrowed anteriorly and constricted, sometimes deeply and abruptly, near the apex; disk apparently flat, broadly impressed from the basal margin to the frontal constriction, distinctly and moderately finely punctured, but rather coarsely and closely near the sides. *Scutellum* minute, smooth. *Elytra* broader than thorax at the base, sub-parallel, curvedly narrowed behind; regularly striate-punctate, the sutural striæ distinct behind, the third interstices somewhat thickened and acutely bent at the apex and prolonged forwards along the sides; dorsum plane, the interstices with minute serial punctures. *Legs* moderately stout; femora medially dilated; basal three joints of tarsi of nearly equal length, with very long, slender, outstanding grey setæ; third joint a little expanded, deeply excavate above,

with indistinct lobes, the terminal rather longer than the basal three combined.

Scape moderate as to length, stout, subclavate at the extremity. Funiculus 5-articulate, basal joint obconical, much stouter and longer than second, which is slightly longer than the third, joints 3-5 subquadrate; club oblong-oval, with yellow pubescence.

Underside shining brick-red, basal two ventral segments darker; distinctly yet finely but not closely punctured, with minute pubescence; the suture between the intermediate coxæ extremely fine and straight. The metasternum very elongate, flat, with a linear impression extending more than halfway towards the front, in the female much shorter. Basal ventral segment rather larger than second, broadly impressed, the suture very fine.

♀. Rostrum more slender and finely sculptured, its subparallel frontal half evidently broader than the basal.

Much more slender than previously described species, of a paler red, but with the elytra more or less darkened near the base.

♂. Length $1\frac{1}{8}$ - $1\frac{1}{4}$; breadth $\frac{1}{4}$ line.

Broken River. A good series found by Mr. J. H. Lewis.

Rhinanisus elongatus, sp. n.

Angustate, elongate, subdepressed, subopaque, sparsely clothed with minute greyish setæ; piceo-rufous, antennæ and tarsi obscure rufo-testaceous or pale ferruginous.

♀. *Rostrum* shorter than thorax, widest at apex, very slightly, hardly appreciably, dilated at the point of antennal insertion just behind the middle, its basal portion evidently contracted; it is finely but distinctly punctate. *Head* much narrowed anteriorly, rather coarsely, closely, and somewhat rugosely punctured, the usually smooth hind portion minutely coriaceous and distantly punctate. *Eyes* rather flat, with coarse facets. *Thorax* much longer than broad, gradually narrowed from near the base to the apical constriction, close to the base the sides are rather abruptly and obliquely narrowed; disk longitudinally depressed, distinctly but not closely punctured, the sides more coarsely and quite closely, the middle of apex impunctate. *Scutellum* small and smooth. *Elytra* rather wider than thorax at the base, very elongate and parallel, just visibly narrowed near the extremity; the dorsum not quite flat, evidently striate-punctate, the punctures quadrate or oblong, with short intervals, striate at apex; third interstices bent there but only minutely elevated,

all with distant, minute serial punctures and transversely rugose.

Scape moderately elongate, stout, only a little thickened apically; basal joint of funiculus stout, longer than broad, subtriangular, second slightly longer than third; fourth and fifth transverse; club oblong-oval. *Legs* stout, the tibial hooks well developed; third tarsal joint slightly expanded and lobate, with distinct slender grey setæ.

♂. Rostrum thickened and more coarsely sculptured; antennal insertion at, or immediately before, the middle. The specimen mutilated.

The female of *R. parvicornis* (913) most nearly resembles this species, which latter, however, is larger, more elongate, and darker; the eyes are not at all prominent and not easily distinguishable from the punctuation of the head.

♀. Length $1\frac{3}{8}$; breadth quite $\frac{1}{4}$ line.

Ashburton. I extracted one pair from the mandibles of a *Trichosternus antarcticus* which was sent to me several years ago by Mr. W. W. Smith.

Rhinanisus subconvexus, sp. n.

Rufous, slightly tinged with piceous, tarsi and antennæ paler, moderately nitid.

This species is evidently smaller and paler than *R. elongatus*, and though somewhat similar to *R. gracilis* as regards size and colour is less depressed than it is, with the rostrum and antennæ shorter, and differently sculptured. From *R. parvicornis* it may be at once separated by an examination of the thoracic sculpture; this, however, is the nearest species.

Rostrum distinctly shorter than thorax, its basal portion evidently narrower than the anterior, distinctly punctate. *Head* with distinct, not close, and rather shallow punctures. *Eyes* very slightly convex. *Scape* short, a good deal incrassate apically; second joint of funiculus very little longer than third; club oblong-oval. *Thorax* hardly at all depressed, finely but not closely punctured on the middle, more distinctly but not closely near the sides; in shape like that of *R. parvicornis*. *Scutellum* small and smooth. *Elytra* but little depressed, parallel-sided, striate-punctate, the intervals between the punctures nearly as long as the punctures themselves; interstices with fine distant punctures, scarcely at all rugose; apical sculpture a little indistinct.

The pale yellowish hairs, though slender, are quite perceptible with a good lens.

♂. Length $1\frac{1}{8}$; breadth nearly $\frac{1}{4}$ line.

Otara, Southland. One example from Mr. A. Philpott.

Rhinanisus suturalis, sp. n.

Elongate, slightly nitid, sparsely clothed with slender greyish setæ, rufo-piceous, antennæ and legs infuscate red.

♀. *Rostrum* moderate, contracted behind the middle, rather finely punctate, not closely or rugosely. *Head* globose below, narrowed anteriorly, not closely or coarsely punctured. *Eyes* nearly flat, with coarse facets. *Antennæ* implanted immediately before the middle, where the rostrum is very slightly dilated; scape moderately long and stout, very gradually incrassate; basal joint of funiculus nearly the length of the following two combined, second slightly longer than third, fifth broader than fourth, as wide as the base of the club, which is oblong-oval and slightly acuminate. *Thorax* nearly twice as long as broad, its sides slightly rounded, gradually narrowed towards the well-marked frontal constriction; disk unimpressed, distinctly but not closely or coarsely punctured even near the sides, the intervals smooth and shining, almost smooth and swollen at the apex. *Scutellum* small and smooth. *Elytra* subparallel, distinctly striate-punctate, the intervals sometimes quite as long as the punctures; interstices with minute distant punctures, the third a little incrassate and bent towards the sides at the apex; the suture is slightly elevated.

Legs normal, third tarsal joint but little expanded or lobed; the tarsi setose underneath, as in *R. gracilis*.

Underside moderately glossy, very scantily and finely clad; the metasternum and basal two ventral segments distinctly but not closely punctured, the second about one-half shorter than first; third and fourth transversely punctured at the base; rostrum densely minutely asperate, and with two slender longitudinal carinæ.

♂. Dark ferrugineous. *Rostrum* more expanded in front with slightly coarser sculpture. *Elytra* a little more rugose. One specimen.

This somewhat resembles *R. cheesemani*, which, however, is more glossy, brighter in colour, and has the apical portion of the thorax in front of the constriction nearly twice as long, and the sides almost quite regularly rounded; the underside also differs.

♀. Length $1\frac{1}{4}$; breadth $\frac{1}{4}$ line.

Totara, Southland. One of each sent by Mr. A. Philpott.

Group *Cerambycidae*.*Æmona sublineata*, sp. n.

Elongate, subparallel, slightly nitid, ferruginous; thorax rather darker; elytral vestiture pale yellow, that of the legs and antennæ much finer and greyish, the fine golden pubescence concentrated near the eyes and on the scutellum.

Head narrowed anteriorly, covered with yellow hairs except on a triangular space behind, which has a few fine punctures. *Thorax* elongate, cylindric; the disk pubescent, the middle with a linear longitudinal elevation which is more or less intersected by short transverse rugæ; the lateral punctuation is close and distinct, and extends a little over the disk so as to be quite discernible from above; the front is almost without sculpture. *Elytra* slightly broader at the base than at the rounded apices, closely and somewhat rugosely punctured, more finely towards the extremity.

Prosternum with a smooth, transverse, almost linear, space in front, elsewhere closely and distinctly punctured. Supplementary ventral segment not notched. *Antennæ* reach backwards to the extremity of the body.

Allied to *Æ. mutica*.

♂. Length 6; breadth $1\frac{1}{2}$ line.

Karori, Wellington (*Mr. G. V. Hudson*). A single male.

Group *Lamiidæ*.*Somatidia websteriana*, sp. n.

Subovate, convex, slightly nitid, variegate.

Head excavate and intensely black between the eyes; vertical in front, reddish, and covered with fine grey pubescence. *Antennæ* reaching backwards beyond the hind femora, pale ferruginous; the basal four joints marked with grey pubescence, the fifth with the apical half fuscous; they bear numerous distinct but not very long setæ; fourth joint about a third longer than the preceding one. *Thorax* strongly rounded laterally, the middle widest; distinctly and rather closely punctured, rather more finely at the sides; near the middle of the disk there are two slightly raised smooth spots; the pubescence fine and greyish, but quite yellow in front of the scutellum. *Elytra* as wide as thorax at the base, oviform; disk uneven, with coarse irregularly placed punctures; near each side, not far from the base, there are two rounded nodosities; just behind these, but nearer to the suture, are two rather more elongated eleva-

tions; there are two more on the summit of the hind slope, but further from the suture than the middle pair; lower down there is another pair, almost united to an elongated elevation on each clytron, near the apex; the derm is glossy brown on the disk, but near the hind slope appears greyish, owing to the fine pubescence there; immediately behind this the pubescence is dark, but the lower part of the declivity and the sides are mottled with grey and ash-coloured pubescence.

Femora clavate, fuscous; pubescence grey; tibiæ yellow, but fuscous near the base.

This should be placed near *S. costifer* (2272), which is considerably larger, and bears on each clytron a costa which extends from the middle and is bent at the base, so as to join the raised and thickened suture.

Length $2\frac{3}{4}$; breadth $1\frac{1}{4}$ line.

Hokianga. One found at Opononi, when accompanied by Mr. John Webster, in whose honour it is named. This distinction is conferred so as to place on record the name of one of those courageous northern pioneer settlers who are now fast passing away.

Somatidia heterartha, sp. n.

Small, slightly shining; piceous; antennæ and legs rufescent, not variegated; tarsi testaceous; sparingly clothed with slender but quite perceptible greyish pubescence; the hinder pairs of tibiæ along the outer face more coarsely pilose and darker; the intermediate pair more evidently emarginate than the posterior.

Head moderately convex, its deflexed forehead abruptly truncate in front. *Thorax* widest before the middle, where it is rounded, considerably narrowed behind, with a minute spine at each side behind the middle; the surface rather coarsely punctate, but without inequalities. *Elytra* moderately convex, less coarsely punctured than the thorax, the sutural region and apex more finely and distantly.

Antenna stout, reaching backwards to the top of posterior declivity; basal joint stout, second small and subquadrate, third about as long as the following three or four conjointly, fourth unusually abbreviated, but little longer than broad; remaining joints just oblong.

The small size, unicolorous body, and remarkable antennæ differentiate this from previously described species.

Female less coarsely sculptured and rather dull.

Length $1\frac{3}{8}$; breadth $\frac{1}{2}$ line.

Broken River. Both sexes from Mr. J. H. Lewis.

Somatidia testacea, sp. n.

Subopaque, only moderately convex, rather broad, testaceous; pubescence fine, decumbent, and similar in colour to the derm; femora and antennæ a little rufescent; on the summit of the hind slope, on each elytron, there is a narrow fuscous fascia, not attaining the suture and bent backward at the side.

Thorax widest near the front, moderately rounded laterally and only moderately narrowed behind; the disk slightly flattened, its punctuation coarse but rather shallow. *Elytra* of exactly the same width as thorax at the base, considerably broader at the middle, much narrowed behind; they bear four minute crests, one pair before the middle, the other on top of the declivity; punctuation not close, only moderately coarse, and irregular.

Antennæ unspotted, not coarsely pubescent; third joint about a third longer than fourth; joints 5-11 each nearly as long as the fourth; they extend backwards just beyond the top of the declivity. *Legs* stout, normal.

Allied to *S. picticornæ*, but the coloration and general appearance are materially different.

Length $2\frac{1}{8}$ - $2\frac{1}{2}$; breadth $1-1\frac{1}{8}$ line.

Totara, Southland. I am indebted to Mr. A. Philpott for my two specimens.

Somatidia sericophora, sp. n.

Convex, much contracted medially; the head, thorax, legs, and antennæ nearly ferruginous; elytra æneo-fuscous; a broad, irregular, postmedian fascia and a large space at each side of the posterior declivity pale testaceous; tibiæ and tarsi testaceous.

Thorax broad, subovate, much contracted towards the base, finely yet distinctly, but not at all closely, punctured, except just at the apex, the intervals very minutely sculptured, without lateral denticles, sparingly clothed with fine, silky, yellow hairs. *Elytra* elongate-oval, much narrowed towards the base and apex; each with two series of fine rather distant punctures near the suture and continued to the apex; there are a few more fine punctures towards the sides.

Antennæ stout, pubescent, nearly attaining the hind thighs; basal joint elongate, subovate; second much smaller than any of the others; third equalling the following three combined, and almost reaching the base of thorax; joints 4-10 subequal.

This comes near *S. ptinoides*; it is, however, nearly twice as large, and is distinguishable by the more scanty punctuation on the thorax, particularly behind the middle, and by the relatively shorter and thicker basal joint of the antennæ.

Length 2; breadth $\frac{3}{4}$ line.

Broken River; one. Another discovery by Mr. J. H. Lewis.

Somatidia lineifera, sp. n.

Body moderately elongate and convex, not abruptly narrowed medially, subopaque, dark fuscous; yellow pubescence forms a broad, curvate, median fascia, which extends backwards and expands so as to cover each side of the hind slope; there are, however, several dark spots amongst the pubescence; similar pubescence is less distinct near the base; the femora, knees, and most parts of the tibiæ are rufo-fuscous, the rest of these last and the tarsi are testaceous; antennæ not maculate, rufescent, with outstanding slender greyish setæ.

Head distantly punctate, with a distinct sulcus along the middle. *Thorax* broadest before the middle, with a denticle at each side, a good deal narrowed behind; its surface distinctly and moderately closely punctured, the pubescence distinct, somewhat fulvescent. *Elytra* elongate, oviform, rather thickly pubescent, and bearing elongate variegate setæ; they are rather closely punctured near the shoulders, distantly elsewhere. *Antennæ* reach just beyond the top of the declivity; third joint just passes the base of thorax, so that it is longer than the following two taken together.

Similar to *S. signatus*, in which, however, there is a slender raised line along the middle of the thorax, which is best seen when examined from behind. *S. lineifera* can be separated by the dark groove on the head.

Length $2\frac{3}{8}$; breadth 1 line.

Ashburton. One from Mr. W. W. Smith.

Hybolasius varipes, sp. n.

Elongate, subdepressed, rufo-piceous, rather densely clothed with decumbent griseous pubescence; the legs and antennæ with long, outstanding, slender setæ.

Head short, vertical, and setose in front, the upper central groove distinct. *Thorax* moderately transverse, finely and closely sculptured, more deeply constricted behind than in front; lateral tubercles large, occupying nearly half of each

side, but not acutely produced, the pair of small discoidal tubercles placed before the middle, longitudinal groove slender. *Scutellum* broad, bordered with dense, minute, whitish pubescence. *Elytra* slightly broader at the shoulders than the middle of thorax, almost straight at the sides for half their length, afterwards curved but not abruptly narrowed to the apex; their punctuation is distinct, somewhat irregular, but not close, and does not reach the extremity; the basal two crests are well developed; an elevation on each, approaching the suture, behind, extends from the hind thigh to the posterior slope; the suture is speckled; the apices are narrowed and individually rounded, so as to be debiscent.

Antennæ somewhat mottled with ferruginous and grey; seventh joint extending just beyond the elytral apices; basal joint elongate and pyriform; second small and transverse; third and fifth nearly equal; fourth almost double the length of fifth. *Legs* variegated, base of femora pale chestnut-red; tibiæ slightly incurved.

The elytral punctures, though not coarse, cause a somewhat spotted appearance; the pubescence near each shoulder is faintly tinged with green; the two hind pairs of tibiæ are viridescens; the insect itself, however, is much more slender than *H. viridescens*, and has tapering elytral apices.

Length $2\frac{1}{4}$ – $2\frac{1}{2}$; breadth $\frac{3}{4}$ line.

Broken River. I am indebted to Mr. J. H. Lewis for a pair.

Group Eumolpidæ.

Eucolaspis plicatus, sp. n.

Convex, subovate, rather broad, shining, nude; head, thorax, and apices of elytra fusco-testaceous; elytra fusco-piceous; the palpi, legs, and basal four joints of antennæ testaceous; remaining joints rufo-testaceous.

Head distantly and moderately coarsely punctured; clypeus deeply incurved; eyes large and very prominent. *Thorax* strongly transverse, apex truncate; base broadly rounded, widest near the middle, its sides rounded; anterior angles depressed but rectangular, posterior slightly projecting; the disk closely and finely punctured, more coarsely towards the sides; a short space across the base nearly smooth, but with a close series of minute punctures along the basal margin. *Scutellum* oblong, smooth. *Elytra* rather coarsely but not closely punctured, rather more finely and closely near the base; on the hinder portion of each elytron there are two

striae near the suture, and a still shorter third one; the shoulder is elevated and smooth, and from it two smooth plicae or obtuse ridges, with a deep distinctly punctured stria between them, extend backwards almost to the apex.

Underside piceous, sparingly and finely punctured and pubescent.

It should be placed near *E. subaneus*.

Length 2; breadth nearly $1\frac{1}{4}$ line.

Kaitoke and Pakuratahi, Wellington. One example from Mr. G. V. Hudson.

Atrichatus nitidulus, sp. n.

Convex, oblong-oval, shining, glabrous; elytra and legs fusco-testaceous; the head, thorax, and terminal joints of the antennae rufescent.

Head rather finely punctate, with two smooth, oblique, slight inter-antennal elevations. *Thorax* nearly twice as broad as long, apex truncate, base a little rounded; its sides with distinct dark margins and moderately curvate; front angles depressed and nearly rectangular, the posterior slightly projecting outwardly; the disk finely and irregularly but not very closely punctured, more closely near the sides; the basal margin with a series of fine closely placed punctures. *Scutellum* subtriangular. *Elytra* rather broader than thorax, curvedly narrowed near the extremity, the suture somewhat rufescent and almost impunctate; their punctuation moderately coarse and irregular, nowhere close, a little finer near the base and suture, nearly serial at the sides behind the smooth shoulders, and with two or three ill-defined apical striae on each.

Legs robust, tibiae a little dilated near the extremity and grooved externally. *Tarsi* rather broad; basal joint large, narrowed towards the base, slightly emarginate at apex; second triangular; third bilobed and larger than in *Euco-laspis*. *Antennae* inserted at sides of forehead, attaining the middle of elytra; basal joint stout; second evidently shorter than the contiguous ones; they are sparingly pubescent.

Rather smaller than *A. ochraceus*, more shining, differently coloured, and with more slender antennae.

Length $2\frac{1}{2}$; breadth $1\frac{1}{4}$ line.

Broken River (*Mr. J. H. Lewis*); one individual.

Group Cryptocephalidæ.

Arnomus viridicollis, sp. n.

Subnudus, shining, variegate; thorax æneo-viridis; elytra

rufocupreous; the legs, front of head, and basal three joints of antennæ testaceous; remaining joints piceo-fuscous.

Head vertical in front, finely punctate with a slender inter-ocular sulcus, sparsely clothed with greyish hairs. *Thorax* transverse, its sides rounded, slightly narrower in front than at the base, lateral margins fine and indistinct, posterior angles rectangular; the surface moderately closely, distinctly, and somewhat irregularly punctured, with a fine dorsal line and a few fine grey hairs near each side. *Scutellum* smooth, viridescens. *Elytra* rather short, oblong, apices obtusely rounded; shoulders slightly elevated and narrowed, so that their base and that of the thorax are of the same breadth; they are impressed at the inside of each shoulder and behind the scutellum; the lateral margins are well developed except just at the apices and shoulders; their punctuation is moderately coarse and close, but not quite seriate; the suture is brassy and sharply defined behind.

Legs only moderately long and stout; anterior femora rather short. *Antennæ* elongate and slender, the dark joints with greyish pubescence.

Underside fusco-testaceous, finely and rather closely sculptured, with greyish pubescence; terminal ventral segment with a large simple fovea.

Broader than *A. curtipes*, with shorter front legs and rather elongated lobes to the penultimate joint of the front tarsi, and without any smooth raised spot before the scutellum.

Length $1\frac{1}{2}$; breadth $\frac{7}{8}$ line.

Broken River (*Mr. J. H. Lewis*); one individual.

Arnemus signatus, sp. n.

Variete, testaceous; the back of the head and a triangular space behind the scutellum subcyanous; thorax more or less rufo-fuscous; it is shining and apparently glabrous.

Head finely punctate. *Thorax* rather small, strongly transverse; apex slightly but widely emarginate, with subacute angles; its sides much rounded, so that the posterior angles are less distinct than the anterior, base feebly curvate; its surface distinctly but very irregularly punctured, so that small smooth intervals occur here and there; its sides more coarsely punctured. *Elytra* rather wider than thorax, base subtruncate but very oblique near the scutellum; they are wider behind the middle than near the base; their punctuation rather coarser than that of the thorax, but more serial.

Legs moderately slender, rather long, the front pair longest.

Underside fusco-testaceous; prosternal process broad and evidently punctured; metasternum grooved along the middle; abdomen finely sculptured, apical segment with a large fovea occupying about half of the whole area.

This may be readily identified by the variegation. The bluish space on the base of the elytra in one specimen is prolonged backwards towards the apex of each as a broad dilute vitta. The eyes, though of moderate size, are only just perceptibly convex, and are therefore less prominent than usual.

Length 2; breadth 1 line.

Mount Arthur. Two mutilated individuals forwarded by Mr. G. V. Hudson.

Group Galerucidæ.

Luperus angularius, sp. n.

Subdepressed, moderately elongate, shining; nigrescent, slightly æneous; femora, terminal joint of tarsi, and the antennæ fuscous; destitute of perceptible pubescence.

Antennæ attain the hind thighs, basal three joints a little shining and paler than the following opaque ones. *Head* uneven above, with some grey pubescence in front. *Thorax* nearly twice as broad as long, distinctly and moderately closely punctured, slightly uneven, with four or five irregularly formed almost smooth spots; apex truncate, base very feebly curved, the sides only a little rounded, nearly straight behind, lateral margins well developed and very evidently thickened at the anterior angles; posterior angles indistinct, but just inside each there is a small granular elevation with a setigerous puncture. *Scutellum* impressed. *Elytra* oblong, wider than thorax, shoulders slightly raised and prominent; apices nearly subtruncate, so that the extremity of each at the suture is sharply rectangular; they are distinctly, rather closely, but not coarsely punctured; the interstices near the sides are slightly transversely rugose. The two hind pairs of *tibiæ* are moderately curvate.

A careful scrutiny of the thoracic angles will lead to its recognition.

Length $2\frac{1}{2}$; breadth $1\frac{1}{8}$ line.

Broken River (*Mr. J. H. Lewis*); one individual.

Luperus scutellaris, sp. n.

Elongate, oblong, shining, brassy black, indistinctly rufescent on some parts; tibiæ and basal joint of tarsi testaceous.

Head glossy black, with rather prominent antennal tubercles. *Thorax* transverse, with a transverse impression in front, the surface not uneven elsewhere; its punctuation of two kinds, one distinct but not coarse or close, the other minute and scattered on the intervals; the sides in front nearly smooth, the middle of the disk with fine punctures. *Scutellum* perfectly smooth. *Elytra* parallel-sided, shoulders raised, the whole sutural region from the base to the top of the hind slope broadly depressed; their punctuation moderately close, not coarse, finer near the suture, transversely rugose near the sides.

Antennæ elongate, except the basal three joints, dark and opaque, with some white hairs which are most obvious on the basal joints.

Most nearly allied to *L. angularis*, the front angles of the thorax less evidently thickened, the hind tibiæ rather less curvate, and the general appearance and sculpture different. The elytral suture at the apex is obtuse.

Length $2\frac{1}{2}$; breadth $1\frac{1}{4}$ line.

Broken River. Found by Mr. J. H. Lewis.

Luperus lewisi, sp. n.

Subdepressed, rather narrow, shining, nigro-æneous; the legs and basal three joints of antennæ pale fuscous, remaining joints dark and dull.

Head quite smooth and polished behind. *Thorax* transverse, not uneven above, its punctuation very fine and distant, the intervening spaces densely and very minutely sculptured; the sides a little rounded, apex truncate, lateral margins well developed; anterior angles not only incrassate, but just visibly projecting outwardly, the posterior indefinite. *Scutellum* small. *Elytra* elongate, subparallel, shoulders only slightly raised; rather finely and not very closely punctured; the suture almost rectangular at the apices. *Legs* rather slender; tibiæ nearly straight.

A glossy, finely sculptured species, which can be easily distinguished by the prominent front angles of the thorax.

Length $2\frac{1}{4}$; breadth nearly 1 line.

Broken River. It bears the name of its discoverer, Mr. J. H. Lewis. One example.

Luperus axyrocharis, sp. n.

Body cyanaceous or slightly tinged with green; legs fuscous, the knees and basal three joints of antennæ paler, remainder of antennæ dull blackish.

Thorax about a third broader than long, a little curved at the sides, front and hind angles nearly rectangular; the surface rather distantly and finely punctate. *Scutellum* minute, violaceous. *Elytra* slightly and gradually dilated behind, with a fovea-like impression near each shoulder; the shoulders themselves, however, are not distinctly raised; they are a little rugosely, rather finely, and not very closely punctured. *Antennæ* proportionately rather stout but elongate; third joint hardly exceeding the second in length, both, taken together, scarcely longer than the basal one, the others elongate. *Tarsi* moderately slender, third joint short. *Tibiæ* straight.

This species no doubt is distinct. A second specimen has rather stouter antennæ and hind tibiæ.

Length $1\frac{1}{2}$; breadth $\frac{5}{8}$ line.

Arthur's Pass. Found by Mr. J. H. Lewis.

Luperus palialis, sp. n.

Slender, elongate, narrow, nitid, unicolorous, flavescent, subnude.

Head smooth behind. *Thorax* strongly transverse, its sides but little curved, with rectangular angles; it is obsoletely sculptured. *Scutellum* small. *Elytra* obviously broader than thorax at the base, subparallel; shoulders but little elevated; apices broadly rounded, their punctuation fine, not very close, but slightly rugose. *Legs* slender.

Underside testaceous, almost quite smooth.

Length $1\frac{3}{4}$; breadth $\frac{3}{4}$ line.

Broken River. Three specimens found by Mr. J. H. Lewis.

Luperus asperellus, sp. n.

Glabrous, oblong, dark violaceous; the thorax and sides of elytra with metallic red reflections; tarsi dull fusco-piceous.

Head uneven, rugose. *Thorax* strongly transverse, with moderately curvate sides, its angles obtusely rectangular; the surface asperate, coarsely punctate and rugose, with two more or less distinct nodules and an irregular linear elevation near the middle, marginal channels rather dull and

nearly smooth. *Scutellum* subtriangular, impunctate. *Elytra* rather wider than thorax, at the base, a little distended posteriorly, apices obtusely rounded; they are closely, distinctly and rugosely punctured. *Antennæ* thick and elongate. *Tibiæ* straight. Front *tarsi* rather narrow and relatively slender.

Underside shining, violaceous, with close, shallow, indefinite sculpture; terminal ventral segment obconical, simple.

We have but one similarly glittering metallic species (*L. princeps*), which, however, has the head smooth; the elytra are somewhat attenuated posteriorly, the tibiæ arcuate, the anterior tarsi stouter, and the body is decidedly more rufescent.

Length $3\frac{1}{4}$; breadth $1\frac{1}{2}$ line.

South Island. The donor and exact locality are, unfortunately, not recorded.

XXXIII.—On new Species of Histeridæ and Notices of others.

By G. LEWIS, F.L.S.

THIS is the thirty-fifth paper on the Histeridæ in this series. In the first paper (1884), which dealt exclusively with the Japanese species, I suggested that it was probable that *Teretrius* was the only genus likely to occur in the islands, but not at the time known as existent. Lately in the south of the Archipelago a species of *Platylister* has been found, and in the Museum of Paris there is a Japanese species of *Mendelius*. In other families also discoveries have been made from time to time of subtropical and tropical forms, which show that such are more common in Japan than it was at first supposed. I now look for the finding of *Teretriosoma*, *Plæsius*, *Apobletes*, *Eblisia*, and probably other genera not yet characterized.

I also think that the Japanese fauna may eventually be found to have something more in common, though in a less degree, with that of North America. The curious and probably subcortical *Heterius optatus*, Lew., is somewhat similar to, but not congeneric with, *Melaneterius infernalis*, Fall. Unfortunately both these species are known only by single examples, and have not been brought together for comparison. The Japanese *Heterius gratus*, Lew., is also very similar to *H. brunneipennis*, Rand.

List of Species.

Teretriosoma saginatum.	Carcinops sinensis.
Apobletes pumicatus, <i>Lew.</i>	Isolomalus teres, <i>Lec.</i>
Platylister bandæ.	— debilis, <i>Lec.</i>
Platysoma incurvatum.	Exosternus angole.
Nagelius, gen. nov.	— rufulus, <i>Lew.</i>
Eugrammicus minor.	Paratropus congonis.
Zabromorphus pinguis.	Saprinus æratus.
Macrolister emarginatus.	— schmidtii, <i>Reitt.</i>
Hister marginipunctatus, <i>Lew.</i>	Euspilotus colombicus, <i>Kirsch.</i>
— lineimargo, <i>Reitt.</i>	— richteri.
Atholus sculus, <i>Tourn.</i>	— læsus, <i>Lew.</i>
— coalescens.	— devius.

Teretriosoma saginatum, sp. n.

Cylindricum, breve, robustum, nigrum, nitidum, undique punctatum; antennis pedibusque obscure rufis; pygidio convexo; mesosterno valde marginato; tibiis anticis 6-7-denticulatis.
L. 3 mill.

Cylindrical, rather short and robust, black and shining; antennæ and legs somewhat obscurely red; the punctuation above is evenly dispersed and fairly close (closer than that of *T. afrum*); the thorax is clearly marginate, the lateral stria is strong and before the base sinuous; the propygidium, the punctuation is slightly larger than that of the elytra and the pygidium is similar except that about one-third of the apical part is somewhat rugose-punctate; the sterna are equally and rather coarsely punctate, punctures somewhat shallow and not very close; the mesosternum is strongly marginate anteriorly; the anterior tibiæ are 6-7-denticulate and microscopically strigose on the upper surface.

This species is rather smaller and broader than *T. chalybæum*, Horn, and smaller and not nearly so robust as *T. afrum*, Lew., but the general punctuation and the form of the tibiæ scarcely differ from *afrum*. It is a species without any very conspicuous differentiating characters.

Hab. Lake Chad, Central Africa (*Dr. J. Decorse*, 1904).

Five examples in the Museum of Paris and my own collection.

Apobletes pumicatus, Lew. Mem. Soc. esp. Hist. nat. i. (1907).

Oblongo-ovatus, deplanatus, niger, nitidus; antennis pedibusque piceis; fronte plana, haud striata, impunctata; pronoto stria marginali tenuiter impressa, brevi in angulo antico; elytris striis 1-3 integris, 4 apicali, dimidiata; propygidio disperse punctu-

lato; pygidio basi transversim punctato; prosterno lato haud striato; mesosterno bisinuato, immarginato; tibiis anticis multi-denticulatis.

L. $2\frac{3}{4}$ mill.

Very similar to *A. marseuli*, Lew., and *pauperatus*, Sch., which together form a local section of the genus in which the head is smooth and without striæ, the thorax has a very fine marginal stria close to the edge and confined to the region of the anterior angle, the pygidia are indistinctly punctured, and the prosternum broad and not striate. Specifically *pumicatus* may be known by its more oblong form and by the third dorsal stria being complete.

Hab. Cabo S. Juan, Biafra, West Africa.

In the Museum of Madrid and my own collection.

Platylister bandæ, sp. n.

Oblongus, subdepressus, niger, nitidus; fronte stria integra leviter impressa, in medio subsinuata, clypeo emarginato; pronoto stria laterali antice interrupta, postice ad angulos continuata; elytris striis dorsalibus 1-2 integris, 3 interrupta; pygidio margine elevato, æqualiter sat dense punctato; mesosterno stria marginali lato interrupta; tibiis anticis 4-dentatis.

L. $5\frac{1}{2}$ mill.

Oblong, somewhat depressed, black and shining; the head concave anteriorly, transverse stria rather fine and feebly sinuous in the middle; the thorax, the lateral stria is interrupted behind the head, but it is continued at the base round the angle and terminates opposite the third elytral stria; the elytra, 1-2 dorsal striæ are complete, 3 interrupted in the middle, others are wanting; the propygidium has two clusters of rather small punctures; the pygidium has the outer rim elevated and its surface evenly and rather densely punctured; the mesosternum, the marginal stria does not pass along its emargination; the anterior tibiæ are 4-dentate.

The thoracic stria of *P. canalicollis*, Mars., is continued along the whole of the base, but the stria in *P. bandæ* ceases at a point opposite the third dorsal striæ. The mesosternal stria being interrupted is also a character to be noted. The dorsal striæ resemble those of *P. abruptus*, Er.

Hab. Tenimber and Banda Islands. Five examples.

Platysoma incurvatum, sp. n.

Oblongo-ovatum, convexum, nigro-nitidum; fronte concava; elytris

striae 1-3 integris basi incurvatis, 4-5 apicalibus, suturali longiuscula utrinque abbreviata; pygidio marginato, grosse et dense punctato; mesosterno stria transversa arcuatim impressa; tibiis anticis 4-dentatis.

L. $4\frac{1}{4}$ mill.

Oval, somewhat oblong, convex; the forehead widely excavated, transverse stria fine and nearly straight; the thorax, marginal stria rather fine, complete, and parallel to the edge laterally; the elytra, outer humeral stria fine and complete, inner humeral wanting, 1-3 dorsal somewhat strong and complete, all turn inwards at the base, but especially 2-3, the third is finest apically, 4 fine, apical, and a little broken, 5 apical and punctiform, sutural shortened at both ends, anteriorly only reaching the disk; the propygidium somewhat irregularly punctate; the pygidium is marginate posteriorly and closely and evenly punctured; the prosternal keel is very slightly widened behind the coxæ and without striæ; the mesosternum is rather widely sinuous anteriorly, with a short irregular stria behind each of the anterior angles, and across the sternum is a remarkable arched stria which reaches the base at the sides, and anteriorly it does not pass very close to the sinuous edge.

The peculiar incurved dorsal striæ suggest the specific name. *Platylister arcuatus*, Lew., has a similar arched mesosternal stria to that of the above, but otherwise it in no respect resembles it. *Pachycrærus nanus*, Lew., also has an arched mesosternal stria.

Hab. Sarawak, Borneo (*John Hewitt*). One example.

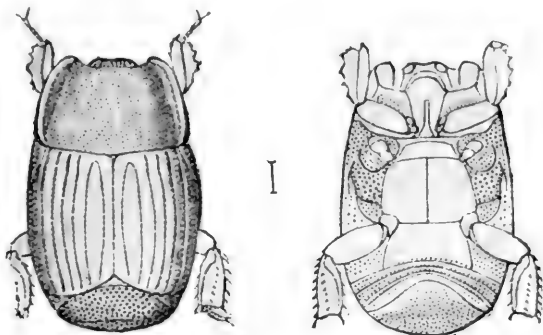
NAGELIUS, gen. nov.

Body oblong-oval, somewhat convex; head retractile, mandibles convex above; antennæ, scape long and narrow, nearly as long as the other joints together, joints of funiculus gradually enlarging to the club, club oval, antennal fossette in the thoracic angle, large and deep (in these last three characters the species are similar to those in *Campylorhabdus*); thoracic lateral interstice somewhat elevated; elytra, inner humeral stria abbreviated at both ends; pygidium perpendicular, immarginate, and very slightly convex; prosternum bistriate; mesosternum very feebly sinuous, almost truncate; tibiæ broad and compressed, anterior tarsal groove sinuous.

Type, *limatulus*, Lew., in the National Collection, of which figures are given here.

This genus is founded to receive three Oriental species hitherto included in the New-World genus *Psiloscelis*. The

species are *P. castelnaudi*, Mars., 1870, *P. limatulus*, Lew., 1892, and *carinicollis*, Lew., 1893. In the four North-American species which now remain in *Psiloscelis* the antennal fossette is behind the thoracic angle, the club of the antenna is circular in outline, the tarsal groove in the anterior tibiæ is straight, the prosternal keel is not bistriate, and the general facies of the species known are very different, for all are opaque.



Nagelius limatulus, Lew.

I believe that the species of *Nagelius* are of subcortical habit; I once saw *castelnaudi*, Mars., under bark at Balagoda in Ceylon. The name of the genus is derived from that of the author of 'Mechanisch-physiologische Theorie der Abstammungs-Lehre,' 1884.

Eugrammicus minor, sp. n.

Ovalis, convexus, tenuissime punctulatus, niger, nitidus; fronte stria haud sinuata; pronoto stria laterali interna post angulos indistincta, externa ad angulum evanescenti; elytris striis didymis, 1-4 integris, 5 et suturali subintegris prope conjunctis; pygidio obscure brunneo; tibiis anticis 3-dentatis.

L. 6½ mill.

Oval, convex above, black and shining; the head and thorax feebly punctulate, frontal stria complete and straight anteriorly and relatively, as regards the other known species, well-marked; the thorax is bistriate laterally, outer stria evanescent behind the angle, inner stria is traceable behind the anterior angle, but is not clearly defined, it continues behind the head; the elytra, striæ didymous, 1-4 complete, 5 and sutural almost complete and almost joining at the

base, the fifth stria turns outwards at the apical edge, the inner subhumeral is complete, outer humeral short and basal (these two striæ are similar in all the known species); the propygidium is very finely punctulate over the whole surface, and there is a basal lateral stria (common also to the other known species); the pygidium is much less distinctly punctulate and is obscurely reddish brown, not apparently owing to immaturity; the prosternal keel is margined along its base like that of *Psiloscelis harrisi*, Lec. (a character also seen in the other species); the mesosternum is narrowly sinuous and marginate; the anterior tibiæ are 3-dentate.

There are now five species of this genus known, and with the additional species it is easy to see that the characters referred to in parentheses should be considered generic. In *Contipus* the pygidia are simply convex.

Hab. Congo River.

Zabromorphus pinguis, sp. n.

Oblongo-ovatus, convexus, niger, nitidus; fronte impunctata, stria integra antice recta; pronoto ciliato, striis integris, parallelis, interstitiis latis; elytris striis latis, crenulatis, 1-4 integris, 5 et suturali vix abbreviatis; propygidio pygidioque grosse punctatis; prosterno basi marginato; mesosterno antice emarginato, stria integra recta.

L. $9\frac{1}{2}$ mill.

Oblong-oval, convex, black and shining; the forehead smooth, stria very strong and straight anteriorly; the thorax, lateral striæ deep, outer stria ceasing behind the eye, inner continued behind the head, lateral interstice wide, with a few marks and punctures at the angle; the elytra, striæ deeply impressed with crenulate edges, inner humeral apical and just passes the middle at the point where the outer humeral ends, the dorsal striæ 1-4 complete, 5 a little shortened at the base but not at the apex, sutural less shortened in front but similarly shortened behind; the pygidia are coarsely punctate; the prosternum is marginate along the base of the keel; the mesosternum emarginate, stria well-marked and straight anteriorly; the anterior tibiæ 3-dentate.

This species differs from *Z. longicollis*, Mars., by the head being without foveæ and the greater depth and completeness of the elytral striæ; in outline it is very similar. The form of the inner humeral stria may be considered a generic character of *Zabromorphus*.

Hab. Congo River (*C. Neave*).

One example in the Natural History Museum.

MACROLISTER, Lew. Ann. & Mag. Nat. Hist. xiv.
p. 145 (1904).

This genus, as at present constituted, may be conveniently divided into two sections. In the first, which includes the largest species, the mesosternum is anteriorly immarginate; in the second the marginal stria is complete, but there is no intermediate form, so it is evidently a character of some significance.

Macrolister emarginatus, sp. n.

Oblongo-oratus, convexiusculus, niger, nitidus; stria frontali antice recta utrinque anguste interrupta, labro transverso antice emarginato; pronoto ciliato, striis lateralibus integris, stria interna antice interrupta; elytris striis 1-3 integris, 4 vage impressa; pygidio dense punctato; prosterno laud striato; mesosterno emarginato, stria marginali late interrupta; tibiis anticis 3-dentatis.

L. 12½ mill.

Oblong-oval, rather convex, black and shining; the head very finely punctulate, frontal stria rather fine, straight anteriorly and narrowly interrupted on either side, the labrum transverse and rather widely emarginate on the anterior edge; the thorax is bistrate laterally and the inner stria is continued anteriorly but is interrupted behind the middle of the neck, lateral edge ciliate; the elytra, inner humeral stria shortened at the base, not quite touching the oblique stria, 1-3 dorsal complete, 4 traceable, punctiform, and obscurely shortened at the base, 5 indicated apically by three or four points, sutural wanting; the propygidium is lightly and somewhat sparingly punctured; the pygidium is densely but not coarsely punctured; the prosternum, keel narrow and not striate; the mesosternum markedly emarginate and only striate on the sides; the anterior tibiæ are 3-dentate.

The form of the labrum is characteristic of this species.

Hub. Bihé, Angola.

Hister marginipunctatus, Lew. Ann. & Mag. Nat. Hist. iv.
p. 461 (1870).

Of this species only one example is known to me; it is a larger species than *H. marginatus*, Er., but very similar in its general facies, except that the base of the prosternal keel is markedly marginate. Erichson's species has lately been found commonly in mole-nests, but formerly it was seldom seen, and it was supposed to associate with an ant. The

Japanese species came from a locality abounding with moles, and, being unique, probably had some peculiar habit in retirement. Had it been an ordinary stercoraceous or cadaverous species, it is more than likely that it would have been found in abundance.

Hister lineimargo, Reitt. Wien. ent. Zeit. xvii.
p. 118 (1898).

“Ovalis, subparallelus, nitidus, parum convexus, niger, clava antennarum fulva, pedibus fusco-ferrugineis, stria frontali integra, minus arcuata; pronoto striis lateralibus tribus integris, interna ab externis parum remota, postice magis approximata; elytris stria subhumerali distincta, in medio interrupta, striis dorsalibus 1-4 integris, 5-6 (internis 2) abbreviatis; propygidio parce fortiter, pygidio confertissime fortiterque punctato; mesosterno antice recte truncato, stria marginali integra; prosternum subtilissime marginatum, haud striatum; tibiis dilatatis, anticis extus 3-4-dentatis.

“Long. $6\frac{1}{2}$ -7 mill.”

Hab. Caucasus.

Atholus (Hister) siculus, Tourn. Abeille, v. p. 142 (1868).

Tournier in his description did not notice the form of the mesosternum of this species, but it is truncate, almost straight anteriorly, and markedly marginate, and it should therefore be assigned to the genus *Atholus*.

Atholus coalescens, sp. n.

Ovalis, convexiusculus, niger, nitidus; fronte biimpressa, stria integra retrorsum angulata; pronoto stria interna integra pone oculos sinuata; elytris striis subhumerali dimidiata, dorsalibus integris, 5 cum suturali connexa; propygidio parce punctato; mesosterno truncato, marginato; tibiis anticis 3-dentatis.

L. $5\frac{1}{2}$ mill.

Oval, rather convex, black and shining; the head with two shallow impressions behind the stria, stria rather fine and acuminate in the middle; the thorax, inner lateral stria is sinuous behind the eyes and does not quite reach the basal edge; the elytra, the inner subhumeral stria is apical, well-marked, and dimidiata, the dorsal striæ are all complete, the interstice between the second and third is widened at the base, the fifth and sutural join anteriorly; the propygidium is sparsely punctulate, the pygidium much less distinctly so; the mesosternum is marginate and nearly straight anteriorly; the anterior tibiæ are 3-dentate.

The facies of this species is very similar to *I4-striatus*, Gyll., especially in the dorsal striæ, but it is a little more convex and the frontal stria is differently formed.

Hab. Cape Colony (*Peringuey*).

Carcinops sinensis, sp. n.

Oblongo-ovata, convexiuscula, nigra, nitida; fronto antice subimpressa, stria laterali valida; pronoto lateribus punctato; elytris striis subhumerali integra ad apicem continuata, 1-3 dorsalibus integris, 4 integra sed antice et postice punctis formata; prosterno bistriato, lobo grosse punctato; mesosterno utrinque punctato, marginato; tibiis anticis 6-7-denticulatis.

L. 3 mill.

Oblong-oval, rather convex, black and shining; the head strongly striate laterally and irregularly punctate; the thorax is marginate and punctate broadly at the sides and narrowly along the scutellar edge, disk smooth; the elytra, striæ 1-3 complete and somewhat sinuous in the middle, 4 bent towards the suture at the base and punctiform at both its ends, a few irregular points along the suture seem to represent a sutural stria, on about one-third of the apical area there are sparse and irregular punctures; the pygidia are clearly and rather closely punctured; the prosternum is bistrate, striæ widen out before the coxæ and do not join at either end, anteriorly they are obliterated by punctures and posteriorly they are evanescent, the anterior lobe is coarsely punctured and the keel has a very few irregular points; the mesosternum is margined on all sides by an irregular crenate stria and laterally there are a few punctures, the area behind the emargination is smooth; the metasternum has a few punctures near the hind coxæ; the anterior tibiæ are 6-7-denticulate and are without a notable emargination on the outer edge.

There is no other known *Carcinops* similar to this.

Hab. Nankin, China.

Isolomalus teres, Leconte.

Paromalus teres, Lec. Proc. Amer. Phil. Soc. xvii. p. 609 (1878).

"Cylindrical, but not slender, shining, black; head and thorax punctulate; elytra finely, not densely punctured, each with faint traces of two oblique striæ near the base; sutural stria wanting. Pygidium very finely punctulate, under surface finely and sparsely punctured; mesosternum emarginate in front, marked with a fine lateral line; prosternum flattened and without striæ. Length 2 m.

"This species only differs from *P. seminulum* by the cylindrical form, in which it deceptively resembles *Teretrius americanus*, by having the elytra more finely punctured, and by the entire absence of the sutural stria."

Hab. Sault S. Marie, Michigan. One specimen.

Isolomalus debilis, Leconte.

Paromalus debilis, Lec. Bull. U.S. Geol. Survey, v. p. 515 (1879).

"Oval, subconvex, black and shining, finely punctured. Head finely punctulate. Elytra without sutural stria; there are two short oblique faintly impressed striæ at the base, and two others more feebly impressed, visible near the margin behind the middle. Prosternum without striæ; mesosternum margined only at the sides.

"Of the same size and form as *P. difficilis*, Horn, but much more finely punctured and with no sutural stria."

Hab. Veta Pass, Rocky Mountains, U.S.A.

This species and the last having no prosternal striæ should be placed in *Isolomalus* provisionally, notwithstanding the absence of the sutural stria.

Exosternus angolæ, sp. n.

Breviter ovalis, convexus, niger, nitidus; fronte utrinque marginata, punctata; pronoto stria marginali integra; elytris striis 1-3 integris, 4 et suturali subintegris haud conjunctis; propygidio pygidioque punctatis; prosterno bistriato, striis antice divergentibus; mesosterno marginato; tibiis anticis 8-9-dentatis.

L. $3\frac{2}{3}$ mm.

Somewhat shortly oval, convex, black and shining; the head, clypeus narrow and transverse, surface punctured but not very evenly, marginate at the sides, not anteriorly; the thorax, marginal striæ complete but fine behind the head, surface punctured not densely and the points vary in size; the elytra, outer humeral stria abbreviated apically about one-third, anteriorly clearly reaching the base, inner humeral is shortened about one-third at the base, dorsal striæ 1-3 strong and complete, 4 and sutural nearly join at the base, but the fourth is slightly broken, 5 dimidiate and apical; the pygidia are evenly but not very densely punctured; the prosternum is bistriate and the striæ widen out at the middle and continue widened to the anterior suture, keel densely and finely punctulate; the mesosternum is marginate; the anterior tibiæ are 8-9-dentate.

It will be noticed that the fifth dorsal stria in this species

is abbreviated : in the generic characters drawn from the first two species known the dorsal striæ were said to be all complete, now two species are known in which the fifth dorsal stria is shortened.

Hab. Central Angola (*Dr. Welwitsch*).

One example in the British Museum.

Exosternus rufulus, Lew.

This species is variable in colour, in the National Museum there is an example in which the apical margin of the elytra is alone red, and I have an example in which this colour is wholly absent.

Paratropus congonis, sp. n.

Ovatus, brunneus, supra punctulatus, subnitidus; fronte stria integra utrinque angulata, antice impressa; pronoto anguste marginato; elytris striis 1-4 et suturali integris, 4 arcu basali suturali cœunte, 5 ultra medium abbreviata; propygidio pygidioque distincte punctatis; prosterno bistriato, striis anticis evanescentibus; mesosterno margine bistriato.

L. 3 mm.

Oval, brown, punctulate above, rather shining; the head impressed anteriorly, stria complete and markedly angulate at the sides; the thorax narrowly marginate; the elytra, striæ with slightly crenate edges, 1-4 and sutural complete, 4 joins the sutural at the base, 5 apical, shortened just beyond the middle; the pygidia are distinctly but not densely punctured; the prosternum is bistrate, striæ almost parallel but anteriorly evanescent and apparently turn outwards, but they are merged in the minute strigose surface-sculpture; the mesosternum has a very fine marginal stria and close and parallel to it a second well-marked stria, the sutural stria is transverse, very fine and irregularly crenate; the metasternum and the first segment of the abdomen are punctured, but not closely.

The species is smaller than *P. aptistrius*, Lew., the forehead is impressed anteriorly, the pygidia are punctured, and the prosternal striæ are evanescent anteriorly. There are now 17 species of this genus known, and I have no doubt that the African species are very numerous.

Hab. Stanley Falls, Congo River.

Saprinus aratus, sp. n.

Ovalis, convexus, æneus, nitidissimus; fronte stria integra, antice angulata; pronoto ciliato, lateribus rugoso-punctato; elytris striis

1-4 dimidiatis, 4 cum suturali arcuatim juncta; pygidio vix dense punctato; prosterno striis utrinque divergentibus; mesosterno leviter punctato, marginato; tibiis anticis 8-9-denticulatis. L. $4\frac{3}{4}$ mm.

Oval, convex, brassy, very shining; the head usually with a small fovea on the vertex, strigosely and densely punctured, the strigosities giving the punctures an appearance of confluence, frontal stria complete and angularly joined behind the epistoma; the thorax markedly ciliate along the edge, with a somewhat shallow fovea behind each eye, disk smooth, lateral margin sculptured like the head; the elytra, striæ 1-4 dimidiate, all equal in length, 4 joins the sutural which is complete, 5 dorsal and very short, punctuation fine and not close, occupying nearly half of the apical area, and finer on the interstices of the 2nd, 3rd, and 4th striæ, the interstice of 1 and 2 is more distinctly sculptured and somewhat strigose; the pygidia are very evenly but not very densely punctured; the prosternum is bistriate, striæ somewhat constricted in the middle and divergent at each end; the mesosternum is marginate and its surface lightly sculptured; the anterior tibiæ 8-9-denticulate.

This species resembles *S. discoidalis*, Lec., in the form of the prosternum, and it is a little like it in its general facies. The form of the frontal stria is a distinguishing character.

Hab. Argentina (*H. Richter*, No. 277).

Saprinus schmidii, Richter, Ent. Nachr. xv. p. 124 (1889).

“Rotundo-ovatus, æneo-cupreus, nitidus; fronte carinata, rugose punctata; thorace ciliato, dense, lateribus rugose, punctato, disco postico lævi; elytris densissime punctatis, areis lævibus, duabus basalibus, altera magna ad scutellum in 4° interstitio, altera minore in 2°, tribusque apicalibus, stria suturali integra cum 4^a coëunte, dorsalibus longis areas posticas attingentibus, 2^a quartaque paulo brevioribus, subhumerali interna sat longa, externa inconspicua; prosterno striis postice divergentibus, ante coxas mox unitis, sub apicem evanescentibus, mesosterno punctulato; tibiis anticis 5-dentatis.

“L. $2\frac{1}{4}$ mm.

“*Hab.* regio flum. Nigri.”

This species belongs to the same group as *S. specillum* and *sculpturifer*, Mars.

Euspilotus colombicus.

Saprinus colombicus, Kirsch, Abh. Mus. Dresden, p. 3 (1888-89).

This species should be placed in the genus *Euspilotus*.

Euspilotus richteri, sp. n.

Ovatus, æneus, nitidus; fronte dense punctata; pronoto utrinque ciliato; elytris macula flava lata utrinque flexuosa, striis 4 suturalique arcu basali cœunte; tibiis anticis 8-9-spinosis.

L. $3\frac{1}{2}$ -4 mm.

Oval, brassy and shining; the head densely punctate, stria obsolete anteriorly; the thorax broadly rugose-punctate laterally and narrowly along the base, lateral edge with flavous hair; the elytra, behind the humeral angle surface smooth and slightly raised, striæ 1 and 3 basal and short, the second much longer, the first is somewhat obscured by strigose sculpture, 4 is the length of the second and joins the sutural, the dark area at the base is somewhat obscure and lacks conciseness of outline, the flavous band is narrowly and evenly divided in the middle on the sutural disk and posteriorly encroaches on the dark area twice, feebly near the suture and more widely in the middle, anteriorly the yellow band encroaches obtusely on the inside of the fourth stria and less distinctly, but somewhat pointedly, inside the second stria; the dark area in front of the narrow sutural margin spreads out almost rectangularly; the pygidia are densely punctured; the sterna do not afford any special specific characters.

In *E. flavopictus*, Lew., *decoratus*, and *bisignatus*, Er., the apical dark margin of the elytra is even in outline; in *richteri* it is encroached on twice by the flavous band.

Hab. Mendora, Argentina (*H. Richter*, No. 300).

Euspilotus læsus, Lew. Ann. & Mag. Nat. Hist. vi.
p. 288 (1900).

This species has two oblique striæ on the apex of the pygidium which almost join anteriorly. I did not mention this in my description and it may only exist in one of the sexes.

Euspilotus devius, sp. n.

Ovalis, convexus, æneo-niger, nitidus; fronte dense rugoso-punctata, laud striata; pronoto lateribus ciliato utrinque punctato; elytris striis 1-2 dorsalibus pone medium abbreviatis, 3 brevioribus, 4 in medio abbreviata, arcu suturali juncta; pygidio dense punctato; mesosterno grosse punctato; tibiis anticis 9-10-denticulatis.

L. $3\frac{3}{4}$ mm.

Oval, convex, brassy-black, immaculate; the head is densely and somewhat rugosely punctured and without striæ; the thorax, marginal stria hamate at the basal angle, ciliate

laterally, clearly not very densely punctured at the sides and along the basal edge; the elytra, apically about one-third is clearly punctured, the striæ, inner humeral shortened apically, 1-2 are shortened behind the middle, 3 somewhat shorter than the fourth, but both are nearly dimidiate, sutural complete and joined to the fourth at the base; the pygidium is evenly and densely punctured; the prosternum, keel smooth, striæ as figured (Ann. xix. p. 320, 1907) for *E. zonatus*, Lew.; the mesosternum is widely sinuous, surface coarsely not closely punctate; the anterior tibiæ are 9-10-denticulate.

The discovery of the above introduces an immaculate species to the genus.

Hab. Argentina (*H. Richter*, R. 282).

One example.

Note.—**Scarabidæ.**

MARAXES, Lew. Ann. & Mag. Nat. Hist. xvi. p. 376,
figs. 3, 4 (1895).

= *Xynophron*, Harold, Notes Leyd. Mus. ii. p. 199 (1880).

This synonymy has not been recorded in this Magazine.

XXXIV. — *Description of new Species of Monkeys of the Genera Cercopithecus and Papio.* By D. G. ELLIOT, D.Sc., F.R.S.E., &c.

Cercopithecus princeps, sp. n.

Type locality. Mpanga Forest, west and south of Lake Albert.

Geogr. Distr. Mpanga Forest and Mt. Ruwenzori, 5000 feet elevation.

Colour. Forehead, sides of face and head (extending on to sides of throat) speckled black and white; top of head, nape, hind-neck, space between shoulders, arms, hands, and feet jet-black; upper parts and sides of body speckled black and white; legs black, faintly speckled with white on thighs, and very slightly so on legs beneath knees; chin and throat pure white; conspicuous black band across breast below throat, rest of under parts iron-grey, the hairs being much less speckled with white than on the upper parts, and general tone more greyish; tail speckled black and grey on basal half, darker than the back; remainder jet-black to tip; ears

with a few white hairs on top; face slate-colour, upper lip covered with short white hairs.

Measurements. Total length 1530 mm.; tail 915; foot 165; ear 50 (collector). Skull: total length 113.5; occipito-nasal length 88; hensel 78.7; zygomatic width 76.2; intertemporal width 42.6; width of brain-case 56.2; length of nasals 17.7; palatal length 39.1; length of upper molar series 25.1; length of mandible 77.2; length of lower molar series 31.1; length of upper canines 25.9.

Type in British Museum, no. 7. 4. 6. 6.

This species resembles *C. stuhlmanni*, Matschie, but differs in the black band across breast, absent altogether in Matschie's species; in the black on upper back and hind-neck, which is more or less speckled in the allied species; and in the blacker legs, having very slight speckling.

Papio planirostris, sp. n.

Type locality. Fan, Southern Cameroon, West Africa.

Gen. char. Skulls alone known, no skin. Size large; facial region much longer than brain-case; rostrum very broad; ridges curved, and most widely separated at middle, not rising above nasals for their entire length; very broad posteriorly; lateral pits long and wide, but not deep; entire width of orbits only slightly broader than greatest width of rostrum; occipital region in shape pyramidal, not rounded, posteriorly; no sagittal crest, but low ridges start on outer side of each orbit and meet at interparietal; zygomatic arches broad, but not widely spread; pterygoid fossa very broad; palatal arch rounded; palate broad, widest anteriorly; tooth-rows straight; canines heavy, broad, and rather short.

Measurements. Total length 228 mm.; occipito-nasal length 185; hensel 167; zygomatic width 124.9; intertemporal width 61; length of rostrum 122.6; breadth of rostrum 71.7; length of rostral ridges 83; greatest width of orbits 72; greatest width of brain-case 79; length of nasals 81; palatal length 107.7; greatest width of palate behind canines 41.4; length of upper canines 32.5; length of upper molar series 55.7; length of mandible 167; length of lower molar series 78.

There are a number of skulls of this species in the Berlin Museum, all characterized by the broad flat rostral region, and the depressed almost straight rostral ridges, not curved as in *P. maimon*. A comparison of the skulls of the two species shows that they differ in almost every particular. In the new form the rostral region is flatter, longer, and wider, the ridges not rising to the top of the nasals; narial opening

broader and shorter, nasals wider; orbital ridge not depressed in centre, and orbits therefore more rounded in shape; brain-case more rounded posteriorly and on a level with orbital ridge and rising gradually to occiput, which is higher than the orbits; while the brain-case of *P. maimon* curves downward to occiput, which lies lower than the rostral ridges, so that the superior outlines of these brain-cases of these species are widely different; bony palate not so much contracted posteriorly; basi-occipital more abruptly descending to pterygoid fossa; tooth-row much longer; occipital region much more slanting, that of *P. maimon* being nearly perpendicular; second upper molar of new species much larger, and the second lower molar smaller than the corresponding teeth of *P. maimon*. It will be readily seen from the above comparison that the two skulls are almost entirely different in nearly all respects. All the skulls came from the same locality and the range of the species is not known. The type is in the Berlin Museum, and I am indebted to Herr Paul Matschie, the Curator of the Mammalogical Department, for the privilege of describing it.

XXXV.—*A new Species of Fossa from Central Madagascar.*
By GUY DOLLMAN, B.A.

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Fossa majori, sp. n.

In size and general proportions similar to Buffon's Fossane (*F. fossa*, Schr.), but having continuous stripes on the back and sides, and not, as in that species, irregular stripes on the anterior part of the back, breaking up into spots posteriorly.

Fur longer and rather harsher than in *F. fossa*, individual hairs of back measuring about 30 mm. in length. General colour of back a rich tawny-russet, darker in the middle line, and gradually getting lighter towards the sides. Four broad, well-marked, dark brown stripes down middle of back, breaking up into indistinct spots at base of tail. The outer pair of these stripes extends forwards almost up to the ears, while the inner two gradually disappear about 40 mm. behind this point. Along each side of the body are two dark brown lateral stripes, extending back as far as the point of insertion of the hind legs, where they break up into a few large spots. Forehead a rich Mars-brown colour, becoming paler and greyer on the muzzle and sides of the face. Under surface of body buff-coloured, rather lighter

towards the throat. Upper side of tail rufous russet, the anterior portion blotched with indistinct dark spots. Under side of tail tawny russet.

Skull smaller and with much smaller auditory bullæ, the greatest length of the bullæ being only 11·5 mm., while in *F. fossa* they measure 15 mm. in length.

Dimensions of the type (measured in skin):—

Head and body 480 mm.; tail 265; hind foot 78; ear 32.

Skull: greatest length 93; zygomatic breadth 43; greatest length of nasals 23; length of upper tooth-row, from front of first premolar to back of last molar, 31·5.

Hab. Ambohimombo, near Ambositra, Central Madagascar.

Type. Immature male. B.M. no. 97. 9. 1. 115. Original no. 167. Collected 22 January, 1895, by Dr. C. I. Forsyth Major.

The continuous dorsal and lateral stripes, together with the more rufous colouring of the back and the much smaller auditory bullæ, indicate that this form must be considered quite distinct from *F. fossa*. I propose to call it *F. majori*, after Dr. C. I. Forsyth Major, who collected the specimen during his famous expedition in Madagascar in 1895.

BIBLIOGRAPHICAL NOTICES.

Catalogue of the Fresh-water Fishes of Africa in the British Museum (Natural History). Vol. I. By G. A. BOULENGER, F.R.S. London: Printed by Order of the Trustees, 1909.

It is expected that not less than three volumes will be required to complete the 'Catalogue of the Fresh-water Fishes of Africa,' to which subject Mr. Boulenger has devoted many years of study. The present volume contains an account of the Selachii, Crossopterygii, and Dipneusti, and of the Teleostean suborder Malacopterygii and part of the Ostariophysii.

That the time is ripe for the appearance of such a Catalogue as this admits of no question, for during the past decade an enormous increase in our knowledge of the Fresh-water Fishes of Africa has been made, and types of most of the large number of new generic and specific forms are deposited in the British Museum. Nearly every species described in this volume is figured, and some of these figures, as in the case of the Mormyridæ, are remarkable for the high degree of specialization which they indicate, especially in regard to feeding-habits.

Though larval forms are occasionally referred to, in no case are these figured; yet we venture to think that such figures would have added not a little to the value of this work. Similarly, it has been

the custom, in other catalogues of the kind, to give figures of anatomical characters used as a basis of classification in the volume; but no such aids are included in Mr. Boulenger's present volume—a fact which is surely to be regretted.

The figures which adorn these pages have for the most part appeared already in Mr. Boulenger's 'Matériaux pour la Faune du Congo,' wherein they appeared in the form of lithographs, and very beautiful examples of their kind. But it is impossible to reproduce such illustrations successfully by photography, and the attempt to achieve this in the volume now before us it must be admitted fails completely.

A Treatise on Zoology. Edited by Sir RAY LANKESTER, K.C.B., M.D., LL.D., F.R.S.—Part IX. *Vertebrata Craniata* (First Fascicle: *Cyclostomes and Fishes*). By E. S. GOODRICH, M.A., F.R.S. London: Adam and Charles Black. 1909.

THIS scholarly work is making a most gratifying progress, and the present volume most unquestionably maintains the high and dignified standard which the earlier volumes led us to expect. Mr. Goodrich has long since earned the reputation of one of the ablest morphologists in this country, and his work in these pages in every way sustains this reputation. He has given us the last word on the anatomy of the Cyclostomes and Fishes, for he has not only brought together all that has been done by other workers, but he has added much thereto of his own. On every page we find proof of laborious research and a singularly well-balanced judgment as to what is essential. It is a book for the advanced student, highly technical, much condensed, but throughout clear and to the point. It forms, in short, a solid, well-planned foundation on which to base the remaining volumes on the Vertebrates.

He traces, in lucid fashion, the evolution both of the exo- and endoskeleton, and the relation thereto of the segmentation of the body—themes which are singularly difficult to handle, and are rarely successfully carried through when attempted. In no other work of the kind will there be found so clear or so thorough an account of the genital ducts or of the vascular and nervous systems, while his treatment of the paired and median fins and of the cranial and axial skeleton is most admirable.

Here and there, perhaps, there is room for criticism. Thus it seems to us that the classification is rather over-elaborate, while we notice one or two omissions. Thus we have failed to find any account of the quite remarkable vertebræ of the sword-fishes, or of the annual increments of scale-growth or of scale-ecdysis; and we venture to think that larval forms might well have received more attention than has been given them. These, however, are not very serious omissions, and may even have been deliberate on the part of the author.

It is a work, in short, which will long remain the standard of its kind.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 22. OCTOBER 1909.

XXXVI.—*Descriptions and Records of Bees.*—XXII.

By T. D. A. COCKERELL, University of Colorado.

HYLEOIDES, Smith.

This genus has short Prosopiform palpi; the figure given by Smith, purporting to represent the mouth-parts, is really taken from an *Odynerus*. There are in the British Museum Australian species of *Odynerus* almost exactly resembling *Hyleoides concinna* and *H. zonalis*, but unfortunately they have not yet been described. I hope later to figure the mouth-parts of *Hyleoides* and other Australian bees, using material very kindly supplied by Mr. Turner.

A close scrutiny of the *Hyleoides* in the British Museum shows that there are five different forms, representing at least three species, as follows:—

Females.

- | | |
|---|--|
| Scutellum black, without spots | <i>concinna</i> (Fabr.) |
| Scutellum conspicuously spotted | 1. |
| 1. Pale markings all dull creamy white; size of <i>zonalis</i> (expanse 25 mm.); clypeus almost all white or with only a white median band, broadened above; postscutellum black or with a pair of spots; first abdominal segment with an apical white band, broadened laterally; prothoracic band rather widely interrupted. (Two from West Australia: <i>Dr. J. Burton Cleland.</i>) | [subsp. n.]
<i>zonalis albocincta</i> , |

- Pale markings bright chrome-yellow; clypeus with only a median yellow band; postscutellum black or spotted; structure as in *albocincta*. (Hunter River=type; Swan River; Champion Bay.)..... *zonalis*, Smith.
- Pale markings of thorax and abdomen above red, of the same colour as those of the abdomen of *H. concinna*; ventral abdominal band ivory-white
2. Size of *zonalis*; broad red band on clypeus sharply defined, enlarged above; band on prothorax rather broadly interrupted; face longer; double curve of inner orbital margin very strong; postscutellum all black; bosses at base of metathorax wider apart; first abdominal segment with an apical band as in *zonalis*; punctures of mesothorax weaker. (Swan River, 69. 50=type; W. Australia, 68. 6.)..... *zonalis rufocincta*, [subsp. n.]
- Smaller, length slightly over 13 mm.; differences as indicated in the last description; band of clypeus broad, yellow in the middle, ferruginous at sides, the ferruginous extending a little beyond clypeus above and at sides; scutellum and postscutellum nearly all red; first abdominal segment red, with the base only black, and that suffusedly so; tegulæ ferruginous, lighter than in any of the others. (W. Australia, 68. 6=type; also another specimen with same history.)..... *concinnumula*, sp. n.

Males.

- Scutellum black, without spots, or with small obscure spots; clypeus almost all deep yellow, but no lateral marks. (Sydney: *Froggatt*.)..... *concinna* (Fabr.).
- Scutellum conspicuously spotted; face very pale yellow right across; tegulæ light ferruginous. 1.
1. Supraclypeal mark present, broad and short; lateral face-marks extending above level of antennæ, their upper side oblique; scape ferruginous beneath; first abdominal segment with more red. (Swan River, 69. 50; W. Australia, 68. 6.)..... *concinnumula*, sp. n.
- Clypeus considerably broader above; no supraclypeal mark; lateral marks ending squarely at about level of top of clypeus; scape all black. (W. Australia, 68. 6.)..... *zonalis rufocincta*, [subsp. n.]

Tetralonia convicta, sp. n.

♂.—Closely related to *T. brevicornis*, Smith, with which it is placed in the British Museum collection. The differences are as follows:—Smaller (expanse 19 mm.) and not quite so robust; antennæ longer and more slender (much as in *T. malvæ*, but perhaps rather longer, not of the very long

type); flagellum strongly crenulated, ferruginous beneath; face longer in proportion to its width; tibiæ and tarsi clearer red, hair of hind tibiæ and tarsi pale yellowish; abdomen smaller and shorter; third s.m. much narrower above, being narrower above than second (broader above than second in *brevicornis*); scutellum with a median depression, but no distinct bosses (bigibbose, with a pair of bosses and a valley between, in *brevicornis*).

Hab. Australia, 50. 7.

The type of *T. brevicornis* (Moreton Bay, 50. 71) is also a male.

Tetralonia antennata (W. F. Kirby).

Podalirius antennatus, W. F. Kirby, from Sokotra, is a female *Tetralonia* of the type of *T. tricincta*, Lep., with an apical pale yellow band on the clypeus. It is a smaller species than *tricincta*. *Tetralonia antennata* (Fabr.) is quite a different species, and is *T. malvæ* (Rossi).

Nomia testacea (Smith).

The British Museum contains four males, one being Smith's type of *Tetralonia testacea*. The locality given is "Africa." Stigma large; second s.m. less than half length of first or third; basal nervure with lower section strongly nearly evenly arched; face narrow; tegulæ rather large.

Nomia ceratina (Smith).

The British Museum possesses a male of *Halictus ceratinus*, Smith, from Sarawak, not stated to be the type. It is a *Nomia* with clavate abdomen, slender basally, the first segment much longer than broad; segments with light yellowish hair-bands; hind legs slender, simple; head seen from in front nearly exactly circular, a little broader than long; antennæ long and slender; area of metathorax plicate; venation normal for *Nomia*, stigma large. The anterior tarsi are very pale testaceous.

Agapostemon sicheli, Vachal.

Nomia tacita, Cameron (type in British Museum), is this species, though compared with a specimen of *A. sicheli* it is a little larger and has darker stigma and nervures. The peculiar antennæ are quite the same.

Nomia cillaba, Cameron, is also a male *Agapostemon*.

Nomioides appendiculata (Cameron).

The type of *Ceratina appendiculata*, Cam., in the Cambridge University Museum (Inadu, Maldives, *Gardiner*) is a *Nomioides*. Abdomen black, with more or less interrupted yellow bands; mesothorax and scutellum green, postscutellum yellow; metathorax black; clypeus yellow, with two black bars; tubercles and upper edge of prothorax yellow; legs with much yellow; stigma large; marginal cell ending, narrowly rounded, on costa; b. n. strongly bent; second s.m. small. Cameron's description agrees with the specimen.

Lithurgus andrewsi, sp. n.

Christmas Island, Indian Ocean (*Andrews*). Type in British Museum.

This is the female described as *Megachile rotundipennis*, W. F. Kirby ('Monograph of Christmas Island,' 1900, p. 87). The male, which is described first, is a true *Megachile* (anterior tarsi simple; sixth abdominal segment broadly emarginate, with spines at side; pubescence golden fulvous), and must retain the name *rotundipennis*.

L. andrewsi (♀) is about 14½ mm. long.; scopa red; last dorsal segment covered with red hair; segments 2 to 5 with very narrow white apical hair-bands. It has the rough mesothorax and frontal prominence usual in *Lithurgus*.

The new species is related to *L. rubricatus* and *cognatus*; the three are easily separated (♀) as follows:—

- | | |
|--|---------------------------------|
| Facial prominence large and bilobed; vertex rather sparsely punctured on a shining ground; hair on inner side of hind tarsi dark. (Swan River, Australia)..... | <i>cognatus</i> , Sm. |
| Facial prominence lower, not distinctly or not bilobed, vertex densely punctured..... | 1. |
| 1. Prominence relatively narrow; hair on inner side of hind tarsi dark fuscous..... | <i>rubricatus</i> , Sm. (type). |
| Prominence very broad, with an obtuse median keel; hair on inner side of hind tarsi bright ferruginous..... | <i>andrewsi</i> , sp. n. |

All three have red hair at apex of abdomen.

L. andrewsi was taken near Flying-Fish Cove, Sept.–Oct. 1897.

Megachile nivescens, W. F. Kirby.

Christmas Island.

The male is easily distinguished from *M. rotundipennis* by the white hair of head and thorax and very distinct white

bands on first three segments of abdomen. The apex of the abdomen is light orange-fulvous, its structure much as in *rotundipennis*. The basal joint of anterior tarsi is grooved behind.

The female is coloured much as the male; hair on inner side of hind tarsi very bright ferruginous, as in *Lithurgus andrewsi*.

Prosopis maoriana, sp. n.

♀.—Extremely like *P. agilis*, Smith, but has the clypeus broader and more closely punctured; the lateral marks of the face triangular, pointed above, the upper inner side about equal to the lower inner (in *agilis* they are bluntly cuneiform, broadly truncate above). Wings greyish (reddish in *agilis*); second r. n. reaching second s.m. very near apex (some distance before apex in *agilis*). Both have the tubercles and an interrupted band on prothorax yellow.

Hab. New Zealand.

A specimen in the British Museum, determined by Cameron as *P. agilis*, but upon comparison with Smith's type seen to be quite distinct. On the other hand, *P. levigata*, Sm., as represented in the Museum, is a slight variety of *P. agilis*, having the lateral face-marks obliquely truncate above.

The New-Zealand species of *Prosopis* may be separated thus:—

- | | |
|--|---|
| Tubercles black; slender black species, 7 mm. or a little over; legs black, the anterior tibiae ferruginous in front; lateral face-marks not continuous with sides of clypeus. ♂ | <i>innocens</i> , Cam. |
| Tubercles yellow | 1. |
| 1. Male; first r. n. entering apex of first s.m.; lateral face-marks continuous with sides of clypeus | <i>relegata</i> , Sm. |
| Females; clypeus black | 2. |
| 2. Small species with a curious quadrate head; lateral face-marks nearly semicircular, deep chrome-yellow | <i>capitosa</i> , Sm. |
| Head normal | 3. |
| 3. Lateral face-marks longer, dull pale yellowish; black species, about 9 mm. long; face broad; first r. n. meeting first t.-c. a little on outer side; mesothorax dull, with fine punctures | [<i>frons</i> , Cam., preocc.).
<i>cameroni</i> , Ckll. (<i>sulci-</i> |
| Lateral face-marks shorter, deep chrome-yellow | <i>maoriana</i> , sp. n., and
<i>agilis</i> , Sm., separated as above. |

Cameron's types, as well as those of Smith, are in the British Museum.

Paracolletes advena (Smith).

Andrena advena, Sm., is no doubt a *Paracolletes*, though it looks like a rather large black *Andrena*. No facial foveæ; tongue apparently Colletid, but not very clearly seen; scutellum with plumose black hair; abdominal segments 2 to 4 with narrow silvery marginal hair-bands; face very broad; stigma subobsolete; b. n. falling short of t.-m.; second s.m. broadened below, receiving the r. n. a little before middle; area of metathorax triangular, with a sort of sericeous surface, not ridged.

Australia.

Augochlora lævipyga (W. F. Kirby).

Halictus lævipyga, W. F. Kirby, in H. N. Ridley, Journ. Linn. Soc., Zoology, xx. (1890) p. 542. ♀.

Halictus alternipes, W. F. Kirby, l. c. ♂. ("♂, ♀.")

The types of this Fernando Noronha species are in the British Museum and are the sexes of an *Augochlora*.

♀.—About 9 mm. long.

Head and thorax very dark green; abdomen black, with dark green shades, not ciliate; hind spur simple. Nervures and stigma rather dark red-brown; first r. n. meeting second t.-c.; second s.m. about square; inner orbits strongly emarginate. Flagellum ferruginous beneath; tongue very slender, only moderately long; mesothorax dullish, densely punctured; area of metathorax short, finely but distinctly grooved.

♂.—Clypeus produced, its lower margin testaceous; antennæ only moderately long; inner orbits very strongly emarginate.

The following table separates the females of some of the dark forms of *Augochlora*:—

First two abdominal segments orange-ciliate	1.	
Abdominal segments not ciliate	2.	
1. First abdominal segment brown-black, the others green; hind spur very long, pectinate		<i>atropos</i> , Sm.
Abdomen blue; thorax green; hind spur long, pectinate		<i>hebescens</i> , Sm.
2. Hind spur pectinate with two spines; mesothorax crimson, sparsely punctured		<i>briseis</i> , Sm.
Hind spur simple		<i>lævipyga</i> (W. F. Kirby).

Halictus atripyga, W. F. Kirby.*Halictus atripyga*, W. F. Kirby, t. c. p. 543.

Fernando Noronha. ♂ ♀.

A true *Halictus*, of small size.

♂.—A little over 5 mm.

Head and thorax dark yellowish green, vertex coppery; abdomen shining black; antennæ long, strongly crenulate beneath; ocelli rather large; inner orbits shallowly emarginate; nervures and stigma dark red-brown; first r. n. entering apex of second s.m.; legs partly ferruginous.

♀.—Just over 5 mm. long.

Hind spur with at least one distinct tooth; tegulæ shining testaceous; area of metathorax granular.

Halictus distinctus, Walker.

Wady Genneh.

Of the three specimens in the British Museum two are *Halictus*, while the third is a *Nomia*.

Halictus of Japan and China.

The following table, based on Smith's types, may be of service:—

Abdomen green; species with curious oblong head; abdomen brassy green, with transverse dark shades or bands. ♂. (Japan.)	[rius, Sm.
Abdomen black	<i>H.</i> (<i>Chloralictus</i>) <i>erac-</i>
1. Small species, of subg. <i>Evylicæus</i> , with (♀) hind margins of abdominal segments conspicuously testaceous; hind spur finely pectinate. (Japan.)	1. <i>H. tarsatus</i> , Sm.
Larger species	2.
2. Large species, with very large, broad, pale basal hair-bands on abdominal segments; hair on apical half of segments 3 and 4 dark fuscous; area of metathorax very strongly ridged; mesothorax dull, with very strong punctures; hind spur with a few nodules. ♀. (Japan.)	<i>H. occidentis</i> , Sm.
Species of medium size	3.
3. Male; hair of head and thorax largely reddish; outer nervures of wing not weakened; lower part of clypeus yellow; area of metathorax cancellate. (N. China; type in poor condition.)	<i>H. affinis</i> , Sm.
Females	4.
4. First abdominal segment dull, densely minutely punctured; black species, like <i>H. coriaccus</i> &c., with basal hair-bands. ♀	

- about 9 mm. long; stigma and nervures light ferruginous; mesothorax strongly punctured; area of metathorax with strong anastomosing wrinkles; hind spur with about four blunt laminae. ♀. (N. China.)
- First abdominal segment shining *H. subopacus*, Sm. 5.
5. Area of metathorax distinctly but rather irregularly ridged; hind margins of abdominal segments narrowly rufescent; stigma and nervures amber-colour. ♀. (Japan.) *H. scitulus*, Sm. 6.
- Area of metathorax with irregular wrinkles
6. Larger; about 9 mm. long; first abdominal segment very shiny, with sparse punctures, second and third segments with lateral basal hair-patches; area of metathorax strongly bounded behind; outer nervures weakened; hind spur simple. Superficially looks just like *H. discus*, but easily distinguished by the dullish closely punctured mesothorax. ♀. (Japan.) *H. proximatus*, Sm.
- Smaller; length about 8 mm., but the difference of size greater than the linear measurement would suggest; first abdominal segment very feebly punctured; hind spur minutely nodulose. ♀. (Japan.) *H. familiaris*, Sm. (preocc.), = *duplex*, D. T.

Dianthidium minutissimum (Bingham).

Anthidium minutissimum, Bingham.

Pulvillus distinct; second r. n. going beyond second s.m.

Dianthidium lachrymosum (Smith).

Anthidium lachrymosum, Smith.

I have seen Smith's types, and also one from the Kangra Valley, 4500 feet (*Dudgeon*).

Pulvillus well developed; second r. n. going beyond second s.m. A very compact little species, with white spots at sides of abdomen; scutellum overlapping base of abdomen; maxillary palpi apparently 2-jointed.

Dianthidium truncatum (Smith).

Anthidium truncatum, Smith.

♀.—Obuasi, Ashanti (*Graham*), in Cambridge Univ. Mus.

I have also seen Smith's type. Pulvillus present, though small; second r. n. going conspicuously beyond end of second s.m. A small compact species, the tibiae all yellow on

outer side. Mesothorax and scutellum all black. Markings of face and abdomen yellow.

The following, usually referred to *Anthidium*, belong to *Dianthidium*:—

- Dianthidium interruptum* (Fabr.); (*Apis interrupta*, Fabr.; *Anthidium flavilabre*, Latr.). Belongs to subgen. *Paraanthidium*, Friese.
Dianthidium septemdentatum (Latr.); (*Anthidium septemdentatum*, Latr.). Belongs to subgen. *Anthidium*, s. str., Friese.
Dianthidium laterale (Latr.); (*Anthidium cimbiciforme*, Sm.). Belongs to subgen. *Proanthidium*, Friese.
Dianthidium ferrugineum (Fabr.); (*Apis ferruginea*, Fabr.). Belongs to subgen. *Proanthidium*, Friese.
Dianthidium siculum (Spin.); (*Anthidium fontanesii*, Lep.). Belongs to subgen. *Anthidium*, s. str., Friese.
Dianthidium rubiginosum (Lep.), according to specimen in British Museum; but if this is correct, *Anthidium coronatum*, Sm., from Corfu, has been erroneously referred here, as it is a genuine *Anthidium*.
Dianthidium cordatum (Sm.). Natal. Pulvillus small.
Dianthidium rufipes (Sm.). India. (Dalla Torre erroneously says Natal.)

The following are genuine *Anthidium*:—*lituratum*, Pz.; *punctatum*, Latr.; *variegatum*, Fabr.; *imitator*, Sm. (India); *ordinatum*, Sm. (India).

A. subochraceum, Walker (gardens round Mt. Sinai), has the venation of *Dianthidium*, but apparently no pulvilli. Nearly the same may be said of *A. pulchellum*, Klug, but this seems to have a very small pulvillus.

It is a question whether one of the subgeneric names proposed by Friese should be used in place of *Dianthidium*.

XXXVII.—Description of a new Japanese Vole.

By MALCOLM P. ANDERSON.

Craseomys niigatæ, sp. n.

Type. Adult ♂. B.M. no. 8. 12. 1. 65. Collected by Kiyoshi Kanai at Akakura, Niigata Prefecture, Hondo, Japan, 7th Sept., 1908.

This new species seems to be most closely related to *Craseomys andersoni*, Thos., but it differs externally from that form in colour, smaller size, and distinctly longer tail. It is a much smaller animal than *C. beafordix*, Thos., of Hokkaido. In some respects it may be compared with *Evotomys (Phaulomys) smithii*, Thos. (see below).

Description.—General colour of head and body buffy brown, with a greyish tinge on some hairs, this colour passing gradually on the sides into the grey of the under surface, which is often tinged with buffy. Tail dark above, grey beneath, not sufficiently haired to conceal the scales; averaging 60·8 mm. in length in the seven specimens examined. Hands and feet greyish or dusky; hind foot 17·5 to 20 mm. long. Ears like head and back; usually 12 to 13 mm. long.

Measurements of type.—Head and body 107 mm.; tail 63; hind foot 18; ear 12.

Skull.—Much shorter, but very nearly as broad as that of *C. andersoni*. Nasals shorter, but equally broad; inter-orbital region broader; palatal foramina longer; diastema longer than in *C. andersoni*.

Skull-measurements of type.—Greatest length 25·3 mm.; basilar length 22·5; zygomatic breadth 14·5; nasals 7·3; interorbital breadth 4; breadth of brain-case 11·5; palatal length 11·9; diastema 7·4; palatal foramina 5·2; length of upper molar series 5·5.

Pattern of upper molars as in *Craseomys andersoni*, with three re-entrant angles on each side of m^3 , dividing that tooth into five cement-areas.

Seven specimens examined, four males and two females from Akakura, Niigata Prefecture, collected by Kiyoshi Kanai, and presented to the British Museum by the Hon. N. C. Rothschild; and one male from Makado, near Nohechi, Aomori Prefecture, extreme north Hondo, collected by the author, and presented by the Duke of Bedford, K.G.

In studying *Craseomys niigatae* I have compared the molars of this species with those of a large series of *Evotomys* (*Phaulomys*) *smithii*, Thos., and I find that, although the tooth-pattern of the type of *Phaulomys* is quite different from that of *Craseomys*, there are among specimens not separable from *smithii* many individuals with a tooth-pattern closely resembling that of *C. andersoni* and *C. niigatae*. There are many examples intermediate between *andersoni* and *smithii*, and those resembling *smithii* are greatly in the minority. Mr. Thomas himself first drew attention to this*. These observations lead me to conclude that "*Phaulomys*" is really *Craseomys*.

* Cf. Thomas, P. Z. S. 1905, vol. ii. p. 356.

XXXVIII.—*The Land Isopoda of Lundy Island.*

By BRUCE F. CUMMINGS.

IN JUNE this year I spent a few days on Lundy Island and devoted a small portion of my time there to collecting the land Isopoda, no list of which has, so far as I am aware, been hitherto drawn up. My short search for the woodlice convinced me that more prolonged and more careful study would reveal a far richer harvest of species than that indicated in the list below.

Ligia cceanica, L.—Very common on the beach near the landing-place.

Trichoniscus pusillus, Brandt.—Common everywhere.

Trichoniscus roseus, Koch.—I captured a small specimen in the garden of the Rev. Hudson G. Heaven, who is the owner of the island, and to whom I am indebted for permission to enter his private grounds.

Trichoniscus pygmaeus, G. O. Sars.—Two specimens in Mr. Heaven's garden.

Oniscus asellus, L.—Very common in its typical form. There is also a very handsome island variety of a butterscotch-yellow colour.

Philoscia muscorum, Scop.—Very frequent both in the cultivated and uncultivated portions. The dark brown-black and the light lemon-coloured varieties both equally common. I also took a pink specimen, which not uncommonly is found on the mainland in North Devon.

Philoscia couchii, Kin.—Common near the landing-place with *Ligia*. Those which I observed were of the typical lead-grey tint.

Platyarthrus hoffmannseggii, Brandt.—Abundant in the nests of the yellow ant (*Formica flava*).

Porcellio scaber, Latr.—Abundant everywhere in its various colour-varieties.

Cylisticus convexus, De Geer.—I obtained a single specimen of this animal. I looked carefully for more, but was unsuccessful.

Armadillidium vulgare, Latr.—Very common everywhere. I obtained a number of small specimens, which I thought were the young of *Arm. nasatum*, but Dr. Norman, to whom I submitted them, told me that it was a form which he had from several places close to the sea, but which he was unable to distinguish from *Arm. vulgare*.

Of the above eleven species, *Cylisticus convexus* and

Trichoniscus pygmaeus have not yet been taken in North Devon; the latter probably occurs, but has been overlooked.

Of the seventeen species I have collected in North Devon, the following did not occur to me on Lundy:—*Haplothalmus danicus*, B.-L. (near Barnstaple); *Porcellio pictus*, Brandt (only once); *P. lævis*, Latr. (only once in the north, but very frequently in a garden at Topsham in South Devon); *P. dilatatus*, Brandt; *Armadillidium album*, Dollfus (River Taw), *A. pulchellum*, *A. nasatum*; and *Metoponorthus pruinosis*, Brandt.

I have never seen the butterscotch-coloured form of *O. asellus* in North Devon, and it is also interesting to note that, as regards *Philoscia couchii*, the typical grey form occurs at Lundy, whereas on the North Devon coast I have only observed a light variety, marbled with brown, something like *T. pusillus*. A more extended study of the land Isopoda of both localities is necessary before an opinion can be expressed on the relations of the forms occurring on the mainland of North Devon and those on the island.

XXXIX.—*Rhynchotal Notes*.—XLIX. By W. L. DISTANT.

HOMOPTERA.

Fam. Fulgoridæ.

Subfam. RICANIINÆ.

The study of this subfamily has been very considerably advanced by the publication in 1898 of Dr. Melichar's "Monographie der Ricaniiden," which was published in the *Annal. k.-k. nat. Hofmus.* Bd. xiii., and is in the following pages referred to as "Mon. Ricaniid." Edmund Schmidt (*Stett. ent. Zeit.* 1905) has also, in his 'Die Ricaniiden des Stettiner Museums,' described a number of new species. Fowler, in the 'Biol. Centr.-Amer.,' has dealt with those of Central America; and the splendid collection made by Wallace in the Malayan Archipelago was described by Walker some forty years ago, while some generic revision of these species is attempted in this paper. The writer has had an opportunity of working out a considerable number of the species found in British India (*Faun. Brit. Ind., Rynch.* iii. 1906). We know little of the Ricaniinæ of Australia, and

much may be expected from that large region of diverse environments, while the Ethiopian record will certainly be much increased.

Genus POHAZIA.

Pochazia, Amy. & Serv. Hist. Hém. p. 528 (1843).

Type, *P. fasciata*, Fabr.

Pochazia gradiens.

Pochazia gradiens, Walk. Journ. Linn. Soc. Lond., Zool. i. p. 91 (1857);
Melich. Mon. Ricaniid. p. 218 (1898).

Ricania gradiens, Atkins. Journ. Asiat. Soc. Beng. iv. p. 69 (1886).

Ricania (Pochazia) flavocostata, Dist. Tr. Ent. Soc. Lond. 1892, p. 283.

Pochazia flavocostata, Melich. Mon. Ricaniid. p. 211, Taf. ix. fig. 9 (1898).

Hab. Malay Peninsula ; Sumatra ; Borneo.

Pochazia subatomaria.

Ricania subatomaria, Walk. Journ. Linn. Soc., Lond. Zool. x. p. 143 (1868); Melich. Mon. Ricaniid. p. 344 (1898).

Hab. Morty Island.

Pochazia emarginatus.

Flatoides emarginatus, Walk. Journ. Linn. Soc., Zool. i. p. 89 (1857).

Pochazia marginata, Melich. (nec Walk.), Mon. Ricaniid. p. 217, t. xiii. fig. 3 (1898); Schmidt, Stett. ent. Zeit. 1905, p. 172.

Hab. Singapore ; Java ; Sumatra ; Borneo.

Dr. Melichar has fallen into confusion over this species. He has figured it correctly, but has given incorrect references. It was described by Walker as above, but Melichar has referred to the *Ricania emarginata*, Walk. (1868), from Sula, which belongs to the genus *Armacia* and = *A. latipennis*, Walk. He has also referred to the *Flatoides marginatus*, Walk. (1851), as a synonym of the species, and hence the older name; but *F. marginatus*, Walk., belongs to the genus *Epitemna*, and although unlocalised by its describer is undoubtedly a West-African species.

Pochazia subflava, sp. n.

Head, face, pronotum, and mesonotum piceous; lateral margins and carinations to vertex, lateral and apical margins to face, and the whole of the clypeus ochraceous; anterior and posterior margins and central carination to pronotum

and anterior lateral areas to mesonotum dull reddish ; abdomen above and body beneath and legs ochraceous ; tegmina pale bright shining yellow, the costal membrane, apical margin, claval area, a transverse irregularly angulate fascia beyond middle, and two small discal spots on basal area (the outermost largest) more or less brownish ochraceous, on costal membrane—above the transverse fascia—a yellow transverse spot ; wings pale yellow, the veins slightly darker yellow ; vertex with the lateral margins ridged, a transverse carination near base and a central longitudinal carination ; face tricarinate, the central carination straight and continuous, the lateral carinations curved and not reaching apex ; clypeus with a central longitudinal ridge ; pronotum centrally longitudinally carinate ; mesonotum tricarinate, the central carination straight, the lateral ones curved and meeting anteriorly, from near their middle a straight carinate line connects them with the anterior margin.

Long., excl. tegm., 7 mm. ; exp. tegm. 30 mm.

Hab. North Borneo ; Laluk Riv. (Brit. Mus.).

Allied to *P. crocata*, Melich., from Sumatra.

Pochazia aurulenta, sp. n.

Body pale brownish ochraceous ; legs pale ochraceous ; tegmina and wings pale saffron-yellow, the veins almost concolorous ; vertex with a central longitudinal carination ; face with three carinations, the central one straight and continuous, the lateral ones short and curved ; clypeus centrally ridged ; pro- and mesonota somewhat mutilated in type, the latter, however, distinctly tricarinate ; posterior tibiae with four spines, the two nearer base very small, the other two prominent ; tegmina short and broad, subtriangular, costal margin arched at base, a little concavely sinuate before middle, apical angle obtusely acute, apical margin nearly straight, much longer than inner and almost as long as costal margin.

Long., excl. tegm., 9 mm. ; exp. tegm. 26 mm.

Hab. Borneo ; Brunnei (Brit. Mus.).

Allied to *P. triangularis*, Dist.

A species described by Walker, the type of which cannot be found in the British Museum.

Ricania antica, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 162 (1868).

Pochazia antica, Melich. Mon. Ricaniid. p. 217 (1898).

Hab. New Guinea.

Other types of species described by Walker as belonging to the Ricaniinæ cannot be found at present in the National Collection, but mention must be made of the above, as it is included by Melichar in the genus *Pochazia* as a valid species. Dr. Melichar, however, had not seen it and only reproduces Walker's description.

Genus RICANIA.

Ricania, Germ. Mag. Ent. iii. p. 221 (1818).

Type, *R. fenestrata*, Fabr.

Ricania stigma.

Flatoides stigma, Walk. List Hom. ii. p. 410 (1851).

Ricania subfusca, Melich. Mon. Ricaniid. p. 230 (1898).

Hab. Brit. India; Tenasserim; Nicobar Islands; Borneo; Celebes; Japan.

Ricania trimaculata.

Ricania trimaculata, Guér. Voy. Coq., Ins. p. 190 (1830); Melich. Mon. Ricaniid. p. 238, Taf. xi. fig. 19 (1898).

Ricania albosignata, Stål, Öfv. Vet.-Ak. Förh. 1865, p. 161.

Ricania atomaria, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 147 (1868); Melich. Mon. Ricaniid. p. 240 (1898).

Hab. New Guinea; Aru; Batchian; Waigiou.

Ricania caliginosa.

Ricania caliginosa, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 144 (1868); Melich. Mon. Ricaniid. p. 332 (1898).

Ricania simplex, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 144 (1868); Melich. Mon. Ricaniid. p. 342 (1898).

Hab. Aru; Waigiou.

Ricania consanguinea, sp. n.

Head and pronotum brownish ochraceous; mesonotum piceous; abdomen above piceous, the base and apex more or less ochraceous; face, clypeus, body beneath, and legs pale ochraceous; tegmina black with two oblique white fasciæ, the innermost extending from a little beneath claval suture to near the lower apex of the radial area, the outermost between the first and the apical margin, broadly inwardly notched above middle, and attenuated near costal margin, on costal membrane above innermost fascia is a white spot with

a much smaller one near its outer apex; base of clavus, part of basal cell, and extreme base of costal membrane more or less ochraceous; wings pale fuscous, the outer and inner margins darker fuscous and the basal area whitish; face obscurely centrally and sublaterally carinate; pronotum centrally longitudinally carinate; mesonotum tricarinate, the central carination straight and continuous, the lateral carinations angularly anteriorly narrowed inwardly and near their middle connected by a straight carinate line with the anterior margin.

Var.—Head and pronotum paler and more greyish; ground-colour of tegmina greyish brown, not black.

Long., excl. tegm., 7 mm.; exp. tegm. 21 to 22 mm.

Hab. Queensland (*F. P. Dodd*, Brit. Mus.).

Allied to *R. episcopus*, Walk., from China and Japan.

Ricania rubrifascia, sp. n.

rubrifascia, Walk. MS.

Vertex, face, pronotum, and mesonotum black, more or less greyishly tomentose; anterior area of pronotum dull castaneous; abdomen above black, its base pale ochraceous; legs pale brownish, the femora darker; tegmina castaneous, greyishly tomentose, with two prominent straightly transverse castaneous fasciæ which are not greyishly tomentose, the first near base, the second a little beyond middle, before apical margin a broken maculate fascia of the same colour, two oblique greyish-white spots on costal membrane, the first near middle, the second near apex, another greyish-white spot a little below middle of apical margin; wings fuscous brown, two small contiguous greyish-white spots near apex of costal margin; face with the carinations subobsolete, the central most distinct but neither quite reaching base nor apex; carinations to the mesonotum distinctly prominent; tegmina somewhat short and broad, the apical about as long as inner margin.

Long., excl. tegm., $6\frac{1}{2}$ mm.; exp. tegm. 18 mm.

Hab. Ceram (*Wallace*, Brit. Mus.).

I can find no trace of a description by Walker of this beautiful species.

Ricania protea, sp. n.

Vertex piceous brown or black; pronotum and mesonotum dull black, the carinations more or less piceous brown; abdomen above black, somewhat shining, narrowly greyish at

base; body beneath black; lateral margins of face, legs, rostrum, and a spot near base of anal segment ochraceous; legs more or less spotted or suffused with piceous; tegmina black, a costal spot a little beyond middle, a broad central angulate transverse fascia commencing beneath the costal spot, broadly extending inwardly at about one-third from posterior claval margin, and then more narrowly and straightly continued to posterior claval margin at about one-third from base, and the apical margin beneath apex greyish white; wings pale fuscous hyaline, the veins piceous; pronotum with a central longitudinal carination; mesonotum tricarinate, the central carination straight, the lateral carinations curved and meeting on anterior margin, the latter also connected with the anterior margin by a straight carination from near their middle; tegmina short and broad.

Var. *a*.—Tegmina with the costal and apical marginal pale markings present, but the large discal fascia absent.

Var. *b*.—Costal spot present or obsolete, remaining pale markings absent.

Long., excl. tegm., 6 mm.; exp. tegm. 16 to 18 mm.

Hab. Queensland (*F. P. Dodd*, Brit. Mus.).

Ricania aurora, sp. n.

Vertex and pronotum pale ochraceous; mesonotum brownish ochraceous, with a black spot on each posterior lateral margin; abdomen above, body beneath, and legs pale ochraceous; tegmina pale shining ochraceous, a paler ochraceous spot crossing costal membrane at apex of radial area, just beyond which there is a black spot and another of the same colour at apex near margin; wings hyaline, with the venation pale ochraceous; face broad, faintly tricarinate, none of the carinations reaching the posterior margin; vertex and pronotum centrally longitudinally finely carinate; mesonotum finely tricarinate, the lateral carinations curved, meeting on anterior margin and also connected with it by a straight carinate line on each side; tegmina short and broad, their apices convexly rounded.

Long., excl. tegm., $6\frac{1}{2}$ to 7 mm.; exp. tegm. 21 mm.

Hab. Queensland (*F. P. Dodd*, Brit. Mus.).

A larger and more brightly coloured species than *R. confusa*, Melich.; tegmina with their apices convex.

MARLEYIA, gen. nov.

Vertex short, broad, the lateral margins distinctly, the anterior margin more finely ridged, centrally longitudinally

carinate, the eyes a little projecting beyond the margins of the pronotum; face broader than long, tricarinate; clypeus not carinate; pronotum longer than vertex, centrally longitudinally carinate; mesonotum tricarinate, the central carination straight, the lateral carinations curved and meeting on anterior margin, from near the middle of the latter a short curved carination connects them with the anterior margin; legs short, robust, posterior tibiæ with two spines on apical half; tegmina strongly waved and sinuate, the costal margin convexly rounded for about two-thirds from base and then concavely sinuate to apex, which is broadly sinuately truncate, apical margin broadly bi-sinuate, costal membrane broad and coarsely transversely veined, basal cell connected with five longitudinal veins, the first and second with a common origin at its upper apex, the third and fourth with a common origin at its lower apex, the fifth from its lower margin and subclaval.

This genus is intermediate between *Mulvia*, Stål, and *Epitemna*, Melich. The shape of the tegmina allies it to *Epitemna*, from which it is separated by the four upper longitudinal veins being emitted close to the cell and not bifurcating at some distance from it, thus resembling the venation of *Mulvia*; the species are also small as in that genus.

I have founded the name of this genus on that of my friend Mr. Bell-Marley, who has done so much to assist us in collecting Natalian Rhynchota.

Type, *M. brunnescens*, Dist.

Marleyia brunnescens, sp. n.

Body and tegmina ochraceous brown; legs paler, annulated with ochraceous brown; tegmina finely palely spotted on basal half of costal margin and on the apical margin, the spots on the latter more numerous and confluent than on the former, a larger pale spot on costal margin just before apex; wings a little paler ochraceous brown; posterior tibiæ with two strong spines on apical area.

Long., excl. tegm., $5\frac{1}{2}$ mm.; exp. tegm. 14 mm.

Hab. Natal; Durban (*Gueinzus*, Brit. Mus.).

Marleyia albomaculata, sp. n.

Vertex, pronotum, and mesonotum piceous; abdomen above black, its base stramineous; face, clypeus, sternum, and legs stramineous, the latter indistinctly annulated with fuscous;

abdomen beneath piceous, with the base stramineous; tegmina black, claval area more or less piceous brown, basal half of costal margin minutely spotted with whitish, upper half of apical margin whitish, an irregular transverse series of whitish spots crossing tegmen near middle, one large and rounded a little before and beneath apex, one semilunate near middle, and a third deeply notched above clavus, before and near these spots a number of smaller and nebulous spots of the same colour; wings with the basal halves dull greyish, the apical halves fuscous. Structural characters as in generic diagnosis.

Long., excl. tegm., 5 mm.; exp. tegm. 15 mm.

Hab. Natal; Durban (*Bell-Marley*).

Genus EPITEMNA.

Epitemna, Melich. Mon. Ricaniid. p. 247 (1898).

Type, *E. retracta*, Walk.

Epitemna marginata.

Flatoides marginatus, Walk. List Hom. ii. p. 415 (1851).

Pochazia marginata, Melich. (part.), Mon. Ricaniid. p. 217 (1898).

Epitemna pilifera, Melich. Mon. Ricaniid. p. 250 (1898).

Walker's type is without a locality, but the British Museum has since acquired an example of the species collected by Señ. Escalera in the Cameroons. The *E. pilifera*, Melich., of which I possess the type, is an exact synonym of Walker's species, but I am answerable for the erroneous locality "Antillen." I forwarded my unworked material to Dr. Melichar when he was preparing his monograph, and amongst them some specimens which I had acquired as from, and labelled, "West Indies." This must have been a wrong locality, and they should all have probably been labelled "West Africa." The same remark applies to the following species.

Epitemna retracta.

Flatoides retractus, Walk. List Hom. ii. p. 416, iv. t. iii. fig. 3 (1851).

Epitemna retracta, Melich. Mon. Ricaniid. p. 248 (1898).

Epitemna speculifera, Melich. *loc. cit.* p. 250.

Hab. W. Africa.

Genus RICANOPTERA.

Ricanoptera, Melich. Mon. Ricaniid. p. 253 (1898).

Type, *R. inculta*, Melich.

Ricanoptera varia.

Ricania varia, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 155 (1868).

Hab. Flores.

Genus EURICANIA.

Euricania, Melich. Mon. Ricaniid. p. 258 (1898).

Type, *E. ocellus*, Walk.

Euricania concinna.

Tarundia concinna, Stål, Tr. Ent. Soc. Lond. (3) i. p. 590 (1863).

Hab. Aru Islands.

Euricania subapicalis.

Ricania subapicalis, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 153 (1868).

Hab. Aru Islands.

Euricania aperiens.

Flatoides aperiens, Walk. List Hom. Suppl. p. 103 (1858).

Hab. Fiji Islands.

A small species allied to *E. tristicula*, Stål.

MOTUMOTUA, gen. nov.

Resembling *Euricania*; tegmina with the first longitudinal vein proceeding from the upper end of basal cell and furcate before middle as in *Euricania*, second and third not arising from a common stem at lower end of basal cell, but second and third bifurcating beyond cell, all the veins connected and the whole corium covered with transverse veins; face as broad as long, centrally and sublaterally carinate, the lateral carinations strong and distinct.

Type, *M. trinotata*, Walk.

Motumotua trinotata.

Ricania trinotata, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 152 (1868).

Hab. New Guinea.

Motumotua bicincta.

Ricania bicincta, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 153 (1868).

Hab. Morty.

MOTUA, gen. nov.

Tegmina with the first and second longitudinal veins proceeding from a common origin at upper end of cell, third and fourth bifurcating from lower end of cell; basal third of corium practically without transverse veins, remaining two-thirds thickly transversely veined; other characters as in *Euricania* and *Motumotua*.

Type, *M. humeralis*, Walk.

This genus is also allied to *Hajar*, Kirk., from the description of which it differs in having the clavus somewhat thickly transversely veined, not "six or seven transverse nerves (*sic*) in clavus," corium not with "few transverse nervures," but with the apical two-thirds thickly transversely veined.

Motua humeralis.

Ricania humeralis, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 161 (1868).

Hab. Mysol.

Motua? cribrata.

Ricania cribrata, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 162 (1868).

Hab. Mysol.

Genus TARUNDIA.

Tarundia, Stål, Berl. ent. Zeitschr. iii. p. 325 (1859); id. Rio Jan. Hem. ii. p. 70 (1862).

Type, *T. servillei*, Spin.

Tarundia boadicea, sp. n.

Body and legs greenish ochraceous; tegmina sordidly hyaline, the venation fuscous, the stigma pale fuscous; wings pale hyaline, the venation fuscous; vertex short, broadly transverse, the anterior and lateral margins ridged; face about as long as broad, tricarinate, the central carination straight and continuous, the lateral carinations indistinct and not continuous; clypeus centrally longitudinally ridged; posterior tibiæ with a strong subapical spine; tegmina with the costal membrane containing about ten transverse veins, the stigma with five oblique veins, the venation very similar to that of *T. glaucescens*, Melich., as figured by that describer (Mon. Ricaniid. Taf. xiii. fig. 16), but with the venation of the clavus different to that species, in the usually

six transverse veins, the first and second are somewhat close together before middle, the third and fourth similarly placed beyond middle, the fifth and sixth wide apart between the latter pair and apex, sometimes there is an additional transverse vein between the first pair and the base.

Long., excl. tegm., 7 mm. ; exp. tegm. 23 to 24 mm.

Hab. New Britain.

A few specimens of this species were sent to me some thirty years ago by the recently deceased Dr. Schmeltz, at that time custodian of the then Godeffroy Museum at Hamburg. I could not then identify it, but the figures of the described species given by Dr. Melichar in his monograph of the subfamily now enable me to do so. I have placed a cotype in the British Museum.

T. boadicea is allied to *T. glaucescens*, Melich., by the venation of the corium, but differs by that of the clavus, which more resembles that of *T. curtula*, Melich.

APACHNAS, gen. nov.

Vertex short, broadly transverse, the eyes considerably extending over the lateral margins of the pronotum; face about as long as broad, the posterior lateral margins obliquely directed to clypeus, tricarinate, the central carination straight, the lateral carinations moderately oblique; clypeus finely medially carinate; pronotum broader than vertex, centrally carinate; mesonotum tricarinate, the lateral carinations anteriorly curved inwardly and outwardly doubly attached to the anterior margin, by a longitudinal carinate line from near middle and by a shorter line near anterior margin; posterior tibiae with two strong spines on apical area; tegmina and wings hyaline; tegmina with the costal and apical margins subequal in length, each much longer than the inner margin and with the costal membrane a little narrower than the radial area, with five transverse veins close together at base and three (wide apart) between these and stigma, which contains about seven oblique transverse veins; basal cell emitting three longitudinal veins from its outer margin, which are connected by transverse veins at about one-fourth from base, a second series of transverse veins and a subapical series of transverse veins, together enclosing four series of cells, there is also a continuous series of submarginal transverse veins, defining a narrow marginal area, clavus with the claval vein connected with the inner and posterior margins by two short oblique veins at a little before middle, followed by about four transverse veins somewhat wide apart.

Allied to *Tarundia* and *Hajar*.

Apachnas nobilis, sp. n.

Body and legs olivaceous; tegmina hyaline, the venation, interspaces between the basal transverse veins of costal membrane, stigma, a spot immediately beneath it with a pale centre, and costal margin from stigma to about one-fourth of apical margin, fuscous brown, a series of small pale fuscous apical marginal spots, this marginal area a little darker than the discal colour of the corium; wings hyaline, the venation fuscous; structural characters as in generic diagnosis.

Long., excl. tegm., $6\frac{1}{2}$ mm.; exp. tegm. 22 mm.

Hab. Nilgiris; N. slope, 3300 feet (*Sir G. Hampson*).

Genus PRIVESA.

Privesa, Stål, Rio Jan. Hem. ii. p. 70 (1862).

Type, *P. lævifrons*, Stål.

Privesa stipata.

Flatoides stipatus, Walk. List Hom. ii. p. 411 (1851).

? *stipatus*, Melich. Mon. Ricaniid. p. 343 (1898).

Hab. "Australia."

Genus ARMACIA.

Armacia, Stål, Rio Jan. Hem. ii. p. 70 (1862).

Type, *A. clara*, Stål.

Armacia basigera.

Ricania basigera, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 153 (1868).

Ricania consobrina, Walk. *loc. cit.* p. 159.

Armacia basigera, Melich. Mon. Ricaniid. p. 290 (1898).

Armacia consobrina, Melich. *loc. cit.*

Hab. Papua.

Armacia latipennis.

Ricania latipennis, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 160, t. iii. fig. 15 (1868).

Ricania emarginata, Walk. *loc. cit.*

Alisca latipennis, Melich. Mon. Ricaniid. p. 293 (1898).

Hab. Aru, Batchian, Sula.

LUGARDIA, gen. nov.

Vertex very short, much broader than long, a little longer

at the region of the eyes, the lateral and anterior margins moderately ridged; face broader than long, transversely carinate between eyes, and between this carination and the anterior margin there is a central longitudinal carination, lateral margins straight at inner areas of eyes and then obliquely narrowing to clypeus, which is very strongly centrally ridged; pronotum fully twice as long as vertex, anteriorly convexly produced and centrally longitudinally carinate; mesonotum more than twice as long as pronotum, tricarinate, the central carination straight, the lateral carinations curved and meeting a little before anterior margin; legs moderately short and stout, the posterior tibiæ with two strong spines; tegmina about one and a half times longer than broad, the apical considerably longer than the inner margin, costal margin a little convexly arched, apex rounded, basal cell emitting from its upper outer angle two contiguous longitudinal veins with a common origin, from the lower outer angles two other veins with a common origin and which widely bifurcate and form a large cell, three transverse discal series of large prominent cells, the central series shortest and consisting of two cells only, the outer series longest; wings somewhat small, the veins longitudinal.

This genus may be placed between *Armacia* and *Alisca*.

Lugardia mimica, sp. n.

♂. Head, face, clypeus, pronotum, mesonotum, and sternum black, margins of sternum and suffusions to abdomen ochraceous; legs black or piceous, annulations to the anterior tibiæ, and all the tarsi ochraceous; tegmina black, with a large, broad, discal, irregular, macular, hyaline fascia, broadest on basal half of tegmen and upwardly narrowing to costal margin near apex, costal margin irregularly marked with small greyish-white spots and apical margin marked with two clusters of larger hyaline spots, basal area sparsely suffused with small linear ochraceous markings; wings hyaline, the apical area broadly suffused with fuscous.

♀. All the black markings of body and tegmina replaced by piceous brown.

Long., excl. tegm., ♂ 4, ♀ 5 mm.; exp. tegm., ♂ 16, ♀ 18 mm.

Hab. South Africa; N'Gami Country (*Col. F. D. Lugard*, *Brit. Mus.*).

Lugardia mimica, apart from structural characters, exhibits a strong superficial resemblance to *Ricanoptera mellerborgi*, Stål, a well-known Oriental species. The difference in

habitat, however, in agreement with a canon of the theory, prevents its being adduced as an example of "mimicry."

Genus VUTINA.

Vutina, Stål, Ann. Soc. Ent. Fr. (4) iv. p. 64 (1864).

Type, *V. sexmaculata*, Sign.

Vutina atrata.

Flata atrata, Fabr. Syst. Rhynch. p. 47. 10 (1803).

Flatoides humeralis, Walk. List Hom. ii. p. 405 (1851).

Vutina atrata, Stål, Hem. Fabr. ii. p. 106 (1869).

Ricania feralis, Fowl. Biol. Centr.-Amer., Rhynch.-Hom. ii. pt. 1, p. 65, t. viii. fig. 7 a (1900).

Hab. Neotropical Region.

Genus MINDURA.

Mindura, Stål, Rio Jan. Hem. ii. p. 69 (1862); id. Öfv. Vet.-Ak. Förh. xxvii. p. 770 (1870).

Type, *M. alligata*, Walk.

Stål originally (1862) gave the *Flata obscura*, Fabr., as type of this genus. This species he subsequently and rightly, in his 'Hemiptera Fabriciana' (1869), placed in the genus *Pochazia*. In his 'Hemiptera Insularum Philippinarum' (1870) he describes his *Mindura subfasciata* = *Nogodina alligata*, Walk., and this must be taken as the type of *Mindura*.

Mindura alligata.

Nogodina alligata, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 170 (1868).

Mindura subfasciata, Stål, Öfv. Vet.-Ak. Förh. 1870, p. 770; Melich. Mon. Ricaniid. p. 302 (1898):

Hab. Philippines, Ceram.

Mindura signatifrons.

Nogodina signatifrons, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 164 (1868).

Hab. New Guinea.

Mindura guttifrons.

Nogodina guttifrons, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 164 (1868).

Hab. Sula.

Mindura invaria.

Nogodina invaria, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 166 (1868).

Hab. Sula.

Mindura interrupta.

Pochazia interrupta, Walk. Journ. Linn. Soc. Lond., Zool. i. p. 91 (1857).

Ricania walkeri, Atkins. Journ. Asiat. Soc. Beng. lv. p. 59 (1886).

Hab. Singapore.

Genus SASSULA.

Sassula, Stål, Öfv. Vet.-Ak. Förh. 1870, p. 769.

Detya, Dist. Faun. B. I., Rhynch. iii. p. 387.

Type, *S. osmyloides*, Walk.

Sassula osmyloides.

Ricania osmyloides, Walk. Journ. Linn. Soc. Lond., Zool. i. p. 157 (1857).

Sassula osmyloides, Melich. Mon. Ricaniid. p. 312 (1898).

Nogodina sublineata, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 167 (1868); Melich. Mon. Ricaniid. p. 307 (1898).

Hab. Malayan Archipelago.

Sassula sorurcula.

Miriza sorurcula, Stål, Öfv. Vet.-Ak. Förh. 1865, p. 164.

Sassula sorurcula, Melich. Mon. Ricaniid. p. 312 (1898).

Detya fusconebulosa, Dist. Faun. B. I., Rhynch. iii. p. 388 (1906).

Hab. Burma, Tenasserim, Cambodia, Borneo.

Sassula concolor.

Nogodina concolor, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 166 (1868); Melich. Mon. Ricaniid. p. 309 (1898).

Hab. Morty.

Sassula subguttata.

Ricania subguttata, Walk. List Hom., Suppl. p. 105 (1858).

Ricania subguttata, var., Walk. Journ. Linn. Soc. Lond., Zool. x. p. 165 (1868).

Nogodina subguttata, Melich. Mon. Ricaniid. p. 309 (1898).

Hab. Celebes.

Sassula subviridis.

Nogodina subviridis, Kirby, Mon. Christmas Isl. p. 135, pl. xv. fig. 10 (1900).

Hab. Christmas Island.

BIOLLEYANA, gen. nov.

Allied to *Sassula*, Stål, but differing by the structure of the face, which possesses three distinct longitudinal carinae, which are almost continuous from base to apex, the central one straight, the others very slightly curved; the tegmina are also shorter and broader, not twice as long as broad, which they are in *Sassula*.

Type, *B. pictifrons*, Stål.

Biolleyana contains the Neotropical species hitherto included in the Indian and Malayan genus *Sassula*.

I have dedicated this genus to the memory of the late Prof. Biolley, of San José, Costa Rica, who did so much to help workers on the insect fauna of Central America.

Biolleyana pictifrons.

Nogodina pictifrons, Stål, Stett. ent. Zeit. xxv. p. 53 (1864).

Sassula pictifrons, Melich. Mon. Ricaniid. p. 311 (1898); Fowl. (part.) Biol. Centr.-Am., Rhynch.-Hom. i. p. 67 (1900).

Hab. Central America.

Biolleyana fenestrata.

Nogodina fenestrata, Gerst. Mitth. nat. Ver. Neu-Vorp. xxvii. p. 46 (1895).

Sassula fenestrata, Melich. Mon. Ricaniid. p. 313, Taf. xii. fig. 2 (1898).

Sassula pictifrons, Fowl. (part.) Biol. Centr.-Am., Rhynch.-Hom. i. p. 67 (1900).

Hab. Panama, Honduras.

Fowler has not referred to this species in his enumeration of the Central-American Ricaniidæ. The figure of the face given by Melichar (Taf. xiii. fig. 22) is not accurate and represents a species of the genus *Sassula*.

Biolleyana costalis.

Sassula costalis, Fowl. Biol. Centr.-Am., Rhynch.-Hom. i. p. 68, t. viii. fig. 12 a (1900).

Hab. Nicaragua.

Genus VARCIA.

Varcia, Stål, Öfv. Vet.-Ak. Förh. 1870, p. 769.

Type, *V. nigrovittata*, Stål.

Varcia plena.

Nogodina plena, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 168 (1868); Melich. Mon. Ricaniid. p. 303 (1898).

Hab. Key Island.

Varcia flavicostalis.

Ricania flavicostalis, Kirby, Proc. Zool. Soc. 1888, p. 554.

Varcia flavicostalis, Melich. Mon. Ricaniid. p. 319 (1898); Kirby, Mon. Christmas Isld. p. 133, pl. xv. fig. 7 (1900).

Var. *affinis*, Kirby.

Ricania affinis, Kirby, Proc. Zool. Soc. 1888, p. 554.

Nogodina affinis, Melich. Mon. Ricaniid. p. 309 (1898); Kirby, Mon. Christmas Isld. p. 134 (nec fig.) (1900).

Kirby, in the 'Monograph of Christmas Island,' has followed Melichar in placing *R. flavicostalis* and *R. affinis* in different genera. They are, however, but vars. of one species. The neuration in Kirby's two figures has been drawn too diverse.

Varcia venosa.

Nogodina venosa, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 169 (1868).

Hab. Flores.

Walker refers to the differential characters between this species and *V. plena*, Walk., as being found in the markings of the face and the size of the tegminal stigma. In *V. venosa* the costal membrane is narrower than in *V. plena*.

Varcia sordida, sp. n.

— *sordida*, Walk., MS.

In general appearance and markings very closely resembling *V. hemerobii*, Walk., but smaller in size and with the costal membrane very much narrower and containing ten to twelve transverse veins; the face has four distinct black spots on anterior margin. Other characters generally as in *V. hemerobii*.

Long., excl. tegm., 9 mm.; exp. tegm. 24 mm.

Hab. Aru, Dorey (Brit. Mus.). Duke of York Island (Coll. Dist.).

Varcia sordida possesses a narrower costal membrane than that of any other species of the genus with which I am acquainted.

Genus GÆTULIA.

Gætulia, Stål, Stett. ent. Zeit. 1864, p. 54.

Type, *G. plenipennis*, Walk.

Kirkaldy (Rep. Exp. Stat. Haw. Plant. Assoc. iii. p. 98, 1907) writes:—"Distant states that the head is considerably narrower than the pronotum. This is incorrect as a generic character, for in *G. chrysopoides* the eyes project very slightly beyond the pronotum; Distant's figure also scarcely bears out his diagnosis; moreover, the clypeus is *not* carinate, as, indeed, Stål also states." This pronouncement of Kirkaldy is unfortunately inaccurate and misleading.

1. That the head considerably narrower than the pronotum "is incorrect as a generic character" is an amazing remark when the accurate figure of the Neotropical type (*G. plenipennis*, Walk., = *pubibunda*, Stål) given by Fowler (Biol. Centr.-Am., Rhynch.-Hom. i. t. viii. fig. 13) is available for consultation by one who is evidently unacquainted with the species. The Australian species *Ricania chrysopoides*, Walk., which Kirkaldy refers to as typical of *Gætulia*, has been so placed by none but himself; Melichar, in his Monograph (not having seen the species), merely remarks "Scheint zur Gattung *Gætulia* zu gehören."

2. Stål did not state that "the clypeus is *not* carinate," but "clypeus lateribus haud carinatis." The clypeus in the type is strongly centrally carinate, and laterally, in my opinion, also finely carinate; in the *chrysopoides*, Walk., it is distinctly so.

NURUNDERIA, gen. nov.

Allied to *Gætulia*, but differing by the head (including eyes) being as wide as the pronotum; face narrow elongate, the margins parallel, not widened beyond middle, and then obliquely narrowed to clypeus, which is centrally strongly longitudinally carinate and laterally finely carinate.

Type, *N. chrysopoides*, Walk.

Nurunderia chrysopoides.

Ricania chrysopoides, Walk. Journ. Ent. i. p. 312 (1862).

Gætulia chrysopoides, Kirk. Rep. Exp. Stat. Haw. Plant. Assoc. iii. p. 98 (1907).

Hab. Sydney (type, Pascoe Coll. in Brit. Mus.).

POSTSCRIPT.

Subfam. *ACHILINÆ*.

Apateson albomaculatum, Fowl. Biol. Centr.-Am., Rhynch.-Hom. i. p. 70, tab. viii. fig. 15a (1900).

This genus and species were placed by Canon Fowler, though with reservation, in the Ricaniidæ. By the structure of the clypeus, which has the lateral margins strongly carinate, it seems more naturally to belong to the Achilinæ.

Subfam. *ISSINÆ*.Genus *GALBALÆCA*.

Galbalæca, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 170 (1868).

Type, *G. retifera*, Walk.

This genus, placed by Walker at the end of the Ricaniidæ and after the genus *Nogodina*, belongs to the Issinæ and is allied to the genus *Eupilis*, Walk.

Galbalæca retifera.

Galbalæca retifera, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 171 (1868).

Hab. New Guinea.

XL.—Notes on *Fossorial Hymenoptera*.—I.

By ROWLAND E. TURNER, F.Z.S., F.E.S.

THE following new species were presented to the British Museum by Mons. A. Ducke, of the Pará Museum. The collection is of interest as containing females of the little-known Thynnid genus *Scotæna*, Klug, which differ from those of *Spilothynnus* in the short, broad, and more or less excavated pronotum and in the form of the pygidium.

Fam. *Thynnidæ*.*Spilothynnus remotus*, sp. n.

♂. Clypeus very slightly produced, narrowly and shallowly emarginate at the apex, the angles of the emargination produced into porrect tubercles, a very small tubercle in the

middle of the clypeus, a narrow shining space below the tubercle reaching to the apex, the base and sides very finely punctured. Mandibles bidentate, the inner tooth short and blunt. Antennæ inserted as far from each other as from the eyes, longer than the thorax and median segment combined, the apical joints arcuate. Front strongly, vertex more finely and shallowly punctured, the interantennal prominence broad, well developed, feebly bilobed at the apex. Posterior ocelli about twice as far from the eyes as from each other. Thorax and median segment punctured, closely on the sides of the mesonotum and on the pleuræ, more sparsely elsewhere; the pronotum almost smooth, the anterior margin raised. Scutellum strongly raised, with an oblique triangular slope anteriorly, broadly subtruncate at the apex. Median segment rounded, much longer than broad. Abdomen slender, flattened and elongate, very slender at the base, much longer than the head, thorax, and median segment combined, sparsely but not finely punctured, the apical segments with rather long fuscous pubescence on the sides. Hypopygium small, produced a little beyond the dorsal segment and rounded at the apex. Third abscissa of the radius half as long again as the second; the third cubital cell receives the second recurrent nervure at one-third from the base.

Black; the mandibles (except at the apex), a curved spot on the middle of the clypeus, the orbits of the eyes as high as the base of the antennæ, the apex of the interantennal prominence, a short transverse line on each side at the posterior angles of the head, a narrow curved band on each side of the pronotum and a very short transverse line on each side on the anterior margin, a curved spot on the mesopleuræ below the anterior wing, a narrow line on the mesonotum, a small spot on the middle of the scutellum and one at each of the anterior angles, a transverse line on the postscutellum and the anterior angles, a curved oblique band on each side on the apical half of the median segment, a small spot on each side at the apex of the first abdominal segment, and a spot at the apex of the coxæ yellow; the four basal abdominal segments ferruginous, very narrowly black on the apical margin, the base of the first segment black. Wings very pale flavo-hyaline, nervures ferruginous.

Length 16 mm.

Hab. Barbacena, Minas Geraes (*A. Ducke*), December. A single specimen.

The colour is so variable in some species of *Thynnidae* that it is possible that this may be a variety of *histris*, Klug, which I have not seen. Klug gives no details as to structure

except "clypeus medio productus, apice reflexus," which does not seem applicable to the present species.

Scotæna velusta, sp. n.

♂. Clypeus very slightly produced and semicircularly emarginate at the apex, produced on each side of the emargination into a long acute spine. Head finely and very closely punctured, the interantennal prominence deeply emarginate at the apex. Antennæ inserted a little nearer to each other than to the eyes, as long as the thorax and median segment combined, the apical joints very feebly arcuate beneath. Posterior ocelli more than twice as far from the eyes as from each other; the posterior angles of the head only slightly rounded. Pronotum narrower than the head, very minutely punctured, the anterior margin raised, with a shining groove behind it. Mesonotum, median segment, and dorsal segments of the abdomen very closely and rather deeply punctured, the scutellum a little more sparsely, the first dorsal segment and the ventral surface of the abdomen sparsely and shallowly punctured; scutellum convex, broadly rounded at the apex; median segment rounded, a little longer than broad. Abdomen elongate, tapering to the base; the first segment narrow, with a sulcus from the base nearly reaching the apex; the segments not constricted at the base; the apical segment rugose. Hypopygium short, not very narrow, reaching a little beyond the dorsal segment and rounded at the apex. Third abscissa of the radius fully half as long again as the second, the second recurrent nervure is received by the third cubital cell at one-fifth from the base.

Opaque black; a spot on each side at the apex of the clypeus, the anterior margin of the pronotum interrupted in the middle, a spot on each side of the postscutellum, and a small spot on each side of the four basal abdominal segments yellow. Tegulæ, tibiæ, and tarsi, sometimes also the femora, testaceous brown. Wings pale fusco-hyaline, darkest along the costa, nervures fuscous, stigma testaceous.

Length 14-16 mm.

♀. Head nearly twice as broad anteriorly as long, strongly rounded at the posterior angles, shining, sparsely and minutely punctured, with a few larger scattered punctures. Pronotum much narrower than the head, more than half as broad again as long, strongly carinate longitudinally in the middle, concave on each side of the carina, the lateral margins raised and emarginate near the posterior angles, which are subtuberculate, the median carina strongly broadened

posteriorly. Abdomen very sparsely and finely punctured; the first segment with the apical margin slightly raised, with a narrow transverse groove before it; second segment with three strong transverse carinæ including the raised apical margin, and another very low carina just before the apex. Pygidium rather narrow, slightly arched at the base, obliquely truncate posteriorly, the surface of the truncation constricted near the base, narrow before the constriction, the portion beyond the constriction ovate with slightly raised margins. Fifth ventral segment sparsely and not coarsely punctured.

Fuscous, paler on the thorax; head ferruginous; legs testaceous brown, a spot on each side of the two first abdominal segments obscure ochreous.

Length 8 mm.

Hab. Barbacena, Minas Geraes (*A. Ducke*), November. 4 ♂, 1 ♀.

Scotæna duckei, sp. n.

♂. Clypeus narrowly produced and triangularly emarginate at the apex, very slightly convex, shallowly punctured, with sparse white pubescence. Head very finely and closely punctured, with a longitudinal frontal sulcus, the inter-antennal prominence emarginate at the apex, not strongly developed, the front and sides of the head thinly covered with white pubescence. Antennæ inserted as near to each other as to the eyes, shorter than the thorax and median segment combined, filiform, the apical joints scarcely arcuate. Thorax and median segment shining, very finely punctured, more closely on the sides of the mesonotum and base of the median segment than elsewhere, the pronotum almost smooth. Scutellum rather short, very broadly rounded posteriorly; median segment broader than long, not convex, obliquely sloped from near the base. Abdomen elongate, tapering a little at the extremities, longer than the head, thorax, and median segment combined, segments 2-5 slightly constricted at the base. Hypopygium projecting beyond the dorsal segment, narrow, gradually narrowed to the blunt apex. The ventral segments of the abdomen are rather strongly punctured; the dorsal segments shining, very sparsely and finely punctured. The third abscissa of the radius is nearly twice as long as the second; the second recurrent nervure is received just beyond two-fifths from the base of the third cubital cell.

Black; the mandibles (except at the apex), clypeus, inner orbits of the eyes narrowly, two minute spots between the antennæ, a transverse line on each side at the posterior angles

of the head, the margins of the pronotum, very narrowly interrupted in the middle on the anterior margin, the tegulæ, a quadrate spot on the mesonotum, a spot on the mesopleuræ beneath the anterior wings, a broad band emarginate anteriorly on the scutellum and a spot at each of the anterior angles, the postscutellum, the median segment (except at the base and on the sides), a transverse band on the six basal dorsal segments of the abdomen, narrowly interrupted on segments 3-5 and very broadly on the sixth segment, yellow. Wings hyaline, a faint fuscous cloud in the apical half of the radial cell, nervures black, stigma ferruginous. Legs fuscous, the femora beneath and a line on the tibiæ above yellow.

Length 10-12 mm.

♀. Head slightly convex, half as broad again as long, rounded at the posterior angles, minutely and rather closely punctured, with a well-marked frontal sulcus, the clypeus subcarinate. Pronotum nearly twice as broad as long, the sides parallel, the lateral margins slightly raised near the posterior angles, finely and sparsely punctured. Scutellum small, broadly rounded at the apex. Median segment short, scarcely longer than the scutellum, almost smooth, broadened from the base and obliquely truncate posteriorly, with a small low tubercle in the middle at the base of the truncation. Abdomen very sparsely and shallowly punctured; the first segment rather broadly depressed at the apex, the apical margin very feebly raised; second segment with four transverse carinæ, including the strongly raised apical margin, the basal carina very low; third and fourth segments narrowly depressed at the apex, the raised portion bilobed at the apex. Pygidium narrow, compressed and arched at the base, truncate posteriorly, the surface of the truncation about half as long again as broad, the dorsal plate very short and narrow, the ventral plate with nearly parallel sides, rounded at the apex. Ventral segments sparsely but not finely punctured, the fifth segment more closely than the others. Tarsi slender, the ungues bidentate.

Testaceous brown; the head ferruginous, luteous on the sides and at the base of the mandibles, the median segment and the fourth dorsal segment of the abdomen fuscous.

Fresh specimens are entirely pale castaneous.

Length 6-7 mm.

Hab. Ceara (*A. Ducke*), April and May. 3 ♂, 3 ♀.

Near *Thynnus fastuosus*, Sm., but that species, of which only the male is known, is more strongly punctured and rather more robust, though the clypeus and hypopygium are similar.

Fam. Scoliidæ.

Anthobosca bipustulata, sp. n.

♂. Clypeus very slightly produced and very shallowly subemarginate at the apex, very minutely punctured. Head and thorax very finely and closely punctured, more sparsely on the vertex and scutellum, a shining, delicately impressed, longitudinal line on the front. Eyes very broadly and shallowly emarginate on the inner margin, the posterior ocelli a little further from the eyes than from each other. Antennæ very stout, tapering towards the apex, shorter than the thorax and median segment combined, the second joint of the flagellum broader than long, scarcely more than half as long as the third joint. Median segment very closely and minutely punctured, depressed on the sides round the stigma, as long as broad, convex. Abdomen very slender, tapering to the extremities, finely shagreened, the apical segment punctured, the first segment longer than the second, slender at the base. Apical ventral segment rounded and ciliate. Tarsal ungues bidentate, the pad large.

Black; the basal half of the mandibles, the clypeus, a spot on each side near the middle of the pronotum, a spot on the posterior margin of the mesonotum, a minute spot near the apex of the scutellum, a bilobed spot on the postscutellum, and the tegulæ pale yellow. Legs ferruginous in the type, but very variable in colour; the yellow markings on the mesonotum and scutellum are also variable.

First abscissa of the radius more than half as long as the second, the two together shorter than the third. Second recurrent nervure received close to the middle of the third cubital cell.

Length 7-13 mm.

Hab. Barbacena, Minas Geraes (*A. Ducke*). Seven specimens.

Very near *albomaculata*, Sm., but in that species the second recurrent nervure is received at one-third from the base of the third cubital cell, not in the middle, and the abdomen is not quite so slender. It is more distinct from *antennata*, Sm., and will probably prove to be the male of *bimaculata*, Perty. The second recurrent nervure in *bimaculata* is received in the middle of the third cubital cell as in this species.

XLI.—*Descriptions of new Genera and Species of Syntomidæ, Arctiadæ, Agaristidæ, and Noctuidæ.* By Sir GEORGE F. HAMPSON, Bart., F.Z.S.

THE following paper forms a fifth supplement to the first six volumes of the 'Catalogue of Lepidoptera Phalænæ in the British Museum,' the former papers having appeared in the Ann. & Mag. Nat. Hist. ser. 7, vol. viii. pp. 165-186 (1901), vol. xi. pp. 337-351 (1903), vol. xv. pp. 425-453 (1905), and vol. xix. pp. 221-257 (1907).

The numbers before the species indicate their position in the classification adopted in those volumes. The types are in the British Museum.

Syntomidæ.

232 a. *Hyalæthea bivitreata*, sp. n.

♂. Head, thorax, and abdomen brown; palpi (except at tips), frons, shoulders, pectus, legs, and ventral surface of abdomen orange. Fore wing brown, with a purplish tinge; a wedge-shaped hyaline patch in cell and elongate triangular patch below the cell from near base to near tornus. Hind wing brown, the base yellow, the lobe on inner margin yellow.

Hab. TENIMBER, Larat, 2 ♂ type. *Exp.* 22 mm.

287 b. *Metarctia phæoptera*, sp. n.

♀. Head and thorax fuscous brown; antennæ with some pink hair on basal joint in front; prothorax with a slight pink spot; pectus with lateral pinkish streaks; coxæ and femora with some pinkish hair; abdomen dark brown, with pinkish segmental rings. Fore wing uniform fuscous brown, the cilia greyish at tips. Hind wing fuscous brown, the disk somewhat semihyaline; cilia greyish at tips.

Hab. UPPER CONGO (*Wollaston*), 1 ♀ type. *Exp.* 34 mm.

287 c. *Metarctia pumila*, sp. n.

♂. Head and thorax dark reddish brown; abdomen yellowish suffused with red-brown. Fore wing uniform red-brown with a greyish tinge. Hind wing white suffused with ochreous.

♀. Head and thorax fuscous brown; sides of pectus and coxæ with some yellow; abdomen yellowish suffused with fuscous brown forming obscure bands, the ventral surface

fuscous brown with paired series of yellowish spots. Fore wing uniform fuscous brown. Hind wing fuscous brown with the interspaces of disk semihyaline.

Hab. UGANDA, White Nile, Gondokoro (*Reynes-Cole*), 2 ♂, 2 ♀ type. *Exp.*, ♂ 32, ♀ 36 mm.

Genus LASIOSCELES, nov.

Type, *L. erythrozonata*.

Proboscis fully developed; palpi upturned, the second joint reaching about to vertex of head and clothed with long hair, the third moderate; antennæ of male with very short branches dilated at extremity from near base to three-fourths, the apex serrate; thorax clothed with rough woolly hair; abdomen with rough hair at base. Fore wing with vein 3 from before angle of cell; 5 from just above angle; 6 from upper angle; 7, 8, 9, 10 stalked; 11 from cell. Hind wing with veins 2, 3, 4 strongly stalked; 5 obsolescent from middle of discocellulars; 6, 7 stalked; the area from apex to below middle of cell and submedian fold on upperside clothed with brownish-ochreous androconia.

385 a. *Lasiosceles erythrozonata*, sp. n.

♂. Head and thorax black-brown with a slight bluish gloss; pectus in front and tufts of hair on the femora crimson; abdomen black, with crimson dorsal and lateral bands. Fore wing black, the terminal area brownish; two elongate hyaline spots in end of cell and two shorter spots below end of cell; four spots beyond the cell between veins 7 and 3, the upper spots elongate, the lowest wedge-shaped. Hind wing black-brown, with two elongate hyaline spots beyond the cell above and below vein 5, the area beyond them and below them to submedian fold brownish ochreous.

Hab. PANAMA, Chiriqui, 1 ♂ type. *Exp.* 48 mm.

402 a. *Phænicoprocta flavipicta*, sp. n.

♂. Head and tegulæ black-brown, with patches of metallic blue, the tegulæ with yellow patches; palpi greyish in front; antennæ white at tips; patagia yellow; thorax brown; pectus at sides with patches of yellow and metallic blue, the fore coxæ white, the mid and hind coxæ yellow; abdomen brown, with patches of metallic blue, the first segment with paired dorsal yellow stripes, the other segment with yellow dorsal bands, the anal tuft orange, the ventral valve yellow edged with white. Fore wing hyaline, the veins

and margins black; a black discoidal bar, the terminal band expanding towards apex. Hind wing hyaline, the veins, costal area, and a terminal band black.

Hab. BR. GUIANA (*Rodway*), 1 ♂ type. *Exp.* 32 mm.

561 a. *Dixophlebia holophæa*, sp. n.

♂. Head, thorax, and abdomen black-brown with a faint bluish gloss; sides of frons grey; ventral surface of abdomen greyish. Fore wing black-brown, with a hyaline streak in the cell, a triangular fascia below the cell, and fascia above basal half of vein 2. Hind wing black-brown, with hyaline streak in and beyond lower end of cell to near termen.

Hab. BR. GUIANA (*Rodway*), 1 ♂ type. *Exp.* 26 mm.

592 a. *Rhynchopyga steniptera*, sp. n.

♀. Head, thorax, and abdomen black-brown. Fore wing very narrow and elongate, uniform black-brown. Hind wing slightly paler.

Hab. BR. GUIANA (*Rodway*), 1 ♀ type. *Exp.* 24 mm.

647 c. *Dycladia xanthobasis*, sp. n.

♀. Head and thorax black-brown; palpi orange at base; back of head and shoulders with orange stripes; abdomen black-brown, suffused with metallic blue on terminal segments, lateral orange fasciæ with serrate upper edge. Fore wing black-brown, the base orange; a wedge-shaped hyaline patch in basal half of cell and elongate patch below the cell; a hyaline band beyond the cell between veins 7 and 3, where it extends to near termen, leaving a round black-brown discoidal patch. Hind wing hyaline, the base orange, the veins, a discoidal spot, an apical patch, and the inner area (except at base) black-brown.

Hab. BR. GUIANA (*Rodway*), 1 ♀ type. *Exp.* 26 mm.

737 a. *Calonotos triplaga*.

Calonotos tripunctata, Hmps. Cat. Lep. Phal. B. M. i. p. 335, nec Druce.

♂. Black; frons with pair of white patches; tegulæ with two small dorsal white spots; prothorax with two metallic-green patches, metathorax with one patch; sides of pectus, coxæ, and extremities of femora with white spots; abdomen with paired subdorsal and lateral small white spots, the other segments with broad dorsal and lateral golden-green stripes,

the ventral surface with white stripe. Fore wing with white point at base of costa; a metallic-green streak below basal half of costa and wedge-shaped patch below base of cell; an elliptical medial semihyaline spot below the cell and round patch beyond its extremity; a slight green mark below extremity of cell. Hind wing with elliptical semihyaline white spot beyond the cell; the underside with metallic-green streak below costa to beyond middle and patch in cell.

Hab. BRAZIL, Amazons, Manaus (*Scholtz*), 1 ♂ type. *Exp.* 38 mm.

800 c. *Hypocladia parcipuncta*, sp. n.

♂. Head, thorax, and abdomen black-brown; palpi with slight white marks at base; shoulders with crimson patches; coxæ white; abdomen with pair of dorsal crimson spots at base and ventral white patches (except on terminal segments). Fore wing black-brown, with semihyaline streaks in and below middle of cell and postmedial streaks between veins 7 and 2. Hind wing black-brown, with hyaline streaks in and below cell and in the interspaces beyond it; the inner margin with some white hair.

Hab. BR. GUIANA (*Rodway*), 1 ♀ type. *Exp.* 30 mm.

835 a. *Chrysostola atridorsata*, sp. n.

♂. Head, thorax, and abdomen orange-yellow; antennæ black, with some white on shaft towards tips; vertex of head with black spot; patagia and dorsum of thorax with black stripes; pectus with lateral black spots; abdomen with dorsal black stripe, the two terminal segments with black bands, subdorsal short black stripes at base and middle and sublateral black spots at base. Fore wing hyaline, the veins and margins black; the base orange, an orange streak on inner margin to beyond middle; a black discoidal spot conjoined to the costal fascia; the terminal band expanding into a patch at apex. Hind wing hyaline, the veins and margins black; the inner area and an apical patch black.

Hab. BR. GUIANA (*Rodway*), 1 ♂ type. *Exp.* 26 mm.

890 a. *Methysia melanota*, sp. n.

♂. Head, thorax, and abdomen black with a faint bluish gloss; palpi white in front; tegulæ white at base; coxæ and stripes on inner side of femora white; abdomen with white ventral fascia. Fore wing hyaline, the veins and margins black, the inner area black to submedian fold; a black

streak in discal fold from middle of cell to termen, the terminal area with black streaks above veins 6 and 4. Hind wing white, the margins and inner area black.

Hab. BR. GUIANA (*Rodway*), 1 ♂ type. *Exp.* 26 mm.

Genus GONOTREPHES, nov.

Type, *Thyractia friga*, Druce.

Proboscis aborted, minute; palpi obliquely upturned, the second joint reaching about to middle of frons and moderately fringed with hair, the third short; frons smooth; antennæ of male bipectinate with moderate branches to apex; tegulæ dorsally produced to form a hood; tibiæ fringed with long hair; abdomen clothed with rough hair on dorsum, the anal segment with long lateral tufts of hair. Fore wing with the apex rather produced and acute, the termen angled at vein 5, then obliquely curved; vein 3 from well before angle of cell; 5 from well above angle; 6 from upper angle; 7, 8, 9, 10 stalked; 11 from cell. Hind wing with vein 4 absent; 5 from well above angle of cell; 6, 7 coincident.

1073 c. *Eucereon metaloba*, sp. n.

Hind wing of male with the tornal area strongly lobed, but without fold and fringe of scales, the basal half of costa slightly lobed.

♂. Head and thorax fuscous brown mixed with grey; neck with yellow ring; palpi white at base; fore coxæ, the femora and bands at extremity of fore tibiæ, and the first joints of tarsi whitish; abdomen fuscous brown with yellow lateral spots at extremity, the ventral surface white. Fore wing grey-white, the veins, discal and submedian folds with brown streaks; an indistinct somewhat dentate antemedial line; a black medial line, oblique to submedian fold, then angled inwards; a small black annulus in middle of cell; a diffused brown discoidal patch extending to costa with a pale curved line on the discocellulars; a slight postmedial white streak on costa; postmedial line blackish, rather diffused and dentate to vein 5, then double and minutely crenulate, bent inwards below vein 3; some irregular dark subterminal marks from apex to vein 3 and above tornus. Hind wing semihyaline greyish suffused with fuscous, the costal area whitish except at apex; the underside grey, with dark discoidal bar, the termen suffused with brown from apex to submedian fold.

Hab. PERU, La Oroya (*Ockenden*), 1 ♂ type. *Exp.* 30 mm.

1110 a. *Eucereon perstriata*, sp. n.

♂. Head and thorax greyish mixed with dark brown; back of head with two yellow spots; gule yellow; patagia with dark streaks near edges; vertex of thorax with fine dark streak; abdomen dark brown with paired subdorsal and sublateral yellow patches on two terminal segments, the three basal segments with paired ventral whitish spots. Fore wing ochreous whitish, the veins and interspaces streaked with dark brown; an incurved antemedial brown line from cell to vein 1; the medial part of costa dark brown; a dark brown patch in middle of cell; reniform represented by an oblique striga above and small spot below on inner side and faint brown line on outer; postmedial line double, strongly excurved from costa to vein 4, then strongly incurved, crossed by a rather sinuous dark streak on vein 2 extending to the subterminal pale line, which arises as a pale streak from termen below apex, excurved to near termen at vein 2 and forming two pale streaks in submedian interspace; apical area dark brown. Hind wing semihyaline whitish, the apex and veins of terminal area tinged with brown; a fine brown terminal line.

Hab. S.E. PERU, S. Domingo (*Ockenden*), 1 ♂ type. *Exp.* 44 mm.

Arctiadae.

NOLINÆ.

10 a. *Celama mesotherma*, sp. n.

Head, thorax, and abdomen white tinged with rufous; palpi with the scales fringing the joints tipped with black; tibiae and the tarsi ringed with blackish. Fore wing white irrorated with rufous and some fuscous; a subbasal black point on costa; antemedial line brown defined on inner side by white, angled outwards below costa, then oblique; medial area suffused with rufous, the tufts of scales at middle and upper angle of cell dark with oblique elliptical brownish stigmata above them from costa; postmedial line blackish and somewhat punctiform, defined on outer side by white, slightly bent outwards below costa, oblique to vein 4, then incurved and again excurved above inner margin; subterminal line white, defined on inner side by blackish scales with rufous suffusion before them, angled outwards at vein 7, excurved at middle and ending at tornus; a punctiform dark terminal line; cilia white mixed with some rufous and

fuscous. Hind wing white, tinged with ochreous brown, especially towards termen; cilia white faintly tinged with brown; the underside white, the costal area irrorated with brown.

Hab. CEYLON, Rambakkhana (*Alston*), 1 ♂, Colombo (*Mackwood*), 1 ♀ type; BORNEO, Sarawak (*Meade-Waldo*), 1 ♀, Sandakan (*Pryer*), 1 ♀. *Exp.* 14 mm.

10 b. *Celama rufimixta*, sp. n.

Head and thorax white; palpi rufous; antennæ tinged with rufous; thorax with some rufous behind tegulæ; tarsi rufous ringed with white; abdomen white tinged with rufous. Fore wing white, with some blackish irroration on basal area and before postmedial line; antemedial, medial, and postmedial rufous patches on costa; the terminal area suffused with rufous except at apex; antemedial line white, defined on inner side by rufous and on outer side by black from cell to inner margin, excurved in submedian interspace; large tufts of rufous and white scales in middle and at end of cell; an indistinct oblique waved line from lower angle of cell to inner margin; postmedial line white defined on inner side by brown, slightly bent outwards below costa and incurved below vein 4; subterminal line white slightly defined on inner side by black scales, excurved below costa, at middle, and above inner margin. Hind wing white, the terminal area tinged with brown; the underside with the costal area irrorated with brown, a dark discoidal striga.

Hab. CEYLON, Yatiyantota (*Green*), 1 ♂ type, Matale (*Pole*), 1 ♀, Wattegama (*Mackwood*), 1 ♀. *Exp.* 18 mm.

15 a. *Celama dentilinea*, sp. n.

♀. Head, thorax, and abdomen white tinged with ochreous brown; fore tibiæ and the tarsi fuscous brown ringed with white. Fore wing white tinged with ochreous brown and slightly irrorated with fuscous; antemedial line blackish, defined on inner side by white, curved, angled outwards in submedian fold; the tufts of scales at middle and upper angle of cell dark, with oblique elliptical brownish stigmata above them from costa; a waved dark line from lower angle of cell to inner margin; postmedial line blackish, punctiform, oblique from costa to vein 6, then inwardly oblique; terminal area suffused with ochreous brown, the subterminal line white, strongly and evenly dentate; a brown terminal line; cilia white tinged with ochreous brown. Hind wing white, the costal area slightly tinged with ochreous brown.

Hab. CEYLON (*Alston*), 1 ♀ type. *Exp.* 18 mm.

51 a. *Celama phaeocraspis*, sp. n.

♂. Head and thorax white mixed with some fuscous; palpi at sides and antennae (except basal joint) blackish; legs blackish, the tarsi ringed with white; abdomen pale ochreous. Fore wing grey-white irrorated with fuscous, the terminal area suffused with fuscous; a blackish subbasal bar from costa to median nervure; antemedial line black, expanding into a small spot at costa, strongly excurved from below costa to vein 1, where it is angled inwards, a blackish patch beyond it in cell; a black point at upper angle of cell; postmedial line black, strongly bent outwards and obsolescent below costa, then somewhat punctiform, very slightly incurved at vein 6 and strongly below vein 4, some black points beyond it on costa; subterminal line indistinct, dark, oblique from costa to vein 7, where it is angled outwards, excurved at middle and slightly angled inwards at discal and submedian folds, the area beyond it suffused with fuscous except at costa; cilia whitish, with a series of small fuscous spots. Hind wing white, faintly tinged with brownish ochreous.

♀. Fore wing with the terminal area much less suffused with fuscous, the subterminal line maculate, a terminal series of small blackish spots.

Hub. S. NIGERIA, Olokemeji (*Dudgeon*), 1 ♂ type; BR. F. AFRICA, Ndimu (*Betton*), 1 ♀. *Exp.*, ♂ 16, ♀ 20 mm.

61 b. *Nola mesoscota*, sp. n.

♀. Head and thorax whitish mixed with rufous and fuscous; tarsi fuscous slightly ringed with white; abdomen grey tinged with rufous and mixed with fuscous. Fore wing rufous mixed with some grey and irrorated with fuscous, the medial area before postmedial line and the terminal area suffused with fuscous; a somewhat diffused blackish antemedial line, angled outwards below costa, then inwardly oblique; slight tufts of dark scales in middle of cell and on discocellulars; postmedial line blackish, angled outwards below costa and slightly at vein 4, then incurved, some grey and fuscous marks beyond it on costa; subterminal line whitish, defined on inner side by blackish suffusion, angled outwards below apex, then oblique and ending at tornus; cilia with a whitish line at base. Hind wing whitish tinged with fuscous brown, the cilia with a whitish line at base; the underside whitish thickly irrorated with brown, a blackish discoidal bar.

Hab. TRANSVAAL, White R. (Cooke), 2 ♀ type. *Exp.* 24 mm.

75 b. *Nola achromia*, sp. n.

♂. Head and thorax white slightly tinged with yellowish; abdomen white. Fore wing white faintly tinged with rufous and irrorated with a few black scales; traces of a postmedial rufous line from vein 6 to middle of inner margin, with series of blackish points on it, very oblique below vein 5; traces of a rufous subterminal line, excurred below vein 7 and at middle; a terminal series of minute black points. Hind wing pure white; the underside with slight discoidal lunule.

Hab. QUEENSLAND, Kuranda (Dodd), 1 ♂ type. *Exp.* 16 mm.

LITHOSIANÆ.

Genus HYPOSHADA, nov.

Type, *Scoliacma pelopis*, Beth.-Baker.

Proboscis fully developed; palpi porrect, not reaching beyond the frons, which is rounded; antennæ of male with long cilia; hind tibiæ with two pairs of spurs. Fore wing long and narrow, the termen obliquely curved; the subcostal and median nervures closely approximated to middle; vein 2 oblique, joined at middle by a spur curving upwards from vein 1 b; 3, 4, 5 from angle of cell; 6, 7 stalked from 9; 10 from angle; 11 from cell, free; a fringe of hair from basal half of costa on underside; the base of inner margin fringed with hair. Hind wing very ample; the cell very long; vein 2 from well before middle, becoming coincident with 4; 3 from well before angle of cell, becoming coincident with 4; 4, 5 from angle, the former very oblique; a recurrent vein in cell; 6, 7 on a long stalk, rather distorted; 8 free, curving upwards to costa near base.

Genus STENILEMA, nov.

Type, *S. aurantiaca*.

Proboscis fully developed; palpi porrect, hardly extending beyond the frons, which is smooth; antennæ of male minutely serrate, with fasciculate cilia; tibiæ with the spurs short. Fore wing narrow, the apex rounded, the termen obliquely curved; vein 2 from towards end of cell, oblique; 3, 4 coincident; 5 absent; 6 from upper angle; 7, 8, 9

stalked, 7 from before 9; 10 from cell; 11 anastomosing with 12. Hind wing with veins 3, 4 coincident; 5 absent; 6, 7 stalked; 8 from middle of cell.

229 a. *Stenilema aurantiaca*, sp. n.

♂. Head and base of tegulae orange; antennae brown; tips of tegulae and thorax fuscous tinged with leaden grey; pectus, legs, and abdomen deep orange. Fore wing leaden grey, a costal fascia, a fascia on base of inner margin, and the cilia deep orange. Hind wing deep orange.

Hab. ABYSSINIA (*Drake-Brockman*), 1 ♂ type. *Exp.* 34 mm.

229 c. *Phryganopsis hemiphæa*, sp. n.

Antennae of male serrate and fasciculate; fore wing with vein 6 stalked with 7, 8, 9.

♂. Head and thorax orange; antennae brown except at base; tibiae and tarsi brown; abdomen orange dorsally, tinged with brown except at extremity. Fore wing with the costal half yellow, extending to inner margin near base and narrowing to a point at apex, the costa orange, the inner half grey-brown; an erect fuscous band just beyond middle. Hind wing pale yellow, the termen grey-brown towards apex.

Hab. UGANDA, White Nile, Gondokoro (*Reynes-Cole*), 1 ♂ type. *Exp.* 30 mm.

296 a. *Ilema rubrescens*, sp. n.

♀. Head and thorax pale red-brown with a yellowish tinge; abdomen grey, tinged with rufous. Fore wing pale red-brown with a yellowish tinge; an indistinct fuscous postmedial line, oblique from costa to vein 4, then inwardly oblique. Hind wing whitish faintly tinged with red-brown.

Hab. FORMOSA, Kagi Distr., 1 ♀ type. *Exp.* 40 mm.

415 a. *Agylla brunneostriata*, sp. n.

♂. Head and thorax ochreous suffused with reddish brown; abdomen ochreous white. Fore wing ochreous white, the inner half suffused and irrorated with red-brown, forming ill-defined streaks in the interspaces between veins 5 and 2; a brown streak below basal half of costa and two short streaks in end of cell; slight brown streaks in the interspaces below costa towards apex and slight brown marks in the terminal interspaces towards apex. Hind wing white slightly tinged with brown, the terminal area more strongly

tinged; the underside with the costal half suffused with brown.

Hab. S.E. PERU, Limbani (*Ockenden*), 2 ♂ type. *Exp.* 44 mm.

425 a. *Agylla sanguivitta*, sp. n.

Head and thorax fuscous, palpi blood-red, fuscous at tips; frons, antennæ, and patches on tegulæ and patagia blood-red; pectus whitish; head with slight white line behind; metathorax edged with white behind; legs fulvous, the fore tibiæ and tarsi with fuscous streak in front; abdomen ochreous, dorsally tinged with grey. Fore wing silvery white; a narrow orange-red fascia on costa; the inner area purplish fuscous except at base, with blood-red fascia above submedian fold from near base to beyond middle. Hind wing semihyaline white; the underside with ochreous fascia on costa.

Hab. S.E. PERU, Limbani (*Ockenden*), 1 ♂, 1 ♀ type, Aquilane (*Ockenden*), 2 ♂. *Exp.*, ♂ 42, ♀ 46 mm.

453 b. *Metareva endoscota*, sp. n.

♀. Head and thorax white tinged with fuscous; abdomen white. Fore wing silvery white, the inner area tinged with fuscous below submedian fold. Hind wing pure white.

Hab. S.E. PERU, La Oroya (*Ockenden*), 1 ♀ type. *Exp.* 34 mm.

455 a. *Pasteosia orientalis*, sp. n.

Fore wing with veins 7, 8, 9 stalked, 7 from beyond 9; 10 from cell.

♀. Head and thorax pale ochreous, the palpi blackish at base; abdomen grey-white, the ventral surface ochreous. Fore wing ochreous irrorated with fuscous brown; a minute black streak in middle of cell and two discoidal points; a curved diffused brownish postmedial line; slight subterminal dark marks below vein 3 and in submedian interspace; a punctiform brown terminal line; cilia whitish. Hind wing grey tinged with fuscous brown; the cilia whitish.

Hab. SINGAPORE (*Ridley*), 1 ♀ type. *Exp.* 22 mm.

528 b. *Anaphosia aurantiaca*, sp. n.

♂. Head, thorax, and abdomen orange; tibiæ streaked with black; tarsi black and orange. Fore wing yellowish white, the inner and terminal areas more or less strongly

suffused with orange; costa black; an oblique sinuous black medial line, incurved from median nervure to vein 1; an oblique sinuous black postmedial line, excurved below costa and joined at vein 5 by a curved black line from costa before apex; an oblique black streak from just beyond postmedial line below vein 4 to termen; a black terminal line; cilia orange. Hind wing orange. Underside of fore wing with black suffusion in and below cell to medial line and beyond middle of postmedial line.

Hab. TRANSVAAL (*C. H. Pead*), 2 ♂ type. *Exp.* 44 mm.

543 a. *Manoba atripuncta*, sp. n.

♂. Head and thorax pale grey tinged with brown; palpi black except at base; abdomen grey, dorsally suffused with fuscous brown. Fore wing grey tinged with brown; the costal edge black towards base; subbasal black points below costa and cell with a black point beyond them in the cell; a diffused fuscous bar from middle of costa and a slight nearly erect line from cell to inner margin; postmedial black points above and below vein 6; a fuscous spot on costa before apex and a curved subterminal series of black points; a terminal series of black points. Hind wing grey suffused with fuscous brown.

Hab. S. NIGERIA, Old Calabar (*Sampson*), 1 ♂ type. *Exp.* 14 mm.

634 a. *Chionæma formosana*, sp. n.

♀. Head, thorax, and abdomen white; palpi red-brown at sides; tegulæ with scarlet tips; inner side of fore tibiæ and the tarsi red-brown. Fore wing white; the costa scarlet towards base; subbasal line scarlet, angled outwards in cell and ending at vein 1; antemedial line scarlet, excurved below costa and angled inwards below the cell; a small black spot in end of cell and two obliquely placed on discocellulars; postmedial line scarlet, broad, strongly excurved between discal and submedian folds; a terminal scarlet band with slightly waved inner edge, expanding at apex and angled inwards in submedian fold. Hind wing pale crimson, the costal area to beyond middle and the cilia white.

Hab. FORMOSA, Kagi Distr., 1 ♀ type. *Exp.* 44 mm.

694 a. *Chionæma asticta*, sp. n.

Fore wing of male with vein 5 from middle of cell, 6 from upper angle, 7 and 9 stalked, 8 absent, the lobe represented

by a slight distortion, and veins 10, 11 almost obsolete; of female with vein 5 from lower angle of cell, 6 stalked with 7 and 9; 10, 11 from cell.

White; palpi blackish; antennæ tinged with fuscous except at base; tegulæ edged with orange in male; fore legs tinged with fuscous in front. Fore wing with the costal edge orange to beyond middle; the underside with the costa suffused with orange.

Hab. QUEENSLAND, Kuranda (*Dodd*), 1 ♂, 1 ♀ type. *Exp.* 22 mm.

694*b.* *Chionæma phæocraspis*, sp. n.

♂. Pure white; palpi fuscous; fore and mid legs tinged with brown. Fore wing with the costal edge brown to beyond middle; the underside with the costal area tinged with yellow.

Hab. LOUISIADES, St. Aignan (*Meek*), 1 ♂ type. *Exp.* 20 mm.

802*a.* *Seripha plumbeola*, sp. n.

♂. Uniform fuscous brown with a purplish-grey gloss.

Hab. CUBA, Baracoa (*Schaus*), 1 ♂ type; ECUADOR, Chimborazo, 1 ♂. *Exp.* 16 mm.

805*a.* *Lycomorhodes flavipars*, sp. n.

♂. Head and thorax orange-yellow, with fuscous-brown stripes on dorsum and shoulders; palpi, lower part of frons, and antennæ brown; fore legs brown, with some yellowish on femora and first joint of tarsi; mid and hind legs yellow banded with brown; abdomen crimson, the extremity and ventral surface yellow, some fuscous at tip of anal tuft and before the anal tuft on ventral surface. Fore wing fuscous brown; the inner margin orange-yellow, expanding into a patch at base; a broad postmedial orange-yellow band, its inner edge excurved, its outer angled outwards at middle and to tornus. Hind wing deep crimson, with terminal fuscous band, rather broad at apex and narrowing to a point at submedian fold.

Hab. W. COLOMBIA, Jiminez, 1 ♂ type. *Exp.* 20 mm.

830*a.* *Siccia atriguttata*, sp. n.

Head and thorax white; palpi black; frons black at sides; prothorax with black spots; fore legs fuscous; abdomen brownish white. Fore wing white; subbasal black spots

below costa and cell; antemedial black spots on costa, in and below cell, on vein 1, and on inner margin further from base; round black spots in middle of cell and on discocellulars; a black spot on middle of costa, with slight oblique line from it to discoidal spot, then incurved below the cell and with two black spots in submedian interspace; post-medial line black, maculate, bent outwards below costa, angled outwards at vein 6, incurved at discal fold and ex-curved at median nervules, then strongly incurved; a black lunule on costa before apex; the termen with small black spots at apex, middle, and below vein 2. Hind wing white; a slight discoidal point; the underside with the costal area slightly tinged with brown.

Hab. ANGOLA, Bihé, 1 ♂, 1 ♀ type. *Exp.*, ♂ 24, ♀ 26 mm.

990 a. *Asura fulvimarginata*, sp. n.

♀. Head, tegulae, and patagia orange-yellow, the vertex of head with slight dark streak; thorax and abdomen pale brown; antennae brown; hind tibiae and tarsi yellowish. Fore wing pale red-brown, the costal and inner margin reddish yellow. Hind wing pale semihyaline red-brown.

Hab. MADRAS, Horsleykonda (*Campbell*), 1 ♀ type. *Exp.* 26 mm.

ARCTIAXÆ.

1259 b. *Automolis rhodocyma*, sp. n.

♂. Head, thorax, and abdomen yellow, the palpi scarlet behind, the antennae brownish, the thorax tinged with rufous and the abdomen with scarlet; pectus, legs, and ventral surface of abdomen white. Fore wing yellow, the costal area and base except at inner margin rufous, the veins streaked with scarlet; a subbasal white point defined by brown above vein 1, and a brownish antemedial spot on sub-costal nervure; antemedial line scarlet, strongly dentate, more strongly angled outwards above median nervure and inwards on vein 1, a brown point on it on subcostal nervure; an irregular rufous discoidal patch with yellowish point on it, slightly defined by scarlet except above where it is con-joined to the rufous costal area; postmedial line double, scarlet filled in with yellow, highly waved, obsolete on costal area, excurved to vein 4, then strongly incurved, a curved patch of rufous and dark brown beyond it from vein 3 to tornus where it expands to termen; an irregular rufous

band beyond it from the costal area to vein 3, emitting streaks to termen on veins 5, 4, 3; a fine rufous terminal line; cilia chequered yellow and rufous, the tips dark at the rufous patches. Hind wing pale yellow, the inner half suffused with scarlet, the termen tinged with scarlet. Under-side pale yellow, the costa of fore wing and some irregular subterminal marks rufous.

Hab. PERU, Huacamayo (*Ockenden*), 2 ♂ type. *Exp.* 40 mm.

1400 a. *Ischnocampa hemihyala*, sp. n.

♂. Head and thorax yellow-brown mixed with some whitish; palpi with the second and third joints black, with pale tips; vertex of head and thorax with black stripe; patagia with blackish streak near upper edge; abdomen fuscous brown, the ventral surface yellow-brown. Fore wing with the marginal areas yellowish mixed with whitish and irrorated and striated with yellow-brown, the rest of wing hyaline irrorated with a few dark scales, the veins brownish; black points in cell near base, at middle, and on discocellulars; small postmedial black spots on costa and inner margin and a series of slight streaks on the veins; a subterminal blackish shade from costa and a series of minute black streaks on termen in the interspaces. Hind wing hyaline; a black discoidal point; the apex and cilia tinged with ochreous brown.

Hab. PERU, Oconeque (*Ockenden*), 1 ♂ type. *Exp.* 38 mm.

1458 a. *Amastus fulvizonata*, sp. n.

♂. Palpi black with some white in front and scarlet at sides; frons white with oblique black bars above, the vertex of head and spots in front of antennæ fulvous yellow; antennæ black; tegulæ white at base with black medial line and fulvous tips; patagia white with sinuous fulvous fascia at middle defined by black; thorax rufous and yellow; pectus and legs brown and white, the coxæ crimson, the fore tibiæ with orange stripes above; abdomen crimson, with lateral series of triangular white and yellow patches defined by black, the ventral surface white with sublateral series of fulvous spots defined by black. Fore wing semihyaline white irrorated with black, the veins streaked with black and irrorated with yellow; a small yellow spot at base with white streak below it and a white streak above basal part of inner margin; an antemedial white bar from costa and oblique bar from inner margin; a medial white spot on

costa, slight mark on vein 2, and oblique bar on inner margin confluent with the antemedial bar; postmedial line represented by an angled white striga from costa and oblique series of slight marks on the veins and inner margin, with fulvous yellow marks beyond it on costa, veins, and inner margin; an irregular subterminal whitish patch on costal area and patches in the interspaces of terminal area; a series of small yellow wedge-shaped marks defined by black on the termen and cilia. Hind wing semihyaline white, the veins, base, and inner margins tinged with yellow; the underside with the costa tinged with brown.

♀. Fore wing less hyaline, more suffused with black and irrorated with yellow, the antemedial, medial, and postmedial white bands and the yellow postmedial band more complete. Hind wing with the termen and cilia brown, with series of small yellow spots from apex to vein 2.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂, 1 ♀ type. *Exp.*, ♂ 60, ♀ 70 mm.

1523 a. *Halisidota melanoproctis*, sp. n.

♀. Head white; palpi black; antennæ rufous; thorax rufous; abdomen white-scaled with rufous hair at base, the terminal segments and ventral surface black and without scales, the slight anal tuft white. Fore wing yellowish rufous, the interspaces hyaline except on terminal area, which is irrorated with black; a black discoidal point; an indistinct wavy yellowish subterminal line defined on inner side by slight diffused black scaling. Hind wing hyaline, the terminal area suffused with fulvous yellow; the underside with the costal area fulvous yellow.

Hab. S.E. PERU, Agualani (*Ockenden*), 2 ♀ type. *Exp.* 56 mm.

1523 c. *Halisidota vitreata*, sp. n.

♂. Head and thorax bright rufous; palpi, antennæ, and legs dark brown; abdomen pale rufous, the terminal segments blackish. Fore wing hyaline, the margins rufous. Hind wing hyaline, the inner area reddish ochreous, the cilia rufous.

♀. Fore wing with the interspaces of basal half semihyaline, the terminal half and margins rufous slightly irrorated with dark scales. Hind wing pale reddish ochreous.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂, 1 ♀ type. *Exp.* 66 mm.

1559 b. *Æmilia brunneipars*, sp. n.

♂. Head, thorax, and abdomen very dark brown, the vertex of head with a yellow spot; femora yellowish above. Fore wing ochreous brown thickly striated with dark brown; the costa and inner margin except at base dark brown; the terminal area obliquely from apex to lower angle of cell, and thence to inner margin beyond middle dark brown; an elliptical black-brown discoidal spot; cilia blackish at base, white at tips. Hind wing whitish tinged with brown, the terminal area suffused with brown; cilia white at tips; the underside with the costal area and terminal area to vein 3 tinged with ochreous and striated with brown.

Hab. S.E. PERU, Agualani (*Ockenden*), 2 ♂ type. *Exp.* 44 mm.

1701 a. *Diacrisia rhodophilodes*, sp. n.

♂. Head and thorax white; palpi crimson, black at tips; sides of frons and antennæ black; neck with crimson ring and the tegulæ crimson below; fore femora crimson above, the tibiæ and tarsi black; mid and hind femoro-tibial joints and the tarsi black above; abdomen crimson, the base, anal tuft, and ventral surface white; a lateral series of black points. Fore wing white, thinly scaled; an antemedial black point in upper part of cell and two obliquely placed above inner margin; a black point in upper angle of cell; a postmedial series of black points, excurved from below costa to vein 4, then oblique, met at vein 5 by an oblique series of double minute black streaks on each side of veins from apex; minute subterminal black streaks on each side of veins 5, 4, 3. Hind wing white, thinly scaled; a small black spot at upper angle of cell and subterminal spots above vein 5 and between vein 2 and tornus.

♀. Palpi and neck without crimson; fore femora black above; abdomen white tinged with ochreous brown towards extremity and with subdorsal and sublateral series of black spots; fore wing with the postmedial series of spots obsolete towards costa.

Hab. FORMOSA, Kagi Distr., 4 ♂, 1 ♀ type. *Exp.*, ♂ 40, ♀ 46 mm.

1787 a. *Diacrisia neurographa*, sp. n.

♂. Head and thorax ochreous brown; palpi, antennæ, and shoulders black; thorax with dorsal black streak; legs black, the fore femora crimson above; abdomen crimson, the

ventral surface ochreous brown, dorsal and lateral black streaks and sublateral series of small spots. Fore wing ochreous suffused with reddish brown, the veins pale, the costal edge black; an antemedial series of short black streaks from costa to just below cell, where there is another short streak before it, an elongate spot above vein 1; wedge-shaped black spots in angles of cell, with streaks beyond them and streaks above them on costal area; a postmedial black mark on costa, divided into streaks by the pale veins, and an oblique series of spots on each side of the veins from beyond lower angle of cell to inner margin; an oblique series of minute streaks on each side of the veins from apex and a curved series on each side of veins 5 to 3 and spot on termen above tornus. Hind wing ochreous brown, the inner area tinged with crimson except on terminal area; a large black discoidal lunule; a curved postmedial series of small fuscous spots in the interspaces from costa to vein 2; an oblique series of minute spots on each side of the veins from apex, another subterminal series on veins 5 to 3, two large spots above tornus, and a streak in extremity of submedian fold; the underside with wedge-shaped black patch in base of cell.

♀. Head, thorax, and fore wing browner, the last with the markings reduced to a small antemedial spot above vein 1, a point at lower angle of cell, slight postmedial mark on each side of veins 2 and 1, and traces of the series from apex and the subterminal series. Hind wing brownish, with the crimson on inner area slight, the postmedial spots absent, also those towards apex and the subterminal series.

Hab. W. CHINA, Pu-tsu-fong, 4 ♂; FORMOSA, Kagi Distr., 3 ♂, 1 ♀ type. *Exp.*, ♂ 44-48, ♀ 56 mm.

1824 b. *Acantharctia latifasciata*, sp. n.

♂. Head and thorax ochreous, with a broad blackish fascia on vertex of head and thorax; palpi mostly black; antennæ black; legs streaked with blackish; abdomen fulvous yellow, with black segmental bands. Fore wing ochreous, with broad fuscous fasciæ from base through the cell to termen, in submedian interspace, and in interspaces of terminal area from costa to vein 2. Hind wing pale ochreous, with broad fuscous fasciæ from before middle through the cell to termen and in submedian interspace, and short fasciæ above extremities of veins 6, 3, 2.

♀. Hind wing with the fasciæ broader and more prominent and with fasciæ above extremity of vein 4 and on vein 1.

Hab. TRANSVAAL (C. H. Peard), 1 ♂, 1 ♀ type. *Exp.* 42 mm.

1833 a. *Amsacta flavicosta*, sp. n.

♂. Head and thorax white; palpi, upper part of frons, back of head, and tips of tegulæ yellow; antennæ with the branches black; femora yellow above, the fore and mid tibiæ and the tarsi streaked with black below; abdomen white, with subdorsal yellow stripes (except at base and extremity) and lateral series of black points. Fore wing white, the costal edge yellow; a black point at lower angle of cell. Hind wing semihyaline white.

Hab. SIERRA LEONE (*Dudgeon*), 1 ♂ type. *Exp.* 34 mm.

1852 b. *Hyphantria atripes*, sp. n.

♀. Head and thorax white; patagia with black spots at middle and two on outer edge; the femora yellow above, the fore and mid tibiæ striped with black, the tarsi blackish ringed with white; abdomen white, with subdorsal yellow bands (except at base and extremity) and lateral series of black points. Fore wing white, the costal edge yellowish; a black point in base of cell and obliquely placed subbasal points in and below cell; an antemedial series of black points angled outwards on median nervure and incurved below costa and cell; paired medial black points below costa, at middle, and vein 1, angled outwards at median nervure, then oblique; a black point at upper angle of cell and three at lower angle; a postmedial series of black points, bent outwards below costa, oblique to vein 4, and slightly incurved at discal fold, then oblique; a subterminal series of black points in pairs on each side of the veins; a terminal series of small black spots. Hind wing white; the underside with slight black discoidal point.

Hab. GOLD COAST, Volta R. (*Dudgeon*), 1 ♀ type. *Exp.* 40 mm.

Genus *PALEOMOLIS*, nov.

Type, *P. purpurascens*.

Proboscis absent; palpi porrect, extending to just beyond the large frontal tuft of hair and fringed with long hair below; eyes large, round; antennæ of male ciliated; head and thorax clothed with long hair; tibiæ fringed with long hair, the hind tibia with two pairs of spurs; abdomen clothed with long hair. Fore wing with the apex rounded, the termen evenly curved; vein 3 from near angle of cell; 4, 5 from angle; 6 from upper angle; 7, 8, 9 stalked; 10, 11

from cell. Hind wing with vein 3 from near angle of cell; 5 from just above angle; 6, 7 from upper angle; 8 from middle of cell.

1972 a. *Palaeomolis purpurascens*, sp. n.

♂. Head and thorax pale purple mixed with pinkish; palpi crimson; frons tinged with crimson; tegulae and patagia slightly edged with crimson above; pectus and legs crimson, the tibiae fringed with pale purple hair; abdomen pale crimson. Fore wing pale olive-yellow, the costal area (except at apex) and the medial area below the cell pale purple; the veins and costa streaked with crimson, the termen deeper yellow, the inner margin with a fine black streak on medial area; antemedial and medial fine black lines oblique from costa to median nervure, then inwardly oblique and sinuous; a fine black postmedial line, slightly excurved below costa and incurved at discal fold, oblique and slightly sinuous below vein 4; cilia whitish at tips. Hind wing yellowish white. Underside of fore wing yellow, with the costal area crimson; hind wing yellowish white, with the costal area yellow.

Hab. S.E. PERU, Agualani (*Ockenden*), 2 ♂ type. *Exp.* 36 mm.

1990 a. *Seirarctia metaxantha*, sp. n.

♂. Head and thorax buff slightly tinged with rufous; palpi crimson at base, black at tips; antennae black, except towards base above; patagia with black spot at base and crimson upper edge; pectus in front and legs crimson, the femoro-tibial joints black, the tibiae ringed with buff at extremities, the tarsi ringed with black; abdomen buff, with crimson hair at base, oblique black subdorsal patches, two small spots on anal segment, and sublateral series of small spots. Fore wing buff thickly striated with rufous, the costa to postmedial line and the submedian interspace to medial band slightly striated; a diffused antemedial rufous band, angled outwards on median nervure; a diffused curved medial band; a slight crimson discoidal lunule; a post-medial rufous line excurved at middle, then oblique. Hind wing pale orange-yellow, the inner area tinged with crimson; a black discoidal striga; a fine orange terminal line; the underside with the costal area tinged with crimson.

Hab. TRANSVAAL, White R. (*Cooke*), 1 ♂ type. *Exp.* 56 mm.

2020 g. *Hyponerita rhodocraspis*, sp. n.

Hind tibiæ of male dilated, the tibiæ and proximal joints of tarsi with thick tufts of hair and scales.

♂. Head yellow; palpi scarlet at sides; lower part of frons and points above eyes scarlet; antennæ brown, the shaft scarlet at base; thorax deep chocolate-brown, the prothorax with scarlet point; pectus and legs yellow, the fore tibia with scarlet streak on inner side; abdomen yellow, with dorsal series of crimson patches (except at extremity) and purple-brown patch near extremity. Fore wing purple-brown, with large yellow antemedial patch on costa extending to median nervure and two narrower patches towards apex, all defined by scarlet below; the terminal area with semi-elliptical patch from just below apex to tornus, defined by scarlet on inner side, indented at vein 6 by the purple-brown area being angled outwards; a rather triangular scarlet sub-basal patch on inner area, an oblique medial bar, and erect postmedial bar from submedian fold to inner margin. Hind wing yellow, the termen slightly tinged with scarlet from apex to just below vein 2; the underside with small brown patch at apex.

Hab. S.E. PERU, La Oroya (*Ockenden*), 1 ♂ type. *Exp.* 32 mm.

GENUS STIDZÆRAS.

Type, *S. strigifera*, Druce.

Proboscis fully developed; palpi smoothly scaled, upturned, the second joint not reaching vertex of head; antennæ in both sexes with short branches ending in a bristle; hind tibiæ with two pairs of spurs; abdomen dorsally clothed with rough hair at base. Fore wing with vein 3 from long before angle of cell; 4, 5 from angle; 6 from upper angle; 9 from 10 anastomosing with 8 to form a long areole; 11 from cell; male with the cell filled by a semihyaline brand, veins 4, 5 stalked, the end of cell very oblique, 6 from well below upper angle, the areole large and broad and vein 7 curved. Hind wing with vein 3 from before angle of cell; 4, 5 stalked; 6, 7 from upper angle; 8 from towards end of cell.

2049 a. *Proschaliphora albida*, sp. n.

♂. Head and thorax white, the head yellowish in front; antennæ yellow, with the basal joint black in front; pectus yellow; legs banded black and white; abdomen pale yellow,

with black bands. Fore wing silvery white; the costal edge orange; subbasal line represented by black striæ from costa and cell; antemedial line black, erect, minutely and irregularly waved; a black discoidal striga; postmedial line black, minutely waved, slightly excurved below costa, somewhat oblique to lower angle of cell, then erect; a series of small black spots on apical part of costa and termen. Hind wing white; a small blackish discoidal spot and terminal series of small black spots from apex to vein 2; cilia slightly tinged with yellow. Underside of fore wing wholly suffused with black; hind wing with the discoidal spot prominent.

Hab. TRANSVAAL, Kranspruit (*Janse*), 1 ♂ type. *Exp.* 36 mm.

Agaristidæ.

158 a. *Tuerta insulica*, sp. n.

♂. Head and thorax chocolate-red mixed with white; palpi black, white at base and tips; frons white; antennæ brown; pectus white, yellow at sides; abdomen yellow, with the crests brown. Fore wing white, thickly irrorated with chocolate-red; subbasal line represented by a red striga from costa; antemedial line indistinct, red, oblique, irregular; orbicular and reniform represented by rather diffused red patches with silvery centres, the former rather elliptical, the latter somewhat quadrate, white patches between and beyond them; postmedial line absent; subterminal line represented by an obscure series of somewhat dentate chocolate marks, with some silver scales on them and some whitish beyond them; terminal area darker; cilia chocolate, with series of small white spots at base. Hind wing golden yellow, with a broad black-brown terminal band tinged with red, its inner edge excurved at middle; cilia white. Underside of fore wing with the basal half yellow, the terminal half red-brown, the white bars before and beyond reniform prominent.

Hab. TRINIDAD (*Kaye*), 1 ♂ type. *Exp.* 36 mm.

Noctuidæ.

AGROTINÆ.

Genus METOPOPLACIS, nov.

Type, *M. olivata*.

Proboscis fully developed; palpi upturned, the second joint hardly reaching to middle of frons and moderately fringed

with hair in front, the third short; frons with large rounded prominence, with small roughened corneous disk at middle and corneous plate below it; eyes large, round; antennæ of female almost simple; thorax clothed with hair only and without crests; tibiæ slightly fringed with hair, the fore tibia short, with long curved claw on outer side and short claw and one spine on inner; abdomen with some rough hair at base, but without crests. Fore wing with the apex rounded, the termen somewhat excised from apex to vein 4 and not crenulate; veins 3 and 5 from near angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hind wing with veins 3, 4 from angle of cell; 5 obsolescent from middle of discocellulars; 6, 7 from upper angle; 8 anastomosing with the cell near base only.

151 a. *Metopoplacis olivata*, sp. n.

♀. Head and thorax white tinged with ochreous; antennæ brownish; abdomen whitish, dorsally tinged with ochreous brown. Fore wing white; a broad diffused olive-green subbasal band, its outer edge excurved below the cell; a medial olive-green band, broad and diffused outwardly from costa to lower angle of cell, then narrow, its inner edge excised at median nervure and slightly angled outwards at vein 1, confluent with an olive-brown patch beyond the cell; a faint minutely dentate white postmedial line, incurved from costa to vein 4, where it is angled outwards, an olive-green patch beyond it on costal area extending to termen below apex, and another patch extending to termen between veins 4 and 3; cilia white, chequered with olive-green. Hind wing white, with some brown suffusion from below angle of cell to the broad diffused brown subterminal band, ending on termen above vein 1; the underside white, with diffused brown band from middle of costa to discal fold, and some brown irroration on terminal area from apex to submedian fold.

Hab. BRAZIL, Mato Grosso, Nivac (*Avila*), 1 ♀ type. *Exp.* 24 mm.

173 a. *Timora diarrhoda*, sp. n.

♂. Head purplish pink in front, olive-yellow behind; tegulæ white at base, purplish pink behind; thorax white, with some dark scales; legs yellow, the fore legs suffused with pink; abdomen orange-yellow. Fore wing olive-yellow; the costa purplish pink with a white point before

middle and series on terminal half; a diffused purplish-pink fascia below costa, not reaching base and sometimes diffused to costa; a diffused pink fascia above inner margin from before middle to near tornus, with some white and black scales below it on inner margin; a large pink patch beyond lower angle of cell; a minute white point in middle of cell defined by pink scales; a pink discoidal spot with white points and striæ on it; a double postmedial series of white points excurved below costa, then oblique; a terminal series of black striæ, defined by white on inner side; cilia white, with some black and pink scales. Hind wing pure white; the underside with the costal area slightly tinged with ochreous and pink.

Hab. TRANSVAAL, Kranspruit (*Janse*), 2 ♂ type. *Exp.* 22 mm.

259 a. *Porosagrotis peruviana*, sp. n.

♂. Head and thorax brown mixed with black and some grey; antennæ with white spot on outer side of basal joint; tegulæ with black medial line; tarsi black ringed with white; abdomen brown mixed with some whitish, especially on ventral surface, the anal tuft ochreous. Fore wing brown mixed with ochreous white; the veins and discal and submedian folds with slight dark streaks; a fine black streak in submedian fold to antemedial line; subbasal line black, from costa to submedian fold; antemedial line black, waved, angled inwards on median nervure and vein 1, and strongly outwards above inner margin; claviform large, defined by black; orbicular and reniform large, defined by black, the former produced on outer side; an oblique dark striga from costa to reniform and indistinct waved line from lower angle of cell to inner margin; postmedial line black, slightly bent outwards below costa, then dentate, excurved to vein 4, then incurved, some slight dark and pale points beyond it on costa; subterminal line formed by whitish dentate marks, defined on inner side by small dentate black marks between veins 6 and 1, somewhat excurved at vein 7 and middle; a terminal series of small black lunules; cilia with two slight brown lines through them. Hind wings white, the veins and inner margin tinged with brown, some light brown lunules on termen from apex to vein 2; cilia with a faint brown line near base from apex to vein 2; the underside with the costal area irrorated with brown, postmedial line represented by a blackish bar from costa and minute black streaks on the veins, some small black lunules on termen from apex to vein 2.

Ab. 1. Fore wing with black streak from claviform to postmedial line above submedian fold; hind wing wholly tinged with brown.

Hab. S.E. PERU, Agualani (*Ockenden*), 2 ♂ type. *Exp.* 32 mm.

383 b. *Euxoa diplosticta*, sp. n.

♂. Head and thorax bright rufous mixed with grey, especially on head and tegulæ, the latter with double rufous line at middle; palpi black-brown except at tips; pectus and legs grey-white mixed with rufous; abdomen grey, tinged with brown and with small dorsal blackish spots on terminal segments. Fore wing bright rufous, the inner and terminal areas greyer, with slight blackish irroration; subbasal line slight, double, filled in with greyish, waved, from costa to submedian fold; antemedial line double, filled in with greyish, oblique, strongly angled inwards on vein 1 and excurved above inner margin; orbicular with pale annulus defined by rufous, small, oblique elliptical; reniform with its centre and outer edge faintly defined and with blackish spot in its lower part, obscured by the dark medial shade, which is oblique from costa to lower angle of cell, then obliquely incurved; postmedial line double, filled in with greyish, oblique from costa to vein 6, then dentate, and with double black points beyond it on the veins; subterminal line hardly traceable, curved, with a pair of small black spots above and below vein 5 and point above them; a series of black points just before termen. Hind wing greyish suffused with reddish brown; a terminal series of black points from apex to vein 2; cilia whitish; the underside grey, the costal area irrorated with brown, a black discoidal lunule, and irregularly waved postmedial line.

Hab. SANDWICH Is., Oahu, Waialua (*Perkins*), 1 ♂ type. *Exp.* 36 mm.

568 b. *Euxoa albiorbis*, sp. n.

♀. Head and thorax rufous, the tips of tegulæ, upper edge of patagia, and vertex of thorax dark brown; tegulæ with black medial line; palpi black, except at tips; pectus and legs blackish, the tarsi ringed with white; abdomen greyish ochreous irrorated with dark brown. Fore wing rufous suffused with blackish to postmedial line, on costal area to apex, and on terminal area; subbasal line double, filled in with rufous, waved, from costa to submedian fold; antemedial line double, filled in with rufous, excurved from

costa to submedian fold, angled inwards on vein 1, and bent outwards above inner margin; claviform defined by black, acute at extremity; orbicular white, defined by black, small, round; reniform fuscous, defined by black, with whitish annulus on inner side only; postmedial line indistinct, pale, bent outwards below costa, then with double series of black points beyond it on the veins, slightly incurved at discal fold, and closely approximated to the reniform; incurved below vein 4 and slightly excurved at vein 1, some whitish points beyond it on costa; subterminal line defined by brown suffusion on inner side, excurved below vein 7 and at middle; a fine terminal black line; cilia bright rufous, with two black points towards apex. Hind wing whitish suffused with brown, especially on terminal area; a fine dark terminal line; cilia whitish, with a brown line through them from apex to vein 2; the underside whitish, the costal area irrorated with brown, the terminal area suffused with brown, a blackish discoidal spot, and sinuous postmedial line, with dark points at the veins.

Hab. MASHONALAND, Salisbury (*Marshall*), 1 ♀ type.
Exp. 24 mm.

716 a. *Agrotis formosensis*, sp. n.

♂. Head and thorax rufous; palpi black, the second joint white at tip; frons whitish; antennæ blackish; tegulae with black band at base; tibiae and tarsi blackish ringed with white; abdomen whitish tinged with rufous. Fore wing whitish, suffused with rufous and irrorated with black; sub-basal line represented by double black striae from costa and cell; antemedial line double, slightly angled outwards below costa, then oblique, sinuous, strongly excurved above inner margin, a black patch before it below the cell; claviform whitish defined by black; orbicular and reniform with whitish annuli defined by black, the former round, the cell before and between them black; medial line blackish, oblique to reniform and sinuous from lower angle of cell to inner margin; postmedial line double, bent outwards below costa, then minutely waved, incurved below vein 4, the costa beyond it blackish, with some whitish points on it; subterminal line pale, defined on inner side by a blackish shade towards costa, slightly excurved below vein 7 and at middle; a terminal series of black points; cilia with a pale line at base. Hind wing whitish tinged with brown, especially towards termen; a dark discoidal striga; cilia reddish, with a pale line at base; the underside whitish, the costal area tinged

with rufous and irrorated with brown, a blackish discoidal lunule, and sinuous postmedial line.

Hab. FORMOSA, Kagi Distr., 2 ♂ type. *Exp.* 30 mm.

815 a. *Episilia trifasciata*, sp. n.

♂. Head and front of thorax red-brown mixed with some whitish, palpi red brown, whitish at tips; sides of frons whitish; hinder part of thorax violaceous whitish, the patagia edged with black; tibiæ streaked with black; abdomen brown, mixed with whitish and dorsally suffused with fuscous except at base. Fore wing violaceous white, tinged in parts with brown and irrorated with black, the veins white defined by slight brown streaks; a black streak below base of cell; a black streak above median nervure and vein 4 from before middle to near termen, another below subcostal nervure and vein 7, and a brownish streak above vein 1; the lines and stigmata absent; a terminal series of prominent black points; cilia with a slight brown line near base and more prominent line near tips. Hind wing whitish, suffused with fuscous brown; some slight black points on termen from apex to vein 3; cilia whitish, with a faint brown line near base; the underside whitish tinged with fuscous, the costal area tinged with ochreous and irrorated with black, a terminal series of black points.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type. *Exp.* 34 mm.

971 a. *Lycophotia melanephra*, sp. n.

Head and thorax pale blue-grey with a few dark scales; palpi black, white at tips; fore and mid tibiæ red-brown, the hind tibiæ irrorated with black, the tarsi black ringed with whitish; abdomen grey-white. Fore wing pale blue-grey irrorated with a few black and rufous scales; a rufous striga from costa near base, followed by the black subbasal line from costa to submedian fold; antemedial line slight, double, rufous, with two black spots at costa, slightly angled outwards below costa, then very minutely waved; orbicular small, round, whitish, slightly defined by rufous; reniform large, deep black, with slight whitish and rufous annulus; medial line rufous, with small black spot at costa, oblique to reniform, then inwardly oblique; postmedial line slight, double, rufous, with two small black spots at costa, bent outwards below costa, then minutely dentate and produced to black points on the veins, incurved below vein 4; subterminal line indistinct, whitish, defined on inner side by a blackish patch

at costa, then by slight rufous marks, and with some rufous suffusion beyond it, excurved below vein 7 and at middle; a terminal series of minute black lunules. Hind wing pure white; the underside with the costa irrorated with a few black scales.

Hab. TRANSVAAL, White R. (*Cooke*), 1 ♂, 1 ♀ type. *Exp.*, ♂ 34, ♀ 38 mm.

971 b. *Lycophotia macrostigma*, sp. n.

♂. Head and thorax dark red-brown mixed with a few white and black scales; palpi blackish, rufous at tips; tegulæ with black medial line; tarsi black ringed with white; abdomen whitish suffused with brown, especially on dorsum. Fore wing dark purplish red-brown, sparsely striated with black on basal and terminal areas; subbasal line double, black, minutely waved, from costa to vein 1; antemedial line double, black, minutely waved, almost obsolete below the cell; claviform represented by a slight black streak on its upper edge; orbicular and reniform large, defined by black, the former round, incomplete above, with black point in centre, the latter with its centre slightly defined by black; postmedial line represented by double black striæ from costa, then by a double series of points on the veins, bent outwards below costa, excurved to vein 4, then oblique, some white points beyond it on costa; subterminal line represented by a diffused dark patch on costa, then by diffused blackish spots; a terminal series of small black lunules; cilia with a fine white line at base. Hind wing white, the veins and inner margin tinged with brown; a brown terminal line; cilia with a slight brown line through them; the underside with the costal area irrorated with black, a small discoidal spot, postmedial series of points on the veins, and terminal series of striæ.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type. *Exp.* 38 mm.

1055 a. *Mythimna sinensis*, sp. n.

♀. Head, thorax, and abdomen dark brown tinged with grey. Fore wing dark brown, tinged with grey and slightly irrorated with white; antemedial line indistinct, blackish, slightly waved, oblique from costa to median nervure; orbicular hardly traceable, round; claviform and reniform obsolete; a faint dark medial shade oblique from costa to lower angle of cell, then inwardly oblique; a minute white point just beyond lower angle of cell; postmedial line indistinct,

blackish, strongly bent outwards below costa, then dentate and produced to black points on the veins, oblique below vein 4, some white points beyond it on costa; subterminal line represented by a series of faint dentate brown marks, somewhat excurved below vein 7 and at middle. Hind wing dark greyish brown, the cilia whitish at tips; the underside irrorated with white, a curved blackish postmedial line.

Hab. W. CHINA, Chin-fu-san (*Maw*), 1 ♀ type. *Exp.* 60 mm.

II ADENINÆ.

1129 a. *Trichestra serrata*, sp. n.

Antennæ of male strongly serrate.

♂. Head and thorax reddish brown mixed with white and some black; palpi and frons blackish; tibiæ and tarsi blackish ringed with white; abdomen dark brown mixed with white, whitish at sides towards base. Fore wing rufous mixed with grey and irrorated with black, the terminal area greyer, the veins slightly streaked with white; subbasal line double, black, from costa to vein 1; autemedial line double, filled in with whitish, oblique, waved; claviform moderate, defined by black; orbicular white, defined by black, small, rounded; reniform with white annulus, defined by black, somewhat angled inwards on median nervure; postmedial line black, bent outwards below costa, then dentate, and with white and black points beyond it on the veins, incurved below vein 4, some white points beyond it on costa; subterminal line white, excurved below vein 7 and at middle; a terminal series of black striæ, with white points between them. Hind wing white tinged with brown, especially on apical area; an indistinct dark discoidal point and curved postmedial line; a terminal series of black striæ; cilia with a blackish line through them; the underside white, the costal area irrorated with rufous and blackish, a blackish discoidal spot, somewhat dentate postmedial line, and terminal series of lunules.

Hab. KASHMIR, 1 ♂ type. *Exp.* 26 mm.

1130 a. *Trichestra renipuncta*, sp. n.

♂. Head and thorax dark brown slightly mixed with grey; tegulæ with slight dark medial line; pectus greyer; tarsi ringed with white; abdomen grey-brown. Fore wing grey-brown slightly tinged with rufous and irrorated with fuscous; subbasal line represented by slight dark striæ from

costa and cell; antemedial line double filled in with greyish, slightly angled outwards below costa, then waved; claviform small, slightly defined by black; orbicular and reniform defined by black, the former oblique elliptical, the latter with whitish line on inner edge and white spot with one point above it and two below it on outer; an indistinct sinuous dark line from lower angle of cell to inner margin; postmedial line double, the outer line indistinct and with series of dark points on it, a white point at costa, bent outwards below costa, slightly incurved at discal fold and incurved below vein 4, some white points beyond it on costa; subterminal line greyish, defined on each side by slight black marks, angled outwards at vein 7 and slightly excurved at middle; the terminal area rather darker, with white points at the extremities of the veins. Hind wing whitish suffused with brown, the terminal area darker; cilia ochreous white mixed with brown and with dark line through them; the underside white irrorated with black, the costal and terminal areas suffused with brown, a small black discoidal spot, and rather diffused sinuous postmedial line.

Hab. S.E. PERU, Limbani (*Ockenden*), 2 ♂ type. *Exp.* 22-28 mm.

1131 c. *Trichestra melanochra*, sp. n.

Head and thorax ochreous mixed with fuscous; palpi black; frons with lateral black bars; antennæ black; tegulae with black patch at tips; pectus and legs fuscous mixed with grey, the tarsi black ringed with ochreous white; abdomen fuscous mixed with grey, the crests black tipped with white, the anal tuft and ventral surface ochreous white. Fore wing black, the antemedial area from below costa to vein 1 and the postmedial area except at costa ochreous white tinged with rufous; subbasal line double, black filled in with ochreous white, expanding into a spot below costa and ending at vein 1; antemedial line double, black filled in with white, waved; claviform deep black; orbicular and reniform ochreous white, defined by black, the former with rufous centre, small, oblique elliptical, the latter with its centre defined by some black scales; traces of a waved medial line; postmedial line double filled in with ochreous white, the outer line indistinct, bent outwards below costa, slightly incurved at discal fold, touching lower extremity of reniform, then oblique and slightly waved; some whitish points beyond it on costa; subterminal line ochreous white, slightly incurved below costa, then minutely waved; a terminal

series of small black lunules; cilia black at base, chequered black and white at tips. Hind wing whitish suffused with fuscous brown, the basal area paler; traces of a discoidal lunule and sinuous postmedial line; cilia black at base, white at tips; the underside whitish irrorated with black, the costal area suffused with fuscous; a black discoidal spot, rather diffused, minutely waved, postmedial line, and terminal series of small lunules.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type, Oconeque. *Exp.* 30 mm.

1131 d. *Trichestra goniophora*, sp. n.

Fore wing with the termen excised from apex to vein 4, where it is angled, then oblique.

Head and thorax ochreous white mixed with pale greenish and some black scales; palpi black at sides, except third joint; antennæ blackish; tarsi black ringed with ochreous; abdomen ochreous, the crests tipped with black. Fore wing ochreous white tinged in parts with pale green and rufous and slightly irrorated with black; subbasal line black defined by white on outer side, waved, from costa to vein 1, some black suffusion beyond it below costa and from cell to inner margin; antemedial line double, blackish filled in with white, waved, angled inwards in cell and on vein 1; orbicular and reniform pure white defined by black, the former small, oblique, irregular, the latter a rather narrow bar angled inwards on median nervure; medial line indistinct, oblique from costa to reniform, inwardly oblique from lower angle of cell to inner margin; postmedial line rather diffused, brown, with double white bar at costa and white mark at inner margin, strongly bent outwards below costa and incurved below vein 4, some white points beyond it on costa; subterminal line white, angled outwards at vein 7 and inwards at discal fold, then outwards to termen at vein 4, then closely approximated to termen, on which it terminates at submedian fold, the area beyond it suffused with black; cilia ochreous suffused with rufous and with some black points at tips. Hind wing ochreous white, the veins irrorated with brown, the terminal area suffused with brown, narrowing to tornus; cilia tinged with rufous; the underside with the costal area sparsely irrorated with large black scales, a black discoidal lunule, and minutely waved postmedial line from costa to vein 3.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type, Oconeque, S. Domingo, La Oroya, Limbani. *Exp.* 30 mm.

1208 e. *Elusa ustula*, sp. n.

Head and thorax rufous tinged with whitish; antennal vesicle of male dark brown; pectus and legs dark brown, the tarsi with slight pale rings; hind tibiæ with the fringe of hair tinged with purplish red; abdomen rufous, dorsally tinged with dark brown. Fore wing glossy rufous with some dark brown irroration, especially on basal area and costal half of medial area; an indistinct subbasal line, defined by pale rufous on outer side, from costa to submedian fold; antemedial line double, filled in with pale rufous, waved, erect; orbicular represented by a faint minute pale spot defined by dark brown; reniform with brownish centre and very indistinct pale annulus constricted at middle; an indistinct slightly waved medial line; postmedial line indistinct, bent outwards below costa, then minutely waved, strongly incurved below vein 3, and bent outwards at vein 1; subterminal line represented by a series of small ill-defined dark spots with some whitish scales on their outer edge; a terminal series of dark striæ with slight whitish points at the veins; cilia red-brown with a fine whitish line at base. Hind wing pale glossy red-brown; cilia whitish with a slight brown line near base; the underside whitish suffused with red-brown.

Hab. MALAY PEN., Kuala Lumpur (*Durham*), 2 ♂ type, Sungkei (*Robinson*), 1 ♂, Patani (*Robinson*), 1 ♀; SINGAPORE (*Ridley*), 1 ♂, 1 ♀; BORNEO, Sarawak (*Wallace*), 1 ♂, 3 ♀; JAVA, Arjuno (*Doherty*), 1 ♂. *Exp.* 18-22 mm.

1208 h. *Elusa mediorufa*, sp. n.

♂. Head and thorax rufous tinged with whitish; tarsi ringed with white; abdomen greyish suffused with brown, the anal tuft ochreous. Fore wing glossy greyish irrorated with rufous, the antemedial area bright rufous from costa to submedian fold, the costa rufous; traces of a curved rufous antemedial line; a rufous medial line oblique below the cell; orbicular absent; reniform represented by two minute brown spots faintly defined by whitish; postmedial line rufous slightly defined by whitish on outer side, bent outwards below costa, then minutely dentate, oblique and incurved between veins 3 and 1, some whitish points beyond it on costa; subterminal line very indistinct, pale, slightly defined by rufous on inner side, incurved at discal and submedian folds and excurved to termen at middle, some whitish beyond it at apex and rufous at discal and submedian folds;

a terminal series of rufous striæ with minute white points at the veins; cilia rufous with dark tips. Hind wing pale, glossy, suffused with pale red-brown; cilia whitish at tips; the underside whitish tinged with red-brown, a slight dark discoidal lunule.

Hab. BORNEO, Sarawak (*Wallace*), 1 ♂ type. *Exp.* 20 mm.

1208 o. *Elusa diloba*, sp. n.

♂. Head and thorax whitish slightly tinged with rufous; antennæ red-brown; abdomen whitish tinged with rufous, the anal tuft ochreous. Fore wing glossy red-brown mixed with whitish, the base whitish; an indistinct waved antemedial line defined on inner side by whitish suffusion; orbicular represented by a white point; reniform with brown centre and white annulus defined by dark brown, strongly constricted at middle, the lower part larger; postmedial line defined by whitish on outer side, slightly bent outwards below costa, then waned, incurved below vein 4, and bent outwards at vein 1, some whitish points beyond it on costa; a very indistinct pale subterminal line defined on inner side by obscure diffused brown spots, slightly excurved below vein 7 and at middle, and ending at tornus; a terminal series of slight brown striæ with white points at the veins. Hind wing pale glossy red-brown, the base whitish; cilia with a faint brown line near base and whitish tips; the underside whitish tinged with brown, a slight brown discoidal lunule and indistinct diffused postmedial line.

Hab. BORNEO, Sandakan (*Pryer*), 1 ♂ type. *Exp.* 20 mm.

1313 a. *Miselia congener*, sp. n.

Head and thorax black mixed with white; tegulæ with slight dark medial line; pectus whitish mixed with brown; tarsi blackish ringed with white; abdomen brownish white, the dorsal crests blackish, the anal tuft tinged with rufous. Fore wing grey suffused in parts with brown and irrorated with black; subbasal line represented by double black bars from costa and cell filled in with white; antemedial line double, black filled in with white, oblique, waned, angled inwards on vein 1; claviform moderate, defined by black; orbicular and reniform with white annuli defined by black, the former round, the latter with whitish centre and rather irregular outer edge; an indistinct waned blackish medial line, oblique below the cell; postmedial line double, black

filled in with white, bent outwards below costa, then lunulate, incurved below vein 4, some white points beyond it on costa; subterminal line represented by a curved series of white spots on black marks, bent outwards to tornus; a terminal series of small black lunules; cilia white tinged with ochreous, a series of black striae at middle and black marks at tips. Hind wing white; the veins, base, and inner margin brownish; the termen tinged with brown, with a fine dark terminal line; cilia white with a brown line near base; the underside with the costal area irrorated with black, a black discoidal spot, and terminal series of lunules.

Ab. 1. Fore wing with some orange on inner half of basal area and before subterminal line.

Ab. 2. Fore wing with the orbicular and reniform filled in with white, the postmedial area white except towards costa.

Hab. S.E. PERU, Agualani (*Ockenden*), 4 ♂, 3 ♀ type.
Exp. 34-38 mm.

1373 b. *Miselia olivochroa*, sp. n.

♀. Head and thorax olive-green mixed with some whitish; palpi yellow at tips; tegulae yellowish at base and tips and with dark medial line; patagia with yellowish bars near base and yellowish tips; pectus and legs yellowish mixed with red-brown, the tarsi brown ringed with yellow; abdomen yellowish tinged with brown. Fore wing olive-green; a yellowish patch at base of costa and black point at base of cell; subbasal line double, black filled in with yellowish white, waved, from costa to vein 1; antemedial line black defined by yellowish on inner side, double at costa, oblique, slightly sinuous, bent inwards to inner margin; claviform defined by black at extremity, with a minute wedge-shaped white spot beyond it; orbicular and reniform olive-green defined at sides by black and whitish, the former oblique, the latter constricted at middle and angled inwards to the former on median nervure; postmedial line black defined on outer side by yellowish, double at costa, bent outwards below costa, then minutely waved, excurved to vein 4, then oblique, the costa beyond it black with some whitish points on it; subterminal line represented by a series of white striae on dentate black marks, interrupted below veins 7 and 4; a terminal series of small black lunules; cilia pale yellow, with a series of blackish points at base. Hind wing pale yellowish tinged with brown; cilia yellowish white with a series of small brown spots; the underside yellowish white irrorated with

brown, a slight dark streak in middle of cell, discoidal lunule, indistinct curved postmedial line, and some slight lunules on termen.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♀ type. *Exp.* 36 mm.

1426 c. *Hadena eugrapha*, sp. n.

♂. Head and thorax rufous mixed with some whitish and black; antennæ whitish at base; tegulæ with two whitish medial lines and whitish tips; patagia with yellowish-white fascia near upper edge defined above by a black line; tarsi ringed with white; abdomen dark brown mixed with grey, the anal tuft and ventral surface pale rufous. Fore wing rufous mixed with some grey and slightly irrorated with black, the median nervure streaked with yellowish white, continued as an oblique streak below vein 3 to subterminal line; subbasal line represented by double black striæ filled in with white from costa and cell, the former angled outwards below costa; antemedial line double filled in with whitish, oblique from costa to submedian fold, a curved yellowish streak before it above inner margin; claviform represented by an oblique white streak above its extremity; orbicular and reniform with yellowish-white annuli, the former oblique elliptical, the latter angled inwards to the former on median nervure; postmedial line double filled in with whitish, oblique from costa to vein 6, then inwardly oblique and dentate, met at vein 6 by an oblique grey fascia from apex, continued along its outer edge to inner margin, some white points beyond it on costa; subterminal line represented by a series of yellowish-white striæ defined on inner side by dentate blackish marks and on outer by blackish spots, incurved below vein 3; a fine waved black terminal line; cilia whitish with waved black line through them and blackish tips. Hind wing white, the termen tinged with brown; cilia with a brownish line through them; the underside with the costal area irrorated with black, a black discoidal spot.

Hab. S.E. PERU, Limbani (*Ockenden*), 1 ♂ type. *Exp.* 36 mm.

1426 d. *Hadena mesotoma*, sp. n.

Head and thorax dark red-brown mixed with white; frons with lateral black bars; tegulæ with blackish lines at middle and tips; patagia with curved white fasciæ; tarsi fuscous brown ringed with whitish; abdomen dark brown mixed with grey, the anal tuft and ventral surface rufous.

Fore wing dark red-brown, mixed with grey except on medial area from subcostal nervure to inner margin, on which there is a rufous streak; the median nervure and bases of veins 4, 3 streaked with white; subbasal line represented by double black striæ filled in with white from costa and median nervure; some black on inner margin before the antemedial line, which is double filled in with white, angled outwards below costa, bent inwards to median nervure, then oblique to above inner margin, to which it is strongly bent inwards; orbicular and reniform with rufous centres and incomplete whitish annuli defined by black, the former small, oblique quadrate, the latter narrow, constricted at middle and at lower extremity angled outwards to beyond lower angle of cell and strongly inwards on median nervure; postmedial line double, black filled in with whitish, bent outwards below costa and oblique below vein 5, where it is met by a whitish oblique band from apex, which then follows its outer edge, some white points beyond it on costa; subterminal line represented by an oblique whitish striga from costa near apex, then by a series of dentate black marks with white points or striæ in centres; the termen greyish; a fine black terminal line; cilia rufous, with a black line through them. Hind wing whitish tinged with brown, the veins, terminal and inner areas suffused with brown; cilia pale rufous with a blackish line through them; the underside whitish, the costal and terminal areas tinged with purplish red and irrorated with black, a small black discoidal spot, and curved postmedial line.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂, 1 ♀ type, Limbaui (*Ockenden*), 2 ♂. *Exp.* 28 mm.

1431 c. *Hadena clavifera*, sp. n.

Head and thorax black mixed with grey-white; frons with lateral black bars; tegule with black lines at middle and tips; patagia whitish with curved black streak; tarsi black ringed with white; abdomen fuscous mixed with grey, the basal crest whitish. Fore wing black-brown mixed with grey, the veins defined by slight greyish streaks; subbasal line represented by double black striæ from costa and cell filled in with whitish; antemedial line double, black filled in with whitish, angled outwards below costa and slightly inwards on median nervure, then oblique to above inner margin, where it is curved round to below subbasal line; claviform slightly defined by black and with oblique white bar at extremity; orbicular and reniform with greyish centres

and whitish annuli, defined by black, the former rather oblique elliptical, the latter angled inwards on median nervure to near former; postmedial line double, black filled in with white, bent outwards below costa, excurved to vein 4, then oblique, sinuous, and angled inwards on vein 1, some whitish points beyond it on costa; subterminal line white defined on inner side by dentate black marks and with slight black marks on outer, formed of striæ to vein 4, a small V-shaped mark below vein 4, and an oblique line below vein 3; a terminal series of small blackish lunules; cilia greyish, with black line near base, intersected by short white streaks and black tips. Hind wing white, the veins, inner margin, and termen tinged with brown; a discoidal point; a black terminal line; cilia brown at base, white at tips; the underside with the costal and terminal areas and veins irrorated with black, the costal area bluish white, a black discoidal spot.

Hab. S.E. PERU, Agualani (*Ockenden*), 2 ♂ type. *Exp.* 36 mm.

1518 a. *Chabuata crenilinea*, sp. n.

♂. Head and thorax purplish red slightly mixed with grey; palpi fuscous brown at sides; tarsi fuscous brown slightly ringed with greyish; abdomen fuscous brown, the basal crest, anal tuft, and ventral surface purplish. Fore wing purplish red, tinged with dark brown on costal area; a blackish subbasal point on median nervure; antemedial line represented by black points from below cell to inner margin, the point in submedian fold further from base; orbicular represented by a white point in upper part of cell, the reniform by white points in the angles of cell, and a faint dark mark at lower angle, with two minute whitish points on its outer edge; postmedial line blackish, dentate and produced to black points on the veins, excurved from costa to vein 4, then oblique, some pinkish points beyond it on costa; subterminal line represented by a series of slight blackish marks in the interspaces and a diffused patch above and below vein 5, somewhat excurved below vein 7; a terminal series of black points; cilia with a slight pale line at base. Hind wing fuscous brown, the interspaces of basal half pale; cilia whitish tinged with purplish red; the underside whitish irrorated with black, the costal area tinged with purple, a black streak in base of cell, discoidal spot, sinuous postmedial line with minute black streaks on the veins, and terminal series of rather triangular points.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type. *Exp.* 48 mm.

1610 a. *Eriopyga perrubra*, sp. n.

♀. Head and thorax fiery red, tinged with brown and irrorated with a few white scales; antennæ with the basal half white ringed with brown; tarsi black ringed with white; abdomen pale brown, tinged with red at base, extremity, and on ventral surface. Fore wing fiery red, the costal area and cell suffused with brown, irrorated with a few white scales; subbasal line formed of white scales, waved, from costa to submedian fold, a white striga beyond it in cell; antemedial line indistinct, double, brown defined on inner side by white scales on costal half, slightly angled outwards below costa, then sinuous; orbicular with white annulus defined by dark brown, small, round; reniform dark brown with white annulus and white line in centre, slightly angled inwards on median nervure; a diffused oblique dark line from lower angle of cell to inner margin; postmedial line indistinct, double, brown filled in with some white scales and with white point at costa, bent outwards below costa, then minutely dentate, excurved to vein 4, then incurved, some white points beyond it on costa; subterminal line formed of small white lunules defined by brown, somewhat excurved below vein 7 and at middle; a terminal series of white points; a fine white line at base of cilia. Hind wing whitish suffused with brown, the basal area paler; cilia tinged with fiery red; the underside whitish tinged with brown, the costal area suffused with rufous, a slight discoidal point, and postmedial line from costa to vein 5.

Hub. S.E. PERU, Agualani (*Ockenden*), 1 ♀ type. *Exp.* 44 mm.

1633 a. *Eriopyga glaucopis*, sp. n.

Head and thorax bright red-brown; antennæ with slight pale rings towards base; tarsi dark brown ringed with white; abdomen reddish brown, the anal tuft and ventral surface rufous. Fore wing bright red-brown; antemedial line brown defined by greyish on inner side, oblique, waved; orbicular and reniform with olive-brown centres and greyish annuli defined by blackish, the former irregularly rounded; a slight diffused dark medial shade; postmedial line blackish, oblique from costa to vein 6, then dentate, incurved below vein 4, some slight pale points beyond it on costa; subterminal line grey-white defined on each side by blackish, obsolescent towards costa, slightly angled outwards at vein 7 and incurved below vein 3; cilia with a slight pale line at base. Hind wing red-brown with a greyish tinge; cilia pale

rufous; the underside whitish tinged with rufous and irrorated with fuscous, a blackish discoidal lunule, and rather diffused postmedial line from costa to vein 2.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂, 2 ♀ type.
Exp. 28 mm.

1641 a. *Eriopyga erythropis*, sp. n.

Head and thorax dark reddish brown tinged with greyish; palpi, pectus, and legs dark grey-brown, the tarsi ringed with white; abdomen fuscous brown, whitish at base. Fore wing deep red-brown with slight dark irroration, the costal area with some greyish irroration, the veins with slight dark streaks, the discal and submedian folds with deep red suffusion; subbasal line represented by faint double oblique striæ from costa; antemedial line double, waved, angled outwards above inner margin; orbicular and reniform indistinct, deep red defined by a few black scales, the former small, round, the latter with its lower part filled in with black, and white point at lower extremity; traces of a diffused curved medial shade; postmedial line black, double towards costa, bent outwards below costa, then dentate and produced to black points on the veins, excurved to vein 4, then oblique, some slight pale points beyond it on costa; subterminal line represented by a series of faint reddish marks in the interspaces, with more distinct spot above tornus; a fine waved black terminal line; cilia black-brown with a fine whitish line at base. Hind wing white, the veins, inner and terminal areas suffused with dark brown; a slight discoidal spot and fine blackish postmedial line; cilia brownish with white line at base; the underside white, the costal and terminal areas irrorated with blackish, a blackish discoidal spot, and sinuous postmedial line with minute dark streaks on the veins.

Hab. S.E. PERU, Limbani (*Ockenden*), 1 ♂, 2 ♀ type, Puno. *Exp.* 34 mm.

1646 a. *Eriopyga flavirufa*, sp. n.

♂. Head and thorax bright rufous mixed with some yellowish; palpi and frons dark brown at sides; pectus whitish mixed with rufous and dark brown; legs brown mixed with whitish, the tarsi ringed with whitish; abdomen brown with some whitish at base, the anal tuft and ventral surface rufous. Fore wing bright rufous mixed with yellowish and slightly irrorated with black, the inner half of medial area darker; subbasal line double, blackish, curved,

from costa to submedian fold; antemedial line double, blackish, waved; claviform minute, faintly defined by blackish; orbicular and reniform yellowish tinged with rufous and slightly defined by blackish, the former round, the latter with its centre defined by rufous and with whitish annulus, a black spot in lower part; medial line black, excurved below costa and cell; postmedial line indistinctly double, bent outwards below costa, then dentate and produced to black points on the veins, excurved to vein 4, then incurved, some pale points beyond it on costa; subterminal line yellowish defined on inner side by minute dentate dark marks and by two more prominent blackish marks at discal fold, angled outwards at vein 7, excurved and waved at middle, and with black streaks beyond it on veins 7 to 4; a terminal series of small black lunules; cilia blackish with yellow line at base expanding into spots at the veins. Hind wing ochreous white tinged with brown, especially on terminal area; cilia yellow tinged with rufous; the underside with the costal area tinged with rufous and irrorated with brown, a black discoidal point, curved postmedial line from costa to vein 4, and terminal series of points from apex to vein 4.

Hab. S.E. PERU, Agualani (*Ockenden*), 1 ♂ type. *Exp.* 42 mm.

1618 a. *Eriopyga melanosigma*, sp. n.

♀. Head and thorax dark reddish brown mixed with a few white hairs; palpi with the extremity of second joint ochreous; pectus and legs black-brown mixed with greyish, the tarsi black with ochreous white rings; abdomen grey-brown, whitish at base. Fore wing black-brown with a cupreous tinge and irrorated with grey-white; an indistinct waved whitish subbasal line from costa to submedian fold; antemedial line black defined by whitish on inner side, angled outwards below costa, oblique to submedian fold and angled inwards on vein 1; orbicular and reniform large, black-brown defined by black, the former somewhat elongate elliptical; an oblique brown medial shade from lower angle of cell to inner margin; postmedial line black defined by white on outer side, bent outwards below costa, excurved to vein 4, then incurved, some white points beyond it on costa; subterminal line white towards costa and tornus, indistinct at middle, defined on inner side by a series of somewhat dentate black marks, angled outwards at vein 7, excurved at middle, and bent outwards to tornus; cilia with

a fine white line at base. Hind wing whitish tinged with brown, the veins and terminal area suffused with brown; a dark discoidal spot and indistinct postmedial line; cilia white, yellowish at base, and with a dark line through them from apex to vein 2; the underside white, the costal area dark brown irrorated with white, the terminal area irrorated with brown, a black discoidal lunule, waved postmedial line incurved at discal fold, and diffused subterminal line.

Hab. S.E. Peru, Limbani (*Ockenden*), 1 ♀ type, *Oconeque*.
Exp. 34 mm.

1905 a. *Cirphis perstriata*, sp. n.

♂. Head and thorax ochreous white mixed with brown; frons with black bar above; tegulæ with fuscous line near base, black medial line, and diffused fuscous line near tips; prothoracic crest with two black lines; patagia with some black scales on upper edge; legs irrorated with black; abdomen ochreous white, dorsally suffused with reddish brown, ventrally irrorated with black. Fore wing ochreous white, the interspaces streaked with purplish brown and the veins defined by purplish-brown streaks, leaving the costal area paler; the median nervure with fine white streak, expanding into a slight angled mark at extremity, with a black point before it in the angle of cell; antemedial line represented by obliquely placed black points on costa, below median nervure, and in submedian fold; a postmedial series of black points bent outwards below costa and oblique below vein 4; an oblique pale fascia from apex to beyond lower angle of cell; a terminal series of black points; cilia with a fine pale line at base. Hind wing semihyaline white, the veins, termen, and inner margin tinged with fuscous brown; cilia ochreous white; the underside with the costal area tinged with ochreous and slightly irrorated with brown except at base, a terminal series of black points.

Hab. RODRIGUEZ, 1 ♂ type. *Exp.* 4.2 mm.

CUCULLIANÆ.

2064 a. *Copicucullia ruptifascia*, sp. n.

♂. Head and thorax grey mixed with white and brown; frons blackish; tegulæ with black medial line; abdomen grey irrorated with brown, the crests darker, the ventral surface whitish. Fore wing blue-grey mixed with white, the

veins with slight black streaks ; a fine black streak slightly defined by white below basal half of cell ; antemedial line represented by slight black streaks on subcostal and median nervures and a faint long tooth in submedian interspace ; orbicular and reniform represented by faint yellowish marks, the former defined by black points, the latter with curved black streak below end of cell ; a slight black streak beyond the cell above vein 6 ; a blackish streak on middle of inner margin ; postmedial line obsolete ; subterminal line very faint, whitish, except in submedian interspace, where it is represented by a white lunule interrupting the strong oblique black fascia from beyond middle to termen at vein 2, a slight black streak before it above vein 4 ; a terminal series of black striæ. Hind wing white, the veins and terminal area brown ; cilia white ; the underside with the costa irrorated with brown.

Hab. TRANSVAAL, White R. (Cooke), 1 ♂ type. *Exp.* 34 mm.

2122 a. *Cucullia atrimacula*, sp. n.

♂. Head and thorax bluish grey slightly mixed with brown, the head browner ; palpi with some blackish at sides ; tegulæ with black line near base and slight medial line ; pectus white ; legs grey mixed with blackish ; abdomen grey tinged with ochreous, the basal crest blackish, the ventral surface white. Fore wing bluish grey slightly irrorated with blackish, especially on the veins, the end of cell tinged with ochreous ; subbasal line represented by a very oblique black striga from costa, the antemedial line by some slight streaks on costal area and very oblique streaks from submedian fold to vein 1 and vein 1 to inner margin ; orbicular represented by a slight black streak in lower part of cell, the reniform by a curved streak below end of cell ; a short black streak beyond the cell above vein 6 ; postmedial line represented by a black striga from costa, then by very slight streaks on the veins beyond the cell, more distinct below vein 3, oblique to submedian fold, where it is angled inwards, angled outwards on vein 1 ; the postmedial area with slight black streaks above veins 6, 5, 4 ; subterminal line represented by some slight white streaks in the interspaces and a prominent black spot below vein 2 with some whitish suffusion round it ; a terminal series of minute black lunules defined on inner side by whitish ; cilia grey intersected with white. Hind wing white, the veins and a fine terminal line brown ; the under-

side with the costa slightly irrorated with brown towards apex.

Hab. TRANSVAAL, White R. (Cooke), 1 ♂ type. *Exp.* 44 mm.

2123 a. *Cucullia tucumani*, sp. n.

♀. Head and thorax brown mixed with grey and black; pectus white; tarsi black ringed with white; abdomen white irrorated with brown and dorsally tinged with brown. Fore wing blue-grey thickly irrorated with brown, the costal area suffused with brown except at base; the veins with slight dark streaks; traces of an antemedial line from cell to inner margin, excurved at vein 1, where there are two black points on it, and with slight oblique dark streak before it above inner margin; orbicular and reniform represented by slight whitish marks with brown centres, the former elongate; an oblique brown line from lower angle of cell to inner margin; postmedial line indistinct, brown, bent outwards below costa, excurved to vein 4, then oblique and represented by double black points on the veins with white points between them; subterminal line represented by a series of slight dentate grey marks with brown marks before them and small blackish spots beyond them, and a diffused blackish patch before it between vein 4 and submedian fold; cilia brown and grey with two slight brown lines through them. Hind wing white with broad terminal black-brown band narrowing to tornus; cilia white with a slight brown line near base. Underside of fore wing white with some black irroration on costa and broad diffused dark band just before termen.

Hab. ARGENTINA, Tucuman, 1 ♀ type. *Exp.* 28 mm.

2460 a. *Dichonia chlorota*, sp. n.

♂. Head and thorax grey-white mixed with pale olive-brown and some black; palpi and antennæ blackish; tarsi blackish, with slight pale rings; abdomen grey suffused with brown, the crest on third segment tipped with black. Fore wing grey-white suffused with brown and pale olive-green and irrorated with black, the medial area somewhat darker; subbasal line black, waved, from costa to vein 1; antemedial line black, oblique, sinuous, angled outwards above inner margin, the area before it pale tinged with olive-green; claviform whitish defined by black except above; orbicular

and reniform with whitish annuli defined by black, the former round; postmedial line black, bent outwards below costa, then dentate, excurved to vein 4, then oblique, defined on outer side by grey tinged with olive-green, some white points beyond it on costa with slight dark streaks between them; subterminal line represented by a series of dentate brownish marks with dentate pale olive-green marks beyond them on termen; cilia brown with a series of whitish points at base. Hind wing greyish suffused with brown; an indistinct dark postmedial line; cilia with a series of whitish points at base; the underside grey-white irrorated with brown, a diffused brown discoidal spot and postmedial line.

Hub. KASHMIR, 1 ♂ type. *Exp.* 36 mm.

2474a. *Meganephria araucanica*, sp. n.

♂. Head and thorax white mixed with brown and black; palpi blackish except at tips; frons with black bars at middle and above; tegulæ with black line near tips; pectus black-brown; tarsi black ringed with white; abdomen dark brown mixed with some white scales. Fore wing violaceous white suffused in parts with rufous, especially in and below cell on medial area and on terminal part of submedian interspace; a sinuous black streak below base of cell, extending to antemedial line, with some golden scales on it at middle and white streaks above it; subbasal line represented by double oblique black striæ from costa; antemedial line black defined by white on inner side, angled outwards below costa, then oblique sinuous; claviform large, defined by black; orbicular and reniform large, defined by black, the former round, the latter open above, very broad, expanding to below cell and with white patch in outer part; postmedial line black defined by white on outer side, double at costa, bent outwards below costa, then dentate and produced to black points on the veins, slightly incurved at discal fold, incurved below vein 4, some whitish points beyond it on costa and black streaks above and below submedian fold, the former sinuous and extending to termen; subterminal line white slightly defined on each side by rufous, dentate to termen at veins 4, 3, 2, and angled inwards in submedian fold; the veins beyond it and the interspaces below veins 4, 3, 2 with black streaks; cilia white with rufous lunules at base and tips. Hind wing ochreous white irrorated with brown, a large brown discoidal spot, minutely waved postmedial line, diffused dentate subterminal and terminal bands from apex to vein 2, and spot

above tornus; cilia white mixed with brown at base; the underside white irrorated with brown, the base suffused with brown, a large black discoidal spot, waved postmedial line oblique to vein 5, then sinuous, the veins of terminal area with dark streaks, a terminal series of slight black lunules.

Hab. S. CHILI, Araucania (*Middleton*), 1 ♂ type. *Exp.* 46 mm.

2530 a. *Xylinissa pulverea*, sp. n.

Antennæ of male simple, laminate.

♂. Head and thorax fuscous mixed with grey; tarsi ringed with whitish; abdomen fuscous mixed with ochreous grey, the anal tuft more ochreous. Fore wing grey thickly irrorated and suffused with fuscous; a slight black streak below base of cell; subbasal line represented by an oblique black striga from costa; antemedial line indistinct, double, waved, oblique; vein 1 streaked with black on medial area; claviform represented by some yellow and black scales; orbicular and reniform large, very incompletely and indistinctly defined by black and with some yellow scales on their edges, the former oblique elliptical, the latter somewhat constricted at middle and extending to well below cell; medial line represented by an oblique dark striga from costa; postmedial line very indistinct, with some dark points on the veins, bent outwards below costa, excurved to vein 4, then very oblique to submedian fold and excurved at vein 1, some slight pale points beyond it on costa; subterminal line represented by blackish marks below costa, above and below vein 5, and in submedian fold, with black streak from it to termen below vein 2; a terminal series of small black lunules; cilia grey mixed with fuscous, a slight dark line near base. Hind wing white, a small black discoidal spot; veins 7, 6 with dark streaks; a dark terminal line and some points on cilia from apex to submedian fold; the underside with the costal area irrorated with brown, a postmedial series of minute dark streaks on the veins.

♀. Fore wing much more variegated with white and black and without the yellow scales on the stigmata.

Hab. PERU, Limbani (*Ockenden*), 1 ♂, 2 ♀ type. *Exp.*, ♂ 36, ♀ 38 mm.

XLII.—*Neotetracus sinensis*, a new Insectivore of the Family Erinaceidæ. By E.-L. TROUessant, C.M.Z.S., Professor at the Muséum National d'Histoire Naturelle de Paris.

NEOTETRACUS, gen. nov.

Similar in external form to *Podogymnura** or *Macroscelides*, but with the dentition of *Erinaceus*. The two-fanged canine in either jaw not higher than the small incisors which precede it and the small premolars which follow it. Palate incompletely ossified like that of *Erinaceus*. Pelage soft, not spiny; tail well developed.

Dental formula:—

$$I. \frac{3-3}{3-3}, C. \frac{1-1}{1-1}, Pm. \frac{3-3}{3-3}, M. \frac{3-3}{3-3} = \text{total } 40.$$

The first upper incisor is high, conical, having the shape usual in the family; the second, widely separated from the preceding, is nearly as broad but not so high; the third is very small; the double-rooted canine, with triangular crown, is a little longer but not higher than the incisor which precedes it; the first two premolars, subequal, are a little smaller than the canine, but have the same shape, the anterior and posterior tubercles being atrophied; the third premolar very large, with four tubercles, of which the anterior external one is well developed and projecting. The molars diminish in height from the first to the third: the first, with quadrangular crown, has five tubercles, as usual in the family, the fifth median, and has in addition a spur simulating a small posterior tubercle closely adjoining the posterior external tubercle; the second molar, a little smaller, resembles the preceding; the third, with triangular crown, has only three tubercles, two in front, one behind.

In the lower jaw, the first incisor is very large, proclivous, spatulate, and with spoon-shaped hollows on its supero-internal face; the second and third are very small, the crowns lower in front (as in *Erinaceus*); the canine is small and similar to the incisors which precede it; the first two premolars are small, with the anterior and posterior tubercles atrophied; the third is very large, trituberculate, the median tubercle very large and prominent. The molars diminish in height from the first to the third: the first has five tubercles disposed 1, 2, and 2, the two posterior pairs united by a trans-

* Mearns, Proc. U.S. Nat. Mus. xxviii. 1905, p. 437; Marcus Ward Lyon, Jr., loc. cit. xxxvi. 1909, pp. 449-456, pl. 36. I was in error in uniting *Hylomys* and *Gymnura* in the 'Catalogus Mammalium'—the two are quite distinct.

verse crest; the second has only four tubercles, 2 and 2; the third is smaller, but similar to the second, slightly narrowed behind.

All these teeth, in both jaws, have their points intact, sharp (and not worn as in *Erinaceus*).

Affinities and Differences.—According to the figures published by M. W. Lyon of the unique specimen of *Podogymnura truei*, *Neotetracus* resembles it in its external form, notably in its well-developed tail, but it differs from it very decidedly by the dentition. The skull of *Neotetracus* resembles, moreover, that of *Hylomys*, but the canine is still more reduced than in that genus; in *Neotetracus* the canine and the premolars want the posterior spur which is very prominent in *Hylomys*. The lower jaw presents still more striking differences: in *Hylomys* the lower incisors decrease very gradually from the first to the third, keeping their spatulate shape; in *Neotetracus* the large anterior incisor is followed by two very small atrophied teeth, so that between the large anterior incisor and the large third premolar there are five small subequal functionless teeth. Seen in profile the jaws are still more dissimilar: in *Hylomys* the anterior part of the ramus is bent downwards in spade form; in *Neotetracus* this anterior part, more constricted, is, on the contrary, turned upwards.

By its incompletely ossified palate, as by its reduced canines, *Neotetracus* approaches *Erinaceus*, but this lacunar character of the palate has probably not the value which has been attributed to it, as all intermediate conditions are found. By its small size (it is the smallest living species of the family), its slender jaw, and the form of its inferior molars the new type approaches *Tetracus nanus*, Aymard*, a fossil species from the Tertiary of France, known only from an incomplete fragment, and of which the fore dental formula is unknown.

To sum up, *Neotetracus* joins the Gymnurinæ to the Erinaccinæ, and it will perhaps be necessary to unite the two subfamilies into one, or to distinguish them solely by the nature of their pelage.

Neotetracus sinensis, sp. n.

Form recalling those of *Macroscolides* and *Podogymnura*. Head conical, elongate, with the snout projecting beyond the

* Aymard, Ann. Soc. du Puy, 1848, p. 244; 1849, p. 110: Filhol, Ann. Sc. Géol. xii. 1882, p. 8, pl. vi. figs. 7-9.

lower jaw. Ears rounded, very large. Feet five-toed, slender, elongate, especially in the hind limb. All the under surface of the foot naked or covered with very short hairs. Tail about half the length of the body, somewhat slender, covered with very short hairs.

Pelage similar to that of *Hylomys suillus dorsalis*, Thomas, composed of two sorts of hair, but the general tint inclining to reddish yellow. The majority of the hairs are of a deep reddish yellow (grey at their base); long black hairs (longer and more scattered, lighter at their points) project beyond the reddish hairs, and are much more numerous on the back, less abundant on the flanks. Beneath of a greyish white. Ears (with very short hairs) and feet of a more or less deep brown; the fore feet tinted with reddish on their anterior face. Soles of feet with six tubercles ranged two and two.

Dimensions.—Head and body 115 millim.; head 35 millim.; ear 15 millim.; tail 55 millim.; tarsus 26 millim.; naked part of the tibia 15 millim.; basal length of the skull 30 millim., greatest breadth 15 millim.

Seven specimens in skin with their skulls.

Hab. Ta-t sien-lou, province of Se-tchouen (China Occidental), at an altitude of 2545 metres. Sent by the Catholic Mission of Ta-t sien-lou, under the direction of Mgr. Biet, Apostolic Bishop of Tibet.

Later on I shall give a more complete description of this interesting type, accompanied by figures.

BIBLIOGRAPHICAL NOTICES.

Catalogue of the Lepidoptera Phalaenæ in the British Museum.

Vol. VIII. *Catalogue of the Noctuidæ.* By Sir GEORGE F. HAMPSON, Bart. London: Printed by Order of the Trustees. 8vo. Pp. xiv, 583; pls. cxxiii.-cxxxvi., and 162 figures in the text. (Text, price 15s.; plates, 12s.)

THE appearance of a new volume of this gigantic work is now almost an annual event, and frequenters of the insect-room at the British Museum must often admire the quiet persistency with which the indefatigable author pursues his work, year in and year out, allowing nothing to divert his attention from it for an instant. In the preface to the present volume Professor Harmer tells us:—"The subject of Vol. VIII. of the 'Catalogue of Moths' is the second part of the Noctuid subfamily *Acronyctinæ*; it contains 720 species belonging to 104 genera as compared with 843 species belonging to 96 genera in Vol. VII., leaving 171 genera to be dealt with in the third and final part of the subfamily, which it is hoped will appear

before the end of the current year." The preface to vol. vii. is dated Nov. 23rd, 1908, and that of vol. viii. March 18th, 1909, thus leaving a period of less than five months between the dates of appearance of these two volumes!

Sir G. F. Hampson's arrangement of the Noctuidæ differs considerably from that of previous authors, and the genera referred to the Acronyctinæ in the present volume include, in addition to *Acronycta* and its immediate allies, many well-known British and European genera usually placed in other groups. Among these we may mention *Simyra*, *Laphygma*, *Xylomyges*, *Stilbia*, *Petilampa*, &c.

We have no need to remark on the general character of the letterpress and illustrations, as we have frequently done so before. We need only say that the high standard of previous volumes appears to be well maintained throughout.

Illustrations of African Blood-sucking Flies other than Mosquitoes and Tsetse-Flies. By ERNEST EDWARD AUSTEN, Assistant in the Department of Zoology, British Museum (Natural History). With coloured figures by Grace Edwards. London, 1909. Printed by Order of the Trustees. Roy. 8vo. Pp. xv, 221; col. pls. xiii. Price 27s. 6d.

THE dissemination of serious diseases by flies has been known for a long period, but it is only within the last few years that its extent and importance has been realized. The present volume is one of a series, suggested by Mr. C. O. Waterhouse, which the Trustees have undertaken to elucidate the increasingly important study of blood-sucking Diptera. Of this series four volumes of a Monograph of Mosquitoes, by Mr. F. V. Theobald, have been published, and a fifth is promised, while Mr. Austen has published a volume on tsetse-flies. The volume before us contains an account of African Diptera (North Africa, except Egypt, being excluded) belonging to the families Chironomidæ, Psychodidæ, Simuliidæ, Tabanidæ, Muscidæ, and Hippoboscidæ, illustrated by excellent coloured figures of 102 species. Technical descriptions of the species figured are omitted; but general observations on the families, genera, and species are given, with full particulars, as far as known, on the habits, localities, &c. of the species.

The book will be extremely useful in coordinating our present knowledge of the subject, and in furnishing a solid foundation for further observations; while even from the less important standpoint of systematic entomology the figures will be of great value to students of the Diptera.

In Chapter VIII. we have a list of African blood-sucking flies at present known (exclusive of mosquitoes and tsetse-flies), arranged under countries—another valuable feature of the work, which concludes with a good and comprehensive index.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 23. NOVEMBER 1909.

XLIII.—*Descriptions and Records of Bees.*—XXIII.
By T. D. A. COCKERELL, University of Colorado.

Prosopis fijiensis, sp. n.

♀.—Length $14\frac{1}{2}$ mm.

With a rather long pointed abdomen; brilliant steel-blue, rather dark, with yellow lateral face-marks, consisting of bands or bars (not in the least triangular) ending very obtusely below level of antennæ. No yellow on clypeus; posterior half of tubercles yellow; legs dark blue without yellow, middle and hind tarsi and apical part of their tibiae with much light hair; head and thorax above with scanty coarse dark hair; clypeus well punctured; mesothorax strongly punctured, the punctures of two sizes, scutellum the same. Wings clear, second s.m. very long, receiving the recurrent nervures near base and apex. Tongue typical for *Prosopis*, so far as can be seen in the dry state. General appearance of insect not unlike *P. aleyonea*.

Hab. Fiji. Type in British Museum (F. Smith Collection, 79. 22).

A very distinct species; in my MS. table of Australian *Prosopis* it runs to *P. albonitens*, but that is a very small species.

Prosopis amata, sp. n.

♀.—Runs in my table of Australian species to *cognata* and *violacea*, but differs from them as follows:—

Lateral face-marks bow-shaped; clypeus sparsely punctured; mesothorax finely punctured . . .	<i>violacea</i> and <i>cognata</i> .
Lateral face-marks cuneate, deep orange, ending above at about level of antennæ; mesothorax with very large coarse dense punctures; clypeus with dense punctiferous grooves	<i>amata</i> .

Other characters of *amata* are:—Yellow of scutellum and postscutellum not reduced; area of metathorax with a transverse ridge and little vertical ridges. Wings nearly clear; first r. n. entering extreme apex of first s.m.; abdomen deep steel-blue, shining, with fine punctures, uniform on segments 1 to 3.

Hab. Kuranda, Queensland (*F. P. Dodd*). Type in British Museum.

Mr. R. E. Turner tells me that Kuranda is near Cairns, at an altitude of about 1100 feet. It is a region of dense jungle.

Prosopis turneriana kurandensis, subsp. n.

♂.—Length 7 mm.

Runs in my table to *P. versicolor*, from which it differs by its blue colour, and the first two abdominal segments sparsely and feebly punctured. It is really related to *turneriana*, from which it differs by having a metallic purplish dark band at each side of clypeus, not quite reaching the lower corners; supraclypeal mark shorter; lateral face-marks pointed above, with the inner upper margin nearly straight (rounded in *turneriana*); second abdominal segment more sparsely and feebly punctured. Tubercles purplish coppery, with a light spot; anterior tibiæ bright chestnut in front and the other tibiæ with red marks.

Hab. Kuranda, Queensland (*F. P. Dodd*, 1907. 129). Type in British Museum.

This species is not a true *Prosopis*.

Prosopis amiculiformis, sp. n.

♀.—Recorded as *P. amacula*, Sm., in *Ann. & Mag. Nat. Hist.*, Nov. 1905, p. 467. Actual comparison with Smith's type shows that it is distinct. Length nearly 7 mm.; clypeus

much broader (especially above) than in *amicula*; irregular wrinkles of metathorax stronger.

Near Mackay, Queensland.

In my key it comes in as follows:—

Clypeus wholly black; light markings deep chrome-yellow.

Larger; punctures of mesothorax very distinct; first r. n. enters first s.m. *amiculiformis*, Ckll.

Smaller; punctures of mesothorax so small as to be hardly visible separately under a lens; first r. n. joins first t.-c. *amicula*, Sm.

Prosopis elegans, Smith.

Comparison of types shows that *P. sydneynana*, Ckll., is the same as *elegans*.

Prosopis diversipuncta, sp. n.

♀.—Length about 8½ mm.

Robust. Runs in my table next to *P. nigrifrons*, having the face entirely black. The two are separated thus:—

Tubercles yellow, and also a contiguous large yellow patch on pleura; front dull and densely punctured; mesothorax quite densely punctured; area of metathorax not ridged *nigrifrons*, Sm.

Tubercles black, but a quadrate yellow patch behind; front shining, with well-separated punctures; mesothorax shining, with strong but scattered punctures, not uniform in size; area of metathorax strongly ridged *diversipuncta*, Ckll.

Other characters of *P. diversipuncta* are:—Wings dilute fuliginous; second r. n. receiving both recurrent nervures; scutellum and postscutellum orange, the anterior margin of orange on scutellum wavy; abdomen shining, first segment with very minute punctures, contrasting with much larger ones on base of second.

Hab. Kuranda, Queensland (*Dodd*). 2 ♀ in British Museum.

Prosopis aureomaculata, sp. n.

♂.—Length about 6 mm.

Black, with almost clear wings; face very narrow, the pale clypeus with a black stripe on each side adjacent to the suture, narrowing above and failing below; a small broad and short supraclypeal mark; lateral marks long and narrow,

but not linear, extending far above antennæ, notched by the antennal sockets, and ending in a point a little away from orbit; scape ivory-colour in front; flagellum bright ferruginous beneath; front, vertex, and mesothorax very densely and minutely punctured; upper edge of prothorax with a very narrow yellow band, interrupted in middle; tubercles orange-yellow, but no spot behind; scutellum and post-scutellum bright orange, very smooth, the anterior edge of orange of scutellum gently convex; area of metathorax shining, with a sericeous surface and a fine transverse line; tegulæ black. Legs black, anterior and middle tibiæ with a whitish spot near apex; anterior tibiæ in front and their tarsi ferruginous; first abdominal segment with very strong punctures, second and third with finer ones; no ventral teeth; first r. n. joins first t.-c.

Runs in table near *P. elongata*, as follows:—

Clypeus and lateral marks ivory-colour	<i>aureomaculata</i> , Ckll.
Clypeus yellow	1.
1. Supraclypeal mark present; mesothorax minutely and densely punctured; anterior tibiæ and tarsi red; a constriction between first and second dorsal abdominal segments	<i>elongata</i> , Sm.
No supraclypeal mark	<i>honesta</i> , Sm., <i>simillima</i> , Sm., and <i>metallica</i> , Sm.

Hab. Kuranda, Queensland (*Dodd*). Type in British Museum.

Prosopis permiranda, sp. n.

♀.—Length about 8 mm.

Rather robust; head and thorax dark green; abdomen purple, with green shades. Wings long, clear, with the apical margin dusky; stigma and nervures sepia-brown; second s.m. considerably broader than high, receiving both recurrent nervures. Head and thorax with pale yellow markings consisting of longitudinal stripes, three on face, one from anterior ocellus to very near clypeal margin, and one on each side along orbits, the latter ending in a fine line at top of eye; a subpyriform light yellow mark on each side of lateral ocelli and a rather broad band along hind margins of eyes; on thorax the upper edge of prothorax is light, a band extends from tubercles backwards across pleura, and another across the lower part of pleura (bent downwards anteriorly); the mesothorax has four narrow bands; rather broad bands extend from axillæ across scutellum and postscutellum, to end in a narrow stripe (detached from rest of band) on each side

of metathoracic enclosure; sides and posterior truncation of metathorax with dense white hair; clypeus and most of front feebly sculptured; vertex strongly punctured; scape black; flagellum dull brown beneath; mesothorax with strong well-separated punctures, as also scutellum, but those on post-scutellum much smaller; area of metathorax sericeous, not punctured, but sides punctured; tegulae black, the edge narrowly pallid; legs black, with silvery hair, anterior tibiae in front and bases of the other tibiae pale yellow; abdomen sparsely punctured and with beautiful white hair-bands (failing in middle) along hind margins of first three segments.

This is the most splendidly ornamented *Prosopis* known to me; whether it is strictly of that genus may be doubted, but I have not been able to see the mouth-parts. It is very easily recognized by its peculiar markings.

Hab. Kuranda, Queensland (*Dodd*). Type in British Museum.

Bombus tetrachromus, sp. n.

♀.—Size of *B. rufofasciatus*, Sm., which it resembles in pubescence of head and thorax, but in the abdomen it is quite different, inasmuch as the hair of the basal part, before the red band, which is black in *rufofasciatus*, is bright canary-yellow. The sides of the first segment have long white hair, as in *rufofasciatus*. As in *rufofasciatus*, the median band on the abdomen is bright red and the apical part is white. Superficially this is so exactly a *rufofasciatus* with yellow in place of black on the abdomen, that I thought it might be merely a remarkable variety, but the following structural differences show that this cannot be:—

Malar space about as long as broad; fourth antennal joint longer than wide	<i>rufofasciatus</i> , Sm.
Malar space much shorter; fourth antennal joint shorter, rather wider than long.....	<i>tetrachromus</i> , Ckll

Hab. Baltistan. Type in British Museum (88. 31).

Colletes rhodaspis, sp. n.

♀.—Length about 9 mm.

Rather stout-bodied, black, with much the general appearance of *C. grisea*, Sm., though smaller, but with the hair of the scutellum entirely bright crimson-red. Head broad; clypeus shining, with a strong median groove; hair of face mostly black at sides and greyish-white with an ochreous tint in middle, mixed on vertex, long and pale on lower part of

cheeks; antennæ black, middle joints of flagellum much longer than broad; mandibles reddish subapically; labrum shining, without pits; thorax (except scutellum) with hair partly greyish white and partly black, about evenly mixed on mesothorax, greyish black on pleura; mesothorax shining, with weak punctures; area of metathorax with a basal series of very small pits, the apical triangle transversely (rather obliquely) plicatulate laterally. Wings dusky hyaline; tegulæ, nervures, and stigma piceous; stigma small. Legs normal, the hair light and dark as on thorax; hair on hind femora long and pale; hind spur ordinary. Abdomen short, shining, bandless, with minute feeble punctures, hair of apical part mainly black, of basal pale, ochreous-tinted.

Closely related to *C. patagonica*, Schrottky, but that species is larger and has the hair all black or fuscous, except that on scutellum, which is orange-red. *C. bicolor*, Sm., has the hair of thorax above entirely very bright apricot-colour, but the abdomen is blue.

Hab. Patagonia, V. del Lago Blanco (*Chubut*). Type in British Museum.

Tetrapedia swainsonæ, sp. n.

A testaceous species, very close to *T. flava* (*Exomalopsis flava*, Smith), and at first sight identical, but the clypeus has only a few very minute punctures, while that of *flava* has very strong punctures; the flagellum is darker than in *flava*. In the male the sides of the face are yellow, but the front below the ocelli is dark brown, with a suffused median yellowish stripe. The stigma and nervures in male are dark reddish brown, in female amber-colour. The wings in both sexes are yellowish. There is a superficial resemblance to *Trigona pallida*, Latr., from Brazil.

Hab. Jamaica; in British Museum. ♀. Bath, St. Thomas, 1892 (*E. M. Swainson*); ♀. Jamaica, 97-166; ♂. P. Cr. River, St. Thomas, June 1892.

The following table separates the testaceous species of *Tetrapedia* and *Exomalopsis* described by Smith:—

Second r. n. precisely meeting third t.-c., the outer sides of the adjacent cells continuous and without any appendiculation at the juncture; outer side of hind basitarsus covered with dark soot-coloured hair. (S. Paulo.)

Second r. n. joining third s.m. before the end .. 1.
 1. Mesothorax shining, evidently punctured.. 2.
 Mesothorax dull not evidently punctured.. 3.

[Sm. *Tetrapedia lævifrons*,

2. Larger; punctures of mesothorax very sparse; abdomen light yellow, the hair on apical segments golden. (Santarem.) *T. punctifrons*, Sm.
 Smaller; punctures of mesothorax numerous; thorax quite dark; abdomen pale dull brownish, apical hair white or almost; scopa of hind legs very large and strongly plumose. [Sm.
Exomalopsis testacea,
 3. Expanse about 19 mm.; front brown-black, with a median yellow stripe; hind margins of abdominal segments darkened. (Ega.) [Sm.
Tetrapedia flavipennis,
 4. Expanse 15 mm. or less 4.
 4. Face broader, colour darker; size a little larger; hind basitarsus longer *T. testacea*, Sm.
 Face narrower, colour lighter, the metathorax quite yellow; size a little smaller; hind basitarsus shorter; apex of abdomen with brilliant reddish-golden hair *T. flava* (Sm.).

T. swainsonæ runs in this table to *flava*, differing as already stated.

Augochlora jamaicana, sp. n.

♀.—Length about 6 mm.

Easily known by the enormous quadrate head, larger than thorax, with very broad face, swollen rounded shining cheeks, and small eyes, which are emarginate within. Head shining brilliant green and purple; thorax bluish green, minutely rugoso-punctate; abdomen short, pyriform, brilliant purple, not vibrissate, with a fine pallid pruinosity; area of metathorax finely but distinctly striolate, some of the striæ curving and meeting in the middle line; legs ferruginous, with pale glittering hair; hind spur simple, bent near the base; mandibles large, suffused with castaneous-red, and with a large inner tooth; antennæ dark, brownish, much nearer together than either to eye; ocelli close together, in a slight depression.

Allied to *A. elegans*, Cresson (specimen from S. Domingo compared), but that has the head narrower and differently shaped, eyes less strongly emarginate, striæ on metathorax different, &c.

Very distinct from the Jamaican *A. regina*, Sm., and *decorata*, Sm.

Hab. Jamaica; type in British Museum, from F. Smith's collection.

Melissa azurea (Lep.).

Syn. *rufipes*, Perty.

Bath, St. Thomas, Jamaica (*E. M. Swainson*).
Perfectly typical; new to Jamaica.

Nomioides muiri, sp. n.

♀.—Length about 5 mm.

Head and thorax a dullish rather variable yellowish green, with bright markings and thin white pubescence; clypeus yellow, its upper edge straight; *yellow lateral face-marks very small, transverse*, not or hardly going above a line drawn horizontally from lower edge of orbit to clypeus; mandibles yellow, black apically; scape yellow, the upper three-fifths black above; flagellum dark above, pallid below; inner orbits conspicuously emarginate; upper edge of prothorax, tubercles (except a black dot), tegulæ, a broad band (abruptly truncate laterally, not reaching sides) on hind part of mesothorax, two large (confluent posteriorly) patches on scutellum and most of postscutellum, all *yellow*, as also a line from scutellar patches to hind wings; pleura without yellow. Wings perfectly clear, with very pale yellow venation; stigma large, b. n. strongly bent, second s.m. narrow; legs yellow, coxæ, hind femora (except at apex), and much of middle of hind tibiæ black. Abdomen yellow with dark brown bands, apical middle of first segment green; base and apex of first segment, narrowly connected in middle line, dark; second and third segments black at anterior basal corners and broadly brown apically, the brown not reaching the lateral margins; on the third segment this is developed medially into a large triangle, the apex of which nearly reaches the base of the segment (in another specimen this triangle is not present); apical segments with rather irregular yellow clouds on a dark ground; venter largely dark, especially on apical half.

Hab. Mozambique (*F. Muir*). Type in Cambridge University Museum.

The genus *Nomioides* was previously known in E. Africa as far south as Somaliland (*N. somalica*, Magr.).

Crocisa cæruleifrons, W. F. Kirby.

An examination of the type in the British Museum shows that this species has been quite misunderstood, and has nothing to do with the Australian insect attributed to it, the

latter being apparently entitled to the name *C. quartinae*, Gribodo. The following characters are distinctive of *cæruleifrons* :—

Expanse $22\frac{1}{2}$ mm. Size and general appearance of *C. nitidula*; spots a beautiful purple-blue; scutellum **W**-shaped, entirely black, no white hair projecting from notch; anterior wings dark fuscous; face blue, the middle third above antennæ black; pleura with a black transverse band; blue spots on thorax as follows—one on each side of prothorax, contiguous with a cuneate one (pointing laterad) on mesothorax, middle of anterior margin of mesothorax with a cuneate mark pointing caudad, a small round spot on each side of disc, and a hook-shaped mark on each side posteriorly. Abdomen with the first segment blue, except a narrow median line, widening into a subquadrate (hut-shaped) mark, which rests on a dark band along the hind margin, narrowing laterally; segments 2 to 4 with broad bands, narrowly interrupted in the middle, the band on 2 with the two divisions somewhat curved; posterior side of hind tibiæ mainly blue.

Related to *C. basalis*, Friese.

Crocisa verticalis, sp. n.

♀.—Length about 10 mm., expanse 23.


Anterior wings dark fuscous, hardly spotted. Similar to *C. cæruleifrons*, with purple markings, but marks on abdomen greatly reduced, as follows: *first segment with only a vertical blue bar on each side*, not reaching its base or apex; segments 2 to 5 each with a lateral transverse blue bar, short and not at all widened laterad (representing very widely interrupted bands). Scutellum practically as in *cæruleifrons*, but strongly and very distinctly punctured (feebly punctured in *cæruleifrons*); mesothorax with a pair of longitudinally oval discal spots and a small spot near each posterior lateral corner, also a pair of very small bars or spots on anterior edge, but no median band or mark; face ornamented about as in *cæruleifrons*, but the black region above antennæ conspicuously wider than the lateral ones; pleura black with an oblong blue spot; hind tibiæ black with a large blue spot on basal half, middle tibiæ similarly marked; anterior tibiæ mainly blue behind; lower side of third s.m. broader than in *cæruleifrons*.

Related to *C. pulchella*, Guér., and *C. nana*, Friese.

Hab. Amboina; "Paso, 1396" (*H. O. Forbes*). Type in British Museum.

Nomia (*Meganomia*, subg. n.) *binghami*, sp. n.

♀.—Length about 15 mm.; expanse slightly over 30.

Head and thorax black, rather sparsely punctured; a small spot before each lateral ocellus, sides of face broadly (obliquely truncate above, at about half distance between ocelli and antennæ, the *lower* side of the truncation on orbit), a large supraclypeal spot, and clypeus (except a black π above) *pale yellow*; basal half of mandibles testaceous; scape yellow in front; flagellum, except at base, ferruginous beneath; upper margin of prothorax (interrupted in middle), tubercles,  formed marks on anterior margin of mesothorax, most of hind half of scutellum (more in sub-lateral region), postscutellum, area of metathorax (narrowly interrupted in middle), and two spots on hind face of metathorax, *yellow*; tegulæ partly yellow, partly ferruginous. Wings slightly dusky, yellowish; nervures ferruginous; *no stigma*, or a mere vestige. Legs dark reddish, anterior and middle knees yellow; anterior tibiæ broadly yellow at base and apex, the yellow connected by a line; middle tibiæ yellow at apex; abdomen broad, ferruginous, with five very broad bright yellow bands, each broadly subemarginate sub-laterally by a dark elongate spot. In build and size it resembles *Stenotritus elegans*, Sm., but the hind spur is minutely ciliate (with long coarse teeth in *S. elegans*), and the venation is entirely different. The middle spur is normal.

The following structural characters will define the new subgenus *Meganomia*:—Tongue short, pointed; maxillary palpi with six short joints; no facial foveæ; mandibles simple; ocelli large, in a low triangle; inner orbits practically parallel, not in the least emarginate; flagellum short and thick, first joint about or nearly as long as next three together, apical joint rounded; tegulæ of moderate size; scutellum with a fine longitudinal ridge; claws very strongly cleft; no pulvillus (at least on front pair); hind trochanters bulging behind; no floccus at base of hind legs; a large scopa on hind tibiæ and tarsus, the white hairs merely spinulose; pygidial plate very broad, broadly rounded (sub-truncate) at apex; marginal cell with rounded apex not on costa, and a slight appendiculation; first s.m. *at least as long as second and third combined*; second s.m. not far from square, receiving first r. n. a little before end of first third; *third s.m. nearly as broad above as second*, and receiving the second r. n. a short distance beyond middle; b. n. going a short distance basad of t.-m.; t.-m. of hind wings vertical,

slightly bent inwards below (practically as in *Andrena*; in *Stenotritus elegans* it is long and very oblique).

♂.—*Apical joint of antennæ produced and hooked.*

Length about 17 mm.

Face narrow, the eyes large; face up to antennæ cream-colour, except a black stripe down each side of supraclypeal area; thorax with less yellow, that on scutellum reduced to a narrow band on hind margin, and no yellow on metathorax; anterior and middle legs yellow; hind trochanters mainly yellow, pointed behind; *hind femora very greatly swollen*, mostly black above and yellow beneath, the black nearly dividing the yellow by a process on outer side; *hind tibiæ more or less flattened, with a hump on middle of inner side*, outer surface yellow, with a black mark in middle and apical outer corner black, inner side with about basal two-fifths yellow; *hind tarsi excavated as though a large piece had been bitten out*; abdomen brown-black, with six bright yellow bands, narrowed (the first interrupted) in middle; venter largely pale yellow, with six conspicuous black spots.

Hab. Damara Land, 2 ♀, 1 ♂ in British Museum, from F. Smith's collection.

One of the females (with an anterior leg of some other bee glued on in place of the proper member) has stood for years in the Museum collection, labelled by Bingham as a new species of *Megacilissa* from the Himalayas. I cannot adopt Bingham's manuscript specific name, as it has reference to the erroneous locality-label, and has, moreover, been used by Nurse for a different *Nomia*. Evidently Col. Bingham came to doubt the Asiatic locality, as the insect is not described in his work on Indian bees.

Xylocopa varians ecuadorica, subsp. n.

♀.—Length about 16½ mm., expanse about 28 mm.

Head dark blue, with black hair mixed with pale, all black on vertex, mostly pale on cheeks; labrum with orange hair; clypeus with large punctures and a smooth line; thorax blue-green, more steel-blue on disc, its hair black, more or less mixed with pale; pleura dark blue. Abdomen dark yellowish green, with short sparse pale golden hairs; last segment and sides of penultimate with black hair, extreme apex with orange. Anterior legs with black hair, middle with hair on outer side of basitarsus pale yellowish; hind legs with pale yellowish hair on outer side of basitarsus and on apical half of tibia; first r. n. reaching base of third s.m.

Differs from genuine *X. varians*, Sm. (S. Brazil), by being less stout, with a narrower abdomen; tegulæ black (red in *variens*); abdomen yellower and with more pale hair. The oblique spine on outer side of hind tibia is practically as in *variens*. Wings orange-tinted as in *variens*.

Differs from *X. ornata*, Sm. (S. Paulo), by being larger, with the abdomen very much darker and less golden, and the face much narrower.

Differs from *X. viridis*, Sm., by the dark hair of thorax, and the abdomen without bands. Easily known from *X. barbata*, Fabr., by the colour, and the absence of the shining silver-white hair which covers the cheeks of *barbata*. Distinguished from *X. electa*, Sm., by the light hair on legs, colour of abdomen, &c.

Hab. Guayaquil, Ecuador (British Museum, 96. 119).

Xylocopa lunulata minensis, subsp. n.

♂. Agrees exactly with Lepeletier's description of his *X. lunulata* from China, except that the clypeus (except its broad lower border) is dull white. Length a little over 30 mm.; anterior wing $25\frac{1}{2}$; face broad, the inner orbits parallel; face-markings greyish-ivory colour, including in addition to the clypeus a semicircular supraclypeal mark, a lunule on each side of anterior ocellus, and broad lateral marks. The face is thinly clothed with black hairs. The general appearance of the insect is like that of *X. dissimilis*, Lep., which also occurs in China, and in view of what Pérez has written concerning the variability of *dissimilis* it is quite possible that *lunulata* and *minensis* are both local races of that insect.

Hab. Sharp Peak, island at mouth of Min River, June 16, 1909 (*James Percy Grant*).

At the same time and place Mr. Grant took *Anthophora zonata* (L.), and species of *Argynnis* and *Papilio*, the latter of a tropical type.

Boulder, Colorado.

Sept. 11, 1909.

XLIV.—*On the Colours of Horses, Zebras, and Tapirs.* By R. I. POCKOCK, F.L.S., F.Z.S., Superintendent of the Zoological Society's Gardens.

IRRESPECTIVE of breed, the commonest types of colours in domestic horses are the following:—Bays with black "points" are rufous-brown horses, with mane, tail, and lower

half of the legs black. Chestnuts are paler reddish brown, with the mane and tail and the lower half of the legs the same colour as the body or even paler. Blacks, as the name suggests, are black all over. Browns are intermediate between bays or chestnuts and blacks. Duns are pale yellow-brown or fawn-coloured horses, typically resembling bays in having the mane, tail, and lower parts of the legs black, but, apart from the colour of the body, generally also differing from them in having a black spinal stripe running from the mane to the tail, those presenting this feature being known as "eel-backed" duns. Roans have the neck and body covered with a mixture of white and black or white and red hairs. A peculiarity about this type is the absence of white hairs, at all events as a rule, from the head, mane, tail, and the lower parts of the legs. Greys are mostly of two kinds, "dappled" when marked with a network of black, and "flea-bitten" when the black or brown is distributed as small specks over a white ground. Greys pass into whites; but it is by no means necessary to assume that whites are always exaggerations of the grey type. Analogy suggests that they may be abrupt variations from bays or chestnuts. Finally, there are piebald and skewbald horses blotched with white and brown or black in varying proportions.

Now these types of colour seem to be reducible to three categories: the first containing bays, blacks, chestnuts, roans, and piebalds; the second duns; and the third greys and the majority of whites. Blacks appear to be melanistic and chestnuts erythristic variations of bays with black points. That chestnuts are "red" sports is attested by the colour of the mane and tail being the same as that of the body or lighter; for in all wild species of the horse family, like Kiangs, Chigetais, and Onagers, whatever shade of chestnut or fawn the coat may be, the bulk of the mane and of the tail-tuft is black. The frequency, too, with which chestnuts have a white blaze and white "stockings" or "bracelets" shows a strong tendency to albinism in this type. In these horses, as well as in bays and blacks, albinism usually shows itself first by a white spot, called the "star," on the hair-whorl of the forehead. This may be the only white mark to be detected. It varies considerably in size, and may spread over the forehead and down the nose, to constitute the "blaze." When the blaze involves the end of the muzzle it is accompanied by a pink tinge of the lips, a sure sign of albinism and certain evidence that the whiteness of this area in domestic horses is not properly comparable to the whiteness of the muzzle in Kiangs and Onagers, in which the area of the

muzzle in front of the nostrils and the lips is never pink, but some shade, darker or lighter, of ashy black or grey.

A second very common sign of albinism is the appearance of white in varying amount on the area of one or more of the legs below the knees and hocks. When the white affects only the fetlocks and pasterns it forms a "bracelet," when it extends to the knees and hocks it is called a "stocking." The albinistic nature of bracelets and stockings is betrayed by the whiteness, partial or complete, of the hoofs; for, reverting once more to the Asiatic asses, not to mention the true Quagga, however nearly white the legs may be, the hoofs are always black with a narrow rim above them darker than the colour of the rest of the fetlock.

When in blacks, bays, or chestnuts the white appears as patches on the body, it gives rise to piebalds and skewbalds.

Thus it appears certain that the white star, blaze, bracelets, stockings, and blotches on the body in all domestic horses are evidences of partial albinism, and cannot be regarded as characters inherited from one or more wild ancestral types*. The same may probably be said of the white that appears in roans. That roan colour belongs to the same category as bay and black is suggested by the dark tint of the head, mane, tail, and legs in typical roan-coloured horses; but in these the white is distributed all over the body, without affecting, however, all the hairs. Thus, eliminating from this category blacks as melanistic and chestnuts as erythristic sports, roans and piebalds as exhibiting partial albinism, and, for the same reason, all horses showing white marks upon the head or legs, there only remain, as perhaps representing a primitive unaltered type of coloration, bays with black points.

Reasoning from different premises, Prof. Ridgeway † has come to the conclusion that there was at one time a wild horse of this colour in Libya, from which the so-called Arabs of English literature are descended. And if, as I believe, chestnuts are erythristic sports, Mr. Wilfrid Blunt's ‡ opinion that chestnut is the original colour of Arabs (Kehailans) is untenable. Moreover, if the above-given explanation of "black," "chestnut," and "white" is correct, it does not, in

* Precisely the same conclusion has been independently reached by Prof. Ewart, who states (P. R. Soc., Oct. 9, 1909), in a paper not seen by me until after mine was in the printer's hands, that his experiments in horse-breeding show that "stars" and bracelets are not ancestral traits, as Prof. Ridgeway supposed them to be.

† 'Origin and Influence of the Thoroughbred Horse,' 1905.

‡ "Arabian Horse," in the 'Standard Cyclopaedia of Modern Agriculture,' i. p. 180 (1908).

my opinion, follow that the occurrence of horses of these colours in any locality or breed justifies, without further evidence, the belief that intermixture of strains has taken place.

Although true dun—that is to say, cream-brown or fawn—is at least as pale a shade as chestnut, there is no reason to regard it as indicating incipient albinism, as is the case with chestnut, because the mane and tail and hoofs are typically black. The lower parts of the legs are also blackish and very frequently show transverse stripes. There is also usually a black spinal stripe extending from the mane to the tail, and not uncommonly a dark stripe or stripes across the shoulders and elsewhere. To this colour some of Prjevalsky's horses closely approximate, and it is believed by Prof. Ewart to have been the colour of a stout wild forest horse of Scandinavia and other parts of Western Europe, the domestic representative of which he has identified as the typical *Equus caballus* of Linnæus*.

As regards greys and whites, the latter may be set aside at once as deviations from the primitive style of colouring, because outside arctic and subarctic latitudes so few species of mammals are perennially white that it may be confidently assumed no wild species of horse was ever of that conspicuous colour. Greys with white manes and tails may be also disregarded as albinistic. But dappled greys with black or mostly black manes, tails, and "points" are more deserving of attention, because, in the first place, horses that are true to this type do not show convincing signs of albinism and because, in the second place, they possess a very definite pattern.

As has been very well known for many years, domestic horses are marked with patterns of two kinds, namely stripes and dapples. Stripes, which are more usually present in duns than in horses of other breeds, although they are sometimes seen in bays and chestnuts, are obviously comparable to the stripes of asses, both African and Asiatic. The stripe most commonly developed is the spinal. Next in order of frequency are short stripes on the legs, especially across and above the knees and hocks. Now and again also there are one or more stripes on the shoulder and adjacent part of the neck, and sometimes narrow stripes on the head resembling in general arrangement those of some zebras. In dun horses

* Tr. Highland and Agric. Soc. Scotland, pp. 32-38 (1904). Prof. Ewart does not, however, now think that the name *caballus* should be fixed to this horse.

all these stripes may coexist in one individual. Some exhibit only the spinal stripe, but when the legs or shoulders are barred the spinal stripe appears to be always present as well; just as in the Asiatic asses, while stripes on the legs and shoulders may or may not be detectable, the spinal stripe is of invariable occurrence.

It is also known that the foals of some horses, especially duns, may show on parts of the body other than those specified faint stripes which usually disappear with the first moult; and Hagenbeck recorded the presence of such evanescent stripes upon the foals of the wild Mongolian Przevalsky's horses. With the exception of this last circumstance, all the above enumerated facts connected with the striping of horses were well known to Darwin*, and he drew from them the conclusion that domestic breeds of horses are descended from a single wild species which was dun in colour and marked more or less with dark stripes. That portion of this view which relates to the presence of black stripes in the ancestral stock is generally accepted at the present time. Nevertheless it must be remembered that dappling or pummel-marking, as it is sometimes called, is a far more usual pattern in domestic horses than stripes. It occurs commonly in bays and blacks, more rarely in chestnuts, is not unknown in duns, and attains its highest perfection in dapple-greys.

In horses of this colour the pattern may be described as consisting of white spots upon a black or blackish-grey ground, or of a black or blackish-grey network with white interspaces, in just the same way as zebras have been stated to be black-striped or white-striped according to the fancy of the describer. When dappling occurs in bays the network is black on the bay ground, and in blacks the dappling stands out against the dark ground-colour on account of the greater intensity of its tone or of a difference in the sheen of the hairs, precisely as is the case in the spots of black leopards or the marbling of tabby cats.

Now it is admittedly possible that "dappling" is a sport without phylogenetic significance. This, however, has not been always held. Darwin suspected that dappling was a modification of the striped pattern † with which he believed

* For a more recent and detailed discussion of this subject, see Prof. Ewart's 'Penycuik Experiments,' pp. 100-134 (1899).

† This is not exactly Prof. Ewart's opinion. He said: "Dappling, I believe, has been acquired since the ancestral stripes were all but lost. When dappling coexists with more or less distinct stripes it is at once evident . . . that the one has not been derived from the other. The

the wild forerunner of domestic horses was marked, and he cites in support of this opinion the alleged fact that in several species of the cat family stripes pass into spots. In opposition to this it must be urged that a pattern of transverse stripes is a very unusual style of coloration in Mammalia, and that in members of the cat family, in the tiger for instance, it is tolerably certain that the stripes owe their origin to the fusion in transverse lines of solid spots or of large irregularly disposed rosette-shaped or subcircular blotches*. Therefore, adopting Darwin's analogy, if dapples and stripes in horses stand in the same relation to one another as spots and stripes in jaguars and tigers, it follows that the dappled pattern preceded the striped pattern in the evolution of equine coloration. It is at all events possible, perhaps indeed more likely than not, that this is the true explanation of the persistence with which the dappled pattern crops up in diverse breeds of domesticated horses. As Dr. Bonavia, perhaps exaggeratedly, said, "the very fact that the dappling is so persistently inherited, either wholly or vestigially, would indicate that it comes from the very foundation of horse evolution" †.

Darwin, moreover, cites a case of a donkey marked in this way, a fact which shows, assuming the truth of the hypothesis, that the dappling has not wholly died out in the asinine line of descent.

The black-and-white-striped coloration of zebras shows that there is nothing intrinsically improbable in the supposition of the existence in former days of a wild horse mottled with black and white. There seem to be no reasons to think that with a slightly different environment the dappled or mottled pattern would not be as beneficially procryptic as the striped is known to be. Perhaps it would lend itself especially to concealment in horses accustomed to shelter in woods through the foliage of which the sun-rays passed, dappling the leaves and tree-trunks with spots of light.

It appears to me to be impossible to say which breed of horses in which dapple-grey individuals crop up approaches

pigment which formerly produced stripes . . . has in recent times been as it were left uncontrolled, with the result that it frequently gives rise to ever-varying and quite meaningless dappling, or to large equally meaningless blotches" ('Penycuik Experiments,' pp. 123-124, 1899). Yet pigment which adheres so persistently to the dappled pattern can scarcely be described as uncontrolled.

* Pocock, *Ann. & Mag. Nat. Hist.* (7) xx. p. 436 (1907).

† 'Studies in the Evolution of Animals,' p. 61 (1895). This work, although the reverse of orthodox in many of its conclusions, is well worth careful reading for its recorded facts.

nearest to the hypothetical wild type that was so coloured. Whether he was tall in stature or a pony, heavily or lightly built, long- or short-headed, must be left, at all events for the present, undecided. It is, in my opinion, almost certain that crossing of different breeds, whether intentionally selective or not, together with changed conditions of life, have so altered domestic horses, that no existing grey resembles, except in colour, and perhaps not exactly in that, the hypothetical wild prototype. Welsh and Airedale terriers have reverted nearly to the coloration of jackals without in themselves resembling jackals in structure.

According to Prof. Ridgeway* there is justification for the conclusion "that grey horses are not an original stock . . . but are the result of crossing Libyan and Asiatic blood." I presume from this that Prof. Ridgeway holds that dapple-greys with the mane, tails, and lower legs mostly black are hybrids or mongrels or "sports" in the sense that chestnuts are sports, a view which may be perfectly correct †. Nevertheless I do not think it follows that dapple-grey was not a primitive colour because it comes out in the progeny when the parents belong to distinct stocks, whether they be breeds, subspecies, or species; for, as Darwin pointed out, the offspring of distinct breeds may revert to the coloration of remote ancestors. Hence, if "dapple-grey" results from crossing bay Libyan with dun Asiatic horses, the fact may be cited as an item of evidence in favour of the possibly primitive nature of that pattern. This, at all events, is a suggested explanation of what is otherwise, if true, a remarkable phenomenon in inheritance.

But the dapple-grey pattern is interesting from another point of view. As already said, a horse so coloured may be described with perfect accuracy either as a dark horse with white spots or as a white horse with dark reticulations, just as zebras may be described as black animals with white or fawn stripes or as white or fawn animals with black stripes. Up to the present time it has been almost universally admitted that in the Equidæ the black markings constitute the stripes and the white or fawn the ground-colour to which the stripes have been superadded, as in the case of the *Æluroid Carnivora*. Sir Harry Johnston ‡, however, thinks this view

* 'Origin and Influence of the Thoroughbred Horse,' p. 261 (1905).

† Compare, however, Hamilton Smith, who said "albinism would produce white or flea-bitten or sorrel horses, but does not afford the round dapples and black legs" ("Horses" in the 'Naturalist's Library,' *Mammalia*, vol. xii. p. 211, 1841).

‡ 'The Woburn Library: British Mammals,' pp. 276-277 (1903).

is entirely wrong, and holds that the white marks in zebras are the true stripes and the black the ground-colour. Although this hypothesis appears at first sight to be improbable, especially when brought into contact with the coloration of such species of Equidæ as Prjevalsky's horse or the Nubian wild ass, it seems to me to be worthy of careful consideration and not hastily dismissible as without foundation.

In its favour its author adduces the following facts. In several groups of Ungulates there is a pattern of white spots, which are either transitory and confined to the young or are persistent through life to old age. The deer furnish familiar instances of both these phenomena, and no one probably doubts that white spots tending to run into longitudinal lines formed the pattern of primitive members of the Cervidæ. Antelopes of the subfamily Tragelaphinæ also commonly exhibit white markings usually in the form of transverse stripes, but sometimes, as in *Tragelaphus*, of longitudinal white stripes and spots often coexistent with the transverse stripes, which have probably been derived from them. Giraffes, too, although commonly described as spotted with brown on a whitish ground, may be equally well regarded as brown animals with a network of white. This is especially evident in the Somaliland race of the North-African giraffe (*Giraffa camelopardalis reticulata*); and in view of what has already been said of the prevalence of a pattern of white in some other ruminant Ungulates, the view that giraffes are fundamentally brown animals marked with white must be regarded as highly plausible. Even outside the limits of the Ruminantia pale longitudinal bands occur in Artiodactyle Ungulates, as in the young of some species of pigs (*Sus*). Artiodactyle Ungulates, however, are by no means nearly related to Equidæ, and cannot in themselves be considered as supplying very valuable evidence on the nature of zebra-patterns. Much more to the point, indeed in the highest degree pertinent to the question at issue, is the fact that the young of tapirs, the most primitive (as horses are the most specialized) of existing Perissodactyle Ungulates, are thickly covered with white stripes and spots forming longitudinal bands on a dark ground.

These are the facts, amplified in detail, upon which Johnston based his conclusion. Let us see if his argument can be further elaborated by a comparison between the markings of young tapirs and existing Equidæ, especially zebras.

In tapirs the only white spots which persist to maturity* are those on the rim of the ears, and on the fetlocks in some specimens. In all zebras the tips of the ears are also white; but some young tapirs, at all events, also show white spots on the back of the ear behind, and the back of the ears in all zebras has a varying amount of white. All zebras, too, have a varying amount of white on the fetlocks. In four young tapirs mounted in the Natural History Museum, and referred to the four species *T. terrestris*, *T. roulini*, *T. bairdi*, and *T. indicus*, there is a broad dark brown spinal area, defined on each side by a white stripe, sometimes more or less broken up into spots, and extending from the base of the neck on to the hind-quarters. In one of them, *T. terrestris*, this area is itself spotted with white in the middle line. In the young of *T. bairdi*, which apparently shows the white pattern in an evanescent stage, the dorsal white stripes are only just visible; but they are there nevertheless. Gray also noticed these dorsal white stripes in the young specimens he described †. In all zebras, all Asiatic asses, the typical African ass, Prjevalsky's horse, and many domestic horses there is a dark spinal line, narrower or broader according to the species. This dark spinal line is defined by a pale line as far forwards as the withers in some races of Asiatic asses, and at least as far as the middle of the back in some zebras, e. g. *E. grevyi*; and the pale line is represented on the neck of many horses and asses, both African and Asiatic, by the outer pale portion of the mane, the middle of which is always black like the spinal line ‡. If it be just to regard as genetically related the dark spinal area set off by a pair of white stripes in young tapirs and in existing Equidæ, it follows that the pale dorsal longitudinal lines in the horses are the stripes and the dark spinal area part of the ground-colour. The mane of zebras fully bears this out, for it is perfectly evident that the white marks, which, be it noted, are continuous with those of the neck, are the stripes. They merely form superficial tufts on the black mane.

Now and again the white marks on young tapirs, especially across the sacral region, form short transversely set stripes,

* In the adult Malayan tapir the whole of the posterior half of the body is white. Presumably this white area results from the extension and fusion of the white pattern on this area in the young.

† P. Z. S. 1872, pp. 483-492.

‡ Unless my memory is at fault, Prof. Cossar Ewart told me some time ago in conversation that he considered the definition of the dark spinal line by two light lines to be a primitive feature in the Equidæ.

like those on the body of zebras; but for the most part the lines are decidedly longitudinal. The stripes are also longitudinal across the thighs up to the root of the tail in all zebras; and this arrangement may be a primitive feature. In young tapirs, where the legs are spotted, the spots often form abbreviated stripes at right angles to the axis of the limbs, and the spots are present on the inside as well as on the outside of the limbs. In all zebras in which the legs are fully marked the stripes are present both on the inside and the outside, and their direction is always at right angles to the long axis of the limbs. But in some young tapirs the legs below the "knees" and "hocks" are unspotted, and thus recall the black "points" of many horses. On the head in young tapirs the spots frequently tend to run into longitudinal lines. In zebras also the white marks form longitudinal lines at least on the area in front of the eyes.

In the young of *T. roulini* the belly is brown; in that of *T. terrestris* it is white; but in that of *T. indicus* it is distinctly spotted with white like the rest of the body. In fully marked zebras the belly is striped like the rest of the body, and in those in which the belly is white the whiteness has evidently been acquired by the suppression of the dark bands. Finally, in all the young tapirs* exhibited in the Museum the nose is dark and unspotted. In all zebras the muzzle is mostly or wholly black or ashy grey, and never marked with white.

It is needless to insist upon the importance of these resemblances, since Johnston's hypothesis supplies an explanation of them.

The greatest apparent difficulty in the way of accepting this author's view is presented, not by the zebras, but by the Asiatic and African donkeys, by Prjevalsky's horse, and by certain domestic breeds like the dun. Now if these animals exhibited a primitive style of coloration, showing dark stripes in an incipient stage of development, the fact would be practically destructive of Johnston's hypothesis. But this is not so. All the evidence goes to prove that the coloration of these species is highly specialized and derivable from a type resembling that of zebras in a general

* The nose of the example of *T. indicus* is denuded of hair. But a figure of the young of this species in J. G. Wood's 'Illustrated Natural History,' vol. i. p. 744, shows this part to be dark and unspotted. There is also an excellent photograph of the young of this species published by Dr. Mitchell in P. Z. S. 1908, p. 786, which shows, I believe, the same feature, the pale patch on the snout being merely reflected light.

way, the dark marks they may exhibit being vestigial. According to the accepted theory, the dark stripes of the zebroid prototype have, apart from these vestiges, vanished, leaving the dun, reddish-fawn, or tan ground-colour unmarked. According to Johnston, the pale stripes have increased in extent until they have enveloped nearly the whole body, fusing together and swamping the dark interspaces representing the ground-colour, the sole remnants of which are the spinal stripe and the stripes, when present, on the legs, shoulders, or elsewhere.

Johnston seems to think also that the uniformity in colour may have been attained by a rather different process as well, namely, by the fading of the dark interspaces and the darkening of the light stripes until they were both of the same brown or dun hue.

There seems to me to be nothing extravagant in the view of a pattern developing so as to overrun the ground-colour. An instance of this is seen in the black leopards of Grahams-town, where the spots have become broken up and multiplied until there is scarcely a trace of the original yellow interspaces left; and, to cite an instance which is peculiarly apposite, I may mention that of the quagga in the Vienna Museum, the type of *E. quagga lorenzi*, in which the dark markings, hitherto quoted by myself and others as stripes, have expanded and spread to such an extent that the head, neck, and fore-quarters of the animal are dark brown, relieved by thin pale lines. If these dark marks, as has been assumed, are stripes that have spread so as almost to crowd out the pale interspaces, no reason can be alleged why white stripes should not similarly spread and obliterate dark interspaces.

It seems to me indeed that we need not look beyond the subspecies of *Equus quagga* itself for justification of Johnston's belief. In these may be seen the passage from thickly striped legs to white legs by the thinning of the black marks, or, stating the same fact another way, by widening of the white marks. It is quite obvious, too, that the dark marks become not only reduced in width and length, but also toned in intensity of colour until they fade away and are replaced by white. This process goes on up to the shoulder and nearly to the root of the tail, and also takes place on the belly. Existing races only go to this stage, which is exhibited in Burchell's quagga (*E. quagga burchelli*). But in extinct races the suppression of the dark marks at the expense of the light marks was carried still further, as is shown in the original quagga depicted by Edwards, in which the black

marks over the quarters break up into spots. In another race, Grey's quagga (*E. quagga greyi*), there are no very definite markings over the hind-quarters and posterior area of the flanks, owing apparently to the toning down of the dark marks and the deepening of the pale marks to a nearly uniform brown; the marks on the head and neck, however, retain respectively their normal width, the dark marks nevertheless being deep brown and the pale marks creamy brown. In yet another form, Daniell's quagga (*E. q. danielli*), of which there are extant three coloured plates drawn by different artists from different living models, the extension of the light marks, which are chestnut in hue, is still further carried, the dark markings being represented principally by narrow lines on the head, neck, and shoulders. Finally, in Lorenz's quagga, as already stated, the dark markings on the head, neck, and fore-parts have encroached upon the light marks, reducing them to pale narrow streaks*.

Thus the quaggas supply evidence of a progressive evolution of the black and white zebroid pattern towards, though never quite achieving, uniformity of colour of a brown or chestnut hue. This approximation to uniformity has been brought about by four distinct processes:—(1) by the lightening of the dark marks and the darkening of the light marks to practically the same tint; (2) by the lightening of the dark marks and their extension across the intervening pale marks; (3) by the darkening of the light marks and their extension across the intervening dark marks; (4) by the fading away of the dark marks, especially after reduction in length and width has taken place.

Thus there appear to me to be very good reasons for thinking that Johnston's view of the coloration of the Equidæ is correct, namely, that they are descended from dark-coloured animals patterned with white spots, running into longitudinal lines originally, and at a late stage in evolution becoming arranged in transverse bars over the neck and body. It is this view of the question which, in my opinion, gives special interest to the coloration of dapple-grey horses; for it, as it is obvious to suggest, the white spots of these horses represent phylogenetically the white spots of a tapiroid progenitor, we see in this dappled pattern a stage in the evolution of equine coloration antecedent to the vertically banded zebroid pattern hitherto regarded as the most primitive pattern extant in the Equidæ.

* Pooock, Ann. & Mag. Nat. Hist. (7) xiv. pp. 313-328 (1901).

XI.V.—Description of a new *Lycænid* from Formosa
By HAMILTON H. DRUCE, F.L.S. &c.

PHENGARIS.

Phengaris, Doherty, J. A. S. B. lx. pt. ii. p. 36 (1891).

Phengaris moltrechtii, sp. n.

♂. Upperside pure white. Fore wing with the apex rather broadly black; a linear black spot partly closing the end of the cell. Costal and basal area slightly fuscous and partially suffused with pale blue scales. Hind wing with a fine black anteciliary line. Underside pure white. Fore wing: basal half of costal margin bluish grey; an elongate black spot closing the cell; two subapical bands composed of black spots, the innermost broadest and most irregular, the lowest spot of its series, *i. e.* that between veins 3 and 4, being separate and placed nearer to the centre of the disk. A submarginal series of elongate black markings placed between the nervules, followed by a black anteciliary line. Cilia chequered. Hind wing white, with black spots arranged as in *P. atroguttata*, Oberth.*, but smaller, and the basal spot on the costal margin wanting. A black anteciliary line. Cilia white. Thorax and abdomen fuscous above, white below.

Expanse 2 inches.

Hab. Arrizan, Kagi District, Central Formosa, 8000–10,000 feet (*Dr. A. Moltrecht*). Type, Mus. Druce.

Described from three specimens, one of which has a minute black dot in cell of fore wing below, but on left side only. Allied to *P. atroguttata*, Oberth., but the spotting on the fore wing below is quite different, the spots in the cell and on the disk being absent.

It is a much whiter insect than var. *albida*, Leech (Butt. China &c. pt. ii. p. 317, pl. xxvii. fig. 5, 1893). Doherty wrote that he often saw *P. atroguttata* in the meadows of the Naga Hills from 6000–8000 feet, flying very slowly, and visible for a great distance; but no mention of the insect appears in the last volume of the 'Fauna of British India' by the late Lieut.-Col. Bingham.

* *Lycæna atroguttata*, Oberth. Étud. d'Entom. ii. p. 21, pl. i. figs. 4 a, b (1876).

XLVI.—*On Simia sphinx*, *Linnaeus*.
By D. G. ELLIOT, D.Sc., F.R.S.E., &c.

IN the tenth edition of the 'Systema Naturæ,' 1758, *Linnaeus* describes a *Simia sphinx* as follows:—

"*Simia semicaudata, ore vibrissato, unguibus acuminatis.*

"Syn. Gesn., Quad. 352, t. 353.

Aldr., digit. 260.

Jonst., Quad. 145, t. 61. fig. 1.

Rai, Quad. 158.

"*Hab. Borneo.*"

It will be noticed that no indication whatever in the above is given as to the colour or size of animal, and the brief diagnosis leaves the species practically undeterminable. So we naturally turn to the authors whose works are cited by *Linnaeus* for a solution of the problem. *Gesner's* 'Quadrupeds' is the first, but careful search does not reveal any mention of a *Simia* as indicated by *Linnaeus*. Next is *Aldrovandus*, and on the page given is a figure of the mandrill, rude in execution, but yet recognizable, with the large head and erect stumpy tail. There is nothing in figure or description that would designate the small red baboon from the west coast of Africa, and which has been and is known to authors as *Papio sphinx*.

In the twelfth edition of the 'Systema Naturæ,' 1766, *Simia sphinx* again appears as follows:—

"*Simia sphinx. Simia semicaudata, ore vibrissato, unguibus acuminatis, natibus calvis.*

"Syn. Gesn., Quad. 252, t. 253.

Aldr., digit. 260.

Jonst., Quad. 145, t. 61. fig. 1.

Rai, Quad. 158.

"*Hab. Borneo.*

"Animal libidinosum, mulieribus facile vim inferens robustum et ferox. Caput oblongum Canis, sed obtusum. Collum longum, cauda brevis erecta. Nates sanguinolentæ."

In this longer description the mandrill can be better recognized than in the shorter diagnoses of the edition of 1758. Of course, the authors cited give the same result, the mandrill being the only monkey indicated. There seems to be an error in the citation of *Gesner's* work, and not his 'Quadrupeds,' but his 'Thierbuch' was intended, for on page clvii of that work is the same figure of the mandrill as that published *Aldrovandus* and *Jonston*; and so the authors cited by

Linnæus unite in declaring the mandrill to be the species to which the name of *sphinx* should be given. The "cauda brevis erecta" would in no wise answer for the tail of the red baboon, but describes perfectly the rudimentary one of the mandrill.

Therefore this baboon must be known in the future as *Papio sphinx*, with *S. maimon* given to it by Linnæus in his twelfth edition as a synonym; and the red baboon from the west coast of Africa, which has always been called *sphinx*, must be known as *Papio papio*, it being the *Cynocephalus papio*, Desmarest ('Mammalogie,' 1820, p. 69), who seems to have been the first to give the species a name other than *sphinx* incorrectly applied by previous writers.

XLVII.—*On some new Plesiosauria from the Oxford Clay of Peterborough.* By C. W. ANDREWS, D.Sc., F.R.S., British Museum (Nat. Hist.).

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In the course of the preparation of a catalogue of the Plesiosauria from the Oxford Clay of Peterborough it has been necessary to examine the great collection of the remains of these reptiles obtained by Mr. A. N. Leeds, and it has become clear that, in addition to the forms already described, there are several others at present unnamed. Since it will be some time before the Catalogue can be published, it seems desirable to give a brief preliminary account of the more important new types.

The chief genera of Elasmosaurian Plesiosaurs already known from the Oxford Clay are *Muraenosaurus* and *Cryptocleidus*. Of the first of these three species are recognized, viz. *M. leedsi*, Seeley, *M. platyclis*, Seeley, and *M. durobriensis*, Lydekker. Another species referred to *Muraenosaurus* by Seeley is now placed as a separate genus, *Picrocleidus*, the specific name being *P. beloclis*. The remains of *Cryptocleidus* have not been fully examined, but so far only one species, *C. oxoniensis*, is recognized. In addition to the above, it is now proposed to establish a fourth genus, *Tricleidus*, for the reception of a small Plesiosaur presenting some very marked peculiarities both in its skull and shoulder-girdle.

Of the Pliosaurus there are three distinct types, viz. *Peloneustes*, *Pliosaurus*, and a short-snouted form which seems in

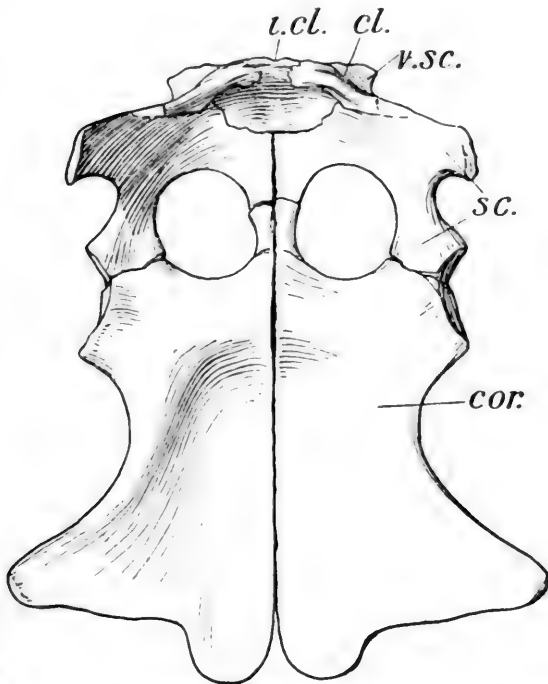
many points to resemble *Thaumatosauros*, but which is probably generically distinct from the animal originally described under that name by von Meyer.

A brief account of the new forms is now given.

TRICLEIDUS, gen. nov.

Small Plesiosaurs in which the skull is short and broad, with twenty teeth on each side (five in the premaxilla, fifteen in the maxilla). Pterygoids bear well-developed processes

Fig. 1.

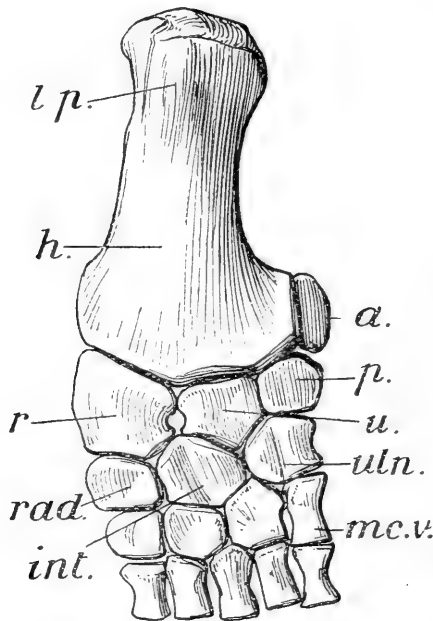


Shoulder-girdle of *Tricleidus seeleyi*, sp. n., from above. (Type specimen R. 3539.) About $\frac{1}{4}$ nat. size. *cl.*, clavicles; *cor.*, coracoid; *i.cl.*, interclavicle; *sc.*, scapula; *v.sc.*, ventral plate of scapula.

for union with the basisphenoid. Parasphenoid broad and abruptly truncated in front. Quadrate region perhaps consisting of two elements (? quadrate and quadrato-jugal).

Teeth long, slender, and very sharp-pointed; anterior maxillary teeth enlarged. Neck rather more than three times the length of the skull and consisting of twenty-six vertebræ, including the atlas and axis; centra short, with strongly concave articular ends, which are much wider than high. The cervical ribs have a prominent anterior angle, which is not, however, produced into a distinct process, as in the next genus. The shoulder-girdle (fig. 1) is of *Elasmosaurian*

Fig. 2.



Left fore paddle of *Tricleidus seeleyi*, sp. n., from above. (Type specimen R. 3539.) $\frac{1}{4}$ nat. size. *a.*, accessory ossicle; *h.*, humerus; *int.*, intermedium; *l.p.*, lateral process; *m.c.v.*, fifth metacarpal; *p.*, pisiform; *r.*, radius; *rad.*, radiale; *u.*, ulna; *uln.*, ulnare.

type; there is a large interclavicle (*i.cl.*) and a pair of well-developed elongated clavicles (*cl.*).

The humerus (fig. 2) is short and not greatly expanded at its distal end, where it articulates with four bones, viz. the radius, ulna, pisiform, and a small accessory postaxial ossicle (*a.*), probably sometimes wanting. Femur more slender than the humerus and articulating distally with two bones only. :

This genus is represented at present by only one species, for which is proposed the name *Tricleidus seeleyi*, after the late Professor H. G. Seeley, who wrote a number of papers on these Oxford Clay Reptilia. The type specimen upon which the species is founded consists of the greater part of the skeleton of an individual in which, in spite of its small size, ossification was complete, so far as completeness is indicated by the union of the coracoids and scapulae in the middle line (fig. 1), the rounding of the heads of the humerus (fig. 2) and femur, and the fusion of the arches with the centra of the cervical vertebræ. Most of the bones of the skull are separated from one another, but it can be seen that the structure must have been much as in *Murænosaurus*. The teeth in the mandible are particularly well preserved, many of the slender curved crowns being complete. The series of cervical vertebræ seems to be complete; they are twenty-six in all. The shoulder-girdle is complete (fig. 1) and shows the peculiar clavicular arch very well preserved. The fore-paddle (fig. 2) shows the articulation distally with four distinct elements. A detailed account of this skeleton will be given later.

Some dimensions (in centimetres) of the type specimen (R. 3539) are:—

Length of basioccipital	3·4
" from occipital condyle to anterior end	
of parasphenoid	8·8
" of mandible	25·0
" of atlas and axis	4·0
" of sixth cervical	2·3
Width of " "	2·8
Height of " "	2·3
" to top of neural spine of sixth cervical .	5·7
Length of shoulder-girdle in middle line	53·0
" of interclavicle	6·4
Width of " "	13·8
Length of coracoid	39·6
Least width of coracoid	13·1
Length of humerus	20·7
Width of distal end of humerus	11·8
Length of femur	21·6
Width of distal end of femur	11·3

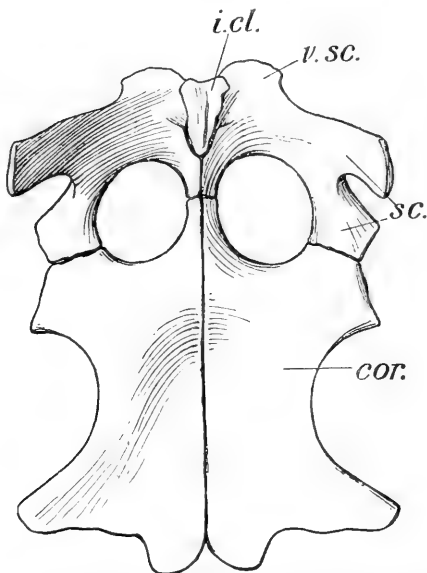
PICROCLEIDUS, gen. nov.

This genus is now established for the reception of Seeley's *Murænosaurus beloclis*, which differs from *Murænosaurus* in some important respects. The genus may be defined as follows:—

Small Plesiosaurs in which the neck is composed of

upwards of thirty-nine vertebræ, the centra of which are shorter than in *Muraenosaurus* (especially in the anterior region) and longer than in *Cryptocleidus*. Ends of centra considerably wider than high and almost flat. The single-headed cervical ribs on the anterior part of the neck have a distinct anterior process. Neural spines on anterior part of neck very low, but they increase in height backwards till at the hinder end of the neck they are both wide and high. The shoulder-girdle (fig. 3) is of Elasmosaurian type; the

Fig. 3.



Shoulder-girdle of *Picrocleidus beloclis*, Seeley, sp., from above. (Type specimen R. 1965.) $\frac{1}{2}$ nat. size. *cor.*, coracoid; *i.cl.*, interclavicle; *sc.*, scapula; *v.sc.*, ventral plate of scapula.

clavicular arch consists of a small interclavicle shaped somewhat like an arrow-head; the clavicles, if present at all, are mere films of bone. The humerus is only slightly expanded distally, where it articulates with two bones only, the radius and ulna, which are somewhat elongated.

The only species at present known is *P. beloclis*, the shoulder-girdle and the radius and ulna of which were

described and figured by Seeley in the Proc. Roy. Soc. vol. li. (1892) pp. 142-145, figs. 10-12, as *Murænosaurus beloclis*. In addition to Seeley's type specimen (R. 1965) the collection includes a second, which in many respects supplements the other—portions of the skull, the anterior portion of the cervical region of the vertebral column with arches and ribs, a number of caudal vertebræ, and parts of a hind paddle being preserved.

The dimensions (in centimetres) of the type specimen (R. 1965) are:—

Posterior cervical vertebra:	
Length of centrum	3.2
Width „	4.6
Height „	3 (app.)
Height to top of neural spine	12.5
Shoulder-girdle: greatest length.....	38.2
Coracoid:	
Length	27.7
Width of united coracoids at hinder angle of glenoid cavity.....	27.8
Width at postero-external angles	23.4
Interclavicle:	
Length.....	7.0
Width	3.8
Humerus:	
Length	18.3
Width of distal expansion	9.9

Fam. Pliosauridæ.

As mentioned above, this family is represented in the Oxford Clay by the genera *Pliosaurus* and *Peloneustes* and by a new form in which the snout is much less elongated than in the other two. It is possible that this animal may be nearly related to *Thaumatosauros* of von Meyer*, a genus known only from a few fragments of the skeleton from the Lower Oolite of Würtemberg. *Thaumatosauros* was redefined by Mr. Lydekker†, but it is almost certain that several of the species, particularly those from the Lias, which he included in it, are generically distinct, and the animal now under consideration does not fall within his definition. On the whole, therefore, it seems well to establish a new genus for this species, particularly as nearly the whole of the skeleton

* Neues Jahrb. f. Min. 1841, p. 176; also 'Palæontographica,' vol. vi. (1856-8) p. 14, pls. iv. & v.

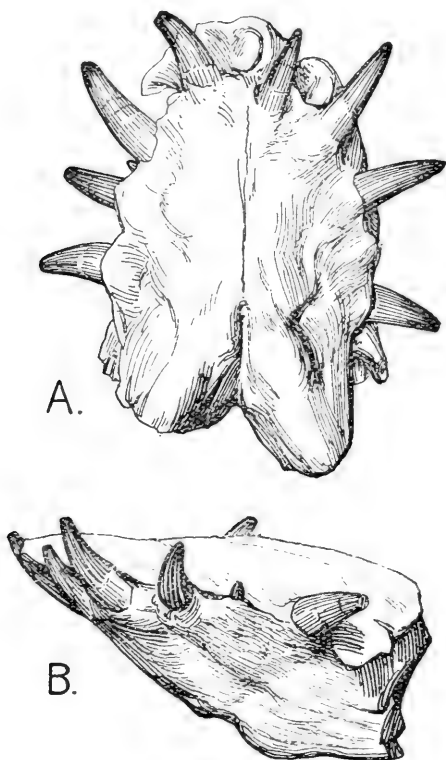
† Cat. Foss. Rept. Brit. Mus. pt. ii. (1889) p. 158.

is known and a fairly complete diagnosis is possible. This genus, which may be called *Simolestes*, is defined as follows:—

SIMOLESTES, gen. nov.

Pliosaurus in which the head is short and broad (fig. 7), the snout not being elongated as in *Pliosaurus* and *Peloneustes*. Mandible with deep massive rami meeting in a short

Fig. 4.

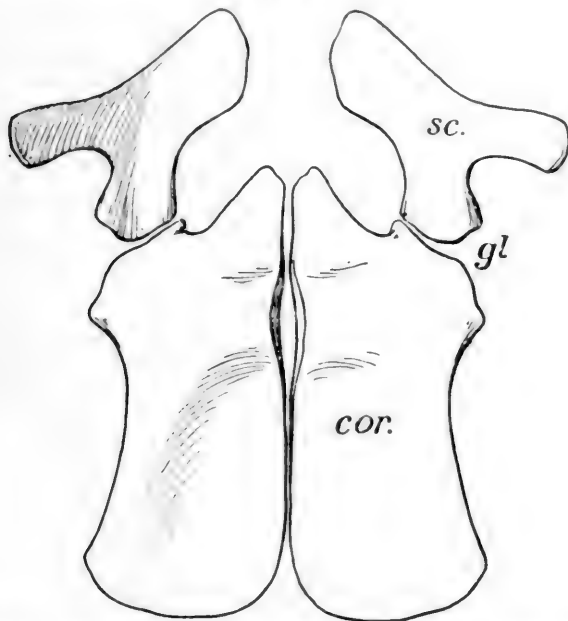


Anterior end of upper and lower jaws of *Simolestes corax*. (Type specimen R. 3319.) $\frac{1}{4}$ nat. size. A, from below; B, from left side.

symphysis, the ventral surface of which makes a well-marked angle with the direction of the lower border of the rami (fig. 4); the postarticular (angular) region is relatively small.

The teeth are sharp-pointed, curved and circular in section, without carinæ, the enamel being marked by a series of fine longitudinal ridges, a few of which extend to the tip; the ridges are most numerous on the inner (concave) side of the crown. In the mandible there were about twenty-six teeth on each side, closely crowded. The five or six anterior teeth in the expanded symphyseal region are enlarged. The neck is short, consisting of about twenty cervical vertebræ, the

Fig. 5.

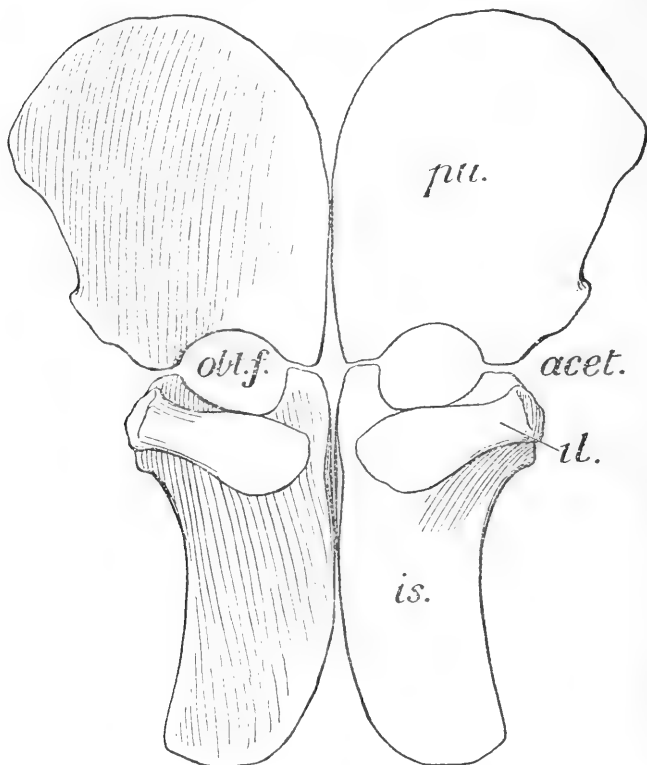


Shoulder-girdle of *Simolestes vorax* from above. (Type specimen R. 3319.) $\frac{1}{7}$ nat. size. *cor.*, coracoid; *gl.*, glenoid cavity; *sc.*, scapula.

centra of which are about as wide as high, while their length is less than half the width; the terminal faces are slightly concave. In front the neural arches bear a low spine, but further back they increase greatly in height both through the lengthening of the pedicles and of the spine. The facets for the cervical ribs are double. The coracoids (fig. 5) are large plates of bone, very thin except between the glenoid cavities. Anteriorly they are prolonged forwards in the middle line in

front of their articulation with the scapulæ, forming broad round processes which are thin at the edge and show no signs of having united either with one another or with backward prolongations of the ventral rami of the scapulæ. The scapulæ have broad ventral plates, which, however, do

Fig. 6.



Pelvic girdle of *Simolestes vorax* from above. (Type specimen R. 3319.) $\frac{1}{17}$ nat. size. *acet.*, acetabulum; *is.*, ischium; *obt.f.*, obturator foramen; *pu.*, pubis.

not meet on the middle line, nor, as already remarked, do they join the anterior prolongations of the coracoids. The clavicular arch is not known. The humerus, which is shorter than the femur, has a more clearly defined expansion at its distal end than is found in *Pliosaurus* or *Peloneustes*,

and rather resembles the humerus of *Marcynosaurus*. The radius and ulna are large and are longer than wide; they enclose a large oval opening between them.

The pelvis (fig. 6) and hind limb, as in other members of the family, are very large. The pubes are very large thin plates of bone, the anterior ends of which are broadly rounded; in the middle line they meet in a suture. The posterior borders are concave, forming the anterior boundaries of the obturator openings. The outer borders in front of the glenoid surfaces are also slightly concave. The ischia, as in the other members of the family, are greatly elongated; in the middle line they meet in a long suture; their hinder extremities are rounded and the outer borders gently concave. The anterior edges are concave and form the hinder borders of the obturator foramina. The head bears three facets, the posterior one for the ilium, the middle one forming the middle part of the acetabulum, the anterior uniting with the pubis. The ilium is much crushed in the type specimen, but it seems to have been considerably expanded both at its upper and lower ends. The femur is larger than the humerus, and, like it, is expanded distally to a degree not seen in *Pliosaurus* and *Peloneustes*. The posterior border of the shaft bears deep grooves and strong ridges for the attachment of muscles; the trochanter is well developed. There was an armour of ventral ribs, but these are not well preserved.

Only one species is at present known.

Simolestes vorax, sp. n.

Type specimen.—The greater part of a skeleton, including skull (fig. 7), mandible (fig. 4), vertebral column (much crushed), pectoral girdle (fig. 5), and parts of the fore paddles, pelvic girdle (fig. 6), and parts of hind paddles; some ventral ribs. (R. 3319.)

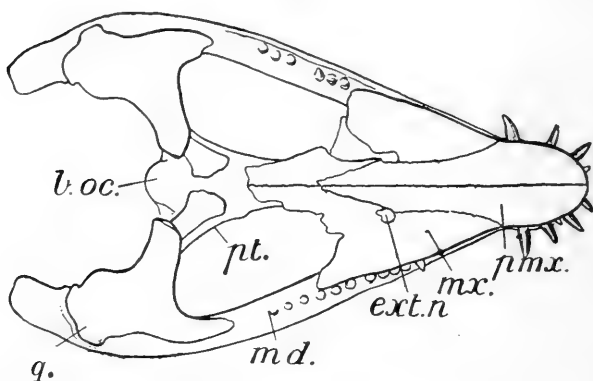
In this specimen the characters given above in the definition of the genus are well shown. The skull is much crushed, the posterior part being imperfect, while the anterior portion has been forced down upon the mandible, so that the points of some of the mandibular teeth completely pierce it. The maxillo-premaxillary suture appears to run in behind the fifth or sixth tooth, and the facial processes of the premaxillæ extend back about as far as the anterior border of the orbits, where they join the frontals. External to the premaxillæ and frontals at their junction is a distinct bone, which may be the prefrontal. The quadrates are very large and the articulation for the lower jaw very wide. In the mandible there are six teeth in

the symphyseal region, and of these the second to the fifth are very large. Behind the symphysis the first three or four teeth are small, then there are seven or eight larger ones, and behind these there is gradual diminution to the end of the series. The ventral surface of the mandibular rami just where they unite at the symphysis form massive ridges, terminating in prominent angles (fig. 4).

In the type specimen the twenty cervical vertebræ are for the most part crushed and obscured with matrix; but it can be seen that the anterior members of the series are very large. The dorsal vertebræ were about thirty-two in number; they are greatly crushed and distorted, and have lost the neural arches; about eighteen crushed caudal vertebræ are preserved.

The shoulder-girdle (fig. 5), with the exception of the clavicular arch, is fairly well preserved; it is especially

Fig. 7.



Imperfect skull and mandible of *Simolestes vorax* from above. (Type specimen R. 3319.) $\frac{1}{17}$ nat. size. *b.oc.*, basioccipital; *ext.n.*, external nares; *md.*, mandible; *mx.*, maxilla; *pmx.*, premaxillæ; *pt.*, pterygoid; *q.*, quadrate.

remarkable for the extreme thinness of the coracoids, except between their symphysis and the articular surfaces for the humeri. The humeri are fully ossified, the head being rounded and the lateral processes well developed; the posterior borders of the shaft bear strong ridges for the attachment of muscles. The radius and ulna are relatively long; they articulate distally with three bones.

The pelvis (fig. 6) is very large, the total length in the mid-ventral line being 120 cm. The pubis is a great plate of very thin bone, and the ischium, as in the other Pliosaura, is much elongated. The femur, like the humerus, is fully ossified, and bears strong ridges for muscle attachment. The tibia and fibula are much like the radius and ulna.

This skeleton will be completely described and figured in the 'Catalogue of the Marine Reptiles of the Oxford Clay.'

Some dimensions in centimetres of the type specimen of *Simolestes vorax* :—

Skull :	
Length from occipital condyle to tip of snout ..	73·0
Width between outer ends of quadrates	51·0
Mandible :	
Length	97·0
" of symphysis	17·3
Middle cervical vertebra :	
Length of centrum	3·2
Width "	7·9
Height "	7·9
" to top of neural spine	21·0
Humerus :	
Length	43·0
Width of distal expansion	21·8
Coracoid :	
Greatest length	71·0
Width at narrowest	32·0
" between glenoid cavities (as mounted) ..	65·0
Ilium : length	31·0
Pubis :	
Length	60·0
Width	48·0
Ischium :	
Greatest length	61·0
Width at glenoid cavity	32·0
Femur :	
Length	50·0
Width of distal expansion	27·5

XLVIII.—*Descriptions of Three new Fishes from Portuguese Guinea.* By G. A. BOULENGER, F.R.S.

DR. W. J. ANSORGE, to whom African ichthyology is indebted for so many discoveries made during the past ten years, had occasion during a recent short visit to Portuguese Guinea to procure a few fishes which are of considerable

interest, and of which specimens are now preserved in the Natural History Museum.

The examples of the first two species here described, together with a single specimen of *Myrophis punctatus*, Lütke., a species known from the mouths of rivers on both sides of the Atlantic between the tropics, were obtained high up the River Mansoa at a place called Port Mansoa, and under rather curious circumstances, as related by Dr. Ansorge:—

“The presence of the tide at the mouth of this river banks up the water in these higher regions much as a canal-lock fills up a waterway till there is enough to float down a barge. On arrival at Port Mansoa we found a broad deep river, and from our steamer’s side we stepped into a canoe moored to the bank and walked ashore; but at ebb the steamer lay embedded in very adhesive bluish-black mud about a third of the way down a steep-sloping mud-bank, and the broad river of our arrival had dwindled into a narrow stream about 15 feet broad at the bottom of a deep gully bounded by two large sloping mud-banks.

“I saw a number of native boys plunging about in this mud, and found they were catching eel-like fishes with their hands. Two of the three species seemed fairly rare, as I secured only one specimen of the white one [*Myrophis*] and only three of the black one [*Symbranchus*]. The third and largest species [*Gobioides*] seemed common, and I selected a few.—8 May, 1909.”

Examples of two species, *Eleotris africanus*, Steindachner, and a new *Gobius* of the subgenus *Oxyurichthys*, Bleeker, were obtained in the Gunnal River, which flows at right angles into the right side of the Cacheu River, and comes from the direction of the French possessions.

Symbranchus afer.

Snout rounded, about twice length of eye and a little exceeding interorbital width; the distance between end of snout and gill-opening is $1\frac{1}{2}$ times length of skull, 8 times length of snout, and is contained $7\frac{2}{3}$ times in distance from snout to vent; length of tail about $3\frac{1}{2}$ times in the total length. Gill-opening rather wide, as in *S. bengalensis*. Tail ending in a rather obtuse point, as in *S. marmoratus*. 126 vertebræ. Coloration uniform blackish.

Total length 320 mm.

Three specimens from Port Mansoa.

Until the discovery of this species the suborder Symbranchii

was not known to have any member in Africa, although represented in the fresh or brackish waters of South-eastern Asia, Tropical America, Australia, and Tasmania. Of the genus *Symbranchus* itself we knew two species from Asia (*S. bengalensis* and *S. caligans*) and one from America (*S. marmoratus*). In some respects the African species is intermediate between *S. bengalensis* and *S. marmoratus*, but it differs from both in the lower number of vertebrae.

Gobioides ansorgii.

Depth of body 8 to 10 times in total length, length of head 6 to 7 times. Snout $\frac{1}{4}$ length of head; eye very small; maxillary extending to beyond vertical of eye. Dorsal VI-VII 19-21, rays subequal, $\frac{2}{3}$ length of head. Anal I 19. Pectoral as long as ventral, nearly $\frac{2}{3}$ length of head. Caudal nearly twice as long as head. Scales very small, as in *G. broussonneti*. Head and back greyish, the rest of the body yellowish; fins white.

Total length 280 mm.

Five specimens from Port Mansoa.

Closely allied to *G. broussonneti*, Lacep., from the east coast of Tropical America. Well distinguished from it by the higher number of dorsal and anal rays.

Gobius (Oxyurichthys) occidentalis.

Depth of body $5\frac{1}{2}$ times in total length, length of head 5 times. Snout rounded, jaws equal in front; a single series of teeth in the upper jaw; maxillary extending to below centre of eye; eye slightly shorter than snout, $4\frac{1}{2}$ times in length of head; interorbital space very narrow; cheek and gill-cover scaly. Dorsal VII, I 13, the two divisions separated by a mere notch; third simple ray longest, as long as head. Anal I 14. Pectoral as long as ventral. Caudal pointed, twice as long as head. Scales ctenoid, 62 in longitudinal series. Uniform yellowish.

Total length 120 mm.

A single specimen from the Gurnal River.

This species belongs to a subgenus, *Oxyurichthys*, Blkr. (*Gobiichthys*, Klunz.), the previously known representatives of which are East African and Indian, marine or estuarine.

XLIX.—*Descriptions of Four new Cyprinoid Fishes from High Asia.* By Dr. ERICH ZUGMAYER, of the Zoological Museum, Munich.

IN a collection of fishes which I made during the year 1906 in Chinese Turkestan, Western Tibet, and Kashmir the following four species appear to be new to science. Of the genus *Aspiorhynchus* (Kessler) two of the known species were previously described under the name of *Ptychobarbus longiceps* and *Pt. laticeps* by Day. Kessler later on introduced the generic name of *Aspiorhynchus*, and added a third species, *A. przewalskii*. *Schizothorax tibetanus* is more allied to the species known from Kashmir than to those described from the Brahmaputra system; this is not surprising, since the Panggong lakes, where this new species was collected, must have belonged to the Indus system until not long ago. *Aspiorhynchus* is exclusively characteristic for the Tarim basin.

Aspiorhynchus sartus, sp. n.

D. III/6. P. I/18. V. I/8. A. III/5. L. lat. ca. 125.

Length of head contained $3\frac{1}{2}$, height of body 7 in total length. The height of the head exceeds its width a little and measures half its length. Eyes oval and oblique, the anterior margin being the higher; their greatest diameter is contained 11 in length of head, 3 in the preorbital, and 3 in the interorbital space, which latter is flat. Barbels two at the corners of the mouth, reaching beyond the vertical from the posterior margin of the eye. Mouth terminal, its cleft obliquely ascending. The maxilla reaches to below the front edge of the eye. An interrupted lower labial fold is present. Lower jaw somewhat the longer, with a moderate knob at the symphysis. Free portion of tail $\frac{2}{3}$ as deep as it is long. Scales oval, arranged in oblique rows on the anterior part of the body. Fins: the distance from tip of snout to beginning of dorsal exceeds the distance from end of dorsal to root of caudal by one half. Osseous ray moderately strong, closely serrated behind, measuring $\frac{1}{3}$ of the length of the head. Pectoral does not extend halfway to insertion of ventral and is about $\frac{3}{8}$ the length of head. Base of the ventral under the first divided dorsal ray; the fin itself does not reach halfway to the anal. The length of the base of the anal is contained twice in its depth; when laid flat the anal misses the root of the caudal by the length of its base.

Colour greyish brown on upper half of body, lower parts silvery. No spots with the exception of a few at the base of the dorsal.

One specimen of 530 mm. was collected from the Kisil Su near Kashgar.

Schizothorax tibetanus, sp. n.

D. III/8. P. I/16-17. V. I/10. A. III/6.

L. lat. ca. 100 (97-102).

Length of head 4, depth of body $4\frac{2}{3}$ in total length (without caudal). Height of head $\frac{2}{3}$ of its length, its width $\frac{2}{3}$ of its height. Eyes 7 in length of head, 2 from end of snout, $2\frac{1}{2}$ apart. Barbels four, subequal, a little longer than the eye (ca. 5:4). Lower labial fold interrupted. Mouth antero-inferior, the upper jaw somewhat the longer and a little overhung by the snout. Margin of the lower jaw rounded and covered with a thinly striated horny layer. Lower part of thorax naked from the insertion of the pectorals to the isthmus. Free portion of tail half as high as it is long. Scales of the tiled row about half as long as the eye. Fins: the dorsal spine is inserted halfway between the hind edge of the eye and the root of the caudal; its osseous portion is as high as the head, moderately strong, rather compressed, and finely serrated. The pectoral reaches beyond halfway to the ventral; the latter begins under the dorsal spine and misses the vent by the diameter of the eye. Anal extending nearly to the root of the caudal, which is deeply forked.

Coloration brown, with a bluish hue, sides yellowish, lower parts silvery. Upper half of body and vertical fins closely dotted with blackish.

One specimen of 350 mm. and three smaller ones were caught in a little river running in the Tso Rum, Panggong Lakes, Tibet.

Schizothorax ladacensis, sp. n.

D. IV/8. P. I/19. V. I/9. A. III/5. C. 30. L. lat. ca. 100.

Length of head $4\frac{1}{4}$, depth of body $4\frac{7}{10}$ in total length (without caudal). The width of the head equals its height and measures $\frac{2}{3}$ of its length. Eyes 8 diameters in length of head, the postorbital portion being as long as the preorbital one, and 3 diameters apart. Interorbital space flattish. Barbels four, the anterior reaches the vertical from the hind margin of the eye; the posterior extends to hind edge of

preopercle. Caudal peduncle as long as high. Mouth inferior, upper jaw considerably overhung by the snout. Lips fleshy. Margin of the lower jaw rounded, with a striated horny covering. Lower labial fold continuous, dividing the lip in a median and two lateral lobes. Scales of the tiled row $\frac{2}{3}$ to $\frac{3}{4}$ the length of the eye. Fins: dorsal spine inserted halfway between the nostrils and the root of the caudal; its osseous portion is very strong, of the same height as the caudal peduncle, and strongly serrated to its extremity. The pectoral reaches considerably over halfway towards the ventral; the latter begins below the dorsal spine and extends $\frac{3}{4}$ the distance to the anal opening. The anal fin reaches the caudal. Caudal deeply forked, the lower lobe being somewhat the longer.

Upper part of body brownish, with blackish marbling, forming indistinct cross-bands, which descend to the lateral line; lower parts silvery yellow; vertical fins feebly spotted with brown.

Two specimens, the bigger one measuring ca. 400 mm., were caught in the Indus near Leh.

Schizothorax montanus, sp. n.

D. III/9. P. I/16. V. I/9. A. II/6. L. lat. ca. 100.

Length of head $3\frac{1}{2}$, depth of body 6 in total length (without caudal). Height of head equal to its width, measuring $\frac{1}{2}$ of its length. Eyes suboval, their longer diameter $9\frac{1}{2}$ in length of head, $3\frac{1}{2}$ in preorbital and 3 in interorbital space. Barbels four, the anterior reaching to the anterior nostril, the posterior to the vertical from the hind margin of the eye. Mouth terminal, with the jaws of equal length. Margin of the lower jaw rounded, its horny covering composed of oblique rows of closely set papillæ. Lower labial fold interrupted. Caudal peduncle $1\frac{2}{3}$ as long as it is high. Scales of the tiled row about half the greater diameter of the eye. Fins: the dorsal spine is inserted halfway between the posterior margin of the eye and the root of the caudal; it is broken in the specimen in question, but appears to be of considerable length, moderately strong, and finely serrated. Pectoral extending two-thirds the distance from its base to that of ventral; this latter fin begins a little before the vertical from the dorsal spine and reaches $\frac{2}{3}$ the distance to the base of the anal. The anal is more than twice as high as its base is long, but it does not quite extend to the caudal.

Caudal deeply forked, the longest rays being twice as long as the shortest.

Colour greenish brown above, sides and lower parts silvery. A few scattered dark spots on upper half of body.

One specimen (ca. 500 mm.) from the Indus near Leh.

L.—*The Species of Three-spined Sticklebacks*
(*Gastrosteus*). By C. TATE REGAN, M.A.

I HAVE recently made a study of the Three-spined Sticklebacks (*Gastrosteus*) in the British Museum, with a view to determining the number of species which may be recognized. After examination of a large number of specimens, representing all the nominal species which have been described, I have arrived at the conclusion that the greater part of the area of the genus is occupied by a single species, *G. aculeatus*, which is very variable. In the northern part of its range in the sea the dermal ossification is strong, the series of bony plates complete, the caudal keel prominent, the ectocoracoids long and the naked areas above them consequently large, the pelvic plate long, lanceolate, without an anterior notch, and the fin-spines usually either long or strong. Towards the southern part of its range in the sea, or in fresh water, the dermal ossification is weaker; if the bony plates form a complete series they are not so deep nor usually so numerous as in northern marine examples, and the caudal keel is less prominent; the series of plates may be incomplete, the first to disappear being the ones preceding the caudal keel, the most persistent being the three (5th to 7th) which are usually in contact with the ascending process of the pelvis; sometimes the plates are entirely absent. The pelvic plate becomes shorter and may develop an anterior notch, becoming heart-shaped, arrow-shaped, or even V-shaped; also the naked area in front of the pectoral fin may become smaller, the spines shorter or weaker, and the fin-rays more or less reduced in number.

I am unable to detect any difference between specimens from the Atlantic and Pacific: for example, fully-mailed specimens from Puget Sound appear to me to be in every way identical with some from the Shetlands; similarly, specimens from the Santa Clara River, California, agree closely with others from various inland localities in the British Isles, from Northern Italy, and from Japan.

Gastrosteus aculeatus is found on the coasts and in the rivers of Northern Europe, Asia, and America, extending southwards to the Iberian Peninsula, Northern Italy, the Black Sea, the Santa Clara River in California, and New Jersey. In the northern part of its range it is principally marine, but further south seems to take less and less to the sea; finally, in Southern Italy, in Algeria, and in streams south of the Santa Clara River in California it is represented by three distinct permanently fluviatile species, which can only owe their differentiation to the fact that they are not now, and have not for some time been reinforced from the ranks of the marine sticklebacks.

As synonyms of *G. aculeatus* I include all the species hitherto described, with the exception of *G. algeriensis*, Sauv.

Gastrosteus aculeatus has III (II-V) 9-14 dorsal rays, I 7-11 anal rays, and 31 to 33 vertebræ. The snout is shorter than the postorbital part of the head, and the first dorsal spine is inserted nearly above the base of the pectoral fin and well in advance of the pelvic spine. The three species which I recognize as distinct from it are:—

1. *Gastrosteus hologymnus*, sp. n.

Gastrosteus argyropomus (non Cuv. & Val.), Günth. Cat. Fish. i. p. 4 (1859).

Depth of body 4 in the length, length of head 3 to $3\frac{1}{2}$ (♂) or $3\frac{2}{3}$ (♀). Snout longer than eye, as long as or only a little shorter than the postorbital part of head; diameter of eye 4 in the length of head, interorbital width $4\frac{2}{3}$ to 5. Sides of body without bony plates; naked area in front of pectoral rather small; pelvic plate notched in front, twice as long as broad, $\frac{1}{2}$ to $\frac{2}{3}$ the length of head. Dorsal with 12 or 13 soft rays, anal with 8 to 10; origin of first dorsal spine a little behind the base of the pectoral; second spine $\frac{1}{4}$ the length of head; pectoral extending beyond the vertical from second dorsal spine; pelvic spines $\frac{1}{3}$ to $\frac{2}{5}$ the length of head. 31 or 32 vertebræ.

Hab. Rome.

Five specimens, 55 to 60 mm. in total length.

The complete absence of bony plates distinguishes this form from the *gymnurus* variety of *aculeatus* found in Northern Italy, whilst the produced snout gives it quite a different physiognomy. Were it not for this last character I should not regard this form as specifically distinct, as a percentage of naked specimens occurs among the sticklebacks of Santa Clara River in California.

2. *Gastrosteus algeriensis*.

Gastrosteus algeriensis, Sauvage, N. Arch. Mus. Paris, x. 1874, p. 17.

Depth of body $3\frac{1}{4}$ to $4\frac{1}{3}$ in the length, length of head 3 to $3\frac{2}{3}$. Snout as long as or a little shorter than eye, the diameter of which is 3 to $3\frac{1}{2}$ in the length of head; interorbital width 4 to $4\frac{1}{2}$ in the length of head. Usually 2 or 3 bony plates above the ascending process of the pelvis; naked area in front of pectoral small; pelvic plate usually notched in front, its breadth $1\frac{1}{3}$ to $2\frac{1}{4}$ in its length, which is $\frac{2}{3}$ to $\frac{3}{4}$ of the length of head. Dorsal with 11 or 12 soft rays, anal with 8 to 10; origin of first dorsal spine equidistant from the vertical through the bases of the pectoral and pelvic fins; second spine $\frac{1}{6}$ to $\frac{1}{4}$ the length of head; pectoral extending to or a little beyond the vertical from the second dorsal spine; pelvic spines $\frac{1}{4}$ to $\frac{1}{3}$ the length of head. 29 vertebræ.

Hab. Algiers.

Thirteen specimens, 38 to 55 mm. in total length, and a number of smaller ones not included in the description.

I am indebted to Dr. Günther for calling my attention to the reduced number of vertebræ in this form; I count the same number in two specimens.

3. *Gastrosteus santæ-annæ*, sp. n.

Gastrosteus williamsoni (non Girard), Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 750.

Depth of body $3\frac{1}{3}$ to 4 in the length, length of head $3\frac{1}{3}$. Snout as long as eye, the diameter of which is $3\frac{1}{3}$ to $3\frac{1}{2}$ in the length of head; interorbital width 5 in the length of head. Sides of body without bony plates (rarely with 2 or 3 anteriorly); naked area in front of pectoral very small; pelvic plate notched in front, $1\frac{1}{3}$ to $1\frac{3}{4}$ as long as broad, its length $\frac{2}{3}$ the length of head. Dorsal with 10 or 11 soft rays, anal with 6 or 7 (8); origin of first dorsal spine well behind the base of pectoral and only slightly in advance of the base of the pelvis; second spine $\frac{1}{5}$ to $\frac{1}{4}$ the length of head; pectoral extending to or nearly to the vertical from second dorsal spine; pelvic spines from $\frac{1}{4}$ to more than $\frac{1}{3}$ the length of head. 29 vertebræ.

Hab. Santa Anna River, California.

Three specimens, 38 to 45 mm. in total length, from Colton.

I am indebted to Dr. Jordan for a series of examples of the true *G. williamsoni* from Santa Clara River. In three of these I count 31, 31, and 32 vertebræ, and in all of them the insertion of the dorsal spine is only slightly behind the base of the pectoral.

LI.—*Descriptions of new Marine Fishes from Australia and the Pacific.* By C. TATE REGAN, M.A.

1. *Muraena monostigma.*

Tail as long as or shorter than the body; length of head $3\frac{1}{4}$ to $3\frac{1}{2}$ in that of the trunk. Anterior nasal tube short; posterior nostril with edge raised to form a distinct but short tube; eye situated above middle of mouth, its diameter less than $\frac{1}{2}$ the length of snout; cleft of mouth $\frac{1}{3}$ the length of head or a little more; jaws equal anteriorly; teeth with serrated edges, uniserial, canine-like on the sides of the jaws; 12 to 16 teeth forming the mandibular series on each side. Dorsal origin above gill-opening; fin low, above the vent measuring less than $\frac{1}{4}$ the depth of the body. Brownish, sometimes with irregular yellowish spots; a single deep-black spot immediately behind the eye; posterior nasal tube, 2 or 3 pores below the eye and sometimes pores on the lower jaw situated in white spots.

Three specimens, 450 to 550 mm. in total length, from Tahiti and Raiatea (*Godeffroy Mus.*).

Allied to *M. moluccensis*, Bleek., in which the posterior nostril is not tubular, the teeth on the sides of the mandible are smaller and more numerous, forming a regular series, and there is no black spot nor white pores on the head.

2. *Gymnomuraena polypila.*

Tail slightly longer than body; length of head 11 in the total length. Posterior nostril not tubular; eye nearer to angle of mouth than to end of snout, its diameter $\frac{1}{2}$ the length of snout; cleft of mouth $\frac{1}{3}$ the length of head; jaws equal anteriorly; teeth in jaws biserial; gill-opening on middle of side. Reddish, with large dark brownish or purplish spots forming 2 or 3 irregular series on each side; snout and anterior half of lower jaw pale yellow.

A specimen of 182 mm. from Tahiti (*Godeffroy Mus.*).

A much larger fish (720 mm.) from Zanzibar (*Playfair*) probably belongs to this species. It is labelled *G. tigrina*, but differs from that species in the less slender form and in having the tail nearly equal in length to the body. The rim of the posterior nostril is raised. The colour is faded, but apparently the spots and red ground-colour ceased just behind the eye and in the middle of the lower jaw.

3. *Gymnomuraena fasciolata.*

Tail longer than body; length of head $8\frac{1}{2}$ in the total length. Posterior nostril tubular, the tube longer than that

of the anterior nostril; eye above middle of mouth, its diameter $\frac{1}{2}$ the length of snout; cleft of snout $\frac{2}{3}$ the length of head; jaws equal anteriorly; teeth in jaws triserial; gill-opening on middle of side. Body with numerous narrow undulating dark cross-bands, some of which are broken up into spots.

A specimen of 300 mm. from Duke of York Is. (*Brown*).

4. *Gymnomuraena supraforata*.

Tail slightly longer than body; length of head $10\frac{1}{2}$ in total length. Posterior nostril with a raised rim; eye nearer to end of snout than to angle of mouth, its diameter $\frac{2}{3}$ the length of snout; cleft of mouth $\frac{1}{2}$ the length of head; jaws equal anteriorly; teeth in 5 series in the upper jaw and 4 in the lower; vomerine band of teeth short; gill-opening much nearer dorsal than ventral profile. Reddish, with numerous darker spots forming vertical series and posteriorly uniting to form undulating vertical stripes.

A specimen of 300 mm. from Savay (*Whitmee*).

Three young examples (170 to 210 mm.) from Tahiti (*Godeffroy*) have the head $\frac{1}{10}$ to $\frac{1}{5}$ of the total length, the eye $\frac{1}{2}$ the length of the snout, 4 series of teeth in the upper jaw and 3 in the lower.

5. *Muraenichthys godeffroyi*.

Tail $1\frac{1}{3}$ as long as body; length of head $3\frac{1}{4}$ in that of trunk. Snout obtuse; cleft of mouth extending beyond the small eye; teeth obtusely conical, mostly biserial. Origin of dorsal well in advance of vent, but nearer to vent than to gill-opening. Coloration uniform.

A specimen of 135 mm. from Bowen, Queensland (*Godeffroy Mus.*).

Allied to *M. gymnopterus*, Bleek.

6. *Spheroides liosomus*.

Tetrodon hamiltonii (part.), Günth. Cat. Fish. viii. p. 280 (1870).

Smooth, without evident spines, but with numerous pores. Length of head less than its distance from the dorsal fin; snout blunt, shorter than postorbital part of head; diameter of eye not more than $\frac{1}{2}$ postorbital length of head; osseous interorbital width $\frac{1}{4}$ to $\frac{1}{3}$ the length of head; mouth terminal, the chin not prominent; upper and lower teeth subequal. Dorsal 10-11; second branched ray the longest. Anal 9. Caudal rounded. Back and sides with blackish spots separated by a pale reticulation; often a transverse band between

the orbits and a broader one across the back behind the pectorals; sometimes a narrow band between them; usually a large spot at the base of the dorsal fin, and another below and in front of it on the side; caudal dusky, other fins pale.

Southern coasts of Australia; Tasmania.

Six specimens, 105 to 150 mm. in total length, from Flinders Island and Port Phillip (*Degen*), Hobart (*Allport*), and Melbourne (*Kreff*).

Spheroides hamiltonii, Richards., from New South Wales and Polynesia, differs in the presence of numerous small spines, the fewer fin-rays (D. 9, A. 7-8), and the different coloration.

LII.—*Descriptions of Oriental Capsidæ.*

By W. L. DISTANT.

THE new genera proposed in this paper will be figured in vol. v. (Appendix) of the Rhynchotal portion of the 'Fauna of British India.'

EBUTIUS, gen. nov.

Head subequal in length to the pronotum, transversely impressed behind the eyes, which are well separated from the anterior margin of the pronotum, between the eyes distinctly longitudinally sulcate, the disk moderately convex, obtusely attenuated in front of the insertion of the antennæ, where it is a little ridged and excavated on each side; antenniferous tubercles prominent, first joint of the antennæ robust and about as long as the head, second joint slender, nearly three times as long as the first, third and fourth short, together longer than first; rostrum reaching the intermediate coxæ; pronotum transversely constricted before middle, this anterior area somewhat transversely striate at anterior margin and with a distinct moderately transverse tubercle immediately in front of each side of the constriction, posterior area convexly deflected from base, thickly punctate, the lateral margins carinate and oblique, posterior lateral angles subprominent, basal margin a little concave before scutellum, which is somewhat large and triangular, and somewhat foveate at each basal angle; hemelytra a little more than twice as long as head and pronotum together, clavus broad, cuneus elongately angulate, membrane apparently (as seen in

spirit-specimens) with a single cell truncate posteriorly; legs slender, the femora slightly but regularly thickened, posterior tarsi with the basal joint almost as long as remaining joints together.

Ebutius bellus, sp. n.

Uniformly pale ochraceous as seen in spirit-specimens (possibly virescent in living or fresh examples); scutellum with a linear, foveate, piceous spot at each basal angle; basal joint of antennæ with a few short obscure hairs; other characters as in generic diagnosis.

Length $6\frac{1}{2}$ to 7 mm.

Hab. Sikhim (*Major Roberts*).

The above generic and specific descriptions are based on a few spirit-specimens given to me by the late Col. Bingham.

In the enumeration of the Capsid fauna of British India, *Ebutius* is allied to *Onomaus*, Dist., and is placed in the division Herdoniaria of the subfam. Mirinæ.

Harpedona sanguinipes, sp. n.

Head, pronotum, and scutellum black; antennæ black, the basal joint pale sanguineous; corium piceous, the costal margin narrowly ochraceous; membrane fuscous, the apex paler and the veins darker; head beneath and sternum black, abdomen beneath piceous; femora pale sanguineous, tibiæ and tarsi pale ochraceous; head centrally longitudinally sulcate; second joint of antennæ scarcely more than twice as long as first; pronotum transversely constricted before middle, the anterior lobe distinctly centrally foveate at base, posterior lobe obsoletely punctate.

Length 4 mm.

Hab. Darjiling; Pussumbing, 4700 feet (*R. H. Mann*).

Allied to the Ceylonese species *H. marginata*, Dist., from which it differs by the different colour of the legs and of the basal joint of the antennæ, posterior lobe of the pronotum much less distinctly punctate, &c.

CINNAMUS, gen. nov.

Vertex convex, anteriorly, centrally, pointedly produced; eyes prominent, contiguous to the anterior margin of the pronotum, but projecting beyond it, the disc centrally longitudinally sulcate; antennæ long, the basal joint moderately robust, sparsely hirsute, about as long as the pronotum,

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second joint more than twice as long as first and about as long as third and fourth together; rostrum reaching the posterior coxæ; pronotum transversely constricted near middle, the anterior area with a distinct rugose collar, and with a moderate transverse tubercle on each side immediately in front of the transverse impression, posterior area deflected from base, which is concave and thus exposes the mesonotum, the lateral margins oblique; scutellum triangular with a small subbasal central tubercle; corium slightly longer than space between the apices of head and scutellum, clavus moderately raised and deflected on each side, cuneus somewhat broadly triangular, the cuneal fracture distinct; membrane with a short, posteriorly truncate basal cell; legs long and slender, finely spinulose hirsute, femora moderately and evenly thickened, all the tibiæ longer than the femora, basal joint of posterior tarsi short and moderately thickened.

Among the Capsidæ of British India this genus may be located between *Harpedona* and *Clapmarius*.

Cinnamus rhinoceros, sp. n.

Head, pronotum, mesonotum, and scutellum pale mottled fuscous brown; anterior collar and posterior lobe of pronotum mottled brownish ochraceous, apex of scutellum ochraceous; antennæ and eyes blackish; clavus pale ochraceous, its basal third and apical area mottled fuscous brown; corium ochraceous, much mottled with fuscous brown and with an oblique transverse piceous fascia at about one-third before apex, cuneus shining black; membrane fuscous, blackish on basal area, margins of cell dull greyish; body beneath piceous, mesosternum ochraceous; legs piceous, femora obscurely palely annulate near apices; body above shortly obscurely pilose; mesonotum with a central longitudinal pale line; structural characters as in generic diagnosis.

Length 5 mm.

Hab. Ceylon; Peradeniya (*Green*).

ZALMUNNA, gen. nov.

Head elongate, almost as long as the pronotum, the central lobe prominent at apex, behind which it is transversely impressed, between eyes shortly longitudinally sulcate; eyes short, somewhat adpressed, contiguous to the anterior margin of the pronotum; antennæ with the first joint stout, attenuated at its base, about as long as head, remaining

joints slender, second more than twice as long as first, third shorter than second, but considerably longer than fourth; rostrum passing the posterior coxæ, first joint robust and as long as head; pronotum moderately declivous from base to apex with a distinct narrow anterior collar, somewhat obscurely transversely impressed before middle, the lateral margins oblique, basal margin truncate; scutellum triangular, slightly longitudinally foveate at each basal angle; hemelytra passing the abdominal apex, corium elongate, the costal margin slightly rounded, cuneus acutely subtriangular, the cuneal fracture distinct, membrane with a prominent posteriorly truncate cell; legs of moderate length, posterior femora incrassated, tibiæ finely spinulose, posterior tibiæ about as long as corium, posterior tarsi with the basal joint almost as long as remaining joints together.

Allied to the S. African genus *Nymannus*, Dist., and in the enumeration of the British Indian Capsidæ to be placed near the genus *Clapmarius*.

Zalmunna dux, sp. n.

Reddish ochraceous, shortly finely pilose; antennæ ochraceous, the basal joint brownish ochraceous; head, pronotum, and scutellum with a more or less distinct pale longitudinal line, the scutellum darker and more reddish ochraceous, clavus dark reddish ochraceous on basal half, somewhat dull greyish on apical half; corium dark reddish ochraceous, the costal margin ochraceous, cuneus with the basal margin dull greyish; membrane pale fuscous, the lateral margin paler; body beneath and legs reddish ochraceous; basal joint of rostrum, basal disk of abdomen, tibiæ, tarsi, and apical annulations to femora pale ochraceous; structural characters as in generic diagnosis.

Length $5\frac{1}{2}$ mm.

Hab. Ceylon; Trincomalee (*Green*).

Mystilus antrami, sp. n.

Head, antennæ, pronotum, and scutellum dull black; apex and two spots at base of head and anterior and posterior margins of pronotum pale ochraceous; hemelytra very pale ochraceous, subhyaline, membrane reflecting the dark abdomen beneath; head and abdomen beneath pale ochraceous, the sternum and apex of abdomen black; legs pale ochraceous, the femora (especially the anterior) much

mottled with black, more densely so on apical areas, posterior tibiæ black, with a long apical pale ochraceous annulation; rostrum pale ochraceous, its apex black; head deeply longitudinally sulcate between the eyes, which are contiguous to the anterior margin of the pronotum; antennæ much longer than the body, basal joint almost as long as the head and pronotum together; pronotum very coarsely punctate, anterior collar distinct, transversely constricted at about one-third from anterior margin, in front of which are two distinct callosities with a short central longitudinal carinate line between them, cuneus a little longer than broad, concolorous with the pale corium.

Length 4 mm.

Hab. Cachar; Koomber (*Antram*).

Mystilus manni, sp. n.

Head black, its apex pale ochraceous, two dull ochraceous spots at base; antennæ black, the basal joint ochraceous, more or less mottled or spotted with black; pronotum ochraceous, the anterior collar dull greyish, the anterior transverse callosities a little darker; scutellum ochraceous; hemelytra stramineous, semihyaline; clavus with the inner margins and the apex of the suture black, cuneus concolorous, membrane reflecting the dark abdomen beneath; head beneath and sternum pale ochraceous, abdomen beneath more or less greyish; legs ochraceous, femora finely mottled or spotted with black, posterior tibiæ black with a long pale ochraceous apical annulation.

Length 4½ mm.

Hab. Cachar; Koomber (*Antram*).

This species is allied to *M. antrami* by the concolorous cuneus, but differs from it in the different colour of the pronotum and scutellum, the absence of the short carinate line between the pronotal callosities, &c.

Megacælum insignis, sp. n.

Very pale ochraceous; antennæ with the under surface of the first joint, a central annulation and apex to second joint, and two contiguous annulations and apex to third joint, black; eyes black; narrow lateral margins to pronotum, narrow lateral margins to scutellum (excluding base), narrow margins to the claval suture, a basal subcostal line to corium and three prominent rounded spots—one before costal margin near middle, the other two before basal margin of cuneus—

black; apex of rostrum black; head with a fine central longitudinal sulcation between the eyes; first joint of antennæ nearly half as long as second joint, third a little shorter than second (fourth mutilated in typical specimen); rostrum slightly passing the posterior coxæ; corium shortly sparingly palely pilose; membrane considerably passing the abdominal apex; posterior legs mutilated in typical specimen; anterior and intermediate tibiæ spinulose.

Length, incl. membr., ♀, 9 mm.

Hab. Mussooree (coll. Dist.).

Megacelum tibialis, sp. n.

Black, finely shortly greyishly pilose; antennæ with the first joint black, second and third joints ochraceous, base and apex of second joint narrowly black; legs black, apices of anterior and intermediate femora, the anterior and intermediate tibiæ (excluding extreme apices), coxæ, and the tarsi (more or less) ochraceous; head finely, centrally, longitudinally, sulcately impressed between the eyes; antennæ with the first joint moderately thickened, about half as long as second, third distinctly shorter than second (fourth joint mutilated in typical specimen); rostrum piceous and reaching the posterior coxæ; apex of cuneus castaneous; membrane fuscous, reflecting the dark abdomen beneath and moderately passing the abdominal apex; tibiæ finely spinulose, the spinules black; first joint of posterior tarsi a little shorter than second joint.

Length, incl. membr., ♂, 8 mm.

Hab. Simla Hills, Dharampur, 5000 ft.

Megacelum pervalidum, sp. n.

Body and tegmina castaneous brown, somewhat thickly finely palely pilose; costal area of corium widening posteriorly, ochraceous; cuneus pale castaneous; antennæ ochraceous, basal joint castaneous brown, apical area of second joint piceous, anterior and intermediate femora castaneous brown, their bases and the whole of the tibiæ and tarsi ochraceous, tarsal claws piceous, posterior femora ochraceous, their apical areas and the posterior tibiæ (excluding apex) black; body beneath and coxæ piceous; head finely, linearly sulcate between the eyes; first joint of antennæ about half as long as second joint, third distinctly shorter than second and longer than fourth; rostrum reaching the posterior coxæ; rostrum ochraceous, basal joint castaneous brown,

apex black and reaching the posterior coxæ; pronotum transversely wrinkled; membrane fuscous, somewhat longly passing the abdominal apex; tibiæ spinulose, the spinules black.

Length, incl. membr., 9 mm.

Hab. Nepal; Soondrijal and Nagorkote (Ind. Mus.). Pussumbing; Darjiling (*Mann*).

In some specimens the margin of the costal area to corium is castaneous brown.

Megacælum straminipes, sp. n.

Head brownish ochraceous, eyes black; antennæ with the first joint piceous, second piceous biannulated with ochraceous, third joint fuscous, its base ochraceous; pronotum, the narrow anterior collar and extreme basal margin pale ochraceous; scutellum and corium black, finely pilose, the costal margin of the latter brownish ochraceous; cuneus brownish ochraceous, its outer margin and inner angle black; membrane fuscous, reflecting the dark abdomen beneath; body beneath piceous; legs stramineous, the posterior tibiæ black; head finely longitudinally sulcate between the eyes; antennæ with the basal joint moderately thickened, about half as long as second, third only a little shorter than second (fourth mutilated in typical specimen); pronotum finely transversely wrinkled and with two distinct callosities near anterior margin; membrane considerably passing abdominal apex; rostrum stramineous and reaching the posterior coxæ; tibiæ spinulose, the spinules black.

Length, incl. membr., 7 mm.

Hab. Kangra Valley, 4500 ft. (*Dudgeon*).

Megacælum mussooriensis, sp. n.

Head black, posterior margins of eyes ochraceous; antennæ black, second joint usually brownish ochraceous except at base and apex; pronotum brownish ochraceous, the anterior collar and extreme posterior margin pale ochraceous, two contiguous transverse black spots near anterior margin and with a blackish suffusion near posterior margin; scutellum piceous or black; corium piceous brown, shortly, palely, sparingly pilose, the costal margin pale ochraceous, cuneus pale castaneous brown; membrane piceous; body beneath and legs black, the anterior and intermediate tibiæ more or less brownish ochraceous; head narrowly, longitudinally sulcate between the eyes; antennæ with the basal joint

moderately thickened, about as long as the pronotum, second joint a little more than twice as long as the first, third joint a little shorter than second and much longer than fourth; scutellum finely transversely striate; corium (including cuneus) about as long as posterior tibiæ, clavus and corium concolorous; rostrum black, with brownish-ochraceous suffusions, reaching the posterior coxæ; tibiæ finely spinulose, the spinules black; tarsi more or less ochraceous, their apices black, first and second joints of posterior tarsi subequal in length; membrane largely passing the abdominal apex.

Var.—Lateral margins of the pronotum black.

Length 7 to 8 mm.

Hab. Mussooree (*Brunetti*).

Megacælum brunettii, sp. n.

Head black, the base sometimes piceous; antennæ with the basal joint black, second joint brownish ochraceous, piceous at base and more broadly so at apex, third joint pale ochraceous; pronotum black, the narrow anterior collar and narrow posterior margin pale ochraceous; scutellum black; clavus and corium black, the latter with the costal area, widening to cuneus, brownish ochraceous, the extreme costal margin, widest before cuneus, piceous; cuneus pale castaneous, the inner and outer margins black; membrane fuscous, reflecting the dark abdomen beneath; body beneath, trochanters, and coxæ black; legs sanguineous, bases and apices of femora and tibiæ more or less piceous; tarsi ochraceous; head moderately convex, finely longitudinally sulcate between the eyes; antennæ with the first joint moderately thickened and about as long as pronotum, second slightly more than twice as long as first and distinctly longer than third (fourth mutilated in typical specimens); rostrum brownish ochraceous with piceous suffusions, reaching the posterior coxæ; pronotum, scutellum, and corium sparsely, finely, palely pilose; scutellum smooth, not distinctly striate; corium (including cuneus) about as long as posterior tibiæ; the tibiæ finely spinulose, the spinules black; membrane longly passing the abdominal apex.

Length 7 mm.

Hab. Meerut, 750 ft. (*Brunetti*).

Megacælum marginandum, sp. n.

Head and antennæ ochraceous, eyes black; pronotum ochraceous, the anterior collar and narrow posterior margin

paler, the disk sometimes more or less suffused with blackish; scutellum and corium dull deep ochraceous, the latter with the costal margin pale ochraceous and sparsely finely pilose, cuneus usually with pale castaneous suffusions; membrane pale fuscous, the margins greyish and the basal area darker by reflecting the abdomen beneath; body beneath and legs pale ochraceous, the lateral areas of the abdomen and sometimes the posterior tibiæ rosy red; head moderately convex, finely longitudinally sulcate between the eyes; antennæ with the first joint moderately thickened and not quite so long as the pronotum, second joint about twice as long as first, scarcely longer than third, which is about twice the length of fourth; scutellum moderately convex; corium (including cuneus) a little longer than posterior tibiæ; membrane longly passing the abdominal apex; legs distinctly paler at basal areas, the tibiæ spinulose, the spinules black; rostrum with its apex black and reaching the posterior coxæ; posterior tarsi with the first and second joints subequal in length.

Length 7 to 8 mm.

Hab. Ceylon; Peradeniya (*Green*). Madulsima, Diya'wa, 4000 ft., Hakgala (*Bainbrigge-Fletcher*).

Megacælum patrum, sp. n.

Head and pronotum obscure ochraceous, somewhat mottled with piceous; antennæ ochraceous, the whole of the first joint, base and apex of second joint, and apical two-thirds of third and fourth joints black; pronotum with the posterior lateral angles narrowly black; scutellum and corium dull piceous black, the latter with the costal margins ochraceous; cuneus very dark castaneous, its apex pale; head beneath and abdomen more or less brownish ochraceous, the sternum piceous or black; legs stramineous, apical areas of the posterior femora more or less distinctly blackishly biannulate; head finely longitudinally sulcate between the eyes; antennæ with the first joint moderately thickened and about as long as the pronotum, second joint about twice as long as first, second and third subequal in length, third about twice as long as first; scutellum moderately convex; corium (including cuneus) as long as posterior tibiæ; membrane fuscous, longly passing the abdominal apex; rostrum brownish ochraceous, its apex black and reaching the posterior coxæ; tibiæ spinulose, the spinules black.

Var.—Basal joint of antennæ brownish, not black.

Length 8 mm.

Hab. Ceylon; Kandy (*Green*), Madulsima (*Bainbrigge-Fletcher*).

PHILOSTEPHANUS, gen. nov.

Head a little longer than broad, deflected anteriorly, centrally longitudinally sulcate between the eyes, which are moderately transversely exerted; antennæ with the basal joint only slightly thickened, about as long as head, second joint twice as long as first (remaining joints mutilated in typical specimen); rostrum reaching the posterior coxæ; pronotum much broader than long, moderately convex, deflected anteriorly, lateral margins oblique, anterior and posterior margins truncate; scutellum somewhat small and convex; corium (excluding cuneus) about twice as long as broad, slightly longer than posterior tibiæ, cuneus triangularly elongate, its apex acute; membrane considerably passing the abdominal apex and with a subquadrate posteriorly subtruncate cell; legs of moderate length, the posterior femora distinctly thickened, tibiæ spinulose, posterior tarsi with the first and second joints subequal in length.

Allied to *Megacælum*.

Philostephanus vitaliter, sp. n.

Head ochraceous, speckled with fuscous; antennæ with the first joint ochraceous speckled with fuscous, second joint piceous, centrally paler (remaining joints mutilated in typical specimen); pronotum shining black, posterior margin very narrowly and a short central basal linear spot ochraceous; scutellum shining black, with a small ochraceous spot at each basal angle; clavus and corium fuscous, largely and somewhat densely mottled with pale ochraceous; cuneus fuscous, its basal area greyish, the extreme apex pale ochraceous; membrane pale fuscous with large greyish suffusions; body beneath and legs ochraceous, a sublateral piceous fascia on each side of sternum, and a similar but narrower and more obscure fascia on each side of abdomen; all the femora and tibiæ annulated with fuscous; head in front of eyes transversely striate, the eyes slightly projecting beyond the anterior margin of the pronotum; other structural characters as in generic diagnosis.

Length $8\frac{1}{2}$ mm.

Hab. Simla.

STECHUS, gen. nov.

Head a little longer than broad, moderately deflected anteriorly, finely longitudinally sulcate between the eyes,

which are very large and project beyond the anterior margin of the pronotum ; antennæ with the first joint about as long as head and only slightly thickened, second joint three times as long as first and half as long again as third ; rostrum reaching the posterior coxæ ; pronotum much broader than long, moderately convex and deflected anteriorly, with a broad transverse callosity near the anterior margin, the lateral margins moderately convex, anterior margin subtruncate, posterior margin a little posteriorly produced at base of scutellum ; scutellum moderately convex and subtriangular ; corium (excluding cuneus) about twice as long as broad and a little shorter than the posterior tibiæ, cuneus elongately subtriangular, its apex acute, the cuneal fracture distinct ; membrane longly passing the abdominal apex, with a subquadrate posteriorly truncate cell ; legs of moderate length, femora moderately thickened, the posterior femora more strongly so, tibiæ spinulose, posterior tarsi with the first and second joints subequal in length.

Stechus libertus, sp. n.

Pale olivaceous green, inclining to ochraceous in more dried specimens ; antennæ black, a subapical annulation to first joint and a subbasal annulation to second joint ochraceous ; eyes black ; corium and cuneus more olivaceous than the head, pronotum, and scutellum, the clavus considerably darker, and the inner area of the corium distinctly darker ; cuneus pale olivaceous with the apical angle black ; membrane pale fuscous ; body beneath and legs pale virescent, apical area of posterior femora fuscous brown with a subapical pale annulation ; clavus and corium obscurely shortly pilose ; structural characters as in generic diagnosis.

Length 5 mm.

Hab. Ceylon ; Madulsima (*Bainbrigge-Fletcher*).

ARETAS, gen. nov.

Head between eyes as broad as long, very finely centrally longitudinally sulcate, transversely impressed a little before base ; eyes longer than broad ; antennæ with the basal joint incrassate, spinulose, about as long as head, second joint about three times as long as first, third joint partially mutilated in typical specimen ; rostrum reaching the intermediate coxæ ; pronotum broader than long, the lateral margins a little concavely sinuate, the anterior margin truncate and ridged, transversely impressed at about one-third before

anterior margin, between which and the anterior margin are two transverse callosities, posterior margin subtruncate; scutellum broad, triangular; corium with the costal margin a little convex, excluding cuneus about as long as posterior tibiæ, cuneus somewhat small, subtriangular; membrane passing the abdominal apex; posterior femora strongly incrassate, tibiæ finely spinulose; posterior tibiæ with the first and second joints subequal in length.

Aretus imperatorius, sp. n.

Head dull greyish, the eyes black; antennæ stramineous, the basal joint pale castaneous; pronotum, scutellum, and corium ochraceous; lateral margins of pronotum, a broad central fascia on apical half of scutellum, base and apex of clavus, costal margin and margin of clavus to corium, two small spots before base of membrane, and the cuneus (excluding two basal spots) sanguineous; membrane very pale fuscous, the posterior margins of the cells sanguineous; body beneath and legs stramineous, tibial spinules concolorous; rostrum stramineous, apex of basal joint dull sanguineous; structural characters as in generic diagnosis.

Length 4 mm.

Hab. Ceylon; Peradeniya (*Green*).

ELTHEMUS, gen. nov.

Head a little longer than broad, centrally longitudinally sulcate, eyes transverse, prominent, projecting beyond the anterior margins of the pronotum; antennæ with the first joint thickened, longer than the head, second joint three times as long as first and considerably longer than third, fourth only slightly longer than first; rostrum reaching the posterior coxæ; pronotum much broader than long, narrowed anteriorly, with a short but distinct collar, the lateral margins oblique, posterior margin subtruncate, slightly transversely impressed about one-third from anterior margin, the anterior area with two callosities, in some specimens these callosities are united, the disk (excluding anterior area) finely punctate; scutellum triangular; corium (excluding cuneus) as long as posterior tibiæ and closely finely pilose, cuneus elongately triangular; membrane passing the abdominal apex; legs of moderate length, femora moderately thickened, the posterior femora more strongly so, tibiæ spinulose, posterior tarsi with the first and second joints subequal in length.

Allied to *Tancredus*, Dist., but differing by the greater

length of the basal joint of antennæ, the non-prominent pronotal angles, the much larger scutellum, the longer corium, &c.

Elthemus conspicatus, sp. n.

Head dull ochraceous, eyes black; antennæ with the first joint blackish, remaining joints brownish; pronotum piceous black, the anterior collar and posterior narrow margin ochraceous; scutellum ochraceous, with piceous suffusions, the most prominent being a more or less distinct basal spot; clavus and corium blackish, the costal area more or less ochraceous, the blackish coloration extending across it near apex as an elongate costal spot; cuneus pale ochraceous, its margins darker; membrane fuscous; body beneath and legs ochraceous, a broad lateral fascia to sternum and abdomen black, posterior femora annulated with fuscous near apex; structural characters as in generic diagnosis.

Length 5-5½ mm.

Hab. Ceylon; Peradeniya (*Green*).

Elthemus domitus, sp. n.

Dull ochraceous (perhaps virescent in life), eyes black; pronotum with the collar and narrow posterior margin a little paler, the latter sometimes inwardly margined with piceous; scutellum and corium pale ochraceous, the clavus and inner area of corium brownish ochraceous; membrane pale fuscous, the basal area piceous; body beneath and legs reddish ochraceous, a sublateral fascia to sternum and sometimes a few discal spots to abdomen piceous; femora longitudinally streaked with pale ochraceous; antennæ ochraceous, the basal joint and apex of second joint black or blackish, first joint longer than head, second joint about three times as long as first; head longitudinally sulcate between the eyes; pronotum finely wrinkled and punctate; clavus and corium thickly finely pilose; membrane considerably passing the abdominal apex; posterior femora apically biannulated with brown.

Length 5-5½ mm.

Hab. Ceylon; Peradeniya (*Green*).

DRUTHMARUS, gen. nov.

Head about as long as broad between eyes, centrally longitudinally sulcate, anteriorly broadly angulate, eyes exerted, large, transverse, longly projecting beyond the anterior margin of the pronotum, a little directed backwardly; antennæ with

the basal joint short and incrassate, second joint very strongly incrassate, about four times as long as first, third and fourth joints short, slender, subequal in length; rostrum reaching the posterior coxæ; pronotum much broader than long, obliquely narrowed to head, moderately deflected anteriorly, and prominently deflected before base of scutellum; scutellum triangular, about as long as head; corium (excluding cuneus) as long as posterior tibiæ; cuneus short and broad, angularly attenuated inwardly; membrane passing abdominal apex; legs of moderate length, tibiæ spinulose, posterior tarsi with the basal joint shortest.

Druthmarus magnicornis, sp. n.

Black; third and fourth joints of antennæ piceous, their bases stramineous; membrane with the apical area fuscous brown, the basal area reflecting the dark abdomen beneath; apical areas of intermediate tibiæ and the tarsi (excluding apices) stramineous; corium faintly shortly palely pilose; structural characters as in generic diagnosis.

Length 3 mm.

Hab. Ceylon; Peradeniya (*Green*).

Prodromus cuneatus, sp. n.

Head, pronotum, and scutellum very pale ochraceous; eyes black; antennæ with the basal joint pale ochraceous, second joint piceous, subapically annulated with pale ochraceous, third and fourth joints dull greyish; hemelytra hyaline, margins of the clavus and cuneus, costal margin of corium and margins of membranal cell more or less virescent; body beneath very pale ochraceous; legs stramineous, apices of the tarsi black; head centrally finely medially impressed; eyes prominent, exerted, well separated from the anterior margins of the pronotum; antennæ with the first joint a little longer than head, second about half as long again as first; pronotum with a narrow anterior collar, transversely constricted before middle and enclosing two callosities, posterior area tumid, thickly somewhat finely punctate; cuneus very long, almost reaching the membranal apex.

Length 5 mm.

Hab. Ceylon; Peradeniya (*Green*).

Distinct from the other described species of *Prodromus* by the length of the cuneus.

APOLLODOTUS, gen. nov.

Head half as long as broad, very broad between eyes, anteriorly perpendicularly deflected, medially longitudinally impressed, transversely impressed behind eyes and narrowed to base; eyes small and placed near apex of head and longly removed from base; antennæ with the basal joint thickened, about as long as head, second joint moderately thickened, more than twice as long as first, third longer than fourth, together little more than half the length of second; pronotum about half as long as breadth at base, with a narrow anterior collar behind which are two transverse constrictions enclosing an area which is centrally carinate and contains a smooth callosity on each side, very strongly narrowed from base to head, the lateral margins straightly oblique; scutellum gibbous, shortly acute at upper posterior angle; corium (excluding cuneus) short, broad, about as long as head and pronotum together, the costal margin a little convexly dilated; cuneus short and broad, the cuneal fracture profound; legs of moderate length, the posterior tibiæ as long as corium and cuneus together, posterior tarsi with the first joint longer than second.

Allied to *Angerianus*, Dist., but shorter, broader, head much shorter and less exserted, pronotum much broader and more regularly narrowed; scutellum distinct.

Apollodotus prefectus, sp. n.

Head obscure ochraceous, centrally and behind the eyes marked with black; antennæ with the first joint black, second joint ochraceous, with the apical area black, third and fourth obscure ochraceous; pronotum black, coarsely punctate, a central longitudinal line, lateral margins and the apical basal margins more or less ochraceous; scutellum black; clavus black, with a large dull ochraceous spot near middle; corium subhyaline, with blackish spots, the two largest forming a transverse fascia near middle; cuneus and membranal cells margined with piceous; membrane pale hyaline, longly passing the abdominal apex; body beneath and legs black, apices of the femora and basal areas of the intermediate and posterior femora ochraceous, tibiæ and tarsi ochraceous; abdomen beneath with two ochraceous spots on each side beyond middle; other structural characters as in generic diagnosis.

Length $3\frac{1}{2}$ mm.

Hab. Ceylon; Eppawala (*Green*).

[To be continued.]

LIII.—On a Collection of Mammals from South Africa.

By H. LYSTER JAMESON.

THIS paper is based on a collection of about 440 mammals, representing 66 species, which I made in South Africa between 1902 and the end of 1907.

I have examined the material which I brought home at the British Museum, and I am indebted to Mr. Oldfield Thomas for courteously allowing me to make use of the magnificent series of South-African skins in the National Collection. Without the opportunity of comparing my material with this standard collection the identification of many of the specimens here recorded would have been impossible.

I have also to thank Mr. Thomas, Mr. R. C. Wroughton, and Dr. K. Andersen for much help and advice in naming difficult species.

(1) *Galago crassicaudatus* E. Geoff.

Woodbush Mountain, Zoutpansberg District, Transvaal (3000 to 6000 feet).

♂. 190, 194; ♀. 167, 189, 193.

The type locality of Geoffroy's *Galago crassicaudatus* is not given in his original description, but Peters states that Geoffroy's type example came from Mozambique (Reise Mossamb. 1852).

Geoffroy (Cat. Primates Mus. Pays-Bas, p. 328) also gives Mozambique as the locality.

The type example of *G. crassicaudatus kirkii* Gray is from Quilimaine; it is therefore not improbable that *kirkii* is a synonym for *crassicaudatus*. On the other hand, the type example of *G. garnetti* (Ogilvie), from Natal, and Grant's Zululand series (Rudd Collection) in the British Museum are, on the whole, browner and more heavily pencilled with black than examples of *G. crassicaudatus* from the type locality, Nyassaland and the Gorongosa Mountains, in the National Collection. Moreover, the Natal and Zululand form nearly always has a dark tail-tip, which is generally absent in *G. crassicaudatus*. It may be added that Grant has observed (Rudd Exploration of South Africa.—IX., P. Z. S. 1908, p. 166) that the calls of the two species are different.

It would appear, therefore, that the Natal and Zululand "Bush baby" (including in all probability *G. zuluensis*

Elliot, Ann. & Mag. Nat. Hist. (7) xx. p. 186) should be distinguished from the Mozambique form as *Galago crassicaudatus garnetti* (Ogilvie).

My specimens, from the Woodbush, are in many ways intermediate between *G. crassicaudatus* and *G. garnetti*, but they are on the whole nearer to the northern form.

They were shot at night in the bush.

(2) *Galago moholi* Smith.

New Agatha, Zoutpansberg District, Transvaal.

♂ (juv.). 319.

(3) *Genetta rubiginosa* Puch.

Tzaneen Estate, Zoutpansberg District, Transvaal (2500 ft.).

♂. 208, 243; ♀. 335.

These examples were obtained at a locality between Klein Letaba and Woodbush, *i. e.* from the type-locality of *G. letabæ* (Thos. & Schw.). *G. letabæ* has now been merged in this species (see Thomas and Wroughton, P. Z. S. 1908, p. 542).

(4) *Mungos paludinosus* (G. Cuv.).

= *Mungos galera* (Erxl.).

Tzaneen, Zoutpansberg District, Transvaal.

♂. 179, 325; ♀. 133.

Wakkerstroom, Transvaal, ♀ (specimen lost).

(5) *Mungos cauii* (Smith).

Johannesburg, Transvaal.

♂ (unnumbered); ♀. 340.

Tzaneen, Zoutpansberg District.

♂. 160, 253; ♀. 229, 367, 368.

The examples from Johannesburg are rather more grey than those from the Zoutpansberg.

(6) *Cynictis penicillatus steedmani* Ogilby.

Ventersburg Road, O.R.C.

♀. 306.

(7) *Lutra maculicollis* Licht.

Wakkerstroom, Transvaal.

Flat skin with skull. ♂. Shot Sept. 4th, 1903.

As the character on which the specific name of this otter is based is not present in my example, I append a few notes on the dimensions and colour of this specimen.

Dimensions:—

Head and body 560 mm.; tail 370; hind foot 117; ear 19; ear-opening to tip of nose 62.

Colour dark brown above, lighter brown on underside, underfur pale buff. Upper and lower lips whitish, the throat and inguinal region lighter than the belly. A small yellow spot on the inner side of each knee, but throat and chest unspotted. Whiskers fawn-coloured.

(8) *Ictonyx capensis* Kaup.

Wonderfontein, Potchefstroom District, Transvaal.

♂ (juv.). 2.

Also obtained at Malvern, Natal (not preserved).

(9) *Pæcilogale albinucha* Gray.

Tzaneen, Zoutpansberg District, Transvaal.

♂. 254.

(10) *Cephalophus grimmi* (Linn.).

Tzaneen, Zoutpansberg, Transvaal.

♀. 148.

(11) *Xerus capensis* (Kerr).

Ventersburg Road, O.R.C.

♂. 342, 349.

(12) *Graphiurus murinus* (Desmar.).

Waynek, Waterberg District, Transvaal.

♀. 417; ♀ (unnumbered).

(13) *Graphiurus nanus* (de Wint.).

Tzaneen, Zoutpansberg District, Transvaal.

♂. 147.

(14) *Tatera brantsii* (Smith).

Rooiberg, Waterberg District, Transvaal.

♂. 378, 380, 381, 382; ♀. 379.

Florida, Witwatersrand, Transvaal.

♂ (juv.). 3.

(15) *Tatera miliaria salsa* Wrought.

Tzaneen, Zoutpansberg District, Transvaal.

Series.

These examples are from a locality situated between the two stations from which Wroughton records his species.

This form is very near to *Tatera lobengulæ mashonæ*; indeed, my examples were first identified by Mr. Wroughton himself as that form.

The chief difference between these two forms seems to be the dimensions of the head and body and tail, and more particularly the size of the skull. My examples agree in these points more nearly with *salsa* than with *mashonæ*, as may be seen from the following dimensions:—

	Head and body.	Tail.	Hind foot.	Ear.	Skull.	
					Greatest length.	Basilar length.
* <i>Tatera lobengulæ mashonæ</i> Wr.	146·6	162·3	32·6	22·6	39·6	30·6
*— <i>miliaria salsa</i> Wr.	125·3	146	29·6	19·6	37·6	28·6
— — — — — Wr. (average of nine adult examples in my collection)	132·4	143·3	31·4	24	37·5	28

This species is common everywhere about Tzaneen. In one area of low-lying sandy ground, about an acre in extent, there was a colony or warren which must have contained some dozens of burrows, most of which were occupied by this gerbille.

(16) *Otomys irroratus* (Brants).

Malvern, Natal.

♀. 411.

* Average of three specimens the dimensions of which are quoted in Wroughton's description (Ann. & Mag. Nat. Hist. (7) xvii. 1906, pp. 484, 485).

(17) *Otomys irroratus cupreus* Wrought.

Tzaneen, Zoutpansberg District, Transvaal (near type-locality).

Series.

The female of this species carries her young about attached to her mammæ, a habit that seems to be not uncommon among the smaller South-African rodents.

(18) *Dendromus melanotis* (Smith).

Tzaneen.

♂. 234.

(19) *Dendromus jamesoni* Wrought. (Ann. & Mag. Nat. Hist. (8) iii. 1909, p. 247).

Tzaneen.

Type ♀. 135. (B.M. no. 9. 1. 20. 27.)

♂. 152, 191; ♀. 149, 171, 172, 240.

Spirit ♂. 256.

This species may often be found in the deserted hanging nests of weaver-birds both in the bush and in reed-beds and "Tambutie" grass.

(20) *Steatomys pratensis* Peters.

Tzaneen.

Series.

This little mammal is generally found in a nest of grass situated in a short burrow about 12 inches in length. The entrance to the burrow is closed with earth. The natives (Mashangaan) dig out the mice, which are always enormously fat, as food.

The habits of the fat-mouse in summer are not known.

In captivity it is sluggish, coming out for a short while at night to feed, and accumulating large quantities of grain in its nest, to be eaten at leisure.

If a new example is introduced into a cage of *Steatomys*, it is at once killed and eaten.

Specimens which I kept in my house at Johannesburg showed no signs of a change of habits by the middle of November (when they were sent to Europe), but it is probable that a careful study of this species, which thrives in captivity, would reveal a period of activity in the summer.

(21) *Mus chrysophilus* de Wint.

Makapan's Poort, Potgieter's Rust, Transvaal.

♂. 255.

(22) *Mus chrysophilus tzaneenensis*, subsp. n.

Tzaneen.

Series.

Malvern, Natal.

♂. 414.

Specimens of Darling's rat from the North-eastern Transvaal and Natal are darker than examples from the type-locality of *Mus chrysophilus* (Mazoe, Mashonaland).

A large series which I brought home from Tzaneen differs so markedly from the type series in the British Museum that I propose to apply the above name to the form frequenting the North-eastern Transvaal. The Natal and Zululand forms, unless they also deserve separate subspecific rank, belong to this subspecies rather than to the type species.

Description.—Size as in the type form. Colour altogether darker and less golden, the back being heavily pencilled with black, so that the predominant shade is a dark chestnut-brown, whereas that of *Mus chrysophilus* is tawny brown.

The ear is a little larger, and the tail perhaps a shade shorter in proportion to the body, than in *M. chrysophilus*.

The dimensions of eight full-grown examples in my collection are as follows:—

No.	Sex.	Head and body.	Tail.	Hind foot.	Ear.
*144....	♂	142	160	28	24
120....	♂	155	162	29	22
157....	♂	152	162	29	21
116....	♀	145	157	28	22
117....	♂	145	159	29	23
123....	♀	145	168	28	21
207....	♀	145	157	28	21
162....	♀	147	160	27	23

* Type.

The dimensions of the type of *M. chrysophilus* de Wint. are:—

Head and body 146 mm.; tail 168; hind foot 28; ear 19.
Tzaneen, Zoutpansberg District, Transvaal (2500 feet).

Type ♂. 144. (B.M. no. 9. 7. 2. 15.)

Caught 7th July, 1907.

(23) *Mus namaquensis monticularis*, subsp. n.

Johannesburg, Transvaal.

Series.

Wonderfontein Caves, Potchefstroom District, Transvaal.

♀ (unnumbered).

On comparing a series of some two dozen skins and half a dozen spirit-specimens of this "golden rat," which I collected on the kopjes of the Witwatersrand around Johannesburg, with the material in the British Museum, on which Thomas and Wroughton based their revision of the *Mus namaquensis* group (P. Z. S. 1908, p. 548), I find that it is necessary to create a new subspecies for the form occurring in the Southern Transvaal.

Description.—Colour between that of *Mus namaquensis typicus* and *Mus namaquensis auricomus*, slightly browner than the former and less rufous than the latter. Belly white, with slate-coloured bases to the hairs; these bases are darker than in any other form except *Mus namaquensis centralis*.

Slightly larger than any of the other forms.

Dimensions (of the type):—

Head and body 120 mm.; tail 157; hind foot 26; ear 20.

The tail is rather shorter in proportion to the head and body than in the other forms, the ratio of the length of the head and body to the length of the tail being about 10:12, while the corresponding ratio in other forms varies from 10:13 to 10:14.

Tail-rings 11 to the cm.

Young examples are browner and less golden in colour than adults.

Type ♀ (unnumbered). B.M. no. 9. 7. 2. 10. Johannesburg, 20th May, 1907.

This species is essentially a rock-rat, and is by far the commonest rat on the stony kopjes around Johannesburg.

It makes its nest (of grass, leaves, &c.) in clefts in rocks or in holes under boulders.

I have never found this species away from rocky ground, whereas the allied *M. chrysophilus* is a veld-rat, especially

frequenting the native "Lands" * and the scrub country of the bush-veld.

The following table shows at a glance the distinctive characters of the five races of *Mus namaquensis* which are represented in the British Museum:—

- | | | |
|--|--|--|
| A. Ventral hairs white to the base, or with but slight traces of grey. | | |
| (a) | Bright golden brown above, belly pure white. (Mashonaland and Matabeleland.) | [<i>comus</i> de Wint.
<i>M. namaquensis auri-</i> |
| (b) | Colour browner, with less gold. Some examples have a trace of grey at bases of ventral hairs. (Kuruman.) | [G. Sm.
<i>M. namaquensis lehocla</i> |
| B. Ventral hairs with grey bases. | | |
| (a) | Bases of ventral hairs pale grey, ground-colour above golden-yellow. (Namaqualand.) | <i>M. namaquensis Sm.</i> |
| (b) | Bases of ventral hairs dark slate-colour. | |
| (i.) | Colour golden brown. (South Transvaal.) | [<i>cularis</i> , subsp. n.
<i>M. namaquensis monti-</i> |
| (ii.) | Colour browner, with less gold. (Deelfontein, Cape Colony.) | [Schw.
<i>M. namaquensis centralis</i> |

[*Mus granti* Wroughton (Ann. & Mag. Nat. Hist. (8) i. 1908, p. 257) appears to me to be a variety (or perhaps the young) of *Mus namaquensis centralis*, from the type-locality of which species it is described.]

Apart from the size and skull-characters, rats belonging to this group may readily be distinguished at a glance from the southern members of the *Mus chrysophilus* group by their much more hairy tails.

(24) *Mus coucha* A. Smith.

Wonderfontein Caves, Potchefstroom District, Transvaal.

♀ (unnumbered).

Kopjes near Johannesburg.

♂. 291, 391; ♀ (unnumbered).

(25) *Mus microdon zuluensis* Thos. & Schw.

Malvern, Natal.

♀. 413, 414.

Tzaneen.

Series.

* *I. e.* cultivated ground, as distinguished from "Veld" or uncultivated ground.

Thomas and Wroughton (P. Z. S. 1908, p. 545), in separating *Mus microdon* Peters from *Mus coucha* A. Smith, express a doubt whether their Zululand form, originally named *Mus coucha zuluensis*, can be retained as a subspecies distinct from *Mus microdon*.

While the form from Natal and Zululand and the Eastern and North-eastern Transvaal undoubtedly belongs to the long-tailed *microdon* group rather than to the short-tailed *coucha* group, it is, I think, separable from *Mus microdon* on account of its darker and more slaty colour.

Peters's figure of *Mus microdon* (Reise Mossamb., Säugeth. Taf. xxxvi. fig. 1) depicts an almost fawn-coloured mouse, and the series collected by Mr. Grant at Tette, the type-locality, agree in colour with this figure. On the other hand, the southern form, while very variable, is generally a dark grey rat. I therefore retain the name *Mus microdon zuluensis* for this form.

I am not convinced that my series from Tzaneen may not contain a second and larger species of multimammate rat; but this is such a bewildering group that its ramifications and variations will only be thoroughly understood when a series of breeding experiments, accompanied by observations on colour-changes due to season and age, can be carried out at one of the South-African museums or zoological gardens.

The multimammate rats in South Africa approach more nearly in their habits to the imported *Mus decumanus*, *Mus rattus*, and *Mus musculus* than any other native species.

They are found everywhere. They are equally at home on the veld and kopjes, in the bush and scrub, or living a semi-aquatic life on the banks of streams and vleis. They are the first rats to invade houses, and on the veld and in the smaller dorps, before the arrival of *Mus rattus* and *Mus decumanus*, they are the common house-rats. Owing to the number of young produced at a birth, they quickly became a pest in houses.

They are unable, however, to compete with the imported forms, and have consequently disappeared in the larger towns, where the latter have become established.

Unlike most of the South-African species of *Mus*, which are gentle and docile in captivity, and can often from the first be handled with impunity, this species is fierce and aggressive, biting viciously when handled, and attacking and killing the other species (*Arvicanthis*, *Mus namaquensis*, &c.) which may be put in the same cage.

(26) *Mus rattus* Linn.

Johannesburg.
♂. 4; ♀. 294.

(27) *Mus musculus* Linn.

Johannesburg.
♂. 23.
Pretoria.
♀. 24.

(28) *Leggada minutoides* (Smith).

Johannesburg.
♀. 111.
Tzaneen.
♀. 153.

It is possible that, when a larger number of examples is available for comparison, the Transvaal form will have to be separated from *Leggada minutoides*, the type-locality of which is the Cape.

(29) *Thamnomys dolichurus* (Smuts).

Malvern, Natal.
♂ (unnumbered).

(30) *Saccostomus campestris* Peters.

Tzaneen.
♂. 209; ♀. 360, 361.

Thomas treats Grant's woodbush pouched-rat as this species, the type-locality of which is Tette on the Zambesi. My specimens approach more nearly to *Saccostomus mashonæ*, de Wint.; but, until material is available for a careful revision of the pouched-rats, it is difficult to say to which form any example should be referred, or even to decide what forms are worthy of specific or subspecific rank.

(31) *Dasymys incomtus* (Sund.).

Tzaneen.
Series.

(32) *Arvicanthis dorsalis* (Smith).

Tzaneen.
Series.

(33) *Arvicanthis pumilio* (Sparrm.).

Tzaneen.

Series.

Wonderfontein, Potchefstroom District, Transvaal.

Series.

(The above examples have been identified by Mr. Wroughton as belonging to the subspecies *dilectus* de Winton.)

Pietersburg, Transvaal.

♂. 113.

Riverton, Griqualand West.

♀ (spirit).

(I make no attempt to refer either of the above single examples to any of the numerous subspecies of this species.)

(34) *Mystromys albicaudatus* (Smith).

Wakkerstroom, Transvaal.

Three examples, October 1903 (now in Pretoria Museum).

Wonderfontein, Potchefstroom District, Transvaal (specimens now in Pretoria Museum).

I kept several examples, caught at Wonderfontein, in captivity for some months. These examples were found living in a warren occupied by the meerkat (*Suricata suricatta*). They bred freely in captivity. The period of gestation is about thirty-seven days, and from two to five young are produced at a birth. Apparently litter succeeds litter at intervals of thirty-seven days throughout the entire year, as females caught in October 1903 at Wakkerstroom and in September 1906 at Wonderfontein were all pregnant, while in April 1907 half-grown young and a pregnant female were captured at Wonderfontein, and the latter, kept first at my house and subsequently at the Pretoria Zoological Gardens, went on breeding right through the winter.

The female carries her young about attached to her mammæ, and if one happens to become detached, picks it up in her mouth and carries it back to the nest.

The young ones are dragged about in this manner until about a week before the next litter is born. Reimpregnation occurs a few hours after the birth of the litter.

Grant has observed that cats will not eat this species (presumably owing to a protective secretion of some kind). This may account for its living with impunity among meerkats.

Mystromys shows little fear of man when caught, and becomes very tame and playful in captivity.

(35) *Georychus hottentottus* (Lesson).

Malvern, Natal.

♂. 415; ♀. 416. (January 1908.)

Tzaneen.

♂. 329.

(36) *Georychus holosericeus* Wagner.

Johannesburg.

Series.

(37) *Georychus jorisseni*, sp. n.

Waynek, Waterberg District, Transvaal.

♀. 383, 402.

Tzaneen, Zoutpansberg District, Transvaal.

♂. 213 (juv.); ♀. 224, 225, 226, 269, 330, 355 (juv.).

From a careful examination of the specimens in my collection and in the British Museum, it appears that there are at least four mole-rats, in addition to the several blesmols and the Angolan *G. bocagei*, in South Africa:—

(a) In Southern Cape Colony, and up through the Coast Belt of Natal and Zululand, as far as the Zoutpansberg, *G. hottentottus* is found, with its local race *G. hottentottus talpoides* Thos. in the Knysna.

(b) In the interior and on the High Veld, from Graaf Reinet (type locality) through the Orange River Colony to the Witwatersrand, and down into the highlands of Natal (Estcourt), the larger and stouter *G. holosericeus* Wagner, is found.

(c) In Southern Rhodesia this form appears to be replaced by the very closely allied *G. nimrodi* de Winton, which differs mainly in its skull-characters.

(d) Finally, in the Waterberg there is a much smaller species, which I have named after Mr. E. Jorissen, of Johannesburg, who kindly invited me to accompany him on one of his geological expeditions to the Waterberg, on which occasion I obtained the type here described.

Georychus jorisseni probably extends right across the Bushveld in the Northern Transvaal, as a form which I cannot, from available material, distinguish from it occurs in the Zoutpansberg, alongside of *G. hottentottus*, and in Natal (Grant's Illovo series in British Museum).

Georychus jorisseni may be described as follows:—

Much smaller than *G. hottentottus*, with a rather warmer colouring. Skull much smaller and slighter, zygomatic arches rather depressed, giving the orbit a narrower outline when seen from above.

Dimensions of the type :—

Head and body 100 mm. ; tail 17 ; hind foot 18.

Skull : greatest length 28 ; basilar length 24 ; zygomatic breadth 18 ; breadth of upper incisors at base 4 ; length of upper molars in row 4.5 ; diastema 9.5.

Type ♀. No. 402 (B.M. no. 9. 7. 2. 23). Waynek, Waterberg District, Transvaal, December 1907.

The following table shows the dimensions of the various forms referred to above :—

Species.	No.	Head and body.		Skull.						
		Tail.	Hind foot.	Gr. length.	Bas. length.	Zyg. br.	Up. inc. br.	Up. mol.	Diastema.	
<i>G. jorisseni</i> (Waynek).....	♀. 402 (Type)	100	17	18	28	24	18	4	4.5	9.5
„ (Waynek).....	♀. 383 (Cotype)	107	16	18	..	..	..	3.5	5	9
„ (Tzaneen).....	♀. 330	115	17	18	29	24	21	4	5	10
<i>G. hottentottus</i> (Natal)	♀. 416	121	19	21	32	26	23	4.5	5.7	10.5
<i>G. hottentottus talpoides</i>	(Type) B.M.	126	18	21	33	27	22	..	5.5	9
<i>G. holosericeus</i> (Joh'burg) ..	♂. 112	130	17	25	36	31	25	6	6	11
<i>G. nimrodi</i>	♂ Type, B.M.	..	..	22	35	31	27	..	6.5	12

(38) *Pedetes caffer* Pallas.

Boksburg, Witwatersrand, Transvaal.

♂. 375.

This specimen, as might be expected, is intermediate in characters between Wroughton's *Pedetes caffer orangia* from the Orange River Colony and *Pedetes caffer salina* from the Zoutpansberg.

It agrees with the former in the lighter ground-colour, and with the latter in having a larger proportion of black.

(39) *Pedetes caffer orangia* Wroughton.

Ventersburg Road, O.R.C.

♀. 5.

(40) *Thryonomys swinderenianus* (Temm.).

Tzaneen.

♂. 247, 353; ♀. 245, 367.

(41) *Lepus zuluensis* Thos. & Schw.

Wonderfontein, Potchefstroom District, Transvaal.

♀. 7.

This example extends the range of this species considerably to the westward. Although slightly larger than Zululand examples in the British Museum, the skull-characters and the ears agree with those of the type specimen.

(42) *Lepus ochropus* Wagner.

Ventersburg Road, O.R.C.

♂. 6, 8, 339, 374.

(43) *Pronolagus ruddi randensis* Jameson (Ann. & Mag. Nat. Hist. (7) xx. 1907, p. 404).

Johannesburg.

♂. 280; ♀. 108. (B.M. no. 9. 3. 2. 20.) Type.

Makapan's Poort, Potgieter's Rust, Transvaal.

♂. 350.

The specimen from Makapan's Poort, which may be taken as geographically an extension of the Waterberg Mountains, is decidedly more rufous than the type, but it would be unwise, in the absence of further material, to give it a distinct name. Probably almost every isolated group of kopjes has its own local race of *Pronolagus*, as the hares of this genus seem very sedentary in their habits.

(44) *Epomophorus wahlbergii* Sund.

Tzaneen, Zoutpansberg District (October 1907).

♂. 372; ♀. 371, 373.

Malvern, Natal.

♂. 424.

(45) *Epomophorus angolensis* Gray.

Tzaneen, Zoutpansberg District (June & July, 1907).

♂. 126; ♀. 222.

Kalomo, N.W. Rhodesia.

♀. 9.

For the identification of the above two species I am indebted to Dr. Knud Andersen, who is studying this very difficult genus.

It is interesting to note that while the form which occurs at Tzaneen in considerable numbers in the spring and summer seasons (October) is the commoner South-east African form, *E. wahlbergii*, the two examples obtained in the winter months (June and July) belonged to the northern form *E. angolensis*, which has not hitherto been recorded from so far south.

The specimens of *E. angolensis* obtained at Tzaneen were feeding on bananas. The bats of this genus are evidently to some extent migratory, as I am told that during the summer months numbers of them (evidently *E. wahlbergii*) arrive at Tzaneen, where they feed largely on guavas.

In June and July 1907 only a few *Epomophori* were to be seen, and the two examples obtained proved to be *E. angolensis*, and not *E. wahlbergii*.

(46) *Rhinolophus augur* K. And.

Wonderfontein Caves, Potchefstroom District, Transvaal.
Series.

Witwatersrand (Krugersdorp, Langlaagte, and Johannesburg). (In deserted mines and workings.)

Series.

Makapan's Caves, Potgieter's Rust, Transvaal.

♂. 351, 352.

This bat comes out later than most species, and may be seen flitting in and out among the "thorns" and low bushes, seldom rising sufficiently high to allow of its being shot.

(47) *Hipposiderus caffer* (Sund.).

Malvern, Natal.

♀. 409, unnumbered.

These two examples were caught at night with a butterfly-net, flying under the verandah of Mr. Cecil N. Barker's house at Malvern.

(48) *Petalia capensis* (Smith).

Fountain Grove, near Pretoria.

Series.

Malvern, Natal.

Series.

(49) *Pipistrellus nanus* (Peters).

Malvern, Natal.

Series.

This little bat often sleeps in the tubes formed by the young convolute leaves of the banana. No doubt the adhesive swelling at the base of the thumb enables it to cling to the slippery cuticle of the leaf.

(50) *Pipistrellus rusticus* Tomes.

Tzaneen.

♀. 370.

(51) *Pipistrellus kuhlii fuscatus* Thos.

Malvern, Natal.

♂. 423.

(52) *Vespertilio capensis* Smith.

Johannesburg.

♂. 12.

(Spirit-specimens from Johannesburg, Langlaagte, and Pretoria.)

(53) *Scotophilus nigrita dingani* (Smith).

Malvern, Natal.

♀. 410.

Shot on the wing. Flies high, flight resembling that of the Noctule.

(54) *Miniopterus natalensis* (Smith).

Tzaneen.

♀. 212. (July 1907.)

Wonderfontein Caves, Potchefstroom District, Transvaal.

Series (April 1907).

This species occurs in large numbers in the famous "River Cave" at Wonderfontein, where it forms dense clusters, numbering hundreds of individuals, in the roof of the cave. These bats come out rather late. On the wing they look like a larger species, owing to the length of the wings.

The Tzaneen specimen, which was shot on the wing, was one of two which were seen every evening just before dark, hawking up and down a row of Eucalyptus trees, at a height of about 40 feet.

(55) *Miniopterus breyeri*, sp. n.

I name this bat after my friend and former colleague Dr. H. G. Breyer, Chairman of Senate of the Transvaal University College, who accompanied me on the last of my collecting-expeditions in the Transvaal, when the series under description were captured.

It differs so markedly from the form inhabiting eastern South Africa that it requires a name to itself.

I may here say that it is probable that all the South African *Miniopteri*, with the exception perhaps of *M. minor*, Peters, will prove to be geographical subspecies of *M. schreibersi*, a form originally described from Southern Europe.

Sclater's 'Fauna of South Africa' treats the common South-African *Miniopterus* as *M. schreibersi*, but this form, which is of a light grey colour, does not appear to extend into South Africa at all.

Description.—Size as in *M. natalensis*, but lighter in colour. The hairs on the dorsal surface are reddish brown or reddish grey, the tips with a slight tinge of red-gold. On the ventral surface the tips of the hairs are rather lighter, becoming almost white in the pubic region.

The bases of the hairs are never black, as in *M. natalensis*.

Dimensions of the type:—

Head and body 56 mm.; tail 53; ear 11; tragus 6; forearm 46.

Type ♀. No. 398 (B.M. no. 9.7.2.6).

These examples were found in the great cave at Gatkoppies, in the Waterberg District of the Transvaal. There must have been many hundreds in one small chamber, the roof of which was black for many yards with a continuous cluster of bats.

All the examples examined were females.

The following table sets forth, as clearly as possible, the distinctive features of the known South-African species of *Miniopterus*:—

A. Larger: forearm 43–47 mm.

(a) Fur with well-marked dark brown or black bases.

(i.) Hairs very dark, both basally and at tips.

(a) Larger: skull 15.5 mm., forearm 45–46.

Type-loc. "Interior of Caf-
fraria" (also Knysna) *M. dasythrix* Temm., [1841.

(β) Smaller: skull 14.7 mm., forearm 43–44.

Type-loc. Knysna *M. fraterculus* Thos., [1906.

- (ii.) Hairs black at the base, with light tips.
Forearm 45-47 mm.
Type-loc. "South Africa towards Natal" [1894.
M. natalensis Smith,
(Probably includes *M. scotinus* * Sund., 1847. Type-loc. "Caffraria.")
- (b) Bases of hairs scarcely darker than the rest of the fur, which is reddish brown.
Forearm 45-47 mm., skull 15.5.
Type-loc. Gatkoppies, Waterberg District *M. breyeri*, sp. n.
- B. Smaller: forearm 37 mm.
Type-loc. Coast of Zanzibar..... *M. minor* Peters, 1866.

(56) *Nyctinomus bocagei* Seabra (Jornal de Sciencias, Lisboa, (2) vi. 1900, pp. 84 & 127).

Potchefstroom, Transvaal.

Series (all males).

Florida, Witwatersand, Transvaal.

♂. 343; ♀. 344, 345.

These specimens, representing a *Nyctinomus* with ears separated at their bases, are not *N. ægyptiacus*, and seem to come nearest to *N. bocagei*, described by Seabra from Angola, from which they may perhaps have to be separated as a distinct form, when sufficient material from that locality is available for comparison.

This bat occurs in the roofs of churches and other buildings, and flies early, leaving the buildings with a swift, swallow-like flight while it is still daylight.

(57) *Erinaceus frontalis* Smith.

Ventersburg Road, O.R.C.

♂. 377.

Rooiberg, Waterberg District, Transvaal.

♀. 404.

Common around Johannesburg and Pretoria.

* I have examined the co-type of Sundevall's species in the British Museum, and can see no ground for retaining it as a separate species. The very hairy interfemoral membrane and the band of hairs on the wing-membrane between elbow and ankle are not present in this specimen, but occur in a Madagascar species, wrongly referred by Dobson to this species, but since described by Thomas as *M. manavi*.

- (58) *Elephantulus rupestris jamesoni* Chubb ('Annals of the Transvaal Museum,' vol. i. p. 181).

Witwatersrand series.

Diurnal. May be seen any day hopping over the rocks on the stony kopjes around Johannesburg. (Observatory, Houghton Estate, Orange Grove, &c.).

Omnivorous. Thrives in captivity.

- (59) *Nasilio brachyrhynchus* (Smith).

Tzaneen.

♂. 205; ♀. 188; ♀ juv. 376.

These specimens are a little darker than Grant's examples from Klein Letaba in the British Museum, approaching more nearly to specimens in the National Collection from Mazoe in Mashonaland.

Frequents the open veld. Diurnal.

- (60) *Myosorex tenuis* Thos. & Schw.

Tzaneen.

♂. 223.

- (61) *Crocidura flavescens* Geoff.

Malvern, Natal.

♂. 405.

Spirit-specimens (unnumbered).

- (62) *Crocidura* sp. (1).

Tzaneen.

♂. 246.

(Apparently near to *C. argentata*, which is recorded from Woodbush.)

- (63) *Crocidura* sp. (2).

Tzaneen.

♂. 180, 341.

- (64) *Crocidura* sp. (3).

Johannesburg.

♂ (unnumbered).

Spirit-specimen.

(The above three species cannot be safely identified, as the material available is insufficient.)

(65) *Pachyura varilla* Thos.

Wonderfontein, Potchefstroom District, Transvaal.

♂ and ♀ (unnumbered).

These examples were obtained in deserted "ant-hills" (termites' nests).

(66) *Amblysomus hottentottus* (Smith).

Malvern, Natal.

♀ (unnumbered).

LIV.—*Two new Species of Colobus from Central Africa, collected by Mr. R. Grauer.* By GUY DOLLMAN.

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THE British Museum has acquired from Herr Rolle, of Berlin, examples of the two following new species of *Colobus*, obtained by Herr R. Grauer during a recent Central African expedition.

Colobus graueri, sp. n.

Allied to *Colobus foai*, Pousarg., but differing from that form by having a dark grey-coloured under surface to the body.

Size and general proportions similar to *C. foai*. Hair soft and rather long, measuring about 105 mm. in length on back and sides. Superciliary stripe black, extending back as far as ears, the hairs intermingling with the black crescentic patches situated just anterior to the ears. Crest on top of head bright red (between fawn no. 4 and dull brick-red no. 4, 'Repertoire de Couleurs'). Cheeks and sides of neck pale chestnut (dead leaf no. 3, 'Repertoire'), getting lighter and greyer towards the shoulders. Back of head and neck dark reddish brown (maroon no. 2, 'Repertoire'); anterior part of back blackish brown (reddish black no. 3, 'Repertoire'), grading to a chocolate colour (dark chocolate-brown no. 3, 'Repertoire') behind the shoulders. Posterior portion of back, rump, and sides of body reddish brown (madder-brown, no. 2, 'Repertoire'). Upper surface of limbs very similar in colour to rump and sides, but rather richer (between fawn no. 4 and madder-brown no. 2, 'Repertoire').

Backs of hands and feet a little darker than rest of limbs. Under surface of body greyish, chest and underside of limbs dark slaty grey; chin and throat silvery grey. Tail bright reddish brown (between fawn no. 4 and dull brick-red no. 4, 'Repertoire'). Apical portion rather darker (Indian chestnut-red no. 4, 'Repertoire'); tip dark maroon.

Skull very broad across zygomatic region.

Dimensions of the type (measured in skin):—

Head and body 690 mm.; tail 670; hind foot 170; ear 27.

Skull: greatest length 122.5; basilar length 80.5; zygomatic breadth 88.4; greatest breadth across orbital region 72; condylo-basilar length 91; palatilar length 39.5; length of upper tooth-row, from front of first premolar to back of last molar, 29.4.

Hab. Wabembeland, 80 kilometres west of the N. end of Lake Tanganyika.

Type. Old male. Original no. 52. Collected by R. Grauer.

This specimen differs so strikingly in colour from *C. foai* that it must be regarded as representing a distinct species.

Colobus ellioti, sp. n.

Related to the foregoing species, but readily distinguished by its red-coloured back, dark brownish hind-quarters, and buffy under surface.

Size and general proportions similar to *C. graueri*. Hair rather shorter and harsher. General colour of back reddish, becoming brown posteriorly. Superciliary stripe black. Cheeks red (dark Indian red no. 3, 'Repertoire de Couleurs'), paler under ears (fawn no. 1, 'Repertoire'). Crest on head bright red (dark Indian red no. 3, 'Repertoire'). Back of head reddish chestnut (madder-brown no. 4, 'Repertoire'). Neck, shoulders, and anterior back deep mahogany-colour (between maroon no. 4 and mahogany no. 3, 'Repertoire'). Middle portion of back dark brownish red (dark chocolate-brown no. 2, 'Repertoire'). Rump brownish (warm sepia no. 1, 'Repertoire'). Upper surface of fore limbs and hands red (burnt sienna no. 2, 'Repertoire'). Upper surface of hind limbs very similar in colour to rump, but rather lighter (raw umber no. 2, 'Repertoire'). Backs of feet brownish black (sepia no. 3, 'Repertoire'). Under surface of body buff-coloured (yellowish salmon no. 1, 'Repertoire'), grading to a pale yellow posteriorly (pale yellowish flesh no. 1, 'Repertoire'). Chest reddish (dead leaf no. 4, 'Repertoire'). Throat yellowish red (reddish apricot no. 1,

'Repertoire'). Underside of fore limbs reddish (dead leaf no. 1, 'Repertoire'), richer in colour towards extremities (dead leaf no. 3, 'Repertoire'). Under surface of hind limbs very similar in colour to posterior part of belly, rather greyer and darker towards the feet. Tail brownish black (reddish black no. 2, 'Repertoire').

Dimensions of the type (measured in skin):—

Head and body 760 mm.; tail 650; hind foot 150; ear 30.

Skull missing.

Hab. 90 kilometres west of the south end of Lake Albert Edward.

Type. Adult male. Original number 96. Collected by R. Grauer.

The red-coloured back and dark brownish hind-quarters, together with the black tail and buffy under surface of the body, indicate that this form must be considered quite distinct from *C. graueri*. From *C. foai* it is easily distinguished by its bright red back and head, and from *C. nigrimanus*, Trouessart, by its red hands, dark brown hind-quarters, and black tail.

It gives me great pleasure to name this handsome species after Dr. D. G. Elliot, whose intimate knowledge of this group of monkeys has been of the greatest service to me in distinguishing these two forms.

LV.—*Four new African Squirrels.*

By OLDFIELD THOMAS.

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Sciurus ruwenzorii vulcanius, subsp. n.

Similar in essential characters to true *ruwenzorii*, but the body browner and the extremities more rufous.

General colour above bistre-brown, finely speckled with pale buffy. Muzzle tawny ochraceous. Under surface with the characteristic median white streak of *ruwenzorii*, the sides of the belly washed with ochraceous instead of yellow. Inner sides of limbs ochraceous buff. Forearms (especially along their outer edge), hands, and feet rich tawny ochraceous. Tail with the light rings on the hairs ochraceous, passing

terminally into tawny ochraceous, instead of yellow as in *ruwenzorii*.

Skull and dentition as in true *ruwenzorii*.

Dimensions of the type (measured in skin) :—

Head and body 260 mm. ; tail 260 ; hind foot 54 ; ear 19.

Skull : basal length (c.) 44 ; front of p^4 to back of m^3 8·7.

Hab. Vulcan Forest north of Lake Kivu, between Bajaka and Kassongo.

Type. Adult female. Original number 42. Collected by R. Grauer. Two specimens.

This subspecies is readily distinguishable from the Ruwenzori squirrel by its more rufous limbs and darker and less olivaceous body-colour, in these respects therefore even more like *Heliosciurus rufobrachiatus* than is the typical form.

Funisciurus carruthersi tanganyikæ, subsp. n.

General colour rather darker and more suffused with ochraceous than in the typical greenish *carruthersi* of Ruwenzori. Forearms and hind legs strongly suffused with ochraceous, and the feet also but less strongly. Tail-hairs washed terminally with whitish, far lighter than their basal rings, while in *carruthersi* both proximal and terminal rings are of the same yellowish colour.

Skull and dentition as in *carruthersi*.

Dimensions of the type (measured in skin) :—

Head and body 220 mm. ; tail 200 ; hind foot 52 ; ear 19.

Front of p^4 to back of m^3 8·7.

Hab. Usumbura, N. end of L. Tanganyika.

Type. Adult male. Original number "T.S. 3." Collected by R. Grauer. Two specimens.

This squirrel differs from the Ruwenzori *carruthersi* in very much the same way as *S. ruwenzori vulcanius* does from its type form, although not so strongly. A darkening of the body-colour and a reddening of the extremities are the distinguishing features of each of these two new subspecies.

Funisciurus mandingo nigrensis, subsp. n.

Very similar to the Gambian *F. mandingo*, Thos.*, with which it shares the general pale colour, reduction of rufous

* Ann. & Mag. Nat. Hist. (7) xi. p. 79 (1903).

on sides, limbs, and feet, and other characters, but distinguished as follows:—General colour above, especially on head, slightly darker. Light lateral lines better marked, cream-coloured. Area behind ears with a much more conspicuous white patch, that of *mandingo* being small and little obvious. Under surface white, not sharply defined laterally, the hairs light to their bases; in *mandingo* all the hairs have slaty bases.

No external measurements available.

Skull: greatest length 45 mm.; condylo-basal length 40; greatest breadth 26.5; front of p^1 to back of m^3 7.6.

Hab. Abutschi, Lower Niger, about 150 miles from mouth.

Type. Adult male. B.M. no. 2. 11. 10. 11. Collected by Mr. A. J. Braham.

This squirrel is curiously more like the Gambian *mandingo* than the other Nigerian members of the group. It may, however, be readily distinguished by the white instead of grey-based hairs of its under surface.

Funisciurus leucostigma talboti, subsp. n.

General appearance as in true *leucostigma*, though with many differences in detail. Back of the same grizzled olivaceous tone, but light bands white instead of buffy or ochraceous, and succeeded externally by a line less distinctly blackish. Rufous of head and limbs slightly duller than in *leucostigma*, and that of flanks very much duller, approaching tawny olive of Ridgway, though darker. On the under surface the colour of the flanks encroaches on each side, nearly meeting in the middle line of the belly, and at the same time becoming more ochraceous; chin, chest, and groins dull whitish, the majority of the hairs with slaty bases; in *leucostigma* the under surface is completely white, the hairs white to their bases. Tail with its median area below of the same dull grizzled rufous that is found in the Sierra Leone form, *leonis* *, quite different from the bright uniform rufous occurring in *leucostigma*.

Skull of about the same size as in *leucostigma*; upper profile of brain-case much bowed.

Dimensions of the type (measured in the flesh):—

Head and body 185 mm.; tail 150 †; hind foot 44; ear 15.

Skull: greatest length 48; condylo-basal length 42; greatest breadth 26.8; front of p^4 to back of m^3 8.4.

* *Thos. Ann. & Mag. Nat. Hist.* (7) xv. p. 79 (1905).

† The tail is now 180 mm. in length, and the number above given is perhaps a *lapsus calami*.

Hab. Oban, Eastern Southern Nigeria. Alt. 600'.

Type. Adult male. Original number 7. Collected 13th August, 1909, by Mr. P. A. Talbot.

The brownish or ochraceous belly of this form will readily distinguish it from its ally the white-bellied *F. leucostigma*, as also will the dull-coloured median area of its tail.

I have provisionally placed *nigrens* as a subspecies of *mandingo*, and *talboti* of *leucostigma*, but it is quite impossible until immensely larger series are available to say how far these allocations are likely to prove correct. It is a compromise between the old idea that all members of such a group as the present might be considered to be subspecies of the parent form, and the practice of some of the American zoologists, who appear to restrict the use of trinomials to such forms as no one but the author can distinguish, and he only in certain lights.

LVI.—On the Phylogeny of the Amphidiscophora.

By R. KIRKPATRICK.

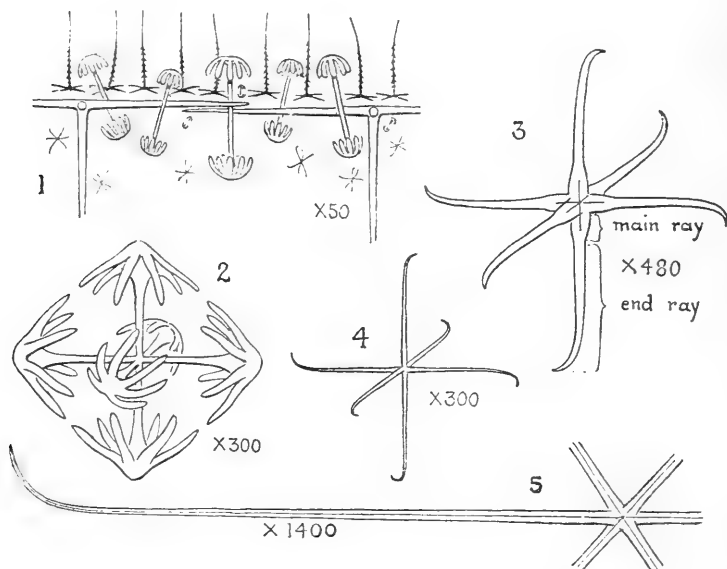
(Published by permission of the Trustees of the British Museum.)

THE division by F. E. Schulze of the order Hexactinellida into the two suborders Amphidiscophora and Hexasterophora was a great step in advance of previous classifications. There are no known transitions between the two great groups.

In several respects the Amphidiscophora have remained in a more primitive condition. There is no evidence to show, however, that one group has arisen from the other, and consequently a bifurcation of the main stem is assumed. The primary and essential character of the Amphidiscophora is the presence of amphidisks; what appears to be a second character is the existence of genuine microhexactins (figs. 4, 5), which do not exist, so far as I have observed, in the Hexasterophora. (The small hexactins forming part of the framework in Dictyonine sponges are not here regarded as microhexactins.) All so-called "derived hexactins" in Hexasterophora are hexasters with a single end ray to each main ray, and have the axial canals terminating abruptly not far from the centre of the spicule (fig. 3)*.

* This is one reason among others for avoiding the use of the "actin" terminology in describing these spicules, and for using the "aster" suffix. In the Report on the 'Discovery' Hexactinellida I have proposed the term monohexaster (*i. e.* monoxyhexaster, monodiscohexaster).

The Amphidiscophoran hexadisk is a hexaster with end rays* turned down towards the main rays; in the Hexasterophora, on the other hand, the end rays of the hexaster are directed upwards away from the main rays.



- Fig. 1.—Dermal surface of *Hyalonema tulipa*, F. E. Sch., $\times 50$ (after F. E. Schulze), showing vertical orientation of amphidisks.
 Fig. 2.—Hexadisk of *Monorhaphis chuni*, F. E. Sch. (after F. E. Schulze).
 Fig. 3.—Monoxyhexaster of *Bathydorus uncifer*, F. E. Sch., with axial canals only in main rays, and not continued into end rays. $\times 480$.
 Fig. 4.—True microhexactin of *Hyalonema divergens*, F. E. Sch. $\times 300$.
 Fig. 5.—Part of same, examined in glycerine, to show axial canal extending the whole length of ray. $\times 1400$.

What are the causes which have brought about these fundamental differences? The Hexactinellid sponge consists of a

* It may be objected that the structure at the end of the ray of a hexadisk is a disk with a peripheral ring of teeth, which should not be compared with end rays of a hexaster; but it is here maintained that the teeth round the periphery of the swollen end of the main rays of a hexadisk are essentially of the same nature as the teeth or spines or end rays at the end of the main rays—also often swollen into capitula—of Hexasterophoran hexasters. The disks of Hexasterophoran discohexasters belong to a third order, and their teeth might be regarded as rays of a third order. The disks and rays of amphidisks belong to a second order, and the main rays of hexasters and amphidisks to a first order.

delicate cup-shaped syncytial network, with the gastral layer suspended midway between outer and inner layers of dermal reticulum; large hexactins or their derivatives form the main scaffolding, and small ones support and keep open the delicate meshes of the network.

To understand the origin of the hexasters with turned-down end rays (hexadisks) and of the hexasters with turned-up end rays (hexasters proper) we must seek for the cause in the structure of the sponge reticulum. Amphidisks (*i. e.* reduced hexadisks) are mainly distributed about the bounding surfaces (fig. 1), which usually have a papyraceous texture. Amphidisks are adapted for keeping apart parallel membranous laminae of sponge reticulum; and hexasters, for maintaining in an expanded state cubical areas of delicate sponge reticulum by prodding out the strands of the network by means of their end rays.

Obviously the hexadisks would soon become reduced to diactin spicules, for the four tangential rays would be acting in the void. Hexadisks still persist in *Monorhaphis dives*, F. E. Sch. (fig. 2), and now and then as sports in other species—a reversion to an earlier and less efficient condition.

The amphidisk teeth, with all their wonderful developments, have arisen in response to the necessity for keeping the spicule orientated at right angles to the opposing planes of tissue, and of restoring it to its position when displaced. They serve, in fact, as the *points d'appui* for bands of contractile tissue passing from the parallel planes to the teeth. A simple wooden model of an amphidisk placed between two sheets of elastic, and with threads of elastic passing from holes in the periphery of the disks to the elastic sheets, will demonstrate the utility of the balancing fibres, for without them it is difficult to keep the spicule vertical or to restore it when out of place*.

Some abnormal or exceptional forms of amphidisk are

* Dwellers in earthquake countries might, perhaps, with advantage follow the methods adopted by the Amphidiscophoran sponge, for in each case there is the same problem to solve. The amphidisk has to keep apart laminae, to be vertically orientated, and to be readily restored to its position when displaced. Similarly, in cases where the earth-pellicle is unstable, the house has to be kept upright, and floor and roof kept apart. The inhabitants, then, should become "Amphidiscoeci" or dwellers in amphidisks. The design would consist of a gigantic amphidisk in a cubical scaffolding, with jointed iron staples passing from the teeth of the disks to the upper and lower planes of the scaffolding; there would be a domed roof, and the polar area of the lower disk would fit into a wide socket. The walls could be made of some strong light material, such as *papier-mâché*, in larged framed plaques jointed together.

especially interesting from the point of view of the theory here set forth. The Z-shaped paradise spicules found in *Hyalonema investigatoris**, F. E. Sch., and in *H. alcocki*, F. E. Sch., appear to have resulted from a pulling of the reticular lamina in opposite directions; the stress had the effect of pulling the disk-forming portion of the scleroblast to one side and preventing the development of the teeth along one edge.

Hyalonema lamella, F. E. Sch., exhibits an anomalous condition in having the macramphidisks scattered about in the parenchyma, in place of being vertically orientated at the surface. By way of explanation, it is suggested that this condition has arisen owing to the change in shape of the body. A typical *Hyalonema* is cup-shaped, and the concentric surface-layers of contractile laminar reticulum with their vertical amphidisks might be compared to a taut bow; but a curved lamella could only be compared to a relaxed bow with all the arrows discharged into the parenchyma. Other instances of loss of orientation and scattering of amphidisks in the parenchyma are found in *H. globiferum*, *H. solutum*, *H. rapa*, F. E. Sch., but the great rule is that these spicules are vertically orientated at surfaces.

In normal amphidisks there is often a thickening at the centre of the axis; this may be partly due to the fact that the centre is or was the meeting-point of three axes, but the swelling often obviously results from the squeezing by the opposing laminæ of network.

Since there are reasonable grounds for assuming a bifurcation of the Hexactinellid main stem, it becomes a matter for speculation to consider what were the characters of the common ancestor of the Amphidiscophora and Hexasterophora. The data for this inquest are furnished by the present-day sponges of those suborders. The hexasters and amphidisks have arisen in response to the need for keeping open the meshes of a contractile network or for keeping apart layers of network. Accordingly it may be assumed that the Ur-Hexactinellid was a cup-shaped body with a dermal reticulum possessed of two tendencies or potentialities. On the one hand, it tended to form concentric laminæ at its outer surface. In response to this condition the microscleral hexactins at the surface acquired broad rounded ends, with a peripheral ring of spines which had a shaftward or centripetal direction impressed upon them; the tangential axes would soon

* F. E. Schulze, "Hexactinelliden des Indischen Oceans, 1894: I. Theil. Hyalonematiden," Abhand. Akad. Wiss. Berlin, 1894, pl. vii. figs. 4, 4a, 11-16.

disappear, and the remaining axis would become vertically orientated.

Turning to the Hexasterophoran tendency, we may suppose that the body reticulum remained delicate and uniform and did not assume a tendency to gather into strongly contractile bands. Accordingly the slight centripetal pressure of the contractile strands would not have the effect of bending back the end rays, which would grow outwards away from the main rays, and, further, all six rays would be needed in a uniform cubical—as distinct from laminate—reticulum.

Although it would seem probable that a laminar condition would arise out of a uniform cubical condition of dermal reticulum, yet the Amphidiscophora, in several respects, would appear to be more primitive than the Hexasterophora.

As Minchin* has pointed out, the collar-cell layer in the former is nearer to the homocœlous state than in the latter. Further, the skeleton is constructed on a simpler plan, *i. e.* of a cubical framework formed from regular hexactins, and, lastly, the microhexactins remain in the condition of simple hexactins.

In the Hexasterophora, the hexasters have developed disks of a third order at the ends of end rays, and there are no true microhexactins, the so-called "derived hexactins" being true hexasters, in which each main ray has one end ray.

Leaving out of account for a moment the fact that the amphidisk is a diaster or didiscaster, the two great groups might alternatively, but less aptly, have been named Microhexactinophora and Hexasterophora: for in the first the microscleres, apart from the amphidisks, are all hexactins, and hexasters are never found; in the second the microscleres are all hexasters, and there appear to be no microhexactins.

It might be supposed that pinular Hexasterophora (*Asconema* &c.) are nearer to Amphidiscophora than are the non-pinular Hexasterophora; even so, the pinular Hexasterophora all have hexasters and are devoid of microhexactins. It is conceivable that an Amphidiscophoran might lose its amphidisks; its true character would probably then be betrayed by the presence of true microhexactins.

In Amphidiscophora there would be, for obvious reasons, a tendency to atrophy of the proximal ray of autodermal and autogastral hexactins, thus giving rise to pinuli, for these rays could not prevail against the concentric laminae, but would be suppressed or reduced to mere buttons, as we frequently see.

Hexasterophora with pinuli (*Asconema* &c.) might be

* E. A. Minchin, "A Speculation on the Phylogeny of the Hexactinellid Sponges," *Zool. Anzeig.* 1905, xxviii. pp. 439-448.

regarded either as being derived from Amphidiscophora by loss of amphidisks, modification of microhexactins into hexasters, and higher development of the choanosom, or simply as Hexasterophora which have developed pinuli; the latter seems the more likely hypothesis.

Specimens of Amphidiscophora would require to be fixed suitably at the moment of capture, in order to show the delicate contractile protoplasm with the spicules *in situ*. In ordinary museum specimens I have invariably found the tissues much contracted, leaving the bare convex distal heads of the amphidisks exposed on the surface.

BIBLIOGRAPHICAL NOTICE.

Memoirs of the Indian Museum.—Vol. II. No. 2. *An Account of the Indian Cirripedia Pedunculata.*—Part I. *Fam. Lepadidæ (sensu stricto)*. Plates VI.–VII. By N. ANNANDALE, D.Sc. Published by Order of the Trustees of the Indian Museum, Calcutta. 1909. Two Rupees.

DR. ANNANDALE has done much more than give a mere list of species in this most valuable and interesting memoir, for he has touched upon many themes that deserve far closer attention than they have hitherto received.

Confining himself in the present contribution to the Pedunculata, he points out the difficulties of his task, owing to the fact that there are few groups which afford so many or such perfect instances of convergence or adaptive resemblance. With such material the formation of a natural system of classification—a system based on descent—is well nigh impossible. He gives some interesting illustrations of this fact, selecting as the best example among the Lepadidæ *Pœcilasma kæmpferi*, which occurs in its typical form in Japan and in the South Pacific, but is represented by subspecies in several different parts of the Indian and Atlantic Oceans.

Some extremely interesting facts on life-history are to be found in Dr. Annandale's notes on the several genera herein described. Thus, of the genus *Dichelaspis* he tells us that with one exception the species thereof affix themselves on settling down in life to the bodies of hard-shelled Crustaceans; but the exception—*D. grayi*—chooses the skin of sea-snakes.

Space forbids more than a very brief notice of this most interesting memoir, which should prove a very welcome addition to carcinological literature.



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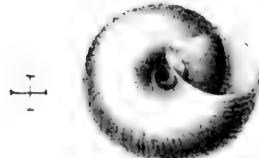
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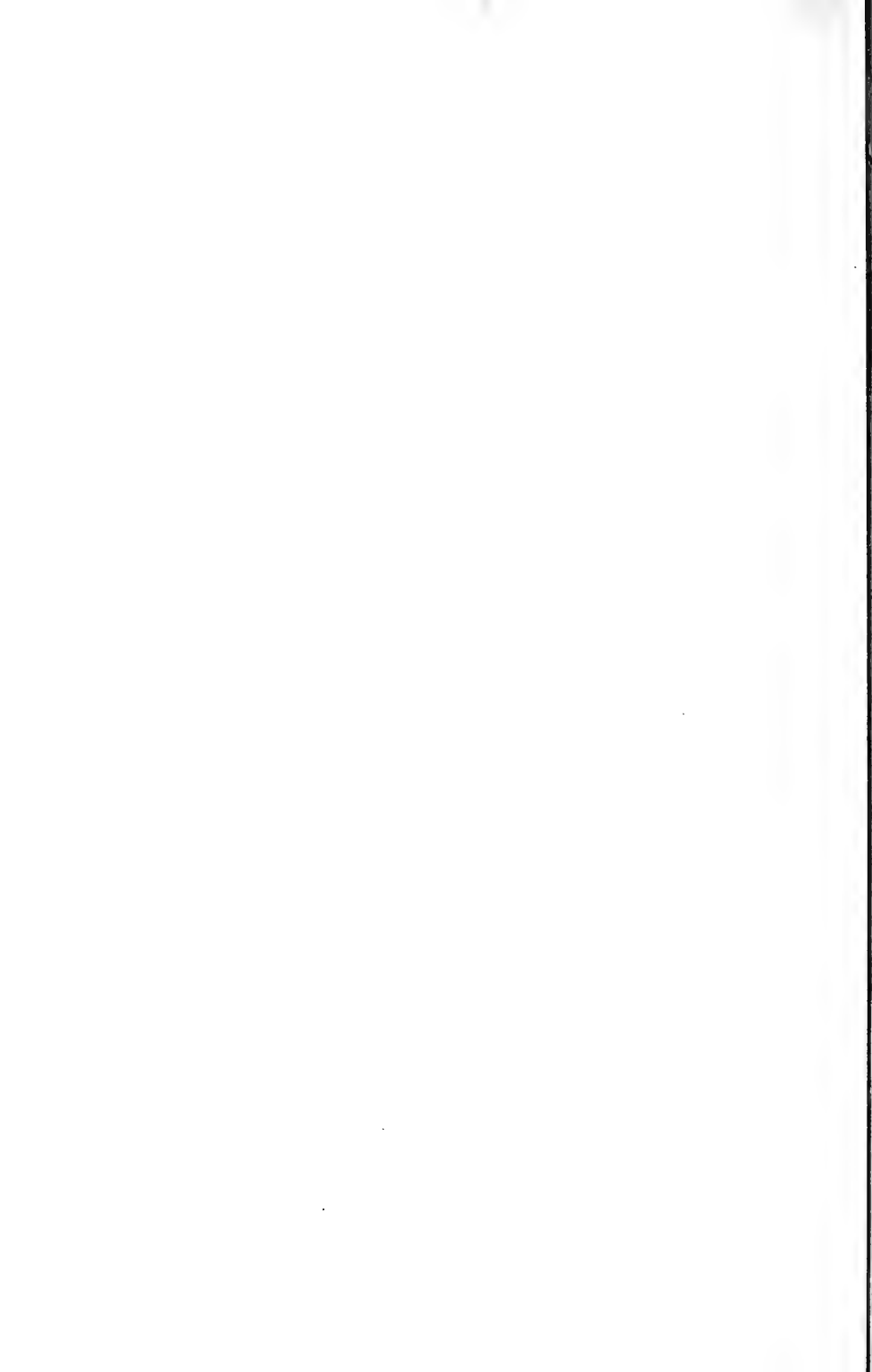
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A. H. Searle, del. et lith.

Forth. 1880.



THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 24. DECEMBER 1909.

LVII.—*Descriptions of Nine Species of Ennea and Five Helicoids, all from South Africa.* By JAMES COSMO MELVILL, M.A., D.Sc., F.L.S., and JOHN HENRY PONSONBY, F.Z.S.

[Plate VIII.]

It is nearly two years since our last paper* upon the non-marine Molluscan fauna of the South-African region was published. Since then one or two new collectors have energetically started in the field, notably Captain Connolly, whilst others, such as Mr. J. Farquhar, are still as successful as ever in prosecuting researches which result invariably in important and valuable discoveries. Amongst these the following fourteen species have been kindly placed in our hands for description. No less than nine species of *Ennea* are here included, mostly of smaller size than usual, and also a few Helicoids. With regard to some of these last we hope before very long to be able to give particulars of their anatomy.

Ennea callista, sp. n. (Pl. VIII. fig. 1.)

E. testa minuta, tenui, omnino pellucida, lævissima, nitida, vitrea, cylindrifirmi; anfractibus ad $6\frac{1}{2}$, apice perobtusos, cæteris fere

* Ann. & Mag. Nat. Hist. ser. 8, vol. i. pp. 129-136 (Feb. 1908).
Ann. & Mag. N. Hist. Ser. 8. Vol. iv. 35

rectis, ultimo prolongato, longitudine cæteros exæquante; apertura ovata, peristomate albo, plicis dentibusve quinque prædito, plica parietali prominula, dente labiali squarrose obtuso, basali minuto, columellari parvo, obtuso, plica columellari omnino interna.

Alt. 2·75, diam. 1 mm.

Hab. Dassy Krantz, Grahamstown (*J. Farquhar*).

A remarkably beautiful but very minute form, conspicuous for its extreme smoothness and glassy appearance. The whorls are $6\frac{1}{2}$ in number, the apex being exceedingly obtuse, while the prolonged body-whorl is conspicuous. The peristome is endowed with five teeth or plaits, there being a columellar tooth situate just above the wholly internal plication.

The alliance of this species is with *E. columnella* and *cimolia*, M. & P. From the former it differs in smaller size, ovate as against rounded aperture, larger and squarer labial tooth, while *columnella* is not so large, with bifid labial tooth, and mamillate columellar plait produced superficially.

Ennea connollyi, sp. n. (Pl. VIII. fig. 2.)

E. testa parva, cylindrica, subrimata, fortiter scrobiculata, versus apicem perobtusata; anfractibus 7, ad suturas constrictis, tribus apicalibus planatis, simplicibus, cæteris arcte rectiliratis, liris crassis, fortibus; apertura angusta, peristomate oblongo, subauriformi, albo, quinque plicis dentibusve instructo, plica parietali conspicua, curta, protrusa, labiali magna, incrassata, dente basali parvo, columellari simili, plica columellari omnino interna, mammæformi, aperturam fere claudente.

Alt. 3, diam. 1 mm.

Hab. Majuba, Transvaal (*Connolly*).

A compact and particularly neat species, with which we have much satisfaction in uniting the name of its discoverer. Its nearest ally would seem to be *E. arnoldi*, Sturany, approaching in form nearest to the var. *elongata*, Stur., and differing mainly in the arrangement and proportionate magnitude of the columellar teeth and plaits.

Ennea crispula, sp. n. (Pl. VIII. fig. 3.)

E. testa minuta, cylindrica, rimata, scrobiculata; anfractibus ad 7, quorum apicalis perlevis, obtusissimus, cæteris tumidulis, ad suturas multum impressis, undique pulcherrime et fortiter obliquistriatis; apertura rotunda, peristomate incrassato, albo, nitido, dentibus plicisve quatuor instructo, plica parietali forti, dente

labiali conspicuo bifido, basali acuto, plica columellari interna, mammaeformi.

Alt. 3.25, diam. 1 mm.

Hab. Grahamstown (per *Hugh Fulton*).

Conspicuous for its tumid whorls, beautifully and strongly striate, and its barrel-like form. Allied to *E. caryatis*, nobis, from which it differs in lesser altitude, more conspicuous ventricosity of whorl, and round peristome, the disposition of plaits and teeth seeming much the same in both species.

Ennea eshowensis, sp. n. (Pl. VIII. fig. 4.)

E. testa rimata, perobtusata, cylindrica, alba, nitida; anfractibus ad 8, apicalibus inclusis rotundo-obtusis, apud suturas paullum impressis, supernis gradatulis, tribus ultimis fere rectis, undique longitudinaliter delicate arcuato-striatis; apertura fere rotunda, peristomate albo, nitido, incrassato, plicis dentibusve quatuor instructo, plica parietali paullum prominente, acuta, acinaciformi, dente labiali bifido, inferiore majore, basali parvo, acuto, plica columellari interna, mammaeformi.

Alt. 5.5, diam. 2.75 mm.

Hab. Eshowe, Zululand.

Comparable with *E. instabilis*, Stur., and *E. obovata*, Pfr. (= *ampullacea*, Stur.), but differing in form, striation, and other particulars. A very handsome little species, broad proportionally to its stature.

Ennea euschemon, sp. n. (Pl. VIII. fig. 5.)

E. testa cylindracea, albo-cinerea, versus apicem obtusa; anfractibus ad 8, omnibus obliquistriatis, striis arcatis, tenuibus, ultimo rectistriato, sutura lineari; apertura lunari, peristomate incrassato, albo, nitido, dentibus plicisve tribus praedito, plica parietali acinaciformi, conspicua, acuta, dente labiali acuto, plica columellari nequaquam conspicua vel fere evanida.

Alt. 10, diam. 5 mm.

Hab. Transvaal (*Connolly*).

This beautiful species differs from *E. eximia*, M. & P., in two particulars. Firstly, in the absence of the small upper labial tooth situate close to the parietal plait. When this latter (*eximia*) was figured* the artist unfortunately omitted to represent this important feature, and accordingly we are giving another delineation now for sake of comparison with

* Ann. & Mag. Nat. Hist. ser. 7, vol. i. p. 28, pl. viii. fig. 8 (1898).

the new form (fig. 6). Secondly, *E. euschemon* differs in the extension of the parietal plait some little distance up the body-whorl, beyond the point of insertion of the outer lip.

Ennea hypsoma *, sp. n. (Pl. VIII. fig. 7.)

E. testa minuta, alba, vitrea, breviter cylindrica; anfractus ad 6, quorum apicales duo obtusi, planati, cæteris tumidulis, apud suturas impressis, longitudinaliter undique arcte tenuistriatis, striis fere rectis; apertura ovato-oblonga, peristomate pro magnitudine percrasso, plicis dentibusve tribus (vel interdum quatuor) prædito, plica parietali magnopere prominula, acuta, dente labiali crasso, obtuso, plica columellari omnino interna, magna, aperturam fere claudente, dente basali fere evanido, in specimine typico perparvo et obscuro.

Alt. 2, diam. .075 mm. (sp. maj.).

Hab. Bathurst (*J. Farquhar*).

This species and *E. periploca* are among the most minute *Enneæ* described, and yet their plications and teeth are more wonderfully disposed than in many of the larger forms of the genus. The particularly prominent parietal plait, projecting well over the plane of the orifice, has suggested the trivial name of this elaborate little shell, whose alliance is, we think, to be traced with the much larger and coarser *E. leppani*, Sturany.

Ennea oppugnans, sp. n. (Pl. VIII. fig. 8.)

E. testa breviter cylindrica, obscure rimata, albo-pellucida, nitida, tenui; anfractibus 6, apicali subplanato, supernis tumescentibus, ad suturas impressis, undique tenuiter obliquistriatis, striis interdum fere evanidis, interdum fortibus; apertura oblonga, peristomate albo, nitido, crassiusculo, reflexo, plicis dentibusve quatuor munito, plica parietali prominula, acinaciformi, acuta, perintrante, dente labiali crasso, bifido, basali interno, parvo, plica columellari omnino interna, aperturam centalem fere claudente.

Alt. 2.75, diam. 1 mm.

Hab. Bathurst, near Grahamstown (*Farquhar*).

A small species, smaller than, but of much the same build as, *E. connollyi* described in this paper; the mouth-processes are very complicate; the columellar plait, wholly internal, spreads centrally, almost closing the orifice. There is a small basal tooth at some little distance below the bifid

* ὑψωμα, an elevation.

labial, while the parietal plait is prominent, acute, and deeply seated. It is comparable with *E. labyrinthea*, M. & P. (Ann. & Mag. Nat. Hist. ser. 6, vol. xvi. p. 479, pl. xviii. figs. 7, 8, 1895), but is larger, and possesses a whorl at least more, while the peristomatal plicæ are even more elaborate in *labyrinthea*.

Ennea parallela, sp. n. (Pl. VIII. fig. 9.)

E. testa vitrea, tenui, recte cylindrica, angusta, obscure et evanide tenuistriata; anfractibus 7, apice perobtusos, supernis tumidis, tribus ultimis fere rectis, ad suturas impressis, ultimo pro rata parte parvo; apertura rotunda, peristomate levi, albo, haud multum incrassato, dentibus plicisve quatuor instructo, plica parietali acuta, intrante, dente labiali inconspicue bifido, basali minuto, plica columellari contorta, magna.

Alt. 4, diam. 1 mm. (sp. maj.).

Hab. Grahamstown (*J. Farquhar*).

We have selected as the type of this small *Ennea* a specimen slightly more elongate in form than the few others yet seen by us, because it appears to be quite adult and in especially good condition. The others are proportionately shorter and more delicately striate; these striæ seem evanescent, and have indeed almost disappeared in the well-grown type. We do not know any species very nearly akin to this. It resembles *E. crispula*, described in this paper, in form and disposition of peristomatal processes, but is abundantly distinct in texture and other particulars. *E. marie*, M. & P., from Somerset East, may perhaps likewise be compared.

Ennea periploca *, sp. n. (Pl. VIII. fig. 10.)

E. testa minuta, dolioliformi, delicata, vitrea; anfractibus 6, quorum apicales obtusissimi, læves, vitrei, cæteris longitudinaliter arcte tenuistriatis, striis fere rectis, apud suturas impressis, ventricosis; apertura ovato-oblonga, peristomate crasso, nitido, albo, plicis dentibusve quatuor intricatè munito, plica parietali prominula, acuta, haud multum intrante, dente labiali magno, prominulo, basali elongatulo, conspicuo, plica columellari omnino interna, magna, aperturam semioccludente.

Alt. 2·15, diam. 1 mm.

Hab. Boschberg Mt., Somerset East (*J. Farquhar*).

As the name would imply, the peristomatal processes of this very refined little species are indeed involved and prominent. It is one of the smallest species known to us and one

* περίπλοκος, intricate.

of the most elaborate in its architecture. The different character of the labial tooth separates it from *columnella*, M. & P., while *montana* possesses another whorl at least and is altogether larger. Indeed, it is hardly comparable with these or their immediate allies. The mouth is differently formed from *hypsona*, described in this paper; indeed, these two stand together as most interesting additions to this wonderfully varied genus.

Helicarion pumilio, sp. n. (Pl. VIII. fig. 11.)

H. testa parva, planulata, succineata, tenui, breviter obscure perforata; anfractibus 3, quorum apicalis submamillatus, nitidus, suturis impressis, ultimo anfractu effuso; apertura late lunari, peristomate tenuissimo, marginem super columellarem obscurissime reflexo.

Alt. 4, diam. 7 mm.

Hab. Zoutpansberg, Transvaal.

At once distinguished from all South-African congeners yet known to us by its small size. The anatomical details of this species, as well as the next, are at present unknown, but the shells of both seem distinct enough to warrant description.

Helicarion russofulgens, sp. n. (Pl. VIII. fig. 12.)

H. testa elliptica, pervitrea, angustissime perforata; anfractibus 4, quorum apicales lente subconici, ad suturas impressis, nitidis, tota superficie late succineata, ultimo supra medium (in typo) obscure transversim rubro-fasciato; apertura magna, rotundo-lunari, peristomate tenuissimo.

Alt. 6, diam. 11 mm.

Hab. Eshowe, Zululand; also what appears to be the same species from Hilton Road, Maritzburg, Natal.

A very beautiful, shining, glassy, reddish-yellow species, the body-whorl (in the type specimen) obscurely once-banded above the periphery, but some examples are plain. Aperture large, roundly lunate. We cannot compare it closely to any other South-African species; the dark amber colour is noteworthy and the form peculiar. The surface of the body-whorl, at first sight appearing smooth, is in reality somewhat malleate and irregularly obliquely scratched.

Natalina lightfootiana, sp. n. (Pl. VIII. fig. 13.)

N. testa ovata, cinereo-alba, epidermide cornea contacta, tenui, parum nitida, profunde sed anguste umbilicata; anfractibus ad

4½-5, quorum apicales paullulum exserti, apud suturas impressis, ventricosulis, undique longitudinaliter rudistriatis, striis obliquis, irregularibus; apertura rotundo-lunari, peristomate tenui, supra umbilicum fortiter triangulatim reflexo, columella ipsa perobliqua. Alt. 15, diam. 19 mm.

Hab. Zwelldam, Cape Colony (*R. M. Lightfoot*).

Without any very tangible characters, this compactly formed *Natalina* seems perfectly distinct from any other member of the genus. It may to some recall, of course only superficially, certain Australian species of the genus *Balistes*.

We have much pleasure in connecting with this interesting mollusk the name of Mr. Lightfoot, of the South African Museum, Capetown, by whom it was collected.

Zingis thermarum, sp. n. (Pl. VIII. fig. 14.)

Z. testa conico-depressa, sat anguste sed profunde umbilicata, vivide fusca, subtus pallidiore; anfractibus 5, quorum apicalis planatus, lævis, cæteris ad suturas profunde impressis, oblique irregulariter striolatis, ultimo anfractu apud peripheriam obtuse carinato; apertura anguste lunari, peristomate tenui, marginem ad columellarem vix reflexo.

Alt. 3, diam. 16 mm.

Hab. Warmbath, Pretoria, Transvaal (*Connolly*, who possesses a good series of the species).

A dark dun-coloured *Zingis*, to some extent comparable with *Z. arnotti*, Bens., also from South Africa (fig. 16), from which it differs in several particulars, such as colour and texture, being a thicker and browner shell, with aperture also narrower, and more distinct umbilicus. The spire, too, is more conically depressed and the whorls narrower proportionally.

Trachycystis connollyi, sp. n. (Pl. VIII. fig. 15, 15 a.)

T. testa parva, conica, tenui, profunde sed anguste umbilicata, pallide brunnea; anfractibus 4½, quorum apicalis nitidus, perobtusus, lævis, cæteris ventricosus, apud suturas multum impressis, undique longitudinaliter acute obliquistriatis, striis irregularibus; apertura rotunda, peristomate tenui, paullum supra umbilicum reflexo.

Alt. 3, diam. 4 mm.

Hab. Montagu, 50 miles from Zwelldam, Cape Colony (*Connolly*).

A very curious species, though small, and quite unlike any form hitherto described of which we are cognizant. It may prove not to belong to *Trachycystis*.

EXPLANATION OF PLATE VIII.

- Fig. 1. *Ennea callista*.
 Fig. 2. — *connollyi*.
 Fig. 3. — *crispula*.
 Fig. 4. — *eshowensis*.
 Fig. 5. — *euschemon*.
 Fig. 6. — *eximia*, M. & P.
 Fig. 7. — *hypsoma*.
 Fig. 8. — *oppugnans*.
 Fig. 9. — *parallela*.
 Fig. 10. — *periploca*.
 Fig. 11. *Helicarion pumilio*.
 Fig. 12. — *russofulgens*.
 Fig. 13. *Natalina lightfootiana*.
 Fig. 14. *Zingis thermarum*.
 Figs. 15, 15 a. *Trachycystis connollyi*.
 Fig. 16. *Zingis arnotti*, Benson.

LVIII.—*Descriptions of Four new Frogs and a new Snake discovered by Mr. H. Sauter in Formosa.* By G. A. BOULENGER, F.R.S.

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Rana adenopleura.

Vomerine teeth in two small oblique groups between the choanæ. Head moderate, as long as broad; snout obtusely pointed, prominent, as long as the orbit; canthus rostralis obtuse; loreal region oblique, concave; nostril equally distant from the eye and from the end of the snout; inter-orbital region nearly as broad as the upper eyelid; tympanum very distinct, two-thirds to three-fourths the diameter of the eye. Fingers slender, with slightly swollen tips, first extending slightly beyond second; toes slender, half-webbed, the tips dilated into small but distinct disks; subarticular tubercles moderate; a small oval inner metatarsal tubercle and sometimes a rounded outer one at the base of the fourth toe. The tibio-tarsal articulation reaches the tip of the snout or between the eye and the tip of the snout. Skin smooth; a moderately broad, very prominent, dorso-lateral glandular fold. Greyish brown above, with or without darker spots and marblings, with or without a light vertebral line; a more or less distinct dark band on each side of the head, passing through the eye; a whitish streak along the upper lip; dorso-lateral fold dark-edged; limbs with dark cross-bars; hinder side of thighs yellowish, spotted or marbled with

brown or black; lower parts white, throat sometimes brownish. Male with an internal vocal sac on each side and a very large flat gland on each side of the body, above and behind the shoulder, as in *A. pleuraden*.

From snout to vent 55 mm.

Several specimens from Fuhacho village, altitude about 4000 feet.

Agrees very closely with *R. pleuraden*, Blgr., from Yunnan, but differs in the distinctly dilated tips of the toes.

Rana sauteri.

Vomerine teeth in two strong oblique series extending considerably beyond the level of the posterior border of the choanæ. Head moderate, as long as broad; snout rounded, not prominent, as long as the eye; canthus rostralis obtuse; loreal region not very oblique, slightly concave; nostril a little nearer the end of the snout than the eye; interorbital region a little narrower than the upper eyelid; tympanum very distinct, two-thirds to three-fourths the diameter of the eye, narrowly separated from the latter. Fingers slender, with distinctly swollen tips, first and second equal or first extending very slightly beyond second; toes slender, three-fourths webbed, the tips dilated into small but distinct disks; subarticular tubercles large and prominent; a small oval inner metatarsal tubercle and a smaller round tubercle at the base of the fourth toe. The tibio-tarsal articulation reaches the tip of the snout or a little beyond. Skin smooth or finely shagreened above; a very narrow dorso-lateral glandular fold. Pale grey or greyish brown above, uniform or with small brown or black spots; a more or less distinct dark bar between the eyes; sometimes a dark \blacktriangle between the shoulders; a dark brown or black canthal streak and a large temporal spot of the same colour covering the tympanum; limbs with dark cross-bars; lower parts white, throat and breast closely spotted or marbled with grey or brown. Male unknown.

Total length 57 mm.

Five specimens from Kanshirei Village, altitude about 2000 feet.

But for the less oblique loreal region and the dilated toes, this species resembles strikingly *R. japonica*, Blgr. It is also allied to *R. mortenseni*, Blgr., which differs in a stouter habit, a much thicker and more prominent dorso-lateral fold, and in the lighter colour of the tympanum. *R. sauteri* furnishes another interesting link between the "Ranae temporariae" and the "Hyloranae."

Rhacophorus robustus.

Vomerine teeth in two strong oblique series between the choanæ, narrowly separated from each other and nearly touching the inner front edge of the latter. Head rather large, not much depressed, as long as broad; snout rounded or subacuminate, slightly projecting beyond the lower jaw; canthus rostralis obtuse, loreal region concave; nostril equally distant from the eye and the end of the snout; interorbital space narrower than the upper eyelid; tympanum moderately distinct, about half the diameter of the eye. Fingers moderately long, with a rudiment of web, the disks as large as the tympanum. Toes moderate, entirely or nearly entirely webbed, the disks a little smaller than those of the fingers; inner metatarsal tubercle small, oval, moderately prominent. The tibio-tarsal articulation reaches the eye or the nostril; tibia about half as long as head and body. Skin smooth or shagreened above, granular on the sides, on the belly, and under the thighs; a strong oblique glandular fold from the eye to the shoulder. Greyish or brownish above, uniform or with darker variegations, sometimes with scattered white dots; a more or less distinct dark area between the eyes, sharply defined in front; limbs with or without dark cross-bars; groin and sides of thighs with dark marblings, or marbled with blackish, or black with yellow spots; lower parts white. Male with an internal vocal sac.

Total length 75 mm.

Several specimens from Kankau (sea-level), Alikang (about 3000 feet), and Kosempo (about 5000 feet).

Closely allied to *R. buergeri*, Schleg., but distinguished by the presence of a rudiment of web between the fingers.

Microhyla steinegeri.

Habit rather stout. Snout truncate, a little shorter than the orbit, projecting beyond the mouth; interorbital space much broader than the upper eyelid; choanæ very large, no ridge between them. Fingers and toes moderately slender, blunt, not dilated into disks; first finger a little shorter than second; subarticular and palmar tubercles very strong; a rounded inner metatarsal tubercle; a very slight rudiment of web between the toes. Tibio-tarsal articulation reaching the temple; tibia not half the length of head and body. Skin smooth; an oblique fold from the eye to the arm. Dark grey, spotted or freckled with black; sides of head and limbs with lichen-like light variegations; a black streak from the end of the snout to the fore limb, passing through the eye;

lower parts dirty white, more or less dotted or spotted with brown. Male with an internal vocal sac and the throat black.

Total length 30 mm.

Five specimens from Kanshirei.

This very distinct species is named after Dr. L. Stejneger, the author of a valuable monograph of the Reptiles and Batrachians of Japan and adjacent territories.

Other Batrachians included in Mr. Sauter's collection are *Rana kuhlii*, D. & B. (Fuhosho, Kanshirei, Alikang), with which, I think, Stejneger's *R. namiyei*, from Okinawa, should be united, *R. latouchii*, Blgr. (Fuhosho), *R. swinhoana*, Blgr. (Kosempo), *Rhacophorus japonicus*, Hallow. (*Rana macropus*, Blgr.) (Kankau), *R. ciffingeri*, Bœttg. (Kanshirei), *R. moltrichti*, Blgr. (Kosempo), and *Microhyla fissipes*, Blgr. (Kosempo and Kanshirei).

Tropidonotus sauteri.

Maxillary teeth 23, posterior feebly enlarged. Head small. Eye moderate. Rostral broader than deep, just visible from above; internasals as long as broad, shorter than the prefrontals; frontal once and a half as long as broad, a little longer than its distance from the end of the snout, much shorter than the parietals; loreal as long as deep; one præ- and three postoculars; temporals 1 + 1 or 1 + 2; seven upper labials, third and fourth entering the eye; four lower labials in contact with the anterior chin-shields, which are much shorter than the posterior. Scales strongly keeled, of outer row smooth or feebly keeled, in 17 rows. Ventrals 125-130; anal divided; subcaudals 78. Dark grey-brown above, with small black spots, with a rather ill-defined reddish-brown streak on each side of the back, bearing, on the anterior part of the body, a series of distant small whitish spots; upper surface of head with black vermiculation; an oblique whitish streak across each side of the nape; upper lip spotted black and white; lower parts yellowish white, with a black spot near the outer end of each ventral, these spots forming a strongly marked ventro-lateral series.

Two specimens, male (V. 125; C. 78) and female (V. 130; C. ?), from Kosempo.

Allied to *T. swinhonis*, Gthr.

Other snakes in the collection are:—*T. swinhonis*, Gthr. (Kosempo), *Calanaria pavimentata*, D. & B. (Kosempo), from which *C. berezowskii*, Gthr., is probably not specifically separable, and *Dipsadomorphus kraepelini*, Stejn. (Kankau, Kosempo).

LIX.—*Descriptions of Three new Frogs discovered by Dr. P. Kreffl in Usambara, German East Africa.* By G. A. BOULENGER, F.R.S.

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Phrynobatrachus krefftii.

Tongue with a conical papilla in the middle. Habit moderately stout. Snout short, rounded, scarcely projecting beyond the mouth; canthus rostralis indistinct; loreal region slightly concave; nostril equally distant from the eye and from the end of the snout; interorbital space as broad as the upper eyelid; tympanum distinct, two-thirds the diameter of the eye. Fingers moderately long, first shorter than second; toes moderate, two-thirds webbed; tips of fingers and toes dilated into small disks; subarticular tubercles small, feebly prominent; a small, narrow, feebly prominent inner metatarsal tubercle. The tibio-tarsal articulation reaches the nostril. Skin smooth. Brown above, with darker spots; a blackish cross-bar between the eyes, light-edged in front; limbs with rather indistinct dark cross-bands; lower parts whitish, belly and lower surface of limbs dotted with brown; a brown band across the throat; lower jaw edged with dark brown. Male with internal vocal sacs.

From snout to vent 40 mm.

Amani.

Arthroleptis xenodactylus.

Tongue without conical papilla. Head moderate, as long as broad; snout rounded, as long as the eye, with obtuse canthi and nearly vertical lores; nostril equally distant from the eye and from the end of the snout; interorbital space much broader than the upper eyelid; tympanum perfectly distinct, half the diameter of the eye. Fingers and toes moderate, dilated into small disks, which are produced into a short mucro, as in *Sooglossus sechellensis*, Boettg.; first finger shorter than second; toes with a slight rudiment of web; subarticular tubercles moderate; a small inner metatarsal tubercle; no tarsal tubercle. The tibio-tarsal articulation reaches between the eye and the tip of the snout. Brown above; loreal region dark brown; lower parts white, finely speckled with brown.

From snout to vent 17 mm.

Amani.

Hylambates vermiculatus.

Vomerine teeth in two small groups on a level with the posterior border of the choanae. Head broader than long, strongly depressed; snout rounded, as long as the eye; interorbital space broader than the upper eyelid; tympanum very distinct, two-thirds the diameter of the eye. Fingers moderate, with a mere rudiment of web; toes half-webbed; disks well developed; subarticular tubercles moderate; inner metatarsal tubercle rather small, oval, feebly prominent. The tibio-tarsal articulation reaches just in front of the eye. Skin smooth above, granular beneath. Green above, vermiculated with black; upper lip with black and white spots; flanks, upper arm, and sides of thigh black with large white marbling; fingers and toes barred black and white; lower parts white, belly with a few brown spots.

From snout to vent 34 mm.

Amani.

LX.—*Description of a new Characinid Fish from Mexico.*

By G. A. BOULENGER, F.R.S.

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Chirodon arnoldi.

Depth of body 3 times in total length, length of head 4 times. Body very strongly compressed. Snout shorter than eye, which is $2\frac{2}{3}$ times in length of head and equals width of slightly convex interorbital region; maxillary not extending quite to below anterior border of eye; lower jaw scarcely projecting. Dorsal II 9, originating just behind base of ventrals, and at equal distance from end of snout and from root of caudal; longest ray as long as head. Anal III 19. Caudal deeply forked. 32 scales in a longitudinal and 11 in a transverse series; lateral line reduced to 4 or 5 anterior scales. Yellowish above, finely speckled with black, silvery white beneath; a large round black spot on caudal peduncle, extending on base of middle rays of caudal; dorsal, ventrals, and caudal tinged with orange.

Total length 33 mm.

This new fish, the type of which has been presented to the British Museum, was received from Mr. J. Paul Arnold, who

wished me to describe it should I fail in its identification. It formed part of a series of freshwater fishes imported from Puerto Mexico, on the north coast of the Isthmus of Tehuantepec, which have been or are still living in Mr. Arnold's aquarium at Hamburg.

LXI.—*Descriptions of Four new Species of Land-Shell* from Natal and the Transvaal. By H. B. PRESTON, F.Z.S.

Helicarion subcornea, sp. n.

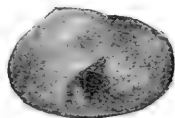
Shell thin, subcorneous, brownish yellow; whorls $3\frac{1}{2}$, rapidly increasing in size, the last considerably inflated, marked with indistinct arcuate lines of growth; sutures impressed, slightly crenulate, faintly margined; columella descending steeply in a gentle curve; peristome acute, arcuate, the margins joined by a light parietal callus extending into the interior of the shell; aperture broadly sublunate.

Alt. 12, diam. maj. 18 mm.

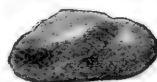
Aperture: alt. 10.5, diam. 10 mm.

Hab. Natal.

The present species may be compared with *H. ampliata*, M. & Pons., but has not the highly polished and glossy texture of that species; it is also of a much paler colour, and the surface is not malleated.



Helicarion subcornea.



Zingis rosenbergi.

Zingis rosenbergi, sp. n.

Shell depressed, dark straw-colour, horny; whorls $4\frac{1}{2}$, marked with lines of growth which are more accentuated just below the sutures, giving to this portion of the shell a wrinkled appearance; last whorl subcarinate; sutures impressed, slightly crenulate; base of shell polished; umbilicus narrow, deep, partly covered by the reflected columella; columella descending obliquely, curved below; peristome acute; aperture obliquely broadly lunate.

Alt. 9.5, diam. maj. 15.75 mm.

Aperture: alt. 6·5, diam. 7·5 mm.

Hab. Pietersburg, N. Transvaal.

Allied to *Z. crawfordi*, Melv. & Pons., from Natal, but smaller and more depressed, the last whorl is subcarinate, the umbilicus narrower, and the aperture more obliquely lunate than in that species; moreover, the columella is more curved and the puckering of the growth-lines below the sutures readily separates it from *Z. crawfordi*.

Subulina pietersburgensis, sp. n.

Shell elongately subulate, yellowish horn-colour; whorls 10½, the apical whorls submamillary, whitish, the later whorls somewhat convex, sculptured with coarse, arcuate, closely set, transverse striæ; sutures rather deeply impressed; columella slightly curved; peristome acute; aperture inversely auriform.

Alt. 15·75, diam. maj. 3·5 mm.

Aperture: alt. 2·75, diam. 1 mm.

Hab. Pietersburg, N. Transvaal.

The present species in some measure bears a resemblance to *S. linearis*, Krss., but it is higher and larger, possessing two whorls more, and is not of a glossy texture; the rather coarse sculpture and deeply impressed sutures, which are not margined, together with the curved columella and broader aperture, are also characters which separate it from that species.



Subulina pietersburgensis.



Subulina eulimoides.

Subulina eulimoides, sp. n.

Shell small, thin, yellowish white, subulate; whorls 7½, rather flat, the later whorls rapidly increasing in size; sutures impressed; columella descending vertically, arched above; peristome acute; aperture elongately ovate.

Alt. 8·75, diam. maj. 1·75 mm.

Aperture: alt. 1·5, diam. ·5 mm.

Hab. Howick, Natal.

Also bearing a resemblance to *S. linearis*, Krss., but smaller, more slender above, with the last whorl more inflated; the suture also, as in the last species, is not margined.

LXII.—*A Collection of Mammals from Northern and Central Mantchuria.* By OLDFIELD THOMAS.

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THE British Museum has acquired from Mr. Alan Owston a collection of small mammals made in Mantchuria by Orié, a Japanese, who collected at the same time the birds recently enumerated by Mr. Collingwood Ingram in the 'Ibis' *.

The majority of the specimens were obtained in the Khingan Mountains, at about an altitude of 3800 feet, at the point where the Siberian Railway cuts the range. The remainder were obtained in the neighbourhood of Chang Chun, in Kirin Province, on the Harbin-Port Arthur branch of the railway.

These Mantchurian mammals are of particular value to us as being from an intermediate locality between the Ussuri and Amur region, worked by Schrenck and others, and the Mongolian plateau, whence the Museum received the valuable series collected by M. P. Anderson and presented by the Duke of Bedford †.

As might be expected, many of the forms are intermediate in character between the Mongolian and Amur animals, and form intermediate but well definable subspecies.

The collection consists of about 100 specimens, belonging to 15 species, of which five prove to need description as local subspecies.

1. *Vespertilio murinus*, L.

♀. Chu Chia Tai, Kirin Province.

The size of this specimen is quite as in Scandinavian *murinus*, not as in the Chinese *superans*.

2. *Erinaceus amurensis*, Schrenck (?).

♀. Chang Chun, S. Mantchuria.

The inter-relationships of *E. amurensis*, Schrenck, *dealbatus*, Swinh., *orientalis*, All., *chinensis* and *ussuriensis*, Sat., need much more material for their elucidation. All are very closely allied, and owing to the almost complete ignoring by each writer of his predecessor's work, no trustworthy comparisons have been made between them.

* Ibis, (9) iii. p. 422 (1909).

† See P. Z. S. 1908, p. 104.

3. *Mustela alpina*, Gebl.

♀. Khingan Mts.

4. *Sciurus vulgaris mantchuricus*, subsp. n.

2 ♂, 3 ♀. Khingan.

Colour in winter pelage very dark blackish grey, with scarcely a trace of rufous (nearest to grey no. 4, Ridgway). A certain number of whitish or white-tipped hairs mixed with the grey. Ear-tufts well-developed, black. Tail very bushy, black, its inferior aspect nearly as uniformly dark as the superior, without tinge of rufous. Size very large, the skull conspicuously larger than in any other of the eastern races of *S. vulgaris*.

Dimensions of the type (measured in flesh):—

Head and body 250 mm.; tail 205; hind foot 61; ear 30.

Skull: greatest length 57; front of p^4 to back of m^3 9.6.

Type. Adult female. Original number 10. Collected 11th May, 1908.

The Khingan squirrel is readily distinguishable from its nearest allies, *S. v. calotus*, the Altai form, *rupestris* of Saghalien, and *orientis* of Hokkaido and Korea, by its markedly larger size, as indicated by its skull. In colour also it is of a much darker grey than any of them.

5. *Eutamias asiaticus*, Gm.

10 ♂, 11 ♀. Khingan Mts.

6. *Citellus mongolicus ramosus*, subsp. n.

3 ♂, 2 ♀. Chu Chia Tai, Kirin Province.

4 ♂, 3 ♀. Fan Chia Tun, Kirin Province.

Both places not far from Chang Chun, the junction of the Kirin branch of the Harbin-Port Arthur railway.

Colour as in *C. m. umbratus*, or even slightly darker; less distinctly speckled. Tail as bushy as in true *mongolicus*, that of *umbratus* far less so.

Dimensions of the type (measured in the flesh):—

Head and body 198 mm.; tail 68; hind foot 37.

Skull: condylo-basal length 43.5.

Type. Adult male. Original number 67. Collected 27th July, 1908, at Fan Chia Tun.

When I described *C. mongolicus umbratus**, from the

* P. Z. S. 1908, p. 970.

Mongolian plateau, I remarked on the shortness of its tail-hairs, but laid no stress on the character, supposing it to be due to season. But the present series was collected at exactly the same time of year (end of July and beginning of August), and it is now evident that the material difference in the bushiness of the tail is a genuine local character. The terminal tail-hairs of *umbratus* are 10–12 mm. in length, those of *ramosus* 16–20, as is also the case in the much paler typical *C. mongolicus*.

It seems probable that the plateau form *umbratus* may deserve to be separated specifically on account of its less bushy tail, while *ramosus* would remain as a darker eastern subspecies of *n. mongolicus*, inhabiting Southern Manchuria.

7. *Arctomys sibiricus*, Radde.

3 ♂ (adult and two young). Khingan Mts.

8. *Mus caraco*, Pall.

♀. Khingan Mts.

♂ (young). Chu Chia Tai, Kirin Province.

This would appear to be a short-footed Eastern representative of *M. norvegicus*, but the only adult specimen has lost its skull, so that I am unable to give any definite opinion about it.

9. *Mus wagneri manchou*, subsp. n.

♂, 2 ♀. Fan Chia Tun, Kirin Province.

6 ♂, 4 ♀. Chu Chia Tai, Kirin Province.

A still darker form than *mongolium* of the pale Central-Asian *M. wagneri*.

General colour above smoky drab, decidedly darker along the middle of the back. Under surface white, generally in marked contrast to the colour of the sides, but there is often a drabby suffusion over the belly, which sometimes even clouds the sharp definition of the upper and under sides. Proectote of ears a little darker than the head. Hands and feet dull white. Tail greyish drab above, lighter below.

Skull as usual.

Dimensions of the type (measured in the flesh):—

Head and body 85 mm.; tail 56; hind foot 16·5; ear 11·5.

Greatest length of skull 21·3.

Hab. (of type). Chu Chia Tai, Kirin Province.

Type. Adult female. Original number 89. Collected 22 August, 1908.

Going eastwards from the dry region of the Mongolian Plateau and Shensi, we get again a still darker form of the *Mus musculus* group than the one I named *M. wagneri mongolium* in 1908*. The specimens are quite uniformly darker, their sides being about as dark as are the central dorsal areas of the paler forms. The mice obtained by Mr. Anderson at the Imperial Tombs to the east of Peking are intermediate in colour as in locality.

All these mice would seem to be wild-living forms, not true house-mice.

10. *Cricetulus griseus fumatus*, subsp. n.

5 ♂, 1 ♀. Chu Chia Tai, Kirin Province.

♂ (young). Fan Chia Tun, Kirin Province.

Essential characters as in *C. griseus*, but the colour darkened throughout. General colour above between brocoli-brown and hair-brown of Ridgway. Black dorsal line heavier, more distinct, and carried forward more definitely on to the crown of the head. Under surface grey no. 8, the tips of the hairs grey no. 10.

Skull quite as in true *griseus*.

Dimensions of the type (measured in the flesh):—

Head and body 108 mm.; tail 29; hind foot 16.5; ear 16.

Skull: greatest length 28.5; upper molar series 3.8.

Hab. (of type). Chu Chia Tai, near Chang Chun, Kirin Province.

Type. Adult male. Original number 97. Collected 27 August, 1908.

This Manchurian race of the common striped hamster of N. China is readily distinguishable by the general darkening of its colour, and the greater development of its dorsal dark line.

11. *Evotomys rutilus*, Pall.

2 ♂, 3 ♀. Khingan Mts.

12. *Myospalax psilurus*, M.-Edw.

5 ♂, 5 ♀. Khingan.

The most careful comparison of these specimens with three examples of *M. psilurus* from between Peking and Tientsin, therefore practically topotypical, presented by Mr. E. B. Howell, fails to show the very slightest difference,

* P. Z. S. 1908, p. 106.

considerable as is the geographical distance between the two localities. Externally the colour, ordinary presence of frontal spots, and the proportions of the claws are alike in the two series, while the skulls and teeth appear to be identical in every detail. In size Mr. Howell's specimens are a little smaller than those from Khingan, but the typical skull in the Paris Museum, which I have myself measured, is exactly as in average specimens from the latter place.

13. *Lepus timidus*, L.

♀. Khingan, April 1908.

In changing pelage.

14. *Ochotona (Pika) hyperborea mantchurica*, subsp. n.

7 adult and 3 young specimens. Khingan.

Most allied to *O. hyperborea cinereo-fusca*, Schrenck, of which the Museum possesses a summer skin from the Kentei Mts. and a winter one from the Ussuri, both collected by Dörries.

Size decidedly larger, the skulls uniformly larger than those representing *cinereo-fusca*.

In winter pelage (hair of back about 18 mm. in length) the upper surface is near "broccoli-brown" of Ridgway, becoming clearer grey on the head and fore back, and warmer—near "clay-colour"—on the rump. In an Ussuri specimen in the same pelage the crown and back are washed with russet-brown, only the nape being clearer grey. Under surface dull whitish with a wash of clay-colour, the bases of the hairs slaty as usual.

Summer pelage (fur about 12 mm. in length) between "cinnamon" and "russet," that of *cinereo-fusca* being nearly true "russet." Sides and belly paler cinnamon, the latter verging into "ochraceous buff."

Dimensions of the type (measured in flesh):—

Head and body 178 mm.; hind foot 28·5; ear 18.

Skull: upper length 43·4; condylo-basal length 41; greatest breadth 22; nasals 14·2; interorbital breadth 4·3; breadth of brain-case 17; palatilar length 15·5; palatal foramen 6·4; upper tooth-series (alveoli) 8·1.

Type. "Male." Original number 23. Killed 18th May, 1908.

These Pikas form an interesting series just covering the change of pelage from the winter coat (specimen killed 18 May) to the summer (June 23), the other specimens showing intermediate phases between the two. Our Dörries

specimens from the Kentei and Ussuri, representing Schrenck's "*Lagomys hyperboreus*, var. *cinereo-fusca*," are without dates, but the present series enables me to determine them with confidence as being respectively summer and winter examples of one form.

This animal would appear to be not more than subspecifically distinguishable from *cinereo-fusca*, and as Schrenck considered that a variety of *hyperborea* I do the same for the present form; but the intergradation with the Tschuktschi Pika may hereafter prove to be broken, and the Amur and Manchurian forms to be worthy of specific separation from the more northern species.

15. *Capreolus bedfordi*, Thos.

♀ and two young. Khingan Mts.

LXIII.—On the Regular Hexactine Spicule of Hexactinellida.
By R. KIRKPATRICK.

THE regular hexactine spicule characteristic of Hexactinellid sponges has three axes crossing at right angles through a common centre and corresponding with the axes of the regular crystalline system; but the silica of which the spicule is composed is isotropic and amorphous. What is the meaning of the form of the regular hexactin*? Is it due to purely organic causes, or is its shape influenced by its mineral characters; or do both of these factors contribute? Further, if its form is due to biological causes, how have they fashioned the regular hexactine shape? Before attempting to suggest an answer to these questions I will refer to theories already put forward by Schulze and Minchin.

The typical Hexactinellid sponge is a cup-shaped lamina with a central layer of thimble-shaped flagellated chambers suspended between an outer dermal and an inner gastral layer of delicate network. Schulze † was of opinion that the regular hexactine spicule came into existence because it was adapted to support the thimble-shaped flagellated chambers.

Minchin ‡ has stated his belief that the spicules arose before the flagellated chambers were formed, that the stauractin preceded the hexactin, and that the symmetry of these two

* I use the term actine as an adjective, and actin as a substantive.

† 'Challenger' Report. Hexactinellida, 1887, p. 504.

‡ "A Speculation on the Phylogeny of the Hexactinellid Sponges," Zool. Anzeiger, 1905, xxviii. p. 439.

forms resulted from the mineral properties of the silica. Later *, he thought it might be possible, by accepting a modification of Marshall's theory of silicification of circular and longitudinal strands of sarcode (Z. wiss. Zool. xxvii. p. 116), "to find a phylogenetic explanation for the origin of the rectangular symmetry without having recourse to supposed crystalline structure, for which there is no evidence, in the siliceous material."

My own view is that the shape of the regular hexactin is due to biological causes, that the form arose primarily to support strands of the network and not to uphold flagellated chambers, and that the coincidence of the axes with those of a regular crystalline system is, literally, a coincidence.

Schulze † thinks that there is not sufficient evidence to prove that purely stauractinophoran sponges existed; for the supposed stauractins may be reduced hexactins (apparently as in the autodermlia of the primitive thin-walled *Bathydorus fimbriatus*, F. E. Sch.), or distal rays of hexactins might have been broken off, or hexactins, though not hitherto observed, may be present. Again, the fact that autodermal stauractin megascleres are the first spicules to appear in the larva of *Vitrolulla*, may, as Ijima observes (Contrib. iv. p. 52), be entirely devoid of phylogenetic significance.

Minchin considered that a homocœlous condition must have preceded the heterocœlous, and that the inner ray of a hexactin, if present, would inconveniently penetrate an unfolded collar cell layer, that a square-meshed network would form convenient spaces for the first outfoldings of the choanosomal layer, and that, as the flagellated chambers arose, radial rays would be added on to the nodes of the tangential rays, just as quadriradiates arise from triradiates in *Calcarea*; but this hypothesis would not account for the existence of gastroosomal micro-hexactins.

In recent Hexactinellida the hexactins are found not only in the dermatosome, but also in the gastrosome, where there can be no question of supporting the convex ends of thimble-shaped flagellated chambers, but every need for keeping open the meshes of the trabecular network. Possibly the distinction between megascleres and microscleres first arose when the choanosome was thrown into folds; some of the micro-hexactins would become macrohexactins, and, later, flexible diactins; but, at first, in a well supported dermal reticulum the *membrana reticularis* possibly could take care of itself.

* "Sponge-Spicules," *Ergeb. Fortschr. Zool.* 1909, p. 268.

† 'Valdivia' Hexactinellida, 1904, p. 170.

The characteristic feature of the Hexactinellid sponge, which must have existed before stauractine or hexactine spicules arose, and which probably conditioned the shape of those spicules, is the dermal* syncytial network.

If purely stauractine sponges existed, it was because this network would be extremely thin at first, and Nature would have the problem of forming a practically—not, of course, mathematically—two-dimensional scaffolding (*i. e.* stauractine). When in course of time the network grew thicker, a three-dimensional scaffolding would become necessary.

It has been supposed that the biological conditions, which would account for the existence of the regular hexactine form, do not occur, because the meshes of the trabecular network are of all shapes. It seems to me that these conditions do actually exist. Nature has a very elusive material to deal with in the case of the fluent and contractile syncytium of the Hexactinellid sponge, and it would be impracticable to construct a scaffolding that would exactly follow the protean form of a syncytial network.

In the Hexactinellid sponge, it is not necessary to look for a perfectly regular network of protoplasmic strands to account for a similarly regular network of supporting scaffolding; the protoplasmic strands of syncytium need only loosely drape the supporting rods; they may fill in the sharp corners, form subsidiary meshes in the cubical compartments, and lastly prod out the walls of the cubicle with spandrils or end rays. For the support of three-dimensional spaces of a network, the most economical and efficient scaffolding is the cubical one. The selected sclerite has been one with six rays at right angles, giving support in the direction of length, breadth, and depth.

Nature, having selected the hexactin, has certainly stereotyped her pattern in a wonderful manner. It is always a surprise to see the axis-cross persisting in long slender diactine and even in monactine spicules, such as the distal pronged knob of root-tuft spicules of *Hyalonema*. No wonder we are led to account for such phenomena by calling in the mysterious molecular forces of crystallisation in place of, or in aid of organic forces acting *en masse*.

We find, however, that Nature readily adapts her methods to the changing requirements. As I have already endeavoured to prove†, when it becomes a question of supporting concentric laminae of reticulum, the two tangential axes essential in a

* Dermal, as contrasted with gastral, and including dermatosome and gastrosome.

† Ann. Mag. N. H. 1909, (viii.) vol. iv. p. 479.

three-dimensional structure are dispensed with, and the one-dimensional prop or standard (amphidisk) is brought into requisition. Although the amphidisk is probably a reduced hexadisk, the axis-cross representing the aborted rays is not in evidence, so completely has the triaxial character been suppressed.

If the coincidence of the primary axes of the spicule with those of the regular system can be accounted for on grounds of selection of a form adapted to maintain the patency of a meshwork, certain cases of coincidence with secondary planes of symmetry are easily explained.

The true microhexactin of *Hyalonema divergens*, F. E. Sch., and the monoxyhexaster of *Bathydorus uncifer* are both of approximately the same shape, *i. e.* with rays meeting at right angles in a common centre, and with curved ends lying in secondary planes of symmetry. In the case of *Hyalonema*, the spicule is a true microhexactin with axial canals running to the very points of the rays; in the monoxyhexaster, the axial canals only extend a short distance from the centre. Along with the monoxyhexasters are hemioxyhexasters with some main rays ending in more than one end ray; and there is no reason to doubt that the monoxyhexasters are reduced from such forms, and that the curved ends are merely deflected spines or end rays. Whatever theory one may adopt concerning the micro-hexactins of *Hyalonema*, it is difficult, in view of the probable history of the spicules, to believe that the incidence of the ends of the rays of the monoxyhexaster of *B. uncifer* in secondary planes of symmetry is anything more than the result of the stresses and strains of the strands of contractile meshwork. Similarly, as Schulze has shown, the pointing of the rays of the discoctaster to the angles of a cube simply results from centripetal pressure suppressing the main rays of a hexaster and pressing back the scleroblastic end rays (2, 3, 4 or many) till they fuse with neighbouring rays into secondary main rays; this incidence of axes in lines pointing to angles of a cube is a pure coincidence; frequently "supernumerary thorns" fail to become fused and do not point to the angles of the cube.

Summary. Reasons are given for the belief:

(1) That the regular hexactine spicule was primarily formed in Hexactinellid sponges as being the most economical and efficient * means for supporting the strands of a syncytial network; for, in the gastrosome at any rate, the microscleres would be useless for upholding the body or

* The human architect, also, has found that the regular hexactin is the most convenient form of spicule for constructing his dictyonine

flagellated chambers, but most efficient for the vitally important function of keeping open the meshes of the dermal network :

(2) That the geometrical forms of cubes, squares, or lines (hexactins, stauractins, amphidisks) arise in correspondence with the requirements for supporting cubical spaces, surfaces, or concentric laminæ :

(3) That the support of flagellated chambers and of the body as a whole was a later need, and was effected by the development of microscleres into parenchymal and auxiliary surface macroscleres :

(4) That the identity of axes of the regular hexactin with those of the regular crystalline system is a coincidence, the real determining factor of the shape being a biological one : the axes of a geometrical system are pure abstractions. The concrete organic filament of the regular hexactin round which alternating layers of spiculin and silex are formed is nothing more than a model of those abstractions. (It is not implied, however, that the cylindrical shape of the axial tubes is to be regarded as an argument against the crystal theory ; for crystals may have curved surfaces.)

LXIV.—*Descriptions of Oriental Capsidæ.*

By W. L. DISTANT.

[Continued from p. 454.]

Hyalopeplus clavatus, sp. n.

Head, pronotum, scutellum, and corium bronzy ochraceous ; head with three longitudinal black lines, the lateral ones converging anteriorly ; antennæ with the basal joint bronzy ochraceous, with a more or less distinct piceous line beneath, second joint black, with its base ochraceous (remaining joints mutilated in typical specimens) ; pronotal collar with the margins and three longitudinal lines black, the central line more prominent, posterior pronotal margin and the posterior angles black ; clavus with the inner and outer margins and the suture black ; corium with the costal marginal area paler and bordered on each side with black, veins piceous ; mem-

scaffoldings. He resorts to the method of splicing with rope his radial and tangential axes (standards, putlogs, and ledgers), because, when separated, they are easier to transport in bundles.

brane pale olivaceous, subhyaline, the basal area reflecting the darker abdomen beneath, the cellular margins black; body beneath, rostrum, and legs ochraceous; antennæ with the basal joint moderately thickened and a little longer than head, second joint slightly thickened and nearly four times as long as first; rostrum reaching the posterior coxæ; pronotum with the anterior area subgranulose, the posterior area transversely striate and centrally longitudinally impressed, posterior angles slightly straightly prominent; scutellum with the disk very finely transversely striate.

Length 10 mm.

Hab. Bengal; Lebong, 500 feet (*Lefroy*).

Differs from *H. spinosus*, Dist., by the less produced posterior pronotal angles; and from *H. vitripennis*, Stål, by the absence of the linear pronotal markings, different colour of antennæ, &c.

DIOPHANTUS, gen. nov.

Head somewhat large, longer than broad, the lateral margins slightly sinuate, centrally slightly longitudinally ridged; eyes large, a little obliquely directed backward; antennæ with the first joint scarcely as long as head, second about three times as long as first, first and second longly pilose, third and fourth slender, third about half the length of second and distinctly longer than fourth; rostrum reaching the posterior coxæ; pronotum nearly twice as broad at base as long, the basal margin convex and about two and a half times as broad as anterior margin, transversely impressed near anterior margin, and behind this impression two transverse callosities, lateral margins oblique; scutellum triangular; corium (including cuneus) a little longer than posterior coxæ, the costal margin slightly convex; cuneus broad, elongately triangular, the basal margin towards inner apex obliquely deflected to membrane; membrane passing abdominal apex, with a short subquadrate posteriorly subtruncate cell, to which is attached a smaller inner cell; legs of moderate size and length; posterior tarsi with the first and second joints subequal in length; body and legs thickly, more or less longly pilose.

In the Indian enumeration I place this genus between *Paracalcoris* and *Calocoris*.

Diophantus literatus, sp. n.

Body above brownish ochraceous, thickly, somewhat longly pilose; cuneus castaneous, its basal margin ochraceous; head with a central longitudinal line and the eyes black; antennæ

ochraceous, apex of second joint and the third and fourth joints piceous; pronotum with the extreme basal margin paler and with a small black spot at each posterior lateral angle; scutellum and the interior area of corium distinctly darker in hue; membrane fuscous, beyond middle mottled with greyish, the basal area reflecting the dark abdomen beneath; body beneath and legs pale ochraceous, mesosternum laterally piceous, legs annulated with fuscous; pronotum finely transversely wrinkled and punctate; scutellum punctate; other structural characters as in generic diagnosis.

Length $5\frac{1}{2}$ mm.

Hab. Ceylon; Ohiya (*Green*).

Calocoris rama, sp. n.

Above bright, shining, pale olivaceous green; body beneath and legs paler; antennæ black, the basal joint olivaceous green; eyes black; membrane fuscous, with a grey spot near apex of cuneus, a little darker on basal area; rostrum ochraceous, its apex black and reaching the intermediate coxæ; antennæ with the basal joint about as long as head, second joint about three times as long as first and obscurely palely annulate near base; head rather elongate anteriorly; pronotum with two small transverse callosities near anterior margin, which is ridged; corium with the costal marginal area a little paler in hue and with cuneus a little longer than posterior tibiæ; tibiæ setose; tarsi apically black.

Length $5\frac{1}{2}$ mm.

Hab. Dairijiling.

Lygus ostensus, sp. n.

Head and pronotum ochraceous; antennæ and eyes black; scutellum black; clavus and inner area of corium black, base of clavus and costal and lateral areas of corium ochraceous; cuneus castaneous; membrane pale fuscous, subhyaline, the base blackish by reflecting the dark abdomen beneath; head beneath, sternum, and legs ochraceous; abdomen beneath black, with the basal angles ochraceous; femora obscurely annulated with brownish; antennæ with the basal joint about as long as head, second joint about twice as long as first; pronotum with two transverse concolorous callosities behind anterior margin; hemelytra very obscurely shortly pilose; membrane longly passing abdominal apex; apices of tarsi black.

Length $3\frac{1}{2}$ –4 mm.

Hab. Calcutta (Ind. Mus.).

Allied to *L. pubens*, Dist.

Lygus patrius, sp. n.

Head, pronotum, scutellum, and corium ochraceous; eyes, apex of clavus, two transverse spots to corium (one before, the other behind middle), and a basal spot and extreme apex to cuneus black or blackish; membrane pale fuscous, subhyaline, the basal area blackish by reflecting the dark abdomen beneath; body beneath and legs ochraceous; intermediate and posterior coxæ and bases of femora and abdomen (excluding apex) black; femora obscurely testaceously annulate, tibiæ obscurely fuscously annulate; antennæ ochraceous, the base and nearly the apical half of second joint black, third and fourth joints very pale fuscous, first joint about as long as head, second about twice as long as first; membrane longly passing the abdominal apex.

Length 4 mm.

Hab. East Himalayas; Kurseong.

Lygus anandalei, sp. n.

Head reddish ochraceous, the eyes fuscous brown; antennæ with the first and second joints ochraceous, apical third of second joint black, third and fourth joints pale fuscous; pronotum pale ochraceous, slightly tinged with virescent, the basal area blackish with the exception of the extreme basal margin; scutellum and clavus black; corium very pale ochraceous, subhyaline, the costal membrane a little darker, a transverse dark castaneous spot at inner posterior angle; cuneus with the lateral and posterior margins and a small spot near its inner base dark castaneous; membrane hyaline, transversely trifasciately mottled with pale fuscous; body beneath and legs pale ochraceous, pro- and mesonota with a sublateral black fascia, abdominal apex castaneous, centrally black; antennæ with the basal joint slightly shorter than head, second joint more than twice as long as first, third little more than half as long as second, but much longer than fourth; pronotum with two transverse callosities near anterior margin; corium shortly obscurely pilose; membrane longly passing the abdominal apex; apices of the tarsi black.

Length $3\frac{1}{2}$ mm.

Hab. L. Bengal; Sonarpur.

Lygus costatus, sp. n.

Head ochraceous, the apex and eyes black; antennæ with the first and second joints ochraceous, apical area of the second black, third and fourth joints pale piceous; pronotum

ochraceous, the disk frequently discoloured; scutellum ochraceous; corium ochraceous, its disk paler and obscurely greyish; inner claval margin (broadly), margins of claval suture, costal margin, and a spot at base and apex of cuneus black; membrane brownish ochraceous, with darker mottlings, the basal area darker by the reflection of the abdomen beneath; body beneath and legs ochraceous, disk of mesonotum and a spot at base of abdomen black; basal joint of antennæ about as long or very slightly shorter than head, second joint a little more than twice as long as first; pronotum with two transverse callosities behind the anterior margin; scutellum moderately tumid; corium obscurely, thickly, shortly pilose; membrane considerably passing the abdominal apex; tibial spinules and apices of the tarsi black.

Var.—The black inner margin to clavus occupying the greater part of its area and the costal black margin considerably widened towards apex.

Length 5 mm.

Hab. Nepal; Chonebal, Katamandu (Ind. Mus.).

Lygus gemellus, sp. n.

Ochraceous, possibly virescent in living or fresh specimens, eyes black; antennæ greenish ochraceous, apex of the second and the whole of the third and fourth joints pale fuscous; cuneus with the apical area a little paler and the apical angle black; membrane subhyaline, mottled with pale brownish; femora obscurely annulated with pale brownish near apices; antennæ with the basal joint scarcely as long as head, second joint more than twice as long as first, third considerably shorter than second and longer than fourth; pronotum very finely wrinkled and with two small obscure transverse callosities near anterior margin; scutellum moderately tumid; corium and clavus distinctly finely pilose, corium appearing paler on marginal areas where the abdomen is not reflected beneath; membrane longly passing the abdominal apex; rostrum with the apex black and very shortly passing the posterior coxæ; apices of the tarsi black.

Length 5 mm.

Hab. Kumaon; Bhim Tal (*Annandale*); Darjiling; Pus-sumbing, 4700 feet (*Mann*).

Allied to *L. viridanus*, Motsch.

In some specimens the apical angle of the cuneus is colorous, not black.

Lygus valerius, sp. n.

Head reddish ochraceous, its apex and the eyes black; antennæ with the first and second joints black, third and fourth pale brownish, base of third ochraceous; pronotum ochraceous, the anterior and lateral margins pale reddish ochraceous, behind the anterior margin two transverse black callose spots; scutellum, corium, and cuneus black; membrane pale fuscous subhyaline, basal area darker, reflecting the dark abdomen beneath; body beneath black, lateral areas of the sternum reddish ochraceous; legs ochraceous, the basal areas and annulations to the apical areas of the femora piceous or black; antennæ with the basal joint about as long as head, second about twice as long as first; eyes prominent and projecting beyond the anterior margin of the pronotum; scutellum foveately impressed at base; hemelytra obscurely, shortly, palely pilose; apices of the tarsi black.

Length 3 to $3\frac{1}{2}$ mm.

Hab. Kumaon; Bhim Tal, 4500 feet (*Annandale*).

Allied to *L. catullus*, Dist.

Lygus devinctus, sp. n.

Head ochraceous or pale castaneous, with the apex and the eyes black; antennæ with the basal joint ochraceous or pale castaneous, second joint black, third and fourth fuscous, base of third ochraceous; pronotum pale ochraceous, with two transverse black callose spots behind the anterior margin; scutellum black; corium ochraceous, clavus with an inner black fascia, widened posteriorly, but not occupying the apical angle, corium with a large transverse black spot beyond middle; cuneus black, its basal margin ochraceous; membrane pale fuscous, subhyaline, its basal area blackish by reflecting the dark abdomen beneath; body beneath black; prosternum, rostrum, and legs ochraceous, femora obscurely annulated with brownish, their bases black or piceous, apices of the tibiæ and tarsi narrowly black, in some specimens the anterior tibiæ are centrally obscurely darkly annulate; antennæ with the basal joint as long as head, second joint about twice as long as first; cuneal fracture profound; membrane longly passing the abdominal apex.

Length 4 mm.

Hab. Nepal; Soondrijal (Ind. Mus.).

THERMUS, gen. nov.

Head a little broader than long, the anterior margin longly

pilose; eyes transverse, passing the anterior margin of the pronotum; antennæ with the basal joint slightly thickened, a little longer than head, somewhat longly pilose, second joint four times as long as first, third almost half as long as second and nearly twice as long as fourth; pronotum about twice as broad as long, coarsely punctate, anteriorly declivous, the lateral margins a little roundly oblique; mesonotum exposed; scutellum subtriangular; corium with cuneus about as long as the second joint of the antennæ; cuneus elongately angulate; membrane longly passing the abdominal apex with two short, posteriorly truncate cells, the outermost smaller; posterior femora very strongly thickened, shorter than the tibiæ, attenuated towards apices; tibiæ spinulose; rostrum reaching the posterior coxæ, with the first joint shorter than the second.

Thermus adumbratus, sp. n.

Head dull ochraceous, with three transverse fasciæ (one basal, one central, and the other apical) and a central longitudinal fascia sanguineous; antennæ ochraceous; pronotum dull ochraceous, a sublateral fascia on each side, a transverse fascia before middle, and a central longitudinal fascia (not reaching base) sanguineous; scutellum dull ochraceous, the lateral margins sanguineous; corium dull ochraceous, with the margins sanguineous, the inner and outer margins preceded by small greyish spots, the apical margin broadest, costal margin (excluding apex) pale ochraceous, clavus greyish, thickly spotted with brownish; cuneus pale ochraceous, the outer margin and apex sanguineous and with a small fuscous spot near base; membrane pale fuscous, the margins of the cells sanguineous; body beneath and legs pale ochraceous, lateral areas of the sternum and abdomen moderately infuscate; posterior femora with their apical halves more or less sanguineous; structural characters as in generic diagnosis.

Length 4 mm.

Hab. Ceylon; Maskeylina (*G. B. de Moubray*).

SAPINIUS, gen. nov.

Head somewhat small, perpendicularly deflected, subtriangular, the lateral margins rounded, eyes broad, narrow, transverse, projecting beyond the anterior margins of the pronotum; antennæ with the basal joint moderately thickened, longer than head, second joint more than three times longer than first, third about half as long as second and considerably longer than fourth; rostrum reaching the posterior

coxæ; pronotum strongly declivous anteriorly, about twice as broad at base as long, the lateral margins oblique, the posterior margin somewhat convex, the posterior lateral angles subprominent; scutellum triangular, the basal angles a little callose; clavus, corium, and cuneus thickly pilose, corium (excluding cuneus) about as long as second joint of antennæ; cuneus elongately subtriangular; membrane longly passing the abdominal apex and with a basal, slightly curved, posteriorly truncate cell; legs moderate, posterior femora not prominently thickened, posterior tarsi with the basal joint longest.

Sapinnius fidelis, sp. n.

Head ochraceous, longitudinally pale sanguineous before each eye; eyes black; antennæ pale ochraceous; pronotum ochraceous, with four longitudinal, slightly curved, pale sanguineous fasciæ; scutellum ochraceous, with basal pale sanguineous markings; corium and clavus pale brownish ochraceous, the corium with the lateral areas irregularly pale ochraceous, cuneus with nearly the inner half pale brownish, the remaining area pale ochraceous; membrane hyaline, at base reflecting the dark abdomen beneath; body beneath pale sanguineous; legs pale ochraceous, posterior femora tinted with pale sanguineous; structural characters as in generic diagnosis.

Length 5 mm.

Hab. Ceylon; Madulsima (*Bainbrigge-Fletcher*, Brit. Mus.).

Camptobrochis exornatus, sp. n.

Head pale greenish ochraceous; eyes and first and second joints of antennæ black (third and fourth joints of antennæ mutilated in typical specimen); pronotum pale greenish ochraceous, two small spots behind the anterior callosities, a larger spot at each posterior angle, and two subbasal transverse linear streaks black; corium pale greenish ochraceous, an obscure macular patch on clavus, two small longitudinal linear, and a transverse linear spot at apex of corium, black; cuneus very pale greenish ochraceous, the inner and outer lateral margins and apical point black; membrane pale fuscous hyaline, with darker mottlings and the basal area black by reflecting the dark abdomen beneath; body beneath and legs pale greenish ochraceous, femora with two black linear annulations near apex; rostrum with the apex black and reaching the intermediate coxæ; apices of the tarsi black; antennæ with the basal joint almost as long as head, second

joint about twice as long as first; pronotum (excepting the anterior transverse callosity) somewhat coarsely punctate; clavus coarsely, corium less coarsely punctate, costal margin impunctate; membrane longly passing the abdominal apex.

Length 6 mm.

Hab. Mussoorie.

Camptobrochis qualis, sp. n.

Head and pronotum ochraceous, head suffused with sanguineous; eyes black; antennæ with the first and second joints ochraceous, extreme apex of second and the whole of third and fourth joints piceous; pronotum with two transverse callosities near anterior margin and a subbasal linear margin sanguineous; rostrum ochraceous; corium ochraceous, the clavus and apical area of corium sanguineous; cuneus sanguineous, its basal margin pale ochraceous; membrane hyaline, the cellular margins a little darker; body beneath, rostrum, and legs ochraceous; mesosternum and apical areas of femora (more or less) sanguineous; abdomen with a sublateral series of small black spots, in a second specimen these are only faintly visible; antennæ with the first joint a little shorter than head, second nearly twice as long as first; pronotum coarsely punctate and slightly wrinkled, anteriorly deflected; clavus thickly punctate, corium punctate, the outer area almost impunctate; membrane longly passing the abdominal apex; rostrum with its apex black and just passing the intermediate coxæ.

Length $4\frac{1}{2}$ mm.

Hab. Simla Hills; Theog, 8000 feet (*Anandale*).

PACORUS, gen. nov.

Allied to *Camptobrochis*, but with the first joint of the antennæ considerably longer than the head, second joint about twice as long as first and distinctly setose; pronotum twice as broad at base as long and three times as broad as anterior margin; scutellum broad, the basal margin much longer than the lateral margins; corium very broad, excluding cuneus about as long as posterior tibiæ; cuneus with its posterior margin nearly twice as long as its lateral margin; posterior tarsi with the first and second joints subequal in length.

Pacorus politus, sp. n.

Head and pronotum ochraceous, the latter somewhat discoloured on disk and with its posterior margin distinctly

paler; eyes piceous; antennæ with the first joint black, the second ochraceous, with its apex black (remaining joints mutilated in typical specimen); scutellum stramineous, with a broad, central, longitudinal black fascia; corium black, base of costal margin dull ochraceous; cuneus pale stramineous, its inner angular area and apex piceous; membrane hyaline, slightly fuliginous, cellular margins and basal area (reflecting the dark abdomen beneath) blackish; sternum and abdomen beneath black; head beneath, rostrum, anterior and lateral margins of prosternum, and the legs ochraceous, posterior femora black, tibiæ biannulated with fuscous near base; head longer than broad, basal joint of antennæ considerably longer than head, second joint about twice as long as first and finely setose; pronotum coarsely punctate, with a transverse anterior callosity; clavus and corium thickly finely punctate; rostrum reaching the posterior coxæ.

Length 5 mm.

Hab. Kurseong.

Gismunda modesta, sp. n.

Brownish ochraceous; antennæ with the basal joint brownish ochraceous, second joint ochraceous, with its apical half black and moderately thickened, third joint brownish, its base ochraceous; head strongly deflected in front of eyes; antennæ with the first joint about as long as head, second a little more than twice as long as first, its apical half distinctly incrassate and pilose; rostrum reaching the posterior coxæ*; pronotum short, transverse, strongly deflected, moderately coarsely punctate; scutellum slightly tumid; corium shortly but not prominently pilose, and thickly, finely punctate on about interior half, clavus thickly, coarsely punctate; cuneus broader than long, its apex subacute; membrane pale fuliginous, with darker mottlings, the cellular areas pale fuscous, longly passing the abdominal apex; tibiæ finely spinulose.

Length 5 mm.

Hab. Darjiling, 6000 feet.

To be separated from *G. chelonia*, Dist., by its unicolorous lue, much less pilose corium, less tumid scutellum, &c.

THAUMATURGUS, gen. nov.

Head strongly almost perpendicularly deflected, subtriangular, the lateral margins a little sinuate, the apex obtusely

* In the description of this genus for "rostrum about reaching the intermediate coxæ" read "*posterior coxæ*."

angulate, eyes moderately projecting beyond and slightly behind the anterior margins of the pronotum; antennæ with the first joint considerably shorter than head, second joint about three times as long as first, its apical area distinctly thickened, third and fourth joints subequal in length and together shorter than second; rostrum not quite reaching the intermediate coxæ; pronotum subquadrate, broader than long, the lateral margins moderately oblique, the anterior margin about one-fourth narrower than the posterior margin; scutellum subtriangular, centrally, longitudinally, irregularly gibbous; corium thickly, shortly pilose, with cuneus a little longer than the posterior tibiæ, the lateral margins concavely sinuate, distinctly broadened at apex; cuneus short and broad; membrane passing the abdominal apex; legs somewhat long and slender, the femora moderately thickened, the posterior tibiæ straight.

Allied to *Pilophorus*, Hahn.

Thaumoturgus typicus, sp. n.

Black; third joint of antennæ with the basal half pale stramineous; clavus and the corium (excluding apical area) thickly, finely, palely pilose, a short, white, oblique, transverse line near middle of costal area and a continuous, curved, transverse, white line crossing corium and apex of clavus before the apical area of corium; membrane fuliginous, the basal area darker by reflecting the abdomen beneath; body beneath black; femora castaneous, tibiæ fuscous, apex of anterior tibiæ, apical half of intermediate tibiæ, and base and apex of posterior tibiæ pale ochraceous, tarsi pale ochraceous, their apices black; structural characters as in generic diagnosis.

Length 3 mm.

Hab. Calcutta (Ind. Mus.). Ceylon; Peradeniya (*Green*).
On chrysanthemum (*C. A. Pavia*).

SILANUS, gen. nov.

Head much longer than broad, anteriorly obtusely angularly produced before bases of antennæ; eyes adpressed, their posterior margins not quite reaching base of head; antennæ with the first joint (excluding base) a little thickened, shorter than head, second about twice as long as first, third and fourth joints short, together about as long as first; rostrum reaching the posterior coxæ; pronotum broader than long, the anterior margin scarcely half as broad as the posterior

margin, which is truncately sinuate, exposing the mesonotum, the anterior margin carinate, transversely impressed before middle, the lateral margins concavely sinuate; scutellum triangular, moderately tumid; corium (including cuneus) as long as posterior tibiæ, cuneus small, broader than long; membrane passing the abdominal apex, and with a basal, anteriorly truncate cell; legs somewhat long, posterior femora a little curved at base, all the femora distinctly but moderately thickened; posterior tarsi with the first joint shorter than the second.

In the enumeration of the Capsidæ of British India this genus is placed near *Tyraquellus*, Dist.

Silanus præfectus, sp. n.

Head, antennæ, thorax, and scutellum black; corium brownish ochraceous, a small marginal spot at base and a larger marginal spot before cuneus ochraceous; clavus darker and more fuscous in hue; cuneus brownish ochraceous, outwardly castaneous; membrane fuliginous; head beneath and sternum black; abdomen beneath piceous; femora black, apices of posterior femora ochraceous; rostrum, tibiæ, and tarsi brownish ochraceous, apex of rostrum black; head granulose, with a pale, central, longitudinal spot at base; pronotum punctate and shortly, palely pilose; clavus and corium thickly, palely pilose; other structural characters as in generic diagnosis.

Length 4 mm.

Hab. Ceylon; Peradeniya (*Green*).

Nicostratus diversus, sp. n.

Head and pronotum fuscous brown, eyes black; antennæ black, basal joint brownish ochraceous, bases of third and fourth joints stramineous; scutellum piceous, with the lateral margins stramineous; corium black, clavus and corium crossed by a transverse white fascia near apex of scutellum; cuneus black, membrane dark piceous; head beneath, sternum, and legs brownish ochraceous, intermediate and posterior coxæ and bases of femora whitish, apices of tibiæ and the tarsi pale ochraceous, apices of tarsi black; abdomen beneath black, with the base and a central longitudinal line ochraceous; antennæ somewhat stout, basal joint much shorter than head, second about three times as long as first, third longer than fourth, third and fourth together almost as long as second; rostrum passing the anterior coxæ; pronotum globosely tumid, deflected anteriorly,

where it is strongly constricted and behind a narrow anterior collar armed with two strong divergent spines; scutellum developed in a strong robust upright tuberculous spine; cuneus posteriorly deflected; membrane considerably passing the abdominal apex.

Length 4 mm.

Hab. Orissa.

ABIBALUS, gen. nov.

Head longer than broad, globose, anteriorly broadly convex, eyes a little exserted, nearer to anterior margin than to base, behind eyes moderately obliquely attenuated; antennæ with the first joint slightly longer than head, second more than twice as long as first, third joint about two-thirds the length of second and a third longer than fourth; rostrum reaching the posterior coxæ; pronotum longer than broad, anterior margin about half the breadth of posterior margin, posterior margin concave, exposing the mesonotum, lateral margins concavely oblique; scutellum small, subtriangular; corium including cuneus very slightly longer than posterior tibiæ, excluding cuneus nearly three times longer than broad; cuneus elongate, much longer than broad; membrane large, about as long as corium without the cuneus, a somewhat long cell on basal area; legs finely spinulose, all the tibiæ subequal in length; posterior tarsi with the basal joint longest.

Abibalus regulus, sp. n.

Head, pronotum, and scutellum black; anterior margin of pronotum and a lateral fascia on each side of scutellum pale ochraceous; corium brownish ochraceous, a large spot near base, an elongate costal spot before cuneous, and some smaller irregular spots near membranous margin, greyish-white, clavus darker, with the margins greyish white; membrane pale fuliginous, the cellular margins darker; body beneath black; legs and rostrum pale ochraceous; apical areas of the femora brownish; structural characters as in generic diagnosis.

Length 4 mm.

Hab. Kurseong.

ANTIPHILUS, gen. nov.

Elongate; head about as broad as long, anteriorly deflected; eyes straightly transverse, distinctly removed from base of head; rostrum reaching the posterior coxæ; antennæ pilose, first joint a little longer than head and moderately thickened,

second a little more than twice as long as first, third twice as long as fourth, third and fourth together about as long as second; pronotum about twice as broad as long, basal margin twice as broad as anterior margin, distinctly transversely impressed before middle, and in front of this impression moderately transversely bi-callose, the lateral margins obliquely sinuate, the posterior angles obtuse; scutellum broadly subtriangular; corium (excluding cuneus) almost as long as posterior tibiæ, about two and a half times as long as broad at greatest width, cuneus much longer than broad at base, angularly narrowed at apex; membrane large, its greatest length equal to that of corium without the cuneus, and with two elongate cellular areas not passing apex of cuneus; legs of moderate length, femora distinctly but not prominently thickened, tibiæ spinulose, posterior tarsi with the basal joint much shorter than the second.

A genus of *Cyllocoraria*.

Antiphilus amicus, sp. n.

Head, antennæ, pronotum, scutellum, and clavus black; corium flavous, shortly, darkly, sparsely pilose and with a small black spot near apical angle, cuneus flavous, apically (broadly) and marginally (narrowly) blackish; membrane pale shining fuliginous with iridescent reflections; the cellular margins black; body beneath black; rostrum and legs pale ochraceous, apices of tarsi (especially the anterior tarsi) blackish; structural characters as in generic diagnosis.

Length $4\frac{1}{2}$ to 5 mm.

Hab. Darjiling, 6000 ft. (Ind. Mus.); Kurseong, East Himalaya, Ukhral, Manipur (Ind. Mus.).

ZONODORUS, gen. nov.

Head short, broad, convex, not horizontally produced in front of eyes, which are placed somewhat midway between base and apex and thus longly removed from the anterior margin of the pronotum, between the eyes obscurely longitudinally sulcate; antennæ with the first joint moderately thickened and about as long as head, second joint about four times as long as first and a little longer than third, fourth scarcely shorter than third; rostrum about reaching the posterior coxæ; pronotum much broader than long, narrowed to head, the lateral margins oblique, distinctly transversely impressed a little before middle, the posterior margin concave and exposing the base of the mesonotum; scutellum subtriangular, a little convex; corium (excluding cuneus)

considerably shorter than posterior tibiæ; membrane longly passing abdominal apex with an elongate posteriorly truncate cell; legs somewhat long and slender, the posterior femora distinctly thickened, the posterior tibiæ as long as corium and cuneus together, posterior tarsi with the basal joint longest.

In the enumeration of the Indian Capsidæ I place this genus near *Zanchius*, Dist., to which it is closely allied, but separated by the structure of the head.

Zonodorus gubernator, sp. n.

Head, antennæ, pro- and mesonota, scutellum, body beneath, rostrum, and legs stramineous or very pale ochraceous; base of first joint of antennæ and the basal areas of the femora greyish white; clavus, corium, and cuneus greyish white, subhyaline, macularly mottled with pale virescent, the costal area of corium (excluding base) and extreme apex pale ochraceous, the margins of clavus adjoining scutellum also pale ochraceous; membrane very pale brownish ochraceous, the basal area mottled with pale virescent and the membranal cells posteriorly margined with the same colour; the upper surface is distinctly, finely, palely pilose; structural characters as in generic diagnosis.

Length 4 mm.

Hab. Ceylon; Peradeniya (*Green*).

[To be continued.]

LXV.—*On the Agriotype of Domestic Asses.* By R. I. Pocock, F.L.S., F.Z.S., Superintendent of the Zoological Society's Gardens.

DOMESTIC asses are usually considered to be descended from the wild ass now found in the Eastern Soudan, to which Fitzinger's name *Equus asinus africanus* has been restricted. Several examples of this local race have been fully described, namely: one from Yalalub and one from Kassala by Mr. de Winton ('Mammals of Egypt,' pp. 329 & 330, 1902), and one from Nakheila, on the south bank of the Atbara River, by Mr. Lydekker (Nov. Zool. xi. pp. 593-595, 1904). These agree closely in coloration, being greyish fawn in colour, with the muzzle, the area round the eyes, and the legs whitish. The specimen, alleged to have come from Nubia, which Dr. Schater depicted on Pl. L. fig. 2 of the P. Z. S. for

1884, appears to belong to the same type, although the general tint is considerably richer fawn, as if a Persian Onager had formed the model for the coloration.

These Eastern Soudan asses differ from ordinary domestic asses in the sharp contrast between the white of the legs and the greyish fawn of the head, neck, and body. In this characteristic, apart from the practical absence of markings from the legs, they resemble the Somaliland race (*E. asinus somaliensis*). They also resemble the latter and differ at all events from the majority of English domestic asses, unless canescence or partial albinism has supervened, in having scarcely any black or brown on the ear, except at the tip and on the margin. As a matter of actual fact, there is a certain amount of clouding on the lower half of the ear above the occiput, at least in some specimens. It is present, for instance, in the examples of *E. a. africanus* from Nakheila and of *E. a. somaliensis* from Somaliland, described by Mr. Lydekker, but was either unnoticed by this author or not considered worth mentioning. Mr. de Winton also says nothing about it in his description of the specimen of *E. a. africanus* from Yalalub; and Heuglin is similarly silent on this matter in the diagnosis of *E. a. tæniopus*. From reading the descriptions of these specimens, indeed, one would infer the entire back of the ear, apart from the tip, to be the same tint as the head.

In ordinary domestic asses, in such, at least, as adhere to the greyish coloration of the wild forms hitherto mentioned, the legs are, as a rule at all events, of the same colour as the body, or nearly so, and are very commonly indeed indistinctly barred with black. Moreover the base of the ear is almost always marked with a large black or dark brown patch. So constant a feature in domestic asses is this patch on the ear that it is impossible to avoid the conclusion that it has been inherited from their ancestral form. If this be so, that ancestral form was not *E. asinus africanus*, nor *E. asinus tæniopus**, nor *E. asinus somaliensis*, in which the ears are decidedly black or brown behind only at the tip, the basal patch being evanescent.

* In the P. Z. S. 1862, p. 164, Dr. Scclater records "*Asinus tæniopus*" from Abyssinia, his information being based upon a specimen then living in the Jardin des Plantes which had been acquired by the French Consul at Massouah. Through the kindness of Dr. Scclater I have been able to examine a coloured drawing of this animal, dated Paris, 1860. It has a long shoulder-stripe and a continuous spinal stripe and as many stripes on the legs as are present in the example of *E. asinus somaliensis* now living in the Zoological Gardens. It thus closely resembles the form Heuglin described as "*Asinus tæniopus*"; but the legs are darker, being hardly lighter externally than the body.

The further question now arises: Is there still in existence a wild form of ass presenting the coloration of the legs and of the ears seen in our domestic animal? The evidence on this head that I have been able to collect is meagre enough, but it amounts to something. We have at the present time living in the Zoological Gardens a female ass belonging to Sir Claud Alexander, which was sold to him as a Nubian wild ass. The body and legs are grey and there are faint stripes on the limbs, with conspicuous patches on the fore fetlocks, like those of the example of *E. a. africanus* described and figured by Mr. Lydekker. The base of the ears has a very large dark patch, which extends more to the front than to the back and runs up in a point so far towards the black area at the tip that the space between them appears as a narrow greyish-yellow band when the ear is seen from the front. Again, photographs of two alleged Nubian wild asses appear in Prof. Ridgeway's book on the 'Thoroughbred Horse' (pp. 50, 51). One of these animals was living in the London Zoological Gardens between 1886 and 1890*, as I learn from Mr. Medland, the photographer; the other died some years ago in the Gardens in Dublin, as Dr. Scharff tells me. Mr. Medland's photograph clearly shows the black patch at the base of the left ear and the photograph of the animal in Dublin shows it on the right ear, but in both cases reflected light prevents an accurate judgment being formed of the extent of the patch. Finally, in the 'Royal Natural History,' ii. p. 511, there is a woodcut, by Mützen, entitled the African Wild Ass, representing two animals practically identical with the one now in the London Gardens, except for the exaggerated length of the ears. There can be very little doubt, I think, that this engraving was taken from one or more animals living somewhere in Germany, probably in Berlin. If this drawing, which bears a general stamp of accuracy, be compared with the description of *E. a. africanus* above cited and with the plate of the specimen from Nakheila in Mr. Lydekker's paper, the differences between the two forms become apparent at once.

For want of completer records, the question of the existence at the present time in Nubia or the adjoining parts of Africa of a race of wild asses resembling those figured in the 'Royal Natural History' and the one now in the Zoological Gardens must be left open; but I feel tolerably sure that such an animal formerly, at all events, existed, and probably extended much further to the north than the fifth cataract of the Nile,

* This is probably the same animal as that figured on p. 82 of Flower's book 'The Horse,' 1891.

to the north of which wild asses do not appear any longer to occur, although Burton, be it remembered, recorded the presence of wild asses in his day in the so-called Arabian desert of Middle Egypt to the east of the Nile.

I also feel convinced that this ass was, at all events, the main ancestral stock, with perhaps an infusion of *africanus* or *teniopus* blood, whence our domestic breeds are descended; but since I am unable to point out any characters by which the alleged wild asses referred to this race differ from what may be regarded as typically coloured domestic asses of England, I propose to extend the meaning of the name *asinus* to include them.

The conclusion that the basal patch on the ear is not a recently acquired feature in domestic breeds, but is a deep-seated ancestral trait of long standing, and that its slight development in *E. a. africanus*, *teniopus*, and *somaliensis* is due to suppression, is confirmed by a number of facts. To begin with, the backs of the ears in all well-striped Zebras and Quaggas, with the exception of some nearly white-eared varieties of Böhm's Quagga, have a considerable quantity of black, often forming a patch, on the lower half. Secondly, a dark brown patch similar to, but less emphasized than, that of domestic asses is present on the ears of Kiangs (*E. kiang*), though at most the merest shadow of it is visible in the Chigetai (*E. hemionus*) and in Onagers (*E. indicus*, *onager*, *hemippus*). Again, it was well developed in four foals bred in the Zoological Gardens between a stallion *E. asinus somaliensis*, in which, like the spinal and shoulder-stripes, it is absent, and donkey-mares of Spanish and English breeds, in which it was present. Moreover, although two out of the four mares were nearly black, and only one a true "ass-grey," the foals in every case were grey, with moderately strongly barred legs and shoulder and spinal stripes. Thus the essential characters of the sire were eliminated and the subhybrids* reverted to what I believe to have been the original coloration of African asses, from which the three races *E. a. africanus*, *teniopus*, and *somaliensis* have departed in varying degrees. Reversion of this kind is not uncommon when distinct varieties are crossed. Finally, the patches are

* Although the word "subhybrid" is open to criticism on the score of its mongrel extraction, I cannot at the moment think of a better to express the result of a cross between two subspecies, the word "hybrid" denoting the progeny of two species, like the horse and ass, and "mongrel" being reserved in zoology for that of two domestic breeds, like spaniels and terriers. The name is, at all events, as defensible as "cotype," which has passed into general use.

present on the ears of two feral Socotran asses in the British Museum, though considerably darker in one than the other. The interest of this circumstance lies in the fact that the forerunners of these asses were introduced into Socotra, according to Messrs. Ogilvie-Grant and Forbes, at a very remote epoch, showing that in early times domestic asses possessed these ear-patches.

The four races of African asses, then, may be distinguished as follows :—

- | | |
|---|--|
| <p>a. A distinct and large black or brown patch at the base of the ear as well as at the tip; legs the same tint as the body or approximately so (domestic and possibly wild forms)</p> | <p>Subsp. <i>asinus</i>, Linn.</p> |
| <p>a'. No large and distinct dark patch at the base of the ear; legs usually, at all events, markedly lighter than the body and striped or unstriped.</p> | |
| <p>b. Legs unmarked except for patches on the fetlock</p> | <p>Subsp. <i>africanus</i>, Fitz.</p> |
| <p>b. Legs boldly striped.</p> | |
| <p>c. Spinal and shoulder-stripes well developed</p> | <p>Subsp. <i>tæniopus</i>, Heug.</p> |
| <p>c'. Spinal and shoulder-stripes obsolete or nearly so</p> | <p>Subsp. <i>somaliensis</i>, Noack.</p> |

I take this opportunity of correcting one or two mistakes that have appeared in literature with regard to the Ass of Somaliland (*E. a. somaliensis*). In his description of this animal, under the name "*somalicus*," Dr. Sclater mentions as distinctive features of this race the more flowing mane and the shorter ears as compared with *E. asinus africanus*. Whatever may have been the case with the original specimen, these remarks do not apply to the example, a very fine stallion, now living in the Zoological Gardens. The mane is in no sense long or flowing, and does not differ appreciably from that of ordinary donkeys. Moreover, the ears measure from the top of the skull just about 10 inches, whereas in the alleged Nubian wild ass they are 9½ inches. He further says, quoting Mr. Loit Phillips, who was confessedly speaking from memory, that one specimen stood 14 hands at the withers. This guess has been repeated as an established fact at least twice in literature; yet the fine male specimen in our Gardens does not exceed 12 hands at the withers.

Finally, it has been alleged that there is no marked seasonal

change in colour or length of coat *. The coat is distinctly longer in the winter than in the summer, though the difference does not approach that which obtains in Persian Onagers and Kiangs, and there is a decided difference in colour. The summer coat is a clear grey, which gradually turns to a sandy fawn as the season advances, the difference in tint between the two being very marked when the old sandy-fawn coat comes away and shows the new stone-grey coat beneath it in patches at moulting-time.

LXVI.—*On the Fruit-Bats of the Genus Dobsonia.*

By KNUD ANDERSEN, F.Z.S.

THE subjoined notes and descriptions are based on ninety-one specimens in the collections of the Leyden, Berlin, Paris, and British Museums. The three former Museums were visited by me in August and September this year, and I have much pleasure in taking this opportunity of acknowledging my indebtedness to Dr. Jentink, Professor Matschie, and Professor Trouessart for the liberal way in which they placed the collections under their charge at my disposal. The large series of *Dobsonia* from the Dutch East Indies preserved in the Leyden Museum has been of special importance for my revision of the genus.

The latest reviser (Matschie, 1899) recognized only one species of *Dobsonia*. The total number of species briefly diagnosed below is twelve, six of which are new.

The notes are preliminary to a completer account of the genus in the British Museum Catalogue of Megachiroptera now under preparation.

I. *Revised List of hitherto-described Species.*

1810, *Pteropus pal[li]atus*, E. Geoffroy, Ann. Mus. d'Hist. Nat. xv. p. 99. In 1825 by Temminck put down as the young of *Cephalotes peroni* [*Dobsonia peroni*] (Mon. Mamm. i. pp. 169, 170), a view accepted also by the original describer in 1828 (Cours d'Hist. Nat. Mamm., 13 leçon, pp. 29, 30), as well as by all later revisers of the genus.—It is evident from Geoffroy's description that the type of *Pt. palliatus* was a quite young *Dobsonia* with the milk-incisors ($\frac{2-2}{2-2}$) *in situ*. As the type locality is unknown, the description confined to

* Lydekker, Novitates Zool. xi. p. 393 (1904).

characters common to all species of *Dobsonia*, and the type no longer in existence, the species is, and will always remain, indeterminable. Inasmuch as the type was acquired from a Dutch Museum (Teyler, Haarlem), the probability is that it was one of the four species common in the Dutch East Indies, viz. *D. peroni* (Timor group), *viridis* (Amboina group), *moluccensis* (Amboina group), or *crenulata* (Gilolo group).

1810, *Cephalotes peroni*, E. Geoffroy, *t. c.* p. 104, pl. vii. Type locality, Timor. A distinct species, differing from all other forms by the combination of these characters:—Antero-internal corner of m_1 sharply marked off as a distinct cusp or ledge; no well-marked antero-internal ledge in m^1 ; skull, total length 48·8–51·7 mm., maxillary tooth-row ($c-m^2$, crowns) 20–22, forearm 108·5–117. Range:—Flores, Timor, Alor, Wetter.

1830, *Hypoderma moluccense*, Quoy & Gaimard, Voy. 'Astrolabe,' Zool. i. p. 86, Atl. pl. xi. Type locality, Amboina. In 1837 by Temminck declared indistinguishable from *Cephalotes peroni* (Mon. Mamm. ii. p. 109), an opinion unhesitatingly accepted by all other revisers.—Is a distinct species. Diagnosis:—Antero-internal corner of m_1 not differentiated as a distinct cusp or ledge; general size unusually large, forearm 133·5–141 mm. Range:—Buru, Amboina, Ceram, Aru Islands.

Nearly half a century passed without further additions to the list. The three principal revisers of the genus during this long period, viz. Peters in 1867 (MB. Akad. Berlin), Gray in 1870 (Cat. Monk. &c.), and Dobson in 1878 (Cat. Chir. B. M.), copied Temminck in recognizing only one species, *Cephalotes peroni*, with the synonyms *Pteropus palliatus* and *Hypoderma moluccense*.

1879, *Cephalotes minor*, Dobson, P. Z. S. 1878, p. 875. Type locality, Amberbaki, N.W. New Guinea.—A distinct species. Differential characters:—Premolars and molars simple (no well-marked antero-internal and posterior ledges, no trace of surface ridges); smallest species known, forearm about 80 mm.—The type in the Paris Museum was hitherto the only specimen known to exist in collections. There is, however, a second specimen in the Leyden Museum ("*Cephalotes peroni*" rr, with skull dd), collected by Dr. Bernstein, but unfortunately without locality; as having been acquired by the Leyden Museum in 1876, years after the explorer's death, it probably dates from his last voyage, and, if so, it must have been obtained either in Sorong (N.W. New Guinea), Salawati, Batanta, or neighbourhood (see his "dagboek," edited by Musschenbroek, Bijdr. Taal-, Land- en

Volkenk. Ned. Ind. (4) vii., 1883). The Leyden specimen is fully adult, the type slightly immature (but for all practical purpose perfectly full-grown).

1896, *Cephalotes viridis*, Heude, Mém. Hist. Nat. Emp. Chin. iii. p. 176, footnote, pl. v. fig. 1.—A distinct species. Differential characters:—A well-marked antero-internal basal cusp both in m_1 and m^1 ; breadth across lower edges of lachrymal foramina 11·5–12·8 mm.; forearm 113–117·5. Range:—Buru, Amboina, Ceram, Banda Islands, Key Islands.

The next, and thus far the latest, reviser of the genus (Matschie, 'Megachiroptera des Berliner Museums,' 1899) again recognized only one species, *Cephalotes palliatus*, with the synonyms *Cephalotes peroni*, *Hypoderma moluccense*, *Cephalotes minor*, and *C. viridis*. So far from being identical, these four species represent in reality four different sections of the genus, a fact which, however, can only be realized on examination of their dentition. But quite apart from dental differences, it would only be possible to put the above four species together under one heading on supposition that the individuals show a perfectly unparallded amount of size variation (forearm in *Dobsonia minor* 80 mm., in *D. moluccensis* 133·5–141).

1905, *Dobsonia magna*, Thomas, Ann. & Mag. N. H. (7) xvi. p. 423. Type locality, Tamata, Mambare River, British New Guinea. A distinct species, closely allied to *D. moluccensis*, from which it differs only in its still larger size (forearm 146–152·5 mm.: largest species known). Range:—The whole of New Guinea; Mysol; Waigeou.

1905, *Cephalotes pannietensis*, De Vis, Ann. Queensl. Mus. vi. p. 36. Type locality, Panniet Island, Louisiade Archipelago. A distinct species: similar in dentition to *D. moluccensis* and *magna*, but much smaller; forearm about 109–112 mm. Range: Trobriand group (Kiriwina), D'Entrecasteaux group (Fergusson Island), Louisiades (Panniet).

In 1906 Dr. Jentink gave a very elaborate table of external measurements of nearly all the specimens of *Dobsonia* in the Leyden Museum (Notes Leyd. Mus. xxviii., table facing p. 168). It is necessary to draw attention to the fact, however, that not all of these measurements are directly comparable. Of the 42 specimens measured 18 are more or less immature (specimens a, g, k, l, n, o, p, q, v, w, x, z, f², g², j², k², p², w²).

From the above it will be noticed that all the principal revisers of the genus, from Temminck, through Peters, Gray,

and Dobson, to Matschie, invariably have failed to recognize more than one single species. The reason is that none of these authors have studied the detailed structure of the premolars and molars of the specimens at their disposal, but all confined themselves to an examination of their external features and the more conspicuous (generic) characters of the skull and dentition. And externally all species of *Dobsonia* are in fact essentially alike, in the shape and relative size of the ears, the wing-structure and insertion of the membranes, and the distribution, quality, length, and colour of the fur, in short, in all external characters except one, the size. That the differences in size, though often very conspicuous, sometimes even enormous, were considered indicative only of an unusually great individual variation is readily understood when it is remembered that very often a larger and a smaller species occur together in the same place. Finding the same small island represented in collections by individuals similar to each other in all external characters but size, those authors naturally hesitated to consider the size-difference by itself a character of specific importance. The truth is, however, that whenever an island is inhabited by two species of *Dobsonia*, they differ not only in size but also, and chiefly, in dentition.

II. Brief Diagnoses of new Species.

Dobsonia exoleta, sp. n.

Similar in dentition to *D. pannietensis*, but larger: skull, total length 52 mm. (47–48 in *pannietensis*), maxillary tooth-row, $c-m^2$ (crowns) 20.5–21.3 mm. (19.8); forearm 112.5–116 mm. (109–112); median surface ridge distinct in m^1 , m_1 , and m_2 (in *pannietensis* distinct in m^1 and m_2 , absent or obsolescent in m_1). *Hab.* Celebes, generally distributed.

Type:—♀ ad., skin and skull; Tomohon, Minabassa, 10 Oct., 1894. Collected by Drs. P. and F. Sarasin. B.M. 99. 10. 1. 4.

Specimens examined, seven, from the following localities:—Minahassa (one), Menado (two), Gorontalo (one), Macassar (one), “Celebes” (two).

Dobsonia sumbana, sp. n.

Closely allied to *D. peroni*, but noticeably smaller: skull, total length 46.5 (48.8–51.7 in *peroni*), maxillary tooth-row 18.8 mm. (20–22), forearm 106 mm. (108.5–117). *Hab.* The island of Sumba, Timor group.

Type:—Ad. al., with skull; Sumba, 3 Oct., 1896. Collected by A. Everett. B.M. 97. 4. 18. 12.

Dobsonia crenulata, sp. n.

Allied to *D. viridis*, but larger and with conspicuously heavier dentition; maxillary tooth-row 20–21 mm. (18·5–19·5 in *viridis*), forearm 125–128·5 mm. (113–117·5). *Hab.* Gilolo group, generally distributed.

Type:—♀ subad., skin and skull; Ternate. Collected by Dr. A. R. Wallace. B.M. 60. 8. 26. 2.

Specimens examined, eleven, from the following localities:—Rau (four), Morotai (two), Ternate (one), Batchian (four).

Dobsonia prædatrix, sp. n.

Allied to *D. viridis* and *crenulata*, but cranial rostrum considerably heavier (across lower edges of lachrymal foramina 12·8–13·8 mm.); general size very nearly as *D. viridis*, smaller than *D. crenulata*: forearm 111·5–121·5 mm. *Hab.* Bismarck Archipelago.

Type:—Imm. sk., with skull; Duke of York group. Collected by the Rev. G. Brown. B.M. 77. 7. 18. 5.

Specimens examined, five.

Dobsonia inermis, sp. n.

A small species of the *D. viridis* group: forearm 105·5–109 mm.; premaxillæ and upper canines not slanted more strongly forward than usual. *Hab.* East Solomon Islands.

Type: ♀ ad., skin and skull; San Christoval, Dec. 1854. Collected by Dr. F. M. Rayner (Voyage of the 'Herald'). B.M. 56. 7. 7. 5.

Specimens examined, two, from San Christoval and Ugi.

Dobsonia nesea, sp. n.

Allied to *D. inermis* and very nearly of the same general size, but premaxillæ and upper canines slanted peculiarly forward (tip of nasals vertically above hinder edge (in *D. inermis* above front half) of alveole of canine); premolars and molars larger, but not differing in structure. Forearm about 109·5 mm. *Hab.* W. and C. Solomon Islands.

Type:—♂ ad., skin and skull; Alu, Shortland, Apr. 1886. Collected by C. M. Woodford, Esq. B.M. 87. 1. 18. 8.

Specimens examined, three, from Shortland (one) and Rubiana (two).

III. Primary Sections of Genus.

The premolars and molars of *Dobsonia* present four different phases of specialization, which may be utilized for a subdivision of the genus into four apparently natural sections, as follows:—

(1) *D. minor* section:—Premolars and molars simple, *i. e.* no distinct posterior basal ledge (a slight indication sometimes seen in p_1 and m_1), no distinct antero-internal basal cusp (a faint indication may be seen in p^1), no trace whatever of surface ridges. One species, *D. minor* (N.W. New Guinea).

(2) *D. moluccensis* section:—A well-developed posterior basal ledge in p^3 , p^4 , p_3 , and p_4 ; a well-marked antero-internal basal ledge or cusp in p^1 and p^4 , generally at least a trace of a similar ledge in p_3 and p_4 , but never in m_1 ; surface ridges in m^1 and m_2 , sometimes also in p^4 and m_1 . Four species:—*D. exoleta*, *pannietensis*, *moluccensis*, and *magna*. *D. exoleta* (Celebes) and *pannietensis* (Islands S.E. of New Guinea), though geographically widely separated, are evidently closely related; the broad intervening area is occupied by the allied but much larger *D. moluccensis* (Amboina group and Aru Islands) and *magna* (New Guinea).

(3) *D. peroni* section:—Essentially as foregoing, but with a strong antero-internal ledge also as in m_1 , but not in m^1 . Two species, *D. peroni* (Flores, Timor, Alor, Wetter) and *sumbana* (Sumba).

(4) *D. viridis* section:—Essentially as foregoing, but a strong antero-internal ledge also in m^1 , this ledge therefore well-differentiated in p^3 , p^4 , m^1 , p_3 , p_4 , and m_1 ; posterior basal ledges still more strongly developed, as are generally also the surface ridges; outer and inner longitudinal ridges of p^4 , m^1 , p_4 , and m_1 (or at least some of these teeth but rarely also p^3 and p_3) showing a more or less distinct tendency to break up into two or three separate cusps. Five species:—*D. viridis* (Amboina group and Key Islands), *crenulata* (Gilolo group), *prædatrix* (Bismarck Archipelago), *nesea* (W. and C. Solomon Islands), and *inermis* (E. Solomon Islands). Although, as here indicated, the section is represented in the Moluccas, Bismarck Archipelago, and Solomon Islands, no species with similar dental characters is known from New Guinea.

LXVII.—*Diagnoses of new Mammals collected by Mr. H. C. Robinson in the Islands of the Straits of Malacca.* By
 OLDFIELD THOMAS and R. C. WROUGHTON*.

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THE following are diagnoses of some new mammals obtained by Mr. H. C. Robinson in the Islands of Langkawi and Terutau, and presented by the Government of the Confederated Malay States to the National Museum. The fuller descriptions, with a detailed list of the collection from the Islands, will be published in the Journal of the Museum at Selangor.

1. *Presbytis obscura carbo*, subsp. n.

A local race of *P. obscura*, characterized by its darker colouring in all details. Colour above black, paler and suffused with reddish on the shoulders and anterior middle back; below dark brown. Nuchal patch pale drab-grey. Thighs and tail dark grey. Hands and feet black.

Hab. Langkawi and Terutau Islands, Straits of Malacca (type from Langkawi).

Type. Adult male. B.M. no. 9. 11. 1. 4. Original number 2373. Collected 25th February, 1909.

Three specimens examined.

2. "*Pteropus hypomelanus robinsoni*, Andersen, subsp. n.

"Similar to *Pt. hypomelanus tomesi*, but mantle, breast, and belly considerably lighter in colour. The same character discriminates it from *Pt. h. condorensis*, from which it is further distinguished by the more blackish, less brown colour of the back. From *Pt. h. canus* and *lepidus* it is separable by the much darker colour of the back, the lighter colour of the mantle, breast, and belly, and the perfectly normal size of the teeth. Finally, it is easily recognizable from *Pt. h. annectens* by the much darker colour of the back.

Hab. Rumbia Island, Straits of Malacca.

Type. Adult female. B.M. no. 9. 11. 1. 8. Original number 1779. Collected 5th March, 1909.

"Three specimens examined."

* The new *Pteropus* by Knud Andersen.

3. *Tupaia lacernata*, sp. n.

Closely allied to *T. ferruginea*, but distinguished by its smaller size and more yellow colouring, especially between the shoulders and on upper back.

Hab. Islands of Langkawi and Terutau, Straits of Malacca (type from Langkawi).

Type. Adult female. B.M. no. 9. 11. 1. 30. Original number 2673. Collected 18th March, 1909.

Seventeen specimens examined.

4. *Ratufa melanopepla fretensis*, subsp. n.

An island race of *melanopepla* distinguished by the darker colouring of the lower surface of the body, being "tawny" instead of at most "ochraceous" as in typical *melanopepla*. *R. m. tiomanensis* is smaller and even darker-coloured.

Hab. Langkawi and Terutau Islands, Straits of Malacca (type from Langkawi).

Type. Adult male. B.M. no. 9. 11. 1. 37. Original number 2217. Collected 8th February, 1909.

Eight specimens examined.

5. *Sciurus concolor terutavensis*, subsp. n.

Closely resembling *S. c. lancavensis*, Miller, in size and coloration, but immediately distinguishable by wanting the silvery-white suffusion on the belly and by having the midrib of the tail below and the bases of the hairs of each side to a length of 5-6 mm. coloured ochraceous buff.

Hab. Terutau Island, Straits of Malacca.

Type. Adult male. B.M. no. 9. 11. 1. 54. Original number 2580. Collected 7th March, 1909.

Ten specimens examined.

6. *Mus vociferans tersus*, subsp. n.

Rather smaller than *M. v. lancavensis* and darker than that form, but at the same time without the markedly darker dorsal area characteristic of typical *vociferans*. Dark upper-side of tail extending for fully half its length, as in the mainland animal. Tail rather shorter than in *lancavensis*, markedly shorter than in the Trong form.

Hab. Terutau Island, Straits of Malacca.

Type. Old male. B.M. no. 9. 11. 1. 80. Original number 2489. Collected 4th March, 1909.

Nineteen specimens examined.

7. *Tragulus canescens terutus*, subsp. n.

Closely resembling *T. canescens* in coloration, but markedly smaller. The dark-coloured nape characteristic of *umbrinus*, Miller, entirely wanting.

Hab. Terutau Island, Straits of Malacca.

Type. Adult male. B.M. no. 9. 11. 1. 159. Original number 2438. Collected 26th October, 1909.

Seven specimens examined.

LXVIII.—*East African Forms of Arvicanthis abyssinicus.*

By R. C. WROUGHTON.

HAVING had occasion to lay out the specimens in the Natural History Museum of *Arvicanthis* from British Africa, I find that several well-marked local races can be distinguished. *Arvicanthus abyssinicus* was described by Rüppell from Simen and Shoa in Abyssinia. Besides cotypes, the Museum possesses quite a long series from many parts of Abyssinia. Thence to German East Africa, whence Matschie described his *A. neumanni* (a very much smaller animal), the only name I have been able to find is *nairobæ*, Allen. This is clearly a geographical race of *abyssinicus*, which it resembles in colour and from which it differs chiefly in size.

The additional forms I have been able to discriminate are: one from Naivasha, closely resembling *nairobæ*, its near neighbour, in size and colour, but easily separable by the shape of the skull; also a reddish colour variety from Unyoro, and a blackish one from Mt. Elgon.

Key to the Subspecies of A. abyssinicus.

- A. General colour greyish (near "hair-brown").
- a. Size larger; hind foot=30 mm., greatest length of skull = 36. Hands and feet grey. (Abyssinia.) (1) *abyssinicus*, Rüpp. (s.s.).
- b. Size smaller; hind foot=27 mm. or less, greatest length of skull=34 or less.
- a'. Hands and feet grey; skull very broad and stoutly built, supra-orbital crests strongly marked. (Nairobi.) (2) *a. nairobæ*, Allen.
- b. Hands and feet yellow; skull narrow, slenderly built, supra-orbital crests much less developed. (Naivasha.) (3) *a. præceps*, subsp. n.

- B. General colour reddish (near "vandyke brown"). Hands and feet yellow. Size large; hind foot=31 mm. (Kisumu, Mount Elgon.) (4) *a. rubescens*, subsp. n.
- C. General colour blackish (near "seal-brown"). Hands and feet dark. Size large; hind foot=29 mm. (Marsindi, Unyoro.) (5) *a. nubilans*, subsp. n.

(1) *Arvicanthis abyssinicus*, Rüpp.1842. *Mus abyssinicus*, Rüppell, Mus. Senck. iii. p. 104.

General colour-effect above pale "hair-brown"; individual hairs of back (10 mm. long) have basal two-thirds black and remainder "cream-buff." Dorsal median black stripe generally distinctly marked, never entirely absent. Tail dark above, pale below, rather short. Hands and feet grey.

Skull rather stout, supraorbital crests strongly marked, anteorbital plates broad, rounded.

Dimensions of an adult male:—

Head and body 140 mm.; tail 102; hind foot 29.

Skull: greatest length 36; basilar length 30; zygomatic breadth 19; nasals length 15; interorbital breadth 6; brain-case breadth 14; diastema 9.5; upper molar series 7.

More than a dozen specimens examined.

(2) *Arvicanthis abyssinicus nairobae*, Allen.1909. *Arvicanthis nairobae*, Allen, Bull. Am. Mus. N. II. p. 168.

This form is coloured exactly as typical *abyssinicus*, but the grizzling is much finer. Smaller in size all round than the Abyssinian form. Hands and feet grey.

Skull broad in proportion to length, with, as Mr. Allen points out, the nasals expanded anteriorly; bullæ large, as in the Abyssinian form.

The following are measurements of a very old male from the Athi River:—

Head and body 133 mm.; tail 107; hind foot 27.

Skull: greatest length 34.5; basilar length 28; zygomatic breadth 19; nasals length 13.5; interorbital breadth 5; brain-case breadth 14; diastema 9; upper molar tooth-row 6.6.

Specimens from Machakos seem to belong to this form. It appears to differ from typical *abyssinicus* in little but its smaller size.

(3) *Arvicanthis abyssinicus præceps*, subsp. n.

Size rather smaller than in *nairobæ*; in colour quite resembling that form, but with the yellow hands and feet of *rubescens*.

Skull in length as in *nairobæ*; markedly narrower and more slightly built, bullæ conspicuously smaller, nasals rather shorter, not appreciably expanded.

Dimensions of type:—

Head and body 131 mm.; tail 113; hind foot 25.

Skull: greatest length 33; basilar length 28; zygomatic breadth 17; nasals length 12; interorbital breadth 4·5; brain-case breadth 12·5; diastema 8·5; upper molar tooth-row 6·5.

Hab. Naivasha.

Type. Very old male. B.M. no. 0. 6. 21. 34. Original number 14. Collected 16th December, 1899, and presented to the Natural History Museum by Lord Delamere.

Easily distinguishable from *nairobæ*, which it closely resembles in colour, by its rather smaller size, yellow hands and feet, and much narrower and more slenderly built skull. In both *præceps* and *nairobæ* the median black dorsal stripe is practically absent.

(4) *Arvicanthis abyssinicus rubescens*, subsp. n.

General colour-effect above between "bistre" and "vandyke-brown." Length and colour-pattern of dorsal hairs as in typical *abyssinicus*, but the pale tips darker ("buff") and proportionally shorter, median dorsal stripe faint. Tail less densely clothed than in the type form. Hands and feet golden yellow.

Skull rather smaller in all details, much more slenderly built.

Dimensions of the type:—

Head and body 139 mm.; tail 129; hind foot 31.

Skull: greatest length 34; basilar length 28; zygomatic breadth 17; nasals length 13; interorbital breadth 5; brain-case breadth 13·5; diastema 9·5; upper molar series 6·3.

Hab. Kibero, Unyoro.

Type. Adult male. B.M. no. 2. 11. 1. 16. Original number 48. Collected by Dr. W. J. Ansorge on 4th August, 1897.

A dozen specimens from localities in Unyoro examined. A series from Aukole and another from E. Kuwenzori seem to belong to this form. In proportion to the body, the tail

would seem to average rather longer in *rubescens* than in typical *abyssinicus*.

(5) *Arvicanthus abyssinicus nubilans*, subsp. n.

General colour-effect above "seal-brown"; individual dorsal hairs longer (12-13 mm.) than in the preceding forms, the pale tips at most 3 mm. long; median dorsal stripe absent. Tail proportionally longer than in *rubescens*, and even more markedly hairy than in typical *abyssinicus*. Hands and feet dark.

Skull stoutly built, but slightly smaller than in the type species; bullæ markedly smaller, as small as, or even smaller than, in the Masindi form.

Dimensions of the type:—

Head and body 145 mm.; tail 115; hind foot 29.

Skull: greatest length 35; basilar length 30; zygomatic breadth 18.6; nasals length 14; interorbital breadth 5.3; brain-case breadth 14.3; diastema 9; upper molar series 6.5.

Hab. Kisumu, B. E. Africa. Alt. 3600'.

Type. Adult ♂. Ruid Collection. Original number 102. Collected by R. Kemp, 12th August, 1909.

Eleven specimens examined. The grizzling is rather fine and the resulting dark colour of the animal renders its identification easy.

LXIX.—*New Muridæ from British East Africa.*

By R. C. WROUGHTON.

Tatera dundasi, sp. n.

A *Tatera* allied to *T. smithi* and *T. ruwenzorii*, but larger than either.

Fur long and soft (20-25 mm. on back). Ground-colour bright pinkish buff, much obscured with black in the dorsal region, much more so than in *ruwenzorii*, rather less so than in *smithi*, flanks bright salmon-buff, passing suddenly but without any distinct dividing line into pure white of belly.

Skull with long posterior palatal foramina as in *smithi* and all the African forms of the northern hemisphere; muzzle markedly longer than in either of those species.

Dimensions of the type:—

Head and body 190 mm.; tail (damaged); hind foot 35; ear 21.

Skull *: greatest length 45 (42); basilar length 38 (34); palatilar length 22·5 (20·3); greatest breadth 23; nasals length 19 (16); interorbital breadth 7·5 (7·4); brain-case breadth 17·8 (18·6); diastema 13·8 (12); upper molar series 6·5 (6·8).

Hab. Kirui, Mt. Elgon. Altitude 6000'.

Type. Old male. Rudd Collection. Original number 238. Collected by R. Kemp, 11th Sept., 1909.

I have much pleasure in dedicating this species to Mr. Dundas, who has quite recently presented to the Museum a younger specimen from Mumias (alt. 4500'), Judging from this individual, the tail in this species (as in *ruwenzorii* and *smithi*) is practically untufted, and that of the type, when complete, was 180–190 mm. long. In my key to the genus *Tatera* (Ann. & Mag. Nat. Hist., May 1906, p. 477) these three species should stand together with *nigrita* in a group separated from all the other species under II. A. by the greater length of the posterior palatal foramina. Within this group *nigrita* is isolated by its black colour and small size, *dundasi* by its very large size, and *ruwenzorii* and *smithi* from one another by the bright buffy colour of the one and the duller greyish colour of the other.

Mus medicatus, sp. n.

A rat allied to and resembling *M. hindei* from Machakos, but somewhat smaller and with a much longer tail in proportion to the body.

Fur soft and silky, 12–15 mm. long on back. General colour duller than in *hindei*, ground-colour near "salmon-buff," much mixed with black on back, less so on sides, passing rather abruptly but without any definite line into white of belly, this last looking almost grey owing to the long slaty bases of individual hairs. Hands and feet white. Tail unicolorous, very sparsely haired, dark.

Skull as in *hindei*, but larger, the bullæ larger and the palatal foramina longer.

Dimensions of the type:—

Head and body 160 mm.; tail 178; hind foot 30; ear 21.

Skull: greatest length 40; basilar length 33; zygomatic breadth 20; nasals 15; interorbital breadth 6; brain-case breadth 15·5; diastema 10·5; upper molar series 6·2.

Hab. Mumias, B. E. Africa. Alt. 4500'.

* The figures in brackets are those of *Tatera smithi*.

Type. Adult female. Rudd Collection. Original number 134. Collected by Mr. Kemp, 25th August, 1909.

Seven specimens examined, viz. two from Mumias (4500'), five from Kirui (6000').

While comparing the specimens of *Mus medicatus* with those labelled *M. hindei*, I found, amongst these latter, three specimens which seem to me quite distinct from both these species.

Mus noræ, sp. n.

A rat allied to and of the size of *M. medicatus*, and, like that species, differing from *M. hindei* by the greater length of its tail in proportion to its body.

Fur soft and silky, longer than in *M. medicatus*, 18–20 mm. on back. Colour pattern quite as in the Elgon species, but paler, the ground-colour being quite a pale buff instead of the "salmon-buff" of *medicatus*.

Skull smaller than in *medicatus*, about as in *hindei*, teeth slightly larger than in the former, much larger than in the latter, bullæ smaller even than in *hindei*.

Dimensions of the type:—

Head and body 170 mm.; tail 166; hind foot 29; ear 20.

Skull: greatest length 38·5; basilar length 31; greatest breadth 19; nasals 17·5; interorbital breadth 5·5; brain-case breadth 15·5; diastema 10·5; upper molar series 6·6.

Hab. Guasa Narok, Upper Guaso Nyiro, Brit. E. Africa.

Type. Adult male. B.M. no. 6. 7. 8. 11. Original number 30. Collected by Mrs. Holms Tarn, 16th December, 1905, and presented to the National Collection.

Three specimens. The long loose coat and pale colour are characteristic.

Dendromus acræus, sp. n.

A *Dendromus* of the *pumilio* group, with the dorsal stripe well marked, as in *D. jamesoni*, black lines joining the eyes to the point of the nose, forming a V-shaped mark.

Fur soft and silky, 5–7 mm. long on back. General colour above near ochraceous buff, so modified, in a dry specimen, by the slaty bases showing through, that it seems near "russet"; individual hairs (exclusive of some scattered longer black hairs) dark slate, with buff tips at most 2 mm. long. Buff colouring purer on flanks, fading gradually into the pure white belly, in some specimens tinted with buffy on the chest and lower throat. Face dark like back; cheeks and

muzzle, outside V-shaped black mark, buffy white, quickly fading into pure white of chin and throat. Hands and feet near "clay-colour." Tail dark above, whitish beneath.

Skull rather short, rather wide across zygomata, brain-case small.

Dimensions of the type:—

Head and body 60 mm.; tail 76; hind foot 15; ear 10.

Skull: greatest length 19 (c.); basilar length 14; zygomatic breadth 11; nasals 7.5; interorbital breadth 3; brain-case breadth 8; diastema 5; upper molar series 3.

Hab. Kirui, Elgon, British East Africa. Alt. 6000'.

Type. Old male. Rudd Collection. Original number 152. Collected by Mr. R. Kemp, 30th August, 1909.

A fine series of thirteen specimens of both sexes.

In size and the presence of the black dorsal stripe the present species closely approaches *D. jamesoni* from the Transvaal, but it is much duller in colour, the dorsal stripe never extends in front of the shoulders, rarely as far, and its skull (especially the bullæ) is somewhat smaller.

LXX.—*New African Mammals.* By OLDFIELD THOMAS.

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Cercopithecus ascanius whitesidei, subsp. n.

A spot-nosed monkey agreeing with true *ascanius* in having red hairs on the ears, but with the dark cheek-stripe much less developed.

General colour above a warm tawny-olive, the dorsal hairs ringed with black and ochraceous. Under surface sharply defined creamy white. Nose-spot "pinkish buff," not white as is usual. A well-marked black frontal line, passing round to the base of each ear. Temporal whorl present, but inconspicuous, its hairs dull creamy-white; hairs below it tipped with black, and so forming an indistinct darker cheek-band, but none of the hairs are black to their bases, and there is nothing of the strong black cheek-patch so conspicuous in true *ascanius*. Hairs of ear orange-rufous. Outer side of arms blackish from elbows downwards, the dark passing quite round the wrists and lower arms. Inner sides proximally white. Legs externally like back to knees, then slaty greyish, internally white to ankles; feet black, slightly ticked with buffy. Tail above

like back proximally, then darkening, turning more rufous and finally black at end; below prominently sharply contrasted white, turning rich reddish at about half its length, the extreme tip below also black.

Dimensions of type (measured by collector in the flesh):—
Head and body 530 mm.; tail 880; hind foot 120.

Skull: greatest length 98; basal length 70; breadth of brain-case 52; upper cheek-tooth series 22.

Hab. Nsoli, Ikan, Upper Lulanga River, Central Congo. About 1° N., 22° E.

Type. Adult male. Original number 3. Collected 15th July, 1909, by the Rev. H. M. Whiteside.

Specimens of the *ascanius* group are so rare that I am not able to make a detailed comparison of this handsome monkey with the various forms which have been described, but it would seem to be different from all by the reduction of the black on the cheeks. Its white underside, buffy nose-spot, and red-ended sharply contrasted tricolor tail render this monkey a very striking object, but how far these characters are affected by age remains to be proved.

Rousettus kempfi, sp. n.

Allied to, but with heavier teeth than, *R. lanosus*.

External characters as in the Ruwenzori Mountain Fruit-bat, *R. lanosus*, except that the long hairs of the back, rump, and interfemoral region tend to be greyer. Palate-ridges 4—3—1.

Skull as in *lanosus*, the brain-case equally strongly deflected.

Teeth larger, broader, and heavier throughout, more as in ordinary Rousetts, not so highly specialized as in *R. lanosus*. Incisors, canines, and anterior premolars as in *lanosus*. P^4 3 mm. in horizontal length as against 2.4 in *lanosus*; m^1 3.0×1.5 (*lanosus* 2.5×1.2); m^2 2.8×1.5 ; p_4 2.4; m_1 2.9×1.4 ; m_2 1.9×1.4 .

Forearm of the type 86 mm.

Head and body (measured in flesh) 125 mm.; tail 15; ear 23.

Hab. Kirui, Mt. Elgon, British East Africa. Alt. 6000'.

Type. Subadult male. Rudd Collection. Original number 269. Collected 16th September, 1909.

This is evidently the Elgon representative of the Ruwenzori *A. lanosus*; the Shoa specimen mentioned by Dr. Andersen* would appear, as is natural, to be the same as the Elgon rather than the Ruwenzori species.

* Ann. & Mag. N. H. (7) xix. p. 511 (1907).

Scotæcus albigula, sp. n.

Closely allied to *S. hindei*, Thos. (locality Kitui, Ukamba), but the whole under surface nearly uniform whitish, the bases of the hairs only faintly greyer (brownier on the lower abdomen), the whitish underside of neck in particular contrasting markedly with the brown upperside. Fur a little softer and more woolly, as is natural at the higher elevation. A band of fine whitish hairs along the membrane just external to the forearm, this part being quite naked in *S. hindei*.

Skull slightly longer than that of *hindei* and its palate rather broader. A minute p^1 present on each side in, or close behind, a deep notch in the cingulum of the canine. No such tooth is present in the type of *S. hindei*, but it occurs in the specimen from Nyasaland mentioned by Mr. Wroughton in 1907 †.

Dimensions of type (the starred measurements taken in the flesh) :—

Forearm 38 mm.

Head and body * 58 ; tail * 35 ; ear * 13 ; third finger, metacarpal 36·5, 1st phalanx 12·5 ; lower leg and hind foot (c. u.) 20.

Skull : condylo-basal length 14·5 ; basi-sinual length 11 ; front of canine to back of m^3 6 ; breadth across palate outside molars 7·8.

Hab. Kirui, Mt. Elgon, Brit. E. Africa. Alt. 6000'.

Type Adult male. Rudd Collection. Original number 200. Collected 5th September, 1909, by R. Kemp.

Heliosciurus gambianus senescens, subsp. n.

General characters as in *H. gambianus*, but the whole animal lighter and greyer, the shoulders and hips especially much lighter, owing to a liberal admixture of white or greyish-white hairs. Hairs of the middle of the back and rump ringed with pale buff or cream-buff and black, as compared with the more fawn or ochraceous tone of the light rings in true *gambianus*. Other characters as in that animal.

Dimensions of the type (measured in the flesh) :—

Head and body 220 mm. ; tail 245 ; hind foot 46.

Skull imperfect. A fully adult skull of another specimen is 47 mm. in greatest length ; upper cheek-teeth 8·7.

Hab. Senegal. Type from Thiès.

Type. Immature female. B.M. no. 9. 11. 2. 11. Collected 11th May, 1907, by F. W. Riegenbach. Six specimens.

† Mem. Manchester Phil. Soc. li. no. 5, p. 4.

TACHYORYCTES.

The comparison of a series of Mole-Rats from the Elgon district in the Rudd Collection with those in the British Museum shows that these animals are fairly constant locally, and, like as they are externally, have cranial characters which enable me to distinguish the following different forms among those hitherto referred to my *T. ibeanus*.

Tachyoryctes ankolia, sp. n.

Distinguished by the fact that, even in the oldest specimens, the parietal ridges never quite meet to form a single median sagittal crest, the space between them on the crown never less than about 2-3 mm. Frontal part of ridges, above the intertemporal constriction, strongly developed, high, and in some cases meeting in the middle line. Spread of zygomata about as in *ibeanus*.

Nasals fairly broad anteriorly. Teeth rather larger than in the type of *T. ibeanus*. Bullæ rather small.

Size medium. General colour rather pale. Proportion of plumbaceous specimens small.

Dimensions of type (measured in flesh):—

Head and body 200 mm.; tail 60; hind foot 28.

Condyllo-basilar length 43; zygomatic breadth 33; nasals 17.7×6.7 ; brain-case* 19.2×19 ; upper molar series (crowns) 9.1; length of bulla 10.2.

Hab. Burumba, Ankole, S. Uganda.

Type. Old male. B.M. no. 4.2.6.25. Original number 583. Collected 1st August, 1903, by W. G. Doggett. Presented by Col. E. Delmé-Radcliffe. Eight specimens.

Tachyoryctes daemon, sp. n.

Size markedly smaller than in *T. ibeanus*. Sagittal crest linear in adults, owing to the meeting of the parietal ridges in the middle line, as is also the case in all the succeeding species; the crest itself is, however, not very strongly developed in the present form. Zygomata strongly bowed out anteriorly, forming a marked projecting shoulder on each side, much more so than in the next species. Nasals medium or narrow, a slight re-entrant curve generally present on each side.

Colour a fairly dark fulvous, all three adult specimens with dark faces.

Dimensions of type skull (no external measurements available):—

Condyllo-basal length 42 mm.; zygomatic breadth 32.5;

* Length measured on either side from the antero-lateral protuberances to the lambdoid ridge; breadth above the zygoma-roots.

nasals 15.5×5.8 ; brain-case 20×18.3 ; upper molar series 9.4 ; length of bulla 10 .

Hab. Mt. Kilimanjaro. Alt. 5000'.

Type. Adult female. B.M. no. 89. 3. 8. 5. Collected and presented by H. C. V. Hunter, Esq. Five specimens.

Distinguishable from the last species by its linear sagittal crest, and from the next by its more abruptly and widely expanded zygomata.

Tachyoryctes ruddi, sp. n.

Size as in *T. demon*. Sagittal crest linear, more developed than in that animal. Nasals narrow, often barely broader anteriorly than halfway back, a well-marked re-entrant curve on each side. Zygomata not widely expanded anywhere, and the expansion very gradual, so that there is scarcely any perceptible shoulder on each side. Bullæ and molars rather smaller than in *T. demon*.

Colour dark, an unusual proportion of specimens plumbeous.

Dimensions of the type (measured in flesh):—

Head and body 185 mm.; tail 65; hind foot 26.

Skull: condylo-basal length 42.6; zygomatic breadth 31; nasals 18×5.5 ; brain-case 19×18.5 ; upper molar series 7.8 ; length of bullæ 9.3 .

Hab. Kirui, Elgon, British E. Africa. Alt. 6000'. Other specimens from Mumias.

Type. Old male. Rudd Collection. Original number 183. Collected 3rd September, 1909, by R. Kemp. Twenty specimens.

This Elgon species is distinguishable from that of Mt. Kilimanjaro by the uniformly less marked anterior expansion of its zygomata.

I have named it in honour of Mr. C. D. Rudd, of whose collection it forms a part, and to whom I am indebted for the privilege of describing it.

Tachyoryctes ruddi badius, sp. n.

Essential characters of *ruddi*, but the colour, instead of averaging darker than usual, is brighter than in any other known form, a bright tawny-russet. Below, again, instead of being almost wholly blackish, the hairs are broadly tipped with tawny. Ears, feet, and tail silvery, with a slight fulvous tinge.

Skull-dimensions of type:—

Condylo-basilar length 43.5 mm.; zygomatic breadth 33.5; nasals 17.2×6.2 ; upper molar series 8.6.

Hab. Eldoma Ravine, Brit. E. Africa. Alt. 7200'.

Type. Adult male. B.M. no. 3. 3. 7. 4. Original number 5. Collected 16th January, 1903, and presented by F. W. Isaac, Esq.

Tachyoryctes storeyi, sp. n.

Size comparatively large, only exceeded among E. African forms by *T. annectens*. Brain-case particularly long, its length greater than its breadth. Nasals long, expanded in front, with well-marked re-entrant lateral curves. Sagittal crest well-developed. Zygomata of medium expansion. Incisors broader in proportion than those of *ibeanus*.

Dimensions of the type skull (no external measurements available):—

Condyllo-basal length 46.5 mm.; zygomatic breadth 33.6; nasals 20×7.8 ; brain-case 21.5×19 ; upper molar series 8.5; length of bullæ 11.

Hab. Lake Elmentaita, Brit. E. Africa.

Type. Adult male. B.M. no. 4. 2. 1. 3. Original number 500. Collected 10th October, 1903, and presented by C. B. C. Storey, Esq., after whom I have named the species.

This well-marked form is readily distinguishable by its comparatively large size, long and well-defined brain-case, and long nasals.

Tachyoryctes naivashæ, sp. n.

Size smallest of the group; the skull broad, low, and flattened. Nasals small, evenly tapering backwards. Zygomata strong, widely expanded. Sagittal crest not highly developed. Bullæ of medium size.

Colour variable, the type light, its face not darker, a second specimen dark, with a blackish face.

Dimensions of the type (measured in flesh):—

Head and body 188 mm.; tail 46; hind foot 24.

Skull: condyllo-basal length 39.5; zygomatic breadth 31.3; nasals 16.2×6.3 ; brain-case 17.2×18.2 ; upper molar series 7.5; length of bullæ 10.

Hab. Lake Naivasha. Alt. 6350'.

Type. Old female. B.M. no. 8. 2. 6. 1. Original number A. II. Collected 25th May, 1901, and presented by R. J. Cuninghame, Esq.

It is curious that this, the smallest East-African *Tachyoryctes*, should occur quite close to the two largest, *T. annectens* and *storeyi*. Its small size and flattened skull will readily separate it from any other form.

Tachyoryctes spalacinus, sp. n.

A medium-sized species, with the occipital plane unusually slanted forward.

Size about as in *T. ruddi*. Sagittal crest linear, well developed. Nasals rather small, with but slight tendency to lateral re-entrant curves. Occipital plane much more slanted forward than usual, tending toward the condition characteristic of *Spalax*, the plane at an angle to a gnathion—condylar line of about 65° , as compared with about 75° in all the other East-African species; the lambdon above the anterior edge of the external auditory meatus.

Colour of the single specimen rather dark, the head blackened.

Dimensions of the type:—

Hind foot (dry) 29 mm.

Skull: condylo-basal length 42.5; zygomatic breadth 31.5; nasals 15.7×5.5 ; tip of nasals to lambdon 38; brain-case 18×18.3 ; upper molar series 8; length of bullæ 10.5.

Hab. Embi, near Mt. Kenya. Alt. 5400'.

Type. Adult male. B.M. no. O. 6. 1. 41. Original number 30. Collected 8th February, 1900, and presented by Lord Delamere.

Readily recognizable by its sloping occipital plane.

Leggada triton, sp. n.

A large species, allied to *L. musculoides* and *L. fors.*

General colour above about that of *Mus musculus*, or rather darker. Below greyish, the hairs slaty at base, their ends greyish white with a slight buffy tone; line of demarcation on sides not sharply defined. Upper side of hands and feet dark brown. Tail of medium length.

Skull markedly larger than that of any other known species, its surface smooth and rounded. Supraorbital edges well defined.

Dimensions of the type (measured in the flesh):—

Head and body 81 mm.; tail 51; hind foot 16.

Skull: greatest length 23 mm. (21 in the older type of *L. fors.*); greatest breadth 11.5; nasals 9; interorbital breadth 4; breadth of brain-case 10.6; palatal foramina 5.1; upper molar series 3.8.

Hab. Kirui, Elgon, British East Africa. Alt. 6000'.

Type. Adult female. Rudd Collection. Original number 252. Collected 13th September, 1909, by Robin Kemp. Three specimens.

Readily distinguishable from its allies by the greater size of its skull.

Leggada sorella, sp. n.

A large species of the smaller group of the genus, that containing the species with a white belly edged with buffy.

Size approaching that in the *L. musculoides* group. Fur

crisp; hairs of back about 4.5 mm. in length. Colour of back and crown about as in *L. triton*, but on the cheeks and sides this becomes more buffy, and there is an unusually definite buffy-ochraceous line edging the belly, which is sharply defined pure white. Upper side of hands and feet white. Tail rather short, dark above, dull whitish below.

Skull long, unusually slender, especially in the muzzle; incisors more thrown forward than usual; brain-case narrow, smooth, and rounded. Palatal foramina long, reaching past the antero-internal cusp of *m*¹.

Dimensions of the type (measured in flesh):—

Head and body 65 mm.; tail 37; hind foot 12.

Skull: greatest length 21 (18 in *L. grata*); nasals 7.7; interorbital breadth 3.5; breadth of brain-case 9.2; palatal foramina 5.6; upper molar series 3.6.

Hab. Kirui, Elgon. Alt. 6000'.

Type. Adult female. Rudd Collection. Original number 282. Collected 16th September, 1909, by Robin Kemp.

This pretty species is most nearly allied to the ordinary *L. grata* of East Africa generally, but is distinguished by its long slender skull.

LXXI.—*New Mammals from British East Africa.*

By GUY DOLLMAN, B.A.

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Galago braccatus albipes, subsp. n.

Allied to *Galago braccatus*, Elliot, but with much lighter-coloured limbs and darker back.

Fur soft and of medium length; individual hairs measuring about 13 mm. in length on back. General colour of back dark ash grey. Upper surface of fore limbs similar in colour to back, paler and yellower towards the extremities. Upper surface of hind limbs dark grey for the first 30 mm. or so, the remainder pale yellowish buff, rather greyer on the inside. Backs of fingers and toes white. Under surface of body greyish white; throat and chest buff-coloured. Under-sides of limbs greyish-buff, the buff tint not nearly so rich as in *G. braccatus*.

Skull with shorter nasals and smaller teeth.

Dimensions of the type (measured in the flesh):—

Head and body 175 mm.; tail 270; hind foot 65; ear 41.

Skull: greatest length 46 mm.; basilar length 32; condylo-basilar length 38; zygomatic breadth 33.5; palatilar length 14; length of upper tooth-row, from front of first premolar to back of last molar 13.

Hab. Kirui, Elgon, British East Africa. Altitude 6000 feet.

Type. Adult male. Rudd Collection. Original number 210. Collected by Mr. R. Kemp on September 8th, 1909.

The dark grey-coloured back and much paler limbs and under surface indicate that these Elgon specimens must be considered subspecifically distinct from *G. braccatus*.

Lophuromys zena, sp. n.

Larger than *L. aquilus*, Truc, and with the body speckled all over with buff.

Tail longer, measuring 64 mm. in the flesh. Fur thick and of medium length, about 10 mm. in length on back. General colour of back reddish brown (near raw umber no. 3, 'Repertoire de Couleurs'), closely speckled with orange-buff, the speckling extending back on to the rump and hind limbs. Individual hairs of back orange at base, becoming brownish towards the middle, subterminal ring orange-buff, tip dark brown. Flanks and upper surface of limbs similar in colour to back, but not quite so rich in colour. Sides of face buffy (snuff-brown no 1, 'Repertoire'). Backs of hands brownish, with a light buff-coloured patch on the inside of the wrist; digits covered with short greyish hairs. Upper surface of feet brown, with a similar light-coloured patch on the outside of the metatarsal region, toes covered with light greyish-white hairs. Under surface of body yellowish buff (maize-yellow no. 2, 'Repertoire'). Underside of limbs rather greyer in colour than belly. Upper surface of tail thinly covered with short dark brown hairs; lower surface rather more thickly clothed with greyish-white hairs.

Skull large, with rather long nasals and palatal foramina; teeth a little larger than those of the following species.

Dimensions of the type (measured in the flesh):—

Head and body 134 mm.; tail 64; hind foot 20; ear 17.

Skull: condylo-basal length 29 mm.; basal length 26.1; condylo-basilar length 27.2; basilar length 24.9; zygomatic breadth 15; palatal length 14.5; palatilar length 12.9; greatest length of nasals 12.2; length of palatal foramina 6.4; length of upper molar series 5.5.

Hab. East side of the Aberdare Range, near Nyeri, British East Africa; lat. 0° 28' 00" S., long. 36° 45' 00" E. Altitude 9581 feet.

Type. Adult male. B.M. no. 6. 7. 8. 27. Original number 17. Presented by Mrs. Holms Tarn, who collected the specimen on November 8th, 1905.

In addition to the type, Mrs. Holms Tarn has presented ten other specimens to the Museum, all from the Aberdare Range, the whole series being exactly similar to the type.

I have compared this form with Mr. True's description of *L. aquilus*, and consider that it must be regarded as a distinct species.

Lophuromys rubecula, sp. n.

Allied to the foregoing species, but much darker in colour and more finely speckled with orange.

Size rather smaller than *L. zena*. General colour of back dark brown (dark chocolate-brown no. 3, 'Repertoire de Couleurs'), very finely speckled, over the entire surface, with bright orange. Individual hairs of back orange-red at base, gradually darkening towards the apical portion; sub-terminal ring orange, tip black. Sides of face richer in colour than flanks (near fawn no. 3, 'Repertoire'). Upper surface of hands and feet brownish red, the feet rather paler than the hands. Under surface of body rich cinnamon (yellowish salmon no. 3, 'Repertoire'), darker on the throat, chest, and underside of limbs. Upper surface of tail brownish black, lower surface greyish, but not so light in colour as in *L. zena*.

Skull rather smaller than that of *L. zena*, with shorter nasals and smaller cheek-teeth.

Dimensions of the type (measured in the flesh):—

Head and body 118 mm.; tail 62; hind foot 20; ear 17.

Skull: condylo-basal length 27·8; basal length 25·1; condylo-basilar length 26; basilar length 23·8; zygomatic breadth 14; palatal length 13·5; palatilar length 11·7; greatest length of nasals 11; length of palatal foramina 5·5; length of upper tooth-row 4·7.

Hab. Elgonyi, Elgon, British East Africa. Altitude 7000 ft.

Type. Adult male. Rudd Collection. Original number 311. Collected by Mr. R. Kemp on September 26th, 1909.

In addition to the type, Mr. Kemp obtained two other specimens referable to this new form, both from Elgonyi.

This species is readily distinguished from *L. zena* by its smaller size and very much darker colour, and from *L. aquilus*, True, by the richer colour at the bases of the hairs and in having the entire upper surface finely speckled with buffy orange.

It is interesting to note that *L. ansorgei*, de Wint., a member of the western *sikapusi* group, occurs quite close to Elgon, the type locality being Mumias.

URANOMYS, gen. nov. (*Muridae*).

Size similar to *Lophuromys*. Hind feet small, with short toes; claws small, as in *Muriculus*.

Fur long and harsh, very much as in *Lophuromys*. Tail longer than in *Muriculus*, thinly clad with short coarse hairs.

Skull similar in general appearance to that of *Muriculus*, but very much larger and more heavily built. Pterygoid region quite unlike both that of *Muriculus* and *Lophuromys*, a well-defined A-shaped ridge extending from the posterior end of the palate to the anterior ends of the auditory bullæ. Incisors large and heavy, thrown forwards even more than in the case of *Muriculus*. Lower jaw similar in shape to that of *Muriculus*; incisors extending back into the posterior part of the mandible, to form a prominent excrescence close to the condyle.

Type. *Uranomys ruddi*.

The unique arrangement of the pterygoid region necessitates this species being regarded as forming a distinct genus. The skin-characters would appear to indicate a close relationship with the genus *Lophuromys*, but, on account of the general structure of the skull, this new form must be considered as more nearly allied to *Muriculus*.

Uranomys ruddi, sp. n.

General appearance very much that of a light-coloured *Lophuromys*.

Feet and ears rather small, tail a little longer than that of *Lophuromys aquilus*, True. Hair on back harsh and long, measuring about 17 mm. in length on rump. General colour of back greyish brown (warm sepia no. 1, 'Repertoire de Couleurs'), paling to a buffy tint (between dark fawn no. 2 and yellowish salmon no. 3, 'Repertoire') on the sides and upper surface of limbs. Individual hairs of back slaty grey at base, tips dark brown, subterminal ring orange-buff. Nasal region and top of head rather darker than back. Sides of face pale buff. Upper surface of hands and feet white. Under surface of body white, washed over with pinkish buff (pale flesh no. 1, 'Repertoire'). Tail thinly covered with short, rather stiff, grey hairs.

Skull strongly built. Cranial region large and rather elongate, almost pear-shaped. Nasals broad and very short, the premaxillary region projecting for about 3 mm. in front of their anterior ends. Occipital region well developed. Palatal foramina very long, extending back posteriorly as far as the middle of the first molar. Auditory bullæ rather small and flat. Molar series small, evidently murine in character, but the teeth are too worn to make out the cusps. Palate, pterygoids, and incisors as described above.

Dimensions of the type (measured in the flesh):—

Head and body 118 mm.; tail 77; hind foot 19; ear 15.

Skull: greatest length 30.4; condylo-basal length 28.5;

basal length 27; condylo-basilar length 27; basilar length 26; zygomatic breadth (across squamosal region) 16; nasals, greatest length 10, greatest breadth 3.2; length of palatal foramina 8; length of upper molar series 5.

Hab. Kirui, Elgon, British East Africa. Altitude 6000 feet.

Type. Old female. Rudd Collection. Original number 257. Collected by Mr. R. Kemp on September 14th, 1909.

I have named this interesting species after Mr. C. D. Rudd, to whose enterprise the discovery of this new genus is due.

BIBLIOGRAPHICAL NOTICE.

Fische der Süd-See.—Part VIII. By Dr. ALBERT GÜNTHER. Being Heft xvi. of the 'Journal des Museum Godeffroy.' Hamburg, 1909. 4to.

For the benefit of those of the readers of the 'Annals' who may have forgotten, or may never have been acquainted with, the history of the 'Journal of the Museum Godeffroy,' we offer this brief summary of its origin and object. In the latter half of the last century a wealthy merchant of Hamburg, the late Herr Cæsar Godeffroy, whose firm had extensive trade connexions in many parts of the world, and especially in the Pacific, conceived the idea of collecting in a separate museum the numerous objects brought home by his ships. This, the "Museum Godeffroy," was placed in the charge of an exceedingly able curator, the late J. D. E. Schmeltz, whose death, as Director of the Ethnographical Museum at Leyden, we had to deplore last year. By the advice of the latter, and guided by his own enlightened and generous spirit, Godeffroy not only engaged a staff of experienced collectors, who sent home large and numerous consignments of ethnographical and natural history specimens, but also determined upon the creation of a special Journal, in which the more important results of the labours of his travellers should be published.

Thus the 'Journal of the Museum Godeffroy' was devoted to a miscellaneous series of papers on ethnographical, geographical, botanical, and zoological subjects. The first part appeared in 1873, L. Friederichsen & Co., of Hamburg, being the publishers.

Among the men who worked for the Godeffroy Museum was a collector, Andrew Garrett, who during his long residence in the Pacific islands, particularly in the Sandwich and Society groups, had formed a collection of some 470 illustrations of fishes, drawn and coloured from life by himself. This collection was purchased by C. Godeffroy with the view of utilising it for his Journal. He consulted Dr. Günther, who proposed to make it the basis for the

illustrations of a general work on the fishes of the South Seas which was to include all the species then known. Dr. Günther undertook to prepare this work on the understanding that he should be at liberty to make a first selection from all collections sent to Hamburg for the completion of the series in the British Museum. It was arranged that this monograph, whilst forming an integral portion of the Journal, should have certain parts exclusively devoted to it, with a consecutive pagination of its own.

Seven parts of the 'Fische der Süd-See' (pp. 1-260), illustrated with 160 plates, had appeared, when, in 1881, owing to financial difficulties, the Godeffroy Museum, and with it the Journal, ceased to exist.

More than twenty-five years elapsed before the energetic publisher Dr. L. Friederichsen, of Hamburg, succeeded in finding the means for the continuance and completion of the 'Fische der Süd-See' through the munificence of the Trustees of the "Dr. Wilhelm Martin von Godeffroy Familien-Fidei-Commiss Stiftung." It is a fortunate circumstance that the author of the earlier parts has been able to undertake the completion of a work to the preparation of which he had devoted much time and labour. It would either have been left unfinished or have been continued by another hand, with the inevitable consequence of lack of uniformity of treatment. Besides, the British Museum was clearly the place most appropriate to the work, containing as it does the most complete collection of South-Sea fish, many obtained by Garrett and others of the Godeffroy staff, as well as a large number of types from the Indian Ocean which, on account of their close affinity to species of the Pacific fauna, are necessary for critical comparative examination.

The new part consists of 128 pages of letterpress, illustrated by several text-figures, and 20 plates, executed partly by Werner and Winter, partly by Green. It deals with the Labridæ, Anacanthini, and Malacopterygii-Pharyngognathi and Abdominales. Over 200 species are described, but only eight are added to those previously named, the author taking binominal species in a wider sense than some ichthyologists of the present time. And in this he seems to be particularly justified in a family like the Labridæ, in which the coloration varies in an extraordinary degree with age and season, sex and locality. It is to be regretted that the author was unable to make more considerable additions to our knowledge of life-histories; but in this respect we could only expect information of value from scientific observers residing for a considerable period in the islands. Garrett seems to have been satisfied with endeavouring to acquaint us with the wonderful brilliance and play of colour of the fish of the Pacific Coral-reefs; eighteen out of twenty plates have been reproduced from his pictures.

We hope that the Author will be able to carry out his intention of issuing another part within the coming year, which will then conclude this magnificent monograph.

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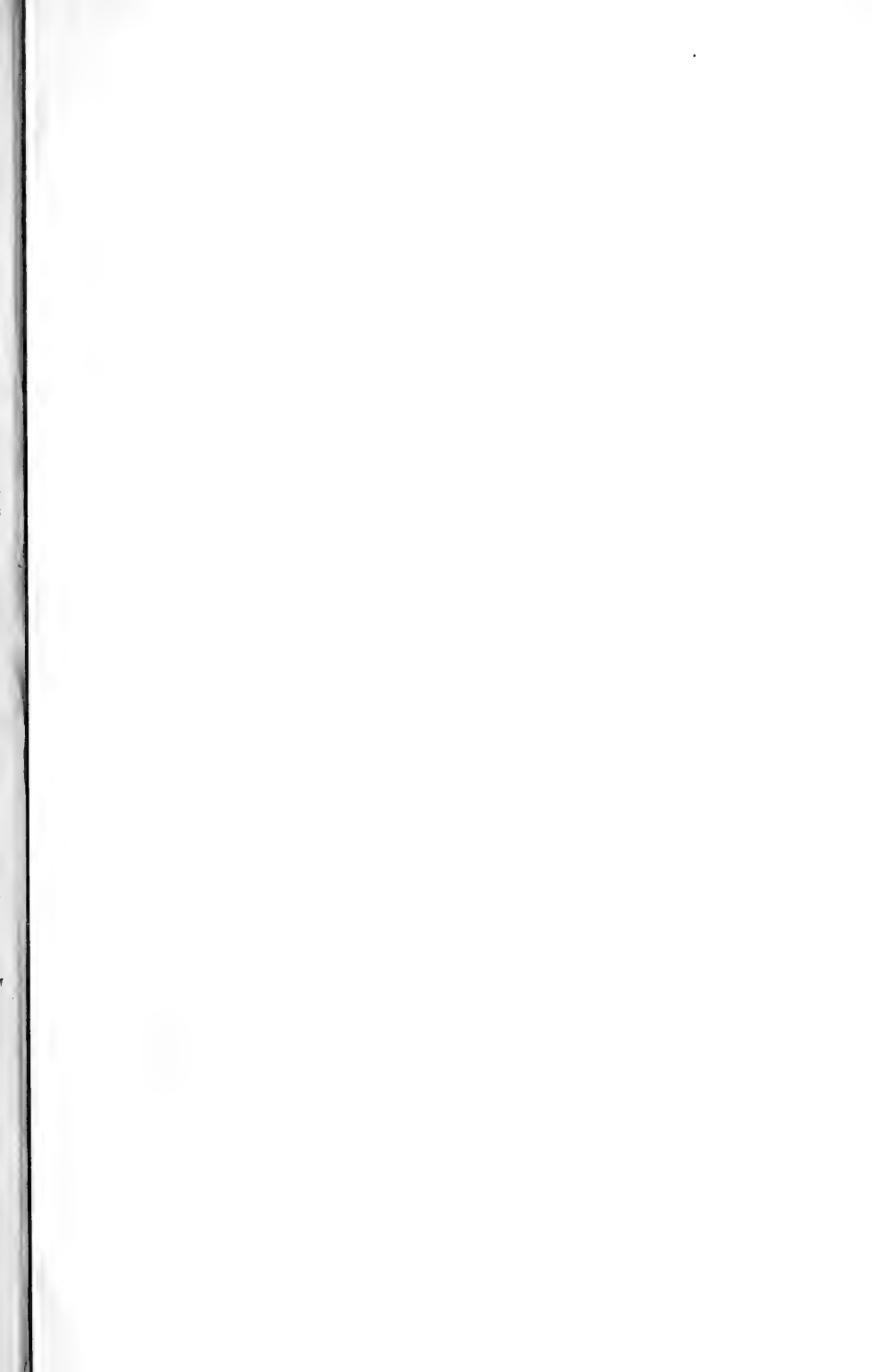
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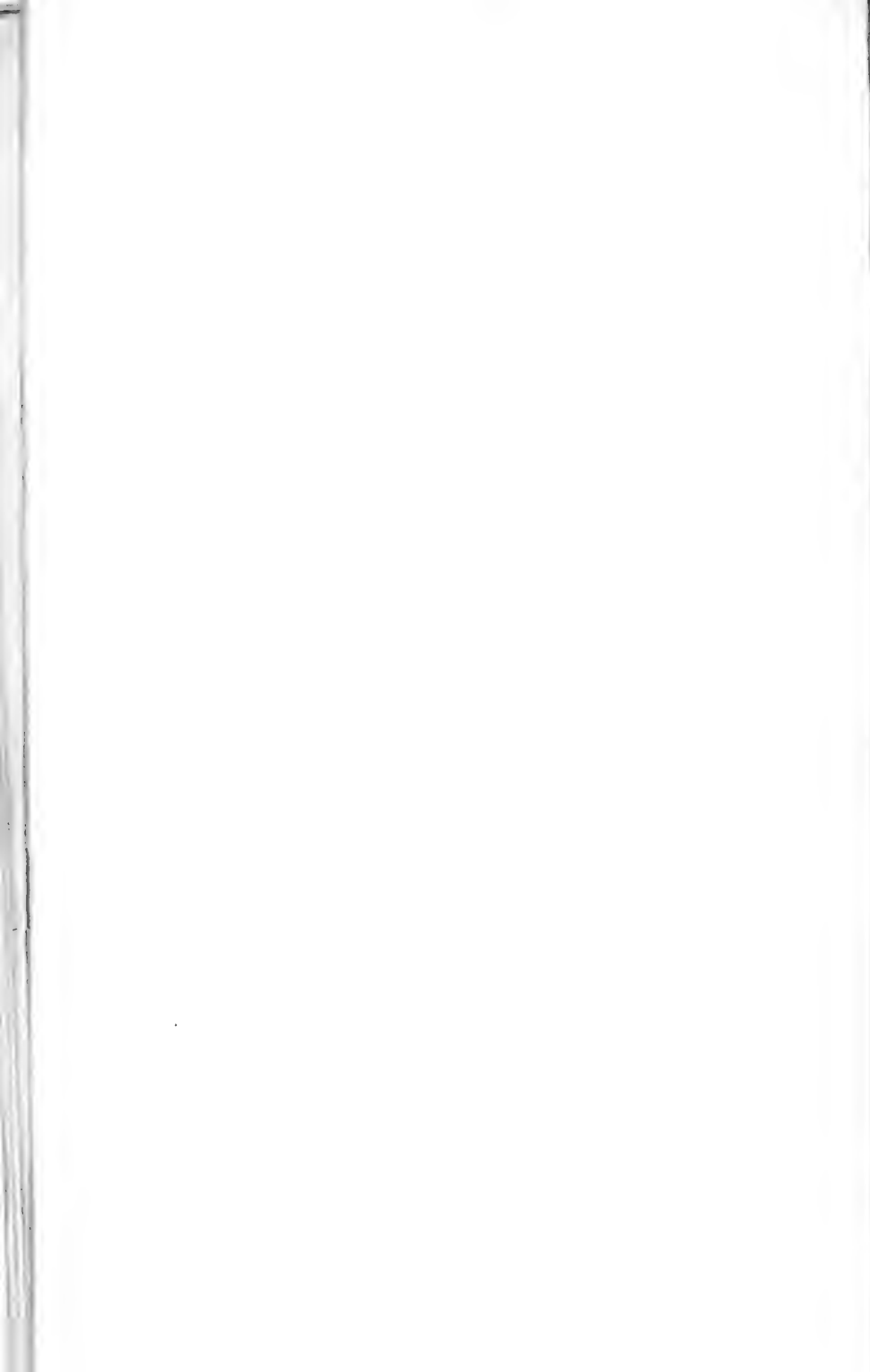
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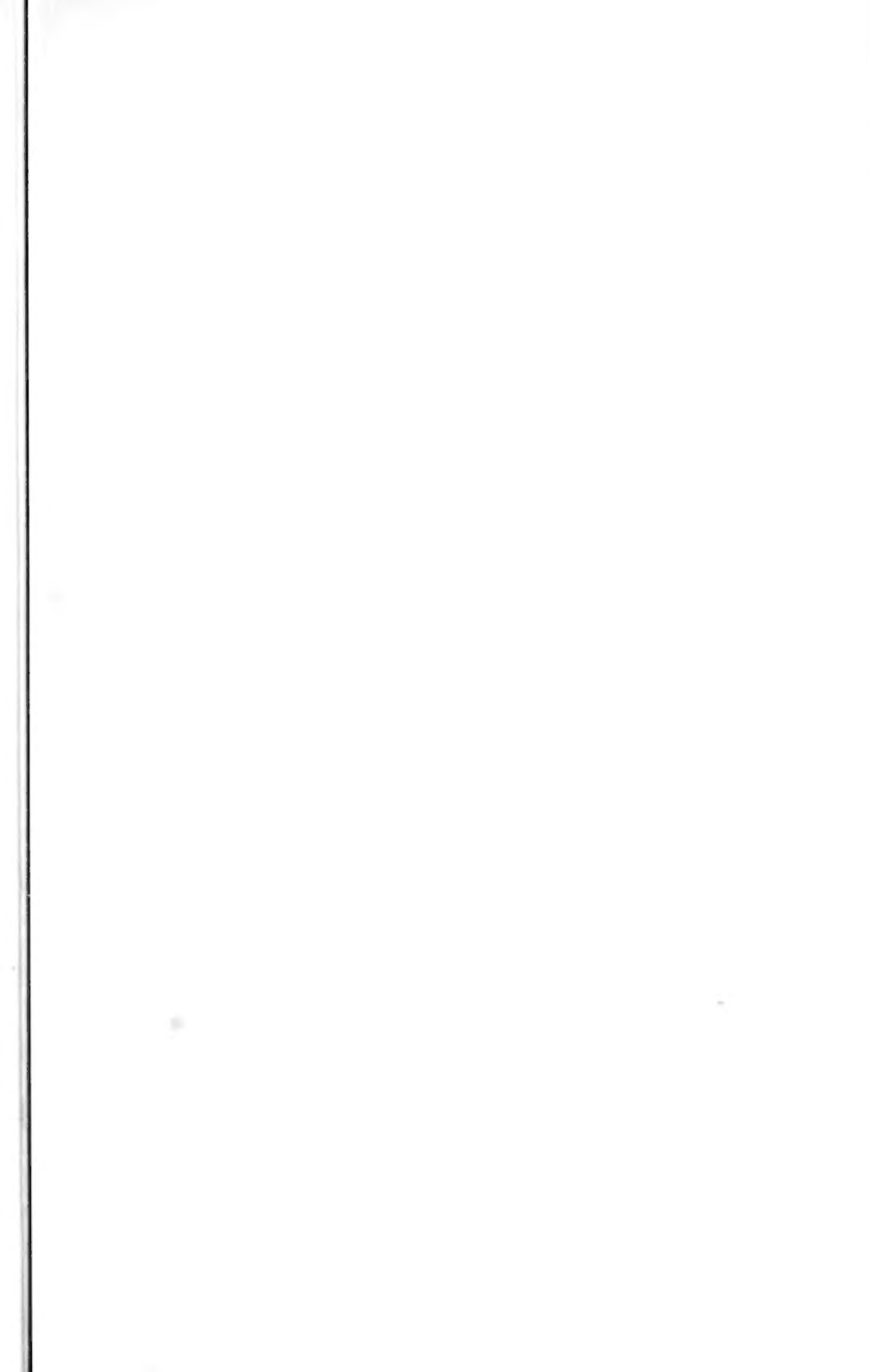
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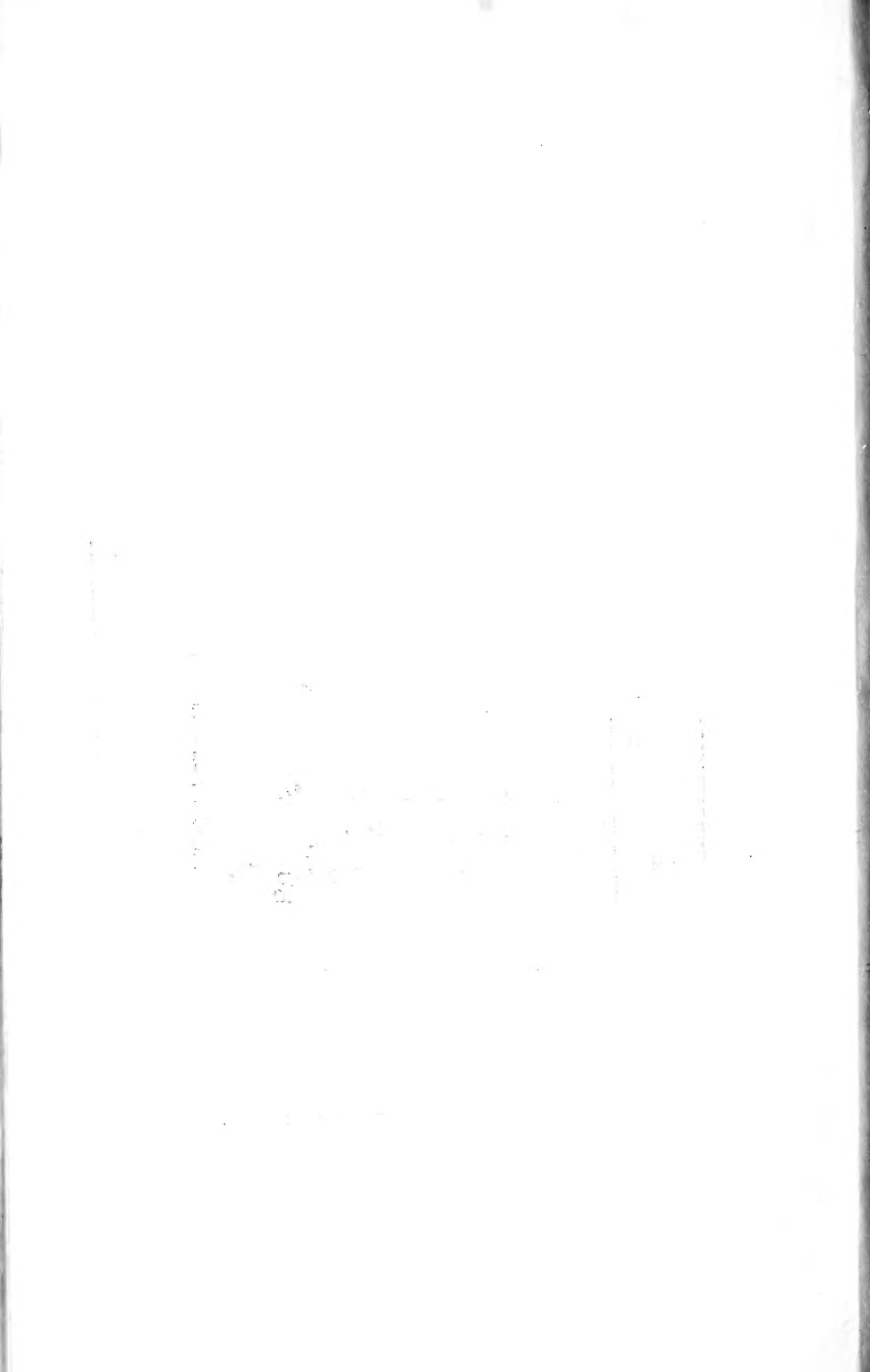
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