





THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.

INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY.

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

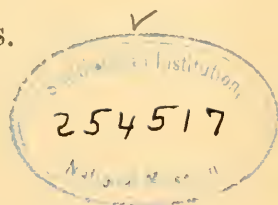
CONDUCTED BY

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,

ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,

AND

RICHARD T. FRANCIS, F.Z.S.



VOL. IV.—NINTH SERIES.

LONDON:

PRINTED AND PUBLISHED BY TAYLOR AND FRANCIS.
SOLD BY BAILLIÈRE, PARIS: AND HODGES, FIGGIS, AND CO., DUBLIN.

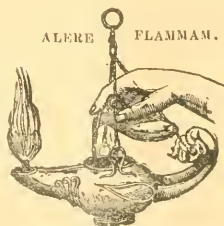
1919.

“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 eruditis et sapientibus semper exulta; malò 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.”—BRÜCKNER, *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.



CONTENTS OF VOL. IV.

[NINTH SERIES.]

NUMBER 19.

	Page
I. Papers on Oriental <i>Carabidae</i> .—II. By H. E. ANDREWES....	1
II. The Myth of the Ship-holder: a Postscript. By E. W. GUDGER, American Museum of Natural History, New York City..	17
III. Systematic Notes on a few Melolonthine Coleoptera. By GILBERT J. ARROW. (Plate I.)	21
IV. On a small Collection of Mammals from Lumbo, Mozambique. By OLDFIELD THOMAS	29
V. A List of the Freshwater Fishes of Sierra Leone. By G. A. BOULENGER, F.R.S.	34
VI. Notes on the <i>Ichneumonidae</i> in the British Museum.—II. By ROWLAND E. TURNER, F.Z.S., F.E.S.	36
VII. Notes on Fossorial Hymenoptera. —XXXVIII. On new Ethiopian Species. By ROWLAND E. TURNER, F.Z.S., F.E.S.	44
Proceedings of the Geological Society.....	59

NUMBER 20.

	Page
VIII. Descriptions of New <i>Pyralidæ</i> of the Subfamilies <i>Crambinae</i> and <i>Saginae</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c.	53
IX. Notes on Fossorial Hymenoptera.—XXXIX. New <i>Sphecoidea</i> collected in Palestine by Major E. E. Austen. By ROWLAND E. TURNER, F.Z.S., F.E.S.	69
X. Descriptions of new Species and Genera of the Heteropterous Family <i>Reduviidæ</i> from British India. By W. L. DISTANT	71
XI. On the Discovery of Two Species of <i>Brachychateumidæ</i> , a Minor Group of Millipedes peculiar to the British Isles. By RICHARD S. BAGNALL, F.L.S.	79
XII. New Species and Genera of <i>Nymphalidæ</i> , <i>Syntomidæ</i> , and <i>Sphingidæ</i> in the Joicey Collection. By W. J. KAYE, F.E.S.	84
XIII. A new Species of the Nematode Genus <i>Crossocephalus</i> from the Rhinoceros. By H. A. BAYLIS, M.A.	94
XIV. Descriptions and Records of Bees.—LXXXVI. By T. D. A. COCKERELL, University of Colorado	98

NUMBER 21.

XV. Notes on <i>Platypodidæ</i> and <i>Scolytidæ</i> collected by Mr. G. E. Bryant and others. By Lt.-Col. WINN SAMPSON, F.E.S.	105
XVI. On a curious Malformation in <i>Tenia saginata</i> . By H. A. BAYLIS, M.A.	114
XVII. Indo-Malayan and Australian <i>Noctuidæ</i> . By Colonel C. SWINHÖE, M.A., F.L.S., &c.	118
XVIII. A new Species of <i>Euneomys</i> from Patagonia. By OLD-FIELD THOMAS	127

	Page
XIX. List of Mammals from the Highlands of Jujuy, North Argentina, collected by Sr. E. Budin. By OLDFIELD THOMAS	128
XX. Two apparently undescribed Species of <i>Cicadidæ</i> from Tropical Africa. By W. L. DISTANT	136
XXI. Descriptions of New <i>Pyralidæ</i> of the Subfamilies <i>Crambinae</i> and <i>Siginae</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c.	137
XXII. Two new Rodents from Tartagal, Salta, N. Argentina. By OLDFIELD THOMAS	154
NUMBER 22.	
XXIII. Notes on the African and Asiatic Species of <i>Melyris</i> , Fab. (sensu lato), with an Account of their Sexual Characters. By G. C. CHAMPION, F.Z.S.	157
XXIV. A Contribution to the Study of South Indian Arachnology. By W. RAE SHERRIFFS, M.A., D.Sc., formerly Professor of Zoology, Madras Christian College, Madras. (Plates II.-VI.) . .	220
XXV. Brief Descriptions of new Thysanoptera.—X. By RICHARD S. BAGNALL, F.L.S.	253
XXVI. New Species and Forms in the Joicey Collection. By LOUIS B. PROUT	277
XXVII. Notes on the Genus <i>Cricetomys</i> , with Descriptions of Four new Forms. By MARTIN A. C. HINTON	282
XXVIII. The Method of taking the Incisive Index in Rodents. By OLDFIELD THOMAS	289
XXIX. Papers on Oriental <i>Carabidæ</i> .—III. By H. E. ANDREWEES	290
XXX. New Forms of South-American Birds. By CHARLES CHUBB, F.Z.S., M.B.O.U., Zoological Department, British Museum (Natural History)	301

NUMBER 23.

	Page
XXXI. Descriptions of New <i>Pyrallide</i> of the Subfamilies <i>Crambinae</i> and <i>Siginæ</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c.	305
XXXII. New Bryozoa from the Kuckers Stage in Esthonia. By HENDRIK BEKKER, Cand. Geol., University of Tartu (Dorpat). (Plate VII.)	327
XXXIII. Diagnose de Genres nouveaux de Sarcoptides plumi- coles (<i>Analgesinæ</i>). Par E.-L. TROUESSART, Professeur au Muséum National de Paris	336
XXXIV. On the Genus <i>Aorus</i> , Schh. (Coleoptera, <i>Curculionidæ</i>). By GUY A. K. MARSHALL, D.Sc.	338
XXXV. <i>Crossophorus collaris</i> , Hemprich & Ehrenberg, a little- known Nematode Parasite of the Hyrax. By H. A. BAYLIS, M.A.	343
XXXVI. The Types of the Mammals described by M. Fernand Lataste. By OLDFIELD THOMAS	350
XXXVII. Descriptions and Records of Bees.—LXXXVII. By T. D. A. COCKERELL, University of Colorado	355
XXXVIII. Notes on the African and Asiatic Species of <i>Melyris</i> , Fab. (sensu lato), with an Account of their Sexual Characters: Supplementary. By G. C. CHAMPION, F.Z.S.	360

NUMBER 24.

XXXIX. On Barnacles of the Genus <i>Megalasma</i> from Deep-sea Telegraph-Cables. By W. T. CALMAN, D.Sc.	361
XL. On Five new Mammals from Java. By HERBERT C. ROBINSON and C. BODEN KLOSS.	374

	Page
XLI. Notes on Ruteline Coleoptera and Descriptions of a few new Species in the British Museum. By GILBERT J. ARROW, F.Z.S., F.E.S. (Plate VIII.)	379
XLII. On Indo-Chinese Hymenoptera collected by R. Vitalis de Salvaza.—III. By ROWLAND E. TURNER, F.Z.S., F.E.S.	385
XLIII. A List of the Myriapoda of Ulster. By NEVIN H. FOSTER, F.L.S., M.R.I.A.	395
XLIV. New <i>Hispinæ</i> . By S. MAULIK, Professor of Zoology in the University of Calcutta	407
<i>New Books</i> :—Studies on Acari.—No. 1. The Genus <i>Demodex</i> , Owen. By STANLEY HIRST	411
Report on Cetacea stranded on the British Coasts during 1918. By Dr. S. F. HARMER, F.R.S.	412
Index	413

PLATES IN VOL. IV.

- PLATE I. Melolonthine Coleoptera.
II. }
III. }
IV. } South African spiders.
V. }
VI. }
VII. Ordovician Bryozoa from Esthonia.
VIII. Ruteline Coleoptera.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



CONDUCTED BY

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,
AND
RICHARD T. FRANCIS, F.Z.S.

BEING A CONTINUATION OF THE "ANNALS" COMBINED WITH
MESSRS. LONDON AND CHARLESWORTH'S "MAGAZINE OF NATURAL HISTORY."

WITH ONE PLATE.

Illustrative of Mr. G. J. Arrow's Paper on a few Melolonthine Coleoptera.

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Simpkin, Marshall, Hamilton, Kent, & Co., Ltd., Baillière, Paris:
and Hodges, Figgis, & Co., Dublin.

WATKINS & DONCASTER,

Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

G. A. BENTALL, F.Z.S.

CABINETS,
STORE BOXES,
SETTING BOARDS,
TRAVELLING
CASES,
NETS,
PINS, ETC.

Naturalist,

DUDLEY HOUSE,
SOUTHAMPTON STREET
(Opposite Hotel Cecil),

STRAND, LONDON,
W.C. 2.

BRITISH,
CONTINENTAL,
AND EXOTIC
LEPIDOPTERA,
COLEOPTERA,
BIRDS' EGGS
AND SKINS,
BOOKS, ETC.

Price Lists post free on request.

Price 12s. 6d.

THE FAUNA OF BRITISH INDIA

(Including Ceylon and Burma).

Published under the authority of the Secretary of State for India in Council.

Medium 8vo, with Text Illustrations.

RHYNCHOTA, Vol. VII.

TAYLOR & FRANCIS, Red Lion Court, Fleet Street, E.C. 4.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	} All Net.
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	
HALF-PAGE - -	1 2 6	1 0 0 „	17 6 „	
QUARTER-PAGE -	12 6	11 3 „	10 0 „	

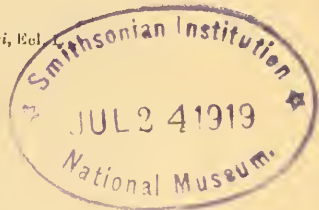
All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdhurst Road, Croydon.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.
[NINTH SERIES.]

"..... per litora spargite muscum,
Naiades, et circum vitreos considite fontes:
Pollice virgineo teneros hic 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, Dea pelagi, et pingui conchyliis succo."
N. Parthenii Giannettasi, Ecl.

No. 19. JULY 1919.



I.—*Papers on Oriental Carabidæ.*—II.
By H. E. ANDREWES.

IN this paper I am describing some new species of *Chlenius*, all of them either from India or from adjoining countries, and giving a few notes on old ones. It is now more than forty years since Chaudoir published (*Ann. Mus. Civ. Gen.* 1876) his Monograph on this genus and its allies, and since then a large number of new species have been described, chiefly—as far as Oriental species go—by H. W. Bates. A general revision is much to be desired, especially in view of certain defects in the synoptic table preceding the Monograph, viz.:—
(1) Chaudoir broke up the genus into groups, not into species (although some of the groups contain only a single species).
(2) The table, on its second page, goes quite to pieces; the signs used do not properly correspond, and this section is therefore of little use. I hope at some future date to tabulate the Eastern species, but there are as yet too many of them of which I have not seen examples. In the following descriptions the extreme measurements of the specimens examined are given after the name; any measurements given in the course of the description are those of the type-specimen.

Chlœnius (Homalolachnus) sexguttatus, ♂.

Length 14 mm. ; width 5.5 mm.

Black. Clypeus blue-green, head dark copper-red with metallic green margins ; prothorax black, with faint blue and green reflections round front angles ; elytra blue-black ; labrum, front of front femora, outer margin of front and intermediate tibiæ, and three spots on each elytron flavous ; first three joints of antennæ and apex of palpi reddish. Upper surface of prothorax and elytra with a short yellowish pubescence.

Head small, convex, labrum and clypeus smooth, frontal foveæ obsolete, a punctiform impression on each side of front adjoining clypeus ; surface irregularly punctate, more coarsely behind, some fine punctures mingled with the larger ones ; eyes moderately prominent.

Prothorax convex, narrow, very nearly as long as wide, nearly half as wide again as head, sides uniformly rounded, a little more contracted in front than behind, angles obtuse and rounded, a seta on margin at a fifth from base ; median line deep, not reaching extremities, other impressions obsolete ; surface very coarsely and confluent punctate.

Elytra elongate-ovate, half as wide again as prothorax, and nearly three times as long, punctate-striate, intervals moderately convex, each with two series of umbilicate punctures, surface dull ; front spot very small, elongate, adjoining shoulder, intermediate spot larger, triangular, extending over intervals 4-9 and tapering inwards, hind spot at a fifth from apex, irregularly rounded, extending over same intervals.

Underside shiny, slightly iridescent, coarsely but not closely punctate, ventral surface smooth in middle, finely and sparsely punctate at sides ; prosternal process not margined at apex, pilose, metepisterna as long as wide ; upper surface of tarsi sparsely pilose.

The species resembles *C. panagœoides*, Chaud., and is about the same size. The eyes are more prominent, prothorax narrower, more convex, more contracted behind, and with a deeper median line. The presence of a shoulder-spot on the elytra at once distinguishes the new species ; the other spots are rather smaller and extend inwards to stria 3 only, whereas in *C. panagœoides* they extend to stria 2 and sometimes to stria 1.

Upper Burma, Maymyo, May 1910 (*H. L. Andrewes*).

The type, a single ♂ specimen, is in my collection.

Chlœnius djaïna, Maindr., Bull. Soc. Ent. Fr. 1899, p. 251.

This species was described by Maindron from a ♀ example taken by him at Karachi and two examples taken by Cardon in Chota Nagpur. Mr. Guy Babault has kindly sent me one of the latter, which also proves to be a ♀. I have compared this with a specimen in the Pusa Collection from Chapra, Bengal (*Mackenzie*), which is evidently a ♂ of the same species.

Maindron quite rightly put it in the neighbourhood of *C. orbicollis*, Chaud. In dealing in his Monograph with this little group, for which he retained Laferté's name of *Ocybatus*, Chaudoir (p. 37) describes the palpi, which are of unusual form; he only knew the ♂, however, in one species, viz., *C. deyrollei*, Laf. The ♂ palpi in *C. djaïna* I find to be exactly as described by Chaudoir, but in the ♀ the apical joint of the labials is quite half as long again as wide.

Maindron says that the pubescence is "rare," but in the example from Chota Nagpur it has evidently been rubbed off; in the Chapra example it is comparatively dense and quite well marked on the prothorax.

Chlœnius kanaræ, ♂ ♀.

Length 14 mm.; width 5 mm.

Black. Head metallic green, prothorax dull copper-red on disk, greenish at sides, blue at extreme margin, elytra æeneous-black, interval 9 faintly blue; femora, tibiæ, and base of antennæ testaceous; rest of antennæ, labrum, palpi (tips lighter), trochanters, and tarsi reddish; a yellowish apical spot on each elytron. Prothorax and elytra finely pubescent.

Head small, very finely rugose, with a few small punctures; eyes prominent, antennæ slender, joint 3 almost glabrous, very slightly shorter than 4.

Prothorax convex, half as wide again as head, length to width as 3 to 4, more narrowed in front than behind, widest behind middle, sides rather explanate, hind angles obtuse and rounded, surface coarsely punctate, more sparsely towards front angles.

Elytra nearly parallel, one-fourth as wide again as prothorax, and three times as long; border rounded at shoulder, punctate-striate, intervals flat, finely aciculate; yellow spot near apex from middle of interval 3 to stria 9, the colour extending a little forward on intervals 5 and 6 and backwards on 6-8.

Underside shiny, iridescent, prosternal process bordered

at apex, pro-episterna moderately punctate on inner side, metepisterna longer than wide, moderately punctate, with a groove near outer margin. Front femora (δ) without trace of tooth; tarsi glabrous on upper surface.

Closely allied to *C. neelgheriensis*, Guér., but differing in the absence of a tooth on the front femora (δ); antennæ more slender, prothorax wider, more coarsely punctate, the punctures more uniformly distributed on disk, not so closely crowded together at base, both pro- and metepisterna with more numerous punctures.

Bombay, North Kanara (*T. R. D. Bell*), 2 δ δ , 1 ♀ .

Type (δ) in my collection.

Chlænium multicolor, δ .

Length 15 mm.; width 6 mm.

Black; head and prothorax metallic green, the latter with some faint copper-red colour along median line, and blue reflections at margin, elytra purple-blue; legs, antennæ, palpi, and mouth-parts reddish. Prothorax and elytra covered, but not closely, with a grey pubescence.

Head moderately convex, faintly rugose, a few coarse punctures on sides and vertex, neck closely, finely, and confluent punctate; eyes prominent, joint 3 of antennæ a third as long again as 4, labrum small, truncate.

Prothorax declivous towards front angles, rather flat behind, not quite twice as wide as head, length to width as 4 to 5, extremities truncate, but sides of base curve towards hind angles; contracted towards apex, which is much narrower than base, sides with a very fine border, margin explanate, rather widely so towards hind angles, which are obtuse and rounded; median line very fine, not reaching extremities, basal foveæ short but fairly deep, not reaching base, surface coarsely and irregularly punctate.

Elytra moderately shiny, elongate-ovate, base bisinuate, border forming an obtuse angle at shoulder, faintly sinuate near apex; punctate-striate, intervals flat, rather coarsely punctate, more sparsely on disk, very closely at sides.

Underside shiny and iridescent, prosternum moderately punctate, pro-episterna with only one or two stray punctures, prosternal process irregularly depressed but not bordered, metasternum and metepisterna coarsely punctate, the latter much longer than wide, with an external groove, ventral surface finely and sparsely punctate at sides. Front femora

(♂) without tooth; upper surface of tarsi very sparsely pilose.

I know of no other species with which to compare this. According to Chaudoir's table it would come near *C. abstersus*, Bates, from which it is widely different.

Bombay, Belgaum.

The type (♂), a unique specimen, is in my collection. I find from my notes that I took it in July 1886.

Chlænium chapanus, ♂ ♀.

Length 13-14 mm. ; width 4.25-4.75 mm.

Black; head and prothorax metallic green, side-margins of latter dark green-blue; legs, antennæ, and palpi dark red; apex of palpi and an apical spot on each elytron red-yellow.

Head (2.25 mm. wide) shiny, convex, closely and finely punctate, the punctures of varying sizes, vertex smoother, finely rugose; eyes moderately prominent, palpi slender but short, joint 3 of antennæ practically glabrous, hardly longer than 4.

Prothorax transverse (3 × 2.75 mm.), subcordate, rather flat, truncate at extremities, sides gently rounded, slightly sinuate before hind angles, which are about right, though rounded, border very fine, reflexed near hind angles; median line fine, not reaching extremities, basal foveæ elongate, fairly deep, surface moderately shiny, closely, more or less confluent, but not very coarsely punctate, more sparsely on disk at each side of median line, pubescence rather long though not obvious.

Elytra (about 8.5 mm. long) elongate, nearly parallel, border rounded at shoulders, rather strongly sinuate before apex, punctulate-striate, intervals flat, the whole surface very finely aciculate-punctate, the punctures transversely confluent, covered with a rather long though not dense yellowish pubescence; the yellowish spot at a fourth from apex, irregularly transverse, covering striæ 3-8.

Underside sparsely punctate, nearly glabrous, prosternal process bordered, metepisterna elongate, with a groove along outer margin, along with metasternum, and sides of ventral surface at base coarsely but not closely punctate. Front femora (♂) without tooth; tarsi pubescent on upper surface, joints 1-3 of front tarsi (♂) strongly dilated.

Allied to *C. tetragonoderus*, Chand.; eyes less prominent, antennæ much longer, prothorax narrower, much more contracted behind, more coarsely and closely punctate, elytra—

owing to the fine and transversely confluent puncturation—more opaque.

Tonkin, Chapa, May 1916 (*R. Vitalis de Salvaza*), 4 ♂♂, 1 ♀.

The type is in the British Museum.

Chlœnius vitalisi, ♂ ♀.

Length 12–14 mm. ; width 4.25–5 mm.

Black ; head and prothorax metallic green, elytra green, darker (sometimes with faint purplish tinge) on disk ; legs, first three joints of antennæ (rest brown), and apex of elytra flavous ; palpi, margin and epipleuræ of elytra, margin and apex of ventral surface yellow-red.

Head (2.5 mm. wide) shiny, convex, minutely rugose, with a few small scattered punctures, eyes prominent, antennæ long, joint 3 sparsely pilose, half as long again as 4, palpi slender.

Prothorax transverse (3 × 2.75 mm.) moderately shiny, subconvex, truncate in front, base emarginate, widest before middle, sides rounded in front, slightly sinuate behind, hind angles a little obtuse and rounded, side-border very fine ; median line fine, basal fovæ deep, curving behind towards hind angles, surface very finely vermiculate-striate, more densely near both front and hind angles, sparsely covered with punctures of moderate size, basal area with some finer punctures as well, middle of base longitudinally striate.

Elytra subconvex and subopaque, nearly three times as long as prothorax, widest a little behind middle, border obtusely angled at shoulder, hardly sinuate towards apex, punctulate-striate, with a row of minute setiferous punctures (visible only when magnified) on each side of the striæ, intervals 8 and 9, and the apical area more visibly punctate and pubescent, border dark red for first two-fifths, interval 9 also for next two-fifths, apex widely flavous, with irregular front margin (as in *C. inops*, Chaud.).

Underside shiny, proepisterna smooth, sides of metasternum and episterna with a few scattered punctures, prosternal process unbordered, shortly pilose. Front femora without tooth, upper surface of tarsi very sparsely punctate, with a few minute setæ.

Very closely allied to *C. marginifer*, Chaud., but differing in the very fine rugosity of both head and prothorax, the latter wider and more contracted behind, surface of elytra less finely shagreened. In *C. marginifer* striæ 8 and 9 and the

apex are impunctate, the yellow border extends from shoulder to suture and is hardly wider at apex.

Laos: Vientiane, vi.-vii. 1915; Tourakom, vii. 1915; Pak Lane, i. 1918; Ban Nam Mo, iii. 1918 (*R. Vitalis de Salvaza*), 8 ex., ♂ ♀.

Type in the British Museum.

Chlenius tudicus, ♂ ♀.

Length 12.5 mm.; width 4.5 mm.

Black; head and prothorax metallic green, disk of latter faintly suffused with copper-red, elytra brown-black on disk as far on each side as stria 5, green at sides (in the two Kanarese specimens the prothorax and sides of the elytra are blue-green); legs, antennæ, palpi, epipleuræ of elytra, and margin of ventral surface testaceous red; labrum and border of elytra red-brown.

Head smooth, shiny, faintly strigose near eyes, with a few small punctures at sides; eyes prominent, antennæ and palpi slender, former with joint 3 hardly longer than 4.

Prothorax quadrate, a third as wide again as head, only a little wider than long, more contracted in front than behind, widest rather before middle, sides narrowly bordered, faintly sinuate before hind angles, which are obtuse though very little rounded, the sides of the base advancing towards them; median line fine, not nearly reaching extremities, basal fovæ rounded and deep, surface shiny, convex at sides, covered with few but coarse setiferous punctures, irregularly disposed.

Elytra elongate-oval, a third as wide again as prothorax and nearly three times as long, border with an angle at shoulder, punctate-striate, intervals rather flat, the whole surface finely aciculate-punctate and pubescent, the puncturation rather closer at sides.

Underside shiny and nearly smooth, metasternum and episterna moderately punctate, sides of ventral surface sparsely punctate and pubescent, prosternal process faintly bordered at apex, with a few setæ. Upper surface of tarsi glabrous; first three joints of front tarsi (♂) rather longer than wide.

The species belongs to the *C. chalthorax*, Wied., group, and seems most nearly allied to *C. privatus*, Bates, of which I have seen no example. The last-named species comes from Burma and is a much larger insect; it differs also to some extent in colour and has the head coarsely punctate. The coloration of the elytra in *C. tudicus* (except for the reddish border) is as in *C. chalthorax*, but the prothorax is more

coarsely and sparsely punctate, and the sinuation of the sides before the hind angles, though slight, is more evident.

Bombay, Belgaum, 6 ex. ♂ ♀ ; I took these at the end of May 1886 on the banks of a small pool near the village of Tudia. Bombay, North Kanara (*T. R. D. Bell*), 2 ex., ♂.

The type is in my collection.

Chlœnius apollo.

Length 12·0–14·5 mm. ; width 4·75–5·5 mm.

Black ; head and prothorax blue-green, latter usually blue at margins and green on disk, -elytra dark blue ; femora flavous, rest of legs, antennæ, palpi, and mouth-parts reddish.

Head (2·5 mm. wide) convex, uniformly and very finely punctate, frontal foveæ punctiform, eyes flat, joint 3 of antennæ sparsely pilose, half as long again as 4, palpi slender.

Prothorax rather flat, quadrate, as long as wide (3·5 mm.), broadly emarginate at both extremities and not much contracted, a little narrower in front than behind, sides very gently rounded, with a narrow reflexed border, hind angles rounded but well marked, sides of base advancing towards them ; median line fine, transverse impressions moderate, basal foveæ elongate, deep, curving backwards towards hind angles, surface glabrous and shiny, minutely punctulate, with some larger scattered punctures (almost wanting in the type), base longitudinally striate.

Elytra rather short, ovate, wider in ♀ than in ♂, not more than twice as long as prothorax, border sharply angled at shoulder, gradually increasing in width up to three-fifths from base, rounded at apex ; punctulate-striate, with a row of faintly indicated setiferous punctures on each side of the striæ, the setæ minute, an umbilicate pore near base of stria 1, intervals moderately convex, surface dull, interval 8 more evidently punctate.

Underside almost smooth and glabrous, metasternum, its episterna, and sides of ventral surface at base faintly punctate, prosternal process bordered at apex, metepisterna as long as wide. Dilated joints of front tarsi (♂) rather longer than wide, glabrous on upper surface.

Allied to *C. quadricolor*, but front tarsi (♂) with rather narrower joints and metepisterna no longer than wide. The very flat eyes, uniformly punctate head, nearly square prothorax, and short wide elytra distinguish this species from most other members of the group.

Nilgiri Hills, 6000' (*H. L. Andrewes*, 4 ex., *A. K. Weld*

Downing, 5 ex., T. V. Campbell, 1 ex.). Mr. Downing's specimens were taken at Hulikal; Dr. Campbell's specimen is in Mr. E. A. Butler's collection.

British Museum, 3 ex., labelled respectively "India," "S. India," and "Nilgiris."

The type (♂) is in my collection.

Chlenius nilgiricus, ♂ ♀.

Length 16.0 mm.; width 6.0 mm.

Black; head dark green, prothorax green on disk, darker (blue, purple, or blackish) on margin, elytra blue-black; femora, upperside of front tibiæ, and first joint of antennæ flavous, rest of legs and antennæ and mouth-parts dark red.

Head (3.0 mm. wide), including clypeus, finely punctate, longitudinally striate near eyes, which are only moderately prominent, joint 3 of antennæ sparsely pilose, about one-third as long again as 4.

Prothorax flat, quadrate, as long as wide (4.25 mm.), a little emarginate at extremities, about equally and very little contracted before and behind, sides very gently rounded, angles distinct but rounded; median line fine, transverse impressions visible in middle only, basal foveæ short but deep, parallel, not reaching base, but merging in a depressed area adjoining basal angles; surface shiny, minutely punctulate, uniformly but sparsely covered with larger (though still small) punctures, minutely striate along both basal and apical margins.

Elytra ovate, moderately convex, more than twice as long as prothorax, widest just behind middle, border angled at shoulder, punctulate-striate, with a well-marked row of setiferous punctures along each side of the striæ, intervals only moderately convex, the pubescence hardly noticeable.

Underside shiny, prosternum rugose at sides, process very finely bordered at apex, episterna with some punctures on inner side, sides of metasternum and the episterna rather coarsely, sides of ventral surface more finely and sparsely punctate, metepisterna rather longer than wide; tarsi glabrous on upper surface.

In the puncturation of the head and the form of the prothorax the species resembles *C. apollo*, but the insect is a larger one, the eyes are more prominent, the prothorax a little less sparsely punctate, the form of the basal foveæ different, the elytra longer, narrower, less convex, and with a longer scutellary striae. Compared with the better-known *C. quadricolor*, the head is larger and much more closely

punctate, prothorax equally contracted at extremities, flatter, surface more finely punctate, elytra rather similar, but the punctures on each side of the striæ are smaller, closer together, and more distinct.

Nilgiri Hills, 3000', Nov. 1910 (*H. L. Andrewes*), 2 ex., ♂ ♀; Coimbatore, 4. ii. 1913 (*T. B. Fletcher*), 1 ex., Agric. Coll. and Research Inst., Coimbatore.

The type is in my collection.

Chlenius fletcheri, ♂ ♀.

Length 13·5–16·0 mm. ; width 5·0–5·75 mm.

Black; head and prothorax metallic green, latter darker at margins; femora and joint 1 of antennæ red, rest of legs and antennæ dark red, palpi brown.

Head (3·0 mm. wide) convex, moderately shiny, finely punctate (a few larger punctures mingled with the small ones) and subrugose, frontal foveæ reduced to two small round punctures, eyes rather flat, joint 3 of antennæ nearly glabrous, quite half as long again as 4, palpi slender, labrum truncate.

Prothorax as long as wide (4·0 mm.), shiny, rather flat, widest at middle, equally contracted at extremities, which are very slightly emarginate, sides finely bordered and a little reflexed, moderately and quite uniformly rounded from base to apex, hind angles obtuse and rounded; median line fine, not reaching extremities, basal foveæ moderately deep, elongate, curving outwards at both extremities, produced and very shallow in front, surface moderately and fairly uniformly punctate throughout.

Elytra (9·5 mm. long) elongate-ovate, narrower and less dilated behind in ♂ than in ♀, base bisinuate, border sharply angled at shoulder, faintly sinuate before apex, punctulate-striate, a row of well-marked setiferous punctures along each side of the striæ, a few irregular additional punctures here and there, especially on intervals 1 and 2, more closely punctate at sides, intervals convex and moderately shiny in ♂, flat and dull in ♀.

Underside shiny, faintly iridescent, indistinctly pubescent, prosternal process bordered, pilose at apex, metepisterna half as long again as wide, coarsely punctate, ventral surface sparsely punctate at sides. Tarsi glabrous on upper surface, dilated joints (♂) a little longer than wide.

Very close to *C. nilgircus*, but the elytra are black. Prothorax more strongly rounded at sides, which are more or less reflexed, surface much more coarsely punctate, intervals of

elytra much more convex and more coarsely punctured in ♂, very similar in ♀.

Ceylon, Diyatalawa, 3. viii. 1908 (*T. B. Fletcher*), 1 ♂, 2 ♀ ♀.

British Museum.

Chlanenius opacipennis, Chaud. "Mon. des Chlénieniens," Ann. Mus. Civ. Gen. 1876, p. 176.

Chaudoir described this species from two Bengal examples (♂ ♀), but gives no hint of any difference in the sexes. I have before me seven examples, four males and three females, which I am convinced belong to the same species, but I find rather marked sexual differences. Chaudoir's description, as far as it goes, applies very well to the females, but the male insect is narrower, flatter, and much more brightly coloured; the head and prothorax do not differ much, but the elytra are not so opaque, the intervals are moderately convex, and the puncturation is coarser and more conspicuous. The side-margins of the prothorax are blue in front, the sides and apex of the elytra violet-blue, green on the shoulder.

♂ ♂. India and N.W. India, 2 ex., British Museum; Central Provinces (*Gen. Hearsey*), 1 ex., Hope Dept. Oxford Univ. Museum. Bengal, Chapra (*Mackenzie*), 1 ex., Agric. Research Inst., Pusa.

♀ ♀. Bengal, Barkura, eating millipede, 1 ex., Agric. Research Inst., Pusa. Central Provinces, Nagpur (*E. A. D'Abreu*), 1 ex. Central Mus., Nagpur. United Provinces, Sitapur (*H. G. Champion*), 1 ex.

Chlanenius henryi, ♂.

Length 15.5 mm.; width 6 mm.

Black; head and prothorax with an æneous tinge, green at margins; joints 1-3 of antennæ and legs testaceous, tarsi, labrum, and mouth-parts brown.

Head convex, coarsely and rugosely punctate, neck and middle of front nearly smooth, clypeus smooth, with an oblique rugose depression at each side, labrum strongly emarginate, eyes fairly prominent, antennæ thick, joint 3 a little longer than 4.

Prothorax moderately convex, a third as wide again as head, length to width as 3 to 4, widest rather behind middle, base slightly emarginate, apex truncate, narrower at apex than base, sides gently rounded, border narrow and a little reflexed, hind angles obtuse and rounded; median line very

fine, not reaching extremities, transverse impressions obsolete, basal foveæ short and narrow, hardly breaking the general convexity, distant from base, rather nearer margin than middle; surface coarsely, confluent, and uniformly punctate.

Elytra oval, convex, widest behind middle, half as wide again as prothorax and three times as long, border forming an angle at shoulder, punctate-striate, the punctures very fine and close together, the first stria arising from an umbilicate pore at some distance from base, the whole surface finely, closely, and uniformly punctate, with a short greyish pubescence.

Underside shiny and iridescent, sterna and episterna coarsely but not closely punctate, sides of ventral surface more finely and sparsely, prosternal process very finely bordered with some setæ at apex, metepisterna without external groove, a little longer than wide. Front femora (σ) without tooth; upper surface of tarsi minutely and very sparsely setose.

The species belongs to the group of which *C. chlorodius*, Dej., is the type, but, although the elytra are relatively longer, the form is more that of *C. opacipennis*, Chaud. It is widely distinguished from all other members of the group by the dense puncturation of both prothorax and elytra, also by the rounded hind angles of the former.

A single σ specimen from the Colombo Museum, sent to me some years ago by Mr. G. M. Henry, after whom I have named it. There is no locality-label, but I understand that the specimen was taken in Ceylon.

Chlœnius binghami, σ .

Length 12.0 mm.; width 5.0 mm.

Buff-coloured; basal two-fifths of elytra, together with an extension, in the form of a square patch over the first four intervals, to about a third from apex, and apex of mandibles black; apex of palpi and an ill-defined area near apex of elytra infuscate.

Head (2.25 mm. wide) convex, shiny, smooth, apart from some very minute punctures on neck and sides of front, frontal foveæ fairly deep, eyes prominent, labrum truncate, joint 3 of antennæ very sparsely pilose, equal to 4.

Prothorax transverse (3.25 \times 2.50 mm.), shiny, convex on disk, widest before middle, extremities truncate, sides of base advancing towards hind angles, sides with a fine border, slightly reflexed, strongly rounded in front, sinuate near hind

angles, which are right but not sharp, median line and transverse impressious well marked, basal foveæ large and fairly deep, surface smooth except over the foveæ and for a short distance forwards along sides, where it is coarsely punctate and pubescent.

Elytra (7.0 mm. long) short, rather convex, border forming a very obtuse angle at shoulder, and only faintly sinuate near apex, punctulate-striate, intervals convex on disk, much flatter at sides, the first four (where black) smooth, except for an irregular row of setiferous punctures along each side of the striæ, the rest of the surface closely punctate and pubescent, the puncturation rather coarse, the buff colour extending forwards along interval 9 and covering the shoulder, but not extending inwards beyond the base of stria 5.

Underside finely punctate and pubescent, but smoother down the middle line of the body, prosternal process not bordered, a few small setæ at apex, metepisterna much longer than wide, tarsi with a few minute setæ on upper surface.

Nearly related to *C. kolariensis*, Maindr., from Chota Nagpur, but larger, prothorax with blunter hind angles and quite without the minute rugosity of the base in that species; the median elytral intervals are more evidently smooth, and the square black patch projected backwards from the black basal area gives the species a very distinctive facies.

Upper Burma, Maymyo, 3000' (*Col. C. T. Bingham*), 1 ex., ♀.

The type is in the British Museum.

Chlenius corbetti, ♀.

Length 17 mm.; width 6.25 mm.

Dark green-blue; head and prothorax metallic green, latter copper-red on disk, elytra green-blue with middle of intervals blackish; legs, palpi, antennæ (lighter at apex), and labrum red.

Head (3.0 mm. wide) shiny, almost smooth, a very few punctures on sides and vertex, frontal foveæ obsolete, eyes fairly prominent, palpi slender, joint 3 of antennæ sparsely pilose, slightly curved, half as long again as 4.

Prothorax transverse (4 × 3.5 mm.), widest before middle, rather flat but declivous towards front angles, emarginate at extremities, sides rounded, sinuate at some distance from base, hind angles about right, projecting a little laterally, sides of base advancing towards them; median line fine, but rather deeply impressed, basal foveæ elongate, fairly deep, curving

backwards towards hind angles, surface shiny, finely punctate, sparsely on disk, more closely over basal area, where some large punctures are mingled with the small ones, faintly pubescent.

Elytra (10 mm. long) subopaque, flat, elongate, sides nearly parallel, border at shoulder forming a very obtuse angle, rounded at apex without appreciable sinuation, punctulate-striate, stria 1 arising from an umbilicate pore, intervals flat, the whole surface finely but not very closely aciculate-punctate, a few larger punctures mingled quite irregularly with the smaller ones, covered with a short but not dense yellowish pubescence.

Underside shiny, prosternal process unbordered, metepisterna a little longer than broad, without external groove, metasternum, its episterna, and sides of ventral surface moderately punctate and pubescent, much more finely and sparsely over the median area; tarsi pilose on upper surface.

The species seems to belong to the little American group in Chaudoir's Monograph, of which *C. cordicollis*, Kirby, is typical. The shape of the pronotum is unlike that of any Eastern species known to me, though it is very similar to that of *C. æratus*, Quens., from N. Africa. It is possible, though unlikely, that this is the unidentified *C. viridanus*, Motsch. (Bull. Mosc. 1864, iv. p. 339).

Burma, Rangoon (*G. Q. Corbett*), 1 ex., ♀.

The type is in my collection.

Chlanius laotinus, ♂ ♀.

Length 11-12 mm.; width 4.50-4.75 mm.

Black; head and prothorax dark metallic green (bluish when viewed sideways), elytra dark æneous on disk, green at base and sides, border of both prothorax and elytra dark red; legs, first three joints of antennæ (rest darker), palpi, apex of elytra (widely) and of ventral surface (narrowly) testaceous.

Head (2.0 mm. wide) convex, shiny, smooth, a few small punctures near eyes, frontal foveæ deep, rounded, subrugose, eyes moderately prominent, antennæ slender, joint 3 sparsely pilose, hardly longer than 4, palpi slender, labrum slightly emarginate.

Prothorax transverse (3.0 × 2.5 mm.), shiny, subconvex, widest just before middle, truncate at extremities, sides bordered and strongly rounded, sinuate just before hind angles, which are about right, sharp, projecting a little laterally, front angles rounded; median line rather deeply impressed,

basal foveæ large, rather shallow, surface moderately and fairly closely punctate, very closely over the basal foveæ, smooth on middle of disk (except along median line), pubescence evident and rather long.

Elytra (7.5 mm. long) ovate, convex, border rounded at shoulder, sinuate near apex, punctulate-striate, surface closely but not very finely punctate (as in *C. submarginatus*, Chaud.), more closely at sides, covered with a fairly long yellowish pubescence, apical area broadly testaceous, as in *C. inops*, Chaud., but more widely along suture, and not quite so far forwards along margin, with a less jagged edge where the colours meet.

Ventral surface finely punctate, the pubescence shorter and less evident than on upper surface, prosternum smooth between coxæ, process bordered and pilose at apex, metepisterna elongate. Upper surface of tarsi sparsely punctate and minutely setose, dilated joints (♂) rather narrow.

Closely allied to *C. fraterculus*, Maindr., of which Mr. Guy Babault has kindly sent me a typical specimen for examination. The form of the prothorax is almost identical, though in *C. laotinus* the hind angles are hardly acute, puncturation closer and finer, smooth discal area much smaller (in *C. fraterculus* it extends almost to the front angles), elytra rather more finely punctate, the yellow apical area extending further forwards at sides.

Laos; many examples taken at various localities in the Provinces of Luang Prabang and Haut Mekong, 1915-18 (*R. Vitalis de Salvaza*).

The type is in the British Museum.

Chlenius comans, ♂ ♀.

Length 11.5-13.0 mm.; width 4.25-5.0 mm.

Black; head and prothorax metallic green, latter sometimes copper-red on disk, elytra æneous black; legs, first three joints of antennæ (rest fuscous), palpi, border of prothorax and elytra, epipleuræ of elytra, and apex of ventral surface generally testaceous, but sometimes quite dark red.

Head (2.25 mm. wide) convex, shiny, minutely punctate, with a few larger punctures on front and near eyes, frontal foveæ small but deep, eyes prominent, joints 2 and 3 of antennæ moderately pilose, joint 3=4, palpi slender, labrum truncate.

Prothorax transverse (3.50 × 2.75 mm.), convex on disk, flatter towards base, truncate at extremities, sides moderately rounded, not sinuate before hind angles, not much wider

behind than in front, border narrow in front, thicker behind, hind angles obtuse, but not much rounded; median line very fine, basal foveæ short but fairly deep, curving outwards at both extremities, surface moderately punctate, closely near hind angles, disk almost smooth (except along median line), evidently pubescent.

Elytra (8.0 mm. long) ovate, subconvex, border rounded at shoulders, sinuate near apex, punctate-striate, intervals flat, surface rather finely aciculate-punctate, more closely at sides, with a fairly long golden-yellow pubescence.

Underside moderately shiny, closely punctate and pubescent, ventral surface very closely and finely, prosternum punctate between coxæ, process with indications of a border only, metepisterna elongate, closely punctate, metasternum with some coarse punctures as well. Upper surface of tarsi minutely punctate, practically glabrous. Dilated joints of front tarsi (δ) rather elongate.

According to Chaudoir's table the species would go with *C. tristis*, Schall., and *C. nigricornis*, F., but it is more closely allied to *C. submarginatus*, Chaud. Head a little wider than in the last-named species, prothorax less contracted behind, sides and especially hind angles much less rounded, less closely punctate, elytra more finely punctate, prosternal process practically unbordered. I think probably Chaudoir attached too much importance to the border on the prosternal process in this genus, as he did also in *Oodes* (see Bates, Ann. Mus. Civ. Gen. 1892, p. 323).

Tonkin: Hoabinh, Guang Yen, and Muong Sin, many examples (*R. Vitalis de Salvaza*), China (*Bowring*), 4 ex.

The type is in the British Museum.

Chlœnius unnotatus, δ ♀ .

Length 10–11 mm.; width 3.75–4.0 mm.

Blue-black; head metallic green or blue-green, border and epipleuræ of prothorax reddish; legs, palpi, labrum, joints 1 and 2 of antennæ, and a common spot near apex of elytra testaceous.

Head (2.0 mm. wide) convex, minutely punctate, smoother on vertex, frontal foveæ nearly obsolete, joints 1 and 2 of antennæ sparsely pilose, 3 more closely so and a little longer than 4, palpi slender, obliquely truncate at apex, labrum truncate.

Prothorax transverse (2.75 \times 2.25 mm.), flat, widest at middle, equally contracted and slightly emarginate at both extremities, very finely bordered at sides, strongly and evenly

rounded, without any sinuation before base, angles rounded, front ones a little prominent, hind ones obtuse; a fine median line reaching extremities, transverse impressions obsolete, basal foveæ shallow, surface opaque, finely and densely granulate and pubescent, the pubescence inconspicuous.

Elytra (6.5 mm. long) oval, narrower and more pointed at apex in ♂, rather flat on disk, opaque, border fine, rounded at shoulder, reflexed along sides, hardly sinuate before apex, punctulate-striate, intervals flat, finely but not very closely punctate, and inconspicuously pubescent; the testaceous spot, which is divided by the suture (red at this point), small, more or less rectangular, covering three intervals on each side of the suture, the colour extending a little nearer apex on interval 1; scutellum shagreened and indistinctly punctate.

Underside highly iridescent, shiny, sparsely punctate, and pubescent, prosternal process not bordered, metepisterna not much longer than wide; tarsi pubescent on upper surface.

Closely resembling *C. guttula*, Chaud., but larger, the common spot a little larger, more angular, and further from apex; head wider, less closely rugose, prothorax more coarsely granulate, striæ of elytra deeper and more evidently punctate.

Assam: Naga Hills, Assam Valley, Manipur (all *Doherty*), 1 ♂, 6 ♀ ♀.

British Museum.

II.—*The Myth of the Ship-holder: a Postscript.* By E. W. GUDGER, American Museum of Natural History, New York City.

IN the issue of this Journal for October 1918 I published a paper of some length on this myth*. While that paper was going through the press I chanced upon some additional data bearing on this subject and its explanation, and it has seemed worth while to present it here in abbreviated form in the hope that it may prove of interest to readers of the first paper. It is all the more interesting because three of the writers quoted approximated the true explanation.

The first of these old writers is Jerome Cardan, mathematician, naturalist, and several other things beside. In

* Gudger, E. W., "The Myth of the Ship-holder: Studies in Echeneis or Remora.—I." *Ann. & Mag. Nat. Hist.* 1918, ser. 9, vol. ii. pp. 271-307, 3 pls. with 9 figs., 1 text-fig.

his book*, published at Basilæ in 1557, his description of the ship-retarder, which he denominates *Mustela marina*, is very inexact; but when he says that it has seven round openings on each side of its neck, we recognize it as a lamprey-eel. The interesting thing in his account is his recital of a voyage on the Liger River in the spring, when seven large specimens were detached from the prow of the boat, where they acted as very effectual remoras—delayers. In this account Cardan effectually corroborates Rondelet †, who says that he has seen a lamprey-eel attach itself to a boat and actually retard its progress. Both these ancients in turn are corroborated fully by one of the most distinguished ichthyologists of the present day, Mr. David G. Stead, of Australia ‡, who tells of an instance coming under his own observation of a vessel in tropical waters being actually “considerably delayed through a school of ‘suckers’ attaching themselves all round its sides and bottom.”

Next we come to the old Jesuit, Athanasius Kircher (1643), who goes very carefully into the matter of the ship-holder. Not to weary the reader, the gist of Kircher’s dissertation is to be found in the following paragraph. He contends that the explanation of the retardation of ships by a fish is as fabulous as that this is due to magnetic rocks, and goes on to offer the following explanation of his own:—

“Nevertheless I do not deny that ships in their course do stand still. But I do not think to ascribe this to any occult quality, nor to any virtue derived from heaven, nor to any fantastic cause whatever, but to contrary upheavals or currents in the sea. For unless I had observed such a happening myself, I would myself scarcely believe that which I am going to set forth. Truly it happens not infrequently in the Strait of Sicily that a huge ship with all sails set to a following wind sticks fast in the middle of the sea as if she had been affixed to a spike in a beam, the other ships in the neighbourhood holding their courses. This I allege not only on the testimony of my own eyes, but of that of the inhabitants of Messina, who frequently enjoy this spectacle. In like fashion the imperial fleet of Anthony at the battle of Actium was detained in the narrows of the Archipelago. This I would ascribe to the currents and

* Cordano, Girolamo. ‘Hieronymi Cardani Mediolanensis Medici de Rerum Varietate Libri XVII.’ Basilæ, 1557, chapter 31.

† Rondelet, Guillaume. ‘L’Histoire Entière des Poissons.’ Lion, 1558, p. 313. The original edition of this great work was published in Latin in 1554.

‡ Stead, David G. ‘Fishes of Australia.’ Sydney, 1906, pp. 190-191.

eddies which are everywhere met with in straits. For it can scarcely be said how much eddying in the sea, how many [opposing] currents would be strong and powerful enough to cause ships to stand. This is, indeed, my idea of the *Remora*”*.

We now come to that man of the Renaissance writers who most thoroughly and in scientific fashion goes into a study of the ship-holder. This is the Jesuit, Gaspar Schott, professor in the gymnasium of Herbigoli. His scientific attitude is first shown in his extensive review of his predecessors, where he expressly quotes them by book, chapter, and paragraph, and in this he is about as exact as a present-day writer who takes pride in the care with which his bibliography is prepared †.

Schott carefully dissects the writings and opinions of his predecessors, and, while acknowledging that vessels are stopped, rejects their explanations as depending on some occult power or cause or quality. He then sets forth his own conclusions under four heads and in as many distinct paragraphs. First, he thinks it doubtful if such a remarkable power of detaining and retarding ships is to be found in such a small animal. He notes that there are no eye-witnesses among the ancients, but that their accounts run “it is said,” “some believe,” “it is reported.” In short, there is no agreement among the ancients, and their accounts are mere fables.

Having thus established himself as a disbeliever, Schott, in the next paragraph, affirms his belief in the occult and the supernatural. Since so many writers record them, there must be truth in these accounts, and it must be acknowledged that the ships are retarded, but from causes different from the assigned ones. These retardations, he thinks, are due to angels—good or bad,—to frauds on the parts of sailors (some backing, others pulling), or to upheavings and boilings in the sea. These latter, on the whole, he thinks to be the more probable causes.

In his third paragraph Schott affirms his belief in extraordinary tides and currents which arise at times to retard the progress of the weakly propelled vessels of his day. He quotes Kircher's experience in the Straits of Sicily. This

* Kircher, Athanasius. ‘Athanasii Kircheri Magnes Sive de Artis Magnetica, Opus Tripartum.’ Coloniae Agrippinae, 1643. Liber tertius, pars sexta, De Echeneida, seu Remora, p. 669.

† Schottus, Caspar. ‘Physica Curiosa sive Mirabilia Naturæ et Artis Libris XII.’ Herbigoli, 1662. Caput XIV. Dissertatio Physiologica de Echeneide seu Remora, pp. 1309-1338.

he had confirmed by the inhabitants of Messina and likewise by a personal experience in those waters. Next he argues that similar detentions have been known in similar regions, but that, unlike the ones more or less regularly occurring, though at different hours, in the Sicilian Straits, they occur irregularly and at intervals only—in short, were temporary and due to temporary and unusual causes. These causes, he thinks, were earthquakes or submarine disturbances of some kind which produce large and conflicting waves, this being in accordance with Kircher's experience when he was once returning from Melita to Rome.

Lastly, Schott comes to the conclusion that the retardation is due to the little fish rightly called remora, but that it does not do this by virtue of any occult quality, since when taken into the vessel the latter is no longer necessarily stopped in her course—witness the vessels of Caligula and the Cardinal of Tours (see pages 276 and 284 of previous paper). When it lays hold of a vessel and opposes its propulsion it acts in the same way that a man does when he prevents gravity from drawing a body downward.

Both Kircher and Schott had a glimmering idea of the truth, each wanted to break away from ancient tradition and give a rational explanation; but the axiom that action and reaction are equal not having been established in their day, they apparently took refuge in jesuitical fashion in a flood of words. However, it is true that, in their conflicting currents or boilings in the sea, they approximated the true explanation as set forth by Ekman* in 1904. For this see my larger article.

The last author to be quoted in this paper is a compatriot of Ekman's, the famous Bishop Pontoppidan † of Norway. He quotes Schott, that "Among other reasons that are given for a ship's being stopt in her course in the middle of the sea, tho' under full sail with a good wind, which is an undeniable fact, he reckons, the conflux of rivers from several places struggling together, to be one cause." This translation I am unable to get from Schott's Latin; but doubting my own rendition, I had a translation made by an expert in Romanic languages. This agreed with mine very closely, but not with the good Bishop's.

Possibly this translation represents an embryonic idea in

* Ekman, V. Walfrid. 'On Dead-Water.' Vol. V. Scientific Results Norwegian North Polar Expedition, 1893-1896. Christiania, 1904.

† Pontoppidan, Erich. 'The Natural History of Norway.' London, 1755, pp. 216-217.

the Bishop's own mind, for he continues (see above): "This opinion has some probability, and that strange effect is really owing to this cause in some places." But, being under the thrall of the Kraken, the gigantic cephalopod which, like "Dead Water," abounded in the fiords of his country, he finally concludes that it, under the name *Kors-Trold* or *Soe-Drawl*, is the effecting agent in ship-detention.

III.—*Systematic Notes on a few Melolonthine Coleoptera.*
By GILBERT J. ARROW.

(Published by permission of the Trustees of the British Museum.)

[Plate I.]

THE following descriptions and notes have been put together in the course of working out the nomenclature of certain species of *Melolonthinæ* injurious to crops in different regions. The types of the species described as new are in the British Museum.

In his 'Report on *Phytalus smithi*, Arrow, and other Beetles injurious to Sugar-cane in Mauritius' Mr. d'Emmerez de Charmoy refers to certain Lamellicorn beetles to which no precise names could be given. These were subsequently sent to me for identification, but, owing to uncertainty as to whether they were imported or indigenous, I deferred their determination at that time. Having failed to obtain sufficient evidence of their occurrence elsewhere, I have now described them, their economic importance rendering the absence of recognized names highly inconvenient.

In the Report above mentioned the name *Gymnogaster buphthalma*, Bl., is applied to certain cane-feeding grubs. The beetles sent to me as probably belonging to that species are two different forms, both of them apparently unnamed hitherto. *G. buphthalmus* is an inhabitant of the island of Bourbon, and in all probability is not found elsewhere. Although it has a close superficial resemblance to the insect I here call *Rhizotrogus pallens*, there are important anatomical differences in the reduction of the biting parts of the mouth and the existence of five, instead of three, joints in the antennal club. No other species of *Gymnogaster* is known.

Rhizotrogus gravis, sp. n. (Pl. I. fig. 4.)

Læte flavus, capite fusco-rufo, pronoto (lateribus exceptis), antennis tarsisque rufis; oblongus, nitidus, glaber, pectore pedibusque sat longe flavo-hirsutis, capite crebre et rugose punctato, absque carinis, clypeo parvo, excavato, margine antice recto, lateraliter fortiter arcuato; pronoto sat crebre et fortiter punctato, linea media fere lævi, lateribus medio fortiter dilatatis, deinde ad angulos fere rectis, his obtusis, margine antico toto ciliato, postico leviter trisinuato, marginato; scutello parce punctato; elytris crebre et fortiter punctatis, costa suturali valida aliisque angustis parum distinctis; pygidio parce haud fortiter punctato; antennis 10-articulatis, articulis 3-7 regulariter decrescentibus; tibiæ anticæ dente tertio minutissimo, unguibus subtus medio dente recto armatis; mento postice carina V-formi instructo, anticæ excavato.

Long. 25-27 mm.; lat. max. 13-15 mm.

N.E. MAURITIUS: Bassin.

An old specimen of this species in the British Museum bears the locality "Florida," for which reason I at first believed it to have been, like *Phytalus smithi*, imported into Mauritius; but I have failed on enquiry to find any evidence of its occurrence in America, nor has it by any abnormal increase shown the usual indication of an introduced insect.

The colour is a bright tawny yellow, paler beneath, with the pronotum red, except at the sides, and the head very dark red.

The male is rather elongate and parallel-sided, the female shorter and more dilated behind, and both rather shining (except upon the head, which is densely punctured and rugose), free from hair upon the upper surface, but with long and thick yellow pubescence upon the metasternum. The eyes are large and prominent, the clypeus rather small, hollowed, with continuous reflexed margin, straight in front and rounded at the sides. The pronotum is moderately punctured, with an indefinite longitudinal smooth space in the middle, with the lateral margins strongly dilated in the middle and nearly straight from there to the front and hind angles, which are obtuse. The elytra are closely and evenly punctured, with a prominent smooth sutural costa of nearly equal breadth throughout and exceedingly narrow and feeble vestiges of three or four other costæ. The pygidium is much less closely punctured. The uppermost (third) tooth of the front tibia is very feeble and the claws bear a strong vertical tooth at the middle of the lower edge. The antennæ are 10-jointed, joints 3 to 7 progressively diminishing in length.

The male is much less massive than the female, with the club of the antenna as long as the footstalk, all the tarsi long and slender, and the abdomen longitudinally channelled beneath.

Larvæ found feeding at the roots of cane have been sent to me together with adult females of this species.

Rhizotrogus pallens, sp. n. (Pl. I. fig. 1.)

Pallide flavus, capite fusco-rufo, tarsis pronotique medio plus minusve rufescentibus; oblongus, nitidus, glaber, pectore pedibusque sat longe flavo-hirsutis, capite fortiter et confluentur punctato, absque carinis, clypeo excavato, margine reflexo, medio subtiliter exciso, lateraliter fortiter arcuato; pronoto inæqualiter, haud crebre, punctato, lateribus medio fortiter dilatatis, deinde ad angulos omnes fere rectis, his obtusis, margine antico toto ciliato; scutello fere impunctato; elytris haud fortiter aut dense punctatis, costa suturali angusta; pygidio sparse erecte setoso; tibia antica tridentata, unguibus medio dente erecto armatis; mento postice carina semicirculari instructo.

Long. 23-27 mm.; lat. max. 11-14 mm.

S.E. MAURITIUS: Ebène Sugar Estate, near Réduit.

This is closely related to *R. gravis* and has a marked superficial resemblance to *Gymnogaster bupthalmus*, Bl., from which it is easily distinguished by its 3-jointed antennal club. It is narrower than *R. gravis*, paler in colour, and less strongly and closely punctured upon the pronotum and elytra. The clypeus is a little larger, feebly sinuated in the middle of its margin, and the eyes are a little smaller. The pronotum is rather flat and sparsely punctured, with its sides still more strongly angulated in the middle and straight from there to the front and hind angles, which are obtuse. The scutellum is almost smooth and the elytra are lightly punctured and very shining, with a narrow sutural costa only. The pygidium bears a thin clothing of erect hairs, but is scarcely visibly punctured. The mentum bears a semicircular (not V-shaped) carina and the uppermost tooth of the front tibia is more distinct than in *R. gravis*. The claws are similar.

As in the allied species, the male is more slenderly built than the female, with the abdomen channelled beneath and the tarsi longer. The club of the antenna is longer than in the male of *R. gravis*, and the seventh joint is produced into a short but distinct lamella.

Rhizotrogus rufus, sp. n. (Pl. I. fig. 2.)

Læte castaneo-rufus, capite obscuriori abdomineque pallide flavo; sat late ovatus, nitidus, glaber, pectore dense fulvo-hirsuto; capite dense fortiter punctato, fronte rugosa, clypeo parvo, margine integro, arcuato, reflexo; pronoto crebre et minute punctato, margine laterali crenulato, ante medium angulato, dein ad angulum anticum et posticum fere recto, hoc fere quadrato, illo paulo producto; scutello lato, lævi; elytris subtiliter parum æqualiter punctatis, margine suturali costisque discoidalibus duabus vix perspicuis lævioribus; pygidio subtiliter sat crebre punctato; pedibus parum gracilibus, tibiis anticis robustis, 3-dentatis, unguibus fortiter arcuatis, medio valde dentatis:

♂, clava antennali duplo longiori quam stipitem; unguorum dente paulo post medium sito; pygidio leviter convexo:

♀, clava antennali quam stipitem multo breviori; unguorum dente paulo ante medium sito; pygidio deplanato, apice leviter porrecto.

Long. 14–16 mm.; lat. max. 9 mm.

NILGIRI HILLS: Dodabetta, 8000 ft. (May), Ootacamund (April).

This insect has been sent to me by Mr. T. V. Ramakrishna Ayyar, who found it in large numbers just beneath the surface-soil in plantations of cinchona seedlings.

It is moderately short and broad in shape, very smooth and shining, with the metasternum densely clothed with rather long tawny hair. The legs are not very long, the front tibiæ rather short and armed with three strong but not sharp teeth, separated by acute notches. The clypeus is small, very strongly and closely punctured, with the margin regularly rounded and entire, and the forehead rugose, the punctures coalescing, carinate at its posterior limit. The pronotum is broad, not very convex, closely and rather evenly punctured, with its lateral margins crenulated, angulated in the middle, and nearly straight from there to the front and hind angles, of which the former is a little produced and the latter a right angle. The scutellum is broad and almost unpunctured. The elytra are finely and moderately closely punctured, with the sutural margins and two indistinct discoidal costæ smoother. The pygidium is also finely and moderately closely punctured. The antennæ are 10-jointed, joints 3–7 very short and transverse in the male and 8–10 forming a very long club more than twice as long as the entire footstalk. In the female joints 3 and 4 are a little longer than wide and the club is very short. The basal joint

of the hind tarsus is slightly longer than the following one, and the claws are strongly curved and toothed in the middle.

The male is easily recognizable by the exceptional length of the antennal club, and another slight but important difference is found in the claws, in which the tooth is placed nearer to the tip in the male than in the female.

I have used the generic name *Rhizotrogus* because it is the oldest of the various names in use for the immense and almost world-wide series of species to which these three insects belong, although that name is generally restricted to species from the Palæarctic region. The classification of these insects is very largely a geographical one at present, and species from the Oriental region are referred to *Holotrichia*, those from America to *Lachnosterna*, while those from the Palæarctic, African, and Madagascan areas have been distributed under very numerous names, some of which are no doubt well justified, but the maintenance of others must necessitate the introduction of a very large number of fresh generic names for the forms yet undescribed and conforming to none of the feebly differentiated diagnoses formulated by Brenske, Reitter, and Kolbe. The handling of the extremely difficult generic problem by artificially limited geographical groups enables genera to be defined in terms which are found inapplicable when entire natural groups come to be investigated. Reitter, for instance, studying Palæarctic forms, has divided the genera of the present group into two sections according to the situation of the tooth upon the claws *before* or *behind* their middle, one section being represented by *Rhizotrogus* and the other by *Holotrichia*. As thus defined, the male of the species last described would be referred to the *Holotrichia* section and the female to the *Rhizotrogus* section. The many forms in which the tooth is placed precisely in the middle completely bridge the two groups and render their generic separation impossible. Pending a general revision, therefore, it seems to me best to accept only those genera which appear to be exactly defined, and to regard as a single genus the great mass of species at present called *Rhizotrogus*, *Holotrichia*, or *Lachnosterna*.

Two species, not closely related, were described by Waterhouse from the island of Rodriguez under the name of *Lachnosterna*. *L. rodriguezii*, Wat., is a very peculiar insect belonging to no known genus. Unfortunately the two specimens are in an extremely imperfect state, so that it is not yet possible to state all its distinctive features; but,

although its proper systematic position must remain in doubt, enough can be stated for its ready recognition.

MASCARENA, gen. nov.

Elongate and rather depressed in shape. Head broad, with the clypeus extremely short and subacuminate in the middle. Labrum broad, produced vertically downwards on each side, the two lobes long and wide apart, the median part slightly produced. Mandibles strong and exposed. Mentum excavated externally, deeply excised in front, with the palpi attached to the outer face. Third and fourth joints of the antenna equal and moderately short (the remainder wanting). Legs slender, with the front tibia rather feebly tridentate and the claws long, toothed before the middle.

The tarsi of the male are very long, the claws longer than in the female and the tooth much shorter.

The second species from Rodriguez referred by Waterhouse to *Lachnosterna* (*L. gradaria*, Wat.) belongs to the genus *Hoplochelus*. This genus is at present in a state of great confusion. *Empecta* and *Hoplochelus*, very distinct as they are, were mixed together by Blanchard, and, although Brenske has partly unravelled them, the recent Catalogue of Dalla Torre has only increased the confusion. The two genera are easily distinguishable by the different form of the clypeus and labrum and the occurrence of two teeth upon the front tibia in *Empecta*, instead of three as in *Hoplochelus*. The former genus is allied to *Apogonia* and the latter to *Rhizotrogus*. The typical species of *Hoplochelus* is *H. rhizotrogoides*, Bl., and the others known to me are *piligera*, Bl., *micantipennis*, Bl., *semirufus*, Fairm., and *gradaria*, Wat. "*Enaria*" *adusta* and *albosparsa*, of Fairmaire, belong to *Empecta*.

Fairmaire has described as *Empecta nudiplaga* a form which he distinguishes from *E. marginalis*, Fairm., by certain features, all of which, although he was not aware of it, are merely characters of the female of *Hoplochelus micantipennis*, Bl. Both the above names are therefore evidently synonyms of the last. *Empecta betanimena*, Kunck., attributed to this species in Allaud's Catalogue, is really *Hoplochelus semirufus*, Fairm.

Much of this confusion would have been avoided by the simple observation of the features distinctive of the sexes. It appears never to have been noticed that a sparser clothing

and puncturation of the upper surface are characteristic of the females of both the genera in question. This is especially striking in the following new species:—

Empecta disparilis, sp. n. (Pl. I. fig. 3.)

Nigra, elytris pedibusque rufescentibus, corpore toto squamis minutis vestito (maris supra dense), elytrorum humeris et epipleuris scutellique lateribus et linea mediana nudis, pectore haud dense fulvo-hirsuto; elongato-ovata, capite dense rugoso, margine antica lævissime arcuata, haud excisa; pronoti lateribus fortiter bisinuatis, antice valde approximatis, angulis anticis acute productis, posticis obtusis; pygidio crebre punctato-rugoso et setoso:

♂, corpore supra toto opaco, densissime flavo-squamoso, pedibusque omnibus gracilibus:

♀, corpore supra modice nitido, grosse punctato, punctis squamiferis, pedibus posticis multo brevioribus.

Long. 17–19 mm.; lat. max. 9–10 mm.

MADAGASCAR: Diego Suarez.

The difference between the sexes is very strongly marked. The male is entirely opaque above and densely clothed with perfectly uniform yellow scales. The female is more shining, the pronotum covered with large dense punctures each containing a scale, and the elytra rather coarsely punctured, each puncture similarly giving rise to a scale, and the punctures of the inner half tending to coalesce transversely. The posterior half of the pygidium is also more coarsely punctured and shining in the female, and the hind legs are much shorter and stouter than in the male.

Lepidiota flavimargo, sp. n.

Fusca, corpore supra et subtus dense albo-squamoso, elytris rufescentibus, lateribus pallidioribus, denudatis, squamis nonnullis minutis parce ornatis; elongato-ovalis, undique coriaceo-punctata, elytrorum lateribus exceptis, clypeo haud lato, margine antica medio lævissime sinuata, prothoracis lateribus serratis, antice fere rectis, post medium arcuatis, angulis omnibus obtusis, pygidio postice leviter sulcato, mesosterno medio compresso, vix producto:

♂, tibiis anticis bidentatis, tibiarum posticarum calcaribus angustis, spinosis:

♀, tibiis anticis tridentatis, tibiarum posticarum calcaribus latissimis, spatulatis, extremitatibus translucenibus.

Long. 39–52 mm.; lat. max. 20–26 mm.

BRIT. N. BORNEO: Sandakan (*C. V. Creagh*, *W. B. Pryer*), Sarawak (*J. C. Moulton*).

This is a species closely related to the very abundant *L. stigma*, F., of the Malay Peninsula and Java, which is apparently not found in Borneo. The females of that species strongly resemble the present insect, but the latter can be at once distinguished by the sharply defined yellow or reddish lateral borders of the elytra, almost denuded of scales. The border occupies about one-eighth of the width of the elytron, is paler than the remaining surface, smooth and shining, and bears only a few minute scales, whereas the remaining surface of the body is closely covered with scales, replaced by short, close-lying yellowish hairs upon the coxæ and the sides of the metasternum. The scales of the upper surface are generally pure white, the elytra each showing three more or less distinct longitudinal lines of scales still more closely crowded than the rest. Upon the head, the sides of the pronotum, and the lower surface of the body the scales are more yellowish.

The two sexes, unlike those of *L. stigma*, are alike in colour, but the female is distinctly larger than the male, its front tibiæ are stouter and bear three well-developed teeth instead of two, and the hind tibiæ are dilated at the end and their spurs broad and spatuliform (much more so than in *L. stigma*), the extremities dilated, rounded, and translucent.

L. munda, Sharp, has similar bare lateral margins to the elytra, but is a smaller insect, more tapering in front, and clothed with yellow scales.

The Dalla Torre Catalogue is entirely wrong in identifying the European *Polyphylla alba* of Pallas and Olivier with the female of *L. stigma* (*Melolontha alba*, F.).

Leucopholis diffinis, Sharp, and *lateralis*, Brenske, are, I believe, synonyms of *L. nummicudens*, Newm. The inconspicuous row of hairs upon the median line of the pronotum seems to occur only in the female (the sex described by Brenske), and is present in one of the two original specimens of Newman. Sharp's two specimens are presumably both females, but very much abraded, so that the clothing could not be described. Brenske appears to have believed Penang to be in Sumatra (Stett. Ent. Zeit. 1896, p. 189).

Another related insect re-named in error is *Eucirrus mellyi*, Guér., which, as I have already recorded, is a Malayan form, not Ceylonese. The elongate palpi, which Brenske believed to characterize a second species (*E. elegans*), is a feature of the male of *E. mellyi*.

Another redundant name for a sexual form may be noted here. Moser has described as *Hoplia thoracica* an insect

from Sarawak, which he compares with the Javan *H. aurantiaca*, Wat. He has overlooked *H. aurata*, Wat., from Sarawak, the type of which is a female, whereas his form is the male of the same species, differing from the female by opaque red scales replacing the glistening golden scales of the female upon the front of the pronotum, the sides of the elytra and the legs.

EXPLANATION OF PLATE I.

Fig. 1. *Rhizotrogus pallens*, male and female.

Fig. 2. *Rhizotrogus rufus*, male and female.

Fig. 3. *Empecta disparilis*, male and female.

Fig. 4. *Rhizotrogus gravis*, male and female.

The male of each on the left. All natural size.

IV.—On a small Collection of Mammals from Lumbo,
Mozambique. By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

THANKS to the generosity of Lord Swaythling, the British Museum has been enabled to acquire a small collection of mammals obtained during the recent East-African campaign by Mr. Arthur Loveridge at Lumbo—a place on the mainland opposite the island of Mozambique, in Portuguese East Africa.

This region has been exceedingly little worked, and, apart from the specimens collected by Peters at Cabaceira, and mentioned in his work on Mozambique, and a few brought home by Dr. Kirk, almost no mammals from it have come into the hands of zoologists.

As a consequence, I have thought it worth while to give a list of the species obtained by Mr. Loveridge.

1. *Crocidura hirta*, Peters.

♀. 236.

This shrew is in changing pelage, and gives a striking example of the peculiar colour-changes described in Mr. Dollman's Monograph * as occurring in the species.

* Ann. & Mag. Nat. Hist. (8) xvi. p. 71 (1915).

2. *Petrodromus (Mesoctenus) rovumæ*, Thos.

♂. 206, 207, 208, 214, 220; ♀. 209, 210, 211, 212, 215, 216, 219, 221, 222, 223, 224, 225, 226.

This fine series of a species hitherto very insufficiently represented is of particular importance, as some doubt appeared possible in regard to the relation of the thickened tail-bristles to the age of the individual—a point on which its distinction as representing a special subgenus mainly depended. For it might have proved that in old age the bristles of this species became as knobby as they are in the subgenus *Cercoctenus*. Now, however, I am able to record that not in the oldest specimens do the bristles become like those of *P. sultan*, the type of *Cercoctenus*, while, on the other hand, every individual that has its permanent teeth in place has some thickened bristles present, none occurring in true restricted *Petrodromus*. Certainly the bristles do increase in number and knobiness with age, but they never equal those of *Cercoctenus*. The bristles of the males also seem to become in old age more knobby than those of the females.

The palatal vacuities are in most cases of considerable size, but in some individuals are almost completely absent, so that there is no absolute constancy in the character, although it has undoubtedly a certain average value.

It was largely on this character that I separated *mossambicus* of Cabaceira from *rovumæ* of the Rovuma River; but it now appears that the character is not to be trusted when only individual specimens are available.

As to the other character of *mossambicus* (the slaty grey on the belly-hairs) there is in this series a most surprising and abnormal range of variation—from none at all to cases where each hair is broadly slaty at base. In consequence, I think that the name *mossambicus* should be withdrawn and all of these southern forms of *Mesoctenus* should be referred to *rovumæ*. It is, of course, still possible that a subspecific difference in colour may prove to exist when good Rovuma skins are available, but for the present the name *rovumæ* should be used for all.

3. *Mungos mossambicus*, Matsch.

♂. 204, 235; ♀. 205.

Practically topotypes, the name having been based on a specimen obtained by Peters at Cabaceira.

4. *Helogale ivori*, sp. n.

♂. 227, 228; ♀. 200, 229, 233, 234.

A buffy species, resembling *H. victorina* in colour, but *H. brunnula* in its comparatively small size.

Size small, skull not or barely reaching 50 mm. in length. General colour very uniform buffy—that is to say, the body is so buffy that the limbs and tail are less contrasted with it than usual. Back nearest to “cinnamon-buff,” the usual fine brown and whitish ticking of the hairs modifying it less than in other species. Under surface strong ochraceous tawny. Muzzle and cheeks more tawny. Crown slightly greyer and rump a little more ochraceous than back, but these contrasts are very markedly less conspicuous than in the Mweru *H. varia*. Limbs ochraceous tawny. Tail rather shorter than in other species, grizzled buffy above, strong ochraceous-tawny below.

Skull small, about as in *H. brunnula*, markedly smaller than in the Central and East-African forms *victorina*, *rufula*, &c.

Dimensions of male and female (the first the type):—

Head and body 242, 210 mm.; tail 145, 140; hind foot 43, 40; ear 20, 20.

Skull: median length 49·8, 49·3; condylo-basal length 49·3, 49·2; zygomatic breadth 28·3, 27·2; interorbital breadth 10·3, 9·8; palatal length 24·2, 24·3; maxillary tooth-row 17·2, 17.

Type. Adult male. Original number 228. Killed 22nd October, 1918.

This species is conspicuously more buffy and less rufous than Peters's *H. undulata*, which was described from Mos-simboa, some distance further northward. It has a superficial resemblance to the Uganda form *H. victorina*, but is smaller, more uniform in colour, and the tail is decidedly shorter. The Mweru species *H. varia*, which seems to have as short a tail, is larger, and has an unusually dark grey crown and more strongly buffy rump, both contrasting with the dorsal colour more than in *H. ivori*.

Named after the Hon. Ivor Montagu, to whose interest in small mammals the donation of the specimens is mainly due.

5. *Paraxerus flavivittis mossambicus*, subsp. n.♀. 202. Lumbo, 1st September, 1918. *Type.*

Median dorsal area a mixture of blackish and buffy, which

results in a general colour something between "olive-brown" and "*Chaetura* drab," therefore very different from the "ferrugineus" and "rostbraun" of Peters's description of *flavivittis*. Under surface white, with a faint tinge of buffy on the belly; the hairs white to their bases; line of demarcation on sides not sharply defined. Colour of lateral light stripes practically white or ivory-colour, not "flavidus" or "hell-gelb" as in true *flavivittis*. Dark line below them like the middle back above them. Top of muzzle grizzled ochraceous. Crown and nape dark grey, without buffy or fulvous intermixture. Facial lines well defined, alternately dark brown and white. Shoulders ochraceous, the withers between them also more tinged with this colour than the main dorsal area. Ears whitish buffy. Front of fore limbs and top of hands ochraceous; inner side of limb whitish. Outer side of hips greyish buffy, top of hind feet strong buffy. Tail-hairs ringed with black and pale buffy, their tips broadly buffy, those of the terminal hairs stronger buffy; middle line of under surface ochraceous.

Skull apparently as in *flavivittis*, though the nasals are considerably broader behind than in Peters's figure.

Dimensions of the type (measured in flesh):—

Head and body 175 mm.; tail 175; hind foot 40; ear 18.

Skull: greatest length 41; condylo-incisive length 37; zygomatic breadth 24; nasals, length 12·3, posterior breadth 7·5; upper tooth-series 8.

Hab. and *type* as above.

In his description of *P. flavivittis* Peters mentioned two localities for the species—Mossimboa, on the coast, about 11° S., and Cabaceira, near Mozambique,—the second being almost exactly the present locality. But the differences in colour from his description and figure shown by Mr. Loveridge's specimen are so material that there are evidently two subspecies of the animal, and it is obvious that the first-named place—Mossimboa—should be taken as the type-locality.

Judging by a specimen from still further north which has been hitherto taken as *P. flavivittis*, the back of that animal is probably a strong fulvous ochraceous, very different from the dark brownish of *P. f. mossambicus*.

This specimen is a peculiarly welcome accession to the Museum collections, as *P. flavivittis* was one of the only two species which I was not able to allocate to their restricted genera when dividing the African squirrels in 1909*.

* Ann. & Mag. Nat. Hist. (8) iii. p. 475 (1909).

Mr. Loveridge's example now shows that it is unquestionably a typical *Paraxerus*.

Within that genus it renders verbally incorrect my statement, when describing *Tamiscus**, that the species of *Paraxerus*, as there restricted, were "of uniform colour, or at most with an indistinct whitish line down each side of the back," for the light lines of *P. flavivittis* are exceedingly conspicuous, and anything but indistinct. But none the less the striping is quite unlike that in the black-striped *Tamiscus*, and is only an intensification of the indistinct whitish lines referred to.

6. *Taterona* sp.

♂. 199.

Not determinable on a single specimen.

7. *Steatomys loveridgei*, sp. n.

♂. 201. 1st October, 1918. *Type*.

A small pale-coloured species with slender teeth.

Hairs of back little over 6 mm. in length. Colour very much paler than in other species, the dorsal area near wood-brown, the tips of the hairs pale avellaneous. Sides markedly paler, the hairs with a whitish zone below the pale avellaneous tips. Underside pure sharply defined white. Crown like back; cheeks lighter, like flanks. Ears large, a distinct white patch behind and below their posterior base. Fore limbs wholly white. Hind limbs white, with a narrow line of the flank colour running down to the ankle. Tail white, slightly darkened on the upper surface by the presence of a few barely perceptible blackish hairs; its end quite white.

Skull, as compared with that of *S. pratensis*, much smaller, narrower, and with very small brain-case. Molars decidedly smaller and more slender.

Dimensions of the type:—

Head and body 77 mm.; tail 35; hind foot 15; ear 18.

Skull: greatest length 22.5; condylo-incisive length 20.3; zygomatic breadth 10.5; nasals 9; interorbital breadth 3.6; breadth of brain-case 10; palatilar length 10; palatal foramina 5.2; upper molar series 3.4; breadth of m^1 1.1.

This little "fat-mouse" is much smaller than *S. pratensis*, and is probably most nearly allied to the *S. minutus* of Angola. But its molars are more slender than in the latter, with the anterior lamina of m^1 more elongate, and externally

* Ann. & Mag. Nat. Hist. (9) i. p. 33 (1918).

it is distinguishable by its paler colour, larger ears, and practically white tail.

In naming it after Mr. Loveridge I wish to bear testimony to the enthusiasm which resulted in the preparation of a small mammal collection during the difficulties incidental to a trying campaign.

8. *Grammomys* sp.

♂. 198.

This specimen has unfortunately lost its bullæ, so that its determination is doubtful; but it is probably referable to *G. surdaster*, Thos. & Wr.

V.—*A List of the Freshwater Fishes of Sierra Leone.* By G. A. BOULENGER, F.R.S.

(Published by permission of the Trustees of the British Museum.)

WHEN describing some new fishes discovered by Mr. N. W. Thomas in these 'Annals' in 1915 (ser. 8, vol. xv. p. 202), I observed that the exploration of the freshwater fauna of Sierra Leone had not received much attention, and that the number of species of fishes with which I was then acquainted amounted only to eighteen. Thanks to further collections made shortly after by Mr. Thomas and quite recently by Mr. A. F. Wingate, the number has now risen to fifty-eight, and it is of interest to give a list of all the species which can now be recorded:—

Polypteridæ.

Polypterus palmas, Ayres.

Lepidosirenidæ.

Protopterus annectens, Ow.

Mormyridæ.

Petrocephalus simus, Sauv.

Isichthys henryi, Gill.

Marcusenius brachistius, Gill.

Gnathonenus mento, Blgr.

— *thomasi*, Blgr.

Notopteridæ.

- Notopterus afer*, Gthr.
Xenomystus nigri, Gthr.

Clupeidæ.

- Pellonula leonensis*, Blgr.

Characinidæ.

- Sarcodaces odoë*, Bl.
Alestes longipinnis, Gthr.
 — *nurse*, Rüpp.
 — *rutilus*, Blgr.
 — *macrolepidotus*, C. & V.
Nannochara fasciatus, Gthr.
 — *ansorgii*, Blgr.

Cyprinidæ.

- Labeo obscurus*, Pellegr.
Barbus spurrelli, Blgr.
 — *leonensis*, Blgr.
Barilius steindachneri, Blgr.

Siluridæ.

- Clarias liberiensis*, Stdr.
Chrysichthys nigrodigitatus, Lacep.
 — *walkeri*, Gthr.
Auchenoglanis occidentalis, C. & V.
Notoglanidium thomasi, Blgr.
Licauchenoglanis maculatus, Blgr.
Malopterurus electricus, Gm.

Cyprinodontidæ.

- Fundulus sjoestedti*, Lönnb.
Haplochilus fasciolatus, Gthr.
 — *chaperi*, Sauv.
 — *spilauchen*, A. Dum.
 — *macrurus*, Blgr.
 — *bifasciatus*, Stdr.
 — *annulatus*, Blgr.

Scorpididæ.

- Psettus sebæ*, C. & V.

Gerridæ.

- Gerres melanopterus*, Blkr.

Cichlidæ.

- Tilapia caudomarginata*, Blgr.
 — *macrocephala*, Blkr.
 — *melanopleura*, A. Dum.

- Tilapia brevinanus*, Blgr.
 — *buettikoferi*, Hubr.
Paratilapia thomasi, Blgr.
Pelmatochromis jentinki, Stdr.
 — *intermedius*, Blgr.
 — *buettikoferi*, Stdr.
 — *humilis*, Blgr.
 — *pulcher*, Blgr.
Hemichromis fasciatus, Peters.
 — *bimaculatus*, Gill.

Gobiidæ.

- Eleotris lebretoni*, Stdr.
 — *leonensis*, Blgr.
 — *vittata*, A. Dum.
Gobius maindroni, Sauv.
 — *guineensis*, Peters.

Anabantidæ.

- Anabas kingsleyæ*, Gthr.

Ophiocephalidæ.

- Ophiocephalus obscurus*, Gthr.

Mastacembelidæ.

- Mastacembelus loenbergi*, Blgr.

VI.—Notes on the Ichneumonidæ in the British Museum.—II.
 By ROWLAND E. TURNER, F.Z.S., F.E.S.

Tribe ACENITINI.

Chorschizus apicipennis, sp. n.

♀. Castaneo-ferruginea; lobo mediano mesonoti apice, scutello basi, segmento mediano basi late, abdomine, valvulisque terebræ nigris; tergitis primo secundoque fascia angusta mediana apicali, tergitis tertio, quarto, quintoque fascia interrupta apicali, post-scutelloque apice angustissime flavis; antennis in medio tarsisque posticis infuscatis; alis hyalinis, anticis macula magna apicali fusca, venis nigris.

Long. 10 mm.; terebræ long. 4 mm.; antennarum long. 6 mm.

♀. Antennæ 28-jointed; third joint nearly twice as long as the fourth; the apical joint large, as long as the two

penultimate joints combined. Mandibles bidentate at the apex; clypeus broadly truncate at the apex, closely punctured; face closely and finely punctured, slightly raised longitudinally in the middle and on the inner orbits. Eyes parallel on the face, separated from the mandibles by a distance distinctly exceeding the breadth of the mandibles at their base. Front deeply concave in the middle, smooth and shining, with a median carina reaching the anterior ocellus, finely punctured along the inner orbits. Vertex shining, very sparsely punctured, the head transverse, scarcely narrowed behind the eyes. Notauli deep; mesonotum shining, with a few fine scattered punctures, more closely punctured on the middle of the median lobe; mesopleuræ finely and rather sparsely punctured; scutellum smooth and shining, with a deep, transverse, longitudinally striated groove at the base; postscutellum strongly concave laterally. Median segment short; areola rectangular, nearly twice as broad as long, external areas well defined; the apical slope of the segment oblique, shining and almost smooth, with three rather strong arched striæ at the base; spiracles large, elliptical. Abdomen smooth and shining; first segment broadened from the base, at least twice as long as its apical breadth; second segment at least twice as broad at the apex as long. Radial cell at the apex further from the stigma than from the apex of the wing; second recurrent nervure received well beyond the transverse cubital nervure; nervulus prefurcal; disco-cubital nervure with a distinct ramellus; nervellus intercepted close to the middle. Hind legs long and stout; coxæ sparsely, femora closely punctured; hind metatarsus a little shorter than the four apical tarsal joints combined; tarsal ungues very large. Hypopygium lanceolate, produced beyond the apex of the abdomen.

Hab. Yallingup, S.W. Australia; November 1913 (*Turner*).
1 ♀.

This differs structurally from the European *Phænolobus arator*, Rossi, in the presence of a ramellus on the fore wing and in sculpture, but can hardly be separated generically.

Subfamily OPHIONINÆ.

Tribe CAMPOPLEGINI.

Campoplex negatus, sp. n.

♀. Nigra; mandibulis, apice excepto, palpis, tegulis, coxisque

trochanteribusque anticis flavis; pedibus anticis, coxis trochanteribusque exceptis, intermediisque, coxis exceptis, ochraceis; abdomine, supra sæpe nigrolineato, pedibusque posticis, coxis trochanteribusque exceptis, brunneo-ferrugineis; alis subhyalinis, iridescentibus, venis fusco-ferrugineis; terebræ valvulis nigris.

♂. Feminae similis; trochanteribus posticis brunneo-ferrugineis, basi nigris.

Long., ♀ 15 mm., ♂ 12 mm.

♀. Antennæ 60-jointed, scarcely longer than the abdomen, third joint a little less than twice as long as the fourth. Mandibles broad, bidentate at the apex, the upper tooth longer than the lower. Face and clypeus finely punctured-granulate, sparsely covered with white pubescence. Eyes separated from the mandibles by a distance less than half the breadth of the mandibles at the base; front and vertex very finely and closely punctured-granulate. Thorax very closely and finely punctured; notauli well marked in front, becoming obsolete posteriorly. Median segment transversely rugulose, very shallowly longitudinally impressed from base to apex; the external areas well defined apically, but not laterally; spiracles large, elongate. First tergite distinctly swollen at the apex, more than half as long again as the second. Hind calcaria less than half as long as the metatarsus. Areolet somewhat variable in shape, sometimes pointed on the radius, sometimes showing a distinct radial margin, the cubital margin with a distinct angle in the middle at the point of reception of the second recurrent nervure. Nervulus rather strongly postfurcal. Discoidella almost obsolete, nervellus straight.

Hab. Mt. Wellington, S. Tasmania, 2300 ft., January 15–February 6, 1913 (*Turner*), 4 ♀ ♀, 1 ♂. Eaglehawk Neck, S.E. Tasmania, February 1913 (*Turner*), 1 ♀. Victoria (*C. French*), 1 ♀, 1 ♂. Hobart (*J. J. Walker*), 1 ♂.

Campoplex extraneus, sp. n.

♂. Very close to *C. negutus* described above, but differs in colour, the scape being fusco-ferruginous and the intermediate and hind coxæ ferruginous brown. The areolet is distinctly but very shortly petiolate.

Length 10–11 mm.

Antennæ 52-jointed, as long as the whole insect.

Hab. Yallingup, S.W. Australia; October (*Turner*).
2 ♂ ♂.

Subfamily CRYPTINÆ.

Tribe MESOSTENINI.

Buodias gilberti, sp. n.

♀. Nigra; pedibus testaceis, posticis femoribus tibiisque apice nigris; tarsis posticis flavidulis, articulo apicali nigro; palpis flavidulis; antennis 34-articulatis, articulis 7-14 albidis; alis hyalinis, stigmatate venisque nigris.

Long. 14 mm.; terebræ long. 5 mm.; antennarum long. 12 mm.

♀. Clypeus closely and rather finely punctured; face sparsely punctured on the sides, punctured-rugose in the middle; front concave, smooth and shining between and above the antennæ, finely transversely rugulose below the anterior ocellus, with a distinct longitudinal carina, the sides sparsely punctured. Vertex very finely and sparsely punctured. Antennæ filiform; the third, fourth, and fifth joints subequal, each nearly twice as long as the scape. Mesonotum closely and not very finely punctured, parapsidal furrows deep; scutellum convex and almost smooth in the middle, the sides coarsely obliquely striated. Median segment with a transverse carina, deeply emarginate posteriorly before the middle, the base of the segment before the carina finely rugulose, with a small basal area which is strongly narrowed towards the apex; spiracles rather small, oblong, the transverse carina curved below them and running to the base of the segment, thus forming a large enclosed area on each side; beyond the carina the segment is coarsely obliquely rugose-striate, with an almost obsolete strongly arched apical carina, the apical angles produced into a short, blunt, subtriangular spine; the posterior slope coarsely transversely rugose-striate and slightly concave, the dorsal surface broader than long. First tergite as long as the hind coxæ plus two-thirds of the first joint of the hind trochanters, the basal half forming a slender petiole; second tergite about one-third longer than its apical breadth, finely and rather closely punctured; third tergite broader than long, slightly narrowed to the apex and minutely and closely punctured, as also are the remaining tergites. Areolet small, four-sided, the first transverse cubital nervure very short, only half as long as the second; recurrent nervure received close to the apex of the areolet.

Hab. Mackay, Queensland (*Turner*). 2 ♀ ♀.

Very near the Solomon Island species *Mesostenus insularis*, Cam., but differs in the black apices of the hind femora and

tibiæ, in the paler hind tarsi, and in the distinctly longer second tergite. The terebra is also distinctly longer than in *insularis*. Also, but more distantly, related to *B. unicolor*, Turn., from New Caledonia. Although faint indications of a second transverse carina are present on the median segment of this species, I consider it is better placed in *Buodias* than in *Mesostenus*. But Cameron's genera in the Cryptinæ are often founded on small characters of doubtful value, and *Buodias* may have to sink as a synonym of *Mesostenoides*.

Xanthocryptus monticolus, sp. n.

♀. Fulvo-ferruginea; clypeo, labro, fronte fascia mediana longitudinali supra dilatata, orbitis internis, orbitis externis latissime, genis, pronoto linea ante alas, mesopleuris macula elevata infra alas, scutello linea obliqua utrinque, lineaque apicali, antennis articulis 7-11, tarsisque posticis articulo primo apice, secundo, tertio, quartoque basi albo-flavidis; capite, antennis, valvulis terebræ, tarsisque posticis articulis primo, quintoque nigris; alis hyalinis, venis nigris.

Long. 15 mm.; terebræ long. 7 mm.; antennarum long. 13 mm.

♀. Antennæ 25-jointed, joints 3-5 very long and slender, each more than twice as long as the sixth joint, all the joints longer than broad. Mandibles strong, bidentate at the apex, the outer tooth the longest. Labrum exposed, rounded at the apex; clypeus very broadly rounded at the apex, with a minute tubercle in the middle of the apical margin. Eyes very feebly converging towards the clypeus, the mandibles separated from the eyes by a distance about equal to their own basal breadth. Face and clypeus finely and not very closely punctured; the face less than twice as long as the clypeus. Front and vertex microscopically punctured, the front feebly concave. Thorax minutely punctured, notauli deep and smooth; scutellum not much raised, strongly narrowed to the apex, with a smooth transverse depression at the base; mesopleuræ finely striolate, smooth and shining posteriorly. Median segment minutely punctured at the base, with a transverse carina arched in the middle and another transverse carina at the base of the posterior slope, the space between the carinæ very coarsely obliquely striated, the posterior slope less coarsely obliquely striated; the dorsal surface twice as broad as long, without spines at the angles; the sides of the segment finely punctured; spiracles large, elongate-ovate. Abdomen very finely shagreened; first segment very narrow at the base, the spiracles situated behind the middle,

much nearer to each other than to the apex of the segment, behind the spiracles the segment broadens rapidly to the apex; second segment a little longer than its apical breadth; third twice as broad as long; hypopygium short, not reaching the apex of the abdomen. Hind legs long and rather stout; hind metatarsus as long as the four apical tarsal joints combined; unguis large, simple. Areolet very small, rectangular, a little longer than high; the second transverse cubital nervure not developed, but represented by a faint cloud; nervulus prefurcal; nervellus intercepted just below the middle.

Hab. Mt. Wellington, Tasmania; January 1913 (*Turner*).

1 ♀.

This genus was founded by Cameron in 1901 for a species from New Britain, and later he added species from New Guinea and the Solomons. From these the present species differs in details of colour and sculpture and in the presence of an apical carina on the dorsal surface of the median segment. I have never taken a species of this genus in Australia, but apparently *Mesostenus physoscelus*, Brullé, described from Australia, should be placed here. I think Cameron was probably correct in placing this genus in the Mesostenini, though it is somewhat aberrant.

Tribe HEMITELINI.

Camptolynx froggatti, sp. n.

♀. Ferruginea; capite, segmentisque abdominalibus quinto sequentibusque nigris, quarto etiam plerumque nigro; tergitis apice pallide flavo-marginatis; antennis brunneo-ferrugineis, apice nigris; femoribus posticis apice, tibiis posticis, basi albo-annulatis, tarsis posticis valvulisque terebræ nigris; alis hyalinis, anticis posticisque ante apicem latissime fusco-fasciatis, venis nigris, stigmatibus nigro, basi flavo-maculato.

♂. Feminæ similis; mesonoto, scutelloque lateribus fuscis; tergito tertio nigro, apice late albedo-marginato, angulis apicalibus indente fortiter productis; tergitis quarto sequentibusque albidis, lateribus nigro-maculatis.

Long., ♀ 6.5, ♂ 5 mm.

♀. Head transverse, narrowed behind the eyes; front and vertex very closely punctured-rugulose. Antennæ nearly as long as the whole insect; the third and fourth joints equal in length, each almost twice as long as the scape. Mesonotum irregularly rugulose, transversely and with interspersed

punctures anteriorly, obliquely and more coarsely posteriorly; the notauli distinct, meeting each other beyond the middle of the segment, which is feebly depressed in the middle posteriorly. Scutellum longitudinally rugose-striate; with a deep transverse depression at the base, in which are several longitudinal carinae; the sides of the scutellum with marginal carinae, the apex narrowly rounded. Median segment short, rugose, with a transverse carina at the apex, the areas obliterated by the coarse sculpture, the sides of the segment clothed with pale hairs. Abdomen coarsely longitudinally striated; first tergite subsessile, a little longer than its apical breadth; the spiracles situated near the middle of the lateral margins, a curved carina connecting them; second tergite broadly transversely depressed before the apex, nearly twice as broad as long; third tergite more shallowly transversely depressed behind the middle, as long as the second segment; the apical segments small. Terebra very short, the valvulae projecting very little beyond the apex of the abdomen. Second transverse cubital nervure missing; nervulus a little prefurcal. Nervellus elbowed and intercepted just below the middle.

Hab. Moree, New South Wales, February–April (*Froggatt*); 2 ♀ ♀. Mackay, Queensland, October–May (*Turner*); 1 ♂, 4 ♀ ♀. Hermannsburg, Central Australia (*H. J. Hillier*); 1 ♀.

The genus was founded by Cameron in 1911 for three species from Ceylon and India, which are closely related to the Australian species. The spines on the male abdomen are on the third tergite in this species, not on the fourth, as stated by Cameron in the description of his species.

Camptolynx ruficornis, sp. n.

♀. Nigra; mandibulis, palpis tegulisque flavis; antennis, segmentis abdominalibus tribus basalibus pedibusque rufo-testaceis; alis hyalinis, venis fuscis, anticis fascia fusca sub stigmate venam recurrentem non superante, stigmate dimidio basali flavo.
Long. 6 mm.

♀. Antennae 27-jointed; the basal joints long, the third and fourth each nearly twice as long as the scape. Face very finely and closely punctured, convex in the middle; front and vertex finely punctured-rugulose. Mesonotum closely obliquely striate, the median lobe deeply separated from the lateral and extending nearly to the posterior margin, with a narrow, impressed, longitudinal line. Scutellum irregularly

rugose-striate longitudinally, with distinct lateral carinæ. Median segment short, rugulose, with a small basal area which is narrowed towards the apex; the apical carina forms part of an arched carina which is continued in the lateral carinæ of the posterior slope; spiracles small and rounded. First tergite a little longer than its apical breadth, subsessile, longitudinally striated, with a curved groove joining the two spiracles, which are as far from the apex of the segment as from each other. Second tergite nearly twice as broad at the apex as long, granulate, with a coarsely longitudinally striated groove before the apex; third tergite coarsely granulate at the base, with a broad curved groove beyond the middle, the segment beyond the groove closely longitudinally striated; fourth tergite delicately longitudinally striated; fifth and sixth tergites shining, finely punctured; apical segment whitish and smooth. Valvulæ projecting about 1 mm. beyond the apex of the abdomen. Transverse cubital nervure very short; nervulus slightly pre-furcal. The fuscous band of the fore wing is much narrower than in *C. froggatti*, and reaches from the middle of the stigma to the middle of radial cell, and thence crosses the wing, not quite reaching the lower margin.

Hab. Mackay, Queensland; September, March, and April (*Turner*). 5 ♀ ♀.

In a specimen from Moree, New South Wales, taken by Froggatt in March 1918 the fuscous band of the fore wing is almost entirely obliterated.

Subfamily TRYPHONINÆ.

Tribe THYMARINI.

Cedemopsis hobartensis, sp. n.

♀. Nigra; capite, thorace, postscutello excepto, pedibusque anticis rufis; antennis 34-articulatis, nigris, articulis 17-18 albis; abdomine subtus albido-variegato, tergitis 3-7 apice anguste albo-marginatis; alis subhyalinis, iridescentibus, venis nigris, stigmatibus fusco-ferrugineo.

♂. Feminæ similis.

Long. 6 mm.; terebræ long. 1 mm.; ♂, long. 6-7 mm.

♀. Head subglobose; eyes almost parallel on the inner margins, sparsely covered with short hairs. Antennæ filiform, distinctly shorter than the whole insect; front finely and closely punctured. Clypeus very large, divided into two portions by an arched carina, which is intercepted in the

middle by a small semicircular depression, the basal portion porrect, the apical portion strongly deflexed; mandibles bidentate at the apex, the upper tooth the longest. Thorax minutely punctured, the notauli deep and finely crenulate; scutellum with a rather shallow, transverse, closely longitudinally striated groove at the base. Median segment coarsely rugose; areola rather ill-defined, long and narrow; petiolar area short. Abdomen elongate, narrow; the three basal segments longer than broad and punctured-rugulose; the first tergite longitudinally striated at the base, more than three times as long as its apical breadth; second tergite twice as long as its apical breadth; apical tergites shining, minutely punctured. Neuration not differing from typical *Ædemopsis*.

♂. Antennæ a little longer than the whole insect, with two or three more joints than in the female, and without a white ring. First tergite more coarsely striated than in the female. Clypeus nearly flat, as long as the face, not divided by a carina.

Hab. Eaglehawk Neck, S.E. Tasmania, February 1913 (*Turner*); 1 ♀. Mt. Wellington, Tasmania, March 12-21, 1913 (*Turner*); 2 ♂♂.

This is the first record of this small genus from the Australian region. I follow Thomson in placing the genus in the Tryphoninæ, though some authors consider that it is better placed among the Pimplinæ. Morley's amendment of the generic name to *Ædematopsis* appears to me unnecessary.

VII.—*Notes on Fossorial Hymenoptera*.—XXXVIII. *On new Ethiopian Species*. By ROWLAND E. TURNER, F.Z.S., F.E.S.

Family *Scoliidæ*.

Subfamily *ELIDINÆ*.

Elis (Mesa) fusiformis, sp. n.

♂. Niger; mandibulis apice fusco-ferrugineis; segmento abdominali septimo, tergitoque sexto apice ferrugineis; femoribus, tibiis tarsisque brunneo-ferrugineis; tergitis 2-5 fascia apicali bisinuata, sternitisque 2-4 macula parva apicali utrinque sordide luteis; alis hyalinis, venis fuscis.

Long. 10 mm.

♂. Clypeus short and broad, very broadly rounded at the apex, closely punctured-rugulose and clothed with whitish hairs. Head closely and strongly punctured, the front rugose, interantennal prominence strongly raised, broad and emarginate at the apex. Antennæ moderately stout, about 7 mm. in length, third and fourth joints of the flagellum subequal, each at least half as long again as the second, the first almost concealed, the four subapical joints feebly arcuate beneath. Eyes shallowly emarginate on the middle of the inner margin. Thorax closely and not very coarsely punctured; pronotum as long as the scutellum, feebly narrowed anteriorly. Median segment very closely and rather strongly punctured-rugose, the whole thorax and median segment clothed with whitish hairs, very sparsely on the dorsal surface, more closely on the sides. Abdomen shallowly, but not very finely punctured; the petiole of the first segment half as long as its strongly broadened apical portion, second segment as long as the first without the petiole, nearly twice as broad at the apex as at the base, the third segment the broadest. Seventh tergite longitudinally striated, the apex smooth, with a deep but very narrow apical slit; hypopygium forming the usual recurved aculeus, but shorter than in most species of the genus. Hind tibiæ serrate. Third abscissa of the radius a little longer than the second, much longer than the fourth.

Hab. Kraaifontein, Cape Colony (*Lightfoot*).

Type in the South African Museum.

A rather aberrant species in the fusiform shape of the abdomen, and in the sculpture and apical slit of the seventh tergite.

Family Sphegidae.

Subfamily AMPULICINÆ.

Ampulex toroensis, sp. n.

♀. Viridi-cærulea; mandibulis, palpis, flagello articulis 3-11, secundoque apice, tarsisque articulis duobus apicalibus nigris; alis fusco-hyalinis, fusco obscure bifasciatis.

♂. Feminae similis, antennis tarsisque omnino nigris.

Long., ♀ 20 mm., ♂ 13 mm.

♀. Carina of the clypeus produced into a short blunt tooth at the apex, with a blunt tooth on each side. Head produced and strongly narrowed behind the eyes; the frontal carinae prominent, not nearly reaching the level of the anterior ocellus; vertex coarsely punctured, with distinct transverse

striae posteriorly; front rather less coarsely punctured, the area between the frontal carinae with a tendency to oblique striation. Second joint of the flagellum twice as long as the third, the latter less than three times as long as its apical breadth. Eyes strongly convergent towards the vertex, where they are separated by a distance equal to about three-quarters of the length of the second joint of the flagellum. Pronotum nearly as broad in the middle as long, produced posteriorly into a strong tubercle, transversely striated in the middle, smooth at the base and apex, not punctured, propleuræ smooth. Mesonotum sparsely, scutellum very sparsely, mesopleuræ rather more closely punctured, the scutellum with the usual transverse crenulated groove at the base. Median segment transversely striated, the second carina nearly twice as far from the median carina as from the third at the base, the apical area of the dorsal surface not well defined, the teeth at the apical angles strong and subtriangular. Abdomen smooth and shining, second tergite as long as its greatest breadth. Fourth tarsal joint half as long as the fifth and fully as long as the third in the middle; hind tibiae very sparsely punctured. Fourth abscissa of the radius about half as long as the second transverse cubital nervure, first transverse cubital nervure indicated, but subobsolete.

♂. Clypeus broadly rounded at the apex, without teeth, and rather densely clothed with grey hairs. Head coarsely punctured, the frontal carinae produced posteriorly and meeting behind the anterior ocellus, the space between them with distinct oblique striae and a median longitudinal carina. Second joint of flagellum more than half as long again as the third; eyes less strongly convergent towards the vertex than in the female, separated by a distance scarcely less than the length of the second joint of the flagellum. Thorax rather more closely punctured than in the female, the pronotum with distinct punctures. Abdomen closely and strongly punctured; the third tergite sparsely clothed with cinereous hairs.

Hab. Fort Portal Road, Mbarara, Southern Toro, Uganda Protectorate, 2800–4200 ft., October 22–24, 1911 (*S. A. Neave*); 1 ♀. Tigger, Uganda, October 3, 1901 (*C. S. Betton*); 1 ♂.

Somewhat resembles *A. crawshayi*, Turn., but in that species (♀) the mandibles are red, the wings almost hyaline, the head not produced posteriorly and scarcely narrowed behind the eyes; the frontal carinae meet behind the anterior ocellus, and the front tarsal joint is shorter, in addition to other differences. The female is the type.

Type in British Museum.

Ampulex cyanura, Kohl.

Ampulex cyanura, Kohl, Ann. naturh. Hofmus. Wien, viii. p. 471 (1893). ♀.

Ampulex africana, Cam. Rec. Albany Mus. i. p. 256 (1905). ♂.

Ampulex nitidicollis, sp. n.

♀. Viridis; mandibulis, flagello articulis 3-11 secundoque dimidio apicali, tarsisque, articulo basali excepto, nigris; alis fusco-hyalinis, fusco obscure bivittatis.

Long. 19 mm.

♀. Clypeus broadly rounded anteriorly, strongly longitudinally carinate in the middle, without lateral teeth. Eyes strongly convergent towards the vertex, where they are separated by a distance scarcely exceeding three-quarters of the length of the second joint of the flagellum. Head not produced behind the eyes and not much narrowed posteriorly, very minutely and closely punctured, with a few larger but shallow scattered punctures; the two frontal carinæ parallel and not nearly reaching the level of the anterior ocellus. Pronotum fully as long as its median breadth, narrowed anteriorly, without striæ, with a few scattered punctures, depressed and subconcave anteriorly, raised and subtuberculate in the middle posteriorly, without a distinct median sulcus. Mesonotum and scutellum very sparsely punctured. Median segment nearly as long as its median breadth, strongly transversely striated, the striæ closer and finer between the second and third lateral carinæ than elsewhere, the second carina at least half as far again from the median at the base as from the third, the three median carinæ not extending to the apex and leaving a well-defined apical area; the teeth at the apical angles of the segment broad and not very long, slightly curved, and not very acute at the apex. Abdomen almost smooth; second tergite fully as long as its greatest breadth, the sides only slightly convex; segments 4-6 rather strongly compressed laterally. Fourth joint of the hind tarsi less than half as long as the fifth and much shorter than the third; hind tibiæ very sparsely punctured on the outer side. Fourth abscissa of the radius scarcely half as long as the second transverse cubital nervure; first transverse cubital nervure present, but not quite as strong as the second.

Hab. Damba Island, Victoria Nyanza; October 8, 1918 (C. G. Gowdey).

Type in British Museum.

In many points this resembles *A. splendidula*, Kohl, but

the eyes are much closer together on the vertex than described in that species, the fourth joint of the hind tarsi is shorter, and there are no lateral teeth on the clypeus. The sculpture, however, seems to be very similar.

Subfamily *SPHECINÆ*.

Sphex (*Coloptera*) *crassifemoralis*, sp. n.

♂. Nigra; mandibulis, apice excepto, flagello articulis sex basalibus, pronoto lateribus, callis humeralibus, tegulis, mesonoto utrinque ante tegulas, petiolo subtus, sternitis, in medio nigro-suffusis, tergito septimo, pedibusque ferrugineis; femoribus, trochantaribus intermediis posticisque coxisque posticis, supra nigris; tibiis posticis supra nigrolineatis; alis sordide flavo-hyalinis, apice leviter infumatis, venis ferrugineis; pronoto mesonotoque fortiter transverse striatis; scutello postscutelloque fortiter longitudinaliter striatis, convexis, haud lamellato-productis; tergito septimo apice late truncato.

Long. 22 mm.

♂. Clypeus broadly truncate at the apex, broader than long. Eyes distinctly, but not very strongly convergent towards the clypeus; posterior ocelli nearly half as far again from the eyes as from each other, and twice as far from the hind margin of the head as from each other. Head strongly narrowed behind the eyes, the clypeus and front densely clothed with pale golden pubescence. Propleuræ coarsely rugulose; mesopleuræ and sides of median segment irregularly obliquely striated, coarsely punctured between the striae; a broad band of pale golden pubescence on the mesopleuræ behind, a patch of the same below the humeral calli, and a patch on each side of the median segment at the apex. Dorsal surface of the median segment coarsely obliquely striate-reticulate. First joint of petiole a little shorter than the hind femur and trochanter combined; second tergite subtriangular, a little longer than its apical breadth. Hind femur stout and massive as compared with the allied species; pulvillus large.

Hab. Southern slopes of Mt. Elgon, 5100 to 5800 ft. (*S. A. Neave*), June 8-13, 1911; Valley of Nzoia River, N. Kavirondo, 5100-5400 ft. (*S. A. Neave*), June 5-7, 1911.

Nearly allied to *S. saussurei*, Buys., and *S. tuberculiscutis*, Turn., but is a more robust species, and differs in the simple scutellum and postscutellum, which are produced in a lamelliform manner in the two species mentioned. The clypeus is very different to that of *tuberculiscutis* ♂, also the pronotum, and the petiole is shorter.

Type in British Museum.

Subfamily *PHILANTHINÆ*.*Cerceris representans*, sp. n.

♀. Nigra; mandibulis, apice excepto, clypeo, facie lateribus latissime, carina interantennali, orbitis externis fascia angusta ad marginem posteriorem capitis late producta, pronoto fascia interrupta, tegulis, scutello macula magna utrinque, postscutello, segmento mediano macula maxima utrinque, tergito primo macula magna utrinque, tergitis 2-5 fascia lata antice emarginata, coxis posticis supra, trochanteribus posticis, femoribus tibiisque subtus flavis; antennis, dimidio apicali supra infuscatis, femoribus tibiisque supra tarsisque ferrugineo-testaceis; area pygidiali ferruginea; sternitis 2-5 utrinque macula magna flava, quinto sextoque testaceis; alis subhyalinis, apice leviter infumatis, venis ferrugineis.

Long. 13 mm.

♀. Mandibles with a large triangular tooth on the middle of the inner margin, blunt at the apex. Clypeus with a porrect lamella, which is free from the base, gradually narrowed towards the truncate apex and nearly twice as long as the apical breadth; the portion of the clypeus below the lamella short and transverse at the apex. Antennæ inserted about four times as far from the anterior ocellus as from the base of the clypeus, interantennal carina well developed, second joint of the flagellum half as long again as the third. Head large, broader than the thorax, closely punctured, the front with a tendency to longitudinal striation. Mesonotum and scutellum irregularly longitudinally striate, punctured between the striæ; mesopleuræ closely punctured, not tuberculate. Median segment closely punctured; the basal area more or less strongly obliquely striated, with a low longitudinal carina in the middle. First tergite broader than long, second sternite without an elevated basal area; all the tergites sparsely punctured, the sternites more finely punctured; pygidial area granulate, almost parallel-sided, only a little narrowed at the base, nearly three times as long as the greatest breadth.

Hab. Masai Reserve, British East Africa, May 20, 1913 (T. J. Anderson). 2 ♀ ♀.

In colouring this approaches the European *C. ferreri*, Lind., but is easily distinguished by the straight apex of the lamella of the clypeus, the sparse sculpture of the abdomen, the shape of the pygidial area, and the yellow spots on the scutellum. It is not at all nearly related to any of the Ethiopian species of this group described by Dr. Brauns.

Cerceris barbifera, Bisch.

Cerceris barbifera, Bisch. Deutsch. Zentr. Afrik. Exp. iii., Zool. i. p. 222 (1911). ♀.

♀ *Cerceris bagandarum*, Turn. Ann. & Mag. Nat. Hist. (9) ii. p. 465 (1918). ♂ ♀.

I think these are identical, but the median lobe of the clypens in *bagandarum* is much broader and shorter than in Bischoff's figure, which also omits the large triangular tooth on the inner side of the mandibles. These differences may be due to inaccuracies in the figure, as otherwise the description of *barbifera* agrees well with *bagandarum*. As I have previously suggested, I look on this and also on *C. sodalis*, Turn., as subspecies of *C. diodonta*, Schlett.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

December 18th, 1918.—Mr. G. W. Lamplugh, F.R.S.,
President, in the Chair.

The following communication was read:—

‘On a Bed of Interglacial Loess and some Pre-Glacial Fresh-water Clays on the Durham Coast.’ By Charles Taylor Trechmann, D.Sc., F.G.S.

A few years ago the Author described a bed of Scandinavian drift that was found filling up a small pre-Glacial valley-like depression at Warren-House Gill on the Durham coast. This section and others north and south of it have been kept under observation at different times, and several new features have been noticed as the high tides and other agencies exposed parts of the coast.

Towards the southern end of the old pre-Glacial valley at Warren-House Gill a bed of material, varying from 4 to 12 feet in thickness, was found overlying the Magnesian Limestone and also the Scandinavian drift. This material has been carefully examined chemically and microscopically, and proves to be identical in chemical and physical characters with a sample of the true Continental loess. It is light brown or fawn in colour, very porous and extremely finely divided, and is devoid of plasticity. Towards the base, where it has not been disturbed since it was laid down, it contains a number of rounded and elongated, often very hard, calcareous concretions. In the cliff-section it shows little or no trace of bedding, but tends to break down along vertical clefts and cracks. It passes upwards into a few feet of material that consists of loess which has been partly redeposited by water, and is mixed with sand, gravel, and other material derived from the Scandinavian drift.

The bed of loess and redeposited loess-like drift has suffered

much decalcification and weathering; near its surface there was a large boulder of Norwegian titaniferous syenite which was superficially rotted, and decomposed to a considerable depth. Smaller granitic erratics in the redeposited loess are generally very much rotted. The limestone rubble and stones beneath the loess are strongly calcareted, apparently by material leached out of the loess. In a fissure beneath the loess some mammalian bones were collected, including astragali of two species of *Cervus*. It is argued that the formation and subsequent decalcification of the loess deposit lying upon the Scandinavian drift indicates an Interglacial lapse of considerable duration, as great as that which Continental geologists call an Interglacial Period, before the overlying English and Scottish drift was deposited.

About 2 miles south of the Scandinavian drift-bed several fissures occur in the Magnesian Limestone cliffs and on the foreshore, filled with various materials that were transported in front of the earliest ice-sheet that advanced upon this part of the coast. The Author has already recorded the occurrence in these fissures of Upper Permian red and grey marls and dolomites with clay and peaty trees. Continued examination of two of the fissures where they are exposed between tide-marks on the shore, resulted in the finding of a quantity of freshwater mollusca, ostracoda, and fish-remains. Some mammalian remains also occurred, including those of an elephant (probably *Elephas meridionalis*) and of a vole (*Mimomys*).

Vegetable matter has been washed from various parts of the clay. A large number of seeds came from a single patch of clay, and prove to be of Teglialian age: they seem to represent a pre-Glacial flora, half of the species of which are either exotic or extinct. Seeds from other parts of the deposit appear to indicate a later horizon, and contain mainly living forms.

The deposit is a mixed one, and seems to have belonged to a series of late Pliocene and early Pleistocene beds that occupied part of the present area of the North Sea and were torn up by the advancing ice-sheet, like a great glacial erratic, and thrust into the fissures.

The fact that the Scandinavian drift in Durham contains only stones of Scandinavian origin has been confirmed, and the marine Arctic shells that occur in it were further collected and a few additions to the faunal list were made. The most interesting of these is *Cyrtodaria siliqua* Spengler, an American shell which has been recorded hitherto in Great Britain only from the Caithness Boulder Clays.

All the deposits described above are overlain and overridden by the main mass of local Cheviot and Northern drift that caps the cliffs of the Durham coast.

A suggested correlation of the Durham sequence with the European drifts is attempted, and it is concluded that the fringe of the Scandinavian ice-cap that reached the Durham coast probably corresponds with that of the second and greatest glaciation

of Scandinavia, which some Continental geologists correlate with the Riss Stage of the Alps.

In that case, the main local drift of the north-eastern coast falls into the third and last Glacial Period of Northern Europe. The evidence for Interglacial lapses in the local drifts is very inconclusive.

All the observed features seem to point to the fact that the Scandinavian ice-sheet advanced on the east coast of England in the same way as it invaded Northern Europe round the southern shores of the Baltic, and gave rise to analogous climatic conditions leading to the formation of loess, a fragment of which is found protected from the erosive action of the later local glaeiation in a small hollow on the Durham coast.

June 4th, 1919.—Mr. G. W. Lamplugh, F.R.S.,
President, in the Chair.

The following communication was read:—

‘On the Dentition of the Petalodont Shark, *Climaxodus*.’
By Arthur Smith Woodward, LL.D., F.R.S., P.L.S., F.G.S.

The author describes the nearly complete dentition of a new species of *Climaxodus* from the Calciferous Sandstone of Calder-side, near East Kilbride (Lanarkshire), now in the Royal Scottish Museum, Edinburgh. Nearly all the teeth are borne on the symphysis of the jaw, only the outer paired longitudinal series extending a little farther back over the rami. There are from three to five longitudinal series, each of five or six teeth of the ordinary *Climaxodus*-type, covering the greater part of the symphysis; and the flanking paired series, which extends farther back, comprises more depressed teeth, in which the cutting-edge forms a low blunt ridge. The two jaws are nearly similar; but, as in *Janassa*, the upper seems to have been slightly wider than the lower jaw. The teeth rapidly increase in size backwards, also as in *Janassa*, but they must have been all retained in the mouth throughout life; while in *Janassa* only a single transverse row would be in function at one time, the older teeth being thrust beneath to form a supporting base. *Climaxodus* and *Janassa* are thus two distinct genera. These Petalodonts are especially noteworthy among the Elasmobranchii, because during the greater part of the life of each individual there cannot have been more than six or eight teeth in succession, a condition remarkably different from that in all ordinary sharks and skates in which the successional teeth are always very numerous and rapidly replaced. The same limited tooth-succession is to be observed in the Carboniferous *Cochliodontidae*, and perhaps also in the contemporaneous *Psammodontidae*. Most of the teeth of *Climaxodus* are also interesting as showing a restricted area of highly vascular dentine much resembling a tritor in the dental plate of an ordinary Chimæroid. This character in Elasmobranch teeth which are peculiar for their slow and scanty succession, may have some special significance in connexion with the origin of the Chimæroids.

Periodicals published by TAYLOR & FRANCIS.

Published the First Day of every Month.—2s. 6d.

THE

LONDON, EDINBURGH, and DUBLIN

PHILOSOPHICAL MAGAZINE

AND

JOURNAL OF SCIENCE.

Conducted by

SIR OLIVER JOSEPH LODGE, D.Sc., LL.D., F.R.S.,
SIR JOSEPH JOHN THOMSON, O.M., M.A., Sc.D., F.R.S.,
JOHN JOLY, M.A., D.Sc., F.R.S., F.G.S.,
GEORGE CAREY FOSTER, B.A., LL.D., F.R.S., and
WILLIAM FRANCIS, F.L.S.

Published the First Day of every Month.—2s. 6d.

THE

ANNALS AND MAGAZINE OF NATURAL HISTORY

including Zoology, Botany, and Geology.

Conducted by

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S., and
RICHARD T. FRANCIS, F.Z.S.

*Founded in 1877. Monthly, 1s. Annual Subscription
(‘Companion’ and 12 Monthly Numbers), 13s.*

THE OBSERVATORY,

A MONTHLY REVIEW OF ASTRONOMY.

Edited by

A. S. EDDINGTON, M.A., M.Sc., F.R.S.,
F. J. M. STRATTON, M.A., and
H. S. JONES, M.A., B.Sc.

Its Contributors include most of the leading English-speaking Astronomers,
and its Articles give an interesting reflection of the progress of astronomical
thought and achievement.

*Published Monthly. Price 1s. 8d. Annual Subscription,
16s. post free.*

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, K.S.G., F.L.S.,

LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM.

Articles by prominent Botanists; Announcements of Discoveries; Reviews;
Botanical News and Notes, &c., &c.

Red Lion Court, Fleet Street, London.

CONTENTS OF NUMBER 19.—*Ninth Series.*

	Page
I. Papers on Oriental <i>Carabidae</i> .—II. By H. E. ANDREWES	1
II. The Myth of the Ship-holder: a Postscript. By E. W. GUDGER, American Museum of Natural History, New York City . .	17
III. Systematic Notes on a few Melolonthine Coleoptera. By GILBERT J. ARROW. (Plate I.)	21
IV. On a small Collection of Mammals from Lumbo, Mozambique. By OLDFIELD THOMAS	29
V. A List of the Freshwater Fishes of Sierra Leone. By G. A. BOULENGER, F.R.S.	34
VI. Notes on the <i>Ichneumonidae</i> in the British Museum.—II. By ROWLAND E. TURNER, F.Z.S., F.E.S.	36
VII. Notes on Fossorial Hymenoptera.—XXXVIII. On new Ethiopian Species. By ROWLAND E. TURNER, F.Z.S., F.E.S.	44

PROCEEDINGS OF LEARNED SOCIETIES.

Geological Society	50
------------------------------	----

* * * It is requested that all Communications for this Work may be addressed, post-paid, to the Care of Messrs. Taylor and Francis, Printing Office, Red Lion Court, Fleet Street, London.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



CONDUCTED BY

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,

AND

RICHARD T. FRANCIS, F.Z.S.

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

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Simpkin, Marshall, Hamilton, Kent, & Co., Ltd., Baillière, Paris:
and Hodges, Figgis, & Co., Dublin.

NOTICE.
 OWING to the proof of the Plate illustrating Mr. Arrow's paper, which appeared in our last number, having gone astray in the post, the Plate was printed without the legends. Subscribers are asked, when binding their Volumes, to substitute the correct Plate now issued for that inserted last month.—EDITORS.

WATKINS & DONCASTER, Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

G. A. BENTALL, F.Z.S.

CABINETS,
 STORE BOXES,
 SETTING BOARDS,
 TRAVELLING
 CASES,
 NETS,
 PINS, ETC.

Naturalist,
 DUDLEY HOUSE,
 SOUTHAMPTON STREET
 (Opposite Hotel Cecil),
 STRAND, LONDON,
 W.C. 2.

BRITISH,
 CONTINENTAL,
 AND EXOTIC
 LEPIDOPTERA,
 COLEOPTERA,
 BIRDS' EGGS
 AND SKINS,
 BOOKS, ETC.

Price Lists post free on request.

SCIENTIFIC BOOKS AND SERIALS.

JOHN WHELDON & CO. have the largest stock in the country of Books in all Departments of Science and Natural History, also Transactions and Journals of Learned Societies, etc., in sets, runs, and single volumes or numbers.

Libraries or small parcels purchased.

SPECIAL CATALOGUES: Entomological, Ornithological, Zoological, Geological, War Economy (Agriculture, Husbandry, Gardening, Economic Botany, etc.), Botanical (General and Geographical), etc., 2*l.* each, post free.

38 GREAT QUEEN STREET, KINGSWAY, LONDON, W.C. 2.

Telephone: Gerrard 1412.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	}
HALF-PAGE - -	1 2 6	1 0 0 „	17 6 „	
QUARTER-PAGE -	12 6	11 3 „	10 0 „	
				All Net.

All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdharst Road, Croydon.



THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 20. AUGUST 1919.

VIII.—*Descriptions of New Pyralidæ of the Subfamilies Crambinæ and Siginæ.* By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c.

[Continued from vol. iii. p. 547.]

(24) *Diatræa flavilinealis*, sp. n.

♂. Head, thorax, and abdomen white mixed with dark brown, the last with some fulvous yellow on dorsum towards base; palpi, pectus, legs, and ventral surface of abdomen suffused with dark brown. Fore wing white tinged with brown and irrorated with rather large black-brown scales; an orange-yellow line curved from costa beyond middle to lower angle of cell, then oblique to middle of inner margin; an orange-yellow subterminal line; cilia white at base, with fuscous line near base, the tips yellowish mixed with dark brown. Hind wing whitish suffused with pale reddish brown, the cilia whiter. Underside suffused with pale red-brown.

Hab. BR. C. AFRICA, Mlanje Plateau, 6500' (*Neave*), 1 ♂ type. *Exp.* 16 mm.

(26) *Diatræa perpulverea*, sp. n.

♂. Head and thorax white mixed with some dark reddish brown; abdomen white tinged with brown; antennæ brown, white above; palpi reddish brown mixed with black. Fore wing white tinged with reddish brown and thickly irrorated with dark brown; indistinct curved dark medial and subterminal lines; a terminal

series of black points. Hind wing glossy white with a fine dark terminal line to vein 2. Underside of fore wing and costal area of hind wing suffused with reddish brown.

Hab. N. NIGERIA, Minna (*Macfie*), 3 ♂ type. *Exp.* 20 mm.

(28) *Diatræa argyrolepis*, sp. n.

♂. Head and thorax fulvous yellow tinged with dark brown; abdomen whitish tinged with ochreous brown; palpi suffused with dark brown; pectus, legs, and ventral surface of abdomen suffused with ochreous brown. Fore wing fulvous yellow irrorated with black-brown and metallic silver scales; some dark brown suffusion on basal costal area and more or less distinct dark streaks on basal area above and below discal and submedian folds; a more or less complete medial series of small black spots with metallic silver scales on them defined on outer side by a fulvous line, excurved to lower angle of cell, then incurved; the postmedial area with black streaks in the interspaces or black suffusion irrorated with silver scales except towards costa and inner margin; a curved fulvous yellow subterminal line defined on outer side by black points with silver scales on them; a terminal series of small black spots intersected by yellow on the veins; cilia fuscous suffused with metallic silver. Hind wing creamy white faintly tinged with brown; a terminal series of slight black striæ to vein 2. Underside suffused with dark reddish brown except on inner area of hind wing.

♀. Fore wing yellow diffused with rufous and irrorated with dark brown, without the dark suffusion and streaks, the medial series of spots sometimes almost obsolete, the subterminal series and the terminal series of points distinct; the underside of fore wing and costal area of hind wing suffused with pale red-brown except on terminal area.

Hab. GOLD COAST, Bibianaha (*Spurrell*), 1 ♂, 3 ♀, Kunasi (*Sanders*), 1 ♀; S. NIGERIA (*Dudgeon*), 1 ♀; BR. E. AFRICA, Victoria Nyanza, Port Ugowe (*Johnston*), 1 ♀; BR. C. AFRICA, Mt. Mlanje (*Neave*), 2 ♂, 4 ♀ type; PORTUGUESE E. AFRICA, Port Amelia (*Beste*), 1 ♂, Kola Valley (*Neave*), 2 ♀, Ruo Valley (*Neave*), 1 ♀; NATAL, 1 ♀, Weenen, 1 ♂, Durban (*Leigh*), 1 ♀; CAPE COLONY, Annshaw (*Miss F. Barrett*), 1 ♂, 1 ♀. *Exp.*, ♂ 20, ♀ 20-30 mm.

(29) *Diatræa mesoplagalis*, sp. n.

Head and thorax pale ochreous, the patagia irrorated with black; abdomen creamy white tinged with ochreous; antennæ blackish except above; palpi with black mixed; legs irrorated with black. Fore wing pale ochreous irrorated with black, the inner and terminal areas less strongly irrorated, the costal area tinged with rufous; a curved maculate medial band from just below costa to submedian fold irrorated with silver defined by black and with a patch of black suffusion beyond it; two slight black discoidal spots

and the veins beyond the cell defined by slight black streaks; a curved punctiform silver subterminal line; a terminal series of minute black lunules; cilia with fuscous and silvery scales mixed and with a slight black line near base. Hind wing silvery white. Underside of fore wing and costal area of hind wing tinged with red-brown.

Hab. SIERRA LEONE (*Clements*), 2 ♂ type; N. NIGERIA, Ilorin (*Macfie*), 1 ♀, Zungeru (*Macfie*), 3 ♀; UGANDA, Gondokoro (*Reymes-Cole*), 1 ♀. *Exp.*, ♂ 22, ♀ 26 mm.

(31) *Diatræa argentsparsalis*, sp. n.

Head and thorax yellow mixed with red-brown; abdomen creamy white, the ventral surface yellowish. Fore wing yellow tinged with red-brown and irrorated with a few black-brown and silver scales; a small black discoidal spot and two minute brown and silver spots below end of cell with a fulvous bar on their outer side; an indistinct curved fulvous subterminal line; a terminal series of minute black spots; cilia blackish mixed with silver. Hind wing glossy white slightly tinged with ochreous. Underside of fore wing and the costal area of hind wing suffused with red-brown.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 3 ♂, 1 ♀ type; MASHONALAND (*Dobbie*), 1 ♀. *Exp.*, ♂ 18, ♀ 20-22 mm.

(32) *Diatræa perfusalis*, sp. n.

♀. Head and thorax yellowish suffused with deep red-brown; abdomen brownish white; pectus, legs, and ventral surface of abdomen suffused with red-brown. Fore wing yellowish strongly suffused with deep red-brown; two small almost conjoined black discoidal spots with a diffused dark brown fascia from them to the indistinct rather diffused curved dark subterminal line; a terminal series of minute black spots. Hind wing creamy white with a slight brown terminal line to submedian fold. Underside of fore wing and the costal area of hind wing suffused with red-brown.

Hab. S. NIGERIA, Yorubaland, Ogbomoso (*Sir G. Carter*), 2 ♀ type. *Exp.* 26 mm.

(33) *Diatræa costifusalis*, sp. n.

Head and thorax creamy white mixed with black; abdomen creamy white, the ventral surface brown; pectus and legs suffused with red-brown. Fore wing creamy white tinged with rufous, the costal area broadly suffused with bright red-brown; the basal area below the cell sparsely irrorated with large dark brown and silvery scales and the inner margin towards tornus irrorated with black-brown; a small spot formed by blackish and silvery scales in middle of cell and a curved medial series of similar spots between subcostal nevure and vein 1; two small black discoidal spots; a

subterminal series of minute silver and black spots, hardly traceable on costal half; a terminal series of small black spots; cilia black mixed with whitish. Hind wing glossy white. Underside of fore wing and costal area of hind wing suffused with red-brown.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 1 ♂, 1 ♀ type.
Exp. 26 mm.

Genus CHILOPSIS, nov.

Type, *C. squamata*.

Proboscis small; palpi obliquely porrect, extending about the length of head and thickly scaled; maxillary palpi triangularly dilated with scales; frons smooth, with small tuft of hair; antennæ of male minutely serrate and fasciculate; tibiæ fringed with rather long hair. Fore wing narrow, the costa slightly arched, the apex somewhat produced, the termen obliquely curved; vein 3 from well before angle of cell; 5 from just above angle, the discocellulars curved; 6, 7 very shortly stalked or from cell; 8, 9 stalked; 10, 11 from cell; the cell on underside clothed with long scales. Hind wing with vein 3 from close to angle of cell; 4, 5 from angle or stalked; the discocellulars angled; 6, 7 from upper angle, 7 anastomosing with 8.

Chilopsis squamata, sp. n.

♂. Head and thorax ochreous suffused with red-brown, the patagia with a few black scales; abdomen red-brown to beyond middle, then ochreous suffused with red-brown, the ventral surface ochreous irrorated with brown. Fore wing ochreous suffused with red-brown and irrorated with large raised black-tipped scales, the costal area browner; an indistinct diffused slightly sinuous and very oblique brown line from just beyond the cell to inner margin before middle; a more distinct diffused oblique postmedial brown line, slightly excurved below veins 7 and 2; a terminal series of minute black spots; cilia tipped with black except towards tornus. Hind wing ochreous whitish tinged with brown, the inner area suffused with deep red-brown; a brown postmedial shade; a brown terminal line; cilia with a brown line through them; the underside with small black-brown discoidal spot, the postmedial line obsolescent below vein 5.

Hab. PERU, Yahuar Mayo, 1 ♂ type. *Exp.* 64 mm.

Doratoperas vinasella, Schaus, from Costa Rica, belongs to the same genus, also *Chilo incanellus*, Hampson, from Brazil, and *C. nigristigmellus*, Hampson, from Brazil.

(1 b) *Chilo albimarginalis*, sp. n.

♀. Head, thorax, and abdomen pale rufous; pectus, legs, and ventral surface of abdomen whitish tinged with rufous, the last with subventral series of dark brown points except towards extremity. Fore wing whitish suffused with pale rufous and

sparsely irrorated with large dark brown scales, the costal area rather whiter, the terminal area white irrorated with dark brown; black points at middle of costa, at upper angle of cell, and middle of discocellulars; a postmedial series of blackish striæ, oblique to vein 7, excurved to below vein 5, then very oblique to middle of inner margin with a slight angle inwards at submedian fold; a subterminal series of blackish striæ, bent outwards below costa, forming a short streak to the postmedial series at discal fold, and strongly incurved below vein 3; a terminal series of black points. Hind wing whitish suffused with pale red-brown, the costal area white to near apex; a terminal series of dark brown striæ except towards tornus; cilia white. Underside of fore wing whitish suffused with brown except on inner area, the subterminal series of striæ present but almost obsolete below vein 3; hind wing white slightly tinged with brown, a brownish subterminal line to vein 2, bent inwards to costa where there is a black point.

Hab. PERU, Yahuar Mayo, 1 ♀ type. *Exp.* 44 mm.

(1 c) *Chilo diffusifascia*, sp. n.

♀. Head and thorax pale glossy yellow, the sides of head and tegulæ and the patagia suffused with brown; abdomen glossy yellow, with subdorsal tufts of white hair at base; antennæ brown; palpi suffused with red-brown; pectus and legs whitish tinged with brown. Fore wing glossy ochreous yellow irrorated with brown; a diffused red-brown fascia from base in and below the cell to termen where it extends from just below apex to submedian fold; a minute black-brown discoidal spot slightly irrorated with white and defined on outer side by some white; traces of a curved brown postmedial line; a terminal series of dark points with white points beyond them at base of cilia, which are deep glossy red-brown. Hind wing glossy white faintly tinged with ochreous; a slight brownish terminal line to vein 2. Underside white, the fore wing and costal area of hind wing tinged with red-brown except on terminal area.

Hab. URUGUAY, Monte Video (*de la Garde*), 1 ♀ type. *Exp.* 52 mm.

(10 b) *Chilo pyrocaustalis*, sp. n.

Head and thorax fiery red; abdomen white, the 2nd and 3rd segments dorsally fulvous; pectus, legs, and ventral surface of abdomen whitish suffused with red. Fore wing fiery red, the veins whitish; the medial area with two slight brownish spots below the cell and two on vein 1; two faint oblique brownish striæ from middle of costa to and to beyond upper angle of cell, then an oblique postmedial series of minute dentate marks on the veins; a subterminal series of minute dentate brownish marks on the veins; cilia with a dark line near base, the tips silvery white. Hind wing silvery white. Underside of fore wing and costal area of hind wing suffused with rufous.

Hab. W. AFRICA (*Dudgeon*), 2 ♀ ; S. NIGERIA, Lagos (*Bray*), 1 ♂ ; N. NIGERIA, Minna (*Macfie*), 1 ♂, 1 ♀ type, Zungeru (*Macfie*), 3 ♀. *Exp.*, ♂ 20-22, ♀ 26-30 mm.

(10 d) *Chilo rufulalis*, sp. n.

♀. Head, thorax, and abdomen ochreous tinged with brownish rufous, the last with the 2nd and 3rd segments dorsally suffused with fulvous. Fore wing ochreous uniformly suffused with brownish rufous, the inner area with slight dark irroration; the cilia brown. Hind wing ochreous white with a slight brownish tinge; a faint brownish terminal line to vein 2.

Hab. UP. BURMA, Kinyua (*Bingham*), 1 ♀ type. *Exp.* 36 mm.

(11 a) *Chilo mesostrigalis*, sp. n.

Head white; thorax and abdomen whitish tinged with red-brown; antennæ, palpi, pectus, legs, and ventral surface of abdomen white tinged with brown. Fore wing white slightly tinged with reddish brown and sparsely irrorated with blackish scales; a series of five black striae, arising at discal fold just beyond the cell, angled outwards beyond lower angle, then very oblique to middle of submedian fold; a rather interrupted black postmedial line, strongly excurved below costa, then obliquely curved; a terminal series of black points. Hind wing white slightly tinged with brown. Underside white slightly tinged with brown.

Hab. PORTUGUESE E. AFRICA, Kola Valley (*Neave*), 1 ♂, Ruo Valley (*Neave*), 1 ♀ type. *Exp.* 36 mm.

(15 a) *Chilo submedianalis*, sp. n.

♂. Head, thorax, and abdomen ochreous white tinged with red-brown. Fore wing ochreous white suffused with red-brown, the terminal half of costa whiter; some darker brown suffusion in and beyond end of cell and in basal half of submedian fold interrupted by a medial white spot; an indistinct narrow whitish subterminal band. Hind wing white tinged with red-brown, the cilia whiter. Underside ochreous white tinged with red-brown.

Hab. CEYLON, Batticaloa (*Green*), 1 ♂ type. *Exp.* 24 mm.

(15 c) *Chilo ascriptalis*, sp. n.

Head and thorax white tinged with reddish brown; abdomen white; pectus and legs white faintly tinged with brown. Fore wing white tinged with reddish brown; a minute black discoidal point and terminal series of slight black points. Hind wing glossy white. Underside of fore wing and the costal area of hind wing tinged with red-brown.

Hab. N. NIGERIA, Minna (*Macfie*), 1 ♀ ; UGANDA, Gondokoro (*Reymes-Cole*), 3 ♂, 8 ♀ type; BR. C. AFRICA, Mt. Mlanje (*Neave*), 1 ♀. *Exp.*, ♂ 20-24, ♀ 22-28 mm.

(15 d) *Chilo geminotalis*, sp. n.

♀. Head and thorax red-brown with a greyish tinge; abdomen whitish tinged with red-brown; palpi irrorated with dark brown; pectus, legs, and ventral surface of abdomen white, the legs slightly tinged with red-brown. Fore wing greyish suffused with red-brown and irrorated with large blackish scales except on basal and terminal areas and in submedian fold; a diffused blackish fascia along median nervure; a terminal series of small black spots bisected with white; cilia red-brown at base, whitish glossed with silver at tips. Hind wing glossy white. Underside white, the fore wing and costal area of hind wing faintly tinged with rufous.

Hab. CACHAR, Kanny Koory, 1 ♀ type. *Exp.* 30 mm.

(25 a) *Chilo strigatellus*, sp. n.

White; sides of palpi and antennæ and streaks on tegulæ cupreous brown. Fore wing with the veins, except on costal and inner areas, and also the submedian fold streaked with brown, sometimes reduced in places to series of scales; a discoidal spot; a fine terminal line and a line through the cilia. Hind wing slightly tinged with brown; a fine terminal line.

Hab. W. AUSTRALIA, Sherlock R. (*Clements*), 3 ♂, 1 ♀ type. *Exp.*, ♂ 16, ♀ 20 mm.

(25 d) *Chilo argyrostola*, sp. n.

♀. Head, thorax, and abdomen silvery white, the sides of frons and palpi except at base red-brown; legs tinged with red-brown. Wings uniform silvery white, the underside of fore wing tinged with red-brown except on inner and terminal areas.

Hab. VENEZUELA (*Dyson*), 1 ♀ type. *Exp.* 22 mm.

(26 b) *Chilo phlebitalis*, sp. n.

♂. Head and thorax white tinged with red-brown at sides; abdomen white, the 2nd and 3rd segments dorsally rufous; antennæ red-brown except above; palpi, pectus, and legs tinged with red-brown. Fore wing silvery white irrorated with red-brown, the scales forming slight streaks defining the veins above and below, the costal area tinged with red-brown leaving the costal edge white; a black discoidal point; a slight dark terminal line; cilia white with fine dark lines near base and tips. Hind wing silvery white with a slight dark terminal line to vein 2. Underside of fore wing and the costal area of hind wing tinged with red-brown.

Hab. ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 1 ♂, Ocampo, Santa Fé (*Wagner*), 2 ♂ type. *Exp.* 16-20 mm.

(26 c) *Chilo calamistis*, sp. n.

♀. Head, thorax, and abdomen brownish white; palpi slightly irrorated with brown. Fore wing whitish tinged with red-brown and slightly irrorated with brown; faint white streaks irrorated with black in discal and submedian folds; a black discoidal point; a terminal series of black points, the point above tornus rather larger. Hind wing white tinged with brownish ochreous. Underside tinged with red-brown, the inner area of hind wing white.

Hab. MEXICO, Presidio (*Forrer*), 1 ♀, Godman-Salvin Coll.; ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 4 ♀ type. *Exp.* 22-28 mm.

(26 d) *Chilo leptigrammalis*, sp. n.

Head, thorax, and abdomen white faintly tinged with red-brown; palpi strongly irrorated with brown. Fore wing white tinged with reddish brown and rather thickly irrorated with black; the costa whiter, the discal and submedian folds and interspaces beyond the cell with white streaks irrorated with black; a black discoidal point; traces of a dark postmedial line angled outwards at discal and submedian folds; a fine double dark subterminal line filled in with white, strongly bent inwards to costa, then closely approximated to the termen and minutely waved; a terminal series of rather lunulate black points slightly defined on inner side by white; cilia with a dark line near base, the tips browner. Hind wing glossy white slightly tinged with ochreous brown except on inner area; a fine dark terminal line to vein 2. Underside of fore wing and costal area of hind wing suffused with red-brown, the terminal area whiter.

Hab. ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 4 ♂, 2 ♀ type. *Exp.* 24-32 mm.

(26 e) *Chilo leucocraspis*, sp. n.

♀. Head and thorax white, tinged with rufous at sides; abdomen white, the 2nd to 4th segments dorsally suffused with rufous; antennæ rufous; palpi irrorated with brown; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing pale rufous, the inner area white slightly irrorated with brown; the costal edge white on terminal half; a black discoidal point and slight oblique brown striga above it from costa; a curved white subterminal line slightly defined on inner side by brown; a terminal series of black points; cilia with a dark line near base, the tips pure white except at tornus. Hind wing silvery white; a terminal series of slight black points to vein 2. Underside of fore wing and costal area of hind wing suffused with pale red-brown, the hind wing with blackish discoidal point.

Hab. ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 1 ♀ type. *Exp.* 28 mm.

(28) *Chilo argentifascia*, sp. n.

♀. Head ochreous white, pale rufous at sides and behind; thorax pale rufous, the patagia silvery white; abdomen white tinged with brownish ochreous; antennæ tinged with rufous; pectus and legs white tinged with brownish ochreous. Fore wing pale rufous; the costal edge silvery white, expanding into a narrow fascia from before middle to apex; a broad silvery white fascia edged by slight dark brown lines from base, where it extends to the inner margin, in and below the cell and thence to the termen below apex and to the cilia. Hind wing silvery white, the inner area faintly tinged with brown. Underside glossy white, the costal area of both wings faintly tinged with rufous.

Hab. W. AUSTRALIA, Sherlock R. (*Clements*), 2 ♀ type. *Exp.* 30 mm.

(2) *Leucargyra xanthocephs*, sp. n.

Head, tegulæ, and some of the hair on prothorax orange-yellow, the rest of thorax white; abdomen white tinged with orange-yellow, the 2nd and 3rd segments dorsally fulvous; antennæ with the shaft white above; palpi fuscous brown; pectus, legs, and ventral surface of abdomen white, the fore legs fuscous brown in front, the coxæ yellow and white at base. Wings uniform silvery white above and below.

Hab. PERU, Yahuar Mayo, 2 ♂, 1 ♀ type. *Exp.*, ♂ 50, ♀ 74 mm.

(6a) **Eschata irrorata*, sp. n.

♀. Pure white; palpi blackish except at tips; antennæ brown; fore tibiæ orange fringed with white; tarsi orange ringed with white; abdomen with dorsal orange patch on 2nd and 3rd segments; wings silvery white. Fore wing with faint traces of a sinuous golden medial line from vein 2 to inner margin; a curved subterminal golden line, the area on its inner side broadly irrorated with large black scales, extending on inner area to the medial line; cilia reddish golden.

Hab. ASSAM, Khâsis, type in Coll. Rothschild. *Exp.* 52 mm.

(2) *Doratoperas fulvescens*, sp. n.

♂. Head, thorax, and abdomen whitish suffused with red-brown, the head whiter in front, the thorax irrorated with dark brown; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing whitish suffused with fulvous brown and sparsely irrorated with large black scales, the costal area rather whiter to beyond middle; the medial area with oblique rufous shade from subcostal nervure to vein 1; a black discoidal point; an indistinct rather diffused brownish postmedial line, arising below the costa, excurved to vein 4, then very oblique to middle of inner

margin; an indistinct curved slightly waved brownish subterminal line; a terminal series of black points. Hind wing whitish suffused with red-brown, the costal area whiter to near apex; a terminal series of black points to submedian fold. Underside whitish tinged with rufous, the costal area of both wings slightly irrorated with black.

Hab. PERU, Yahuarmayo, 3 ♂ type. *Exp.* 36–42 mm.

(3) *Doratoperas xanthotherma*, sp. n.

♂. Head brownish white, the antennæ brown, the palpi fulvous yellow; thorax dorsally brownish white, the tegulæ with brown subdorsal stripes, the tegulæ at sides and patagia chrome-yellow tinged with rufous and with brown stripe above; abdomen dorsally blackish brown, the anal tuft white; pectus, legs, and ventral surface of abdomen white, the fore tibiæ with tufts of blackish hair, the tarsi fulvous. Fore wing chrome-yellow, the inner area suffused with rufous from before middle, expanding to vein 2 beyond the postmedial line and at termen to vein 3, the rest of wing irrorated with a few brown scales; a minute red-brown discoidal spot; the postmedial line represented by slight obliquely placed rufous spots on veins 4 and 3 and a rather diffused red-brown line angled inwards below vein 2 near its origin and below vein 1 bent inwards to inner margin before middle; a terminal series of dark red-brown points; cilia pure white at base, dark brown at tips, wholly brown towards tornus. Hind wing pale yellow, the apical area whitish, the inner area tinged with red-brown; a terminal series of slight dark points to below vein 3; cilia white, tinged with red-brown towards tornus. Underside white with a slight rufous tinge on costa of fore wing and inner area of both wings.

Hab. PERU, Yahuarmayo, 1 ♂ type. *Exp.* 66 mm.

(1 d) *Mesolia albimaculalis*, sp. n.

♀. Head and thorax black-brown mixed with some white; abdomen red-brown; pectus, legs, and ventral surface of abdomen white, the legs with some blackish scales and the tarsi banded with black. Fore wing cupreous red-brown; a diffused white ante-medial shade with a short blackish streak beyond it above vein 1; a white spot at middle of costa and diffused sinuous line from discal fold to inner margin; a triangular white spot from costa at end of cell, its apex indenting a blackish discoidal spot with a minute white point at lower angle of cell and some silvery scales beyond it; a subterminal white bar from costa and series of small dentate white marks on veins 6 to 2 defined on outer side by minute black spots; a white bar from costa before apex, its outer edge indented and a series of small conical spots on termen from below vein 6 to above tornus; cilia white with a black line near base and dark tips towards apex, then cupreous brown. Hind wing glossy grey-brown, the cilia with dark line near base and white tips

to discal fold. Underside grey-brown, the costa of fore wing white towards apex.

Hab. N. NIGERIA, Zungeru (*Macfie*), 1 ♀ type. *Exp.* 18 mm.

(2 a) *Masolia presidialis*, sp. n.

Mesolia plurimella, Druce, Biol. Centr.-Am., Het. ii. p. 297 (part.), nec Wlk.

Antennæ of male with short branches.

Head and thorax red-brown mixed with grey; abdomen whitish suffused with red-brown, the extremity whiter; palpi with some white at base; pectus, legs, and ventral surface of abdomen white faintly tinged with brown, the tarsi banded with brown. Fore wing red-brown mixed with grey; a diffused antemedial dark brown patch on vein 1; an obscure diffused dark medial line, arising at median nervure, angled outwards at submedian fold and inwards at vein 1; postmedial line diffused dark red-brown, oblique and defined on inner side by whitish to vein 6, where it is angled outwards, angled outwards and forming diffused dentate patches above vein 1 and inner margin, a dark point beyond it above vein 6; subterminal line silvery whitish defined on each side by red-brown, curved, a small white spot beyond it on costa and patch at middle with oblique black streak above it and longitudinal streak below it; an oblique white subapical streak and striga on termen below apex; cilia red-brown to the hook with a white striga below apex and streak above the hook, then white tinged with red-brown. Hind wing whitish suffused with brown, the cilia white. Underside of fore wing red-brown.

Hab. MEXICO, Presidio (*Forrer*), 1 ♂, 1 ♀ type, Godman-Salvin Coll. *Exp.*, ♂ 20, ♀ 22 mm.

(2 b) *Mesolia diaperatalis*, sp. n.

Mesolia plurimella, Druce, Biol. Centr.-Am., Het. ii. p. 297 (part.), nec Wlk.

♀. Head, thorax, and abdomen red-brown; palpi white at base; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing red-brown slightly mixed with whitish; postmedial line deep red-brown, arising below the costa, waved to submedian fold, then strongly incurved and forming a small diffused patch on inner area, veins 6 to 2 beyond it with obscure dark streaks; subterminal line white defined on each side by red-brown, oblique to discal fold and with an oblique white streak beyond it across apical area, incurved below discal fold and waved below vein 3; a bilunulate white mark before middle of termen; cilia white to the hook with a black line at middle, then white at base, brown at tips. Hind wing whitish strongly suffused with red-brown, the cilia whiter. Underside whitish suffused with red-brown, the fore wing with the costa white towards apex.

Hab. MEXICO, Presidio (*Forrer*), 1 ♀ type, Godman-Salvin Coll. *Exp.* 24 mm.

(2c) *Mesolia jamaicensis*, sp. n.

Antennæ of male serrate.

♂. Head and thorax red-brown mixed with grey; antennæ blackish; abdomen whitish suffused with brown; pectus, legs, and ventral surface of abdomen white. Fore wing red-brown variegated with white; an incurved medial white line from cell to inner margin with a diffused dark patch beyond it in submedian interspace; a red-brown postmedial line, bent inwards to costa; subterminal line silvery white defined on each side by red-brown, bent inwards to costa, a white patch beyond it between discal and submedian folds with short black streaks above and below it and one at middle; an oblique dentate white subapical mark; a red-brown terminal line; cilia pure white with blackish lines near base and at tips to the hook, then red-brown with some white at base. Hind wing white tinged with red-brown. Underside white, the fore wing and costal area of hind wing suffused with red-brown.

Hab. JAMAICA (*Gosse*), 1 ♂ type, Mandeville (*Cockerell*), 1 ♂. *Exp.* 16 mm.

(1b) *Prionopteryx sinensis*, sp. n.

Antennæ of male serrate and fasciculate.

♂. Head, thorax, and abdomen red-brown slightly mixed with whitish; palpi red-brown and white; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing red-brown mixed with some white, especially on inner area; an antemedial patch of black-brown scales above inner margin; postmedial line red-brown, oblique to discal fold where it is angled outwards, then incurved and angled outwards at submedian fold; subterminal line white defined on each side by red-brown, very oblique to discal fold, then incurved and excurved below vein 2, a whitish patch beyond it before middle of termen with small dentate blackish mark on it at vein 4 and short streaks below veins 3 and 2. Hind wing red-brown with a greyish tinge. Underside red-brown tinged with grey.

Hab. W. CHINA, Chang-Yang (*Pratt*), 1 ♂ type. *Exp.* 18 mm.

(4b) *Prionopteryx brevivittalis*, sp. n.

Head and thorax dark reddish brown mixed with grey-white; abdomen white slightly tinged with red-brown; antennæ with the branches black; palpi with black mixed; pectus and legs white tinged with brown, the tarsi brown tinged with white. Fore wing with the costal half red-brown mixed with white, the inner half white irrorated with red-brown; a subbasal series of slight oblique black marks in and below the cell and above inner margin, the last met by a streak from base; a slight black mark above middle of median nervure; a dentate white medial line defined on inner side by two small black lunules in the cell and on outer by red-brown

and black; two slight black spots beyond the cell; subterminal line white defined on each side by red-brown with slight black marks before it below costa and at middle, obliquely excurved to discal fold, then incurved and slightly angled outwards at vein 1, a series of white spots beyond it from costa to vein 2 with short black streaks between them; the terminal area red-brown finely pencilled with white; cilia white with a red-brown line through them and red-brown tips to the hook, then white with the tips tinged with red-brown. Hind wing white slightly tinged with red-brown; a red-brown terminal line to submedian fold; cilia pure white. Underside of fore wing brown with a series of diffused white spots before termen; hind wing with the costal area tinged with brown.

Hab. TRANSVAAL, Gemsbokfontein (*Janse*), 1 ♂, Rietfontein (*Janse*), 2 ♂, 1 ♀ type, Van der Merwe's farm (*Janse*), 1 ♂; NATAL, Durban (*Leigh*), 1 ♂, 1 ♀; Orange R. Colony, Bloemfontein (*Eckersley*), 2 ♂. *Exp.* 24-26 mm.

(4c) *Prionopteryx mesozonalis*, sp. n.

♀. Head and thorax pale red-brown mixed with white; abdomen white dorsally tinged with red-brown towards base; palpi with some blackish mixed; pectus, legs, and ventral surface of abdomen white tinged with red-brown, the tarsi red-brown ringed with white. Fore wing white mostly suffused with red-brown and irrorated with blackish; an oblique red-brown antemedial line, arising below the costa and with some black before it in the cell; a white medial line defined on outer side by black and on inner by a diffused black band, angled outwards in the cell and waved below it; a black discoidal point; postmedial line white, defined on inner side by blackish and with a black patch beyond it on costa, angled outwards at discal fold, then incurved and angled inwards at vein 1; a highly dentate white subterminal line with short black streaks beyond it in the interspaces from below costa to vein 1; cilia white with a line near base, black to the hook, then red-brown, and blackish line near tips. Hind wing silvery white with a very faint red-brown tinge. Underside of fore wing and costal area of hind wing tinged with red-brown.

Hab. ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 1 ♀ type. *Exp.* 26 mm.

(4g) *Prionopteryx albirufalis*, sp. n.

♀. Head and thorax white mixed with some red-brown; abdomen white slightly tinged with red-brown; antennæ ringed with blackish; pectus, legs, and ventral surface of abdomen white, the fore tibiæ and the tarsi banded with red-brown. Fore wing white irrorated with red-brown; some black irroration on antemedial area from below costa to inner margin, somewhat angled outwards in the cell; a somewhat dentate white medial line defined on outer

side by a diffused dark red-brown band; subterminal line white defined on each side by red-brown, oblique to discal fold, then incurved and minutely dentate, a small black spot beyond it below costa; a fine red-brown terminal line with two minute black spots before it at middle; cilia white with a fine red-brown line near base to submedian fold and the tips tinged with red-brown at middle. Hind wing silvery white faintly tinged with red-brown, the cilia pure white. Underside white, the fore wing tinged with red-brown on costal half.

Hab. SUDAN, Port Sudan (*Waterfield*), 1 ♀ type. *Exp.* 18 mm.

(4h) *Prionoptyx rubricalis*, sp. n.

♀. Head and thorax rufous slightly mixed with whitish; abdomen whitish suffused with rufous; antennæ blackish ringed with white; palpi red-brown mixed with white, blackish at extremity; pectus, legs, and ventral surface of abdomen whitish suffused with red-brown, the tarsi red-brown ringed with white. Fore wing rufous irrorated with white; a small antemedial white spot above inner margin; small medial white spots on costa and in cell and above and below vein 1; diffused blackish spots in and beyond end of cell with a white spot between them on the discocellulars; a postmedial series of small white spots, somewhat incurved below the costa and excurved beyond the cell; a terminal series of small blackish spots defined on inner side by a lunulate white line; cilia red-brown and white. Hind wing whitish tinged with rufous, the cilia white with a red-brown line near base and some red-brown at tips. Underside whitish suffused with rufous.

Hab. N. NIGERIA, Zungeru (*Macfie, Simpson*), 5 ♀ type. *Exp.* 20 mm.

(5b) *Prionoptyx microdentalis*, sp. n.

Antennæ of male uniserrate; hind wing with veins 4, 5 stalked.

Head and thorax red-brown mixed with some white; abdomen white, dorsally tinged with red-brown towards base; antennæ blackish; palpi banded with blackish; pectus and legs white tinged with red-brown, the fore tibiae and the tarsi banded blackish and white. Fore wing red-brown mixed with whitish, a whitish fascia in submedian interspace; a blackish subbasal mark above inner margin with traces of the angled whitish antemedial line on its outer side; a rather diffused curved red-brown postmedial line, interrupted at submedian fold and with short blackish fascia before it on vein 1, defined on inner side by a white bar from costa; subterminal line whitish, very oblique and defined on inner side by red-brown to discal fold, then dentate and defined on inner side by minute dentate black marks, the area beyond it blackish below discal fold, the apical area red-brown with a sinuous white streak across it; a fine black terminal line defined on inner side by white

below the hook; cilia white at base, red-brown at tips and with black line near base to the hook. Hind wing white faintly tinged with red-brown. Underside suffused with red-brown.

Hab. SIERRA LEONE, Mano (*Dudgeon*), 1 ♀; GOLD COAST (*Dudgeon*), 1 ♂; S. NIGERIA, Lagos (*Dudgeon*), 2 ♀, Old Calabar (*Miss Kingsley, Sampson*), 2 ♂, 1 ♀, Warri Distr. (*Claydon*), 1 ♀; N. NIGERIA, Borgu, Yelwa L. (*Migeod*), 1 ♀. *Exp.* 18–22 mm.

Genus PARANCYLA, nov.

Type, *P. argyrothysana*.

Proboscis fully developed; palpi downcurved, extending about the length of head and thickly scaled; maxillary palpi dilated with scales; frons smooth, with ridge of scales above; antennæ of male laminate and minutely ciliated. Fore wing rather long and narrow, the apex rounded, the termen somewhat excised below discal fold; vein 3 from well before angle of cell; 4, 5 from angle; 6 from below upper angle; 7 from angle; 8, 9 stalked; 10, 11 from cell, the latter becoming coincident with 12. Hind wing with veins 3 and 5 from angle of cell, 4 absent; 6 obsolescent from well below upper angle; 8 anastomosing with 7.

In key differs from *Surattha* in vein 11 becoming coincident with 12.

Parancyla argyrothysana, sp. n.

♂. Head white, the antennæ blackish except above, the palpi tinged with brown and slightly irrorated with black, the tips black; thorax white tinged with red-brown and slightly irrorated with black; abdomen white tinged with red-brown; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing white tinged with red-brown and irrorated with black; a small rather annulate blackish discoidal spot; a metallic silver subterminal line defined on inner side by a pale rufous line, slightly excurved below costa; the terminal area rather whiter with a terminal series of black points; cilia metallic silver, tinged with brown at tips. Hind wing white tinged with red-brown, the cilia whiter. Underside white tinged with red-brown.

♀. More strongly suffused with red-brown.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 4 ♂, 4 ♀ type, Ruo Valley (*Neave*), 1 ♀. *Exp.*, ♂ 22, ♀ 32–38 mm.

(1a) *Surattha africalis*, sp. n.

♂. White irrorated with fuscous; branches of antennæ blackish. Fore wing with a subbasal series of patches of black scales between the veins; a medial sinuous white line defined by black on either side; a prominent white discoidal spot with black suffusion between it and the medial line; a subterminal minutely waved black line obtusely angled at middle and with a diffused brown line parallel

to its inner edge; some terminal fuscous suffusion and a series of black points. Hind wing white with a fine fuscous terminal line.

Ab. 1. Fore wing strongly tinged with ochreous.

♀. Fore wing with the area between the medial and postmedial lines suffused with black.

Hab. SUDAN, Port Sudan (*Waterfield*), 1 ♂; BR. E. AFRICA, Athi-ya-Mawe (*Betton*), 1 ♀; "GERM. E. AFRICA," Dar-es-Salaam, 1 ♂ type; TRANSVAAL, Rietfontein (*Janse*), 1 ♂. *Exp.* 22-26 mm.

(1b) *Surattha selenalis*, sp. n.

♂. Head, thorax, and base of abdomen white faintly tinged with rufous, the rest of abdomen strongly suffused with rufous; antennæ with the branches black; palpi suffused with brown; pectus and legs white, the tibiæ and tarsi banded with brown. Fore wing pale red-brown slightly irrorated with whitish, the postmedial part of costal area white slightly irrorated with rufous; antemedial line whitish, defined on outer side by a slight blackish mark at costa, then indistinct to submedian fold where it is angled outwards, then oblique and defined on each side by blackish; medial line whitish defined on each side by blackish, angled outwards in submedian fold; a pure white discoidal lunule; subterminal line white, excurved at middle and slightly waved towards costa and inner margin; a fine white line just before termen, defined on outer side by slight blackish points; cilia white with a rather interrupted red-brown line near base and some red-brown at tips. Hind wing silvery white. Underside of fore wing except the inner area and the costal area of hind wing tinged with red-brown.

Hab. ABYSSINIA, Taddecha Mullka (*Degen*), 1 ♂ type. *Exp.* 28 mm.

(3b) *Surattha soudanensis*, sp. n.

Head, thorax, and abdomen white tinged with fulvous yellow, the thorax irrorated with black; antennæ of male with the branches black; palpi suffused with rufous; pectus, legs, and ventral surface of abdomen white tinged with rufous. Fore wing white suffused with pale fulvous and irrorated with black in the interspaces, those of postmedial area rather more thickly irrorated; a diffused curved whitish antemedial band defined on inner side by pale fulvous; a narrow white medial band defined on outer side by pale fulvous, its edges slightly waved; a rounded white discoidal spot defined by blackish; a narrow white postmedial band defined on inner side by pale fulvous, its outer edge slightly dentate, somewhat excurved beyond the cell; a lunulate white subterminal line defined on outer side by a series of black points; cilia white mixed with brownish. Hind wing white faintly tinged with reddish brown, the cilia pure white. Underside white faintly tinged with rufous.

Hab. SUDAN, Port Sudan (*Waterfield*), 4 ♂, 1 ♀ type. *Exp.* 22-26 mm.

[To be continued.]

IX.—Notes on *Fossorial Hymenoptera*.—XXXIX. *New Sphecoidea collected in Palestine by Major E. E. Austen*.
By ROWLAND E. TURNER, F.Z.S., F.E.S.

Psammæcius austeni, sp. n.

♂. Niger; scapo subtus flavo; segmentis abdominalibus tribus basalibus, pedibusque, coxis exceptis, rufo-ferrugineis; flagello articulis 9–10 subtus ferrugineis, excavatis; articulo apicali subtus et apice brunneo-ferrugineo, fortiter curvato; alis hyalinis, cellula radiali, cellulisque cubitalibus secunda tertiaque fortiter infuscatis; venis nigris, stigmatibus flavo.

♀. Mari simillima, flagello nigro, articulis haud excavatis; cellula cubitali tertia hyalina.

Long., ♂ 9 mm., ♀ 10 mm.

♂. Eyes strongly convergent towards the clypeus, posterior ocelli a little further from each other than from the eyes; vertex and front strongly and closely punctured. Clypeus broadly and roundly deflexed at the apex, the deflexed portion smooth and shining, the basal portion closely punctured. Thorax and sides of the median segment closely and coarsely punctured; the triangular basal area of the median segment coarsely longitudinally striate-reticulate. First and second tergites strongly but not very closely punctured, less closely than in *P. punctulatus*, Lind., and less coarsely than in *P. luxuriosus*, Rad.; the apical tergites more closely and finely punctured; sternites shining, very sparsely punctured. At the apex of the three basal tergites the red colouring shows a tendency to change to yellow, forming an obscure, narrow, reddish-yellow apical fascia. Neuration as in *P. punctulatus*.

♀. Pygidial area longitudinally striate; fore metatarsus with five long spatulate whitish spines. Flagellum simple, the apical joints not excavated or curved.

Hab. Jerisheh, N.E. of Jaffa; 1 ♂, May 1–8, 1918; 1 ♀, April 29, 1918.

Very different in colour to *punctulatus* and *luxuriosus*; the antennæ are also stouter and the pulvilli larger than in either of those species. I think *Psammæcius*, Lep., is sufficiently distinct to be given generic rank, though Handlirsch sinks it under *Gorytes*. The name *Gorytes* certainly cannot stand, and must be replaced for the genus in the widest sense either by *Ceropales*, Latr., or *Arpactus*, Jur.

Palarus hastatifrons, sp. n.

♂. Niger; abdomine segmentis tribus basalibus, pedibus intermediis posticisque, femoribusque anticis infra fulvis; clypeo, mandibulis, apice excepto, orbitis internis usque ad antennarum basin, macula frontali, longitudinali, hastiformi, mesonoto macula parva angulis anticis, tegulis tibiisque tarsisque anticis flavis; flagello supra sordide flavo; alis hyalinis, leviter infuscatis, venis testaceis; ano tridentato.

♀. Mari simillima; abdomine fere omnino fulvo.

Long., ♂ 8 mm., ♀ 11 mm.

♂. Clypeus rounded at the apex, shining, with sparse and minute punctures; front opaque, coriaceous, clothed with very delicate silver pubescence. Eyes separated on the vertex by a distance slightly exceeding the length of the second joint of the flagellum; posterior ocelli somewhat elongate, oblique and almost touching the eyes. Mandibles not excised on their outer margin. Second joint of the flagellum distinctly longer than the third, twice as long as the first and nearly twice as long as its apical breadth, the flagellar joints not arcuate beneath. Thorax shining, rather sparsely but very deeply punctured; median segment strongly obliquely striated, broadly concave in the middle, the sides of the segment finely and closely obliquely striated, the posterior slope finely rugulose, with a raised V-shaped median area. Abdomen rather sparsely punctured; first tergite deeply and widely emarginate anteriorly; second sternite gradually raised into an acute transverse carina at the apex. Seventh tergite tridentate at the apex, the middle spine the longest. Second cubital cell petiolate, the petiole very short; third cubital cell half as long again on the radius as on the cubitus; first recurrent nervure received close to the base of the second cubital cell, second just beyond three-quarters from the base.

♀. Eyes separated on the vertex by a distance only equal to the length of the first joint of the flagellum, nearer to each other than in the male; second joint of flagellum at least twice as long as its apical breadth. Sixth tergite elongate, pointed at the apex, with sparse elongate punctures. Basal joint of fore tarsus with six spines.

Hab. Khan Yunus, 12 miles S.W. of Gaza, June 1917; 1 ♂, 4 ♀ ♀.

This belongs to the group of *P. lepidus*, Klug; but, in addition to the strong colour-differences, the abdomen is much more sparsely and more strongly punctured; the eyes in both sexes are nearer together on the vertex, and the carina of the second sternite is acute, not broad as in ♂ *lepidus*.

X.—*Descriptions of new Species and Genera of the Heteropterous Family Reduviidæ from British India.* By W. L. DISTANT.

I AM indebted to the kindness of Mr. E. A. Butler for submitting for examination another collection of this family made by his indefatigable friend and excellent collector Dr. T. V. Campbell in Southern India. The types of all the species are now in the collection of the British Museum.

Ploiariola scotti.

Ploiariola scotti, Dist. Tr. Linn. Soc. xvi. p. 163, pl. xii. fig. 2 (1913).

Hab. S. India ; Chikkaballapura (*Dr. T. V. Campbell*). Originally described from the Seychelle Islands.

Stenolemus hirtipes, sp. n.

Head and pronotum very pale ochraceous, apex of head and basal area of pronotum more virescent ; scutellum blackish ; corium of hemelytra greyish white, a small linear spot on clavus, and a large and more quadrate spot on apical area fuscous ; membrane greyish white, mottled with large fuscous spots which are discal on basal half and marginal on apical half, the central and largest spot with ochraceous linear mottlings ; body beneath brownish olivaceous ; rostrum fuscous ; legs greyish, anterior legs mottled with fuscous brown, intermediate and posterior femora strongly and longly pilose and blackly annulate, intermediate and posterior tibiæ longly pilose and with a black annulation near base ; antennæ fuscous, with a few pale annulations, of which the broadest is at base ; pronotum anteriorly globose, the central area narrow and cylindrical, the posterior area strongly tricarinate.

Long. 11 mm.

Hab. S. India ; Chikkaballapura (*Dr. T. V. Campbell*).

Eugubinus intrudans, Dist. Entomologist, xlviii. p. 8 (1915).

I originally described this species found in webs of spiders (*Cyrtophora cicatrosa*, Stoliczka) in S. India, Cochin State, Ermakulam. Dr. Campbell has now sent Mr. E. A. Butler another specimen from Chikkaballapura.

NEOKLUGIA, gen. nov.

Allied to *Oncocephalus*, Klug, but with the apical spine to the scutellum moderately curved upwardly ; rostrum with

the first joint much shorter than the two apical joints together, subequal in length to the second joint; anterior femora only slightly or moderately incrassated, with a single series of slender short spinules beneath; head cylindrical, shortly but distinctly spined at base of each antennæ, the anteocular area much longer than the postocular; first joint of the antennæ about as long as the pronotum, distinctly finely hirsute; pronotum with the anterior lobe shorter than the posterior lobe, shortly but distinctly armed on each side of anterior margin, and moderately tuberculous on disk, posterior lobe strongly centrally longitudinally furrowed, the lateral basal angles distinctly spined; posterior legs with the femora and tibiæ about or almost of equal length.

Neoklugia typica, sp. n.

Head and anterior area of pronotum very dark ochraceous or purplish red; eyes black, and between them the colour is sometimes more or less of the same hue; posterior pronotal area, scutellum, corium, rostrum, body beneath, and legs more or less ochraceous; membrane dull greyish brown; a small spot outside apex of clavus, the large basal areola before membrane, and a subapical linear spot to membrane castaneous; apices of femora a little darker in hue; apical spine to scutellum black and distinctly, concavely, upwardly curved; other characters as in generic diagnosis.

Long. 14 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

NEOTHODELMUS, gen. nov.

Body elongate, narrow; head long, cylindrical, anteocular area longer than postocular area, the latter longitudinally margined on each side with a series of short spines; antennæ with the first joint about or nearly as long as head, moderately incrassated; rostrum with the first joint about as long as the second and third joints together; pronotum long and slender, very narrow from about one-third from base, which is truncate, more than twice longer than broad at base; scutellum small, elongately triangular; membrane extending to base of posterior abdominal segment; anterior femora distinctly incrassated, shortly and very finely spined beneath, about subequal in length to anterior tibiæ; posterior and intermediate tibiæ and femora slender, the posterior about twice as long as the intermediate.

Allied to *Thodelmus*, Stål.

Neothodelmus typicus, sp. n.

Pale dull ochraceous: basal area of pronotum and the membrane dull greyish, the first palest, and with a dark spot near each basal angle, head purplish black, the antecular area darker than the postocular; body beneath and legs pale ochraceous, anterior femora finely inwardly streaked with black, anterior tibiæ centrally, basally, and apically (more or less distinctly) annulated with black; all the tarsi more or less distinctly annulated with black; a rounded black spot near base of membrane.

Long. 18 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

Pasiropsis major, sp. n.

Black; antennæ and tibiæ brownish ochraceous, the latter darker on basal areas; tarsi pale ochraceous; a transverse arcuated greyish-white fascia crossing corium near base, but not entering clavus; first joint of antennæ slightly incrassated, scarcely or only slightly passing apex of head, darker in hue than the other joints; anterior pronotal lobe strongly sculptured, posterior lobe with a narrow central longitudinal incisure and with a broadly coarsely punctate submarginal incisure before each lateral margin, the lateral basal angles subnodulose; scutellum passing claval apex, but not posteriorly elevated; femora robust; hemelytra more opaquely black than pronotum and scutellum.

Long. 14 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

Edocla annulata, sp. n.

Head and anterior lobe of pronotum dull dark ochraceous, narrow lateral margins of head and margins of anterior pronotal lobe black; posterior pronotal lobe, the corium, and legs stramineous; scutellum (excluding apical spine), clavus, membrane, triannulations to femora and tibiæ, abdomen beneath, large sternal spots, rostrum, and eyes dark fuscous brown; antennæ with the first and second joints ochraceous, remaining joints fuscous, bases of first and second joints stramineous; apical area of membrane paler in hue; first joint of antennæ shorter than head, second joint about as long as head and anterior lobe of pronotum together; anterior pronotal lobe strongly and irregularly rugulose; apical spine of

scutellum obliquely erect ; connexivum stramineous spotted with fuscous.

Long. 9 mm.

Hab. S. India ; Nandidrug (*Dr. T. V. Campbell*).

Allied to *E. pelia*, Dist., but differing by the shorter basal joint of the antennæ, the triannulated femora, stramineous corium, &c.

Ectomocoris simulans, sp. n.

Allied to *E. tibialis*, Dist. (Faun. Brit. Ind. ii. p. 293, 1904), but differing in having the whole of the first and second joints of the antennæ brownish ochraceous ; the rudimentary hemelytra broader, less oblique, and the whole of their apical marginal areas black, not only spotted as in *E. tibialis*, but also generally reaching or only just passing the base of the first abdominal segment.

Long. 13–20 mm.

Hab. S. India ; Chikkaballapura and Nandidrug (*Dr. T. V. Campbell*) ; Vizagapatam.

Ectomocoris melanopterus, sp. n.

Dull black, opaque ; first and second joints of the antennæ, rostrum, legs, and irregular broad transverse fascia to hemelytra ochraceous ; apex of hemelytra reaching the posterior margin of the third abdominal segment, the segmental margins very narrowly ochraceous ; legs somewhat longly hirsute ; second joint of the antennæ a little longer than head.

Long. 14 mm.

Hab. S. India ; Chikkaballapura (*Dr. T. V. Campbell*).

Ectomocoris picturatus, sp. n.

Head, anterior lobe of pronotum, scutellum, and body beneath black ; posterior lobe of pronotum purplish brown ; hemelytra pale brownish ; clavus (excluding base) and an oblong spot outside clavus stramineous ; legs ochraceous or reddish ochraceous ; connexivum beneath with minute ochraceous marginal spots ; antennæ ochraceous, second joint about as long as head ; anterior lobe of pronotum longitudinally sulcate ; hemelytra reaching abdominal apex ; anterior femora strongly incrassated.

Long. 14 mm.

Hab. S. India ; Chikkaballapura (*Dr. T. V. Campbell*).

Ectomocoris apicimaculatus, sp. n.

Allied to *E. cordiger*, Stål (Faun. Brit. Ind. ii. p. 295, 1904), but differing in the following characters:—First joint of antennæ black or piceous, and the second joint longer than anterior lobe of pronotum; connexivum unspotted; apices of femora, tibiæ, and tarsi black or piceous; membrane unspotted; anterior lobe of pronotum much more finely, centrally, longitudinally impressed, and the pronotal coloration more opaque and piceous.

Long. 15 mm.

Hab. S. India; Yercand (Dr. T. V. Campbell).

Sphedanolestes aurescens, sp. n.

Bright shining golden yellow; antennæ, apex of head, eyes and a spot behind them, apex of corium, membrane, tibiæ, apex and lateral margins of the penultimate abdominal segment beneath, and the tarsi black; basal joint of antennæ shorter than head and pronotum together, both pronotal lobes centrally longitudinally sulcate; femora nodulose; membrane moderately passing the abdominal apex.

Long. 9 mm.

Hab. S. India; Bangalore (Dr. T. V. Campbell).

Sphedanolestes aterrimus, sp. n.

Head, pronotum, scutellum, and femora shining black; corium, membrane, and tibiæ more darkly fuscous; connexivum above and beneath spotted with ochraceous; antennæ black, first joint (excluding base and apex) and basal area of second joint ochraceous; first joint of antennæ about as long as head and pronotum together; pronotum with the anterior lobe centrally longitudinally broadly sulcate, the posterior lobe discally centrally excavate; femora nodulose; membrane extending slightly beyond the abdominal apex.

Long. 7 mm.

Hab. S. India; Chikkaballapura (Dr. T. V. Campbell).

Allied to *S. indicus*, Reut.

Endochus albomaculatus.

Endochus albomaculatus, Stål, Cefv. Vet.-Ak. Förh. 1859, p. 194; Dist. Faun. Brit. Ind. ii. p. 366 (1904).

This species, already recorded from Ceylon, has now been received from Dr. T. V. Campbell, who found it in S. India

(Chikkaballapura). It is also recorded by Lethierry and Severin from "Cambodgia."

Endochus erectus, sp. n.

Pale ochraceous; antennæ, body beneath, and legs stramineous; apical areas of abdomen (both above and beneath) fuscous; antennæ ochraceous, apex of first joint and the whole of the apical joints rosaceous; eyes black; head dark ochraceous, about as long as pronotum; first joint of rostrum distinctly longer than second joint; lateral basal pronotal spines somewhat long, acute, and upwardly and forwardly produced.

Long. 15 mm.

Hab. Nilgiri Hills; Lovedale (*Dr. T. V. Campbell*).

Allied to *E. albomaculatus*, Stål, but differing from that species in the colour, shape, and direction of the pronotal spines, absence of white spot to corium, &c.

Endochus campbelli, sp. n.

Greyish black, shortly greyishly pilose; head behind ocelli, rostrum, coxæ and trochanters, upper surfaces of anterior femora and tibiæ testaceous; intermediate and posterior legs stramineous, with the apices of the femora testaceous; sternum and body beneath dull testaceous, thickly and very finely mottled with greyish white; abdomen above dull testaceous, the connexivum with large ochraceous spots and one beneath near apex; antennæ testaceous, becoming darker in hue towards apex, more palely annulate near apex and middle of first and near apex of third joints, first joint about as long as posterior femora; lateral pronotal spines ochraceous, somewhat longly acute, and nearly straightly directed outwardly; head about as long as pronotum.

Long. 22 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

Allied to *E. cingalensis*, Stål, but differing by the colour of the head and legs, the longer first antennal joint, &c.

Endochus parvispinus, sp. n.

Head thickly greyishly pilose, with a central, dark, longitudinal, incised line, and a similar dark transverse line between eyes; anterior pronotal lobe dark ochraceous, with irregular white linear markings; posterior pronotal lobe paler and thickly minutely spotted with greyish white, lateral basal spines black; lateral margins and apex of scutellum

greyish white; corium similar in hue to posterior pronotal lobe, but without the minute greyish-white spots; abdomen above brassy black, connexivum ochraceous; body beneath thickly greyishly pilose; basal joint of antennæ black or blackish and about as long as head, pronotum, and scutellum together; spines at bases of antennæ minute; lateral pronotal spines slender, black, and laterally slightly upwardly directed.

Long. 17-22 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

Brassivola hystrix.

Brassivola hystrix, Dist. Faun. Brit. Ind. ii. p. 374; fig. 236, p. 373 (1904). ♀.

♂. Smaller than ♀, lateral margins of abdomen not dilated.

Long., ♂, 18 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

The female type was from Ceylon.

Isyndus modestus, sp. n.

Black; antennæ with a broad subapical annulation to first joint, basal or subbasal annulations to second and third joints, and apical annulations to third and fourth joints, tessellate markings to anterior pronotal lobe, broad anterior margin and narrow hind margin to posterior pronotal lobe, lateral margins and apex to scutellum, corium (excluding clavus), and segmental spots to connexivum more or less ochraceous; membrane bronzy black; body beneath greyishly pilose, marginal spots, stigmata, and abdominal incisures black; legs black, anterior femora with two subapical annulations, intermediate and posterior femora with a single basal annulation, testaceous or ochraceous; lateral pronotal angles somewhat shortly spinous, the spines slightly directed backwardly, anterior pronotal lobe with a short tuberculous spine on each lateral margin.

Long. 17-22 mm.

Hab. S. India; Chikkaballapura (*Dr. T. V. Campbell*).

Allied to *I. reticulatus*, Stål.

Coranus militaris, sp. n.

Black; posterior lobe of pronotum (excluding a black spot near each lateral margin), a curved transverse line to scutellum, corium (excluding clavus and apex), and spots to

connexivum sanguineous; tarsi pale fuscous; anterior femora strongly incrassated; anterior pronotal lobe centrally sulcate, but the sulcation not reaching the anterior margin, the posterior lobe with its hind margin moderately excavate before scutellum.

Long. 8 mm.

Hab. S. India; Chikkaballapura (Dr. T. V. Campbell).

Coranus vitellinus, sp. n.

Brownish ochraceous; eyes, broad lateral fasciæ to post-ocular area of head, eyes, clavus, spots to connexivum, membrane, and submarginal fasciæ to abdomen beneath either fuscous or pale bronzy brown; legs brownish ochraceous, the femora either distinctly or indistinctly darkly annulate; antennæ ochraceous, the extreme apices of the joints usually distinctly darker in hue; scutellum with a central, pale, narrow, longitudinal fascia; first joint of antennæ about as long as head; basal lateral pronotal angles broadly angulate; apical joint of the rostrum fuscous.

Long. 9-10 mm.

Hab. S. India; Chikkaballapura (Dr. T. V. Campbell).

Allæorhynchus notatus, sp. n.

Stramineous, eyes and posterior lobe of pronotum black; ocelli dark purplish; two discal spots on anterior lobe of pronotum, scutellum, apical half of clavus, and corium (excluding base and a marginal spot beyond middle) pale purplish brown; connexivum with four marginal black spots; legs stramineous, femora with darker subapical annulations; large lateral spots to meso- and metasterna and subapical marginal annulations to posterior half of connexivum beneath black; antennæ black, basal joint stramineous; membrane purplish brown, with the apical area greyish white and passing the abdominal apex; intermediate femora with a short black spine near middle of posterior margin.

Long. $5\frac{1}{2}$ -6 mm.

Hab. S. India; Chikkaballapura (Dr. T. V. Campbell).

Allæorhynchus bicoloratus, sp. n.

Pale ochraceous; head and posterior lobe of pronotum shining black; scutellum and corium (excluding base) dull black; meso- and metasterna and a central longitudinal fascia to abdomen beneath black; second joint of antennæ distinctly

black, basal joint of antennæ shorter than head ; connexivum with small black spots.

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

Hab. S. India ; Nandidrug (*Dr. T. V. Campbell*).

Phorticus varicolor, sp. n.

Head black ; pronotum ochraceous, with two large basal black spots which occupy nearly the whole of base and narrowly extend up the lateral margins ; scutellum and hemelytra dark brownish, the latter with a large basal angular and an apical ochraceous spot ; membrane black ; body beneath and legs ochraceous ; antennæ ochraceous, second joint blackish, basal joint scarcely passing apex of head ; first and second joints more or less incrassate ; membrane slightly passing abdominal apex ; abdomen beneath and legs ochraceous, sternum black ; abdominal incisures very distinct and slightly darker in hue.

Long. $3\frac{1}{2}$ mm.

Hab. S. India ; Chikkaballapura (*Dr. T. V. Campbell*).

Genus LANCA.

Lanca, Dist. Ann. & Mag. Nat. Hist. (7) xviii. p. 369 (1906) ; Faun. Brit. Ind., Rhynch. v. p. 212, fig. 117 (1910).

Epidaus, Bergr. (nec Stål), Journ. Bomb. Nat. Hist. Soc. xxiv. p. 175 (1915).

Rostrum with the first joint shorter than the two remaining joints together *Epidaus*.
 Rostrum with the first joint slightly longer than second joint. *Lanca*.

Bergroth (*supra*) writes that *Lanca* "is a plain synonym of *Epidaus*." I have figured the rostrum of each genus in my Faun. Brit. Ind.

XI.—On the Discovery of Two Species of Brachychæteumidæ, a Minor Group of Millipedes peculiar to the British Isles.
 By RICHARD S. BAGNALL, F.L.S.

THE species of the genus *Brachychæteuma* are smallish millipedes ranging from 7 to 8 mm. in length, belonging to the AscospERMOPHORA, white to dirty yellowish-white in

colour, being devoid of pigment. They have thirty body-segments, the lateral keels are weakly defined, and the ocelli few in number, usually indistinct and poorly pigmented. That they are clearly of Chordeumid (s. l.) affinities may be recognized on the field.

The members of the genus are to be found on the ground surface beneath shallow coverings of fallen leaves or under stones, sheltering in crevices or about the roots of vegetation. If found on the surface of the earth or perhaps on the under surface of the upturned stone, they usually remain quiet for some little time, and will then, or if but slightly disturbed, run away with a quick gliding movement. If less mildly disturbed, or touched for instance by the dead leaves one may be removing, they will quickly curl up, and, the conformation of the ground being suitable, roll away.

The best time to search for these animals would seem to be from the early spring (say, March) to May, and again in the late autumn.

Although we now know four species of *Brachychæteuma*, the genus is only of recent discovery. The first species and type of the genus and family, *Brachychæteuma bagnalli*, Verhoeff, was described in 1911*, and in greater detail the following year †, from a single male example collected by the writer in Gibside, a fine old piece of woodland in the county of Durham.

Until 1917, when Dr. Hilda and the Rev. S. Graham Brade-Birks diagnosed *Brachychæteuma bradeæ* (Brol. et Brade-Birks) ‡ from Lancashire (examples of both sexes having been secured), no further discoveries of the group had been made. They referred this species to a new genus—*Jacksoneuma*,—but upon the rediscovery of *Brachychæteuma bagnalli*, as detailed below, Verhoeff's description of the genus proved to be at fault in three important particulars, so that the genus *Jacksoneuma*, the erection of which was fully justified upon the data at that time available, had to be

* Verhoeff, K. W., "Ueber *Brachychæteuma*, n. g., und *Titanosoma jurassicum* aus England," Zool. Anz. xxxviii. pp. 455-458, Nov. 14, 1911.

† Verhoeff, K. W., "On the Occurrence of *Brachychæteuma*, *Titanosoma*, and *Polymicrodon* in England," Trans. Nat. Hist. Soc. Northd., Durham, and Newcastle, n. s. iv. pp. 143-167, pls. ix. & x., June 1912.

‡ Bagnall, R. S., "Brief Records of *Chætechylene vosuviana*, Newp., and other Myriapods new to the British Fauna," The Zoologist, xvi. pp. 264-266, July 1912.

† Brade-Birks, Hilda K. and Rev. S. G., "Notes on Myriapoda.—VII. "A new Member of the Order AscospERMOPHORA (*Jacksoneuma bradeæ*, gen. et sp. nov.)," Journ. Zool. Res. ii. pp. 135-149, figs., Dec. 1917.

withdrawn, and the diagnosis of the genus *Brachychæteuma* and the family Brachychæteumidæ amended*.

The Discovery of Brachychæteuma melanops.

A few months after *Brachychæteuma bradeæ* had been made known I happened to be in London, and between appointments with Admiralty officials I spent a short week-end with a friend in the Honorable Artillery Company, then encamped at Swanage. Thus it happened that on the evening of my arrival on April 6th, 1918, and when it was almost dusk, I stumbled upon another species of the genus, which occurred in numbers below Belle Vue, and, proving to be new, has been described by my friends under the name *Brachychæteuma melanops* †.

The cliffs at Belle Vue are very beautiful, standing out in somewhat marked contrast to those on either side. High up are plantations of evergreens, cedars, pines, laurestinas, and holly-oaks, and from here one can see the bay flanked to the left by a green-clothed prominence screening Peveril Point, and to the right by the undercliff stretching away to Durlston Head. The undercliffs are intersected by paths, the main one leading to Durlston Head, but here broken away and there perhaps blocked by a fall of rock from above; the undergrowth is chiefly of bracken and bramble, but towards the "Head" and below the plantations are little groves—conifers, poplars, and privet predominating,—with tracks leading perhaps to a little knoll or winding to the shore below.

I first discovered *B. melanops* in some plenty by scraping the surface covering of fallen leaves and needles in the lower plantations and groves where somewhat damp; later I found it under stones, but only in this sparsely wooded area, and not on the undercliffs. It was very plentiful—perhaps the most plentiful myriapod in early April,—but was found in less numbers six weeks later.

In October 1918 I found a few examples of a *Brachychæteuma* in the neighbourhood of Torquay and Babbacombe which proved to be the Swanage species, *B. melanops*, and on December 31st, 1918, and New Year's Day, 1919, it

* Brade-Birks, Hilda K. and Rev. G. S., "Notes on Myriapoda.—X. On the Family Brachychæteumidæ," *l. c.* iii. pp. 47-53, figs., Oct. 1918.

† Brade-Birks, Hilda K. and Rev. S. G., "Notes on Myriapoda.—XI. Description of a new Species of Diplopoda (*Brachychæteuma melanops*)," *l. c.* iii. pp. 55-61, figs., Oct. 1918.

occurred more frequently than in October, probably because the undergrowth was less dense and I had better opportunities for this class of collecting.

On this latter visit I spent some hours exploring Kent's Cavern with my friend Mr. J. Williams Vaughan, where *B. melanops* was one of the dominant myriapods; it occurred in the inmost depths of the caves and in all the galleries.

The Re-discovery of B. bagnalli.

Although I repeatedly searched for *B. bagnalli* in Gibside, I was never able to turn up further examples; but shortly after my return from Swanage and the discovery of *B. melanops* Mr. H. S. Wallace gave me a tube collected in a garden at Haddrick's Mill, Newcastle-on-Tyne, in the last week of April 1918, which contained six examples of *B. bagnalli*, 5 ♀♀ and 1 ♂, and a ♀ example of another recently described millipede, *Monacobates tenuis*, Bigler*. I accordingly accompanied my friend to Haddrick's Mill, where we took several examples of both sexes in and about the precincts of an old quarry; and subsequent visits proved that the species was well established and not uncommon.

Later I found a little colony under a log in a garden at Fenham, another residential part of Newcastle 2 miles or more distant from Haddrick's Mill, and only this month (May) Mr. Wallace found a female example at Hexham, where I ultimately turned up both sexes, and thus established its identity.

Ecological Notes.

In the cited discoveries of *B. melanops* and *B. bagnalli* I noticed a certain definite association of allied forms, and if zoologists find certain of the millipedes or centipedes named below there should be a chance of meeting with *Brachychaeteuma*.

For the uninitiated I should add that *Stigmatogaster subterraneus*, *Clinopodes linearis*, and *Chaetechylene vesuviana* are large Geophilids, a family of long slender centipedes, generally yellow or yellowish-brown and bearing a large number of legs. *Chordeumella scutellare* is a "square-backed"

* Bigler, Walter, "Die Diplopoden von Basel und Umgebung," Rev. Suisse Zool. Genève, xxi. pp. 675-793, pls. xvii.-xix., 1913.

Bagnall, R. S., "Records of some new British Diplopods and Pauro-pods, with a Preliminary Check List of the British 'Myriapoda,'" Journ. Zool. Res. iii. pp. 87-93, Oct. 1918.

millipede belonging to the Microchordenmidæ, and therefore more closely related to Brachychæteumidæ; it is smallish, has 28–30 body-segments, and the lateral keels are vestigial. *Macrosternodesmus pulicola* and *Ophiodesmus albonanus* are our two smallest examples of the true square-backed millipedes of the family Polydesmidæ; they are both white; the former is the smaller and more slender, has 19 body-segments, and the lateral keels are irregular (notched or “toothed”) as in *Polydesmus* and *Brachydesmus*, whilst *Ophiodesmus* has 20 body-segments, with the lateral keels entire as in *Orthomorpha*. *Monacobates* is a Protoiulid, very slender and small, like a short piece of animated wire.

Brachychæteuma melanops.

SWANAGE (Jurassic formation). *Stigmatogaster subterraneus*, common; *Macrosternodesmus pulicola*, frequent; the recently discovered *Ophiodesmus albonanus*, both sexes, several; and *Monacobates tenuis*, rare.

TORQUAY DISTRICT (Middle Devonian). Whilst collecting in this district no species were found commonly or in company, but the following were noted while searching for *Brachychæteuma*:—*Stigmatogaster*, rare and apparently replaced by *Chatechylene vesuviana*, a species so far only known from South Devon in our country; *Macrosternodesmus*, *Ophiodesmus*, and the *Monacobates*, rare.

Brachychæteuma bagnalli.

Gibside, Co. DURHAM (Carboniferous). *Stigmatogaster*, rare; *Macrosternodesmus* and *Monacobates*, in numbers. The original example of *B. bagnalli* was found here, but has not yet been rediscovered, and a solitary female example of *Chordeumella* is also recorded.

NEWCASTLE-ON-TYNE (Carboniferous). Haddrick’s Mill: *Stigmatogaster*, not uncommon; *Macrosternodesmus* and *Monacobates*, frequent; *Chordeumella* sp., once only. Fenham: *Stigmatogaster*, *Macrosternodesmus*, and *Monacobates* were all found under the single log harbouring the Fenham colony of *B. bagnalli*.

HEXHAM (Millstone Grit). *Monacobates* occurred in very large numbers, together with a few of a similar creature—*Nopoiulus palmatus*,—but only two examples of *Macrosternodesmus* were found. A Geophilid, curiously resembling *Stigmatogaster*, proved to be *Clinopodes linearis*, a rare southern form that I had not previously met with.

An Atlantean Group?

Species of terrestrial arthropods peculiar to our country are rare, and particularly so if we consider groups which have had an equal or greater attention from Continental naturalists. Since the pioneer work of Newport, Leach, and (later) Meinert and Latzel, the Central and Southern European "Myriapods" have received close study, whilst until very recently the British forms have been entirely neglected. Yet here we have a natural group containing four species* widely distributed in this country, not extraordinarily small and without any near relatives on the Continent. If the group had its centre of distribution in Western Europe, then it would have spread east and south, and remnants would have surely been found on the Continent of to-day. Similarly, were the group of Lusitanian origin it would be more richly represented in the Mediterranean subregion than with us. But not only is *Brachychæteuma* or allied genus unknown elsewhere, but its distribution with us (north, south, midlands, east, and west of England) does not suggest a Lusitanian group, and we are thus forced to suggest that *Brachychæteuma* is of Atlantean origin, and that in the very dim past it formed a modest member of the fauna of the old continent of Atlantis.

XII.—*New Species and Genera of Nymphalidæ, Syntomidæ, and Sphingidæ in the Joicey Collection.* By W. J. KAYE, F.E.S.

Family Nymphalidæ.

The confusion over certain species of *Callithea* is considerable, and as a foreword to the description of the new forms that follow it is as well to state the position adopted. *Callithea davisii* was described by Butler (Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 123, 1877), as Hewitson had confused two species under one name—*markii*. Fig. 2 of Hewitson (Ex. Butt., *Callithea*, pl. i.)—the first under the species—becomes

* For description of the fourth species see Brade-Birks, Hilda K. and Rev. S. G., "Notes on Myriapods.—XII. A Preliminary List for Derbyshire, with a Description of *Brachychæteuma quartum*, sp. n., and *Chordeumella scutellare bagnalli*, var. n.," Ann. & Mag. Nat. Hist. ser. 9, xi. pp. 319-336, figs., Oct. 1918.

the type of the species *markii*, and fig. 5 is another species which Butler named *davisi*. This was all correct till Staudinger, not knowing of Butler's description, described this same insect as *hewitsoni* in Exot. Tag. i. p. 123 (1888). Staudinger also gave the name *wallacei* to Hewitson's figs. 2, 3, 6, but quite unjustifiably. *C. davisi* now seems to have several local races, of which I describe below two as new. The *C. refulgens* may be a race of *markii*. *C. batesi* is most probably a distinct species, with the hind margin of the hind wing bluish green and the broad apical area of fore wing of the same colour. The ♀♀ of *batesi* and *markii* may be distinguished by these characters and also by the amount of yellow at the base of the hind wing. *Batesi* has a large yellow area stretching halfway across the cell, while *markii* has a very small amount and much broken up with brown. The synonymy of these three species is as follows:—

Callithea markii, Hew. Ex. Butt., *Call.* i. publ. 1862 (plate dated 1857, ined.).

Callithea wallacei, Stgr. Ex. Tag. i. p. 123 (1888).

Callithea markii (= *wallacei*), Rüb. in Seitz. Mac. Lep. v. p. 491 (1915).

Hab. Upper Amazons, Teffé.

Callithea batesi, Hew. Trans. Ent. Soc. i. pl. xi. (1850).

Callithea batesi, Hew. Ex. Butt., *Callithea*, pl. i. figs. 1, 4 (1862); Rüb. in Seitz. Mac. Lep. v. p. 491 (1915).

Hab. Upper Amazons.

Callithea davisi, Butl. Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 123 (1877).

Callithea markii, Hew. (part.), Exot. Butt., *Call.* pl. i. fig. 5 (1862).

Callithea hewitsoni, Stgr. Exot. Tag. i. p. 123 (1888); Rüb. in Seitz. Mac. Lep. v. p. 491 (1915).

Hab. Colombia, Upper Amazons, Peru.

This species has at least three separate races:—

Callithea davisi davisi, Butl.

Colombia.

Callithea davisi croceus, Kaye.

N. Peru, Contamana, Rio Ucayali.

Callithea davisi tirapatensis, Kaye.

S. Peru, Tirapata.

Ann. & Mag. N. Hist. Ser. 9. Vol. iv.

Callithea davisii croceus, subsp. n.

Fore wing ochreous with a slight pinkish tinge. Broad apical area black except near costa, which is deep blue. Inner margin black with only very slight suffusion near base. Hind wing purplish blue, with the area about tornus brightest.

Expanse 62 mm.

Hab. Ecuador, Sarayacu, Upper Amazons, Jurua.

This subspecies is very like *davisii davisii*, except for the yellow fore wing. The next following subspecies from South Peru is much further removed.

Type in Coll. Joicey.

Callithea davisii tirapatensis, subsp. n.

Fore wing yellowish ochreous, the inner margin blackish extending basally into the cell. Apical area black, with hardly a trace of blue, and the small apical greenish streak often with a whitish area in centre. Hind wing black, with a conspicuous blue patch at tornus extending beyond vein 2 internally and beyond vein 4 externally. Fore wing below with the lower part of the greenish apical area blackish internally.

Expanse 62 mm.

Hab. S. Peru, Tirapata, Yahuarmayo.

Type in Coll. Joicey.

Callithea refulgens, sp. n.

♂. Fore wing like *markii*, Hew., but the blue of the distal half deeper internally and lighter externally and in costal area. The base pinkish ochreous inclining to reddish. The apex dull blackish, with a narrow subapical slaty green band. The whole broad distal half or more of the wing various shades of deep brilliant blue, becoming blackish internally and on the inner margin. Hind wing with a faint indication of a slaty greenish subterminal band mostly obscured by the deep blue of the ground-colour. Costa dull blackish, without a basal or subbasal orange patch. Inner margin broadly and outer margin narrowly dull blackish. Blue area of hind wing brightest between veins 2 and 4. Fore wing below with the basal area ochreous; tornus, except at extreme margin and along veins for a short distance, blackish. A pair of small black spots between veins 4, 5 and 5, 6. Broad apical area glistening slaty blue. Hind wing below with an ochreous basal stripe. Ground-colour slaty bluish, with four transverse rows of black spots in distal half, the two outermost spots at apex suffused with ochreous.

Expanse 60 mm.

Hab. Brazil, Parana (?).

This locality is more than questionable. Typical *markii* occurs at Ega, on the Upper Amazon, and it is even possible the present species may be an aberration of it. Hewitson's locality for *markii* is New Grenada, but as he figures both *davisi* and *markii* under the same name, his locality probably refers to the *davisi*, which is a Colombian species. His fig. 2 on pl. i., *Callithea* in Ex. Butt., agrees with what is known from the Ega district of the Amazon.

Type in Coll. Joicey.

Family Nymphalidæ.

Subfamily ITHOMINÆ.

Velamysta pardalis totumbra, subsp. n.

♂. Fore wing like *pardalis pardalis*, except that there are no blackish marks in disc and the S-shaped black discoidal mark is much less pronounced. Inner margin less heavily black. Hind wing ochre-brownish as in fore wing, without discoidal patch and no trace of a black band thence to inner margin.

♀. Both fore and hind wing ochre-brownish. Fore wing with all the black markings less than in *pardalis pardalis*. Hind wing with a small black mark along discocellular within the cell. No black band connecting the inner margin.

Expanse 74 mm.

Hab. N. Peru, River Tabaconas, 6000 ft. (A. E. & F. Pratt).

Type in Coll. Joicey.

Haensch, in Seitz, vol. v. p. 158, says of *pardalis*:—"In the ♀ the hind wing is of the same brownish colour as the fore wing." This is incorrect, as in both *pardalis pardalis* and *pardalis totumbra* the sexes are alike as to colour; *pardalis* has white hind wings and *totumbra* brownish.

Family Syntomidæ.

Mimagyrtta chocoensis, sp. n.

Head blue-black; palpi black; frons white; antennæ black; legs with coxæ white and white stripes on femur and tibia; tarsus wholly black. Abdomen bluish black, with slender subdorsal white streaks, below white. Fore wing bluish black shot with bright blue at base; a hyaline sub-apical narrow patch with veins 3, 4, and 5 showing black across it. A triangular flat hyaline streak below the cell, with its sharp apex pointing to base and its short side against vein 2. Hind wing shot with brilliant blue, the apex blackest

and with least gloss; a large hyaline transverse area occupying the central area of wing and with the median and veins 3 and 4 showing black upon it.

Expanse 30 mm.

Hab. W. Colombia, Tado, Rio San Juan, Choco, Colombia, 250 ft. (*G. M. Palmer*), June 1909.

Type in Coll. Joicey.

Pseudomelisa demiavis, sp. n.

♀. Head blue-black, frons white and white patches at the sides of the eyes. Tegulæ and patagia black, with a few white hairs. Abdomen elongated, shiny dark blue. Legs dark bluish black. Fore wing dark steely blue. A small divided transparent spot in middle of cell; a long narrow transparent spot lying just outside cell close to base, and a series of fine irregularly shaped spots across disc to tornus. The upper one is between veins 5 and 6, the next two are close together and between veins 3, 4 and 4, 5. The next is the largest and is immediately below cell between veins 2, 3, and the last is placed just above vein 1*b*. Hind wing very small, dark steely blue except for a small transparent spot at base.

Expanse 35 mm.

Hab. W. Africa, Cameroons, Bitje, Ja River, 2000 ft., Oct.-Nov. 1912.

Type in Coll. Joicey.

Chrysocale olivotincta, sp. n.

Base of palpi white and some white scaling on fore coxæ. Frons black. Tegulæ with a few white scales. Thorax black. Abdomen black, with segments 3, 4, 5, 6 edged above with clayish ochreous and with a series of white dorsal spots on all the segments except the last, which is black. Fore wing dark olive-green, with an elongated transparent spot below the median. A faint indication of a white mark just above within the cell. Hind wing very dark olive-green, with a large wedge-shaped area below the cell transparent, but not reaching base or inner margin. A lateral series of white spots to abdomen and two or three ventral white spots. Legs black except for the white on fore coxæ.

Expanse 48 mm.

Hab. —?

The species looks as if it might have come from the same locality as *Chrysocale enigma*, but this is mere conjecture. This is a *Chrysocale* in all points of neuration, but there is no rough hair on the abdomen. It comes close to *Chrysocale*

chryseis, which appears in Hampson's 'Catalogue Phalænæ,' vol. i. under *Calonotos*.

Type in Coll. Joicey.

Cyanopepla fulgurata, sp. n.

Palpi black, with some white scales above, metallic green beneath. Frons, collar, tegulæ, and patagia metallic green. Thorax black, with metallic green, abdomen green. Fore wing black, with a rather narrow crimson band commencing below costa and finishing just before tornus. Between veins 4 and 5 a short metallic-green streak. At base extending nearly to discal band four metallic-green streaks. Cilia black, at tip white. Hind wing brilliant metallic blue. In the median area and on inner margin slightly paler. Cilia black on apical margin and white on inner margin.

Expanse 36 mm.

Hab. N. Peru, Pachitea.

This may be a race of *C. julia*, but it has slightly less elongated wings and a completely blue hind wing.

Type in Coll. Joicey.

Cyanopepla parvistris, sp. n.

Palpi black above, metallic green below. Collar and tegulæ metallic green; patagia black, with some metallic-green scaling. Abdomen metallic green. Fore wing black, with a very narrow discal crimson band. A minute green dot on costa at base and a metallic-green streak along vein 1 *b* heavy at base. Hind wing deep metallic blue without any greenish shade.

Expanse 50 mm.

Hab. Unknown.

Type in Coll. Joicey.

ACUTIA, gen. nov.

Proboscis fully developed, but weak. Antennæ bipectinated. Spurs to mid tibiæ minute. Fore wing with vein 2 placed very far back. Veins 3 and 4 before angle, 5 from angle, 6 from middle of discocellulars, 7 from upper angle, 8 and 9 stalked, 10 and 11 from cell. Hind wing with 2 long before end of cell, 3 and 4 shortly stalked from angle of cell, 5 from middle of discocellulars.

Type, *A. bidensis*.

Acutia bidensis, sp. n.

♂. Fore wing very long and narrow, the base with a golden streak. Margin and apical half dark brownish black. A large transparent patch within the cell and a much larger double transparent patch immediately below. A small square transparent spot in apex, divided by vein 5. Hind wing small, greatly pointed at apex, yellow, with the apex rather broadly black. A small grey patch on costa. Abdomen segmented with yellow. Head black, collar orange. Thorax black, metathorax yellow.

♀. Similar to male, except that the transparent patches are much more yellowish. The hind wing larger, less pointed. The fore wing more ample.

Expanse 26 mm.

Hab. Sarawak, Bidi, 1907-8 (*C. J. Brooks*).

Type in Coll. Joicey.

Æthria tenumarginata, sp. n.

♂. Palpi black above, white beneath. Coxæ above white, beneath black. Frons with some white scales. Tegulæ mostly metallic blue, but with some white scales. Patagia metallic blue. Abdomen dark metallic bluish green, with a large crimson anal tuft. Fore wing bluish hyaline, with narrow black margins and narrow discoidal black spot. Hind wing bluish hyaline, with a narrow black margin hardly broader than the costal and inner margin of fore wing.

Expanse 27 mm.

Hab. French Guiana, St. Laurent.

Type in Coll. Joicey.

Phœnicoprocta variabilis, sp. n.

♂. Head black, frons metallic peacock-blue. Tegulæ with some metallic blue and orange scales. Patagia orange. Metathorax with a patch of blue. Abdomen with subdorsal stripe of metallic green. Anal tuft crimson. Antennæ black, bipectinated, under surface white at tips. Fore coxæ white below, crimson above. Mid and hind coxæ with some crimson hair. Fore wing dull brownish black, partly hyaline at base of cell and immediately below. Hind wing transparent, with a broad black margin.

Expanse 26 mm.

Ab. melapatagia.

Tegulæ and patagia black, with a few metallic-blue scales.

Hab. Panama, Bugaba.

Type in Coll. Joicey.

Pheia attenuata, sp. n.

Head black. Minute crimson dots behind the eyes. Tegulæ with bright crimson spots preceded by some metallic-green scaling. Base of patagia crimson. Abdomen black, with some metallic-green scaling. On first segment a pair of crimson dots. Fore wing black and transparent. Costa narrowly black. Apex rather broadly black and at tornus a rather heavy black area. Discoidal spot black. Hind wing transparent, the apex broadly black, inner margin narrowly black. Abdomen beneath with all but the last three segments white.

Expanse 26 mm.

Hab. Panama, Gatun, 1. ii. 1913 (*A. Hall*).

Type in Coll. Joicey.

Pheia simillima, sp. n.

Frons, tegulæ, collar, and vertex of head with metallic-green scaling. Thorax and patagia dark brownish black. Metathorax with metallic green. Second abdominal segment with subdorsal crimson spots. Abdomen black, with some metallic-green scaling, terminal segment crimson. Fore wing diaphanous, with margins and discocellular spot black. Apex rather broadly black and an extension inwards at tornus. Hind wing diaphanous, with outer margin narrowly black, greatly reduced between veins 2 and 4. Abdomen beneath with the first three segments covered by large white valve. Fore coxæ pink beneath.

Expanse 23 mm.

Hab. Upper Amazon, Rio Ucayali.

Type in Coll. Joicey.

Euagra monoscopa, sp. n.

Head, thorax, and abdomen dark peacock-blue. Fore wing with the base brilliant blue, the apex bluish black; a large trapezoidal transparent area between veins 2 and 3, bounded above by the wall of the cell and terminating just before outer margin. Hind wing deep brilliant blue, darkest near the outer margin.

Expanse 34 mm.

Hab. E. Ecuador, Alpayacu, Rio Pastazza (*M. G. Palmer*).

Type in Coll. Joicey.

This insect strongly recalls *Agyrta monoplaga*, which has the same scheme of colouring and a hind wing without any transparent area.

Coreura sinerubra, sp. n.

Palpi with the basal joint orange. Collar orange. Thorax, tegulæ, and patagia dull greenish black. Abdomen dull metallic green. Fore wing dull greyish black, with a straight transverse pale yellowish narrow band across disc just touching the discocellulars and ending just short of the tornus. Hind wing rather dull greyish metallic green; cilia yellow. Fore wing below with the transverse yellowish band much wider than above. Hind wing below with the yellow colour of the cilia extending to margin of wing. Both wings dull blackish, with a slight metallic gloss.

Expanse 44 mm.

Hab. N. Peru, W. slope of Andes, 4000 ft. (*Pratt*).

Type in Coll. Joicey.

Heliura quadriflavata, sp. n.

Head dark brownish black, collar orange. Thorax dark brownish black, metathorax with orange patch. Abdomen blackish. Fore wing olivaceous, with transparent patches. The base blackish, with a conspicuous orange spot. A long transparent area lying just beneath the cell and a triangular transparent area occupying the middle of the cell. The veins olivaceous and two, -shaped olive marks on the inner margin. Four rectangular-shaped hyaline spots in pairs forming a discal band. The extreme tip of the wing whitish. Hind wing transparent, with the apex very broadly black and the inner margin much less narrowly black. Fore and hind wing below wholly black and transparent, without any violaceous tint. Coxæ pink and the basal half of mid and hind femora also pink.

Expanse 38 mm.

Hab. French Guiana.

Type in Coll. Joicey.

Napata levata, sp. n.

Frons bluish white. Bluish-white spots on gulæ, patagia, tegulæ, and behind the antennæ. Fore wing very dark olive-green, with a small hyaline spot at end of cell; a similar spot near base of cell, with a large semicircular spot immediately below the cell. Two pairs of spots on disc—one pair just beyond end of cell and the other pair between veins 3, 4 and 4, 5,—the smaller spot of the two here uppermost, while in the former case it is reversed. Hind wing with a large double basal hyaline spot and a hyaline spot in the cell, the rest of the wing dark olive-green. Metathorax with metallic-green spot. Abdomen with a pair of greenish-white spots on

first segment; the remaining segments metallic cupreous, with the segmental joints darker.

Expanse 46 mm.

Hab. E.C. Peru, Chanchamayo.

Type in Coll. Joicey.

Delphyre leucomela, sp. n.

Fore coxæ orange, mid and hind coxæ black; palpi black; collar orange; thorax and abdomen black. Fore wing dark brownish black, with a semihyaline roundish discocellular spot; discal area paler brownish, with elongated black divided streaks along the veins; median area of wing blackish; a triangular semihyaline spot near base within the cell and a large elongated spot immediately below. Hind wing with the larger basal half semihyaline; a broad black marginal band, broadest at apex and narrowest at lower corner of cell. Underside of fore wing dull black except for hyaline spots; hind wing as above, except for some brownish scaling at outer margin.

Expanse 28 mm.

Hab. French Guiana.

Type in Coll. Joicey.

Family Sphingidæ.

TIMORIA, gen. nov.

Type, *T. concolorata*.

♂ ♀. Antenna slender, rather short, ending in a short hook and bristle at the apex. Tongue very long. Palpus rather short, not conspicuously protruding. Eyes large, not lashed. Wings long and rather narrow. Abdomen long. Legs long, without spines on tibiæ. Tarsi very heavily spined; mid and hind tarsi with long combs at base; first segment of hind tarsus very long, and longer than the other four joints together; hind tarsus altogether less than twice the length of the cell. Veins 6 and 7 of hind wing from angle of cell. Pulvillus and paronychium present, the latter with two flaps on each side.

Hab. Timor Laut.

The genus differs from *Meganoton* by the shorter antennæ and much shorter hook, the non-stalking of veins 6 and 7 of hind wing, and by the shorter and less robust legs; the palpus is also markedly smaller and less protruding.

Timoria concolorata, sp. n.

♀. Fore wing dull blackish brown, with small pale discal spot; several indistinct darker striæ; a dark brown elongated

basal patch; a heavily dented and strongly curved postmedian line; a subapical triangular brown patch, succeeded by an intraneural series of large brown subterminal patches; cilia conspicuously chequered with white and brown. Hind wing dull brown, paler than fore wing, with three darker indications of transverse bands near base; basal area pale brownish grey. Abdomen with a broad greyish-black dorsal stripe and subdorsal black and white patches; at base of first segment subdorsal tufts of orange. Thorax blackish brown. Abdomen below pale, whitish.

Expanse 100–110 mm.

Hab. Tenimber Island (*W. J. Frost*), 1918; 2 ♀ ♀.

Type in Coll. Joicey.

XIII.—*A new Species of the Nematode Genus Crossocephalus from the Rhinoceros.* By H. A. BAYLIS, M.A.

(Published by permission of the Trustees of the British Museum.)

THE genus *Crossocephalus* has hitherto been known only from its type-species, *C. viviparus* (v. Linstow)*, which occurs in the zebra. I have now to place on record a second form, parasitic in a rhinoceros (*R. sumatrensis*) from the Malay Peninsula. The material at my disposal is unfortunately not in the most perfect state of preservation, but it serves for the purpose of a brief description, and is sufficient, in my opinion, to warrant the erection of a new species. Incidentally it also throws some light on a matter which has been a source of confusion in the descriptions of *C. viviparus*, viz., the structure of the very complicated and peculiar mouth-apparatus.

Crossocephalus longicaudatus, sp. n.

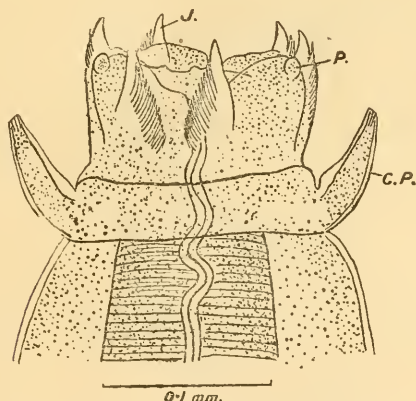
Host: *Rhinoceros sumatrensis*.

This is a short, stout little worm, tapering rather suddenly at the anterior end, in the region of the œsophagus. The male measures about 7 mm. in length and 0.5 mm. in maximum thickness, the female 9 to 10 mm. in length and about 0.63 mm. in thickness. The cuticle has very fine transverse striations. There are no lateral alæ. The mouth is provided with six chitinous jaws (fig. 1, *J.*), each of which bears a row of bristles externally, and a sharp, slightly curved

* *Pterocephalus viviparus*, v. Linst., 1899; *Crossocephalus viviparus*, Railliet, 1909.

tooth at its free end. The jaws are arranged in three pairs, with the bristles of each pair turned towards each other. Between the pairs of jaws there are very slightly raised papillæ (fig. 1, *P.*). The jaws may either be everted and project forward, as in the figure, or they may be completely inverted into the buccal end of the œsophagus, in which case the teeth point backwards, and the rows of bristles meet in the middle of the lumen. Behind the head there is a cuticular collar, bearing on each side a very large forwardly curved papilla (fig. 1, *C.P.*). When the jaws are inverted these papillæ project in front of the head like a pair of horns or ears. No second pair of "neck-papillæ" corresponding to those of *C. viviparus* has been detected.

Fig. 1.



Crossocephalus longicaudatus. The head, showing the jaws in the everted position; dorsal view, highly magnified.

C.P., ear-like papilla on the cuticular collar; *J.*, jaw; *P.*, oral papilla.

The œsophagus is about 1 mm. long, and expands into a bulb before opening into the intestine.

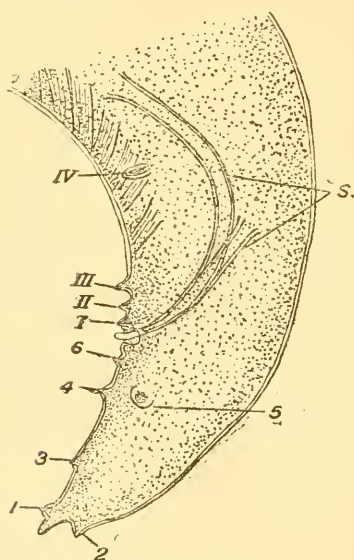
The excretory pore is situated at about 2 mm. (slightly less in the male) from the anterior end. It is in the form of a long transverse slit on the ventral surface, having its lips enclosed within an oval border of radiating cuticular ridges, as has been described and figured by Gedoelst (1916) in the case of the type-species.

In the male the tail (fig. 2) is 0.25–0.3 mm. long, and has a fairly well-marked ventral flexure. There are no alæ. The spicules (fig. 2, *S.*) are unequal in length, measuring

respectively (in a straight line from base to tip) about 0.44 mm. and 0.24 mm. The caudal papillæ are rather large and conical. There are ten pairs, four preanal (fig. 2, I-IV) and six postanal (fig. 2, 1-6). The fourth preanal pair (IV) and the fifth postanal (5), counting from the tail-tip, are laterally placed. The second postanal pair (2) are actually dorsal in position.

The body of the female narrows suddenly at the base of the tail. The anus opens in a transverse fold of the cuticle, which is followed by several wrinkles. The tail tapers to a

Fig. 2.



Crossocephalus longicaudatus. Lateral view of the tail of the male, highly magnified.

S., spicules; 1-6, postanal papillæ; I-IV, preanal papillæ.

fine point, and is 1.7 mm. to 1.9 mm. long. The position of the vulva has not been made out with certainty, but it is probably very close to the anus. The uterus contains embryos in various stages of development, not always enclosed in an egg-membrane, and often of very large size, so that the species is evidently viviparous, like the type-species.

The chief points in which this species differs from *C. vivi-*

parus, according to the descriptions of v. Linstow (1899) and of Gedoelst (1916), are:—

- (1) The much greater length of the tail in the female.
- (2) The absence of a second, flattened pair of neck-papillæ behind the cuticular collar bearing the long ear-like papillæ.
- (3) The absence of the six curved anterior spines ("crochets" of Gedoelst; "Haken" of v. Linstow) on the lips when the jaws are in the inverted position.
- (4) The larger number of caudal papillæ in the male.

The following comparative table of measurements in the two species may serve to complete the foregoing account. It will be observed that the correspondence between them is remarkably close, the most striking exception being the length of the tail in the female. All the measurements are in millimetres. The figures in square brackets have been calculated from v. Linstow's fractional measurements:—

	<i>C. viviparus</i> (v. Linstow).		<i>C. viviparus</i> (Gedoelst).		<i>C. longicaudatus</i> .	
	♂.	♀.	♂.	♀.	♂.	♀.
Length	6.32	6.76	..	5.5-9.5	7.0	9-10
Thickness	0.43	0.55	..	0.28-0.512	0.5	0.63
Length of œso- phagus	[1.02]	[0.9]	..	1.0-1.15	1.0	1.0
Length of tail ..	[0.26]	[0.55]	..	0.575	0.25-0.3	1.7-1.9
Length of spi- cules	{ 0.35, 0.26	..	..	..	{ 0.44, 0.24	..
Vulva from anus.	..	[2.34]	..	0.192-0.208	..	(probably close to anus).
Excretory pore from ant. end .	(close behind œsophagus).		..	1.9-2.2	(less than 2). 2.0	
Excr. pore, out- side measure- ments of stri- ated border ..	..	..	..	0.4 × 0.055	0.31 × 0.07	
Do., thickness of border .....	..	..	..	0.014	0.025	

As regards the structure of the mouth-parts, it has already been stated that some confusion exists in the descriptions of *C. viviparus*. This appears to have been due to the fact that v. Linstow (1899) saw examples with the jaws in both positions—everted and inverted,—whereas Gedoelst (1916) was dealing only with specimens having the jaws inverted

within the œsophagus. It must be admitted, however, that the figures accompanying v. Linstow's account are decidedly confusing, and it is not improbable that a failure to recognize the manner in which the entire jaws fold down, like the blades of a penknife, into the œsophagus, has been at the root of the matter. The condition in the present species makes it almost certain that the action of the jaws will be found to be the same in *C. viviparus*.

One other point remains to be noticed. It does not seem at all clear that the "kegelförmige Spitzen" of v. Linstow are the same as the "papilles céphaliques" of Gedoelst, as the latter supposes, since the former not only figures them as being *within* the six "Haken," but expressly states that this is the case. The fact that both authors describe and figure six outwardly directed hooks on the lips in addition to what I have termed the jaws ("Flügel" of v. Linstow, "lames pectinées" of Gedoelst) seems to indicate that they are both referring to the same structure. The presence of the "Spitzen," however, seems doubtful, and one is rather led to believe that v. Linstow's account, in this particular, may be erroneous, possibly as the result of a misinterpretation of the structure of the jaws. The present species apparently possesses neither the "Spitzen" nor the "Haken," but it occurs to me as not impossible that the incurved terminal teeth of the jaws, when partly, but not wholly, everted, might, by crossing each other, give rise to the appearance of six forwardly-directed points occupying the centre of the oral aperture.

The writer's thanks are again due to Dr. G. A. K. Marshall, of the Imperial Bureau of Entomology, for the opportunity of examining this material, which was collected by Mr. T. R. Hubback.

REFERENCES.

- GEDOELST, L. 1916. "Notes sur la Faune Parasitaire du Congo belge,"
Revue Zool. Afric. v. fasc. 1, p. 1.
LINSTOW, O. VON. 1899. "Nematoden aus der Berliner Zoologischen
Sammlung," Mitt. Mus. Nat. Berlin, i. 2.

XIV.—*Descriptions and Records of Bees.*—LXXXVI.

By T. D. A. COCKERELL, University of Colorado.

THE Indian bees recorded below were all received from Mr. T. V. Ramakrishna Ayyar.

Crocisa ramakrishnæ, Cockerell.

Bangalore, at flowers of *Cosmos*, Aug. 25 (T. B. F.);

Taliparamba, Malabar District, Sept. 30–Oct. 4 (*Ramakrishna Ayyar*).

Crocisa histrio (Fabricius).

Beeravalli-Bellary District (*C. N.*). India.

Crocisa macraspis, sp. n.

♂.—Length about 10 mm.

Robust, black, with clear white markings (hair-patches); anterior wings fuliginous; scutellum unusually large, the apical incision broad and open, but with straight sides; no white hair on scutellum, but a large white tuft beneath the incision; thoracic markings with the usual pattern, but median line reduced to a rather small elongate mark, stripe above tegulae reduced to anterior portion, median and posterior mesothoracic spots large and rounded; pleura with a very broad median transverse band, narrowly connected anteriorly with a large patch beneath wings, and an isolated round spot ventrally; anterior and middle tibiae covered with white hair on outer side, hind tibiae with about the basal half white, the white divided from the black diagonally; hind basitarsi with a small tuft of white near base; head with white hair; white on abdomen reduced to lateral patches; on first segment shaped much like a bird's head and neck (reversed), the inner projection broad and obtuse, but narrowing toward end; marks on the other segments broader than long. The hind femora have a rounded keel beneath, but no tooth.

Saidapet farm, Sept. 6, 1907, on flower (*T. V. R.*). The locality is in Madras.

Differs from *C. ramosa* by the much larger scutellum, abdominal markings, &c.; the scutellum is also quite different from that of *C. ramosella*. Compared with *C. reductula*, it is larger and broader, with more white hair on tibiae.

Crocisa chionotricha, sp. n.

♀.—Length about 9 mm.

Looks like *C. ramosella*, Ckll., but is smaller, with the markings pure white (instead of creamy white), scutellum with white hair above the notch, and no long stripe of white hair above the tegulae. Anterior wings fuliginous; head with white hair; markings of thorax as usual, anterior median band reaching level of anterior end of middle pair of spots, stripe above tegulae reduced to a large cuneiform mark anteriorly; posterior mesothoracic spots oblique; pleura marked nearly as in *C. macraspis*; scutellum deeply incised, W-like, the points acute; middle tibiae with rather more, and hind tibiae with rather less, than basal half covered with

white hair; abdominal markings reduced to lateral patches, those on first segment shaped like a boot, those on second curved upward and broadly emarginate laterally (shaped like a human mandible), the others broader than long.

Coimbatore, S. India, the type Feb. 7, 1913 (*T. V. R.*); another Jan. 1, 1913 (*A. G. R.*).

In Friese's tables this runs to *C. ramosa*, but the scutellum is quite different.

Crocisa reducta, Cockerell.

Described from Singapore, but the same species comes from the Island of Penang (*Baker*).

The posterior and lateral mesothoracic markings have much the outline of the stem and bowl of a clay pipe.

Crocisa crucifera, Cockerell.

Described from the Philippine Is., but I cannot separate one from Sandakan, Borneo (*Baker*, 9966).

Anthophora violacea, Lepeletier.

Parlakimedi, Nayanapuram, Ganjam District, India, May 1914 (*Ramakrishna Ayyar*). ♀.

Anthophora cingulifera, Cockerell.

Rockhill, 3500 ft., Coorg, Sidapur, April 1913 (*T. V. R.*). ♀.

Anthophora confusa, Smith.

Pulney Hills, S. India, May 1917 (*P. S. Nathan*). ♀.

Anthophora zonata (Linnæus).

Rockhill, 3500 ft., Coorg, Sidapur, April 1913 (*T. V. R.*). ♀.

Cælixys apicata, Smith.

Coimbatore, India, January, May, October, November (*T. V. R.*, *A. G. R.*); Devanakonda, Kurnool District, August (*Ponniiah*). All females.

Cælixys dormitans, Cockerell.

Coimbatore, February, on wheat-ear (*P. S.*); Yemmiganur, Bellary District, December (*Ponniiah*). Females.

The female of *C. dormitans* differs from that of *C. apicata* in the venation, the first recurrent nervure meeting the first transverso-cubital. In other respects they are so much alike that one hesitates to regard them as distinct. The type of *C. apicata* was a female from Northern India, in the Baly collection. My knowledge of the venation (not mentioned in Smith's description) comes from a female from "India," from F. Smith's collection. The group of species or races

related to *C. decipiens*, Spinola, presents difficulties which can only be overcome in the presence of more material from various localities.

Cælioxys sexmaculata, Cameron.

Coimbatore, May 5 (*T. V. R.*); Devanakonda, Aug. 15 (*T. V. R.*). Females.

According to Bingham's table this should have "tarsi with golden pubescence," a character derived from Cameron's description. The specimens before me have pale ferruginous hair on the inner side of the tarsi only; the hind basitarsi have white hair on the outer surface. No doubt Cameron referred to this condition. In the case of *C. fulvitaris*, which he says is near to *sexmaculata*, he definitely states that the rufo-fulvous hair is on the under side of the tarsi.

Cælioxys pachyrhina, sp. n.

♀.—Length about 13.5 mm., anterior wing 8 mm.

Black, including legs and tegulæ, except that the anterior legs, especially the tibiæ, are rufescent anteriorly, and the middle legs are also partly rufescent; pubescence forming pure white markings, the white areas including sides of face, cheeks, upper part of pleura, patch before tegulæ, spot behind tegulæ, sides of metathorax, linear bands on hind margins of abdominal segments, expanding laterally, broad longitudinal bands on each side of first segment, base and middle of first ventral segment, and broad interrupted bands on ventral segments 2 to 4; clypeus very prominent and very strongly keeled (roof-like), very convex in lateral profile; a broad flattened longitudinal elevation from the front to the upper margin of clypeus; mesothorax strongly punctured, with a median anterior patch of slightly yellowish pubescence, and there are two yellowish-white spots at base of scutellum; scutellum rugoso-punctate all over, very broadly rounded; axillar spines prominent. Wings pale fuliginous; first r. n. joining second s. m. as far from base as the second from apex; hind spurs pale dull reddish. Abdomen strongly punctured; last dorsal segment elongated, shining, the narrow apical part strongly keeled; last ventral very narrow, with entire margins, extending far beyond dorsal, and curved downward, its basal margins (under the dorsal plate) fringed with white hair.

Devanakonda, Kurnool District, India, Aug. 15, 1913 (*T. V. R.*).

In Bingham's table runs to *C. confusa*, Smith, from which it is easily known by the structure of clypeus and front. A

really related species, with darker wings and stout axillar spines, is *C. philippensis*, Bingham, from the Philippine Is.

Cælixys ramakrishnæ, sp. n.

♂.—Length slightly over 10 mm.

Black, including legs and tegulæ; eyes greenish, with abundant short hair; face and clypeus flat, covered with white hair; cheeks with a broad depressed sharply defined band, filled with snow-white hair; vertex with large punctures; antennæ black; mesothorax and scutellum with very large punctures, not covering the whole surface; no hair-spots on mesothorax; scutellum broadly rounded posteriorly; axillar spines large; pleura not densely hairy, but a white line runs down from the tubercles; tegulæ black. Wings dilute fuliginous, hyaline basally; second submarginal cell receiving recurrent nervures almost equally far from base and apex; anterior coxæ spined. Abdomen polished, strongly but sparsely punctured, hind margins of segments with linear white hair-bands, broadening laterally; sides of first segment with only a rather thin and narrow longitudinal band; fifth segment with a small spine on each side; sixth (terminal) segment with long and slender lateral spines at base, and four apical ones, the lowermost long and slender. The fourth ventral segment is entire. Hind spurs dark reddish.

Coimbatore, India, February (*T. V. R.*).

Runs in Bingham's table to *C. confusa*, Smith, but appears to differ by the longer axillar spines, more strongly punctured abdomen, and the very small (scarcely noticeable), white hair-marks at base of scutellum. Smith described the female, and Bingham only gives two lines of description for male *confusa*, so exact comparisons cannot be made. Meade-Waldo, on comparing types, found that Cameron's *C. tenuilineata* from Simla was *confusa*. This differs from our insect by the dense hair on base and apex of mesopleura, and the emarginate scutellum. No doubt the two insects are allied, but I believe them to be distinct.

Nomioides patruelis, sp. n.

♀.—Length about 4 mm.

Head circular seen from in front, dark bluish green; clypeus, a small round supra-clypeal mark, labrum, mandibles (except the ferruginous apical part), and the long scape in front, all pale yellow; flagellum pale yellowish ferruginous beneath, reddish brown above; mesothorax bright green, shining; pleura dark green; metathorax black, the base finely rugose; upper border of prothorax, tubercles, line

bordering axillæ, two large eye-shaped areas on scutellum, and postscutellum, all pale yellow. Wings hyaline, with extremely pale nervures and stigma; first r. n. meeting second t.-c.; second s.m. narrowed practically to a point above. Legs very dark brown basally, the apices of the femora and the tibiæ and tarsi wholly yellow. Abdomen cream-colored, the first segment basally suffused with reddish, with a dark dot on each side, and its apical region with a very broad well-defined black band, the margin narrowly reddish; segments 2 and 3 with arched black bands, leaving a broad pale reddish area posteriorly except at sides; segments 4 and 5 with the bands broken into a large median spot and a band on each side; venter suffused with dusky reddish.

Shevaroy's-Yergand, India, 4500 ft., April 21-May 13 (Y. R.).

Very similar to *N. parvula*, Fabr. (*pulchella*, Sch., *cerea*, Nurse), but easily separated by the broader head, green eyes, two marks on scutellum, and heavy abdominal banding.

Stelis tuberculata, sp. n.

♀.—Length about 6 mm.

Black, with creamy-white markings as follows: band along each side of clypeus (and sometimes whole upper part), broad band on each side of face (narrowing above, ending as a free finger-like projection close to upper end of each eye), stripe on upper part of cheeks (away from eye), interrupted band on occiput, small spot on tubercles, L-shaped mark at lateral anterior corners of mesothorax, spot on axillæ, interrupted band on scutellum, under side of anterior and middle femora, and short stripe on hind ones, stripe on anterior tibiæ in front (the knees are ferruginous), large mark on each side of first abdominal segment, very broadly interrupted band on second segment, less broadly interrupted one on third, narrowly interrupted band on fourth and fifth, but these also interrupted laterally. Mandibles with a yellowish spot near base, and a large red one subapically; lower part of clypeus with two prominent tubercles; flagellum dark red beneath; tegulæ piceous, with a pallid mark in front. Wings hyaline, with a dusky apical cloud; second r. n. going beyond end of second s.m. Mesothorax dull, very closely and finely punctured. Abdomen shining, with distinct punctures; pulvilli small, but distinct; anterior coxæ with a white apical spot.

Coorg Sanivarsandai, Hansey Estate, India, 4000 ft., on coffee, April 29-30, 1913 (T. V. R.), type. Another

is marked Coorg Sidapur, Rockhill, 3500 ft., April 23-26, 1919 (*T. V. R.*).

Readily known from *S. parvula*, Cam., by the tuberculate clypeus.

Lithurgus australior, Cockerell.

Described from the male. A female is from Coimbatore, India, Dec. 24, 1918 (*Ramakrishna Ayyar*). It is about 12.5 mm. long, and runs in Friese's table nearest to the Australian *L. dentipes*, but the structure of the face is different. It is very near *L. scabrosus* (Smith), but the white hair-bands on abdomen are broader. The ventral scopa is brownish black.

Ceratina binghami, Cockerell.

Salem, India, Dec. 2-18, 1914 (*Ramakrishna Ayyar*).

Nomia iridescens, Smith.

Bangalore, India, May (*T. V. R.*).

Nomia histrionica, sp. n.

♂.—Length about 10.5 mm.

Running in Bingham's table to *N. curvipes*, from which it differs conspicuously in the mesothorax, which shows the black densely and minutely punctured surface, with a conspicuous band of ochreous hair all around the margins; in the smaller scutellum, the creamy-white hair of metathorax, the ivory-colour (not greenish or reddish) abdominal bands, the hair fringing sixth abdominal segment white, and the clear red (instead of black) basal part of hind femora. In my table in *Trans. Amer. Ent. Soc.* xxxvii. p. 233, it runs to *N. aureohirta*, Cam., to which it is also closely allied, differing by the paler hair of face, the flagellum chestnut-red beneath, the mesothorax as described above, the scutellum with the densely punctured surface exposed, the broad tegumentary abdominal bands bare, and the hind tibiae with a large black spot. The shape of the hind tibiae is also highly characteristic; the anterior margin is undulating, so that the whole tibia resembles the head of a deer, the apical lamina representing the ear. The abdomen has a well-developed subapical dentiform process. It is also related to *N. eburnigera*, Ckll., but the face and abdomen are broader, and the hind tibia is different. It is quite distinct from *N. fulvohirta*, Cam., and *N. varipes*, Cam., from Allahabad.

Koilpaty, Tinnevely, India, Dec. 3, 1906 (*T. V. R.*).

Andronicus cylindricus, Cresson.

Boulder, Colorado, May 14, 1919, ♂ (*Katherine Fitzgerald*).

Periodicals published by TAYLOR & FRANCIS.

Published the First Day of every Month.—2s. 6d.

THE

LONDON, EDINBURGH, and DUBLIN

PHILOSOPHICAL MAGAZINE

AND

JOURNAL OF SCIENCE.

Conducted by

SIR OLIVER JOSEPH LODGE, D.Sc., LL.D., F.R.S.,
SIR JOSEPH JOHN THOMSON, O.M., M.A., Sc.D., F.R.S.,
JOHN JOLY, M.A., D.Sc., F.R.S., F.G.S.,
GEORGE CAREY FOSTER, B.A., LL.D., F.R.S., and
WILLIAM FRANCIS, F.L.S.

Published the First Day of every Month.—2s. 6d.

THE

ANNALS AND MAGAZINE OF NATURAL HISTORY,
including Zoology, Botany, and Geology.

Conducted by

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S., and
RICHARD T. FRANCIS, F.Z.S.

*Founded in 1877. Monthly, 1s. Annual Subscription
(‘Companion’ and 12 Monthly Numbers), 13s.*

THE OBSERVATORY,
A MONTHLY REVIEW OF ASTRONOMY.

Edited by

A. S. EDDINGTON, M.A., M.Sc., F.R.S.,
F. J. M. STRATTON, M.A., and
H. S. JONES, M.A., B.Sc.

Its Contributors include most of the leading English-speaking Astronomers,
and its Articles give an interesting reflection of the progress of astronomical
thought and achievement.

*Published Monthly. Price 1s. 6d. Annual Subscription,
16s. post free.*

THE

JOURNAL OF BOTANY
BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, K.S.G., F.L.S.,

LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM,

Articles by prominent Botanists; Announcements of Discoveries; Reviews;
Botanical News and Notes, &c., &c.

Red Lion Court, Fleet Street, London.

CONTENTS OF NUMBER 20.—*Ninth Series.*

	Page
VIII. Descriptions of new <i>Pyralidæ</i> of the Subfamilies <i>Cram- bince</i> and <i>Sigine</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c. . .	53
IX. Notes on Fossorial Hymenoptera.—XXXIX. New <i>Sphe- coidea</i> collected in Palestine by Major E. E. Austen. By ROWLAND E. TURNER, F.Z.S., F.E.S.	69
X. Descriptions of new Species and Genera of the Heteropterous Family <i>Reduviidæ</i> from British India. By W. L. DISTANT.	71
XI. On the Discovery of Two Species of <i>Brachychæteumidæ</i> , a Minor Group of Millipedes peculiar to the British Isles. By RICHARD S. BAGNALL, F.L.S.	79
XII. New Species and Genera of <i>Nymphalidæ</i> , <i>Syntomidæ</i> , and <i>Sphingidæ</i> in the Joicey Collection. By W. J. KAYE, F.E.S.	84
XIII. A new Species of the Nematode Genus <i>Crossocephalus</i> from the Rhinoceros. By H. A. BAYLIS, M.A.	94
XIV. Descriptions and Records of Bees.—LXXXVI. By T. D. A. COCKERELL, University of Colorado.	98

* * * It is requested that all Communications for this Work may be addressed,
post-paid, to the Care of Messrs. Taylor and Francis, Printing Office,
Red Lion Court, Fleet Street, London.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



CONDUCTED BY

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,

AND

RICHARD T. FRANCIS, F.Z.S.

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

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Baillière, Paris: and Hodges, Figgis, & Co., Dublin.

Smithsonian Institution
SEP 15 1919
National Museum

WATKINS & DONCASTER,

Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

G. A. BENTALL, F.Z.S.

CABINETS,
STORE BOXES,
SETTING BOARDS,
TRAVELLING
CASES,
NETS,
PINS, ETC.

Naturalist,
DUDLEY HOUSE,
SOUTHAMPTON STREET
(Opposite Hotel Cecil),
STRAND, LONDON,
W.C. 2.

BRITISH,
CONTINENTAL,
AND EXOTIC
LEPIDOPTERA,
COLEOPTERA,
BIRDS' EGGS
AND SKINS,
BOOKS, ETC.

Price Lists post free on request.

Price 21s.

THE FAUNA OF BRITISH INDIA

(Including Ceylon and Burma).

Published under the authority of the Secretary of State for India in Council.

Medium 8vo, with Text Illustrations.

COLEOPTERA (CHRYSOMELIDÆ).

TAYLOR & FRANCIS, Red Lion Court, Fleet Street, E.C. 4.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	} All Net.
HALF-PAGE - -	1 2 6	1 0 0 „	17 6 „	
QUARTER-PAGE -	12 6	11 3 „	10 0 „	

All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdharst Road, Croydon.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 21. SEPTEMBER 1919.

XV.—*Notes on Platypodidæ and Scolytidæ collected by Mr. G. E. Bryant and others.* By Lt.-Col. WINN SAMPSON, F.E.S.

THE following pages do not complete the descriptions of the very varied examples placed in the writer's hands for examination, but it is hoped that the rest of the specimens may be dealt with at an early date. At present, Mr. Bryant's collection has been found to contain

Family Platypodidæ.

Genus CROSSOTARSUS, Chap.

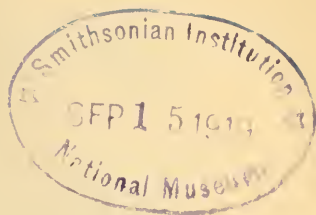
Crossotarsus wallacei, Thoms. Malacca, Borneo, Sumatra.

A good series of both sexes from Sarawak (Mt. Matang and Quop).

Crossotarsus penicillatus, Chap., ♀ (lege ♂). Borneo.

A number of specimens were taken on Mt. Matang, and several females taken at the same time coincide so exactly with the description of *C. cincinnatus*, Chap., that there is little doubt the two species are merely the sexes of *C. penicillatus*, Chap.

Crossotarsus penicillatus, Chap., ♀ (lege ♂), ♂ (lege ♀),
nov.



Crossotarsus wollastoni, Chap.; ♀ (lege ♂). Borneo.

Amongst the specimens of this species taken in Sarawak (Quop) is one that may be the female (nec Chap.), but further material is necessary before deciding the question.

Crossotarsus squamulatus, Chap., ♂ (lege ♀). Java.

Hitherto only taken in Java, but now captured by Mr. Bryant at Penang and Sarawak (Quop).

Herr Strohmeier suggests that *C. fragmentus*, Samp., may be the male of this species. My type, now in the British Museum, was described from a Singapore specimen, and since then I have received a long series of both sexes bred by Mr. C. F. C. Beeson, Imperial Forest Zoologist, Dehra Dun, from Sundri Wood, the females of which agree with Chapuis's type in the British Museum; but if my species is the male, then *C. squamulatus*, Chap., must be transferred to the group *subdepressi* from the *coleoprati*.

As regards Strohmeier's further suggestion, that *C. fractus*, Samp., may be the male of *C. venustus*, Chap., he has overlooked the fact that Mr. Blanford described the male of this species twenty-four years ago (Ann. & Mag. Nat. Hist. ser. 6, vol. xv., April 1895, p. 324).

Genus PLATYPUS, Chap.

Platypus perrisi, Chap., ♂ ♀ (lege ♀ ♂). Borneo, Malacca.

Further specimens from Sarawak (Mt. Matang) and a female from Penang.

Platypus westwoodi, Chap., ♀ (lege ♂). Borneo.

One male from Penang, also a single female from Sarawak (Mt. Matang) that is probably the undescribed female of this species or *P. signatus*, Chap.

Platypus solidus, Walk. Ceylon, India, Sunda Is.

Two specimens from Penang.

Platypus pilifrons, Chap., ♂. India and Indian Archipelago.

One example from Penang.

Chapuis considered this to be the male (lege ♀) of *P. solidus* Walk. Herr Strohmeier has not mentioned this species in his fascicule in the 'Genera Insectorum,' although it is placed in the group Platypi Oxyuri in his list of the Platypodidae (Coleopt. Catalog. W. Junk, 20, vi. 1912, p. 17).

Platypus candezei, Chap., ♂ ♀ (lege ♀ ♂). Borneo, Malacca.
" A single male specimen from Sarawak (Puak) and others from Sarawak (Mt. Matang).

Platypus suffodiens, Samp.

In the description of this species published in the Ann. & Mag. Nat. Hist. ser. 8, vol. xii., Nov. 1913, the following was accidentally omitted, and should be added at the end of the description of the male: The abdominal segments in both sexes are hairy, the fourth segment in the male having a transverse row of stiff bristles on each side of the centre, the other segments being furnished with transverse rows of piliferous tubercles, the fifth segment being the most strongly tuberculate at the apex and variolose on the rest of the surface; in the female, the hairs are more scanty and the variolosity slighter.

Genus *DIAPUS*, Chap.

Diapus pusillimus, Chap., ♂ ♀ (lege ♀ ♂). New Guinea.

Both sexes from Penang and a male from Sarawak (Mt. Matang).

Diapus quinquespinatus, Chap., ♂ ♀ (lege ♀ ♂). Celebes, Borneo, New Guinea, Morty, Java.

The sexes were taken at Sarawak (Mt. Matang).

Family *Scolytidæ*.

Genus *DIAMERUS*, Er.

The following new species was taken by Mr. Bryant in Sarawak (Mt. Merinjak):—

Diamerus merinjaki, sp. n.

Black, slightly shining. *Front* elongate, concave, and narrow, covered with palish hairs and closely punctured, with a slight central depression; eyes large, vertical and not emarginate; antennæ inserted at the base of the eyes in deep depressions; the funicular joints slightly hairy, the antennal club elongate and broadened apically, the surface solid with two lateral septa meeting diagonally in the centre, the rest of the surface being hairy and porous. *Prothorax* transverse with rounded sides, the frontal edge straight with a broad margin, the posterior angles rounded, the whole

surface very deeply punctured and covered with thick, black, erect hairs; there is an obscure median line on the basal third. Scutellum absent. *Elytra* slightly more than twice as long as the prothorax and broader except basally, where they are abruptly narrowed to the size of the prothoracic base, increasing in width until again narrowed at the blunt apex, punctate-striate, the interstices convex, with rows of punctures and short semi-erect scale-like brownish hairs, the declivity somewhat abruptly rounded both dorsally and laterally. Anterior coxæ widely separated. The antennæ and tarsi testaceous.

Long. 6·3 mm.

Hab. Sarawak, Borneo (*Bryant*).

This species differs from any other of the genus known to me by the greater size, the increasing breadth of the elytra apically, the very deeply punctured thorax, the different construction of the antennal club, etc.

There is an undescribed specimen collected at the same time with parallel-sided elytra and of smaller size, which may prove to be the male when more material is available.

The next species was taken also in Sarawak (Mt. Matang):—

Diamerus matangi, sp. n.

Black, slightly shiny. *Front* elongate, concave, and narrow, closely punctured and with a central depression; eyes large, vertical, and not emarginate; funicular joints somewhat hairy, club solid, not broadened apically and having a septum placed diagonally from the basal third to the centre, and another faintly marked one immediately anterior to the first and parallel to it. *Prothorax* transverse with rounded sides and very slightly contracted anteriorly and at the base, the whole surface semi-opaque, closely and evenly punctured with a faint median line from the base towards the centre. Scutellum absent. *Elytra* more than twice as long as, and slightly broader than, the prothorax except at the immediate base; punctate-striate, the interstices convex with rows of semi-erect hairs and punctures; the elytral surface convex from base to apex where there is a very slight thickening of the sutural angle. The anterior coxæ are widely separated.

Long. 4·5–5·1 mm.

Hab. Sarawak, Borneo (*Bryant*).

This species is very similar to the last, but smaller, and has a differently constructed antennal club, the prothoracic punctures are also much smaller. A similar broadening of

the elytra laterally from near the base to the apex is common to both species, but in the present one there is a slight production of the elytra at the sutural apex, of which the former shows no trace. The regular and shiny punctures of the elytral striæ are more evident than in the preceding species.

GENUS XYLEBORUS, Eichh.

Xyleborus submarginatus, Blandf., ♀.

Hab. India, Belgaum (*Andrewes*); Ceylon (*Thwaites in Mus. Oxon.*); Celebes (*Wallace*); New Guinea, Dorey (*Wallace*).

A single specimen now taken in Sarawak (Mt. Matang).

Xyleborus sumatranus, Haged.

Hab. Sumatra.

One example from Sarawak (Mt. Matang).

The following two new species were taken at Sarawak:—

Xyleborus comans, sp. n.

Black, globose; antennæ and tarsi ferruginous. *Front* nearly flat, thickly hairy with a transverse row of paler hairs over the mouth; rugose, the rugosity becoming longitudinally confluent apically. *Prothorax* as broad as long, rounded laterally and anteriorly, the front sharply depressed with two large and two small prominent recurved tubercles on the anterior edge, the surface rugose as far as the central transverse gibbosity and punctured posteriorly, the whole surface densely hairy with a very thick transverse ridge of erect hair just before the base. Scutellum absent. *Elytra* the same length as the prothorax, laterally rounded to the blunted apex and furnished with obscure rows of piliferous punctures; an abrupt depression commences before the middle and is margined by a few obscure tubercles, the suture being raised and the apex margined on the apical half; the fundus is furnished with more or less irregular piliferous punctures.

Long. 6 mm.

Hab. Borneo, Sarawak (Mt. Merinjak and Quop) (*G. E. Bryant*).

This species differs from Hagedorn's very incomplete description of *X. ursinus* in size, the frontal tubercles, the basal prothoracic collar of thick hair, and the length of the elytra, etc. It is no doubt allied to, but varies in many

respects from, *X. hirtus*, Eichh., and *X. geminatus*, Eichh., both described from single specimens taken in India (Darjeeling).

The prothoracic tubercles vary in size in different specimens, but there are generally four more prominent than the rest.

Xyleborus bryanti, sp. n.

Black, semiopaque. *Front* slightly convex and strongly punctured apically, becoming longitudinally aciculate towards the vertex and having a short median elevation from the epistoma to a slight central depression, also a transverse row of pale hairs anteriorly; eyes transverse and entire. *Prothorax* subquadrate, anteriorly rounded but emarginate in the centre and crenate on either side, rugose anteriorly to the prominent central gibbosity, the posterior portion smoother and punctured laterally, the basal angles subrectangular. *Elytra* half as long again as the prothorax and of equal width, sides nearly parallel to past the centre and then narrowed to the rounded apex; viewed laterally, the elytra appear slightly elevated a short distance from the base, this being caused by the local enlargement of the 3rd and 4th interstices; the striae consist of closely placed shallow impressions with centres of minute dots; the 1st interstice obscurely tuberculate, the 2nd ceasing after the basal third, being continued again from the declivity to the apex, the 3rd interstice is the most prominent and is tuberculate from the basal third, the whole surface, except the raised portions of the 3rd and 4th interstices, of a dull black colour, the declivity being somewhat flattened.

Long. 6.5 mm.

Hab. Borneo, Sarawak (Mt. Matang) (*Bryant*).

There is a similarity in the facies of this species and those forming the cone-shaped group of *Xyleborus*, such as *X. cuneatus*, *X. andrewesi*, etc., and the striae impressions are very like those of *X. comptus* described below, these markings differing from the umbilicate punctures of *Crossotarsus fairmairei*, Chap., in the Platypodidae.

Xyleborus submarginatus, Bldf., ♀.

Hab. India, Belgaum (*Andrewes*); Ceylon (*Thwaites*, in *Mus. Oxon.*); Celebes (*Wallace*); New Guinea, Dorey (*Wallace*).

A single specimen was taken in Sarawak (Mt. Matang).

Xyleborus sumatranus, Haged.

Hab. Sumatra.

One specimen from Sarawak (Mt. Matang).

Xyleborus scabripennis, Bldf., ♀.

Hab. Borneo, Sarawak (*Wallace*); Sumatra, from tobacco (*Grouvelle*).

One example from Penang and another from Sarawak (Mt. Matang).

The next two new species of *Xyleborus* were taken, one by Mr. E. Ernest Green in Ceylon, the other by Mr. C. F. C. Beeson in Bengal:—

Xyleborus comptus, sp. n.

Cylindrical, dark brown, with prothorax paler than the elytra. *Front* convex, rugose, with slight fringe over the mouth. *Prothorax* subglobose, sides slightly and front strongly rounded, anteriorly asperate to the transverse node and posteriorly faintly punctate. *Elytra* less than one-third longer than the prothorax and slightly narrower, the sides nearly parallel and obtusely rounded at the apex; the striæ are furnished with large but shallow depressions, which decrease in size towards the base, the interstices are slightly convex with uniseriate punctures, except the second which is biseriate up to the declivity and deeply depressed towards the apex, the elytral declivity is semiopaque.

Long. 2.6 mm.

Hab. Ceylon (*E. E. Green*).

Food-plant, *Hevea brasiliensis*.

Xyleborus undulatus, sp. n.

♀. Cylindrical, brown and somewhat shiny, sparsely pilose. *Front* dark and subconvex, sparsely punctured on a reticulate surface with a longitudinal carina extending half-way to the vertex, the mouth thinly fringed, eyes deeply emarginate. *Prothorax* slightly longer than broad, strongly rounded apically and much less so laterally, transversely scabrous as far as the prominent transverse gibbosity, posteriorly finely reticulate and sparsely granulate and hairy, paler in colour than the elytra and with a faintly marked longitudinal median smooth space from the base to the transverse ridge. *Elytra* about one-fourth longer than the prothorax and of equal breadth at the broadest part of each, with a transverse depression commencing near the base and

extending to the centre, the declivity beginning before the apical third; laterally narrowed from near the base to the apical third and then broadening again before the bluntly rounded apex, the striæ are furnished with large variolose impressions increasing in size from the base and each having a minute hair at its circumference; the interstices flat with minute piliferous punctures partially replaced in the first six interstices by tubercles before the rounded declivity, the second interstice being unarmed to the apex which is acutely margined; the elytral base is furnished with a transverse row of longish hairs along the edge. The legs and antennæ testaceous.

Long. 2 mm.

Hab. Bengal, India (*C. Beeson*).

The elytral depression gives the appearance of a saddle-back to this species, which is very distinctive, although it is similar in many ways to *X. laticollis*, Bldf., which, however, is much larger, with a differently shaped prothorax and elytral declivity, etc.

Genus ECCOPTOPTERUS, Motsch.

Eccoptopterus, Motsch. Bull. Mosc. xxxvi. 1863, i. p. 515.

Platydactylus, Eichh. Not. Leyden Mus. viii. 1886, p. 110.

Eurydactylus, Haged. Deut. Ent. Zeit. 1909, p. 733.

Eccoptopterus gracilipes, Eichh.

Hab. Molucca.

Several females from Sarawak (Quop).

Genus PHLÆOSINUS, Chap.

The following species is described from a long series in the Calcutta Museum Collection; they are only labelled "Deyhra Dun," and there is no locality mentioned:—

Phlæosinus jubatus, sp. n.

♂. Oblong; head black, and in mature specimens the prothorax is black and the elytra a deep brown. *Front* slightly concave, rugose, with a median shiny ridge to the centre. *Prothorax* not longer than broad, narrowed apically; the dorsum slightly flattened in a semicircle from the anterior end of the shiny median line, as far as two other shiny spaces on each side of the basal third; the anterior edge furnished with a broad polished band, the rest of the prothoracic surface being covered with piliferous punctures, with longer hairs on the sides. *Elytra* striate, the striæ

consisting of rows of double lunate plates facing each other transversely but separated, the intervening space furnished with a single hair bent towards the apex of the elytra ; the interstices transversely rugose and sparsely hairy, the declivity commencing at the apical third, with a fundus formed by the outward deflexion of the first interstice, the continued narrowing of the second until the subsequent fusion of the first and third, leaving a flat, dull, irregularly punctured surface to the apex ; interstices 1 and 3 become strongly toothed at the commencement of the declivity, and 5 and 7 have smaller teeth closer to the apex ; the basal edge of the elytra is raised and strongly toothed.

Long. 3-3.5 mm.

Hab. India.

♀. Differs from the male in the slightly convex front and stronger longitudinal rugosity, and in the rather shallower and narrower fundus, as well as in the smaller interstitial teeth. Immature specimens are very pale in colour, but the prothorax eventually becomes black and shining, and the elytra a dark brown.

Long. 3.5 mm.

If the single specimen in my collection of *P. cristatus*, Lec., is correctly named, the present species is very nearly allied to it, but in the former the interstices are straight, the first and second become obsolete at the declivity, and the third only has large black tubercles.

Genus CRYPHALUS, Er.

The new species of *Cryphalus* is determined from a series of specimens in the collection of Mr. H. E. Andrewes :—

Cryphalus corpulentus, sp. n.

♂. Subovate, brown. *Front* slightly concave and punctate, longitudinally aciculate at the vertex. *Prothorax* transverse, sharply narrowed apically, with 4-6 frontal tubercles, above which are two central ones and three concentric transverse elevations, the last being on the vertex of the prothoracic gibbosity. *Elytra* lineate-punctate, the striae faintly impressed and furnished with small irregularly placed scales, the interstices nearly flat with large erect scales of a pale colour and placed at considerable intervals apart.

Long. 1.4-1.5 mm.

Hab. India, Nilgiri Hills.

♀. Similar to the male, but with the front slightly convex, the prothorax less sharply contracted apically, and with the two prothoracic tubercles replaced by a concentric ridge.

Long. 1.4–1.5 mm.

Hab. India, Nilgiri Hills.

Type in the collection of Mr. H. E. Andrewes.

In neither sex do there appear to be many scales on the prothorax, unless they have been worn off in the series of specimens examined. The species is very closely allied to *C. tilia*, Panz., but is easily separated from it by the elytral clothing alone.

Genus WEBBIA, Hopk.

Webbia dipterocarpi, Hopk., ♂ ♀.

Hab. Philippine Islands.

Several females from Penang and a pair from Sarawak (Mt. Matang).

XVI.—On a curious Malformation in *Tænia saginata*.

By H. A. BAYLIS, M.A.

(Published by permission of the Trustees of the British Museum.)

A VERY curious specimen of the common tapeworm of man, *Tænia saginata*, recently came into my hands through the courtesy of Mr. W. T. Hillier, of the Pathological Department of the Queen's Hospital for Children, Hackney. As is so often the case with cestodes removed by anthelmintic remedies, the head and anterior portion of the strobila were not recovered. The absence of the head is regrettable, as it might have thrown interesting light on the peculiarities of the worm.

The total length of the fragment recovered was about 165 cm. In its general shape and appearance there is nothing remarkable. It is flattened dorso-ventrally as usual, and most of the segments are of the size and shape characteristic of *T. saginata*. On closer inspection, however, two types of anomaly are found to occur very frequently:—

- (1) Imperfectly divided segments, with two or more genital pores on alternate sides, and a separate set of internal organs corresponding to each pore.
- (2) Segments normally divided from their neighbours, but with two genital pores, on opposite sides but at the same level.

Some idea of the proportions of normal and abnormal segments in this specimen may be gathered from the following figures for a portion measuring about 70 cm. in length.

Complete intersegmental divisions	70
Imperfect intersegmental divisions	17
Normally-divided segments with single pore (normal condition)	6
Normally-divided segments with two opposite pores ..	46

The first-mentioned kind of abnormality calls for passing comment only. It is by no means uncommon in *Tænia saginata*; indeed, as Leuckart* remarks, "traces of it may be seen in almost every chain." The commonest case is that in which the division extends only a little way across the width of the strobila. Sometimes it reaches to the middle line, or beyond it. Owing to the divided side being longer than the undivided side of the joint, the partial dividing-line usually curves forwards somewhat before it disappears. This forward curve may be carried so far that it meets the preceding intersegmental division, in which case a triangular "supernumerary" segment is formed, wedged in between two normal segments. Such "supernumerary" segments may occasionally be the starting-points of the double, or rather forked, chains of segments that are sometimes met with.

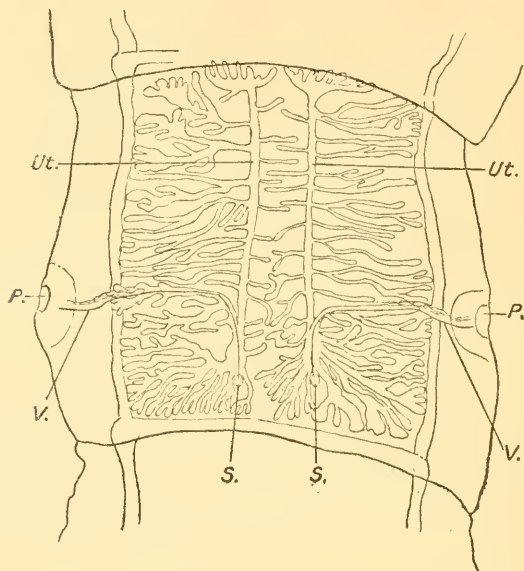
The second anomaly (segments with two opposite genital pores) is more remarkable. Leuckart observed such segments in *T. saginata*, but says of them † "here one finds behind each opening a set of male and female ducts, with cirrus-pouch and vesicula seminalis, but the reproductive organs proper are as usual—the two vaginæ passing into a common shell-gland, and into a single uterus." In the present case, however, further examination shows that the reduplication is not confined to the pores and ducts—*there are two complete and bilaterally symmetrical sets of genital organs in each of the segments with double pores*. Each vagina has its own distinct shell-gland, yolk-gland, ovary, and uterus. The two uteri present a remarkable appearance in gravid segments (see figure), running forward parallel to each other, and each sending out the usual lateral branches. The branches on the two inner, opposed sides of the uteri, however, have not room enough for their normal development, and are stunted and frequently unbranched, many of them containing few or no

* 'The Parasites of Man,' English translation by W. E. Hoyle, 1886, p. 450.

† *L. c.* p. 451.

ova; while the branches on the outer sides appear normal. In younger segments the finger-shaped lobes of the inner halves of the two ovaries are in close contact and somewhat confused.

As regards the female apparatus the condition in most of the segments of this worm is similar to that normally found in certain genera of cestodes (*Dipylidium*, *Moniezia*, *Citotenia*, to mention only a few well-known examples), but



Gravid segment of *Tænia saginata*, showing abnormal, bilaterally symmetrical arrangement of the genital organs.

P., *P.*, the two genital pores, from which the two vaginae, *V.*, *V.*, lead to two shell-glands, *S.*, *S.* From these the main stems (*Ut.*, *Ut.*) of the two uteri extend forward parallel to each other.

unknown in *Tænia*. Were *T. saginata* not well known to be a variable species, such a peculiarity might have been considered sufficient ground for creating not merely a new species but even a new genus. There can, however, be no question of this kind in this case, for two reasons. In the first place, the strobila is not entirely composed of double segments, but here and there we find a normal segment with a single pore and median uterus. In the second place, the reduplication extends also to the male organs—not only to the ducts, but

to the testes themselves. This is shown by the great overcrowding of these organs in the median field of the segments, between the two uteri. Here we have, I think, clear evidence that two sets of testes, enough for two segments—fused together, as it were, side by side,—overlap each other at the point of junction.

Both sets of organs in the double segments appear to be functionally active, as is shown by the presence of spermatozoa in the two vasa deferentia, and by the large numbers of normal ova in the two uteri.

Apart from the genital apparatus, the double segments appear to be normal—the excretory system, for example, shows only the usual two pairs of longitudinal vessels and the usual transverse connections.

In examining the possible causes of this malformation, it must not be confused with the cases of “triradiate,” “prismatic,” or “polyradiate” cestodes, which have been noted by many observers, and recently studied by Foster*, who has found forty-four instances of the phenomenon mentioned in literature. The triradiate forms, as far as is known, are always associated with a triradiate scolex, with six suckers instead of four, and their segments usually have only a single genital pore situated on one of the three “wings.” Where two or more pores are present, they are not, as in the present case, placed at the same level on opposite sides, but one behind the other, usually in regular alternation. It is not, therefore, to cases of this sort that we must look for an explanation of the double symmetrical arrangement. Had the scolex been available, it is, of course, possible that the worm might have proved to be some kind of “double-headed monster”; but this is rendered rather improbable by the fact that a certain proportion (though a very small one) of the segments are of normal type, with single pore and single set of genital organs.

On the whole, it seems more likely that we have here a case where the tendency repeatedly to form partially-divided and “supernumerary” segments, which has been seen to be very marked, has been carried a step further than usual, and many of the divisions have failed to make their appearance at all. We know that there is a tendency for supernumerary segments to assume a position diagonal to the long axis of the worm, and that they often cause the succeeding segment to be pushed out laterally in the opposite direction so as to form a kind of “elbow” in the strobila. If this process

* ‘Journal of Parasitology,’ ii. no. 1 (1915), p. 7.

were pushed to extremes at the time of the formation of the young segments (when presumably they are in a plastic condition), and if at the same time the intersegmental division were suppressed, the result would be a "double segment" of the kind that has been described. It is difficult, of course, to understand what force or forces may have been operating to bring about such a condition, but it is suggested that some such process may have been the cause of this malformation, rather than that the specimen is a "double monster."

Although a number of records are to be found in literature of segments of *T. saginata* with two opposite or nearly opposite genital pores, I have been unable to find an account of a case similar to the present example, with two bilaterally symmetrical sets of internal organs. A very curious case has, however, been described and figured by Blanchard*, where a single segment, in a chain otherwise consisting of quite normal segments, contained a set of organs at each end, both leading into a common uterus in the normal median position. The ovary, yolk-gland and associated organs at the posterior end of the segment were arranged in the usual order, but those at the anterior end were reversed, so as to form a "mirror-image" of the former. Each set had its own ducts and pore, the pores being situated one on either side of the segment, but not quite opposite to each other. Although this has been referred to as a single segment, it ought perhaps to be regarded as two segments, since there was a partial transverse division on one side.

XVII.—*Indo-Malayan and Australian Noctuidæ.*

By Colonel C. SWINHOE, M.A., F.L.S., &c.

Subfamily *SARROTHRIPINÆ.*

Characoma perfecta, nov.

♂. Upperside: fore wing grey irrorated and suffused with pale black, a deep black patch on middle of costa angled downwards, narrowly extending on costa to near apex, and also to the base of the wing, its inner edge with a white patch irrorated with black and containing on its lower part three black spots and another below near the

* Bull. Soc. Zool. France, xv. 1890, p. 166. The writer is indebted to Prof. A. Railliet for drawing his attention to this case.

hinder margin ; two black spots on a whitish ground in the middle of the disc, a white spot at the base of the wing ; a postmedial outwardly curved, dentated white line and another submarginal, marginal line finely dark brown ; cilia checkered white and brown : hind wing dark brownish grey, marginal line and cilia as on the fore wing ; head and body dark grey, a white spot on the middle of the thorax, the abdomen with some whitish suffusion especially at its extremity. Underside grey : fore wing grey, a white spot in the middle : hind wing paler, with some whitish in the interspaces ; face and body white, legs grey above, white beneath.

Expanse of wings, $\frac{7}{10}$ inch.

Hab. Khasia Hills.

Characoma araca, nov.

♂ ♀. Fore wing greyish white minutely irrorated with black atoms, four highly dentated transverse black lines, subbasal, antemedial, postmedial, and submarginal, the first and second lines constricted hindwards, the third bent outward in its middle, a blackish patch on the costa against the outer side of the third line, a black costal spot on the submarginal line, all the lines more or less finely bordered with white, a series of minute black lunules pricked with white on the outer margin ; cilia coloured like the wing, crossed by darker grey lines opposite the vein ends : hind wing whitish, semihyaline, tinged with grey on the costa and outer border, veins grey ; head and body concolorous with the wings. Underside nearly uniform pale grey, three white dots near the apex on the costa of the fore wing ; palpi beneath, face and body smeared with white ; legs striped with white.

Expanse of wings, 1 inch.

Hab. Khasia Hills, 1 ♂, 4 ♀.

Giaura multipunctata, nov.

Symitha punctata, Swinhoe, Trans. Ent. Soc. 1890, p. 236, pl. vii. fig. 15 (præocc.).

Hab. Tenasserim, Khasia Hills, Nilgiri Hills.

Lucas, in Proc. Linn. Soc. New South Wales, (2) iv. p. 1675 (April 1890), described *Sarotricha punctata* from Queensland, Australia ; it is also a *Giaura*, and in Phal. xi. p. 284, Sir George Hampson has put my name as a synonym to Lucas's name. I cannot believe that a rare Australian species is the same as an equally rare Indian species. Unfortunately I have no Australian *punctata* to dissect, but in

every instance but one (a common *Perigea*) all the genitalia I have had examined show a marked difference between Australian and Indian forms.

Selepa demiota.

Sarotricha demiota, Meyrick, Trans. Ent. Soc. 1889, p. 464 (♀ only).
Plotheia geræa, Hampson, Ann. & Mag. Nat. Hist. (7) xvi. p. 582 (1905).
Selepa geræa, Hampson, Phal. xi. p. 300, pl. clxxxii. fig. 15 (1912).

Hab. Port Moresby, Br. N. Guinea, Queensland, Australia.
 Meyrick described both sexes; if his male really falls to Walker's type of *Selepa circulella* from Celebes (see Phal. xi. p. 303), and his female is the same as Hampson's *geræa* from Queensland, Meyrick's name must take precedence.

Barasa suffida, nov.

♂. Fore wing milk-white irrorated with minute grey atoms, the costal portions slightly the darkest, the costa with black spots on the outer half, commencing with minute dots and gradually enlarging towards the apex, transverse lines ochreous-grey, indistinct basal, antemedial (double, well separated), and somewhat sinuous, medial similar, but more sinuous and bent inwards on the hinder margin; post-medial line commencing with two black dots somewhat sinuous and bent inwards in a square form in its middle, submarginal line in a round curve, the upper half of it formed of black dentations, all the lines with white outer edgings, marginal line grey inwardly pricked with white; cilia grey with a white base: hind wing greyish white, the costal portion slightly suffused with grey; palpi black, last joint white; head and body concolorous with the wings, abdomen with some white marks. Underside uniform pale grey; costa of fore wing with black and white dots.

Expanse of wings, 1 inch.

Hab. Khasia Hills.

Superficially somewhat resembles *B. costalis*, Hampson, from Bhutan.

Subfamily *ODONTODINÆ*.

Stictoptera anca, nov.

♀. Fore wing pale fawn-colour, ochreous-tinged; costa and hinder margin suffused with grey, costal line brown, a brown costal patch at the apex; a longitudinal brown band

through the middle of the wing, from the base to the outer margin a little above the middle, another similar but shorter band, edged outwardly with white across the hinder angle, the white continued upwards in lunules near the margin, all the lunules inwardly edged with brown; anteciliary line white, inwardly edged with black in slight inward curves in the interspaces; cilia grey: hind wing white slightly greyish, nearly hyaline, the veins grey; costal and marginal borders broadly black, broadest at the apex. Underside: fore wing uniform blackish brown: hind wing as on the upperside; palpi, head, and collar dark brown above, abdomen grey; on the underside the palpi white, the body and legs dark grey, the abdomen with some white suffusion.

Expanse of wings, $1\frac{7}{10}$ inch.

Hab. Khasia Hills, two examples.

Gyrtona yucca.

Gyrtona yucca, Swinhoe, Ann. & Mag. Nat. Hist. (6) xii. p. 264 (1893).

Gyrtona divitalis, Hampson (part.), Phal. xi. p. 217, pl. clxxx. fig. 1 (1912).

Type, Singapore. I have it also from Goping Perak, the Andaman Islands, and Ceylon; it appears to me to be perfectly distinct from *divitalis*, Walker, from Borneo. I cannot make out what Hampson's figure represents; it is nearly three times the size of my species and very different in colour and markings.

Lophoptera apirtha.

Stictoptera apirtha, Swinhoe, Cat. Het. Mus. Oxon. ii. p. 92 (1900).

Gyrtona chalybea, Butler, P. Z. S. 1883, p. 163 (nom. præocc.)*.

Stictoptera chalybea, Hampson, Moths India, iv., App. p. 529 (1896).

Lophoptera plumbeola, Hampson, Phal. xi. p. 184, pl. clxxviii. fig. 27 (1912).

Type, Solon, Simla, in B.M. Type ♀, from the same locality, in my collection. I have it also from Sikkim, Khasia Hills, Fort Stedman, and Port Blair, Andamans; Sir George Hampson makes no mention of my species; he appears to have described my type of *apirtha* from Simla as *plumbeola*. I suppose my type-label has dropped off the specimen in the B.M.

Lophoptera hampsoni, nov.

Gyrtona chalybea, Hampson, Ill. Het. B.M. viii. p. 86, pl. cxlvi. fig. 24 (1891).

Lophoptera chalybea, Hampson, Phal. xi. p. 187 (1912) (præocc.)*.

Hab. Nilgiris.

* Phal. xi. p. 191.

Lophoptera cerea.

Stictoptera cerea, Swinhoe, Ann. & Mag. Nat. Hist. (6) xix. p. 167 (1897).

Lophoptera pustulifera, Hampson (part.), Phal. xi. p. 190, pl. clxxix. fig. 5 (1912).

Hab. Gilolo.

Cerea is not the same as the Sarawak species *pustulifera*. I have both species in my collection, both sexes of *cerea*, from Gilolo. It is nearly double the size of Walker's species; the hind wings have a pure white cilia, whereas in *pustulifera* they are checkered white with clean-cut brown spots opposite the vein ends.

Subfamily NOCTUINÆ.

Simplicia schaldusalis.

Bocana schaldusalis, Walker, xvi. p. 180 (1858).

Culicula bimarginata, Walker, Journ. Linn. Soc. vii. p. 178 (1864).

Simplicia infausta, Felder, Reise Nov. Lep. pl. cxx. fig. 45 (1873).

Simplicia griseolimbalis, Snellen, Tijds. voor Ent. xxix. p. 47, pl. ii. fig. 4 (1886).

Simplicia schaldusalis, Hampson, Moths of India, iii. p. 35 (1895); Swinhoe (part.), Ann. & Mag. Nat. Hist. xix. p. 341 (1917).

Type, Sarawak, Borneo, in B.M.

Type, *bimarginata*, Sarawak, in Mus. Oxon.

Type, *infausta*, Sarawak, in Mus. Rothschild.

Type, *griseolimbalis*, Sumatra, in Coll. Snellen.

I have examples also from Singapur, Obi Isl. (Moluccas), and from the Solomon Isls., and they all seem to be identical.

Simplicia moorei, nov.

Nabartha marginata, Moore, Lep. Ceylon, iii. p. 234, pl. clxxvii. fig. 2 (1885) (præocc.)*.

Simplicia schaldusalis, Hampson (part.), Moths of India, iii. p. 35 (1895).

Type, Ceylon, in B.M. I have three examples from Kandy and Gampola in Ceylon; they appear to me to be quite distinct from *schaldusalis*, especially on the underside.

Floccicura trilinea.

Simplicia trilinea, Beth.-Baker, Nov. Zool. xv. p. 205 (1908).

Type, Br. N. Guinea, in Coll. Bethune-Baker. I have four examples from N. Guinea, one from Perak, and one each from Madras, Assam, and Sikkim.

* Moore, Lep. Atk. p. 195, pl. vi. fig. 19 (1882).

Libisosa obiana, nov.

♂ ♀. A smaller insect than *caneusalis*, Walker, from Queensland, or *phædrusalis*, Walker, from Borneo: fore wing narrower; hind wing white.

Hab. Obi, six examples.

Plecoptera oculata.

Poaphila oculata, Moore, Lep. Atkinson, p. 172, pl. v. fig. 11 (1882).

Heliothis juncea, Swinhoe, P. Z. S. 1885, p. 448, pl. xxvii. fig. 4.

Heliothis resistens, Hampson (nec Walker), Moths of India, ii. p. 519 (1894).

Hab. Khasia Hills, Bombay.

I have a long series of both sexes; it is a perfectly distinct species, no variations. Moore's figure is so bad I did not recognize it when describing *juncea*, and the type was in coll. Staudinger, in Germany.

Plecoptera quæsita.

Remigia quæsita, Swinhoe, P. Z. S. 1885, p. 468, pl. xxvii. fig. 8.

Heliothis resistens, Hampson (nec Walker), Moths of India, ii. p. 519 (1894).

Hab. Khasia Hills, Bombay, Nilgiris, Burma, Andamans, Gugerat.

I have a long series of both sexes; no variations. All these *Plecopteras* are very constant in their coloration and pattern.

Oræsia argyrosigna.

Oræsia argyrosigna, Moore, Lep. Ceylon, iii. p. 77, pl. cliii. fig. 4 (1884).

Calpe provocans, Hampson (nec Walker), Moths of India, ii. p. 565 (1894).

Hab. Ceylon, Nilgiris, Sikkim, Assam.

Provocans is an African insect, and is certainly not the same as the Indian species. I have it from Natal, where the type came from; the shading is somewhat similar, but it is otherwise different in character. I will publish the genitalia of both in another paper.

GENUS *ATTONDA*, NOV.

Palpi and venation as in *Acantholipes*, antennæ of male minutely ciliated: fore wing with the costa nearly straight, apex subacute, outer margin evenly rounded, wing broad: 10*

hind wing also broad, the outer margin rounded, the entire shape of the wings almost more like *Capnodes* than *Acantholipes*.

Type, *Capnodes trifasciata*, Moore, P. Z. S. 1877, p. 612.

Acantholipes trifasciatus, Hampson, Moths of India, ii. p. 523 (1894).

Attonda natha, nov.

♂ ♀. Upperside: palpi, head, body, and both wings very dark liver-brown, transverse lines indistinct, black, very fine and dentated, five on the fore wing and four on the hind wing, the antemedial line of the fore wing absent: the fore wing has a white subcostal dot near the base, two just before the antemedial line, and four or five on the postmedial line, and the hind wing has four or five similar dots on the medial line, all very minute, and black dots on the outer margin of both wings. Underside pale brownish, the hinder margin of fore wing and abdominal margin of hind wing whitish; two postmedial outwardly curved brown lines on both wings and lunulate marginal black line.

Expanse of wings, $1\frac{2}{10}$ inch.

Hab. Cape York, Australia.

Diomea padanga, nov.

♀. Palpi, head, thorax, and fore wing uniformly dark cupreous brown: fore wing with six white costal dots, one near the apex, the largest joined to a somewhat larger white spot immediately below it; outer marginal line ochreous, cilia dark greyish brown: hind wing pale brown inclining to greyish on the abdominal half; outer marginal line ochreous, somewhat lunulate; cilia as in the fore wing; abdomen concolorous with the hind wing. Underside: fore wing pale brown, a short ochreous mark on the outer margin from the apex, hinder marginal area pale grey, a transverse postmedial brown line, outwardly curved; body, legs, and hind wing grey.

Expanse of wings, $1\frac{1}{10}$ inch.

Hab. Padang, Sumatra.

Hyospila andamana, nov.

♂. Palpi, head, body, and both wings brownish ochreous: fore wing with a small white spot at the end of the cell and two white dots in an inwardly oblique line below it; a broad

blackish patch across the wing before the middle, broad at the costa and gradually somewhat narrowing to the hinder margin, the outer margin of the patch curving round the white spot, then straight down to the hinder margin; ante-medial and medial black, irregular and thin transverse lines, the medial line running through the outer margin of the patch, a blackish thin straight band from near the apex of the fore wing to the abdominal margin of the hind wing close to the hinder angle, its outer edge somewhat suffused; a fine lunulate black marginal line pricked with white dots. Underside: fore wing blackish brown, a white spot ringed with a fine black line at the end of the cell, a line of black submarginal marks interrupted by the veins, the space from this to the margin ochreous, hinder marginal space whitish: hind wing pale ochreous suffused with blackish, a black ringed white spot at the end of the cell, two outwardly curved lunulate lines across the middle, a submarginal series of white spots; abdomen and legs concolorous with the wings, a white spot at the base of the palpi.

♀. Fore wing uniform blackish brown, very dark, nearly black; a white spot at the end of the cell; a black transverse straight band as in the male, but pale-edged outwardly: hind wing slightly paler, no other markings. Underside: both wings as dark as the upperside of the fore wings; markings as in the male, but without the ochreous space at the outer margin of the fore wing.

Expanse of wings, ♂ ♀, $1\frac{4}{10}$ inch.

Hab. Port Blair, Andamans, 2 ♂, 1 ♀, Nicobars, 1 ♀.

Tochara creberrima.

Thermesia creberrima, Walker, xv. 1574 (1858).

Ilusa pyralina, Moore, P. Z. S. 1877, p. 610.

Tochara obliqua, Moore, Lep. Atk. p. 175, pl. vi. fig. 27 (1882).

Thermesia creberrima, Hampson, Moths of India, ii. p. 536 (1894).

The type came from Silhet; it is described by Walker as a female, but the description is that of a male; the female does not seem to have been described by anyone. The pattern is that of the male, but the colour is uniform dark purplish brown. I have both sexes from the Khasia Hills (four females) and a male from Goping Perak; Hampson also records it from the Andamans.

Tochara gilloloensis, nov.

♂. Antennæ and palpi dark grey. Upperside: head, body, and both wings pinkish white; wings irrorated with

minute grey atoms, thickest on the costa of the fore wing ; a reniform stigma made somewhat lunulate by its black borders ; a postmedial thick chestnut straight line inwardly edged with white, from apex of fore wing to the abdominal margin of hind wing a little above the hinder angle ; a fine marginal, lunulate black line pricked with black points and a few white points. Underside as on upperside without the grey irrorations : fore wing with a black dot in the cell, a small black ringlet at the end : hind wing with antemedial and medial line of black dots, both wings with a postmedial series of small black spots, the one nearest the apex of the hind wing the largest ; body and legs concolorous with the wings ; shape of the wings much as in *T. criberima*, but it is a smaller insect.

Expanse of wings, $1\frac{4}{10}$ inch.

Hab. Gilolo Isl., N. Moluccas.

Tochara uniformis, nov.

♂. Antennæ longer than usual in the genus, shaft brown, pectinations grey, shorter than usual ; palpi and top of head black ; body and wings of a uniform pale ochreous-grey colour, slightly pinkish tinged, a faint whitish reniform mark on fore wing, a white straight postmedial line across both wings from the costa near the apex of fore wing to the abdominal margin of hind wing one-third above the hinder angle ; cilia white, no other markings. Underside nearly white, very uniform in colour ; a blackish lunule at the end of each cell, a black postmedial outwardly curved line across both wings, and a black lunular marginal line ; body and legs concolorous with the wings, fore and mid legs black in front. A large insect, the wings much broader than usual.

Expanse of wings, $1\frac{8}{10}$ inch.

Hab. Padang, Sumatra.

Tochara salea, nov.

♀. Palpi, head, body, and both wings ochreous brown ; the ground-colour is really ochreous, but both wings are densely irrorated with olive-brown ; a dark spot in the cell of fore wing, another at the end and one below it ; a thick white straight line, outwardly edged with black, from near apex of fore wing to the abdominal margin of hind wing near the hinder angle ; a marginal lunular, thin black line pricked with black dots ; cilia pale with a somewhat darker internal line. Underside pale ochreous brown ; all the cells

with internal black dot and black spot at the end, a medial and discal transverse series of black spots, a marginal series of black lunules; body and legs concolorous with the wings.

Expanse of wings, $1\frac{7}{10}$ inch.

Hab. Fergusson Isl., Tobriand Group, Papua.

Genus PERATA, nov.

Male with a slight tuft of hair on inner side of 2nd joint of palpi and very large tuft on inner side of 3rd joint; antennæ ciliated: fore wing with the costa arched, outer margin oblique, wing long and somewhat narrow; a large costal fold: hind wing ample, outer margin rounded, veins 3 and 4 from angle of cell; section iv. of Hampson's group of the genus *Adrapsa*.

Type, *Perata curiosalis*, Swinhoe, Ann. & Mag. Nat. Hist. (6) xv. p. 16 (1895).

XVIII.—*A new Species of Euneomys from Patagonia.*

By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

AMONG some small mammals which, through the kind intermediary of Dr. R. Dabbene, the British Museum owes to the authorities of the Zoological Museum, Buenos Ayres, is an example of a new species of *Euneomys*, which may be called

Euneomys dabbenei, sp. n.

Size very much less than in other species. Fur soft and fine, hairs of back about 6–7 mm. in length. General colour pale neutral grey slightly tinged by the buffy brown of the ends of the hairs, but nothing like so strongly as in *E. chinchilloides*. Under surface greyish white, the bases of the hairs deep slaty, the ends faintly tinged with buffy or cream, not strongly buffy as in *chinchilloides*. Hands and feet pure white. Tail markedly bicolor, blackish above, white below.

Skull conspicuously smaller than that of *E. chinchilloides*, broader and shorter in proportion. Interorbital region with sharply square but not beaded edges. Palatal foramina large, with sharp raised edges round them, their hinder edge level with the middle of m^1 .

Measurements (the external ones as taken by the collector):—

Head and body 90 mm. ; tail 53 ; hind foot (c. u.) 24, (s. u.) 22 ; ear 14.

Skull : greatest length 25·2 ; condylo-incisive length 24 ; zygomatic breadth 15·6 ; nasals 10·5 ; interorbital breadth 3·5 ; breadth of brain-case 13·1 ; height of crown from base of m^2 7·7 ; palatilar length 11·8 ; palatal foramina 6·8 ; upper molar series 5·3.

Hab. Lago Viedma, Santa Cruz, Patagonia.

Type. Young adult male. B.M. no. 19. 6. 26. 1. Original number 360. Collected 17th December, 1914, by J. R. Pemberton. Presented by the Buenos Ayres Museum.

This species differs so materially in size of skull from *E. chinchilloides* and *E. petersoni* that it should evidently be distinguished from them. Whether they are distinct from each other I very much doubt, as the typical skulls of the two are of almost precisely the same size, and in describing *E. petersoni* Dr. Allen contents himself by referring to the Tierra del Fuego locality of *chinchilloides* without assigning any reason for the separation of the Patagonian animal from it.

Although not old, the type of *E. dabbenei* is not materially younger than that of *E. chinchilloides*.

XIX.—*List of Mammals from the Highlands of Jujuy, North Argentina, collected by Sr. E. Budin.* By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

THE following is a list of some mammals collected by Sr. Budin at Abrapampa and Casabindo, on the high plateau of North-western Jujuy. The former locality is at an altitude of about 3500 metres, and the latter 4000, while there are, in addition, a number obtained higher up on the Casabindo Cerro or Volcano, as high as 4800 m.

As with the Maimara mammals, of which I gave an account in 1913, these collections clearly indicate the close affinity of the highland Jujuy fauna with that of Bolivia, this being represented by the series sent home by the late Mr. Perry O. Simons. By their help I am enabled more

accurately to work out the distribution of the different forms*.

The most striking novelty is the new *Abrocoma*, a genus not previously known from Argentina.

In fulfilment of my promise of further information on the subject, I may record here that the locality "Otro Cerro," where the collection was obtained of which I gave an account in the May 'Annals' †, proves, after all, to be in the Province of Catamarca. Sr. Budin was thus right as to the Province, but wrong as to the distance and direction from Chumbicha, Otro Cerro being really about 18 kilometres N.N.W. of Chumbicha, and just to the south of Poman.

Correction is therefore needed as to the Province for all the species then described.

1. *Andinomys edax*, Thos.

♂. 524, 527, 531, 533, 544; ♀. 529, 530, 536, 541.

Cerro Casabindo, 4000-4800 m.

"Caught among the rocks on the banks of a stream."—

E. B.

* The following new *Euneomys*, coming from the same general region as the present collection, and, in fact, from the same locality as the type of the new *Galea*, may be conveniently described here:—

Euneomys (Auliscomys) leucurus, sp. n.

Allied to *E. sublimis*, but larger.

Size intermediate between those of *E. pictus* and *sublimis*. Colour not very exactly definable, as the available specimens are either in spirit or have recently been skinned out of it, with resultant discoloration. The general tone, however, appears to be somewhat as in *sublimis*, but more drabby or greyish; hairs of under surface slaty, broadly washed with pale buffy. Hands, feet, and tail white, a very faintly marked narrow darker line perceptible along the top of the latter.

Skull considerably larger than that of *sublimis*, but similarly built; not so broad and stout as in *boliviensis* and *pictus*. Zygomatic plate rather narrow. Palatal foramina long, reaching the level of the middle root of m^1 . Bullæ small, proportionally as in *sublimis*, smaller than in *micropus*, much smaller than in *pictus* and *boliviensis*.

Dimensions of the type (measured on the spirit-specimen, which is probably somewhat contracted):—

Head and body 102 mm.; tail 58; hind foot 21·3; ear 20.

Skull: greatest length 30·5; condylo-incisive length 29; zygomatic breadth 16·3; nasals 11·7; interorbital breadth 4; breadth of braincase 12·8; palatilar length 15; palatal foramina 7·7; antero-posterior length of bulla 4·7; upper molar series 5·7.

Hab. La Lagunita, Maimara, Jujuy.

Type. Adult female in spirit. B.M. no. 19. 7. 10. 3. Collected by E. Budin. Five specimens examined, two of them quite young.

As shown by its small bullæ, this species is clearly most closely allied to *E. sublimis*, but is readily distinguishable by the greater size of its skull.

† Ann. & Mag. Nat. Hist. (9) iii. p. 489.

2. *Phyllotis ricardulus*, Thos.

♂. 410, 411, 420, 421, 457, 458, 473, 482; ♀. 412, 456, 459, 463, 469, 479, 481, 483. Abrapampa, 3500 m.

♂. 503, 506, 516, 517, 526, 535; ♀. 502, 510, 525, 528, 543. Casabindo, 4000-4500 m.

The Pericotes from Maimara, Jujuy, provisionally referred to *P. wolffsohni* in 1913*, appear also to be referable to *P. ricardulus*, recently described from Otro Cerro, Catamarca.

The true *P. wolffsohni* of Bolivia has decidedly larger molars.

3. *Hesperomys carillus argurus*, subsp. n.

♂. 455, 477, 499, 500; ♀. 496, 497. Abrapampa, 3500 m.

“On the bank of the laguna, in humid pasture-land.”

Essential characters apparently quite as in the true *H. carillus*, but colour throughout much paler. General colour above pale drabby buffy varying to greyish buffy; sides clearer, sometimes with a well-marked buffy line. Under surface greyish white, the bases of the hairs broadly slaty. Head like back. Ears with proectote brown lined with buffy; metentote strongly buffy; a whitish postauricular spot present. Hands and feet white. Tail wholly white, one specimen only having its upper median line faintly darkened. Mammæ apparently 3—2 = 10.

Skull apparently much as in *carillus*, though the zygomatic plate is slightly broader than in our only example of that animal.

Dimensions of the type:—

Head and body 79 mm.; tail 45; hind foot 16·5; ear 16·5.

Skull: greatest length 22; condylo-incisive length 20·2; zygomatic breadth 12; nasals 8·5; interorbital breadth 3·3; palatilar length 9·2; palatal foramina 5; upper molar series 3·4.

Hab. as above.

Type. Adult female. B.M. no. 19. 8. 1. 21. Original number 496. Collected 17th February, 1919.

This pretty laucha is evidently the dry-area representative of the forest *H. carillus*, from which it differs by its conspicuously lighter colour.

* Ann. & Mag. Nat. Hist. (3) xi. p. 139 (1913).

4. *Eligmodontia hirtipes jucunda*, subsp. n.

♂. 438, 447, 449, 450, 472, 474, 488, 495; ♀. 451, 471, 478, 487. Abrapampa, 3500 m.

"Caught in sandy soil. Inhabits deserted burrows of Tuco-tucos."—*E. B.*

Similar in proportions and other essential characters to the typical *hirtipes* of the Lake Poopo region of Bolivia, but the colour much less bright and buffy. Upper surface drabby buff, much darker than the sandy buff of *hirtipes*—the rump only more distinctly buffy. Hairs of sides with a lessened but still perceptible whitish subterminal ring. Face greyish buffy. Head and sides drabby buff. Under surface pure white or creamy white to the bases of the hairs. An inconspicuous whitish area between eye and ear. Ears with proectote markedly darker. Hands and feet white. Tail white, with a darker line generally present along its upper surface, but this is absent in the oldest individuals; in *hirtipes* the darker line is scarcely ever perceptible.

Skull as in *hirtipes*.

Dimensions of the type:—

Head and body 85 mm.; tail 80; hind foot 22; ear 18.

Skull: greatest length 25; condylo-incisive length 22.2; zygomatic breadth 13.2; palatilar length 10.2; palatal foramina 5.7; upper molar series 4.

Hab. as above.

Type. Adult male. B.M. no. 19. 8. 1. 29. Original number 488. Collected 5th February, 1919.

This Jujuy representative of the beautiful little gerbil-mouse of the desert-region round Lake Poopo may be readily distinguished by its greyer and duller coloration.

5. *Bolomys albiventer*, Thos.

♂. 437, 439, 452, 460, 461, 464, 466, 470, 475, 480, 486; ♀. 404, 408, 419, 453, 465, 467, 485, 494. Abrapampa, 3500 m.

♂. 501, 505, 519; ♀. 504, 542. Casabindo, 4000 m.

This is evidently the common vole-mouse (as the members of the *Akodon* group might be termed) of the whole of the high *Octodontomys* area of Bolivia and N. Argentina.

6. *Octodontomys gliroides*, Gerv. & D'Orb.

♂. 513, 514, 521. Casabindo, 4000 m.

7. *Ctenomys luteolus*, Thos.

♂. 415, 416, 423, 426, 427, 432, 433, 442, 493; ♀. 407, 409, 413, 424, 431, 440, 441, 445, 489, 492. Abrapampa, 3500 m.

This tuco-tuco was described in 1899 on a single specimen from the "Cordillera of Jujuy"—therefore very much the same locality as the present.

The coloration, notably the whitish or white nose, proves to be absolutely constant throughout this fine series, while in the skull I find that the anterior cheek-teeth are slightly less in diameter than in *opimus*, and the skull itself does not seem to attain so great a size. I consequently now use the name in a binomial form.

8. *Abrocoma cinerea*, sp. n.

♂. 540. Cerro Casabindo, 4800 m. (=15,600'), 22nd March, 1919. B.M. no. 19. 8. 2. 29. *Type*.

A grey mountain *Abrocoma*, with very short tail and feet.

Size about as in *A. murrayi*, smaller than in *A. bennettii*. Fur very soft and fine; hairs of back just over 20 mm. in length. General colour above light grey, slightly paler than "pale neutral grey"; lighter on sides; belly broadly washed with greyish white. Ears very large, almost naked, brown. Forearms and lower legs buffy whitish; hands and feet silvery white. Soles of the same crenulated structure as in the other species, but the feet themselves disproportionately small, only about half the length of the skull. Tail also very short, about half as long as in the other species, uniformly closely haired, not crested, pale neutral grey above, white below.

Skull showing an extreme development of the differences that separate *A. murrayi* from *bennettii*. *A. murrayi* has a bowed skull, with small incisors and large bullæ; in *A. cinerea* the skull is more bowed, has still smaller—indeed, quite abnormally small—incisors and still larger bullæ. Otherwise there is little to distinguish the two, and the structure of the molars is quite the same in all. Height of middle part of zygomatic greatest (4.5 mm.) in *bennettii*, 3.4 in *murrayi*, least (2.8 mm.) in *cinerea*. Posterior palatine foramina quite small, not the conspicuous opening found in the other species.

Dimensions of the type:—

Head and body 192 mm.; tail 70; hind foot 27.5; ear 29.5.

Skull: greatest median length 48; condylo-incisive length 44·7; zygomatic breadth 23·3; bimeatal breadth 25·5; nasals 19·5 × 6·3; interorbital breadth 8·5; least breadth across brain-case 20·3; palatilar length 21·5; palatal foramina 11; bullæ, diagonal horizontal length 16·8, height to protruding part on top of skull 17; upper cheek-tooth series, crowns 9, alveoli 9·7.

Hab. and *type* as above.

So different does this "Raton Chinchilla," as Sr. Budin calls it, look from anything known, that it was at first supposed to represent a new genus; but close study shows that its peculiarities are only a further specialization of those shown by Wolffsohn's *Abrocoma murrayi*, and that there is no reason to separate it generically. It is, however, in any case a very striking addition to the mammal fauna of Argentina, the other species of the genus being Chilian or Peruvian.

The single specimen was trapped by Sr. Budin—to his great delight—among the rocks on the Volcano of Casabindo, at the very considerable altitude recorded above. Of *H. bennettii* we have examples taken by Mr. Wolffsohn at 200 and 800 metres, and of *H. murrayi* at 600 metres in the lower highlands of Chili. But how far they range up on the main Cordillera I do not know.

9. *Lagidium vulcani*, sp. n.

♂. 507; ♀. 508. Casabindo, 4000 m.

♂. 538, 539, and a separate skull. Cerro Casabindo, 4800 m.

"Shot among the rocks."—*E. B.*

Near *L. tucumanum*, but much more suffused with buffy, and with white incisors.

General colour of adult strongly suffused with buffy, the ends of the hairs more or less buffy yellow. Sides and belly brighter yellowish. White axillary and inguinal patches present. Face more greyish or whitish buffy than the body, the colour there much lighter than in other species. Hands and feet buffy whitish. Tail with the usual blackish under surface.

Skull larger than in *tucumanum*. Nasals fairly narrow, slightly inflated anteriorly, but not broader than the premaxillæ. Frontal processes of premaxillæ more surpassing the nasals. Lacrymal bones larger, projected over the orbit. Projecting area of bullæ on top of skull of the same shape as in *tucumanum*, but larger. Incisive fissure quite narrow, not

open as in *lockwoodi*. Bullæ much inflated, larger than in *tucumanum*, nearly equalling those of *lockwoodi*.

Incisors wholly white. Molars larger and heavier than in *tucumanum*, and their laminae slightly less oblique, more transverse than in that species.

Dimensions of the type:—

Head and body 370 mm.; tail 301; hind foot 90; ear (dry) 71*.

Skull: greatest length 88; condylo-incisive length 81; zygomatic breadth 44; nasals 33.5×10.5 ; breadth of brain-case 35; projecting upper part of bulla 5.6×8.5 ; palatilar length 41; diameter of bullæ at right angles to their longest axis 11.8; upper tooth-series, crowns 21, alveoli 21.8; greatest breadth across the two series 21.8; breadth of m^1 on lamina 5.2.

Hab. Cerro Casabindo, 4800 m.

Type. Adult male. B.M. no. 19. 8. 2. 32. Original number 538. Collected 20th March, 1919.

The two specimens from the lower altitude (4000 m.) of Casabindo itself are not so buffy as the two from the Cerro at 4800 m., but they are both much younger, and I put down their greater greyness to this cause.

This species is distinguishable from *L. tucumanum* by its white incisors, all our four specimens of that animal having them deep yellow, as is also the case in *L. cuscus* and *lockwoodi*, its larger teeth, larger bullæ, and by the yellowish-buffy colour of the fur.

10. *Galea comes*, sp. n.

♂. 490, 491; ♀. 448. Abrapampa, 3500 m.

External characters quite as in *G. boliviensis*.

Skull stout and strongly built, very much as in *G. anceps*. Nasals running back in the centre to a point projecting considerably further backward than the premaxillary processes—more so than in the lectotype of *G. boliviensis*. Mesopterygoid fossæ parallel-sided, their anterior edge nearly squarely transverse, or notched, their general shape resembling the upper half of the figure called "scutiform" by Ridgway †. The same is the case in *G. anceps*, while in *G. boliviensis* they are narrowed anteriorly to a V-shaped notch, not unlike

* There is an obvious *lapsus calami* in the measurement given on Sr. Budin's label, so I have simply measured the dry ear.

† 'Nomenclature of Colours,' ed. 1, pl. xii. (1912).

the top part of the figure named "cuneate." Bullæ about as in *G. boliviensis*, not so swollen as in *anceps*.

Dimensions of the type:—

Head and body 243 mm.; hind foot 39; ear 22.

Skull: greatest length 54; condylo-incisive length 48.2; zygomatic breadth 33; nasals 20×8.2 ; interorbital breadth 12; palatilar length 24; antero-posterior length of bulla 13; upper tooth-series, crowns 13; breadth across m^3 15.3.

Hab. Jujuy. Type from Maimara, 2230 m. Other specimens from Abrapampa.

Type. Adult female. B.M. no. 12. 12. 12. 53. Original no. 25. Collected 15th March, 1912, by E. Budin and presented by the Hon. N. Charles Rothschild. Eight specimens examined.

This *Cuiso* agrees with *G. boliviensis* in the size of its bullæ, but differs by the peculiarly broadened shape of the choanæ, which are more like those of the large-bulla species, *G. anceps*.

11. *Dasypus nationi*, Thos.

♂. 435, 436. Abrapampa, 3500 m.

"Quirchincho."

So far as I am aware, no specimen of this distinct species has been recorded since I described it in 1894* on an example sent from Oruro to Prof. Nation of Peru, by whom it was presented to the British Museum.

The type having had quite an imperfect skull, I am glad to be now able to record the skull-measurements of an old male of the species, no. 435:—Condylo-nasal length 73; basal length 60.5; zygomatic breadth 46; nasals 24×8.5 ; interorbital breadth 18.5; bi-meatal breadth 45; palatal length 42; greatest breadth of palate including teeth 16.

These two specimens differ in the number of scale-rows in the shoulder-shield, no. 436, like the type, having only three rows in the centre, while no. 435 has four.

Both specimens are rather more hairy than the type, but the latter looks somewhat worn and may possibly have been in confinement.

12. *Marmosa elegans pallidior*, Thos.

♀. 462. Abrapampa, 3500 m.

♂. 512, 518, 520, 522; ♀. 509, 511, 515, 523, 537. Casabindo, 4000–4500 m.

* Ann. & Mag. N. H. (6) xiii. p. 70.

XX.—*Two apparently undescribed Species of Cicadidæ from Tropical Africa.* By W. L. DISTANT.

THE two species of *Ugada* here described are in the Collection of the British Museum, a collection now, without a doubt, the finest and most comprehensive in the world.

Ugada nigrofasciata, sp. n.

Body dark castaneous brown; pronotum with a broad transverse black fascia at the anterior margin of the posterior area of the pronotum, which is dull ochraceous, and the extreme posterior margin of same, black; mesonotum with four small dark obconical spots, on anterior margin of which the two central ones are largest, and a longer but more obscure spot on the lateral areas; abdomen above darker in hue with the segmental margins narrowly ochraceous, the three terminal segments thickly whitely tomentose; body beneath with the pronotal angular dilatations, the tibiæ and rostrum—excluding base—black or blackish; base of rostrum, streaks to coxæ and trochanters, and the opercula in ♂, ochraceous; tegmina dull greyishly opaque, excepting on apical area where it is marginally, submarginally, and on most of postcostal area vitreous, the venation black and the basal cell thickly, pale stramineously tomentose, the costal membrane ochraceous; wings pale castaneous brown, the venation darker in hue, the posterior marginal area vitreous, darkly suffused near anal angle; pronotal angles strongly angularly produced; head including eyes about two-thirds the width of base of mesonotum; rostrum reaching base of posterior trochanters; face strongly centrally longitudinally sulcate and on each side strongly transversely sulcate.

Long., ♂ & ♀ (excl. tegm.), 35–38; exp. tegm. 105–112; breadth between pronot. angl. 22–23 mm.

Hab. Kamerun; Buar, Tazada.

Ugada atratula, sp. n.

Body black, eyes shining black; lateral areas and posterior marginal area of pronotum, sternum, and opercula more fuscous in hue; legs black; tegmina with about basal half fuscous brown where all the veins are somewhat broadly piceous, remaining area hyaline or subhyaline, the veins black, a subapical fuscous angulated fascia crossing the unional veins of the four upper ulnar and apical areas and marked with a few pale spots and a somewhat similar apical submarginal fascia enclosing five marginal pale spots, another

pale spot enclosed on the union of the two lower apical areas; wings fuscous, the venation sanguineous, the marginal fringe pale hyaline; pronotal lateral angles prominently broad and acute; head including eyes a little more than two-thirds the width of base of mesonotum; rostrum passing the posterior trochanters; opercula (in ♂) short, broadly rounded, their inner angles almost uniting; face centrally longitudinally and on each side strongly transversely sulcate.

Long., ♂, 30 (excl. tegm.); exp. tegm. 100 mm.

Hab. French Central Africa; Tuburi Marsh (P. A. Talbot).

XXI.—*Descriptions of New Pyralidæ of the Subfamilies Crambinæ and Siginæ.* By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c.

[Continued from p. 68.]

(3 c) *Surattha rubrifusalis*, sp. n.

♂. Head and thorax white tinged with red-brown, the former faintly; abdomen white slightly tinged with red-brown; antennæ black; palpi tinged with red-brown; pectus, legs, and ventral surface of abdomen white faintly tinged with red-brown, the fore tibiæ and tarsi suffused with red-brown, the mid and hind tarsi banded with red-brown. Fore wing white suffused with pale red-brown and slightly irrorated with black, especially on basal and costal areas; a short diffused black fascia below base of cell; an indistinct diffused curved black antemedial line; a black bar from middle of costa and point above vein 1; a black fascia in and just beyond end of cell with a white discoidal spot on it; a white sub-terminal line defined on inner side by blackish, excurved below vein 6, then faint; a terminal series of blackish points; cilia white with a brown line through them. Hind wing white faintly tinged with red-brown. Underside of fore wing tinged with red-brown.

♀. Thorax and fore wing strongly suffused with red-brown.

Hab. BR. E. AFRICA, Manda I. (Jackson), 1 ♂, 1 ♀ type. Exp. 22 mm.

(3 d) *Surattha phæomesa*, sp. n.

♀. Head, thorax, and abdomen greyish suffused with brown and some rufous, the abdomen more rufous towards base of dorsum; antennæ fuscous; pectus, legs, and ventral surface of abdomen white tinged with brown. Fore wing greyish suffused with brown and some rufous, the costal area almost entirely white, extending on outer half of medial area to the median nervure and vein 4, the

terminal area white; a diffused black subbasal line, oblique below submedian fold and slightly angled outwards above inner margin; antemedial line formed by diffused black marks below the costa and in and below the cell, then almost obsolete; medial line rather diffused, black, angled outwards at median nervure and vein 1; the outer half of medial area grey suffused with fuscous, white to vein 4; a small black discoidal spot; postmedial line rather diffused, black defined on outer side by rufous, somewhat dentate and slightly angled outwards below submedian fold, forming a small spot at costa; subterminal line strong, rufous with some black at costa, its outer edge slightly dentate, its inner excurved at middle; a maculate black terminal line. Hind wing greyish fuscous. Underside greyish fuscous, the fore wing with the terminal half of costa white with a small black postmedial spot on it.

Ab. 1. Fore wing with a white line beyond the antemedial black marks, the terminal area with the rufous much broader and the white before and beyond it reduced.

Ab. 2. Fore wing with the outer half of medial area dark except at costa.

Hab. "GERM. E. AFRICA," Lulanguru, nr. Tabora (*Carpenter*), 4 ♀ type. *Exp.* 18-20 mm.

(3e) *Surattha diffusilinea*, sp. n.

Head white; thorax and abdomen white tinged with rufous; antennæ of male with the branches black; palpi slightly tinged with rufous; pectus, legs, and ventral surface of abdomen white. Fore wing white faintly tinged with rufous and slightly irrorated with blackish; a diffused oblique black antemedial line, excurved below submedian fold; two similar medial lines, the inner more diffused and indistinct, the outer with a pure white discoidal lunule on its outer edge; a diffused curved black postmedial line and similar but narrower and somewhat dentate subterminal line; a terminal series of slight blackish points; cilia white mixed with some red-brown. Hind wing white faintly tinged with rufous. Underside white tinged with rufous.

Hab. N.S. WALES, Broken Hill (*Lower*), 1 ♂, 1 ♀ type. *Exp.* 20 mm.

(3f) *Surattha albicostalis*, sp. n.

♀. Head and thorax white tinged with rufous; abdomen white; palpi white mixed with rufous and with some blackish at tips; pectus and legs white. Fore wing white suffused with rufous and thickly irrorated with black in the interspaces, the costal area pure white, with a slight rufous tinge towards base; slight subbasal and antemedial marks in the cell and a black streak below vein 1 on antemedial area; an indistinct oblique white medial line from subcostal nervure to inner margin, defined on each side by slight

diffused black marks; black bars before and beyond the discocellulars; postmedial line white, defined on inner side by diffused black except at costa and on outer by fulvous yellow, excurved beyond the cell and incurved at submedian fold; a series of small dentate black spots before termen; cilia white with red-brown lines near base and tips. Hind wing white faintly tinged with red-brown, the cilia pure white with a pale red-brown line near base. Underside white slightly tinged with rufous.

Hab. MADRAS, Horseleykonda (*Campbell*), 1 ♀ type. *Exp.* 28 mm.

(4a) *Surattha endoleuca*, sp. n.

♂. Head and thorax white irrorated with brown; antennæ with the shaft white, the branches black; abdomen red-brown with some white at base and extremity and with white segmental lines except towards base, the ventral surface white irrorated with brown; pectus and femora white; tibiæ and tarsi pale red-brown. Fore wing reddish brown tinged with grey and irrorated with white, the inner area and the termen except towards apex white irrorated with brown; a faint, pale fulvous, almost medial line oblique towards costa, then waved and ending at vein 1, defined on outer side by black irroration below subcostal nervure and on inner side below the cell; a subbasal patch of black irroration above and below vein 1; a small white discoidal spot; subterminal line white towards costa then pale fulvous, ending at vein 1, dentate except towards costa and defined on inner side by black irroration, somewhat excurved at middle, then oblique; a rather maculate black terminal line; cilia white tinged with fulvous, with two slight blackish lines through them and some black scales at tips. Hind wing whitish suffused with reddish brown; a fine dark terminal line; the cilia whiter with traces of two dark lines through them. Underside white tinged with reddish brown especially on fore wing which has the subterminal line white and maculate.

Hab. S. PALESTINE, El Fukhari (*Austen*), 2 ♂ type. *Exp.* 20 mm.

(4b) *Surattha arenalis*, sp. n.

♂. Head, thorax, and abdomen whitish suffused with pale red-brown; antennæ with the shaft white, the branches pale red-brown; pectus, legs, and ventral surface of abdomen white. Fore wing whitish uniformly suffused with pale reddish brown; traces of a sinuous dark line from lower angle of cell to inner margin and of a postmedial line excurved towards costa and inner margin and incurved at vein 2. Hind wing whitish strongly suffused with reddish brown. Underside whitish suffused with reddish brown.

♀. Hind wing paler.

Hab. PUNJAB, Moghal Sarai (*Betton*), 1 ♂, 3 ♀ type. *Exp.*, ♂ 20, ♀ 24-26 mm.

(5 a) *Surattha ochrifasciata*, sp. n.

♂. Head and thorax black irrorated with a few white scales; abdomen whitish suffused with black; pectus and legs white mixed with black. Fore wing black mixed with grey-white, the costal area tinged with red-brown to towards apex with a black streak below its medial part; a reddish-ochreous fascia in submedian interspace to beyond middle with a deep black streak below it on terminal half; another reddish-ochreous fascia in and beyond end of cell. Hind wing whitish tinged with brown; a blackish streak on terminal part of vein 1 and some black scales on termen from apex to submedian fold. Underside of fore wing and costal area of hind wing suffused with reddish brown.

Hab. BR. E. AFRICA, Eb Urru (*Betton*), 1 ♂ type. *Exp.* 28 mm.

Genus CATANCYLA, nov.

Type, *C. brunnea*.

Proboscis fully developed; palpi downcurved, extending about twice the length of head and thickly scaled; maxillary palpi triangularly dilated with scales; frons with pointed conical prominence; antennæ of male bipectinate with rather long branches to apex. Fore wing rather narrow, the apex rounded, the termen evenly curved; vein 2 from towards angle of cell; 3 and 5 from angle, 4 absent; 6 from below upper angle; 7, 8, 9 stalked; 10, 11 from cell, 11 not anastomosing with 12. Hind wing with vein 2 from well before angle of cell; 3 and 5 from angle, 4 absent; 6 obsolescent from below upper angle; 8 approximated to 7, but not anastomosing with it.

In key differs from *Ancylolomia* in the fore wing having vein 4 absent and 11 free.

Catancylla brunnea, sp. n.

♂. Head and thorax bright red-brown; abdomen whitish suffused with red-brown; pectus and legs whitish suffused with red-brown. Fore wing bright red-brown mixed with some whitish and irrorated with blackish, a whitish fascia in submedian fold to end of cell; traces of an oblique postmedial series of blackish points on veins 6 to 1; a red-brown terminal line and line near base of cilia. Hind wing white tinged with red-brown. Underside of fore wing whitish tinged with red-brown.

♀. Fore wing more uniform red-brown without the whitish fascia below the cell, traces of a blackish medial line bent outwards below costa and incurved below submedian fold, the postmedial points more distinct and somewhat clavate, a subterminal series of blackish points on the veins.

Hab. W. AUSTRALIA, Roebourne, 1 ♂, 2 ♀ type. *Exp.*, ♂ 22, ♀ 24 mm.

(1 a) *Ancylolomia castaneata*, sp. n.

♂. Head and thorax glossy black-brown; abdomen rufous with a cupreous gloss; palpi, pectus, legs, and ventral surface of abdomen red-brown suffused with blackish. Fore wing chestnut-brown, the inner half to near termen and a postmedial shade except at costa fuscous brown; a black streak in the cell with some silvery scales above it, two short streaks beyond the cell, and a short streak in submedian fold below end of cell; a slightly sinuous dark subterminal line with some silvery scales on it; a series of black points before termen; cilia with a dark line at base. Hind wing pale reddish brown. Underside greyish tinged with red-brown.

Hab. TRANSVAAL, White R. (*Cooke*), 2 ♂ type. *Exp.* 32 mm.

(1 b) *Ancylolomia melanella*, sp. n.

Head and thorax black-brown; abdomen greyish dorsally tinged with brown. Fore wing black-brown; cupreous fasciæ with streaks of black scales on them in the cell, on the veins for some distance beyond it and in submedian interspace; silvery streaks above median nervure, in the interspaces beyond the cell for some distance and below submedian fold; a whitish terminal band with series of fuscous and black points on it, defined on inner side by silvery and brown lines and angled at vein 3; cilia black with pale tips. Hind wing white, the costal area and terminal area to vein 2 in male, in female the costal area only tinged with brown.

Hab. "GERM. E. AFRICA," Dar-es-Salaam, 1 ♀; NATAL, Maritzburg (*Queckett*), 1 ♂ type. *Exp.* 30 mm.

(1 d) *Ancylolomia perfasciata*, sp. n.

♂. Head and thorax golden cupreous with a black streak on vertex of head and thorax and fascia at sides of tegulæ and patagia, the outer edge of base of patagia white; abdomen white with some fulvous at base of dorsum and forming slight segmental lines; antennæ tinged with black; pectus and legs white, the latter tinged with golden cupreous; ventral surface of abdomen with subventral and ventral cupreous streaks. Fore wing golden cupreous; a blackish fascia through the cell to the subterminal line, rather diffused beyond the cell, and another on basal half of vein 1, then in submedian interspace to the subterminal line; streaks of black scales through the cell, in terminal half of submedian fold and on the veins beyond the cell; silvery streaks above median nervure, above and below terminal half of submedian fold and in the interspaces beyond the cell to the subterminal line, which is double, silvery blackish filled in with orange-yellow, oblique towards apex, then minutely dentate to vein 3 where it is angled outwards, then incurved; a silvery blackish line before termen, arising before apex, slightly waved to below vein 4 where it is interrupted and oblique from below vein 3; cilia silvery fuscous

at base, then silvery white tinged with fuscous at tips. Hind wing glossy white. Underside of fore wing and costal area of hind wing suffused with red-brown except on terminal area.

♀. Fore wing with the black fasciæ much stronger.

Ab. 1. Hind wing suffused with fuscous, the base white.

Hab. ABYSSINIA, Zegi Tsana (*Degen*), 1 ♀; BR. E. AFRICA, Nakura (*Bodeker*), 1 ♂, 1 ♀ type; UGANDA (*Doggett*), 1 ♀; MASHONALAND, Salisbury (*Marshall*), 1 ♂; TRANSVAAL (*Cholmley*), 2 ♂, Johannesburg (*Cregoe*), 1 ♂, Pretoria (*Distant*), 1 ♀; ZULULAND, Lr. Tugela R. (*Reynolds*), 2 ♂, 1 ♀; NATAL, Maritzburg (*Burnup*), 1 ♂; MADAGASCAR, Antananarivo (*Kingdon*), 2 ♀. *Exp.* 32-42 mm.

(1e) *Ancylolomia prepiella*, sp. n.

Head, thorax, and abdomen white; palpi brown at sides; patagia with the upper half brown. Fore wing golden brown with pure white fasciæ on costa to near apex, below the cell to just beyond lower angle, on inner margin, and above vein 5; two silver streaks in cell, one in submedian interspace, and others in the interspaces beyond the cell; series of black scales on the veins, in the cell, and in submedian interspaces; a terminal white band with series of black points on it and defined on inner side by silvery and white lines; cilia silver at tips. Hind wing pure white.

Hab. TRANSVAAL, White R. (*Cook*), 1 ♂, 1 ♀, Modderfontein (*Cruger*), 1 ♀, Johannesburg (*Cregoe*), 1 ♂; NATAL, 1 ♀ type; BASUTOLAND, Masite (*Weigall*), 1 ♂, Pithaneng R. Valley (*Crawshay*), 1 ♂; C. COLONY, Zuurberg (*Bairstow*), 4 ♂. *Exp.* 28-36 mm.

(1f) *Ancylolomia albicostalis*, sp. n.

♀. Head and thorax pale fulvous; abdomen white; antennæ tinged with fuscous, pectus white; legs and ventral surface of abdomen pale fulvous. Fore wing pale golden cupreous, the costal area whitish to near apex with the costal edge fuscous; a white fascia along median nervure to origin of vein 2; silvery streaks above terminal half of median nervure, below terminal half of submedian fold, and in the interspaces beyond the cell to near the subterminal line; streaks of black scales through the cell, on terminal part of median nervure, in terminal half of submedian fold, on medial part of vein 1, and on the veins beyond the cell to the subterminal line, which is double, silvery, slightly waved, and angled outwards at vein 3; the termen creamy white with a black point before it below apex; cilia silvery fuscous at base, then silvery white with some brown at tips. Hind wing glossy white. Underside of fore wing tinged with red-brown except on inner and terminal areas.

Hab. MASHONALAND, Salisbury (*Marshall*), 1 ♀ type. *Exp.* 42 mm.

(4b) *Ancylolomia lentifascialis*, sp. n.

♂. Head, thorax, and abdomen white tinged with brown; antennæ tinged with fuscous; palpi and fore legs fulvous brown. Fore wing whitish irrorated with brown and the costal area tinged with golden cupreous to beyond middle, a brownish shade through the cell; faint silvery streaks above median nervure, along vein 1, and in the interspaces beyond the cell; streaks of black scales through the cells and on the veins just beyond the cell and a patch of black and silver scales in submedian fold below origin of vein 2; subterminal line double, silvery, oblique towards costa, then slightly waved to vein 3 where it is angled outwards; the termen white with a brownish line before it from below apex with a series of slight black points on it; cilia silvery at base, silvery white at tips. Hind wing glossy white. Underside of fore wing and costal area of hind wing suffused with red-brown, the termen whitish.

Hab. TRANSVAAL, Zoutspanberg (*Janse*), 4 ♂ type. *Exp.* 32 mm.

(4c) *Ancylolomia fulvitinctalis*, sp. n.

♀. Head and thorax white tinged with rufous; abdomen white, the base of dorsum tinged with fulvous; pectus white; legs tinged with rufous; abdomen with blackish subventral spots on medial segments. Fore wing white tinged with fulvous and sparsely irrorated with black-brown scales; faint silvery streaks above end of median nervure, above middle of vein 1, and in the interspaces beyond the cell; some black scales tending to form short streaks in end of cell, in the interspaces just beyond the cell, and below base of vein 2; an indistinctly double brownish and silvery subterminal line, oblique towards costa, then slightly waved to vein 3 where it is angled outwards; a series of prominent black points before termen; cilia metallic silvery at base, then silvery white with some brownish at tips. Hind wing glossy white. Underside of fore wing and costal area of hind wing tinged with rufous.

Hab. UGANDA, Gondokoro (*Reymes-Cole*), 1 ♀ type. *Exp.* 36 mm.

(4e) *Ancylolomia melanothoracia*, sp. n.

♀. Head and thorax black; abdomen brownish grey, dorsally fulvous yellow towards base then with whitish segmental lines; fore legs whitish. Fore wing ochreous yellow, the costal area to near apex and the inner area towards base red-brown, the costa darker towards base; slight streaks of silvery scales with some black scales above them below discal and submedian folds to end of cell and in the interspaces of postmedial area; a deep rufous discoidal bar; a lunulate black postmedial spot between veins 6 and 4 with a quadrate patch beyond it on termen, and an oblique

mark below vein 2 with a wedge-shaped patch beyond it on termen. Hind wing glossy fuscous grey, the cilia whiter. Underside fuscous grey, the fore wing with the costa fulvous yellow towards apex.

Hab. "GERM. E. AFRICA," Lulanguru, nr. Tabora (*Carpenter*), 1 ♀ type. *Exp.* 26 mm.

(4f) *Ancylolomia agraphella*, sp. n.

♀. Head, thorax, and abdomen fuscous brown, the last dorsally ochreous towards base. Fore wing pale golden brown irrorated with a few black scales; a black point at upper angle of cell; traces of a subterminal series of specks on the veins; a terminal series of points. Hind wing fuscous.

Hab. ASSAM (*Badgley*), 1 ♀; TIMOR, Oinainissa (*Doherty*), 1 ♀ type. *Exp.* 28-32 mm.

(5a) *Ancylolomia chrysargyria*, sp. n.

Head and thorax rufous with some whitish on vertex of head; abdomen white, the 2nd and 3rd segments dorsally fulvous; pectus, legs, and ventral surface of abdomen white suffused with rufous. Fore wing golden cupreous; a diffused whitish fascia on medial part of costa; a white fascia on and below median nervure to origin of vein 2, then below vein 2 to end of cell; a silvery streak below submedian fold to well beyond middle, a streak below the terminal half of the white fascia and short streaks in the interspaces beyond the cell; streaks formed by black scales in terminal half of cell, on terminal part of median nervure, in submedian fold, and on the basal half of the veins beyond the cell; the terminal area white with a narrow silvery subterminal band to submedian fold, excurved at vein 3, with a fine slightly waved rufous line before it; a series of minute black points before termen to submedian fold, placed on a fine brown line interrupted at vein 3; cilia silvery at base, white at tips. Hind wing glossy white. Underside white, the fore wing and costal area of hind wing tinged with rufous except on terminal area.

Hab. S. NIGERIA, Forcados (*Simpson*), 1 ♂, Lokoja (*Dudgeon*), 1 ♀; N. NIGERIA, Minna (*Macfie*), 6 ♂, 1 ♀ type, Zungeru (*Macfie*), 1 ♀. *Exp.*, ♂ 22, ♀ 26-28 mm.

(5b) *Ancylolomia cræsus*, sp. n.

♂. Head and thorax fulvous; abdomen white, the 2nd and 3rd segments dorsally fulvous; pectus, legs, and ventral surface of abdomen white suffused with red-brown, the fore tibiae and tarsi white in front. Fore wing golden cupreous; a diffused whitish fascia on medial part of costa; a pure white fascia below median nervure to end of cell, silvery streaks on median nervure, below submedian fold, and in the interspaces beyond the cell to well beyond middle; streaks formed by black scales from middle of cell, in

submedian fold, above vein 1, and on the veins beyond the cell to well beyond middle; the terminal area white with a silvery subterminal line to submedian fold, angled outwards at vein 3, a fine rufous line before it; a series of minute black points before termen to submedian fold, placed on a fine brown line interrupted at vein 3; cilia silvery white with a brownish line at base. Hind wing glossy white. Underside white, the fore wing and costal area of hind wing tinged with red-brown except on terminal area.

♀. Fore wing with the medial part of costa only slightly pale, the rufous line before the subterminal line hardly traceable.

Hab. BR. E. AFRICA, Nairobi (*Anderson*), 1 ♂, 4 ♀ type, Kikuyu (*Crawshay*), 2 ♀, Eb Urru (*Betton*), 1 ♂. *Exp.*, ♂ 26-30, ♀ 34-40 mm.

(5 c) *Ancylolomia dives*, sp. n.

♂. Head and thorax rufous; abdomen white tinged with rufous; pectus whitish; legs rufous. Fore wing golden cupreous; a diffused white fascia on medial part of costa; silvery streaks from middle above and below submedian fold and in the interspaces beyond the cell to near the subterminal line; streaks formed by black scales in discal fold from before middle, on terminal parts of subcostal and median nervures, in submedian fold, and on the veins beyond the cell to well beyond middle; a silvery subterminal line to submedian fold with a fine rufous line before it and defined on outer side by a narrow white band, somewhat dentate on costal half and slightly angled outwards at vein 3; the termen pale yellow with a series of minute black points before it to submedian fold placed on a brown line interrupted at vein 3; cilia silvery at base, white at tips. Hind wing glossy white, faintly tinged with red-brown except on inner and terminal areas. Underside of fore wing and costal half of hind wing suffused with red-brown except at termen.

Hab. MADRAS, Belgaum (*Watson*), 3 ♂ type. *Exp.* 24 mm.

(5 e) *Ancylolomia ophiralis*, sp. n.

♂. Head and thorax rufous, the patagia with white stripe at middle and black stripe above, the dorsum of thorax with some black; abdomen white, the 2nd and 3rd segments dorsally fulvous; pectus whitish; legs and ventral surface of abdomen pale rufous. Fore wing golden cupreous, the medial part of costal area suffused with white; silvery streaks above basal half of subcostal nervure, in upper and lower parts of cell, above vein 1, and in the interspaces beyond the cell to near the subterminal line; slight rather diffused streaks formed by black scales through middle of cell, on terminal parts of subcostal and median nervures, in terminal half of submedian fold, and on the veins beyond the cell to near the subterminal line; the terminal area white with a silvery subterminal line with slight rufous line before it, minutely dentate on costal half and

angled outwards at vein 3; a slightly waved brownish line just before termen with some blackish points on it. Hind wing white tinged with reddish brown except on basal area. Underside of fore wing and costal area of hind wing suffused with reddish brown except at termen.

♀. Head and thorax uniform rufous; fore wing with the medial part of costal area only slightly paler, the markings less distinct.

Hab. S. NIGERIA (*Dudgeon*), 1 ♂, 1 ♀ type. *Exp.*, ♂ 32, ♀ 36 mm.

(5f) *Ancylolomia atrifasciata*, sp. n.

Head white with a red-brown streak; thorax ochreous rufous with black stripes at sides of tegulae and upper edge of patagia and dorsum of thorax; abdomen white tinged with brownish ochreous, the 2nd segment dorsally fulvous; antennae and palpi fulvous, the latter with some black scales at tips; pectus, legs, and ventral surface of abdomen white suffused with rufous. Fore wing reddish ochreous with a golden gloss, the costal edge white towards base and the medial part of costal area suffused with whitish, a white fascia below the cell to near extremity; silvery streaks below subcostal and above median nervure and streaks in the interspaces beyond the cell to near the subterminal line; a streak formed by black scales through middle of cell; a diffused black fascia on and above vein 1 to below origin of vein 2 and a short fascia below vein 2 below end of cell; a double pale red-brown subterminal line filled in with white, oblique towards apex, then minutely dentate to vein 3 where it is angled outwards; a series of black points before termen placed on a slight brownish line; cilia silvery white with a dark line at base. Hind wing white, tinged with red-brown except on basal and inner areas. Underside of fore wing and costal area of hind wing suffused with reddish brown.

Ab. 1. ♀. Fore wing with black fascia in the cell and the fasciae on vein 1 and below vein 2 stronger.

Hab. BR. E. AFRICA, Nakutu (*Bodeker*), 2 ♂, 3 ♀ type. *Exp.*, ♂ 30, ♀ 40 mm.

(9a) *Ancylolomia irrorata*, sp. n.

♂. Head and thorax whitish tinged with rufous and slightly irrorated with red-brown; abdomen white, dorsally tinged with rufous towards base; antennae with the branches brownish; pectus, legs, and ventral surface of abdomen whitish suffused with rufous. Fore wing white largely tinged with rufous and irrorated with brown, the costal area with a golden gloss; traces of a dark streak in the cell; a slight fuscous discoidal point, point below origin of vein 2 and slight bar below end of cell; a series of black points just before termen. Hind wing glossy white with a series of slight dark terminal points to submedian fold. Underside of fore wing and costal area of hind wing suffused with rufous.

Hab. S. NIGERIA, Lagos (*Boag*), 2 ♂ type. *Exp.* 22 mm.

(9 h) *Ancylolomia holochrea*, sp. n.

♂. Head and thorax ochreous; abdomen, pectus, and legs ochreous white. Fore wing ochreous, the costal area tinged with rufous, the rest of wing irrorated with red-brown, less strongly below the cell on basal half; a terminal series of black points. Hind wing nearly pure white.

Hab. S. NIGERIA, Warri (*Roth, Claydon*), 1 ♂ type; N. NIGERIA, Zunguru (*Simpson*), 1 ♂. *Exp.* 22-24 mm.

Genus PROSMIXIS.

	Type.
<i>Talis</i> , Guen. Eur. Micr. Ind. Meth. p. 86 (1845), non descr.	<i>quercella</i> .
<i>Prosmixis</i> , Zell. Linn. Ent. i. p. 270 (1846)	<i>quercella</i> .
<i>Hednota</i> , Meyr. Trans. Ent. Soc. 1886, p. 270	<i>bifractella</i> .
<i>Araxates</i> , Rag. Ann. Soc. Ent. Fr. (6) viii. p. 281 (1888)	<i>pulcherrima</i> .

(7 a) *Prosmixis radialis*, sp. n.

♂. Head and thorax whitish tinged with ochreous yellow, the tegulae at sides and patagia ochreous yellow; abdomen silvery white tinged with ochreous; pectus white; legs ochreous yellow. Fore wing ochreous yellow; a silvery white streak below costa from base to near apex; a silvery white streak on median nervure and streaks on veins 5, 3, 2 defined above and below by some black-brown scales; a silvery white line before termen from apex to vein 3; cilia silvery white with a pale fulvous line near base. Hind wing silvery white tinged with ochreous yellow, the cilia white with a pale fulvous line near base. Underside tinged with ochreous yellow, the costa more strongly.

Hab. W. AUSTRALIA, Waroona (*Berthoud*), 1 ♂ type. *Exp.* 30 mm.

(22 c) *Prosmixis discilunalis*, sp. n.

♂. Head white, the antennae tinged with red-brown, the palpi tinged with red-brown and irrorated with black, white above; thorax red-brown mixed with white; abdomen white tinged with red-brown; pectus and legs white tinged with red-brown. Fore wing white suffused with red-brown and irrorated with a few black scales especially in basal half of submedian fold, the inner and terminal areas white; traces of a sinuous whitish medial line from subcostal nervure to inner margin; a minute white discoidal lunule defined by some black scales; postmedial line double, brown filled in with white, excurved below costal, then oblique, some darker brown beyond it on costa; the termen red-brown with slight blackish points at the interspaces; cilia with a fine brown line near base. Hind wing white slightly tinged with red-brown, the termen deeper red-brown; cilia white with a pale red-brown line near base. Underside of fore wing and costal area of hind wing suffused with red-brown, the terminal area of fore wing whitish except towards tornus.

Hab. VICTORIA, Melbourne (*Anderson*), 1 ♂ type. *Exp.* 22 mm.

(22 d) *Prosmixis plumbealis*, sp. n.

♂. Head rufous, the antennæ dark brown, the palpi red-brown; thorax glossy red-brown; abdomen whitish suffused with red-brown; pectus and legs rufous. Fore wing whitish suffused with blackish brown with a silvery leaden gloss and irrorated with black scales; an indistinct diffused oblique white antemedial line; a narrow white waved medial band defined on outer side by rufous followed by some blackish, a small black spot on its inner side at middle of cell and a small discoidal spot on its outer edge; a narrow white subterminal band with slightly waved edges, defined on inner side by rufous with some black scales before it except towards inner margin, slight marks formed by black scales on its outer edge at costa and below vein 6 with a rufous subapical patch between them, the band slightly incurved below costa and excurved below vein 6; the termen white with some black points towards apex and points below veins 4 and 2. Hind wing white tinged with brown and with indistinct narrow white band before termen. Underside white tinged with brown, the apical area of fore wing whiter.

Hab. MASHONALAND (*Dobbie*), 1 ♂ type. *Exp.* 20 mm.

(22 e) *Prosmixis albimaculalis*, sp. n.

♀. Head and thorax rufous mixed with some white; abdomen white suffused with rufous except at base of dorsum; antennæ blackish ringed with white; palpi brownish tinged with fuscous; pectus and legs white tinged with brown. Fore wing whitish suffused with pale red-brown and sparsely irrorated with dark brown; a diffused white fascia in basal part of submedian fold; rather ill-defined spots in middle of cell and beyond its extremity with a rufous patch between them and short black streak beyond them; ill-defined white spots in submedian interspace below middle and end of cell with a rufous patch between them; postmedial line white, excurved beyond the cell, then sinuous; a terminal series of black points; cilia silvery white with a brown line near base and the tips tinged with brown. Hind wing white slightly tinged with brown, the cilia pure white. Underside of fore wing and costal area of hind wing tinged with red-brown.

Hab. TRANSVAAL, Enkeld (*Janse*), 1 ♀ type. *Exp.* 24 mm.

(23 d) *Prosmixis flavipars*, sp. n.

♂. Head and thorax black-brown, the outer part of patagia red-brown; abdomen whitish mixed with brown; antennæ black; pectus, legs, and ventral surface of abdomen white mixed with red-brown. Fore wing red-brown mixed with some blackish, the costal area, the cell and area below it to just above vein 1 ochreous yellow with some rufous irroration at costa; a series of slight black marks in the interspaces just before termen; cilia dark brown mixed with

white. Hind wing white suffused with brown. Underside white suffused with red-brown.

Hab. MASHONALAND, Salisbury (*Marshall*), 2 ♂ type. *Exp.* 26-28 mm.

(23 e) *Prosmixis albofascialis*, sp. n.

♂. Head and thorax whitish suffused with red-brown; abdomen white tinged with red-brown, the 2nd segment with a dorsal rufous band; antennæ black; pectus and legs white tinged with red-brown. Fore wing whitish suffused with red-brown; a creamy white fascia in submedian interspace to below end of cell with a rufous streak below it on medial area; some white in terminal half of cell with some rufous scales on it at middle of cell and a rufous discoidal bar; an indistinct whitish postmedial line, strongly excurred from costa to vein 3, then incurved and with a rufous mark before it below vein 2; some slight dark points on termen. Hind wing white tinged with red-brown; the inner half of hind wing whiter.

Hab. TRANSVAAL, Piet Reteif (*Crawshay*), 1 ♂ type. *Exp.* 30 mm.

(26 a) *Prosmixis molybdella*, sp. n.

Head, thorax, and abdomen yellowish white suffused with pale reddish brown; head above and 1st segment of abdomen whiter. Fore wing ochreous white, the basal area with obscure fuscous streaks in and below the cell and a dark brown streak above vein 1; a medial brown line produced to very long points on costa, in and below the cell and to a shorter point on vein 1, the area beyond it suffused with leaden grey except towards costa and with some white in submedian fold; a double brown subterminal line filled in with ochreous, strongly dentate inwards below costa then with dentitions which increase in length to vein 2; the terminal area with some white scales; slight brown points on a fine terminal ochreous line. Hind wing yellowish white with a fuscous tinge; cilia pure white.

Hab. ORANGE R. COLONY, Bloemfontein (*Eckersley*), 2 ♂, Kronstadt (*Eckersley*), 3 ♂; CAPE COLONY, Annshaw (*Miss F. Barrett*), 1 ♂ type, Grahamstown, 1 ♀. *Exp.* 26-30 mm.

(26 b) *Prosmixis albiceps*, sp. n.

♀. Head white with a few pale brown scales; thorax and abdomen brown mixed with whitish; antennæ tinged with brown; pectus, legs, and ventral surface of abdomen white tinged with brown. Fore wing reddish brown mixed with grey-white; blackish subbasal streaks above and below vein 1; a dentate black medial line strongly angled outwards at discal and submedian folds and defined on inner side by white except towards costa; subterminal line white defined on each side by blackish, dentate, angled inwards at discal fold and above and below vein 3; a slightly waved dark brown terminal line; cilia white with dark lines near base and

tips. Hind wing white tinged with brown; cilia white slightly tinged with brown at tips. Underside white suffused with brown except on apical area of fore wing.

Hab. CAPE COLONY, Capetown, Table M. (*Meade-Waldo*), 1 ♀ type. *Exp.* 30 mm.

(26 c) *Prosmixis argentescens*, sp. n.

Head and thorax bright red-brown mixed with some whitish; abdomen white tinged with red-brown, the 2nd segment with some fulvous on dorsum; antennæ black ringed with white; palpi white at base and with some black at tips; pectus, legs, and ventral surface of abdomen white tinged with red-brown. Fore wing bright red-brown mixed with some silvery whitish and slightly irrorated with black scales except on costal and terminal areas; a faint blackish streak in end of cell and obscure red-brown discoidal spot defined by whitish; the veins beyond the cell with slight blackish streaks; a faint whitish subterminal line excurved above and below middle; a series of black points before termen from below costa to vein 2; cilia silvery white tinged with red-brown. Hind wing white tinged with red-brown; cilia white with a pale red-brown line near base. Underside white tinged with red-brown.

Hab. TRANSVAAL, Lydenburg, 1 ♂; CAPE COLONY, Deelfontein (*Hoggett*), 1 ♀ type, Annshaw (*Miss F. Barrett*), 1 ♀. *Exp.* 28-32 mm.

(26 d) *Prosmixis albescens*, sp. n.

♀. Head and thorax white mixed with red-brown, the head whiter; abdomen white tinged with red-brown; palpi suffused with black except towards base; pectus, legs, and ventral surface of abdomen white irrorated with red-brown. Fore wing white more or less strongly mixed with red-brown and irrorated with black, the costal area whiter; a small rather diffused black discoidal spot; postmedial line indistinct, white defined on outer side by blackish, angled outwards to near termen at vein 6, then oblique to below vein 3, then bent inwards to vein 1 before middle and incurved to inner margin. Hind wing white slightly tinged with red-brown, the cilia almost pure white. Underside of fore wing white suffused with red-brown, the terminal area whiter.

Hab. BR. E. AFRICA, Nairobi (*Crawshay, Anderson*), 2 ♀ type. *Exp.* 34 mm.

Genus CONOTALIS, nov.

Type, *C. aurantifascia*.

Proboscis nearly fully developed; palpi downcurved, extending about the length of head and thickly scaled; maxillary palpi strongly dilated with scales; frons with rounded prominence; antennæ of male typically strongly laminate. Fore wing with the

apex rounded, the termen evenly curved; veins 3 and 5 from near angle of cell; 6 from below upper angle; 7 from angle; 8, 9 stalked; 10, 11 from cell, 11 usually anastomosing with 12. Hind wing with vein 3 from close to angle of cell; 4, 5 from angle; 6 obsolescent from well below upper angle; 8 slightly anastomosing with 7.

In key differs from *Prosmixis* in the frons having a rounded prominence.

SECT. I. Antennæ of male with rather long uniseriate branches, the apex ciliated.

(1) *Conotalis nigrisquamalis*, sp. n.

Head and thorax yellowish white tinged with rufous; abdomen yellowish white. Fore wing yellowish white with golden streaks in the interspaces irrorated with large black scales; an almost straight erect bright orange line just before middle; cilia golden. Hind wing white tinged with brown.

Hab. TRANSVAAL (*Ross, Janse*), 1 ♂, 1 ♀, Lydenburg, 1 ♂; NATAL, 2 ♂; CAPE COLONY, Annshaw (*Miss F. Barrett*), 1 ♂ type. *Exp.* 24–30 mm.

SECT. II. Antennæ of male laminate.

(2) *Conotalis aurantifascia*.

Charltona aurantifascia, Hmpsn. P. Z. S. 1895, p. 970.

GAMBIA; SIERRA LEONE; GOLD COAST; S. & N. NIGERIA.

(3) *Conotalis nigroradians*.

Crambus nigroradians, Mab. Ann. Soc. Ent. Fr. 1899, p. 479.

CONGO; "GERM. E. AFRICA"; BR. C. AFRICA.

Genus DIPLOPTALIS, nov.

Type, *D. metallescens*.

Proboscis aborted and slight; palpi downcurved, extending about the length of the head and thickly scaled; maxillary palpi strongly dilated with scales at extremity; frons smooth and rounded; antennæ of female ciliated. Fore wing with the apex rounded; veins 3 and 5 from near angle of cell; 6 from below upper angle; 7 from angle; 8, 9 stalked; 10, 11 from cell, 11 anastomosing with 12. Hind wing with vein 3 from just before angle of cell; 4, 5 from angle; 6 obsolescent from below upper angle; 8 anastomosing slightly with 7.

In key differs from *Charltona* in the fore wing having the apex rounded, vein 11 anastomosing with 12.

Diploptalis metallescens, sp. n.

♀. Head and thorax golden brown with a silvery gloss; abdomen white; pectus and legs white, the latter tinged with golden brown. Fore wing metallic golden brown largely glossed with greenish silver in the interspaces; a white fascia on costa, narrowing to base and apex; a white fascia in submedian fold to below end of cell and a white fascia in discal fold beyond the cell, expanding to termen; a slightly incurved golden line at end of cell, arising just below costa; an ocellate postmedial mark between veins 4 and 2 with two black pupils defined by chrome-yellow streaks which are connected on inner side; cilia silvery white with a golden tinge. Hind wing glossy white, the cilia silvery. Underside white, the fore wing with the cell and area just beyond its upper extremity tinged with red-brown.

Hab. N. NIGERIA, Ilorin (*Macfie*), 1 ♀ type, Minna (*Macfie*), 1 ♀. *Exp.* 30 mm.

Genus CÆNOTALIS, nov.

Type, *C. distictalis*.

Proboscis aborted and small; palpi downcurved, extending about three times length of head and thickly scaled; maxillary palpi strongly dilated with scales at extremity; frons rounded, with tuft of scales above; antennæ of male laminate. Fore wing with the apex produced and acute, the termen oblique; vein 3 from well before angle of cell; 5 from above angle; 6 from below upper angle; 7 from angle; 8, 9, 10 stalked; 11 anastomosing with 12. Hind wing with vein 3 from well before angle of cell; 4, 5 stalked; 6 obsolescent from below upper angle; 8 anastomosing with 7.

In key differs from *Gadira* in the fore wing having vein 10 stalked with 8, 9, and 11 anastomosing with 12.

Cænotalis distictalis, sp. n.

Head, thorax, and abdomen white tinged with rufous; palpi white, irrorated with black-brown. Fore wing white tinged with rufous and irrorated with dark brown; two obliquely placed black discoidal points; an indistinct oblique brownish line from costa before apex to vein 2 just beyond the cell; a fine black terminal line; cilia with a fine dark line at middle. Hind wing glossy white faintly tinged with ochreous. Underside white tinged with rufous, the fore wing and costal area of hind wing more strongly.

Hab. N. NIGERIA, Borgu, Yelwa L. (*Migeod*), 1 ♂, 1 ♀ type. *Exp.*, ♂ 22, ♀ 24 mm.

Genus PRIONOTALIS, nov.

Type, *P. peracutella*.

Proboscis small; palpi downcurved, about three times length of head and fringed with hair below; maxillary palpi strongly dilated with scales; frons smooth and without tuft of hair; antennæ of

female almost simple. Fore wing very long and narrow, the costa arched, the apex produced to an acute point, the termen very oblique; the cell long; vein 3 from well before angle of cell; 4, 5 from angle; 6 from well below upper angle; 7 from just below the angle; 8, 9 stalked; 10, 11 from cell, 11 anastomosing with 12. Hind wing with the cell long; vein 3 from well before angle of cell; 4, 5 from angle; 6 from below upper angle; 7 slightly anastomosing with 8.

In key differs from *Charltona* in the fore wing having the apex produced and acute, vein 11 anastomosing with 12.

Prionotalis peracutella, sp. n.

♀. Head and thorax whitish tinged with pale pink; abdomen white faintly tinged with red-brown; pectus, legs, and ventral surface of abdomen white faintly tinged with red-brown. Fore wing whitish suffused with pale pink, the terminal half of costa deeper pink; a small dark brown spot below the cell near base, slight antemedial marks formed by dark scales below costa and cell, a similar medial bar below costa, spots below the cell and above vein 1, and spots in and beyond upper angle of cell; a double curved postmedial series of slight dark spots on the veins; a terminal series of black points; cilia dark brown mixed with some whitish. Hind wing silvery white; the underside with the costal area slightly tinged with ochreous.

Hab. GOLD COAST, Sekondi, 1 ♀; N. NIGERIA, Zungeru (*Simpson*), 1 ♀ type; BR. C. AFRICA, Zomba (*Rendall*). *Exp.* 36 mm.

(6 a) *Charltona rufalis*, sp. n.

♂. Head and thorax whitish suffused with rufous; abdomen golden brown; palpi and legs golden brown, the fore legs darker. Fore wing brownish rufous mixed with whitish; a white streak in base of cell continued along median nervure and on bases of veins 4, 3, defined by a dark brown streak below basal half of cell and a dark streak above from middle of cell; an ill-defined white spot at upper angle of cell and some diffused white above inner margin before middle; short blackish streaks in the interspaces at termen; cilia with some whitish mixed. Hind wing dark glossy reddish brown, the cilia paler with a fine whitish line at base. Underside uniform dark glossy reddish brown.

♀. Abdomen with the anal tuft fulvous yellow; fore wing paler rufous irrorated with elongate dark brown scales.

Hab. MADRAS, Nilgiris, Ouchterlony Valley (*Andrewes*), 2 ♂, 3 ♀ type; TRAVANCORE, Trivandrum (*Fergusson*), 1 ♀. *Exp.*, ♂ 40, ♀ 54 mm.

(7 a) *Charltona endothermalis*, sp. n.

♀. Head and thorax pale ochreous white mixed with red-brown; abdomen pale ochreous tinged with red-brown except at base; palpi red-brown except above; legs suffused with red-brown. Fore wing ochreous white, the costal area slightly tinged with red-brown, the

inner area suffused with red-brown, sparsely irrorated with dark brown scales, some of the scales forming a slight diffused obliquely curved shade from discal fold beyond the cell to below middle of cell; a terminal series of black points from apex to submedian fold. Hind wing creamy white suffused with reddish brown except at base and inner margin; a slight brown terminal line to submedian fold; cilia creamy white. Underside creamy white tinged with red-brown, the fore wing with obscure white discoidal bar.

Hab. MADRAS, Belgaum (*Watson*), 1 ♀ type. *Exp.* 44 mm.

(8 a) *Charltona interstitialis*, sp. n.

♀. Head golden yellow, the antennæ black; thorax ochreous white with dorsal black streak and oblique streak across base of patagia; abdomen pale yellow, tinged with brown except at base; legs suffused with blackish. Fore wing ochreous white; a black streak on costa; a black fascia in discal fold from before middle of cell to termen, interrupted by a pale discoidal bar; a black fascia in submedian fold from base to below end of cell; a black fascia on inner margin from before middle to tornus; a subapical black spot on termen; the terminal area with black fasciæ in the interspaces from below vein 7 to above 2, the fascia below vein 5 short and the one below 3 extending to below end of cell; a small black spot at submedian fold on termen. Hind wing yellowish white suffused with reddish brown, the base, inner area, and a streak above median nervure paler; a terminal series of blackish points to submedian fold; cilia pale. Underside yellowish white tinged with reddish brown.

Hab. N. NIGERIA, Zungeru (*Macfie*), 1 ♀ type, Ilorin (*Lugard*), 1 ♀. *Exp.* 42 mm.

[To be continued.]

XXII.—*Two new Rodents from Tartagal, Salta, N. Argentina.* By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

BEFORE obtaining the series from Abrapampa and Casabindo, of which an account is given above, Sr. Budin tried collecting at Tartagal, in the comparatively lowland part of the Province of Salta. Conditions, however, were not very suitable for the work, while a plague of ants rendered trapping almost nugatory. Examples of the following species were however obtained, among them being a new tuco-tuco with the highly exceptional habit of living in thick forest instead of open country:—

1. *Hesperomys venustus*, Thos.

♀. 401. Tartagal, 600 m.
"Caught in woods."—*E. B.*

2. *Akodon tartareus*, sp. n.

♂. 399.

"Caught in a ravine on river-bank. Toes eaten by ants."—

E. B.

A large vole-mouse of the *varius* group.

Size very large, larger than in any of the genus except the Brazilian *A. arviculoides* and its allies. Fur long, soft, and fine, hairs of back 12–13 mm. in length. General colour above greyish buffy or clay-colour becoming more intense posteriorly, the rump more ochraceous tawny. Under surface slaty washed with pale pinkish cinnamon, not whitish as it is in *varius*. Chin with a white patch, as in other members of this group, but it is not very conspicuous. Hands and feet buffy whitish. Tail long, finely scaled, dark brown above, dull buffy whitish below.

Skull larger than in *A. varius*. Nasals long, much projected behind. Supraorbital edges sharply angular, though not beaded. Interparietal rather broad antero-posteriorly, short transversely. Palatal foramina reaching to the level of the front of the middle lamina of m^1 . Incisive angle 73° .

Dimensions of the type:—

Head and body 134 mm.; tail 94; hind foot 25; ear 19.

Skull: greatest length 31.5 mm.; condylo-incisive length 29.2; zygomatic breadth 16.6; nasals 12; interorbital breadth 5.2; breadth of brain-case 13.5; palatilar length 13.5; palatine foramina 7.2; upper molar series (worn) 4.6.

Hab. as above.

Type. Adult male. B.M. no. 19. 7. 25. 2. Original number 399. Collected 30th November, 1918.

This fine *Akodon* may be distinguished from *A. varius*, its nearest ally, by its larger size and by the buffy or cinnamon wash on its under surface.

3. *Ctenomys sylvanus*, sp. n.

♂. 395; ♀. 396, 397, 398, 400, 402, 403.

"In sparse colonies in the woods on vegetable soil."—

E. B.

A very dark-coloured species allied to *C. budini*.

General colour above dull bistre-brown, very variable according to the extent to which the slaty bases of the hairs are hidden by their cinnamon-brown subterminal rings. In addition, partly or wholly plumbeous specimens are in the majority; indeed, only one example, no. 397, is wholly free from plumbeism, the type having a median blackish area on the back. Under surface dark slaty washed with brownish

cinnamon. Muzzle darker brown, but not definitely blackened. Area round ears dark slaty. Hands thinly haired, whitish; feet almost naked, the few fine hairs white. Tail practically naked, its minute hairs brownish white.

Skull not distinguishable by any definite character from that of *C. budini*. A separate bone present at the front of the parietal in the only specimen in which this part has not been broken. Interparietal distinct, but small. Palate ending opposite the front edge of m^2 . Bullæ about as in *budini*.

Teeth as in *budini*, though the incisors may be slightly more opisthodont (angle, 100° - 103°).

Dimensions of the type:—

Head and body 200 mm.; tail 73; hind foot 34; ear 8.

Skull: upper median length 44.5 * mm.; condylo-incisive length 45 *; gnathion to back of bulla 46.5 *; zygomatic breadth 27; nasals 16×8.2 ; interorbital breadth 10.5; palatilar length 20; upper tooth-series (crowns) 10.3; greatest diameter of p^1 4.2.

Hab. as above.

Type. Adult female. B.M. no. 19. 7. 25. 4. Original number 396. Collected 20th November, 1918.

The remarkable note made by Sr. Budin on the labels that this species is found in thick forest is confirmed by the following extract from one of his letters (translation):—"In spite of having been ill I have secured some specimens of Tuco-tuco which certainly will interest you very much, and I believe are new. They are in general of a dark plumbeous colour, and the largest measures 200 mm. in length. I have been surprised to find these animals in the thickest woods, as I believed that Tuco-tucos only inhabited open country. They are very rare, besides being exceedingly shy and difficult to trap, and it has given me great trouble to get this small series."

In spite of this great difference in habits, which is as great a surprise to me as it was to Sr. Budin, there is unexpectedly little essential difference between *C. sylvanus* and *C. budini*, the different colour and the more naked feet and tail being practically the only distinguishing points, the skulls being almost precisely similar. But as not one of the seven skulls has escaped damage in the trapping, more perfect skulls may in the future indicate some cranial difference not now perceptible.

* These measurements were taken before the skull was separated for cleaning, it having been broken in half by the trap.

Periodicals published by TAYLOR & FRANCIS.

Published the First Day of every Month.—2s. 6d.

THE

LONDON, EDINBURGH, and DUBLIN

PHILOSOPHICAL MAGAZINE

AND

JOURNAL OF SCIENCE.

Conducted by

SIR OLIVER JOSEPH LODGE, D.Sc., LL.D., F.R.S.,
SIR JOSEPH JOHN THOMSON, O.M., M.A., Sc.D., F.R.S.,
JOHN JOLY, M.A., D.Sc., F.R.S., F.G.S., and
WILLIAM FRANCIS, F.L.S.

Published the First Day of every Month.—2s. 6d.

THE

ANNALS AND MAGAZINE OF NATURAL HISTORY, including Zoology, Botany, and Geology.

Conducted by

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S., and
RICHARD T. FRANCIS, F.Z.S.

*Founded in 1877. Monthly, 1s. Annual Subscription
(‘Companion’ and 12 Monthly Numbers), 13s.*

THE OBSERVATORY, A MONTHLY REVIEW OF ASTRONOMY.

Edited by

A. S. EDDINGTON, M.A., M.Sc., F.R.S.,
F. J. M. STRATTON, M.A., and
H. S. JONES, M.A., B.Sc.

Its Contributors include most of the leading English-speaking Astronomers,
and its Articles give an interesting reflection of the progress of astronomical
thought and achievement.

*Published Monthly. Price 1s. 8d. Annual Subscription,
16s. post free.*

THE

JOURNAL OF BOTANY. BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, K.S.G., F.L.S.,

LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM.

Articles by prominent Botanists; Announcements of Discoveries; Reviews;
Botanical News and Notes, &c., &c.

Red Lion Court, Fleet Street, London.

CONTENTS OF NUMBER 21.—*Ninth Series.*

	Page
XV. Notes on <i>Platypodidae</i> and <i>Scolytidae</i> collected by Mr. G. E. Bryant and others. By Lt.-Col. WINN SAMPSON, F.E.S.	105
XVI. On a curious Malformation in <i>Taenia saginata</i> . By H. A. BAYLIS, M.A.	114
XVII. Indo-Malayan and Australian <i>Noctuidae</i> . By Colonel C. SWINHOE, M.A., F.L.S., &c.	118
XVIII. A new Species of <i>Euneomys</i> from Patagonia. By OLD-FIELD THOMAS	127
XIX. List of Mammals from the Highlands of Jujuy, North Argentina, collected by Sr. E. Budin. By OLDFIELD THOMAS	128
XX. Two apparently undescribed Species of <i>Cicadidae</i> from Tropical Africa. By W. L. DISTANT	136
XXI. Descriptions of new <i>Pyralidae</i> of the Subfamilies <i>Crambinae</i> and <i>Siginae</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c. ..	137
XXII. Two new Rodents from Tartagal, Salta, N. Argentina. By OLDFIELD THOMAS	154

*** It is requested that all Communications for this Work may be addressed, post-paid, to the Care of Messrs. Taylor and Francis, Printing Office, Red Lion Court, Fleet Street, London.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



CONDUCTED BY

WILLIAM CARRUTHERS, PH.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,
AND
RICHARD T. FRANCIS, F.Z.S.

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

WITH FIVE PLATES.

LONDON:
TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Baillière, Paris: and Hodges, Figgis, & Co., Dublin.

Double Number. Price Five Shillings.

WATKINS & DONCASTER,

Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

G. A. BENTALL, F.Z.S.

CABINETS,
STORE BOXES,
SETTING BOARDS,
TRAVELLING
CASES,
NETS,
PINS, ETC.

Naturalist,
DUDLEY HOUSE,
SOUTHAMPTON STREET
(Opposite Hotel Cecil),
STRAND, LONDON,
W.C. 2.

BRITISH,
CONTINENTAL,
AND EXOTIC
LEPIDOPTERA,
COLEOPTERA,
BIRDS' EGGS
AND SKINS,
BOOKS, ETC.

Price Lists post free on request.

SCIENTIFIC BOOKS AND SERIALS.

JOHN WHELDON & CO. have the largest stock in the country of Books in all Departments of Science and Natural History, also Transactions and Journals of Learned Societies, etc., in sets, runs, and single volumes or numbers.

Libraries or small parcels purchased.

SPECIAL CATALOGUES: Entomological, Ornithological, Zoological, Geological, War Economy (Agriculture, Husbandry, Gardening, Economic Botany, etc.), Botanical (General and Geographical), etc., 2d. each, post free.

38 GREAT QUEEN STREET, KINGSWAY, LONDON, W.C. 2.

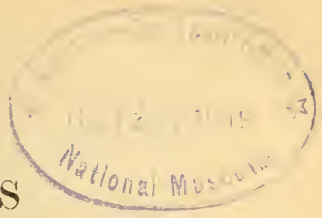
Telephone: Gerrard 1412.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	} All Net.
HALF-PAGE - - -	1 2 6	1 0 0 ,,	17 6 ,,	
QUARTER-PAGE -	12 6	11 3 ,,	10 0 ,,	

All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdharst Road, Croydon.



THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 22. OCTOBER 1919.

XXIII.—*Notes on the African and Asiatic Species of Melyris, Fab. (sensu lato), with an Account of their Sexual Characters.* By G. C. CHAMPION, F.Z.S.

THIS paper is based upon a study of the African and Asiatic species of *Melyris*, *Zygia*, and *Pseudozygia* belonging to the British Museum, the Hope Collection at Oxford, the Genoa Museum, and the Congo Museum at Tervueren, Belgium. The collections together possess upwards of 1000 specimens of these insects, representing not less than 80 species, 36 of which are here described as new. *Melyris*, in the wide sense, extends over the whole of Africa, and is abundantly represented in the vicinity of the Great Lakes, the British Museum collection being particularly rich in material from these places. Numerous peculiar forms, too, inhabit Somaliland, Abyssinia, and the Cape Region. Eastward, in Arabia, Mesopotamia, and Syria, and northward, in Algeria, Tunis, and the Mediterranean Region, there are also a certain number of representatives. The small northern forms allied to *M. granulata*, F., are excluded from the present enumeration, the available material adding nothing to the account of them given by Schilsky in 1897. The types of three species only were to be found in the British Museum—*M. nigra*, F., and *M. monticola* and *insularis*, Gahan; but amongst the extensive material kindly lent me by Dr. Gestro and M. Schouteden, there are many types or co-types of Reiche, Harold, Gorham, and Pic, so that a certain number of the species of these authors could be identified with certainty. The type

of *M. nigra*, F., in the Banks collection at the British Museum, is a South-African insect, which has been wrongly identified by modern writers, mainly owing to Fabricius subsequently referring another species (from Tangier) to it. Amongst the large number of forms here enumerated*, no fewer than 18 are represented by females only in the material before me, the males being as a rule very much rarer: of one species, *M. incompleta*, Fairm., upwards of 50 examples have been examined, all females. The genera *Melyris*, type *M. viridis*, F., from S. Africa, *Zygia*, type *Z. oblonga*, F., from Syria, and *Pseudozygia*, type *P. rubricollis*, Pic, are treated as synonymous, no character of sufficient value having been detected by which to separate them. *Melyris*, it is true, has a peculiarly formed ædeagus and long, loosely articulated antennæ in ♂, and, if restricted to the forms possessing these characters, it would include two species only, both S. African. In that case the remainder, excluding those with a non-carinate prothorax, would have to be placed under *Zygia*, an arrangement followed by both Pic and Schilsky. *Pseudozygia* is based upon Somaliland forms with a very convex, red, non-carinate prothorax. *M. granulata*, F., and its allies, included by Schilsky under *Melyris*, require a distinctive subgeneric or group name, and *Melyridella* is here used for these insects, three of which are described in the present paper. The American forms, all of small size, placed under *Melyris* by Leconte, have unarmed tarsal claws, non-costate elytra, &c., and they, again, require a separate generic name. The tarsal claws (described as simple by Lacordaire †) are toothed in all the Old World forms, the tooth varying in length and position according to the species, but no use can be made of this character in grouping the very numerous members of the genus. The sexes are easily distinguished by the form of the terminal ventral segments of the abdomen, which are described by Baudi and Schilsky. In addition five Arabian or East-African species (including *M. klugi*, Baudi) have the basal or second joint of the intermediate, or the basal joint of the posterior, tarsi produced into a spur or lobe in the males. The ♂ genital armature has been examined in a number of forms, but no very important differences have been detected in the general

* *M. marginicollis*, Ancy (♀ = *collaris*, Fairm.), *olivacea*, Guér., *sieboldi*, Gredl., *semihirta*, *incostata*, *testaceipes*, Fairm., *limbata*, Péring., *rubripes*, Luc., *sinaita*, *obscuritarsis*, *rubrolimbata*, *atriceps*, *femoralis*, and *taborensis*, Pic, *reitteri*, Heyd., and *longicollis*, Schilsky, have not been found or identified in the collections studied.

† Gen. Coléopt. iv. p. 407 (1857).

structure, except that the median lobe of the ædeagus of the S. African *M. viridis* and *lavicornis* is strongly toothed towards the tip, the tooth being altogether absent in all the other species dissected by myself. The females have the fifth ventral segment truncate at the apex, and the sixth so deeply sulcate down the middle as to appear cleft, this terminal segment (and the corresponding dorsal one) being almost invariably infusate or black, even when the abdomen is testaceous. The males have the fifth ventral segment more or less hollowed or emarginate at the apex, the sixth smoother, notched at the tip, and usually hollowed or foveate on each side of the somewhat convex median portion, the sixth sometimes rufescent when the rest of the ventral surface of the abdomen is metallic or black. In some species the abdomen differs in colour in the two sexes, the base, apex, or median portion being infusate in ♀, when the rest of the ventral surface is wholly testaceous in ♂. The colour of the metasternum (pectus) and legs has been used by various authors as a distinctive specific character in the present genus, and on the whole it seems to be fairly reliable.

In arranging the African *Melyris* it has been found convenient to group them under various geographical areas, notwithstanding the fact that some of the species of wider distribution are not confined to the areas in question, there being a mixture of Eastern and Western forms in Uganda, Northern Rhodesia, and the Congo Region.

According to the notes attached to various specimens captured by Dr. G. H. D. Carpenter, H. C. Dollman, and other collectors, these insects are mainly found upon flowers, especially of *Acacia*.

The material examined belongs to the British Museum when the collector's name only is quoted.

Key to the Arrangement of the Species of Melyris, sensu lato.

- I. Prothoracic carinæ present.
 - a. Antennæ loosely articulated, long in ♂, joints 4-10 triangular; prothoracic carinæ abbreviated posteriorly; median lobe of ♂ ædeagus armed with a sharp, backwardly-directed triangular tooth towards apex beneath. [S. Africa] [MELYRIS, F., s. str.] . . . Nos. 1, 2.
 - b. Antennæ shorter and broader (except in Nos. 20 and 43), strongly serrate or dentate; median lobe of ♂ ædeagus without tooth*.

* So far as ascertained in the species dissected.

- a*¹. Ventral segments 3-5 of ♂ without linear depressed areas. [Africa, generally] Nos. 3-71.
- b*¹. Ventral segments 3-5 of ♂ with linear depressed areas. [Palæarctic and Asiatic] [Subgen. ZYGIA, F.]..... Nos. 72-75.
- II. Prothoracic carinæ wanting, or, at most, indicated near anterior margin.
- a*. Anterior margin of prothorax very prominent in the middle in front, the prothorax itself convex or gibbous: species larger and more robust, with the elytra metallic and the prothorax and under surface testaceous. [Somaliland] [Subgen. PSEUDOZYGIA, Pic] Nos. 76, 77.
- b*. Anterior margin of prothorax not or but little extended in front, the prothorax itself moderately convex: species smaller and more depressed, black or metallic, except in *M. fulvipennis*. [Africa, generally, and Mediteranean Region*] [Subgen. MELYRIDELLA, n.] Nos. 78-80.

NOTE.—Species belonging to I, *a*, *b*, and *a*¹ (Nos. 1-71) are tabulated under six geographical headings in the accompanying text: S. Africa (Nos. 1-15), W. and W. Central Africa (Nos. 16-23), E. and E. Central Africa (Nos. 24-46), Somaliland (Nos. 47-55), Abyssinia (Nos. 56-64), and N. Africa, &c. (Nos. 65-71).

MELYRIS.

- Melyris*, Fabricius, Syst. Ent. p. 58 (1775) (type *M. viridis*, F.).
Zygia, Fabricius, loc. cit. p. 126 (type *Z. oblonga*, F.).
Pseudozygia, Pic, Ann. Mus. Genova, xxxix. p. 506 (1898) (type *P. rubricollis*, Pic).

SECTION I.

South African Forms.

- a*. Antennæ long and loosely articulated, at least in ♂.
 [MELYRIS, s. str.] Nos. 1, 2.

1. *Melyris viridis*.

Melyris viridis, Fabr. Syst. Ent. p. 58 (1775); Oliv. Ent. ii. 21, p. 1, t. 1. fig. 1; Guér. Icon. Règne Anim. p. 50; Fairm. Ann. Soc. Ent. Fr. 1888, p. 174.

♂. Ventral segment 5 with a transverse arcuate excavation in the middle, broadly arcuate-emarginate at apex, 6 short, convex along the centre, angularly emarginate at tip; median lobe of ædeagus broad, subangularly dilated

* *M. granulata*, F., and its N. African and Asiatic allies are not enumerated in this paper.

towards apex, rapidly, obliquely narrowed and excavate ventrally thence to the pointed tip, the apical ventral portion with a strongly raised, prominent median keel terminating proximally in a backwardly-directed acute triangular tooth (figs. 1 *a*, *b*) ; tegmen feebly emarginate and fringed with long flavous hairs at tip.

Fig. 1.



a. *b.*

Melyris viridis, F., ♂.

Hab. S. AND S.W. AFRICA (*Mus. Oxon.*, *Mus. Genoa*), Cape of Good Hope, Port Nolloth, and Damaraland (*Mus. Brit.*), Owampo (♂ *Schinz*, sec. Fairmaire).

The British Museum possesses a long series of *M. viridis* (♂ ♀) from Cape Town, also four females from Port Nolloth and two males from Damaraland. This insect, the type of the genus *Melyris*, has the head small and rather elongate ; the antennal joints 4–10 triangular, 6–10 transverse, strongly so in ♀ ; the tarsal claws feebly toothed at the middle (the tooth being so small that it seems to have been overlooked by Lacordaire) ; and the median lobe of the ♂ aedeagus furnished with a strong backwardly-directed tooth. The body is green, rarely blue, above and beneath, the legs included, pubescent, and not very shining ; the head and prothorax are closely, rather coarsely, umbilicate-punctate ; the lateral carina of the prothorax is sinuate, abbreviated posteriorly ; the elytra are feebly tricostate, the interspaces with about five rows of crowded coalescent punctures ; and the legs are more elongate than in *M. abdominalis* and its allies. Two males have been dissected.

2. *Melyris laxicornis*, sp. n.

Oblong-oval, rather dull, green or bluish-green, the elytra and under surface sometimes aeneous or aeneo-cupreous, the antennæ black with the basal joints more or less reddish ; finely pubescent ; the head and prothorax densely punctulate

and reticulate. Head small, narrow; antennæ (δ) long, the joints loosely articulate, 4-10 triangular, longer than broad, gradually decreasing in length, (♀) shorter, joints 6-10 broader than long. Prothorax transverse, explanate laterally, the sides rounded posteriorly and rapidly converging anteriorly, the lateral carina sinuate and not reaching the base, the disc feebly convex and shallowly canaliculate. Elytra wider than the prothorax, acuminate at tip; alutaceous, sharply tricostate, the interspaces with from 3-5 irregular rows of rather fine punctures, the lateral margins somewhat explanate, the inferior margin crenulate. Abdomen closely punctured, without long hairs at tip. Legs long; tarsal claws with a small tooth at the middle.

δ . Ventral segments 4 and 5 each with a deep, transverse, arcuate excavation in the centre, that on 4 small, 5 broadly arcuate-emarginate at apex, 6 bi-impressed; median lobe of ædeagus stout, lanceiform, armed with an acute triangular tooth on the ventral aspect at some distance before the tip (figs. 2 *a*, *b*).

Length $6\frac{1}{2}$ -8, breadth 3-4 mm. (δ ♀ .)

Fig. 2.



a. *b.*

Melyris lavicornis, sp. n., δ .

Hab. S.W. AFRICA, Namaqualand (C. H. B. Grant: δ ♀), Port Nolloth (*ex coll. Fry*: δ ♀).

Ten specimens, a δ from Namaqualand taken as the type. Closely related to the S. African *M. viridis*, F., but much smaller; the antennæ elongated and loosely articulated, and the median lobe of the ædeagus differently shaped, in δ ; the elytra sharply costate and more finely punctate. The colour is variable. *M. lavicornis* cannot be identified with any of the *Melyris* from Caffraria described by Boheman. A δ from each locality has been dissected.

- b.* Antennæ shorter, strongly serrate.
- a.* Species small, black or metallic, above and beneath, elytral margins red in *M. rufomarginata* Nos. 3-13.
- b.* Species larger and more robust, metallic above, the legs in part and abdomen rufescent, the metasternum green Nos. 14, 15.

3. *Melyris nigra*.

Melyris niger, Fabr. Spec. Ins. i. p. 67 (1781)¹; Ent. Syst. i. p. 226 (1792)²; Syst. Eleuth. i. p. 311 (1801)³; Oliv. Ent. ii. 21, p. 5, t. 1. figs. 3 *a*, *b*⁴ (nec *M. nigra*, Schilsky, Käf. Europ. xxxiv. no. 97, 1897).
Melyris nigrita, Gory, in litt. (in Mus. Brit. and Mus. Oxon.).

Oblong, opaque above, moderately shining beneath, nigropiceous or black, the basal joints of the antennæ slightly rufescent; thickly clothed with rather stiff blackish pubescence, which forms a conspicuous close fringe along the margins of the body, the abdomen also with long black hairs at the tip; the head and prothorax densely punctulate and reticulate. Head short, rather broad, the eyes convex; antennæ short. Prothorax transverse, arcuately narrowed anteriorly, obsoletely canaliculate, the lateral carina feebly sinuate. Elytra moderately long, at the base very little broader than the prothorax, slightly widened posteriorly and rounded at the apex; sharply tricostate to near the tip, the interspaces coarsely and regularly triseriate-punctate, the inferior apical margin sharply crenulate. Beneath alutaceous, sparsely, minutely punctate. Legs slender; tarsal claws sharply toothed near the base.

♂. Ventral segment 5 transversely excavate in the middle, broadly emarginate at tip, 6 smoother, unimpressed, notched at apex.

♀. Ventral segment 6 deeply sulcate down the middle.

Length 4-5½, breadth 2-2½ mm. (♂ ♀.)

Hab. SOUTH AFRICA, Cape of Good Hope (*Mus. Brit.*, *Mus. Oxon.*), Table Mountain (*W. Bevins*: ♂ ♀), Cape Town (*G. A. K. Marshall*).

The type (♀) of this species in the Banksian collection (preserved in the British Museum) has been carefully cleaned, and it proves to be a S. African insect (as is also *M. viridis*, F.), which can be exactly matched in a series of eight examples from the Cape. Fabricius in his earlier papers^{1 2} gave no locality for *M. nigra*, but in 1801³ he added "Tanger," obviously in error. Schilsky's *M. nigra* = *granulata*, F.

4. *Melyris rufomarginata*, sp. n.

Melyris rufomarginata, Dej. Cat., 3rd edit. p. 125 (1836)¹.

Moderately elongate, depressed, opaque; piceous or nigropiceous, the outer margins of the elytra testaceous or rufotestaceous, the pallid coloration sometimes extending inward over the humeral callosities and forward for a short distance along the suture at the apex; somewhat thickly clothed with short, bristly, fuscous hairs, which form a conspicuous ciliate margin along the sides of the body. the abdomen also with a few long hairs at the tip; the head and prothorax closely punctulate and reticulate. Head small, short; antennæ short, the outer joints moderately widened. Prothorax strongly transverse, arcuately narrowed anteriorly, canaliculate, the lateral carina sharp and almost straight, reaching the base at some distance from the hind angles, the margins finely crenulate. Elytra moderately long, wider than the prothorax; feebly tricostate, the interspaces rather finely tri- or quadri-seriate-punctate, the lateral and apical margins narrowly explanate, the inferior margin conspicuously crenulate. Legs short, rather slender; tarsal claws comparatively short, toothed near the base.

♂. Ventral segment 5 broadly, feebly arcuate-emarginate, 6 almost smooth, notched at the tip.

♀. Ventral segment 6 deeply sulcate down the middle.

Length $3\frac{1}{2}$ -5, breadth $1\frac{1}{3}$ - $2\frac{1}{2}$ mm. (♂ ♀.)

Hab. S. AFRICA (*Mus. Brit.*, Dr. Andrew Smith), Grahams-town, Cape of Good Hope¹ (*ex coll. Fry*), Enon, Algoa Bay (*J. S. Duncan*, 1835, in *Mus. Oxon.*).

Nine specimens, including one ♂. Apparently undescribed, though examples of it had been received by the British Museum in 1844 and 1848. A small, depressed, opaque, nigro-piceous, hirsute insect, with pallid margins to the elytra, closely related to the unicolorous *M. nigra*, F., which has coarsely triseriate-punctate elytral interspaces and sharper costæ. *M. limbata*, Péringuey (1885), from Knysna, Cape Colony, is a shining, metallic, convex form not represented in the collections before me.

5. *Melyris pubescens*.

? *Melyris pubescens*, Oliv. Ent. ii. 21, p. 5, t. 1. figs. 5 a, 5 b.

Moderately elongate, green or bluish-green, the tarsi and antennæ infusate or black; dull above, more shining beneath,

- somewhat thickly clothed with adpressed whitish pubescence, which is condensed into lines along the prothoracic and elytral ridges, and also tends to form a ciliate posterior margin to the ventral segments in each sex, the abdomen also with long hairs at the tip; the head and prothorax densely punctulate and reticulate. Head and antennæ short. Prothorax transverse, gradually, arcuately narrowed anteriorly, sulcate, the lateral carina almost straight, the margins obsoletely crenulate. Elytra much wider than the prothorax, moderately long, sharply triecostate, the interspaces feebly transversely wrinkled and rather coarsely triseriate-punctate. Legs slender; tarsal claws toothed beyond the middle.

♂. Ventral segments 5 and 6 broadly arcuate-emarginate at apex, 6 grooved down the middle.

Length $4\frac{3}{4}$ –7, breadth 2–3 mm. (♂ ♀.)

Hab. S. AFRICA (*Dr. Andrew Smith, in Mus. Brit.*: 1844), Cape of Good Hope (*Mus. Brit., Mus. Oxon.*), Enon, Algoa Bay (*J. S. Duncan, 1835, in Mus. Oxon.*).

The above description is taken from four specimens (1 ♂, 3 ♀ ♀) agreeing with Olivier's figure; those in the Oxford Museum (♀ ♀) are more or less injured or discoloured. The type was from the cabinet of M. Lee, no locality being given for the insect. It is the only S. African form to which the name *pubescens* could be satisfactorily applied. The metallic colour and whitish vestiture separate the present species from the nearly allied *M. nigra*, F. The largest female in the British Museum is labelled *ciliatus*, Oliv.

6. *Melyris lineata*.

Melyris lineatus, Fabr. Ent. Syst. i. p. 226 (1792)¹; Boh. Ins. Caffr. i. 2, p. 482 (1851)² (nec Oliv. Ent. ii. 21, p. 7, t. 1. fig. 6*).

? *Melyris ciliatus*, Oliv. Ent. ii. 26, p. 6, t. 2. figs. 11 a, b³; Dixey and Longstaff, Trans. Ent. Soc. Lond. 1907, p. 374⁴.

“Oblongo-ovata, convexa, viridi-ænea, parum nitida, fusco-sericea; antennis nigris basi ferrugineis; capite prothoraceque subtiliter sat crebre reticulatis, hoc utrinque longitudinaliter carinato, medio leviter canaliculato, basi truncato; elytris sexcostatis, interstitiis profunde triseriatim punctatis, costis ante apicem desinentibus.—Long. 5, lat. 2 millim.” [*Boheman*.]

Hab. S. AFRICA (*Mus. Oxon.*), Grahamstown (*ex coll. Fry, in Mus. Brit.*), Buffalo River, E. London⁴ (*Dr. G. B. Longstaff, in Mus. Oxon.*: 28. ix. 1905); “Caffraria meridionali”² (*sec. Boheman*).

* = *Astylus (Anobium) lineatus*, F., Syst. Ent. p. 62 (1775), from Brazil.

Nine females from S. Africa—four in the British Museum and five at Oxford—are probably referable to *M. lineata*. Fabricius¹ gave no locality for it, simply "Dom. Lee"; and whether Boheman saw the type is doubtful, the last-mentioned author redescribing *M. lineata* in his list of Caffrarian beetles. It is highly improbable that both *M. ciliata* and *pubescens*, Oliv., are synonymous with *M. lineata*, as quoted in the 'Munich Catalogue'; the crude figure of *M. ciliata*, however, agrees with the blue form of the present species. The legs are rather slender and the tarsal claws toothed slightly beyond the middle, as in the allied S. African forms. The insect from Cape Colony named *M. lineata*, F., var. *atriceps*, by Pic (1900), which is said to be rufo-testaceous above and darker beneath, with the head black and the legs testaceous, can scarcely belong here, unless it is represented by an extremely immature example.

7. *Melyris aurescens*, sp. n.

♂. Moderately elongate, convex, robust, shining, finely pubescent; green, the elytra golden-green, the legs, labrum, and antennæ nigro-piceous; the abdomen fringed with long black hairs at the tip; the head and prothorax densely punctulate and finely reticulate. Head and antennæ short. Prothorax strongly transverse, as broad at the base as the elytra, rounded at the sides, narrowed anteriorly, canaliculate, the lateral carina not prominent and becoming evanescent before the base. Elytra moderately long, subparallel, sharply tricostate, the interspaces coarsely triseriate-punctate, the inferior apical margin crenulate. Legs stout; tarsal claws with a long curved tooth at about the middle. Ventral segment 5 emarginate, 6 short, smoother than 5.

Length $5\frac{1}{2}$, breadth $2\frac{1}{2}$ mm.

Hab. S.E. AFRICA, Londiani (*ex coll. E. A. Elliott*).

Two males, recently presented to the Museum by Mr. Elliott. These specimens were at first referred to *M. lineata*, F., the ♂ of which is unknown to me; but this cannot be the case, *M. aurescens* being more robust, and having a relatively broader prothorax, with basally evanescent carina, and more sharply toothed tarsal claws.

8. *Melyris ciliativentris*, sp. n.

? *Melyris ciliatus*, Oliv. Ent. ii. 21, p. 6, t. 2. figs. 11 a, b.

Oblong, somewhat depressed, very finely pubescent, rather

dull above, more shining beneath, the abdomen fringed with long blackish hairs at the tip; blue, bluish-green, or green, the basal one or two joints of the antennæ sometimes reddish beneath, the rest of the antennæ and the legs black, the femora and tibiæ with a greenish lustre; the head and prothorax densely punctulate and reticulate. Head short, rather small; antennæ short in both sexes. Prothorax transverse, canaliculate, the margins feebly crenulate and gradually arcuately converging from near the base forward, the lateral carina running almost parallel with the outer margin and reaching the base at some distance from the obtuse hind angles. Elytra moderately long, slightly dilated along the outer and apical margins, which are finely crenulate beneath; sharply tricostate to near the tip, the interspaces coarsely, regularly triseriate-punctate. Legs slender; tarsal claws moderately long, toothed at about the middle.

♂. Ventral segments 2-5 densely fringed with whitish hairs along their apical margin, 5 transversely depressed and almost bare in the middle, and slightly hollowed at the apex; 6 broadly, very deeply emarginate, appearing bilobed; terminal dorsal segment (pygidium) deeply sulcate.

♀. Ventral segments sparsely, uniformly pubescent, 6 cleft.

Length 4-5, breadth $1\frac{2}{10}$ - $2\frac{1}{5}$ mm. (♂ ♀.)

Hab. S. AFRICA, Table Mountain, Cape of Good Hope (*W. Bevens*), Uitenhage (*Mus. Oxon.*).

The above description is taken from a series of seven males and two females from Table Mountain, received by the British Museum in 1906, a ♀ from Uitenhage, and a pair without locality in the Hope Museum at Oxford. The last-named are labelled "*lineata*," and were purchased at the sale of the Entomological Society's collection. Olivier's type of *M. ciliata* is probably lost, and Boheman does not allude to it in his description of the Fabrician *lineata*. The present species is remarkable amongst its allies by the ciliate ventral segments of the male.

9. *Melyris capensis*, sp. n.

Moderately elongate, rather depressed, opaque above, somewhat shining beneath, green or bluish-green, the tarsi and antennæ black; sparsely clothed with extremely fine cinereous pubescence, which tends to form lines along the faintly crenulate elytral costæ, the abdomen fringed with blackish hairs at the tip; the head and prothorax densely punctulate and feebly reticulate. Head and antennæ short.

Prothorax transverse, gradually, arcuately narrowed from near the base, shallowly canaliculate, the lateral carina nearly straight, the sides slightly expanded. Elytra moderately long, at the base about as broad as the prothorax, widened posteriorly, narrowly explanate at the sides and apex; sharply tricostate, the interspaces alutaceous, and coarsely, regularly triseriate-punctate, the inferior apical margin crenulate. Legs slender; tarsal claws moderately long, toothed at about the middle.

♂. Ventral segments 5 and 6 broadly arcuate-emarginate at the apex, 5 transversely excavate and 6 convex, in the centre.

Length $4\frac{1}{5}$ – $5\frac{1}{2}$, breadth $1\frac{9}{10}$ – $2\frac{1}{4}$ mm. (♂ ♀.)

Hab. S. AFRICA, Cape of Good Hope (*Mus. Brit.*, *Mus. Oxon.*).

Described from two specimens of each sex sent me many years ago from the "Cape" and an imperfect example in the Oxford Museum. Near *M. ciliativentris*, the upper surface opaque, the ♂ wanting the whitish cilia on the ventral segments, the sixth not bifurcate. The more distinctly expanded elytral margins and the less convex general shape separate *M. capensis* from *M. pubescens*, *lineata*, etc., and the non-granulate prothorax from *M. violacea*.

10. *Melyris violacea*, sp. n.

? *Melyris violacea*, Sturm, in Gemm. and Harold's Cat. Col. vi. p. 1719 (1869).

Elongate, rather depressed, brilliant blue or violaceous above and beneath, the legs and antennæ black, the joints 2 and 3 of latter rufescent in one specimen; thickly clothed with short, curled, blackish hairs, which form a prominent imbricate fringe along the sides of the prothorax, the abdomen fringed with long black hairs at the tip. Head small, densely punctulate and reticulate, the eyes convex; antennæ short in ♀, longer and more strongly serrate in ♂. Prothorax broader than long, ample, arcuately narrowing from the obtuse hind angles, obsolete canaliculate, the lateral carina feebly developed; angulato-reticulate and conspicuously granulate. Elytra a little wider than the base of the prothorax, elongate, parallel, narrowly explanate at the sides and apex, rounded at the tip; sharply tricostate, the interspaces coarsely triseriate-punctate, the inferior apical margin crenulate. Beneath closely punctulate. Legs slender; tarsal claws moderately long, toothed at a little beyond the middle.

♂. Ventral segment 5 with a transverse arcuate excavation in the middle, and also deeply arcuate-emarginate at apex, 6 short, almost smooth, subcarinate down the centre, notched at tip; tegmen fringed with a few rather long pallid hairs; median lobe of ædeagus gradually narrowed, blunt at apex.

Length $5\frac{1}{5}$ – $6\frac{2}{5}$, breadth $2\frac{1}{5}$ – $2\frac{1}{2}$ mm. (♂ ♀.)

Hab. S. AFRICA (*Mus. Brit.*, *Mus. Oxon.*), Table Mountain, Cape of Good Hope (*W. Bevins*).

Thirty specimens, including thirteen sent by Mr. Bevins to the British Museum in 1906. Recognizable amongst its S. African allies by the elongate shape, the brilliant blue or violaceous colour, the rather coarsely granulate, angulato-reticulate sculpture of the prothorax, and the explanate elytral margins. This insect may or may not be referable to *M. violacea*, Sturm, from the Cape of Good Hope, given as a synonym of *M. lineata*, F., in the 'Munich Catalogue'; but the MS. name can quite well be used for it.

11. *Melyris lætula*, sp. n.

Moderately elongate, rather broad, somewhat depressed, slightly shining above, brilliant beneath, somewhat thickly clothed with adpressed yellowish pubescence; brassy or golden, with faint greenish or cupreous tinges in certain lights, the antennæ and tarsi black; the abdomen fringed with long blackish hairs at the tip; the head and prothorax densely punctulate and reticulate. Head and antennæ short. Prothorax transverse, arcuately narrowed from near the base, sulcate, the lateral carina almost straight, the margins slightly expanded and obsoletely crenulate. Elytra at the base slightly broader than the prothorax, widened posteriorly, distinctly explanate at the sides and apex; sharply tricostrate, the interspaces alutaceous, coarsely, regularly triseriate-punctate, the inferior margin crenulate.

♂. Ventral segment 5 subtruncate at the apex, and deeply transversely excavate in the middle; 6 very deeply arcuate-emarginate, appearing bilobed.

Length 4– $4\frac{1}{2}$, breadth 2– $2\frac{1}{5}$ mm.

Hab. S. AFRICA, Natal (*Mus. Brit.*).

One pair, acquired in 1840, the ♂ labelled "*lætula*, n. sp., Natal." This insect looks like a brassy variety of *M. capensis* (*M. sulcicollis*, Boh., varying in this way in colour), but differs from that insect in the longer pubescence, and the more deeply emarginate sixth ventral segment in ♂, *M. lætula* in this respect approaching *M. ciliativentris*.

12. *Melyris natalensis*.

Melyris natalensis, Boh. Ins. Caffr. i. 2, p. 480 (1851).

♂. Ventral segments 5 and 6 as in *M. sulcicollis*, Boh.

Hab. S. AFRICA, Natal (*type of Boheman*), Ulundi Drakensburg (*G. A. K. Marshall*), Transvaal (*Mus. Brit.*), Wakkerstroom, alt. 5700-6500 ft. (*R. Crawshaw*).

About a dozen specimens in the British Museum from the above-quoted localities seem to be referable to *M. natalensis*, which is said to have the elytral interspaces somewhat regularly triseriate-punctate, the puncturing being finer, closer, and more irregular in *M. sulcicollis* and not so coarse as in *M. lineata*. The general colour is blue or bluish green, and the legs are dark. The length varies from 4-6½ mm.

13. *Melyris sulcicollis*.

Melyris interstitialis, Dej. Cat., 3rd edit. p. 125 (1836).

Melyris sulcicollis, Boh. Ins. Caffr. i. 2, p. 482 (1851).

♂. Ventral segment 5 broadly, shallowly, 6 deeply, arcuate-emarginate.

Var. *c*, *varipes*, n.—Femora and tibiæ partly or wholly rufo-testaceous. [Transvaal.]

Hab. S. AFRICA (*Mus. Brit.*), River Gariep (*type of Boheman*), Port Natal, Delagoa Bay, Natal (*Mus. Brit.*), Durban, Howick (*J. P. Cregoe*), Barberton (*P. Rendall*: var. *b* of Boheman), Orange River Colony (*G. E. H. B. Hamilton*), Transvaal (*H. Swale*, *A. Ross*), Johannesburg (*A. J. Cholmley*, *Mus. Brit.*), Zoutpansberg (*W. L. Distant*), Pretoria (*L. M. Bucknill*).

A very variable and abundant insect in Natal and the Transvaal, recognizable amongst the small allied S. African forms by the closely, irregularly, finely punctate elytral interspaces. The colour may be green or greenish-æneous (*type*, Boh.), blue (var. *a*, Boh.), fusco-æneous (var. *b*, Boh.), or cupreous, and the femora and tibiæ are sometimes wholly or in part testaceous (var. *c*, *varipes*). About eighty specimens are contained in the collections before me, nearly half of them belonging to the var. *varipes*, which is apparently confined to the Transvaal; the var. *b*. is represented by 15 examples from Barberton, and the cupreous form by two females from Delagoa Bay. The genital armature of the red-legged form is similar to that of the black-legged type. The puncturing of the elytral interspaces is much closer in some examples than in others, specimens occurring that

would be equally well placed under *M. natalensis*, of the same region.

14. *Melyris rufiventris*.

Melyris rufiventris, Boh. Ins. Caffr. i. f. 2, p. 479 (1851).

♂. Ventral segment 5 with a transverse arcuate excavation in the middle, broadly arcuate-emarginate at tip, 6 bi-impressed and triangularly emarginate, as is also the apex of the corresponding dorsal segment; median lobe of aedeagus broad, pointed at tip.

Hab. S. AND S.E. AFRICA (*Mus. Brit.*), Salisbury (*G. A. K. Marshall*), Bulawayo (*Mus. Brit.*), Zambesi (*ex coll. Fry*), Limpopo (*Wahlberg, sec. Boheman*).

In the series of forty specimens of *M. rufiventris* before me, mostly from Salisbury, there are several males. This species has the abdomen (except at or below the base in some females, the terminal dorsal and ventral segments being always black in this sex), legs (the tips of the tarsi excepted), and about the basal half of the antennæ rufo-testaceous; the upper surface blue or bluish-green, thickly pubescent; the prothorax moderately convex, with obtuse angles and a sharp lateral carina, the margins crenulate; the metasternum green; the tarsal claws long, and armed with a sharp tooth at about the middle; the tibiæ fulvo-pubescent. The length varies from 6–9 mm.

15. *Melyris quinqueseriata*, sp. n.

♀. Elongate, broad, moderately shining, green, the antennal joints 1–4 (except 1 in part), abdomen, femora (except at tip), trochanters, and anterior and intermediate coxæ rufo-testaceous, the rest of the legs and antennæ black, the wings violaceous; above sparsely clothed with very short, decumbent, fuscous pubescence, the lower surface with longer hairs, those on the metasternum infuscate, the abdomen also with a few long blackish hairs at tip. Head short, rather broad, densely punctulate and reticulate; antennæ short. Prothorax broader than long, trapezoidal, the sides rounded anteriorly and sinuate behind, the hind angles slightly extended outwards, the lateral carina sinuate and reaching the base at some distance above the latter, the base excavate on each side within the carina; densely punctulate and rather coarsely reticulate. Elytra long, much wider than the prothorax, subparallel; tricostate, the interspaces with five rows of closely packed, moderately coarse

punctures. Ventral segments closely, finely punctate, 5 slightly depressed in the centre. Tarsal claws long, sharply toothed beyond the middle.

Length 12, breadth 5 mm.

Hab. S.E. AFRICA, Umfuli in S. Rhodesia (*G. A. K. Marshall*: ix. 1895).

One female. Extremely like some of the examples of *M. pallidiventris*, Pic, from Itigi, but with five series of closely packed punctures on the intercostal spaces of the elytra. The legs are similarly coloured in the two forms, the black tibiæ separating both of them from *M. incompleta*. The localities for *M. pallidiventris* and *M. quinqueseriata* are so far distant that the insects from these places are scarcely likely to be conspecific.

W. and W. Central African forms.

- a.* Elytral interspaces seriato-punctate *.
- a'*. Abdomen (except in No. 18) and legs red or partly red. Nos. 16-18.
- b'*. Abdomen (except at tip) and legs metallic or infuscate. No. 19.
- c'*. Abdomen metallic, femora testaceous; elytra very coarsely punctured and antennæ rather elongate .. No. 20.
- b.* Elytral interspaces transversely plicate; abdomen red or red at tip Nos. 21-23.

16. *Melyris congoensis*, sp. n.

Closely resembling *M. pallidiventris*, Pic (No. 34): cæruleous, violaceous, or green, the antennal joints 1-4, legs (the infuscate apices of the tarsi excepted), and abdomen (the terminal segment of ♀ excepted) rufo-testaceous; finely pubescent above, clothed with long pallid hairs beneath, the tip of the abdomen of ♂ fringed with long fulvous, and that of ♀ with black, hairs. Elytra a little more elongate, tricostate, the interspaces with 4-5 rows of closely-packed punctures.

♂. Metasternum along each side of the median channel and posterior trochanters thickly fulvo-villose; ventral segments 5 and 6 and median lobe of the ædeagus much as in *M. pallidiventris*.

Length $10\frac{1}{2}$ -13, breadth $4\frac{1}{5}$ - $5\frac{1}{5}$ mm. (♂ ♀.)

Hab. W. CENTRAL AFRICA, Congo region: Luluabourg, Kasai, Hemptinne—St. Benoit (*Mus. Congo Belge*).

Three males and six females from the Belgian Congo, differing in the above-mentioned particulars from *M. pallidiventris*, require a distinctive name. The long series of the allied forms before me show but little variation in the colour of the tibiæ, the latter being rufo-testaceous in the present

* Also transversely plicate in Nos. 17 and 19.

insect, as in *M. rufiventris*. The elytral sculpture is like that of *M. quinqueseriata* from S. Rhodesia. The red abdomen separates *M. congoensis* from *M. nobilis*, var. *viridiventris*, Pic, which is found in the same region.

17. *Melyris apicalis*.

? *Melyris apicalis*, Harold, Mittheil. Münch. ent. Ver. ii. p. 106 (1878).

“Viridis vel cyaneo-viridis, pedibus et abdominis apice rufis. L. 7·5–9·5 mm.”

Oblong, broad, convex, dull; green or brassy green, the flattened elytral interspaces obscure cupreous in one example and the entire upper surface blue in another specimen; the antennæ in about their basal half, trochanters, femora, tibiæ, and usually the outer and apical portions of the abdomen to a variable extent in both sexes, rufescent, the tarsi and the rest of the antennæ infuscate or black; fusco-pubescent above, the lower surface with long pallid hairs, the tip of the abdomen fringed with very long blackish hairs, the legs also closely set with short, bristly, blackish hairs; the head and prothorax densely, minutely punctulate and feebly reticulate. Head small, narrow, somewhat produced in front; antennæ short. Prothorax strongly convex, transverse, arenately narrowing from the base, obsoletely canaliculate, the hind angles obtuse, the lateral carina sharp and feebly sinuate. Elytra wider than the prothorax, moderately elongate; alutaceous, sharply tricostate, the interspaces irregularly, transversely plicate, and with four or five rows of fine punctures traceable between the rugæ. Legs stout; tarsal claws with a long curved tooth at about the middle.

♂. Ventral segment 5 transversely, arcuately depressed in the centre, broadly hollowed at apex, 6 bi-impressed, emarginate at tip, as is also the corresponding dorsal segment; median lobe of ædeagus broadly subtruncate at apex, as seen in profile, shortly pointed, as seen from the ventral aspect.

Length 7–10½, breadth 3¼–4¾ mm. (♂ ♀.)

Hab. W. AND W. CENTRAL AFRICA: Inner Guinea, especially near Kabebe (*Pogge* and *Hohmeyer*: type); Congo Region—Stanley Falls and Pool (*Mus. Oxon.*: ♂ ♀), Kitobola, Kisantu, Lemba (*Mus. Congo Belge*); Angola—R. Alta Plana, Huilla, alt. 3800–5500 ft. (*Welwitsch*, in *Mus. Brit.*), Huilla (*ex coll. Fry*), Lepi, 380 kilom. from coast, alt. 3500 ft. (*E. Robins*).

Three specimens from the Stanley Falls or Pool, seven from other portions of the Congo Region, and seventeen

from Angola, varying in size and colour, and including various males, are referred to the incompletely described *M. apicalis*, Harold, which is said to differ from *M. rufiventris*, Boh., in the colour of the abdomen, the last-named having the ventral segments wholly red in ♂ and infusate at the base in ♀. The present insect is broader and more convex than Boheman's species, the type of which was from Limpopo; the head is narrower in front and subrostrate; the prothorax is strongly convex (or even subgibbose) on the disc and more finely sculptured, and has the margins obsoletely crenulate; the elytral interspaces are alutaceous, transversely plicate (much as in *M. nigripes*, Harold), and finely punctured; and the tibiæ are closely fusco-setose. In one of the two females from the Stanley Falls the abdomen is wholly infusate. The Kisantu specimen is labelled *M. apicalis*, Harold, presumably named by Pic.

18. *Melyris denticulata*, sp. n.

♀. Elongate, rather convex; the head and prothorax black, opaque, the elytra and under surface shining, nigro-violaceous, the antennal joints 1-4, and the coxæ, femora, and tibiæ, clear rufo-testaceous, the tarsi and the rest of the antennæ black; fusco-pubescent, the femora and tibiæ with yellowish hairs, the apex of the abdomen fringed with long blackish hairs; the head and prothorax densely, minutely punctulate and reticulate. Head rather small, somewhat elongated basally, not produced in front; antennæ short, joints 5-10 somewhat loosely articulated, broadly, acutely triangular. Prothorax convex, a little broader than long, arenately narrowing from near the base, feebly canaliculate, the lateral carina slightly sinuate, the hind angles obtuse, the margins finely denticulate. Elytra long, much broader than the prothorax, widened posteriorly, rounded at the apex; feebly tricostate, the broad interspaces with about five rows of rather fine punctures, the inferior apical margin crenulate. Ventral segment 5 excavate down the middle anteriorly. Tarsal claws sharply toothed beyond the middle.

Length $7\frac{1}{2}$, breadth 3 mm.

Hab. W. AFRICA, Mossamedes in Angola (*Welwitsch in Mus. Brit.*).

One specimen received by the Museum in 1876 with various examples of the insect here provisionally identified as *M. apicalis*, Harold, from which it is readily distinguished by the much narrower, black, opaque prothorax, with the lateral margins denticulate; the feebly tricostate elytra, with

quinquieseriata-punctate, less rugose interspaces; the more strongly serrate, loosely articulated joints of the antennæ; and the rather slender, less setose legs. The present species resembles the Abyssinian *M. fulvipes*, Reiche, differing from it in the less closely articulated antennal joints, the denticulate margins of the prothorax, and the more closely and finely punctured elytra, with the costæ moderately prominent.

19. *Melyris umbilicata*, sp. n.

♂. Elongate, rather convex, shining, blue or green above, the basal joints of the antennæ and the apex of the abdomen rufo-testaceous, the rest of the antennæ and under surface, and legs, nigro-piceous or black; somewhat thickly clothed with long, erect, blackish hairs, those along the outer margins of the elytra stiff and setiform, the apex of the abdomen fringed with a few long projecting hairs; the head and prothorax rather coarsely umbilicate-punctate. Head short, rather broad, the eyes convex; antennæ short. Prothorax transverse, convex, arcuately narrowed anteriorly, shallowly sulcate, the hind angles obtuse, the lateral carina sharp, angulate at about the middle, the margins conspicuously crenulate. Elytra wider than the prothorax, moderately long, subparallel; narrowly and rather feebly tricostate, the interspaces coarsely triseriate-punctate, and also here and there transversely plicate, the inferior margin closely crenulate. Legs hairy; tarsal claws moderately long, sharply toothed at about the middle. Ventral segment 5 arcuate-emarginate, without median depression, 6 somewhat convex along the middle, emarginate at tip; median lobe of ædeagus broad, obliquely narrowed at apex, the triangular apical portion toothed on each side basally.

Length 5-5¼, breadth 2-2¼ mm.

Hab. W. CENTRAL AFRICA, Zungeru (*J. W. Scott-Macfie*: xi. 1910: type), Bantschi-Lokoja (*L. M. Bucknill*: 1908), both in N. Nigeria.

Two males. This insect is of about the size of *M. parvula*, but it is more nearly related to the much larger *M. nigripes*, Harold, from which it differs in having the intercostal spaces on the elytra coarsely triseriate-punctate. From *M. parvula* the coarse sculpture, feebler elytral costæ, and the dark hairy legs sufficiently distinguish the present species. The median lobe of the ædeagus is peculiarly formed.

20. *Melyris subcostata*.

Zygia subcostata, Pic, Rev. Zool. Afric. iii. p. 159 (1913).

♂. Ventral segment 5 subtruncate at tip, 6 rufo-testaceous, almost unimpressed, broadly shallowly arcuate-emarginate.

Hab. W. CENTRAL AFRICA, Bukama in the Congo Region (*Dr. Bequaert, in Mus. Congo Belge*).

M. Schouteden has lent me the type, ♂, of this species. It has the elytra almost as coarsely punctate as in the E. African *M. sausibarica*, Harold, the elytra themselves being more elongate in the present insect; the prothorax is thickly nigro-villose, and has a very feeble lateral carina; the antennæ (♂) are longer and somewhat loosely articulate, joint 3 being elongate and nearly as long as 4 and 5 united, and 4-10 are triangular; and the abdomen is green. The tarsal claws are very long and armed with a long tooth. The peculiar antennal structure (suggestive of that of the S. African *M. viridis* and *M. lavicornis*) appears to have been overlooked by Pic, and the sex of the specimens described was not stated.

21. *Melyris abdominalis*.

Lagriæ abdominalis, Fabr. Mant. Ins. i. p. 93 (1787).

Melyris abdominalis, Oliv. Ent. ii. 21, p. 4, t. I. fig. 7; Cast. Hist. Nat. Ins. Coléopt. i. p. 283.

Cryptocephalus (Lagriæ) ventralis, Gmelin, ed. Linn. i. 4, p. 1739.

♂. Ventral segment 5 broadly hollowed at apex: 5 rufescent, almost smooth, deeply excavate on each side of the convex median portion, triangularly emarginate at tip, as is also the corresponding dorsal segment; median lobe of aedeagus narrowed and somewhat pointed at tip; tegmen set with extremely long pallid hairs at apex.

♀. Ventral segment 6 cleft down the middle, black.

Hab. W. AND CENTRAL AFRICA, Senegal, Cameroons, Lagos, Nigeria, Gold Coast, Ashanti, Dahomey, &c.; Congo Region — Bambili-Limbala, Sassa, Uele, Banzylville, Bili-Lebo (*Mus. Congo Belge*); UGANDA, N. shore of L. Salisbury, Mt. Elgon (*C. A. Wiggins, in Mus. Oxon.*), Mazingo, Pajao [Luz Country] (*C. S. Betton*: 28. x. 1901: ♂).

A common species in the warmer parts of the West Coast of Africa, extending eastwards into Uganda, females preponderating in the extensive series before me. A large, elongate, convex, nigro-pilose form, usually brilliant metallic blue or violaceous above, more rarely green, the legs black,

the abdomen rufous or testaceous, except at the base, the sixth segment black in ♀. The tarsal claws are armed with a long tooth near the base. The lateral margins of the prothorax and the inferior margins of the elytra are crenulate, and the elytra themselves are coarsely, irregularly, transversely plicate and tricostate. There are also specimens in the British Museum labelled "C. Bon. Spei" and "Madagascar," but no reliance can be placed on these localities. The length varies from 10–13 mm. Two males have been dissected. Olivier's description appears to have been made from specimens in the British Museum, and, following Fabricius, he gives "Ind. Or." as the habitat.

22. *Melyris elongata*.

Zygia elongata, Pic, Le Naturaliste, 1897, p. 124.

♂. Antennal joints 5–10 each with a long, and 4 with a shorter, pilose ramus; ventral segment 5 broadly hollowed at apex, 6 testaceous, convex in the middle and hollowed on each side of this, emarginate at tip.

♀. Antennal joints 4–10 strongly dentate; ventral segment 6 black, cleft.

Hab. W. AFRICA, Benué on the Niger (*type of Pic*), Gambia (*Mus. Oxon.*: ♂ ♀).

Several specimens in the Oxford Museum are referred to this species, both sexes of which would appear to have been seen by Pic (to judge from his description of the variation in colour of the apex of the abdomen). The antennæ might be described as flabellate or ramose in ♂ and broadly dentate in ♀. The Gambia examples are extremely like the variable *M. nigripes*, and they have a similar transverse plication of the elytral interspaces; but the elytra are relatively narrower, the prothorax is strongly transverse, conspicuously sulcate, and coarsely umbilicate-punctate. The colour varies from violaceous to bluish green.

23. *Melyris bequaerti*.

Zygia bequaerti, Pic, Rev. Zool. Afric. iii. p. 158 (1913).

Hab. W. AND CENTRAL AFRICA, Kikandja, Sanki-ia, Belgian Congo (*Dr. Bequaert*: type), Lualaba River, alt. 2500–4000 ft., and Kambove, Katanga, alt. 4000–5000 ft. (*S. A. Neave*: iv., v., 1907).

A form of the variable *M. nigripes*, Harold, with the basal joints of the antennæ, the femora, and tibiæ, and sometimes the tarsi also, and the abdomen in part or entirely,

rufo-testaceous. About forty specimens (the sexes in almost equal numbers) were captured at Lualaba, and three others at Kambove, by Neave, the black-legged typical *M. nigripes* occurring sparingly with them at the same localities. The two insects have a similar genital armature. For convenience of reference, they are perhaps best treated as specifically distinct. One of the examples (♀) from Kikandja named by Pic has been lent me by M. Schouteden for examination.

E. and E. Central African Forms *.

- | | |
|--|--------------|
| a. Elytral interspaces transversely plicate; abdomen usually in part red, at least in ♂, legs black †. | Nos. 24, 25. |
| b. Elytral interspaces foveolate or very coarsely confluent punctate. | |
| a ¹ . Metasternum metallic femora and abdomen testaceous | No. 26. |
| b ¹ . Metasternum, femora, and abdomen testaceous | No. 27. |
| c ¹ . Metasternum, legs, and abdomen nigro-ceruleous or black. | No. 28. |
| c. Elytral interspaces seriatly punctured; metasternum metallic. | |
| d ¹ . Femora testaceous, the rest of the legs metallic or black. | |
| a ² . Abdomen metallic | Nos. 29-33. |
| b ² . Abdomen testaceous. | No. 34. |
| e ¹ . Femora and tibiae, and sometimes the tarsi also, testaceous. | |
| c ² . Abdomen wholly or in part testaceous | Nos. 35, 36. |
| d ² . Abdomen metallic | Nos. 37-43. |
| f ¹ . Femora, tibiae, tarsi, and under surface metallic or black; elytra triseriate-punctate and, at most, feebly plicate | Nos. 44-46. |

24. *Melyris nigripes*.

Melyris nigripes, Harold, Stett. ent. Zeit. 1879, p. 335¹.

Zygia viridipennis, Pic, Le Naturaliste, 1897, p. 124².

? *Zygia subapicalis*, Pic, L'Echange, xix. p. 179 (1903)³.

♂. Ventral segment 5 with a transverse arcuate depression in the middle, feebly hollowed at apex, 6 almost level, angularly emarginate; median lobe of aedeagus drawn out into a short curved point, obliquely truncate at tip as seen in profile.

Var. Head and prothorax blue or green, the elytra brassy or cupreous, the terminal three or four ventral segments

* Including Northern Rhodesia, but excluding the forms confined to Somaliland and Sokotra. Sixteen species were enumerated from E. Africa (including Somaliland) by Kolbe in 1898 (Deutsch Ost-Afrika, iv. pp. 221, 222).

† The E. African *M. nobilis*, Gerst., and *M. nigripes*, Harold, extend westward to the Congo Region.

in ♂, and 4 and 5 in ♀, rufo-testaceous, as in typical *M. nigripes*. [Kukuru River, Nyasaland, and Ft. Jameson, N.E. Rhodesia.]

Hab. E. AND CENTRAL AFRICA², Nyasa¹ (*Mus. Brit., Thelwall, Simons*), Blantyre (*Dr. J. E. S. Old, Dr. J. B. Davey*), Fort Johnston (*Dr. W. A. Lamborn*), Mombera District and Valley of S. Rukuru River, alt. 3000–4000 ft. (*S. A. Neave*: vi. 1910), between Ft. Mangoché and Chikala Boma, alt. 4000 ft. (*S. A. Neave*: iii. 1910), Mamboia (*Mus. Brit.*), Tabora³ (*G. Revoil, ex coll. Fry*), Lualaba River, alt. 2500–4000 ft., and Kambove, Katanga, alt. 4000–5000 ft. (*S. A. Neave*: iii. and vi. 1909); Belgian Congo—Boma-Coquilhatville, Kasenga, Le Marinel, Shindensa (*Mus. Congo Belge*); Central and S. Angoniland—Dedza District, alt. 4000–5000 ft. (*S. A. Neave*: v. 1910), Tete to Ft. Jameson (*S. A. Neave*: 10. iii. 1904); N. Rhodesia—Fort Jameson to Lundazi, alt. 4000 ft., and Luwumbu Valley, Upper Luangwe, alt. 2500–3500 ft. (*S. A. Neave*: vi., vii. 1910), Petauke to E. Luangwe Valley (*S. A. Neave*: iii, iv. 1905: *Mus. Oxon.*), Broken Hill (*E. A. Copeman*: xi. 1912—ii. 1913), Namaiila near Namwala, and Mwengwa (*H. C. Dollman*: 11. iv. 1913, and 1. ii. 1914).

To judge from the large amount of material before me (300–400 specimens), this is by far the commonest species of the genus in Central Africa. It is recognizable by its elongate shape; the rather sparsely, transversely plicate, rugulose, strongly tricostate elytra, the inferior margins of which are crenulate; the moderately convex, transverse prothorax, with strongly crenulate margins; and the black hairy legs. The colour of the abdomen is variable, the last three ventral segments being rufescent in typical ♂ *nigripes*, specimens of each sex occurring with the terminal segments wholly or in part metallic or black, the sixth ventral segment being invariably black in ♀. Fresh examples are somewhat thickly clothed with long, erect, blackish hairs, which are easily abraded. In some parts of Nyasaland the form with brassy or coppery elytra is dominant; most of those from the Mombera District are uniformly green, while others from Fort Johnston and Blantyre are violaceous or blue, as in specimens labelled type, from Nyasa in the Genoa Museum. The tarsal claws have a long tooth at about the middle. The length varies from 5–10 mm. Two males, from Mombera and Katanga, dissected show a similar genital armature to that of *M. bequaerti* and *M. lemairei*, Pic. The Central African *M. viridipennis*, a specimen of which from the Congo named by its describer has been lent me by M. Schouteden,

has a metallic or infusate abdomen, with the sixth segment only red in ♂. *M. subapicalis*, Pic, type from Tabora, is said to have the fourth and fifth ventral segments red and the sixth black, characters peculiar to the female of *M. nigripes*. The range of the present species is roughly from the Great Lakes westward to near the mouth of the Congo.

25. *Melyris lemairei*.

Zygia lemairei, Pic, Ann. Soc. Ent. Belg. lii. p. 311 (1908).

Elongate, robust, convex, moderately shining, metallic blue or green, the head and prothorax sometimes brassy in the green specimens; legs and antennæ black, joints 1-3 of the latter (except 1 above) rufo-testaceous; abdomen with from 1-3 of the terminal segments wholly or in part rufous in ♂, the reddish coloration less extended or sometimes altogether wanting in ♀, 6 always black in latter sex; somewhat thickly clothed with erect black hairs, the abdomen fringed with long black hairs at the tip, the legs also closely nigropilose; the head and prothorax densely punctulate and reticulate. Head short, rather broad; antennæ short. Prothorax transverse, convex, gibbous in well-developed specimens, arcuately narrowing from the obtuse hind angles, feebly canaliculate, the lateral carina angulate, the margins sharply crenulate. Elytra a little wider than the prothorax, subparallel; sharply tricostate, the interspaces closely, irregularly angulato-plicate, and with 3-5 rows of fine punctures traceable between the rugæ, the inferior margin crenulate throughout. Beneath closely punctulate. Legs rather stout, roughly punctured.

♂. Ventral segment 5 with a deep transverse arcuate excavation, subtruncate at apex, 6 hollowed down the middle and transversely so on each side posteriorly, triangularly emarginate at tip; median lobe of ædeagus much as in *M. nigripes*.

Length 8-10½, breadth 3¼-4 mm. (♂ ♀.)

Hab. CENTRAL AND E. AFRICA, Tanganyika and Mayambé (*types of Pic*), Fwambo, Lake Tanganyika (*A. Carson*: ♂ ♀), Kambove, Katanga, alt. 4000-5000 ft. (*S. A. Neave*: iii. 1907: ♀), Mwengwa in N. Rhodesia (*H. C. Dollman*: ii.-v. 1914: ♂ ♀), Kamfua (*S. Neave, in Mus. Congo Belge*), Elizabethville in the Congo region (*Mus. Congo Belge*: ♂ ♀).

This is a broad robust form of the variable *M. nigripes*, with closer and more irregular plication on the elytral interspaces, and the prothorax usually more convex, sometimes gibbous. One of the types (♀) from Tanganyika has been

lent me by M. Schouteden, and the above description has been taken from similar specimens from Fwambo and Mwengwa, those from Katanga and Kamfua being intermediate. The three forms of *M. nigripes* (*nigripes*, *lemairei*, and *bequaerti*) are imperfectly segregated in Katanga, while in Northern Rhodesia *M. lemairei* and *M. nigripes* seem to be constant. *M. sieboldi*, Gredl. (1877), type from Gondokoro, a species not identified by Pic or myself, is apparently an allied insect with the head reddish in front.

26. *Melyris sansibarica*.

Melyris sansibarica, Harold, Stett. ent. Zeit. 1879, p. 334.

♂. Ventral segment 5 excavate down the middle, broadly arcuate-emarginate at apex, 6 polished, deeply bifoveate, angularly emarginate at tip.

♀. Ventral segment 5 unimpressed, 6 cleft, black.

Hab. E. AFRICA, Zanzibar, Kitui (*Mus. Genoa*).

Dr. Gestro has lent me a pair of this remarkable insect, distinguishable by its robust build, moderately elongate, broad form, and the brilliant blue (or green) upper surface; the elytra closely foveolato-punctate, and with the costæ only just traceable; the femora (except at the tip) and abdomen (the terminal segment in ♀ excepted), and the antennal joints 2-4, rufo-testaceous; the metasternum bluish-black; the tibiæ and tarsi black, the claws long, toothed towards the apex; the abdomen fringed with long blackish hairs at the tip in both sexes. *M. subcostata*, Pic (1913), from the Belgian Congo, is a more elongate allied form, with the ventral segments metallic.

27. *Melyris flavopectus*, sp. n.

♂. Elongate, broad, rather convex, sparsely pubescent, brilliant violaceous above, testaceous beneath (the propleura excepted); the basal four joints of the antennæ, and the femora to near the apex, also testaceous, the rest of these organs infuscate or black, the anterior tibiæ paler towards the tip; the head and prothorax coarsely, closely umbilicate-punctate. Head rather small, short; antennæ short; prothorax convex, transversely subcampanulate, sulcate, the lateral carina sinuate and extending to the prominent hind angles. Elytra much wider than the prothorax, long; coarsely, confluentlly seriato-foveolate, the three costæ almost obsolete, but traceable when the insect is viewed in profile. Tarsal claws long, toothed near the apex. Ventral segments

4 and 5 hollowed down the middle, 5 broadly arcuate-emarginate at apex; 6 bifoveolate, convex in the centre, emarginate at tip; median lobe of ædeagus (so far as visible) stout, pointed. Last dorsal segment fringed with long blackish hairs.

Length $11\frac{1}{2}$, breadth $4\frac{1}{2}$ mm.

Hab. E. AFRICA, Sancerar-Amarr (*Bottego, in Mus. Genoa*: 11. iv. 1896).

One male, named *M. sansibarica*, Harold, by Pic, but differing from the corresponding sex of that species in the wholly testaceous under surface (the propleura excepted), the more elongate elytra, and the coarser puncturing of the entire upper surface. In Harold's species, type from Kitui, Zanzibar, the metasternum is black.

28. *Melyris foveolata*, sp. n.

Elongate, robust, convex, moderately shining; nigro-cyanous or violaceous, sometimes greenish beneath, the antennæ (the rufescent joints 1-4 excepted) and legs black; thickly clothed with short, decumbent, the apex of the abdomen with long, black hairs; the head and prothorax densely punctulate and reticulate. Head short, rather broad; antennæ short. Prothorax a little broader than long, subconical, gradually narrowed from the base, canaliculate, the lateral carina sinuate, reaching the obtusely rectangular hind angles. Elytra long, much broader than the prothorax, a little widened posteriorly, rounded at the apex; not or very feebly tricostate (the costæ just traceable when the insect is viewed in profile), the interspaces closely, confluent, tri- or quadriseriately foveolato-punctate, the inferior apical margin crenulate. Ventral segments 1-5 closely punctulate. Tarsal claws long, sharply toothed towards apex.

♂. Ventral segment 5 rather deeply emarginate, 6 broadly exposed, excavate on each side of the raised median portion; median lobe of ædeagus stout, terminating in a short curved point, as seen in profile.

Length 10-12 $\frac{1}{4}$, breadth 4-6 mm. (♂ ♀.)

Hab. E. AND CENTRAL AFRICA, Mbali-Kumi road, alt. 3700 ft., south of I. Salisbury (*S. A. Neave*: 15-17. viii. 1911: type ♂); Kadunguru, Eastern Province (*C. C. Gowdey*: 1-10. i. 1914), Kagwara (*Gowdey*: 17. xii. 1913), Bululu and Peta (*Gowdey*: xii. 1910 and i. 1911), Palebek (*W. P. Lowe*: 24. ii. 1913), and Fatiko (*E. Dabbene in Mus. Genoa*: ♂ ♀), all in Uganda; Wadelai (*Emin Pasha*).

Fifteen specimens in the British Museum and sixteen in

the Genoa Museum, the Fatiko series including numerous males. The Wadelai example (♀) was presented to the Museum in 1887, those taken by Dabbene were captured in 1882. This species has the elytra closely foveolato-punctate and obsolete costate as in *M. sansibarica*, Harold, type from Kitui, near Zanzibar (a ♂ and ♀ of which have been lent me by Dr. Gestro), differing from that insect in the wholly infusate legs and under surface, and the narrower, subconical prothorax. *M. subcostata*, Pic (1913), from Bukama, Belgian Congo, is an allied form with the coxæ, femora, and abdomen testaceous.

29. *Melyris alluaudi*.

Zygia alluaudi, Pic, Bull. Soc. Ent. Fr. 1905, p. 303¹.

Melyris monticola, Gahan, Trans. Zool. Soc. Lond. xix. p. 204, t. 6, fig. 6 (1909) (♀)².

♂. Ventral segment 5 with a transverse arcuate excavation in the middle and the apex deeply arcuate-emarginate, 6 much smoother, feebly bi-impressed at tip; median lobe of ædeagus curved downward and bluntly pointed at apex.

♀. Ventral segment 5 with a transverse depression or excavation in the middle, 6 cleft.

Length 9–12½, breadth 3½–5 mm.

Hab. E. AFRICA, Kilimandjaro¹ (*type of Pic*), Ruwenzori² (*Legge and Wollaston*: 1906), M'bagoris Village, edge of Kenya Forest, alt. 5 000 ft. (*Mus. Brit.*), S.E. slope of Kenya, alt. 6000–7000 ft. (*S. A. Neave*: 3–12. ii. 1911), Mt. Kenya district² (*Crawshay*), Matanda and Kagera in Uganda, and Ruanda (*C. H. Marshall*).

Dr. Gestro has been kind enough to lend me a co-type (♂) of *M. alluaudi*, Pic, from Kilimandjaro, and this agrees well with the Kenya and Ruwenzori insect named *M. monticola* by Gahan, of which there are eleven examples in all (including three males) in the British Museum. Very like *M. nobilis*, Gerst., but with the tibiæ green, the basal joint of the antennæ infusate or black, the hind angles of the prothorax more obtuse (the sinuous lateral carina extending to the hind angle in each species), the punctures on the elytra a little smaller and more crowded, tending to form four or five series, the ventral segments green or golden green, the fifth transversely excavate in the middle in both sexes. The head is short, closely punctulate and reticulate throughout, and the reticulation of the prothorax is rather coarse. The colour varies from blue to green. *M. mecklenburgi*, Pic, from the same region, is a nearly allied form.

30. *Melyris mecklenburgi*.

? *Zygia mecklenburgi*, Pic, Wiss. Ergebnisse Deutsch. Zentr. Afrika Exped. 1907-08, iii. Lfg. 11, p. 423 (1911).

Elongate, subparallel, narrow (σ), broader (♀); the upper surface shining, green or bluish-green. The head, prothorax (at least along the sides), and scutellum more or less suffused with golden, golden-green, or cupreous, the lower surface brilliant golden, golden-green, or cupreous, the ventral segments 1-5 with an extensive cyaneous suffusion, and 6 green and cupreous, in σ ; the antennæ (the reddish portions of joints 1-4 excepted) and tarsi black, the tibiæ metallic green, the femora (except at the tip), trochanters, and anterior coxæ testaceous, the wings blue; almost glabrous above, the abdomen with long blackish hairs at the tip. Head rather narrow, somewhat produced anteriorly, alutaceous, densely punctulate and reticulate at the base, smoother in front; antennæ short. Prothorax broader than long, somewhat conical (as seen from above); densely punctulate and finely reticulate, grooved down the middle, the lateral carina sharp, moderately sinuate, and reaching the somewhat explanate, raised, rounded hind angles, the basal cavities almost smooth. Elytra long, parallel, much wider than the prothorax; sharply tricostate, the interspaces irregularly, transversely plicate, and with about four rows of not very coarse punctures. Beneath finely punctured; ventral segment 5 depressed in the centre. Tarsal claws long, toothed beyond the middle.

σ . Ventral segment 5 with a transverse arcuate excavation in the middle, deeply emarginate at apex, 6 almost smooth, feebly bi-impressed at tip; median lobe of ædeagus drawn out into a blunt, downwardly curved point at apex.

Length $9\frac{1}{2}$ -10, breadth $3\frac{1}{2}$ -4 mm. (σ ♀ .)

Hab. E. AFRICA, Lake and Volcano of Kiwu, west of Ruwenzori (*type of Pic*), eastern foot of Aberdare, alt. 8300 ft. (*S. A. Neave*: 1, 2. iii 1911: ♀), west slopes of Kenya on Meru-Nyeri Road, alt. 6000-8500 ft. (*S. A. Neave*: 16-23. ii. 1911: ♀), Escarpment Forest (*T. J. Anderson*: 7. iii. 1911: σ).

The four specimens from which the above description is taken seem to be varieties of *M. mecklenburgi*, Pic, with the prothorax more or less golden, at least at the sides, and the under surface very brilliant, especially in σ ; but Pic does not mention the somewhat produced, smoother anterior portion of the head. Compared with his *M. alluaudi* (= *monticola*, Gahan), the prothorax is more rapidly narrowed

anteriorly, with the hind angles rounded and somewhat raised, and the surface sculpture finer, and the head longer and smoother.

31. *Melyris masaiensis*, sp. n.

♀. Elongate, subparallel, the upper surface opaque, cæruleous, the lower surface brilliant metallic green; the antennæ (except the rufescent portions of joints 1-4) and tarsi, and the tips of the femora, black, the tibiæ green, the rest of the femora, the trochanters, and anterior coxæ testaceous, the wings bluish; sparsely pubescent, the apex of the abdomen with long blackish hairs. Head rather narrow, somewhat elongated anteriorly, alutaceous, and densely punctulate and reticulate, smoother in front; antennæ short. Prothorax transverse, arcuately narrowing from the base; densely punctulate and reticulate, the median channel shallow, the lateral carina sharp, sinuate, reaching the obtuse hind angles. Elytra long, subparallel, much wider than the prothorax; alutaceous, tricostate, the interspaces with 4-5 rows of rather fine punctures. Beneath closely, finely punctate; ventral segment 5 transversely excavate in the middle, 6 cleft. Tarsal claws long, toothed beyond the middle.

Length 10-10½, breadth 3¼-4¼ mm.

Hab. E. AFRICA, Keborr Forest, alt. 6000 ft., and Narok, both in the Masai Reserve (*Capt. A. O. Luckman*: 23-30. i. 1914).

Two females. A form of *M. alluandi*, Pic (= *monticola*, Gahan), with a less rugose head and prothorax, the head a little narrower, and the upper surface of the body less shining. The black tibiæ and the less rugose prothorax, with obtuse hind angles, separate *M. masaiensis* from *M. nobilis*, Gerst.

32. *Melyris luckmani*, sp. n.

Elongate, subparallel, rather convex; the upper surface opaque, green, the lower surface shining, green or bluish-green; the antennæ (except the rufescent portions of joints 1-4) and tarsi, and the extreme apices of the femora, black, the tibiæ green, the rest of the legs testaceous or flavescent, the tibiæ usually green on their outer edge, the wings blue; finely pubescent, the apex of the abdomen with long blackish hairs. Head short, rather broad, densely punctulate and reticulate, the eyes prominent; antennæ short, joints 5-10 very broad. Prothorax transverse, gradually narrowed from the base, convex on the disc and somewhat broadly flattened along the sides, the hind angles obtuse; densely punctulate

and reticulate, the lateral carina sinuate, prominent, reaching the rounded hind angles, the median channel shallow. Elytra long, subparallel, much wider than the prothorax, somewhat produced at the apex, alutaceous, feebly tricostate, the interspaces with about five rows of rather fine punctures, the inferior margin finely crenulate. Ventral segments rather closely, finely punctate. Tarsal claws long, with a sharp tooth just beyond the middle.

♂. Ventral segment 5 broadly arcuate-emarginate, and with a deep, transverse, arcuate excavation in the centre (shallower in ♀); 6 broad, exposed, bi-impressed at apex; median lobe of ædeagus stout, curved downward and acuminate at tip.

Length 8–10½, breadth 3–4 mm. (♂ ♀.)

Hab. E. AFRICA, Lake Naivasha, Masai Reserve, alt. 6000 ft. [about midway between Mts. Kenya and Kilimandjaro] (*A. O. Luckman*: 18–24. xii. 1913).

Forty-seven specimens, including numerous males, two of which have been dissected. Recognizable by its elongate form and dull metallic upper surface, the flavescens femora, the laterally flattened, scabrous prothorax, and the closely punctured long, tricostate elytra, the fifth ventral segment of ♂ with a deep transverse excavation. Near *M. alluaudi*, Pic (= *monticola*, Gahan), opaque above, the prothorax more flattened at the sides and less rugose, the elytra more finely punctured. *M. taborensis*, Pic (1903), seems to be an allied form with the abdomen testaceous.

33. *Melyris flavofemorata*, sp. n.

♀. Elongate, subparallel, rather convex; the upper surface opaque, green, tinged with violaceous on the head and prothorax, the lower surface shining, metallic green, the ventral surface suffused with violaceous; the antennæ (except the reddish portions of joints 1–4), tibiæ and tarsi, and the apices of the femora, black, the rest of the femora, the trochanters, and the anterior coxæ flavous, the wings bluish; sparsely pubescent, the apex of the abdomen with long blackish hairs. Head narrow, elongated anteriorly, alutaceous, and densely punctulate and reticulate, the anterior portion finely punctured, the supra-orbital ridges prominent, the eyes depressed; antennæ short. Prothorax nearly as long as broad, conical, rapidly narrowed from the base, feebly convex; densely punctulate and reticulate, the median channel shallow, the lateral carina sinuous, prominent, reaching the rounded hind angles. Elytra long, subparallel, much wider than the prothorax; rugulose, tricostate, the

interspaces with about five rows of rather fine punctures. Beneath closely punctate, the ventral segments also transversely rugulose, 5 transversely depressed in the middle, 6 cleft. Tarsal claws long, with a sharp tooth beyond the middle.

Length 11, breadth $4\frac{1}{2}$ mm.

Hab. E. AFRICA, Lagari (Mile 469) (*C. S. Betton*: 1. iii.-21. v. 1900).

One female. Very like *M. luckmani* from Lake Naivasha, but easily separable therefrom by the narrow elongate head and the longer conical prothorax.

34. *Melyris pallidiventris*.

Zygia pallidiventris, Pic, L'Echange, xxii. p. 1 (1906).

Elongate, rather broad, robust, shining, sparsely, finely pubescent above, and clothed with long pallid or fulvous hairs beneath, the abdomen fringed with long blackish hairs at the tip; cæruleous or green, the basal joints of the antennæ (except the first above), the femora (except at the extreme tip in some specimens), and abdomen (the black terminal abdominal segment in ♀ excepted) rufo-testaceous, the rest of the antennæ and legs black or piceous, the wings violaceous; the head and prothorax densely punctulate and shallowly reticulate. Head short, the anterior portion narrow; antennæ short. Prothorax transversely subcampanulate, feebly canaliculate; the lateral carina angulate, sometimes obsolete at the middle, and becoming very prominent exterior to the deep basal impressions, the latter polished near the posterior margin, the hind angles more or less extended outwards. Elytra much broader than the prothorax, long, somewhat produced at the apex; rather feebly triecostate, the interspaces quadri-seriate-punctate, the punctures coarser and subconfluent in some specimens, smaller and more regularly arranged in others. Tarsal claws long, sharply toothed beyond the middle.

♂. Metasternum along each side of the median channel and posterior trochanters fulvo-villose; ventral segment 5 broadly arcuate-emarginate, 6 hollowed along each side of the convex median portion, notched at tip; median lobe of aedeagus produced into a rather stout, long, downwardly-curved point, which is truncate at the apex.

Length 10-13, breadth $4\frac{1}{2}$ - $5\frac{1}{2}$ mm. (♂ ♀.)

Hab. E. AND CENTRAL AFRICA, Kilimandjaro (*type of Pic*), Itigi (*Dr. G. H. D. Carpenter*: x. 1917: ♂ ♀), Katanga in the Congo Region (*Lemaire, in Mus. Congo Belge*: ♀).

Six males and one female from Itigi (ex-German E. Africa) are referred to *M. pallidiventris*, Pic, a female of which, from Katanga, named by the author, is before me. The wholly infuscate or black tibiae and tarsi separate the present species from *M. rufiventris*, Boh., and the rufo-testaceous abdomen distinguishes it from *M. nobilis*, Gerst., *M. albaudi*, Pic, and others. The puncturing of the elytra varies greatly in the series from Itigi, it being very coarse in three of them. These specimens were all found on flowers of *Acacia*.

35. *Melyris incompleta*.

? *Melyris incompleta*, Fairm. Compt. Rend. Soc. Ent. Belg. xxvi. p. xlix (1882) (♀)¹.

Melyris nobilis, Dixey and Longstaff, Trans. Ent. Soc. Lond. 1907, p. 357².

♀. Elongate, broad, robust, moderately shining, the head and prothorax rather dull; cyanaceous, caeruleous, or more rarely green, the antennal joints 1-4, abdomen (the black terminal segment excepted), and legs (the black tarsi excepted) rufo-testaceous, the wings violaceous; sparsely fusco-pubescent, the lower surface with longer yellowish hairs, the abdomen fringed with long black hairs at the tip; the head and prothorax densely punctulate and reticulate. Head rather small, short; antennae short. Prothorax convex, transversely subcampanulate, at the base nearly as broad as the elytra, canaliculate, and with an angulate lateral carina, the latter sometimes obsolete at the middle and becoming very prominent at the base, which is deeply excavate or foveate on each side, the hind angles more or less produced, the basal cavities smooth near the posterior margin. Elytra long, subparallel in their basal half, tricositate to near the apex, the insterspaces with 4-5 rows of moderately coarse punctures. Ventral segment 5 slightly depressed down the centre, 6 cleft. Tarsal claws long, sharply toothed beyond the middle.

Length $8\frac{1}{2}$ - $10\frac{1}{2}$, breadth $3\frac{1}{2}$ - $4\frac{1}{2}$ mm.

Hab. E. AND S.E. AFRICA, between Zanzibar and the Great Lakes¹ (*type of Fairmaire*), Nyasaland (*Dr. J. E. S. Old, B. H. Woodward*); N. Rhodesia—Niamadzi, near Nawalia, alt. 2000 ft. (*S. A. Neave: 17-22. viii. 1910*), Luangwa River and Valley (*S. A. Neave: 14-16. viii. 1900, viii.-ix. 1904, and vii.-viii. 1910; Mus. Brit. and Mus. Oxon.*), Mulungushi's and Mumbwa (*H. C. Dollman: viii.-ix. 1913*); Zambesi—Victoria Falls² (*C. E. F. Allen, in Mus. Oxon.: 15. ix. 1905*).

Fifty-six specimens, including long series captured by

Dr. Neave and the late H. C. Dollman in N. Rhodesia, all females, are provisionally referred to *M. incompleta*, Fairmaire, who does not mention the deep basal impressions of the prothorax, &c. Separable from *M. rufiventris* (type from the Limpopo), ♀, as here identified, by the broad, transversely subcampanulate prothorax, the base of which is deeply foveate on each side within the very prominent posterior portion of the lateral carina, the latter sinuate and sometimes incomplete, and the black tarsi. It is a curious fact that no male has been received of this conspicuous *Melyris*, though the insect has been met with on many occasions and by various collectors. The red abdomen and the less divergent basal portion of the prothoracic carina separate *M. incompleta* from *M. nobilis*, Gerst., the ♂ of which is also unknown to me.

36. *Melyris albicoma*.

Zygia albicoma, Pic, Ann. Mus. Genova, xxxix. p. 509 (1899).

Hab. E. AFRICA, Brava in Somaliland (*Mus. Genoa*).

The unique type of this insect, captured by Bottego in Oct. 1895, is a ♀. It is of about the same size as *M. parvula*, Gerst., and separable therefrom by its dull, sericeous, much smoother, bluish-green upper surface, which is clothed with short, adpressed, whitish pubescence (including a line of hairs extending down each of the elytral costæ); the head is short and narrow; the prothorax is convex, with the median groove very shallow and the lateral carina sinuate; the elytral interspaces have about four rows of rather fine punctures; and the antennal joints 1-6, abdomen (except segments 1, 2, and 6), and legs (the black fifth tarsal joint excepted) are rufo-testaceous. The S. African *M. pubescens*, Oliv., has a somewhat similar vestiture.

37. *Melyris nobilis*.

Melyris nobilis, Gerst. Arch. f. Naturg. xxxvii. p. 56 (1871)¹, and in Van der Decken's Reisen, iii. p. 156, t. 8. fig. 7 (1873)²; Kolbe, Deutsch Ost-Afrika, iv. p. 222 (1898)³.

Zygia nobilis, var. *viridiventris*, Pic, Rev. Zool. Afric. iii. p. 158 (1913)⁴.

Hab. E. AND CENTRAL AFRICA, Lake Jipe^{1 2 3} (*sec. Gerstaecker*), Masailand (*Mus. Brit.*: ♀); Congo Region—Sankisia⁴, Kabinda, Luauza, Kabambare, Kakauwe, Kisengwa, and Luapula-Kasenga (*Mus. Congo Belge*: ♀); S. Somaliland³.

Fourteen examples of this species are before me, all ♀ ♀ — six from Masailand, presented to the British Museum in
Ann. & Mag. N. Hist. Ser. 9. Vol. iv. 15

1887 by Mr. F. J. Jackson, and eight from the Congo Region, lent me by M. Schouteden, the latter including Pic's type of *M. viridiventris* from Sankisia. The chief characters of this species are: the blue upper surface, the metallic breast and abdomen, the rufo-testaceous femora, tibiæ, and basal joints of the antennæ; the moderately broad, transversely subcampanulate prothorax, with deep basal impressions; and the elongate, tricostate elytra, with somewhat coarsely quadri-seriate-punctate interspaces. Gerstaecker² compares *M. nobilis* with *M. rufiventris*, Boh., and states that the former has the breast and first two ventral segments bluish-green and the last four segments almost black. The male, like that of *M. incompleta*, Fairm., which has the ventral segments 1-5 wholly red, is not represented in the material before me.

38. *Melyris itigiensis*, sp. n.

Moderately elongate, bluish-green or green above, green or golden beneath, the basal four or five joints of the antennæ, the legs, and the sixth ventral segment of ♂ rufo-testaceous; very finely pubescent, the under surface with long pallid hairs, the apex of the abdomen fringed with still longer blackish hairs, the wings bluish; the head and prothorax densely punctulate and reticulate. Head rather long and narrow, but not produced anteriorly, the eyes depressed; antennæ very short, the broadly widened joints 5-11 forming a loose club. Prothorax fully as long as broad, conical, obliquely narrowing from near the base forward, sulcate; the lateral carina sharp, sinuous, and reaching the obtuse hind angles, the base slightly hollowed in the middle. Elytra moderately long, subparallel; alutaceous, sharply tricostate, the interspaces not very coarsely triseriate-punctate, and more or less distinctly transversely plicate, the inferior apical margin crenulate. Beneath closely punctate. Tarsal claws long, sharply toothed at about the middle.

♂. Ventral segment 5 unimpressed, arcuate-emarginate, 6 almost smooth; median lobe of ædeagus sharply acuminate.

Length 5-6, breadth $2\frac{1}{5}$ - $2\frac{1}{2}$ mm. (♂ ♀.)

Hab. E. AFRICA, Itigi (Capt. G. H. D. Carpenter: x. 1917).

Eight specimens, including five males, found with *M. pallidiventris*, Pic, on flowers of *Acacia*. A close ally of *M. parvula*, Gerst., with a much longer, conical prothorax, a longer head, and less coarsely triseriate-punctate intercostal spaces on the elytra, the median lobe of ♂-ædeagus sharply acuminate. The smaller size, green abdomen, &c.,

separate the present species from the Abyssinian *M. ruspolii*, Pic.

39. *Melyris hacquardi*, sp. n.

♂. Elongate, narrow, shining, green or bluish-green, golden-green beneath, the antennæ (except along the inner edge of joints 6-10), legs, and sixth ventral segment rufotestaceous; sparsely and very finely fusco-pubescent above, the nuder surface with longer pallid hairs, the abdomen with long blackish hairs at tip; the head and prothorax densely punctulate and finely reticulate. Head short, rather broad, the eyes convex; antennæ not very short, the joints somewhat loosely articulated, 5-10 about equally widened. Prothorax transverse, rounded at the sides anteriorly, canaliculate, the hind angles obtuse, the lateral carina sharp and feebly sinuate, the margins feebly crenulate. Elytra wider than the prothorax, long, subparallel; very sharply tricostate, the interspaces rather coarsely triseriate-punctate, the inferior margin feebly crenulate towards the apex. Beneath closely, finely punctate. Ventral segment 5 with a deep, transverse, arcuate excavation in the middle and the apex rather deeply arcuate-emarginate, 6 feebly bi-impressed, emarginate at tip. Tarsal claws very long, toothed beyond the middle.

Length $5\frac{1}{5}$ - $5\frac{4}{5}$, breadth 2 - $2\frac{1}{2}$ mm.

Hab. E. AFRICA, Zanzibar, Mhonda-Ouzigoua (*Hacquard Mission*, 1879-80).

Two males from the Sharp collection. Very near *M. parvula*, Gerst., type from Endara, as here identified; but separable therefrom by the longer and paler antennæ, the outer joints of which are less closely articulated and not so broad (these joints forming a sort of club in *M. parvula*), the longer tarsal claws, and the very deep arcuate excavation on the fifth ventral segment in ♂. *M. femoralis*, Pic (1898), also from Zanzibar, is another allied form, with the femora only clear testaceous and the elytra more dilated posteriorly.

40. *Melyris parvula*.

Melyris parvula, Gerst. Arch. f. Naturg. xxxvii. p. 56 (1871)¹, and in Van der Decken's Reisen, iii. p. 157 (1873)²; Waterh. P. Z. S. 1885, p. 231³; Kolbe, Deutsch Ost-Afrika, iv. p. 222 (1898)⁴.

♂. Ventral segment 5 with a shallow, transverse, arcuate depression, broadly arcuate-emarginate at tip, 6 rufous or piccous, bi-impressed, emarginate at apex; median lobe of aedeagus broad, pointed at the apex.

♀. Ventral segment 5 unimpressed, 6 cleft.

Hab. E. AFRICA (*W. A. Lamborn*: v. 1916), Endara (inland from Zanzibar) (*Gerstaecker*)¹²¹, Athi-ya-Mawe (*C. S. Betton*: v. 1899), Kilimandjaro (*Sir H. H. Johnston*)³, Lake Jipe and Tsavo River (*Dr. Bayer, in Mus. Congo Belge*: vi. 1913), Badditu-Dime (*Bottego, in Mus. Genoa*: v.-vii. 1896), Samburu (*C. S. Betton*: x., xi. 1896), Mlanje in Nyasaland (*S. A. Neave*: viii. 1913), Machakos (*S. L. Hinde*: 1897), Caia, Zambesi (*H. Swale*: vii., viii. 1911), Namaila, Lukendo, and Kashitu in N. Rhodesia (*H. C. Dollman*: ♀), S. Somaliland⁴.

Many examples, ♂ ♀, seen from Kilimandjaro, &c., ♀ ♀ only from Rhodesia. A small blue or green form, with the elytra sharply tricostate, their interspaces rather coarsely triseriate-punctate; the basal joints of the antennæ and the legs rufo-testaceous, the tarsi often wholly or in part, and rarely the apices of the tibiæ also, infusate: the antennæ short, the closely articulated, widened outer joints forming a sort of elongate club; the tarsal claws long, sharply toothed at about the middle; the margins of the prothorax, and the inferior apical margin of the elytra, more or less distinctly crenulate. Gerstaecker describes the prothorax as "profunde sulcato," a definition applying to very few of the specimens before me, including a co-type kindly lent me by Dr. Gestro. The twelve examples from Caia and Mlanje, ♂ ♀, are more elongate than the rest, and they may belong to a different species. One of those from Lake Jipe is brassy-cupreous above.

41. *Melyris brevicollis*, sp. n.

Moderately elongate, shining; green or golden-green, the basal joints of the antennæ to a variable extent, and the legs (the more or less infusate tarsi excepted), testaceous or rufo-testaceous; finely pubescent, the apex of the abdomen fringed with long black hairs; the head and prothorax densely punctulate and reticulate. Head short, small; antennæ short in the two sexes. Prothorax strongly transverse, rounded at the sides anteriorly, sulcate; the lateral carina sinuous, the hind angles obtuse, the margins feebly crenulate. Elytra moderately long, wider than the prothorax, flattened on the disc; alutaceous, sharply tricostate, the interspaces with three rows of moderately coarse punctures, the inferior apical margin crenulate. Tarsal claws moderately long, armed with a sharp tooth at about the middle.

♂. Ventral segment 5 broadly arcuate emarginate at tip, 6 black, triangularly emarginate.

♀. Ventral segment 5 deeply foveate in the middle, 6 cleft.

Hab. E AFRICA, Banks of Nile near Kakindu, alt. 3400 ft., Uganda Protectorate (*S. A. Neave* : 24, 25. viii. 1911 : ♀), Kashiit in N. Rhodesia (*H. C. Dollman* : vi. 1915 : ♂ ♀).

Described from a long series found by the late H. C. Dollman on the flowers of shrubs in June 1915, and two females captured some years previously by Dr. Neave. Very near the somewhat variable *M. parvula*, Gerst., which occurred also at Kashiit; but separable therefrom by the more transverse prothorax, which is also less narrowed in front, and the deeply foveate fifth ventral segment of ♀. The less elongate shape, shorter antennæ and legs, and the more feebly developed tarsal claws distinguish *M. brevicollis* from *M. hacquardi*.

42. *Melyris piligera*, sp. n.

♀. Elongate, rather dull above, shining beneath; green, the antennal joints 2-4, the trochanters, femora, and tibiæ rufo-testaceous, the rest of the antennæ and the tarsi black; thickly clothed with rather long, decumbent, blackish hairs, these forming a close curled fringe along the margins of the prothorax and elytra, the apex of the abdomen with long black hairs; the head and prothorax closely punctulate and reticulate. Head short; antennæ short, joints 5-11 closely articulated and broadly widened, forming an elongate club. Prothorax transverse, gradually, arenately narrowed from the base, feebly canaliculate, the lateral carina sinuate, sharp, the hind angles obtuse, the margins finely crenulate. Elytra at the base a little broader than the prothorax, moderately elongate, widened posteriorly, sharply tricostate to near the tip, the interspaces with four rows of not very coarse punctures, the inferior apical margin crenulate. Beneath closely punctured. Legs rather stout; tarsal claws sharply toothed beyond the middle.

Length $6\frac{1}{2}$, breadth $2\frac{1}{3}$ mm.

Hab. E. CENTRAL AFRICA, Chilangwa in N.W. Rhodesia (*R. C. Wood* : 21. vii. 1913).

One specimen. Smaller, narrower, and less robust than *M. apicalis*, Harold. the under surface wholly green, the upper surface thickly clothed with decumbent blackish hairs, the elytral somewhat regularly quadriseriate-punctate.

43. *Melyris serrata*, sp. n.

♂. Moderately elongate, somewhat depressed, widened

posteriorly, thickly nigro-pilose above, sparsely, finely pubescent beneath, the abdomen with a few long projecting hairs at the tip; bluish-green, the basal three joints of the antennæ (the others black), the legs (the tips of the tarsi excepted), and the posterior margin of the ventral segments 5 and 6 rufo-testaceous; the head and prothorax closely punctulate and reticulate, the prothorax subgranulate. Head rather short; antennæ relatively long, the joints somewhat loosely articulated, 4-10 acutely triangular. Prothorax broader than long, rounded at the sides, narrowed anteriorly, canaliculate, the lateral carina sharp and feebly sinuate, the margins set with small projecting teeth. Elytra much broader than the prothorax, widening to near the apex, rather feebly tricostate, the interspaces triseriate-punctate, the margins narrowly explanate and inferiorly crenulate. Ventral segment 5 feebly arcuate-emarginate, 6 (so far as visible) subtruncate. Legs slender, shining, the tarsal claws toothed near the tip.

Length $4\frac{1}{2}$, breadth $2\frac{1}{10}$ mm.

Hab. E. AFRICA, Victoria Falls of the Zambesi, left bank, alt. about 3000 feet (*Dr. Longstaff*, in *Mus. Oxon.*: 18. ix. 1905).

One example. Smaller, less convex, and more thickly pilose than *M. denticulata*, from Angola, the antennæ elongate, the elytral interspaces triseriate-punctate.

44. *Melyris atricornis*, sp. n.

♀. Elongate, narrow, rather convex, moderately shining, green, the antennæ and legs black, clothed with short decumbent, blackish pubescence, the abdomen with long black hairs at tip; the head and prothorax closely punctulate and reticulate. Head small, short; antennæ short, joints 5-11 broadly widened and closely articulated, forming an elongate club. Prothorax broader than long, gradually, arenately narrowed from the base, sulcate, the lateral carina sinuous, sharp, the hind angles obtuse, the margins finely crenulate. Elytra subparallel, wider than the prothorax, sharply tricostate to near the tip, the interspaces triseriate-punctate and feebly, transversely plicate, the inferior apical margin finely crenulate. Ventral segment 5 unimpressed. Legs rather slender; tarsal claws moderately long, sharply toothed at about the middle.

Length 5, breadth 2 mm.

Hab. E. AFRICA, Dedza District, Central Angoniland, alt. 4000-5000 ft. (*S. A. Neave*: v. 1910).

Described from a ♀ example. Another specimen, ♀, from Mlanje in Nyasaland (*S. A. Neave*: 15. viii. 1913), is perhaps referable to the same species: it is broader than the type, bluish-green in colour, and has the eyes more convex. *M. atricornis* cannot be satisfactorily included under the variable *M. nigripes*, Harold, the intercostal spaces on the elytra being somewhat regularly triseriate-punctate, as well as feebly transversely wrinkled. The puncturing of the upper surface is very much finer, and the elytral costæ much more prominent, than in the allied *M. umbilicata* from Nigeria.

45. *Melyris virens*, sp. n.

♀. Moderately elongate, robust, rather broad, shining, fusco-pubescent; bluish-green, the antennæ and legs nigropiceous, the abdomen brassy-green; the head and prothorax densely punctulate and reticulate. Head and antennæ short. Prothorax transverse, arcuately narrowed anteriorly, sulcate, the lateral carina sinuate, the margins feebly crenulate. Elytra broader than the prothorax, moderately long; sharply tricostate, the interspaces coarsely triseriate-punctate, the inferior apical margin sharply crenulate. Legs rather stout; tarsal claws sharply toothed at about the middle.

Length 5-5½, breadth 2½-2¾ mm.

Hab. E. AFRICA, Uganda and the highlands of Masai (*Scott-Elliot*).

One female, without definite locality. A second example of the same sex, from Ukamba, Tiwa River (*S. W. J. Scholefield*: 22-27. i. 1912), with the margins of the prothorax more distinctly crenulate, the elytral interspaces less coarsely triseriate-punctate, and the ventral segments blue, seems to belong to the same species. Near *M. parvula*, Gerst., but a little broader and more robust, the legs wholly blackish. The non-plicate, triseriate-punctate elytral interspaces and the less elongate shape separate *M. virens* from small *M. nigripes*, Harold, and the broader and more robust build distinguishes it from *M. atricornis*. The present species is also very like the S. African *M. lineata*, the latter being a little less robust, less shining above and beneath, and having longer legs and more feebly toothed tarsal claws.

46. *Melyris uniformis*, sp. n.

♀. Elongate, widened posteriorly, rather convex, sparsely pubescent, dull above, shining beneath; green, the antennæ, palpi, labrum, and tarsi piceous or black; the head and

prothorax densely punctulate and finely reticulate; the abdomen fringed with long hairs at the tip. Head somewhat elongated posteriorly, the antennæ short. Prothorax transverse, arcuately narrowed anteriorly, feebly canaliculate, the lateral carina sinuate. Elytra long, wider than the prothorax; rather sharply tricostrate, the interspaces alutaceous and somewhat finely tri-seriate-punctate. Tarsal claws sharply toothed at about the middle.

Length 7, breadth 3 mm.

Hab. E. AFRICA, Kondowe to Karonga in Nyasaland, alt. 2000 ft. (*A. Whyte, in Mus. Brit.*: 1897).

One female. A form extremely like *M. piligera* from N.W. Rhôdesia, metallic green above and beneath, the legs and antennæ wholly blackish, the upper surface more sparsely pubescent, the elytra tri- (instead of quadri-) seriate-punctate, the head a little longer, and the tooth of the tarsal claws arising from nearer the base. The longer head and larger size separate *M. uniformis* from *M. atricornis*.

Somaliland Forms*.

a. Prothorax and elytra metallic.

a¹. Metasternum, abdomen, and legs testaceous No. 47 †.

a². Metasternum metallic, abdomen and legs testaceous. Nos. 48-50 †.

b. Prothorax or elytra with their outer margins, the former sometimes entirely, rufescent, the legs in part and abdomen testaceous Nos. 51-54.

c. Prothorax and elytra metallic, the abdomen and legs black, elytra very coarsely confluent punctured [Sokotra]. No. 55.

47. *Melyris pleuralis*.

Melyris pleuralis, Fairm. Ann. Soc. Ent. Belg. xxxvii. p. 149 (1893).

♂. Ventral segment 5 broadly and rather deeply arcuate-emarginate; 6 transversely tumid in the centre in front of the triangular apical notch.

Var.? The metasternal side-pieces rufo-testaceous, the prothorax more coarsely punctured.

Hab. E. AFRICA, Somaliland (*Revoil, in Mus. Brit.*: ♂): Onebbi (*Dr. Keller*: type), Basso Ganana and Boran Galla (*V. Bottego, in Mus. Genoa*: vii., viii. 1893: ♀), Af-goï [Benadir] (*V. Casale, in Mus. Genoa*: ♀).

* Including Sokotra Island. One species (No. 70) from Obock is included amongst the N. African and Arabian forms.

† The Arabian *M. kluji* (No. 65), which is similarly coloured, extends to Somaliland and Abyssinia.

‡ The similarly coloured *M. parvula* (No. 40) and *nobilis* (No. 37) have been recorded from S. Somaliland.

A male from the Fry collection agrees fairly well with the description of this species, and seven females in the Genoa Museum must also belong here. The latter are blue or bluish-green above, and extremely like *M. gestroi*, Pic, but they have the side-pieces only of the metasternum metallic. The male has the upper surface green and the humeral callosities violaceous. These specimens have the antennæ (except at the apex), legs (the knees and tips of the tarsi excepted), and under surface (the sternal side-pieces excepted) rufo-testaceous; the prothorax sulcate on the disc and excavate on each side at the base, the lateral carina reaching the rather prominent hind angles; the elytra sharply tricostate, the interspaces with about four rows of punctures. Fairmaire separated *M. pleuralis* from his *M. semihirta*, also from Somaliland (but not represented in the collections before me), by the more prominent hind angles of the prothorax, the yellow metasternum (the side-pieces excepted), the non-villose body, &c. The length varies from 9–10½, and the breadth from 3¼–4¼ mm. The variety (?) is represented by a large ♀ from Boran Galla.

48. *Melyris viridinitens*.

Melyris viridinitens, Fairm. in Revoil's Faune et Flore Comalis, Coléopt. p. 57 (1882).

♂. Ventral segment 5 shallowly, 6 triangularly, emarginate, the latter bi-impressed.

Hab. E. AFRICA, Somaliland (*Revoil, ex colls. Sharp and Fry*).

There is a pair of this species in the British Museum, the ♂ having been received from Deyrolle by Dr. Sharp as *M. viridinitens*. A brilliant metallic green or bluish-green form, the prothorax, scutellum, and metasternum golden-green, the abdomen, legs, and the antennæ in great part rufo-testaceous; the prothorax rather long and subconical, canaliculate, foveate on each side at the base, the lateral carina feebly sinuate, the surface shallowly reticulate and finely punctulate; the elytra oblong, very sharply tricostate, the interspaces with 3–4 rows of coarse punctures, the inferior apical margin feebly crenulate; the tarsal claws very long, sharply toothed towards the tip; the apex of the abdomen fringed with long blackish hairs in both sexes. Fairmaire's description of the terminal (sixth) ventral segment must apply to the ♂, and not to the ♀ as stated.

49. *Melyris anceyi*, n. n.

Melyris versicolor, Ancy, Le Naturaliste, iv. No. 10, p. 78 (May 15th, 1882); Fairm. in Revoil's Faune et Flore Çomalis, Coléopt. p. 58 (1882) (nec Chev.): Pic, Ann. Mus. Genova, xxxix. p. 508, nota (1899).

♂. Ventral segment 5 slightly hollowed at apex, 6 bi-impressed, convex in the middle in front of the triangular apical notch; median lobe of aedeagus pointed and slightly curved downward at tip.

♀. Ventral segment 6 black, cleft down the middle.

Hab. E. AFRICA, Somaliland (*Revoil, ex colls. Sharp and Fry; Mus. Oxon., ex Deyrolle*).

If the specimens of this insect before me—a pair in the Oxford Museum, and various others, ♂ ♀, in the Sharp and Fry collections, all received from Deyrolle—are correctly named, *M. versicolor*, Ancy, seems to me to be merely a form of *M. viridinitens* with a rougher and more deeply grooved prothorax. The colour is variable—green, bluish-green, or brilliant violaceous, the reflexed margins of the prothorax being testaceous in one example. The narrower, subconical, more closely sculptured prothorax separates both species from the Abyssinian *M. festiva*, Reiche, which is also a larger insect. The long black hairs at the apex of the abdomen do not arise from the fifth segment as stated by Fairmaire.

50. *Melyris ruspolii*.

Zygia ruspolii, Pic, Ann. Mus. Genova, xxxix. p. 508 (1899).

♂. Ventral segment 5 feebly emarginate at apex, 6 narrowly exposed, bifoveate, notched at tip.

Hab. E. AFRICA, Somaliland: Milmil and Salolé.

There is a long series, ♂ ♀, of this species in the Genoa Museum. It is of about the same size (length 6–8½ mm., excluding head) as the Abyssinian *M. fulvipes*, Reiche, which also has a long prothorax, from which the present species differs in its elongate narrow head, rugosely punctate, sharply tricostate elytra, and rufo-testaceous abdomen.

51. *Melyris discoidalis*.

Melyris discoidalis, Fairm. in Révoil's Faune et Flore Çomalis, Coléopt. p. 59 (1882).

Zygia discoidalis, Bedel, L'Abeille, xxix. p. 36 (1897); Schilsky, Käf. Europ. xxxiv. No. 92 (♂) (1897).

Hab. E. AFRICA, Somaliland, Oboek (*Mus. Brit.*).

A ♂ in the Oxford Museum, received from Deyrolle under the name *M. rubrocincta*, Fairm., and two immature examples of the same sex from Obock * (*Dr. Martin*), seem to be referable to *M. discoidalis*. They are testaceous in colour, with the head and two patches on the disc of the prothorax black, the elytra with a fusco-cæruleous stripe or space on the disc (leaving the outer margins and sutural regions testaceous); the puncturing of the interspaces sparser, coarser, and more regularly arranged than in *M. rubrocincta*. The metasternum is testaceous in the Obock specimens and infusate in the other one. The tarsal claws are very long, toothed at the middle.

52. *Melyris limbifera*.

Melyris limbifera, Ancy, Le Naturaliste, iv. No. 8, p. 62 (April 15th, 1882)¹.

? *Zygia rubrolimbata* and var. *rollei*, Pic, L'Echange, xxv. p. 142 (1909)².

♂. Ventral segment 5 feebly emarginate, 6 deeply bi-impressed and triangularly emarginate.

♀. Ventral segment 6 and terminal dorsal segment black, the former cleft.

Hab. E. AFRICA, Somaliland^{1 2} (*E. Lort Phillips and Miss Gillett, in Mus. Brit.*).

There are a dozen examples of this species in the British Museum, received in 1895 and 1898. It is recognizable by the expanded, sharply upturned, testaceous or rufo-testaceous margins of the prothorax and elytra, the reddish colour of the prothorax so extended as to leave only a large black patch or two oblong marks on the disc, the rest of the elytra being metallic blue. The legs (except the tarsi, wholly or in part) and abdomen are testaceous, and the metasternum more or less infusate. The tarsal claws are very long, toothed at the middle, and the fourth antennal joint is triangular. Pic, in his description of *Z. rubrolimbata*², says nothing about the similarly coloured *M. limbifera*, Ancy, from the same region, the type of which should be in his own collection (*cf.* Le Nat. 1898, p. 273). *M. marginicollis*, Ancy (? = *collaris*, Fairm.), also from Somaliland, not represented in the collections before me, is an allied form with the elytra wholly blue.

* *M. (Zygia) notaticollis*, Pic (1905), from Obock, is a different species coloured like *M. (Zygia) oblonga*, F.

53. *Melyris rubrocincta*.

Melyris rubrocincta, Fairm. in Révoil's Faune et Flore Comalis, Coléopt. p. 60 (1882).

Hub. E. AFRICA, Somaliland (*Mus. Brit.* : ♂ ♀), Berbera (*coll. Andrewes*).

Distinguished from *M. limbifera* by the long narrow head, the longer, subconical, wholly cyaneous prothorax, and the rather sharper elytral costæ. The ♂-ventral-characters, so far as visible without dissection, are similar. The lateral carina of the prothorax is incomplete in one of the five specimens before me. The tarsal claws are very long, sharply toothed at about the middle.

54. *Melyris circumsepta*, sp. n.

Oblong-oval, widened posteriorly, rather convex, somewhat thickly pubescent, dull, the elytra and under surface shining; rufo-testaceous, the head, the antennæ in their outer half, the tarsi and scutellum, and in some specimens the tibiæ and two spots on the disc of the prothorax also, black, the elytra (the expanded reddish margins excepted) cyaneous; the abdomen fringed with long black hairs at the tip, the terminal segment also black in ♀; the head and prothorax densely punctulate and finely reticulate. Head narrow, rather long; antennæ short, joints 5-10 serrate, 4 narrow. Prothorax convex, a little broader than long, rounded at the sides, compressed and much narrowed anteriorly, canaliculate, the lateral carina sinuate and well defined, the margins feebly dilated, the hind angles obtuse. Elytra oblong-oval, much wider than the prothorax in ♀, narrower in ♂, acuminate at tip, the margins rather broadly explanate; feebly tricostrate, the interspaces with from 3-4 rows of moderately coarse punctures. Tarsal claws toothed at about the middle.

♂. Ventral segments 5 and 6 emarginate, 6 bi-impressed. Length 6-7, breadth $2\frac{3}{4}$ - $3\frac{2}{3}$ mm. (♂ ♀.)

Hub. N.E. AFRICA, Hartan Peninsula in Eritrea (*M. Cameron*).

Two males and three females. A small form of the insect here identified as *M. limbifera*, Ancy, with the head narrower, the prothorax less dilated at the sides, and the under surface wholly testaceous. *M. rubrolimbata* and its var. *rollei*, Pic (L'Echange, xxv. p. 142, 1909), from the Somali Coast, the prothorax of which varies in colour in the same way, is a much larger insect (length 9-11 mm.) and has an infusate

metasternum. The Hartan Peninsula forms one side of Beilul Bay. The exact locality for *M. rubrolimbata* is not recorded.

55. *Melyris insularis*.

Melyris insularis, Gahan, Bull. Liverpool Mus. iii. p. 8 (1900).

Hab. E. AFRICA, Sokotra Island, Abd-el-Kuri (*W. R. O. Grant*: 22. ii. 1899).

Two males and one female were captured by Mr. Grant.

A rather short broad form, metallic green above, the antennæ (joints 2-5 excepted), legs, and ventral segments black or piceous; the prothorax transverse, trapezoidal, somewhat hollowed at the sides, the anterior angles prominent, obtuse, the hind angles drawn out laterally, the lateral carina sinuate and not very conspicuous, the median groove evanescent anteriorly; the elytra very coarsely, tri-seriately, subconfluently punctate between the narrow costæ; the tarsal claws long, armed with a small tooth towards the apex. The ♂ has the sixth ventral segment testaceous, and almost smooth, convex along the middle; the median lobe of the ædeagus stout, acuminate, and curved.

Abyssinian Forms *.

a. Prothorax and elytra metallic, abdomen and legs partly or entirely testaceous.

a¹. Prothorax more or less villose Nos. 56-58.

b¹. Prothorax not villose Nos. 59-63.

b. Prothorax, elytra, and under surface metallic, legs testaceous; elytra obsolete costate No. 64.

56. *Melyris corrosa*.

Melyris corrosa, Reiche, in Ferret and Galinier's Voyage Abyss., Ins. p. 291, t. 18, figs. 1, 1a (1850).

Melyris onychina, Roth, in Wieg. Archiv, 1851, i. p. 121.

Melyris atripilosus, Gorb. Ann. Mus. Genova, xviii. p. 600 (1883).

♂. Ventral segment 5 without median depression, broadly arcuate-emarginate at apex, 6 bi-impressed.

Hab. ABYSSINIA, Goundet to Adoua (*Raffray*, in *Mus. Genoa*).

Dr. Gestro has lent me four males of *M. atripilosa*, Gorb. including the type, and a larger worn co-type, ♀, of *M. corrosa*, Reiche. The only visible difference between them is due to the fresher condition of the males, the numerous long black erect hairs on the head, prothorax, and

* *M. klugi*, Baudi (No. 65), extends to Abyssinia and Somaliland, and *M. nobilis*, Gerst. (No. 37), has been recorded from the same regions.

under surface being intact in the specimens of *M. atripilosa* captured by Raffray. A large violaceous, blue, or bluish-green, pilose insect, with a transverse, conical, coarsely, closely umbilicate-punctate, villose prothorax, the elytral interspaces coarsely, closely punctate, the abdomen in great part, or entirely, and the legs testaceous, the latter more hairy than in *M. abdominalis*, F. Reiche's figures show the villose prothorax.

57. *Melyris conicicollis*.

Melyris conicicollis, Gorch. Ann. Mus. Genova, xviii. p. 601 (1883).

Hab. ABYSSINIA.

The types of this species are females. As the author states, *M. conicicollis* is separable from his *atripilosa* (= *corrosa*, Reiche) by its smaller size, the non-pilose under surface of the body, and the more strongly costate elytra; he, however, omitted to note that it had a very much narrower head, and that the long pilosity was sparser on the prothorax and not altogether absent from the head.

58. *Melyris pilicollis*, sp. n.

♀. Elongate, subparallel, rather dull; obscure olivaceous or bluish-green, the antennæ (except the inner portions of joints 5-11), legs (the tips of the tarsi excepted), and the ventral segments 1-5 at the sides and along their posterior margin testaceous; sparsely clothed above with decumbent fuscous pubescence, the hairs forming a close fringe along the edges of the elytra, the prothorax with intermixed very long, erect or laterally projecting, blackish hairs, the abdomen also with long black hairs at the apex, the under surface closely pubescent; the head and prothorax densely punctulate and coarsely reticulate. Head broad, short; antennæ short. Prothorax broader than long, conical, rapidly narrowing from the rather sharp hind angles, deeply sulcate, and with a strongly sinuate lateral carina, the base slightly excavate on each side within the carina. Elytra long, much broader than the prothorax, a little widened posteriorly, rounded at the apex; rather feebly tricostate, the interspaces alutaceous and each with about four rows of moderately coarse punctures. Tarsal claws long, toothed near the tip.

Length $8\frac{1}{4}$, breadth $3\frac{1}{4}$ mm.

Hab. ABYSSINIA, Seioa [Shoa] (*Antinori*, in *Mus. Genou*).

Two females, captured by Antinori in May 1877, found amongst the extremely long series of *M. pectoralis* belonging to the Genoa Museum. This species has the prothorax

conical and clothed with long erect blackish hairs as in *M. conicicollis*, Gorh.; but it differs from that insect in having a shorter and broader head, sharper hind angles to the prothorax, more finely punctured, duller elytra, and the ventral segments of the ♀ in great part infuscate, these segments being probably wholly testaceous in the unknown ♂. The conical hairy prothorax, &c., separate it from *M. pectoralis*, and its much larger size, &c., from *M. olivacea*, Guér.

59. *Melyris gestroi*.

Zygia gestroi, Pic. Ann. Mus. Genova, xxxix. p. 507 (1899).

Hab. ABYSSINIA, Gallago, Salolé, and Hauacio (*Ruspoli*, in *Mus. Genoa*).

The types of this species are ♀ ♀. *M. gestroi* is a form of the insect here identified as *M. pleuralis*, Fairm., differing from it in the wholly green metasternum and the slightly longer and narrower head; the latero-basal depressions of the prothorax are deep in both of them. Pic does not mention *M. pleuralis*, and compares his species with *M. festiva*, Reiche, and *M. versicolor*, Ancy, to which it bears but little resemblance.

60. *Melyris pectoralis*.

Melyris pectoralis, Reiche, in Ferret and Galinier's Voyage Abyssin., Ins. p. 293 (1842); Ann. Soc. Ent. Fr. 1852, p. 97.

Melyris ceruginosa, Roth, in Wieg. Archiv, xvii. 1, p. 121 (1851).

Melyris hæmorrhoidalis, Roth, l. c.

Melyris festiva, Gorh. Ann. Mus. Genova, xviii. p. 509 (1883) (nec Reiche).

♂. Ventral segment 5 broadly arcuate-emarginate, 6 short, deeply foveate, notched at tip; median lobe of ædeagus stout, pointed at apex.

♀. Terminal abdominal dorsal and ventral segments black, the ventral one cleft.

Hab. ABYSSINIA (*Mus. Brit.*; *Mus. Oxon.*; *Raffray*, ex coll. *Sharp*); Adda Galla, Harar, Bogos, Scioa, &c. (*Mus. Genoa*); Zegi Tsana (*Degen*, in *Mus. Brit.*); Junction Camp—E. Elgon (*Dr. Bayer*, in *Mus. Congo Belge*: iv.—v. 1914: ♀).

There are upwards of 200 examples of this species in the Genoa Museum, including a ♂ marked "typus," received from M. Oberthür in 1878, and many more in the British Museum. Specimens of it are labelled *M. pectoralis* in all the collections I have examined. Reiche's description is rather vague, and Gorham identified the Genoa Museum series as

M. festiva, which is a broader insect, with a smoother, brilliantly metallic prothorax. *M. pectoralis* is recognizable amongst the allied Abyssinian forms by its elongate shape, greenish or blue colour, with the legs, abdomen, and the greater part of the antennæ rufo-testaceous; the short head; the transverse, laterally rounded, subquadrate, coarsely punctured, sulcate prothorax, with a sharp sinuous lateral carina; and the elongate, subparallel, tricostate elytra, the interspaces of which have about four rows of moderately coarse punctures. The tarsal claws are long and sharply toothed beyond the middle. *M. hæmorrhoidalis* seems to have been based upon a blue example of the same species. The length varies from 7-11 mm. A ♀ from Cheren, Eritrea (*D. F. Derchi*, 1894), in the Genoa Museum, with the ventral segments black, except along the sides, may represent a new form allied to *M. pectoralis*?

61. *Melyris parallela*, sp. n.

Elongate, parallel, the head and prothorax dull, the rest of the surface more shining, almost glabrous above, thickly clothed with pallid hairs beneath, the apex of the abdomen fringed with long blackish hairs in both sexes; green or bluish-green, the prothorax in two examples cyaneous on the disc and metallic green at the sides, the antennæ (except

Fig. 3.



Melyris parallela, ♂.

at the tip) and legs (except the infuscate tarsi in one specimen), and the ventral segments wholly in ♂, or at the sides and apex only in ♀, rufo-testaceous; the head and prothorax closely, rather coarsely umbilicate-punctate. Head rather broad, short; antennæ short; prothorax strongly transverse, arcuately narrowed anteriorly, in ♂ fully as broad as the elytra, slightly narrower in ♀, sulcate down the middle, and depressed before the base, the hind angles

obtuse, the lateral carina sinuous. Elytra long, parallel, tricostate, the interspaces with four or five rows of moderately coarse punctures. Tarsal claws with a sharp tooth towards the tip.

♂. Joint 1 of intermediate tarsi produced at the inner apical angle (fig. 3); ventral segment 5 broadly arcuate-emarginate, 6 bi-impressed; median lobe of ædeagus terminating in a short downwardly-curved point.

Length 7-9, breadth $2\frac{1}{2}$ - $3\frac{1}{2}$ mm. (♂ ♀.)

Hab. ABYSSINIA (*Mus. Brit.*).

Three specimens, acquired by the Museum in 1876. A form of *M. pectoralis*, Reiche, with the prothorax dilated and fully as broad as the elytra, and the basal joint of the intermediate tarsi somewhat dentiform, in ♂; the ventral segments broadly metallic or infusate across the middle in ♀ (the sexes of *M. festiva* differing in the same way in the two pairs of that species before me); the puncturing of the upper surface not quite so coarse. Amongst the nine species of *Melyris* already recorded from the same country, *M. pectoralis* is the only one with which the present insect can be compared.

62. *Melyris quadricollis*, sp. n.

Melyris corrosa, Gorb. Ann. Mus. Genova, xviii. p. 599 (1883) (nec Reiche).

Elongate, subparallel, slightly widened posteriorly in ♀, the head and prothorax subopaque, the elytra moderately shining; violaceous, cyaneous, or bluish-green, the elytra sometimes wholly greenish, the antennæ (except the inner

Fig. 4.



Melyris quadricollis, ♂.

portions of joints 1 and 5-11, which are black), legs, and abdomen (except the sixth abdominal segment in ♀) rufotestaceous; clothed with fine, decumbent, blackish hairs,

the apex of the abdomen fringed with long black hairs ; the head and prothorax densely punctulate and coarsely reticulate. Head short, rather broad ; antennæ short. Prothorax transverse, subquadrate or trapezoidal, the sides almost straight, finely crenulate, and very gradually converging from the obtuse hind angles forwards (more rapidly so in ♀) ; sulcate down the middle, the lateral carina feebly sinuate and extending outward to the hind angles. Elytra long, subparallel, wider than the prothorax, tricostate, the interspaces with about four rows of rather coarse punctures. Tarsal claws very long, sharply toothed beyond the middle.

♂. Joint 1 of intermediate tarsi very short, 2 produced inferiorly into a slightly curved blunt lobe (fig. 4). Ventral segment 5 without median depression, broadly emarginate at apex, 6 deeply bifoveate.

Length $7\frac{1}{2}$ –11, breadth 3– $4\frac{3}{4}$ mm. (♂ ♀.)

Hab. ABYSSINIA, Scioa [Shoa] (*Antinori*, in *Mus. Genoa*), Gatelo Amayu (*R. J. Sturdy*: 4. xi. 1911: ♀).

Nearly one hundred specimens of this species are before me, including many males. Gorham was unable to distinguish it from the insect incorrectly identified by him as *M. festiva* (= *pectoralis*, Reiche), from which it is easily separable by the straighter-sided, subquadrate, slightly smoother prothorax, and the inferiorly lobed second joint of the ♂ intermediate tarsi, there being no trace of this lobe in the same sex of the allied *M. corrosa*, *pectoralis*, or *festiva*. In the ♂ tarsal structure *M. quadricollis* approaches *M. klugi* and *bicalcarata*.

63. *Melyris festiva*.

Melyris festiva, Reiche, in Ferret and Galinier's Voyage Abyssin., Ins. p. 292, t. 18, figs. 2, 2a (1849) [nec Goth. Ann. Mus. Genova, xviii. p. 599 (1883)].

♂. Ventral segments fulvous, 5 shallowly, broadly emarginate, 6 deeply bi-impressed ; terminal dorsal segment fringed with long fulvous hairs at apex.

♀. Ventral segments broadly viridi- or nigro-cyaneo-fasciate, terminal dorsal segment black and fringed with long black hairs at apex.

Hab. ABYSSINIA (*Raffray*: *Mus. Genoa*, *Mus. Oxon.*, and *ex coll. Sharp*).

There are a pair of this species in the Genoa Museum, a pair in the British Museum (*ex coll. Sharp*), and a ♀ in the Oxford Museum. Four of these specimens have the head and prothorax brilliant metallic green or bluish-green and the

elytra violaceous or greenish violaceous; the fifth has the elytra green, the head golden-green, and the prothorax golden-cupreous. In general shape *M. festiva* is broader than *M. pectoralis*; the prothorax is strongly transverse, much narrowed anteriorly, and more finely punctured on the disc (thus appearing smoother, as shown in Reiche's figures); and the ventral segments are differently coloured in the two sexes, as in *M. parallela*. The tarsal claws are extremely long and sharply toothed towards the apex.

64. *Melyris fulvipes*.

Melyris fulvipes, Reiche, in Ferret and Galinier's Voyage Abyssin., Ins. p. 294, t. 18. figs. 3, 3a (1849) [nec Klug]¹; Gorh. Ann. Mus. Genova, xviii. p. 600 (1883)².

♂. Ventral segment 5 feebly emarginate, unimpressed, 6 bifovcate.

Hab. ABYSSINIA¹ (*Mus. Brit*, *Mus. Oxon.*), woody district from Goundet to Adoua² (*Raffray*, in *Mus. Genoa*); SOUDAN, Metammeh (*P. Magretti*, in *Mus. Genoa*: 22. iii. 1883).

Of this species there are nine specimens before me—seven from Abyssinia and two from the Soudan. They are green, golden-green, or cæruleous in colour, above and beneath, with the legs and the basal joints of the antennæ testaceous; the head is comparatively narrow; the prothorax is rather elongate, subconical, and has an almost straight lateral carina; the elytral costæ are almost obsolete, being only just traceable, the interspaces quadriseriate-punctate; and the tarsal claws are sharply toothed beyond the middle. The wholly green under surface separates *M. fulvipes*, Reiche, from *M. bicolor*, *versicolor*, and *klugi*.

N. African, Mediterranean, and Asiatic Forms.

- a. Ventral segments 3-5 of ♂ without linear depressed areas.
- a¹. Prothorax and elytra metallic, abdomen and legs testaceous.
- a². Metasternum testaceous; joint 1 of intermediate, or of intermediate and posterior, tarsi dentiform in ♂. Nos. 65, 66.
- b². Metasternum fulvous or metallic; tarsi simple in ♂. Nos. 67, 68.
- b¹. Prothorax, under surface, and legs rufescent, elytra metallic or black. Nos. 69-71.
- b. Ventral segments 3-5 of ♂ with linear, depressed, ciliate areas in ♂. [*ZYGIA*, s. str.]
- c¹. Prothorax, elytra, and metasternum metallic, abdomen testaceous No. 72.
- d¹. Prothorax and elytra metallic, under surface testaceous No. 73.
- e¹. Prothorax and under surface testaceous, elytra metallic No. 74.
- f¹. Prothorax, elytra, and under surface testaceous; head rostrate. No. 75.

65. *Melyris klugi*.

Zygia klugi, Baudi, Berl. ent. Zeitschr. 1873, p. 315 (♂)¹; Schilsky, Käf. Europ. xxxiv. No. 91 (♂ ♀) (1897)².

Melyris bicolor, Gorh. Ann. Mus. Genova, xviii. p. 600 (1883) (nec Fabr.)³.

Melyris fulvipes, Klug, in litt. (nec Reiche).

♂. Anterior and intermediate trochanters each with a matted pencil of stiff fuscous hairs at the base beneath; intermediate tibiæ feebly curved; intermediate tarsi (fig. 5) with a slender sharp spur near the base of the first joint beneath; ventral segment 5 transversely excavate in the centre, broadly hollowed at the apex, 6 smoother, short, excavate on each side of the convex median portion, narrowly notched at tip; median lobe of ædeagus slightly curved and gradually narrowed distally, the apex blunt; tegmen set with pallid hairs at tip.

Fig. 5.

*Melyris klugi*, Baudi, ♂.

♀. Antennæ shorter than in ♂; coxæ and tarsi simple; ventral segment 5 hollowed down the middle, 6 cleft, black.

Var. ? The metasternum metallic (♂ ♀).

Hab. ARABIA^{1 2 3} (*Mus. Oxon.*), Aden, Lahej, Jeddah, El Hedjaz, Yemen, Muscat (*Mus. Brit.*, *Mus. Genoa*), La Ache [?=Lahej] (*Dabbene*, in *Mus. Oxon.*); SOMALILAND, Arûc (*Mus. Genoa*); ABYSSINIA^{2 3} (*Raffray*, in *Mus. Brit.*), Scioa [Shoa], Massaua (*Mus. Genoa*); ? EGYPT^{2 3}.

A common insect on the Arabian border of the Red Sea, extending to Somaliland and Abyssinia, the sexes being in about equal numbers in the fifty examples of it in the British Museum. Baudi and Schilsky distinguished *M. klugi* from the similarly coloured *M. bicolor*, Fabr., from Egypt, &c., by the non-plicate ventral segments 3-5 in ♂ (these segments in the ♂♂ of *M. bicolor*, *versicolor*, *oblonga*, and *rostrata* having a transverse, linear, flavo-ciliate fold or depression on each side); but they overlooked the spur on

the basal joint of the intermediate tarsi in that sex. The present species may be known by its shining blue or green upper surface, the rufo-testaceous labrum, basal half of antennæ, under surface (the meso- and metathoracic episterna wholly or in part excepted*), and legs (the tips of the tarsi excepted); the slightly rounded sides of the prothorax, which is sulcate down the middle and has a sharp, almost straight lateral carina; the posteriorly attenuate, sharply tricostate elytra (the outer ridge sometimes abbreviated posteriorly), with four or five irregular rows of fine punctures in the interspaces; and the very long tarsal claws, which are toothed near the tip. The ♂-characters are remarkable. Two examples labelled "Arabia," in the British Museum, with the metasternum metallic, seem to belong here.

66. *Melyris bicalcarata*, sp. n.

Elongate, rather convex, shining; blue or bluish-green, the under surface and legs (except the tarsal claws in ♂ and the tarsi wholly in ♀, which are infuscate or black), and the basal 4 or 5 joints of the antennæ, rufo-testaceous, the outer joints of the latter black; sparsely pubescent, the hairs on the under surface longer, those at the tip of the abdomen very long, fulvous. Head short, coarsely,

Fig. 6.



Fig. 7.



Melyris bicalcarata, ♂: 6, intermediate tarsus; 7, posterior tarsus.

closely umbilicate-punctate; antennæ short. Prothorax transverse, gradually arcuately narrowing from near the base, the hind angles somewhat obtuse, the lateral carina very sharp and feebly sinuate; rather coarsely, not very closely punctate, sulcate down the middle and foveate in the centre at the base. Elytra much wider than the prothorax, long; sharply tricostate, the interspaces with about four rows of confluent, moderately coarse punctures,

* Schilsky's var. *b. dubia*, has the metathoracic episterna rufescent.

the inferior margin feebly crenulate. Tarsal claws very long, feebly toothed near the tip. Trochanters each with a small tuft of long bristly hairs at the base beneath in both sexes.

♂. Intermediate (fig. 6) and posterior tarsi (fig. 7) with the basal joint drawn out into a long, stout, curved spur at the apex beneath, 2 oblique; ventral segment 5 with a transverse arcuate depression in front of the apical emargination, 6 short, not arched at the tip; median lobe of ædeagus blunt at the apex.

Length 7-9, breadth $3-3\frac{3}{4}$ mm. (♂ ♀).

Hab. ARABIA, Lahej (Col. Yerbury: ♂), El Hedjaz and Yemen (Millingen: ♂ ♀).

Three males and two females. Extremely like *M. klugi*, and occurring at the same localities, but separable therefrom by the very coarsely punctured head and the apically produced, spur-like basal joint of the middle and hind tarsi in ♂. The insect provisionally identified as *M. (Zygia) notaticollis*, Pic, type from Obock, has very similar tarsal characters.

67. *Melyris cucullata*, sp. n.

♂. Elongate, moderately shining, the elytra dull; bluish-green, the lower surface (including the sternal side pieces), joints 1-5 of the antennæ, and legs (the black tarsi excepted) rufo-testaceous, the rest of the antennæ black; very finely pubescent, the lower surface with longer pallid hairs, the abdomen with long black hairs at the tip. Head short, coarsely umbilicate-punctate; antennæ somewhat loosely articulated. Prothorax slightly flattened on the disc, a little broader than long, trapezoidal, the sides crenulate, sinuate towards the base, the hind angles sharp and directed outward; alutaceous and rather sparsely punctured, canaliculate, the lateral carina sharp, sinuate, the anterior margin strongly raised. Elytra long, subparallel, much wider than the prothorax; tricostate, the interspaces rugulose, with about four rows of rather fine punctures. Trochanters each with a long, coarse, blackish seta. Tarsi simple, the claws long, toothed near the tip. Ventral segment 5 broadly hollowed at apex, 6 excavate on each side of the convex median portion, triangularly emarginate at tip, the pointed apex of the median lobe of the ædeagus visible in the aperture.

Length $8\frac{1}{2}$, breadth $3\frac{1}{2}$ mm.

Hab. ARABIA, Yemen (Millingen).

One male. This insect has the general shape of the

Abyssinian *M. pectoralis* and *quadricollis*, differing from both of them in the wholly fulvous under surface, and the sparsely punctured prothorax, with outwardly-directed hind angles and very strongly raised anterior margin. The more elongate form, the less convex, differently shaped prothorax, simple ♂-tarsi, &c., separate the present species from *M. klugi* and *bicalcarata*.

68. *Melyris cyanopectus*, sp. n.

♂. Oblong-oval, rather broad, cyaneous or bluish-green, the legs and abdomen (the tarsi wholly or in part, and the sixth ventral segment in ♀, excepted), and joints 1-5 of the antennæ, rufo-testaceous, the outer joints of the latter black; sparsely, finely pubescent, the hairs on the entire under surface rather long and flavescent, the abdomen fringed with long hairs at the tip, which are fulvous in ♂ and black in ♀. Head small, short, coarsely, closely punctate; antennæ short. Prothorax convex, strongly transverse, rounded at the sides anteriorly, sulcate down the middle, and with a sharp, feebly sinuate lateral carina; the puncturing sparse on the disc, coarser, closer, and reticulate at the sides. Elytra broad, subparallel in ♂, somewhat rounded at the sides in ♀; sharply tricostate, the interspaces with four rows of moderately coarse punctures, the lateral margins slightly explanate, crenulate at the apex inferiorly. Tarsi simple in the two sexes, the claws long, toothed near the tip.

♀. Ventral segment 5 broadly, feebly, arcuate-emarginate, 6 narrowly exposed, emarginate at apex; median lobe of ædeagus stout, rounded at tip.

Length $7\frac{1}{2}$ - $8\frac{1}{2}$, breadth $3\frac{1}{2}$ -4 mm. (♂ ♀.)

Hab. ARABIA, Lahej (*Col. Yerbury*, in *Mus. Brit.*: ♂), Yemen and La Ache (*Dabbene*, in *Mus. Genoa*, iv. 1884: ♂ ♀).

Two males and five females, including a pair taken "in copula" by Dabbene. Broader and less parallel-sided than *M. klugi*, *bicalcarata*, and *M. bicolor*, especially in ♀; the head coarsely punctured, the prothorax more transverse, the elytra with the lateral margins more prominent and the costæ sharper, the metasternum blue, the tarsi simple in the two sexes. The sharply costate, more coarsely punctured elytra, the coarsely punctate head, and the simple ventral segments 3-5 of ♂, separate *M. cyanopectus* from *M. versicolor*, Chev. The localities quoted as "Lahej" and "La Ache" are doubtless different spellings of the same name.

69. *Melyris scutellaris*.

Zygia scutellaris, Muls. Mém. Acad. Lyon, i. p. 190 (1851)¹; Opusc. Ent. i. p. 50 (1852)²; Schilsky, Käf. Europ. xxxiv. No. 95 (♀) (1897)³.
Melyris sp.?, Champ. Ent. Mo. Mag. i. p. 78 (1914)⁴.

♂. Ventral segments 3-5 without linear folds, 5 foveate in the middle, 5 feebly, and 6 deeply, emarginate, 6 bi-impressed.

Hab. ALGERIA, Biskra, Boghar; TUNISIA, TOZEUR⁴ (G. C. C.).

A ♀ captured at Tozeur in May 1913, a locality to the south-east of Biskra, is almost certainly a form of this species. It has a bright red scutellum and wholly black, sharply tricostate elytra; the tarsal claws moderately long and feebly toothed at about the middle, as in *Zygia oblonga*, F., the tooth being placed near the tip in the similarly-coloured insect here referred to *M. (Zygia) notaticollis*, Pic. A pair in the Oxford Museum, labelled "*Zygia oblonga*," without locality, from which the above-noted ♂-characters are taken, must also belong here; they have blue elytra and the head testaceous in front; the tarsi, unfortunately, are wanting in the ♂. The female only of *Z. scutellaris* appears to have been seen by Mulsant and Schilsky.

70. *Melyris notaticollis*.

? *Zygia notaticollis*, Pic, L'Echange, xxi. p. 130 (1905).

♂. Intermediate and posterior tarsi with the basal joint drawn out into a sharp curved spur at the apex beneath; ventral segments 3-5 without linear folds, 5 foveate in the middle, feebly emarginate at apex, 6 bi-impressed and deeply emarginate; median lobe of ædeagus rather broad, subtruncate at tip.

Hab. N.E. AFRICA, Obock in French Somaliland (*type of Pic*).

A male without locality-label, received many years ago by the British Museum, is referred to this species. It is very like *Zygia oblonga*, F., but differs from the same sex of that species in wanting the ciliate linear folds on the ventral segments 3-5, and in having the basal joint of the intermediate and posterior tarsi dentiform, as in the same sex of the Arabian *M. bicarata*. This species has the front of the head, the antennæ to near the tip, the prothorax (an oblong infusate patch on the posterior part of the disc excepted), scutellum, legs, and under surface testaceous, the rest of the head black, and the elytra nigro-cæruleous; the prothorax transversely subquadrate, and less narrowed

in front than in *Z. oblonga*; the elytra more sharply costate than in the last-named insect; the tarsal claws very long and feebly toothed near the tip.

71. *Melyris erythrodera*, sp. n.

♀. Elongate, rather broad, moderately shining, sparsely pubescent; obscure rufo-testaceous, the head, palpi, labrum, joints 5–10 of antennæ, sides of scutellum, and tips of the tarsi black, the elytra obscure bluish-green; the head and prothorax punctulate and coarsely, closely reticulate. Head and antennæ short, joints 5–11 of latter broad. Prothorax transverse, convex, rounded at the sides, narrowed anteriorly, deeply sulcate, the lateral carina prominent and almost straight, the hind angles obtuse. Elytra long, considerably wider than the prothorax, subparallel, produced at the apex; tricostate, the interspaces closely, rather coarsely quadriseriate-punctate, the inferior margin crenulate. Tarsal claws rather sharply toothed beyond the middle.

Length $9\frac{1}{2}$, breadth 4 mm.

Hab. INDIA, ? Barrackpore (*Maj.-Gen. Sir John Hearsay*).

One specimen, presented to the British Museum in 1861. This example, according to the Register of that Institution, is one of many insects captured by the donor, at Barrackpore, Mussoorie, Punjab, &c., but the exact locality for each of them is not stated. The similarly coloured *M. (Zygia) oblonga*, F., extends to the Persian Gulf, so there can be little doubt as to the present insect occurring in the drier parts of India. The coarser sculpture of the prothorax and the strongly punctured, sharply tricostate, attenuate elytra bring *M. erythrodera* near *M. (Zygia) notaticollis*, Pic, from Obock; and the carinate prothorax distinguishes it from the species of *Pseudozygia* occurring in Somaliland.

72. *Melyris versicolor*.

Melyris versicolor, Chev. in Guérin's Icon. Règne Anim. p. 50¹ (1829–1844).

Zygia versicolor, Schilsky, Käf. Europ. xxxiv. No. 90 (♂ ♀) (1897).

Hab. MEDITERRANEAN REGION, Spain, Corsica, Sardinia, &c.; ASIA MINOR; SYRIA; ALGERIA; EGYPT; ARABIA.

There are about a dozen examples of *M. versicolor* in the three collections before me. It is a form of *M. bicolor*, F., with the metasternum metallic. The ♂-characters are similar. The allied *Zygia longicollis*, Schilsky (1897), from Turkey and Cyprus, ♀ only known, has the entire under surface green.

73. *Melyris bicolor*.

Melyris bicolor, Fabr. Syst. Eleuth. i. p. 311 (1801)¹; Baudi, Berl. ent. Zeitschr. 1873, p. 315².

Zygia bicolor, Schilsky, Käf. Europ. xxxiv. No. 92 (♂ ♀) (1897)³.

“*M. supra cœrulescens, subtus ferrugineus. Statura omnino M. viridis, at minor. Caput cœrulescens. Thorax utrinque linea elevata cœrulescens. Elytra punctata, lineis tribus elevatis exterioribus sensim abbreviatis. Corpus cum pedibus rufum.*”
(Fabr.)

♂. Basal joint of intermediate tarsi unarmed; ventral segments 3–5 with a transverse, oblique, fulvo-pubescent depression on each side, 5 broadly, feebly emarginate at apex, 6 almost smooth and without definite depressions.

Hab. EGYPT, Cairo¹ (*Mus. Genoa*: ♀); SYRIA²; ARABIA, Hedjaz (*Millingen, ex coll. Sharp*: ♂).

M. bicolor, as restricted by Baudi and Schilsky, has the entire under surface (the metasternal side-pieces wholly or in part in both sexes, and the sixth ventral segment in ♀, excepted) fulvous: the elytral costæ are rather feeble, being almost obsolete (as in *M. fulvipes*, Reiche) in a ♂ from Hedjaz in the Sharp collection. The ♂ tarsal and abdominal characters, and the less prominent elytral costæ, separate *M. bicolor* from *M. klugi*, Baudi. There are three females of the Fabrician insect in the Genoa Museum.

74. *Melyris oblonga*.

Zygia oblonga, Fabr. Syst. Ent. p. 126 (1775); Schilsky, Käf. Europ. xxxiv. No. 94 (♂ ♀) (1897).

♂. Ventral segments 3–5 with a transverse, linear, flavo-pubescent, depressed space on each side, 5 and 6 emarginate at apex, 6 bi-impressed.

Hab. MEDITERRANEAN REGION; ALGERIA: ASIA MINOR; ARABIA; MESOPOTAMIA: PERSIAN GULF, Fa'o (*W. E. Cumming*: v. 1891).

A widely distributed insect, females largely preponderating in the series examined. The elytra vary in colour—violetaceous, blue, or black—and the scutellum and elytral margins are sometimes red (= var. *mulsanti*, Schilsky), or the epipleura red (var. *limbata*, Pic). The plicate ventral segments in ♂ separate *M. (Zygia) oblonga* from all the similarly coloured forms except *M. (Zygia) reitteri*, Heyd., from Tripoli, which does not seem to be represented in the material before me.

75. *Melyris rostrata*.

Zygia rostrata, Reiche, Ann. Soc. Ent. Fr. 1857, p. 184, t. 5. fig. 2; Schilsky, Käf. Europ. xxxiv. No. 87 (♂ ♀) (1897).

♂. Ventral segments 2-5 with a transverse flavo-ciliate fold or depressed area on each side extending from near the middle to not far from the outer margin, 5 and 6 emarginate at apex, 6 smoother and bi-impressed.

Hab. SYRIA; PALESTINE.

There is a long series of this species in the British Museum and several others at Oxford, some of which are from Jerusalem. Five males seen. Recognizable by the fulvous body and narrow, black, rostrate head, the terminal abdominal segment in ♀ also infuscate or black. An allied narrower form from Sinai, with the metasternum infuscate, has been named *Zygia sinaila* by Pic (1913).

SECTION II.

Prothoracic carinæ wanting.

a. *Prothorax convex or gibbous, red, elytra metallic.* [Subgen. PSEUDOZYGLIA, Pic.]

76. *Melyris argodi*.

Pseudozygia argodi, Pic, L'Echange, xvii. p. 26 (1901).

♂. Ventral segment 5 broadly, deeply emarginate, 6 obliquely excavate towards the sides, notched at the tip.

Hab. E. AFRICA, Berbera [type], Somaliland (*Greenfield*, in *Mus. Brit.*: ♂).

A male from Somaliland, received in 1894, seems to be a variety of this species with the black portion of the legs extending to the tarsi, tibiae, and tips of the femora. It has the prothorax broad, transversely gibbous, opaque, and densely, shallowly reticulate; the elytra shorter and less acuminate than in *M. (P.) rubricollis* (type ♀), brilliant violaceous, the interspaces very coarsely, irregularly, transversely plicate, as well as confusedly punctate, the three costae sinuate and crenulate; the tarsal claws feebly toothed towards the tip.

77. *Melyris cyanipennis*, sp. n.

Elongate, rather broad, convex, moderately shining, finely pubescent; fulvous, the head, palpi, outer joints of antennae, sides of scutellum, tarsal claws, and terminal segment of abdomen in ♀, black, the elytra cyaneous; the head densely,

the prothorax a little more sparsely, punctulate and reticulate; the abdomen fringed with long hairs at the tip. Head and antennæ short, the joints 5-11 of latter moderately widened. Prothorax transverse, gibbous, rounded at the sides, narrowed in front; the thickened anterior margin projecting forward over the head, the disc obsoletely grooved, the lateral carina wanting. Elytra moderately elongate, subparallel, very little wider than the head, rounded at the apex; tricostrate, the interspaces transversely wrinkled and confusedly triseriate-punctate. Tarsal claws long, feebly toothed towards the tip.

♂. Ventral segment 5 deeply emarginate, 6 convex along the middle and hollowed on each side of this, notched at the tip.

Length 8-9, breadth $3\frac{1}{2}$ mm. (♂ ♀.)

Hab. E. AFRICA, Somaliland (*Greenfield, in Mus. Brit.*).

Two males and one female, sent with a ♂ of *M. (Pseudozygia) argodi* from the same country. Much smaller than that insect; the prothorax less densely reticulate (the interspaces shining), the disc rounded and less gibbous in ♂; the elytral sculpture much finer; the legs almost wholly fulvous. Compared with the much larger *M. (P.) rubricollis*, the type (♀) of which from Hauacio has been lent me by Dr. Gestro, the elytra are relatively shorter and narrower, and have less prominent humeral callosities and more sparsely, punctured interspaces.

b. *Prothorax moderately convex*, black. [*Subgen. MELYRIDELLA, n. n.]

a¹. Body black or metallic.

a². Elytra moderately long, legs in part testaceous.

[S. Africa] No. 78.

b². Elytra very elongate, legs black. [Abyssinia] No. 79.

b¹. Body in part black, elytra, abdomen, and legs testaceous. [Damaraland] No. 80.

78. *Melyris excisa*, sp. n.

♀. Moderately elongate, depressed, widened posteriorly, moderately shining, sparsely pubescent; cyaneous, the legs and abdomen rufescent, the tarsi slightly infusate, the antennæ black, the abdomen fringed with long, fine, fulvous hairs at the tip; the head and prothorax densely punctulate and reticulate. Head rather small, short, bisulcate anteriorly, the eyes rather prominent; antennæ short, joint 5

* Includes *M. granulata*, F., and its N. African and Asiatic allies.

sharply triangular, 6-10 produced on the inner side into a dentiform ramus, 11 concavo-truncate at the apex. Prothorax strongly transverse, arcuately narrowed from the base forward. the base itself feebly sinuate, the hind angles obtuse; without lateral carina or definite median groove, the margins narrowly explanate. Elytra broader than the prothorax, widening to near the apex, the margins explanate from a little below the shoulder to the sutural angle, the inferior edge crenulate throughout; sharply tricostate, the interspaces feebly transversely wrinkled, coarsely biseriately-punctate, and each with an intermediate row of smaller punctures. Ventral segments very sparsely, minutely punctate; 5 truncate at apex, 6 depressed in the middle anteriorly. Legs slender, comparatively short; tarsal claws rather small, sharply toothed near the base.

Length $4\frac{1}{4}$, breadth 2 mm.

Hab. S.E. AFRICA, Umfuli (*G. A. K. Marshall*: ix. 1895).

One specimen. A small, oblong, depressed, metallic blue insect, with rufescent legs and abdomen, agreeing with *M. testaceipes*, Fairm. (1888), from Owampo, in wanting the marginal carina on the prothorax, a character common to the Palearctic *M. granulata*, F., and its allies. *M. testaceipes*, length 7 mm., must have a longer prothorax, more rounded elytra, &c., than the present species. *M. obscuritarsis*, Pic (Col. Rundschau, i. p. 53, 1912), from the Panzani Falls, compared with *M. lineata*, Fabr., by its describer, is somewhat similarly coloured; but these forms have a laterally carinate prothorax.

79. *Melyris longipennis*, sp. n.

♂. Elongate, narrow, somewhat depressed, moderately shining, the head, prothorax, and scutellum subopaque; black, the elytra brassy green, the prothorax and under surface with a faint bluish tinge; fusco-pubescent, the abdomen fringed with long blackish hairs at the tip; the head and prothorax densely punctate and finely reticulate. Head short, small; antennæ rather short, joints 5-10 broad. Prothorax transverse, gradually narrowed from near the base, depressed laterally and obliquely grooved on each side of the median sulcus, the lateral carina wanting, the hind angles obtuse. Elytra much wider than the prothorax, elongate, subparallel, rounded at the apex; rather sharply tricostate, the interspaces alutaceous and triseriate-punctate, the inferior margin crenulate. Ventral segment 5 slightly hollowed at apex,

6 excavate down the middle anteriorly, truncate at the tip. Legs long, slender; tarsal claws long, sharply toothed at about the middle.

Length $6\frac{1}{5}$, breadth $2\frac{1}{2}$ mm.

Hab. ABYSSINIA, Scioa [Shoa], Let-Marcfia (*Ragazzi*, in *Mus. Genoa* : v. 1885).

One specimen, assumed to be ♂. An isolated form, with a small, subopaque, uneven, non-carinate, black prothorax, and very elongate, much broader, brassy-green elytra, the latter tricostrate, with the interspaces triseriate-punctate. This species looks out of place in the present genus, but it agrees with *M. granulata*, *excisa*, &c., in general structure.

80. *Melyris fulvipennis*, sp. n.

♂. Oblong-oval, shining, thickly fulvo-pilose; black, the three basal joints of the antennæ, the elytra and legs (the infuscate apices of the tarsi excepted), the apical halves of the ventral segments 1-4, and 5 almost entirely, fulvous or testaceous; the head and prothorax densely punctulate and reticulate. Head short; antennæ somewhat elongate, sharply serrate from the fourth joint. Prothorax convex, rounded at the sides, narrowed anteriorly, sulcate, without lateral carina, the margins crenulate. Elytra moderately long, much broader than the prothorax, conjointly rounded at the apex; obsolete tricostrate, the interspaces closely, rather coarsely triseriate-punctate, the inferior margin crenulate. Tarsal claws toothed beyond the middle.

Length $6\frac{2}{5}$, breadth $2\frac{1}{5}$ mm.

Hab. S.W. AFRICA, Damaraland (*Mus. Oxon.*).

One specimen, bought at Stevens's sale rooms in 1865. Easily identified by the fulvous vestiture, elytra, and legs, and the non-carinate prothorax, the position of the carina indicated anteriorly by a line of fulvous hairs. The only *Melyris* at all resembling it in colour is *M. atriceps*, Pic, from Cape Colony; the two other S. African members of the genus with a similar prothorax are metallic.

Alphabetical numbered list of species of Melyris, Zygia, and Pseudozygia enumerated in the present paper; those marked with an asterisk are described as new.

abdominalis, 21.
albicoma, 36.
alluaudi, 29.
auceyi, n. n., 49.

apicalis, 17.
argodi, 76.
*atricornis, 44.
*aurescens, 7.

- bequaerti, 23.
 *bicalcarata, 66.
 bicolor, 73.
 *brevicollis, 41.
 *capensis, 9.
 *ciliativentris, 8.
 *circumsepta, 54.
 *congoensis, 16.
 conicicollis, 57.
 corrosa, 56.
 *cucullata, 67.
 *cyanipennis, 77.
 *cyanopectus, 68.
 *denticulata, 18.
 discoidalis, 51.
 elongata, 22.
 *erythrodera, 71.
 *excisa, 78.
 festiva, 63.
 *flavofemorata, 33.
 *flavopectus, 27.
 *foveolata, 28.
 *fulvipennis, 80.
 fulvipes, 64.
 gestroi, 59.
 *hacquardi, 39.
 incompleta, 35.
 insularis, 55.
 *itigiensis, 38.
 klugi, 65.
 *lætula, 11.
 *laxicornis, 2.
 lemairei, 25.
 limbifera, 52.
 lineata, 6.
 *longipennis, 79.
 *luckmani, 32.
 *masaiensis, 31.
 mecklenburgi, 30.
 natalensis, 12.
 nigra, 3.
 nigripes, 24.
 nobilis, 37.
 notaticollis, 70.
 oblonga, 74.
 pallidiventris, 34.
 *parallela, 61.
 parvula, 40.
 pectoralis, 60.
 *pilicollis, 58.
 *piligera, 42.
 pleuralis, 47.
 pubescens, 5.
 *quadricollis, 62.
 *quinqueseriata, 15.
 rostrata, 75.
 rubrocincta, 53.
 rufiventris, 14.
 *rufomarginata, 4.
 ruspolii, 50.
 sansibarica, 26.
 scutellaris, 69.
 *serrata, 43.
 subcostata, 20.
 sulcicollis, 13.
 *umbilicata, 19.
 *uniformis, 46.
 versicolor, 72.
 *violacea, 10.
 *virens, 45.
 viridinitens, 48.
 viridis, 1.

SYNONYMS AND VARIETIES.

- æruginosa, 60.
 atripilosa, 56.
 ciliata, 6, 8.
 dubia, 65.
 hæmorrhoidalis, 60.
 interstitialis, 13.
 limbata, 74.
 monticola, 29.
 mulsanti, 74.
 nigrita, 3.
 onychina, 56.
 rollei, 52.
 subapicalis, 24.
 *varipes, 13.
 ventralis, 21.
 versicolor, 49.
 viridipennis, 24.
 viridiventris, 37.

XXIV.—*A Contribution to the Study of South Indian Arachnology.* By W. RAE SHERRIFFS, M.A., D.Sc., formerly Professor of Zoology, Madras Christian College, Madras.

[Plates II.-VI.]

IN the preface to his volume on the 'Arachnida' (Fauna of British India Series) Mr. R. I. Pocock says "all that has been attempted is to afford means of identifying the larger, commoner, better known and more widely distributed forms . . . It is to be hoped that the present work, by facilitating the study of Indian spiders, will increase the number of observers and collectors, so that at some future time a far more complete account of these animals may become practicable."

These sentences were penned in 1900 and during the intervening years no contributions have been made to this subject, excepting quite recent papers by Dr. Gravely of the Indian Museum, Calcutta.

Thorell in his 'Catalogue of the Spiders of Burma' (written in Latin) and Pocock in his 'Arachnida' are purely descriptive, their aim being solely to enable their spiders to be identified. Simon in his vast work 'Histoire naturelle des Araignées' not only is systematic in his treatment, but also gives an account of the habits and customs of the different genera. As he deals with the spiders of the whole world, this part of the subject-matter is necessarily brief.

In the present paper the emphasis is not on the systematic side, for the writer has attempted, for the first time in South India, to enumerate the spiders commonly found throughout the hills and plains, regardless of size or any other consideration, definitely noting localities; also to describe their general life, habits and associations, the nature of the webs, their stabilimenta, and the cocoons with contained eggs.

With regard to the localities a few words of explanation are necessary. The spiders were collected during 1914-18 from three distinct regions—(1) the plains of South India represented by Madras city and the country around for 12 miles to the north (Ennur) and 35 miles to the south (Chingleput), (2) the hills, principally the Nilgiris, (3) central upcountry Ceylon. These three distinct regions differ widely in their rainfall, and therefore in the relative abundance of spiders throughout the year. Around Madras

and the plains of the Carnatic the rainfall is about 50 inches per annum; on the Nilgiris anything from 50–160 inches, while in the Dolosbage district of Ceylon it is 250 inches. The reason for the prolific rainfall in Ceylon is that it gets both the south-west and the north-east monsoons, while the Coromandel Coast of South India receives only the north-east which bursts at the middle of October and recurs at intervals till January. Throughout the greater part of the year Madras is dry—in 1911 the rainfall from 1st January to 30th June was half an inch—and spiders are not common. As soon as the first burst of the monsoon is past, then they appear in large numbers and the webs of the Argioidæ are abundant.

On the Nilgiris the plateau gets both monsoons, the south-west bursting in full force against the western slopes, while the north-east, greatly diminished in strength, reaches the eastern slopes. Ootacamund, towards the centre of the plateau, receives a very little of the north-east but much more of the south-west. On the hills with the higher rainfall spiders are common all the year round. The high rainfall of Ceylon ensures a far greater abundance of spiders at all times than can ever be found in South India—excepting perhaps Cochin and Travancore, for there the vegetation is really tropical and insects are numerous.

In the few cases where I have drawn and painted spiders, I have done so in order to show the beautiful natural colours which, so often being changed or totally destroyed in spirit-specimens, have never been seen by the European authorities to whom collections have been sent from the East. Members of seventeen families have been discussed, but all the Mygalomorph spiders, the Thomisidæ and Salticidæ (Attidæ), though commonly represented, I have in the present paper deliberately omitted.

Madras,
October 24, 1918.

Uloboridæ.

ULOBORUS (Latr.), 1806.

1. *Uloborus geniculatus* (Oliv.).

This pretty grey and white spider is cosmopolitan in the Tropics, according to Simon, who has recorded it from Ceylon. McCook figured the web, cf. 'American Spiders' (i. figs. 56, 57, 163), and the cocoon is accurately described by Simon, vol. i. page 213. The web is not laid horizontally, but

almost vertically. The cocoons about 7 mm. at greatest width, has from 6-10 lobes, and contains from 14-50 eggs. Thorell's account of the cocoon is incorrect as regards colour (page 127). Gravely in the 'Records of the Indian Museum,' xi. pages 533, 534, has noted the association of Uloborids with *Stegodyphus sarasinorum*, *Psechrus alticeps*, *Cyrtophora cicatrosa*, and *Gasteracantha brevispina*. I have seen *U. geniculatus* associated with *Nephila malabarensis*. The spider is not a common one, and is never found in large numbers. I have usually got it within outhouses.

Locality. Nawalapitiya, Ceylon (February), 3000 feet; Kayencolam, Travancore (July); Elliot's Beach, Madras (August); High Court compound, Madras (February); Hillgrove, Nilgiris (May), 4200 feet; Ennur (September). As I have found the cocoons present on each of these occasions, these must be made regularly throughout the year. The spider is thus widespread over South India, both on the plains and also on the hills. Not previously reported from South India.

Psechridæ.

PSECHRUS (Thorell), 1878.

2. *Psechrus torvus* (O. P.-Camb.) (Pl. II. figs. 1, 2)

comes out in the evenings and is nocturnal. Its web is large, of a very dense white, often projecting from under a stone on the banks of the roadsides, and ends in a tubular retreat within which the brown spider lurks inverted. The web is not a true dome, *cf.* 'Cambridge Natural History,' iv. page 399, nor is it sheet-like, *cf.* Pocock, page 210. Pocock's figure, page 211, should be inverted, because the spider always moves inverted below its web. The calamistrum is very short.

P. torvus is very difficult to secure whole because of its very irregular and rapid movements on its web, *cf.* Simon, i. page 225. The dense white web which is sometimes quite big, as much as 2 feet at greatest length, is rivalled in its snowy whiteness by the smaller but similarly shaped web of the little *Ischnothele dunicola* (Poc.), a Dipleurid reported from Poona by Wroughton. Both *P. torvus* and *I. dunicola* occur together on the road-banks of the upcountry tea estates round Nawalapitiya, Ceylon. The web of *Ischnothele* is much smaller than that of *Psechrus*, and differs from it in that the tubular retreat spreads out to form the snare as an expanded sheet, upon which the spider moves after its victim.

Locality. Nawalapitiya, Ceylon (February–May), 3000 feet. *P. torvus* (O. P.-C.) belongs to Ceylon; *P. argentatus* (Dol.) is Malayan, while *P. alticeps* (Poc.) is reported by Gravely from Cochin.

Æcobiidæ.

ÆCOBIUS (Luc.), 1845.

3. *Æcobius* sp.?

Quite recently, while on the hills, I found several spiders belonging to this group (family), which has only the single genus *Æcobius*. These of both sexes were taken while running actively on the outside wall of the house or from the corners of the inside walls of the bath-room. They are small spiders (2 mm. long) and prettily marked with black on a pale ground. The cephalothorax dorsally edged with black, the ocular area is blackish, while the abdomen dorsally is black in front and elsewhere spotted in black. In the species now mentioned the eyes are of the usual type characteristic of the family, but in arrangement they are intermediate between the *annulipes* and *concinus* groups mentioned by Simon (i. page 247).

Locality. Coonoor, Nilgiris (April–May). Probably here first reported from India.

Eresidæ.

STEGODYPHUS (Sim.), 1873.

4. *Stegodyphus sarasinorum* (Karsch)

is the common social spider found throughout South India. Mr. N. S. Jambunathan thirteen years ago published an account of it in the 'Smithsonian Miscellaneous Collections.' This spider is found both in the plains and on the hills and always on bushes round the end branches where the colony is built. *Opuntia* on the plains and *Dodonea* and *Berberis* on the hills are often found bearing the web-masses, but the spider builds quite readily on the netting round tennis-courts. These web-masses are easily recognized yards away and are often several feet above the ground. Centrally the web-mass forms a spindle, about 6" × 4" at the widest part, which is well aerated by many holes. Many threads, which are strong and viscid, connect up this spindle to the neighbouring branches. Jambunathan gives 40–100 as the number of spiders found within one spindle. I have not found many

above seventy. The web-mass has no definite architectural plan, and is very dirty and dusty and covered with the remains of victims, *cf.* flies, beetles, bugs, ants, grasshoppers, and dragonflies.

The male is almost as large as the female. Both sexes are very inert when captured, and lie quite still if touched. They work only during the darkness.

The web-mass or central spindle is the "large saccular nest" mentioned by Pocock. Many cocoons are present within the spindle, each measuring 6 mm. in diameter, as Jambunathan has already noted. The cocoons are white, densely spun and irregularly circular in outline, disc-shaped, and of one piece, which bursts in the middle when the young emerge. The number of eggs enclosed varies from 30-50 almost. Gravely, in *Rec. Ind. Mus.* xi. plate 30, shows the nature of the web in detail.

S. sarasinorum is tending to become a pest of tea in the Nilgiris, because the web-mass is woven closely round the tips of the branches of the tea-bushes, preventing the buds from developing and the tender leaves, gathered for tea-making, from forming.

A planting friend who sent me the spiders had them named "Tea Mealy Bug." He later sent me two cuttings of branches with the web-masses representing spiders from three bushes, 165 spiders in all, 128 ♀, 36 ♂, and 57 cocoons. Jambunathan gives the proportion of the sexes as ♂:♀:: 7:1, but my result yields ♂:♀:: 1:3 roughly, with the ♀ much more numerous than the ♂, as they always are. In the case now cited, 2 acres out of a 9-acre block were affected at a level of 4000 feet, and as the tea-bushes were planted 2500 to the acre the number of spiders present must have been very great. Since the growth of the colonies is not rapid and the spiders can easily be removed by hand and destroyed, there does not seem any likelihood of the spider ever becoming a serious pest, unless sheer neglect allows *Stegodyphus* to get a firm hold. *Stegodyphus sarasinorum* is the only spider I have met with as yet that can be considered of economic importance.

Locality. Madras city; Chingleput; Pamban (April), the desert, sandy region in the extreme south next Ceylon. Within Madras it is found throughout the year and so probably for the whole of South India. Kotagiri (6000 feet) and Hillgrove (4000 feet) on the Nilgiris (April-July); Ennur (September). At the end of September, while ascending the Nilgiri Mountain Railway, I saw from the train the web-masses of *S. sarasinorum* at Kolar Station

(1250 feet), near Adderley Station (2398 feet), and again near Hillgrove Station (3580 feet), but not above this level. These are the lower parts of the great Coonoor Ghaut.

5. *Stegodyphus socialis* (Poc.).

An allied species has been reported from Bangalore by Staunton. It is found on the *Casuarina* trees on Elliot's Beach, just south of Madras city.

Sicariidæ.

Representatives of the genera *Loxosceles* and *Scytodes* are both found in South India, but are not common.

LOXOSCELES (Lowe), 1831.

6. *Loxosceles erythrocephala* (C. L. Koch)

I have got as a house-spider, found at the bottom of a big glass vase within a cupboard. It was living on an irregular web covering the bottom of the vase and bearing remains of the victims.

7. *Loxosceles* sp.?

A pair were found beneath a heavy box on the verandah among dust associating with Chelifers.

Loxosceles is not reported from the East by Simon, *cf.* i. p. 273, but by Thorell, *cf.* p. 68.

Locality. Madras city, all the year round within houses.

SCYTODES (Latr.), 1804.

8. *Scytodes gilva* (*Dictis gilva*), Thor.

Also met with as a house-spider, slender with long legs black at the joints. Web consists of a very irregular mass of threads. Both *Loxosceles* and *Scytodes* are nocturnal only.

Locality. Madras city within bungalows all the year round.

These genera are probably found only on the plains. I have seen none on the hills.

S. marmorata (C. L. Koch) and *S. pallida* (Dol.) are Malayan. The latter lives within curled up leaves after the manner of Clubionids and Theridiids, *cf.* Sim. i. p. 276. Such Theridiids and Clubionids are common here on the

Beach on the bushes there, but I have not yet found *Scytodes* living in this fashion. *S. univittata* (Sim.) is recorded from India.

Prodidomidæ.

ZIMIRIS (Sim.), 1882.

9. *Zimiris doriai*?

A very delicate, small, nocturnal spider, found always at night running on the walls of rooms within the bungalow. Entirely a house-spider and not at all common. Found often behind pictures on the walls, the web being just a few irregular threads on the back of the picture. Pair found together there, and as the male is said by Simon (i. p. 335) to be unknown, I give the following description:—

♂. 2 mm. long; colours very much as in ♀; legs yellow and smooth; abdomen all round in front furnished with short silvery hairs, which contrast with the grey colour of the abdomen itself. Spinnerets long and very much as in ♀; cephalothorax yellow-brown dorsally and quite smooth; palps robust and the palpal organ brown where the chitin is thick. As might be expected, the palpal organ greatly resembles that found in *Prodidomus*, cf. Simon, i. p. 335.

♂ caught running swiftly on the wall. When pursued it jumps like an Attid. When alive the colours are pale yellow, except the coxæ, which are clear and almost transparent; head and sternum clear; abdomen light grey; dark parts are the palpal organs, spinnerets, and feet, while the pair of front eyes are the darkest of all. Leg-span when at rest about 7 mm., almost twice this when extended.

Simon records only one species from India, but does not give its name. Presumably it is this one.

Locality. Madras city only, all the year round. Not obtained on the hills. Probably it is found throughout the plains.

Drassidæ.

Of this very large and difficult family I have met with only two members: *Drassodes lapidosus* (or one of that group) sent me from Palghat and *Leptodrassus* sp.? from within Madras city.

DRASSODES (Westr.), 1851.

10. *Drassodes lapidosus* (Walck.)

is taken by Simon as the type of his first group, cf. i. p. 359. My specimen agrees with the description there given and may be *D. lapidosus* itself, which is reported by Simon from Central and Eastern Asia. The eyes in my specimen are exactly as figured by Simon in fig. 319, which gives the arrangement for *D. lapidosus*. As the specimen was sent me among others I have no idea as to where it was found and when.

Locality. Palghat (June).

LEPTODRASSUS (Sim.), 1878.

11. *Leptodrassus* sp. ?

agrees with Simon's description (i. p. 363) and with his figure of the eyes for *Leptodrassus femineus* (i. p. 355). The teeth on the chelicera are two in number also. The only specimens I have got were all found within white woolly tufts of silk under the ledges of the old lighthouse in the High Court compound, Madras. These spiders associate very closely with certain Attids. For, if the white mass be touched, usually the Attids emerge first and jump off, while the Drassid remains within its hollow.

Locality. Madras city, all the year round.

Zodariidæ.

CRYPTOTHELE (C. L. Koch), 1872.

12. *Cryptothele ceylonica* (Camb.)

was found along with a Theridiid whose irregular web was over a few dried leaves, on which the Theridiid was resting beside her cocoon. *Cryptothele* was the exact colour of the withered leaves.

Locality. Nawalapitiya, Ceylon (March).

Hersiliidæ.

HERSILIA (Sav.), 1827.

13. *Hersilia savignyi* (Luc.)

The only member of this family I have come across is *Hersilia savignyi* (Luc.), which is common in Madras.

Simon (i. p. 445) states that *Hersilia* does not spin a web. Pocock (p. 240), however, is correct in saying Hersiliids spin at most a scanty web of irregular threads. I have seen *H. savignyi*, which is always found on tree-trunks, in the centre of a small circular web formed of very few threads with wide meshes.

H. savignyi is extremely variable in colour, and it usually, but by no means always, resembles very much in colour the tree-trunk on which it is resting. Frequently you do not notice the spider till it moves. It varies from fawn to almost black, and I have seen on the same trunk at the same time both shades, the one practically invisible and the other extraordinarily conspicuous.

Locality. Madras city, all the year round. Also from Carolina, Nilgiris, at 5600 feet. Not nearly so common on the hills as on the plains.

Pholcidæ.

The three well-known species described by Pocock (pp. 238-240) are common spiders. *Artema atlanta*, *Smeringopus elongatus*, and *Crossopriza lyoni* are all present in South India as ordinary house-spiders.

ARTEMA (Walck.), 1837.

14. *Artema atlanta* (Walck.)

has the well-known habit of swinging up and down very rapidly on its web when disturbed, probably to render itself less visible. Simon notes that the number of eggs is never considerable, but, though the usual number seems to be about 50, I have found close on 150.

Locality. Madras city.

SMERINGOPUS (Sim.), 1890.

15. *Smeringopus elongatus* (Vinson).

The female was found carrying as usual her cocoon in her mandibles. The cocoon contained 76 eggs. The pair were taken from the same web and lived together captives in the same bottle for over a week. I have seen this spider in the position depicted by Simon for *Mecolæsthus* (fig. 439).

Locality. Madras city (August); Nawalapitiya, Ceylon (April).

CROSSOPRIZA (Sim.), 1893.

16. *Crossopriza lyoni* (Black.).

Its web has sometimes a conical hollow, within which the spider rests inverted.

All the three Pholcids are common either within houses or outside in the open, where they shelter under rocks or under the ledges of buildings. They are not at all common on the hills.

Locality. Madras city (February–August).

Theridiidæ.

ARGYRODES (Sim.), 1864.

The genus *Argyrodes* includes species usually considered parasitic on the webs of other spiders. These spiders are not really parasitic, but are commensals living at the same table as that of the much bigger Argiopid and securing fragments of its food. *Argyrode sargentatus*, *A. fissifrons*, and *A. argyrodes* are found.

17. *Argyrodes argentatus* (Camb.)

are small silvery-backed spiders usually found on a few threads of their own at the back of the big web of an Argiopid. *Argyrodes* is most frequently got on the webs of *Argiope*, but also on those of *Gasteracantha*, *Tetragnatha*, *Araneus*, and *Cyrtophora*. The cocoon is very characteristic in shape and is always attached to withered stems some distance away from the big web.

Locality. Madras city : common on webs on the trees of the Beach during the monsoon (October–January).

18. *Argyrodes fissifrons* (O. P.-Camb.).

Small red and white spiders with black legs, all from threads attached to the large web of *Nephila malabarensis*.

Locality. Nawalapitiya, Ceylon.

This species is said by Simon to be widespread in India and Malaysia, but I have seen it only in Ceylon.

Argyrodes argyrodes is also reported by Simon (i. p. 501) to be common on the web of *Cyrtophora citricola*, but as yet I have seen neither of these.

19. *Argyrodes nigra* (O. P.-Camb.) = *Theridion nigrum*
(O. P.-Camb.) = *Theridion oxyurum* (Thor.).

A very small black spider with yellow legs, found without any web on the back of a convolvulus-leaf; very slow-moving, with the tips of the abdomen upturned; accompanied on the same leaf by many small black ants which it closely resembled.

Locality. Nawalapitiya, Ceylon.

Argyrodes nigra is not an *Argyrodes*, but a *Theridion*. It is not a commensal like the others, both sexes of which are found together on the same big web.

Theridion (Walck.), 1805.

Theridion is a large genus represented by the following common species.

20. *Theridion mundulum* (C. L. Koch) = *T. amœnum* (Thor.).

A very pretty little spider which I have found common on the Nilgiris with its very irregular web, near the centre of which is a withered leaf, below or within which the spider shelters itself.

Locality. Kotagiri, Nilgiris (6000 feet); Madras Beach.

21. *Theridion rufipes* (Luc.)

is found indoors, sheltering in the corners of bath-rooms. The pair are got together within the same small irregular web.

Locality. Nawalapitiya, Ceylon; Kayencolam, Travancore.

22. *Theridion tepidariorum* (C. L. Koch).

Found within doors in corners of store-room, but also outside in the open.

Locality. Nawalapitiya, Ceylon; Kotagiri, Nilgiris; Madras city.

These three species (*T. mundulum*, *T. rufipes*, and *T. tepidariorum*) are noted by Simon as having almost a worldwide distribution throughout the Tropics.

Ariamnes (Thor.), 1869.

23. *Ariamnes* sp.?

I possess two specimens of an *Ariamnes* from Madras. One is a male and 4 mm. long. It may be *A. gracillimus*

(Thor.), described by Thorell from Burma. It is a very small delicate spider found on the bushes. The second is a female, but does not at all agree in proportions with Simon's illustration of the female of *A. flagellum*, cf. i. p. 498. It is only 4 mm. long also.

Argiopidæ.

This huge family includes the numerous orb-weavers (Epeiridæ).

TETRAGNATHA (Latr.), 1804.

24. *Tetragnatha gracilis* (Stol.).

The small orb-web is said by Pocock to be always found over water, but this is not the case, for the spider and its web are often far from water, in such places as the wire-netting of the tennis court, doors of the bungalow, hedges, and bushes well away from water, as on the dry sandy beach of Madras. *T. gracilis* seems specially fond of making its web on the withered branches of spiky bushes. It is the smallest species mentioned by Pocock. The cocoon is a long, irregular, dark grey mass like a Rupert's drop in shape and is always attached to a withered branch. It is 30 mm. long and contained in the one examined 12 young spiders.

Locality. Madras city; Nilgiris at Kotagiri; Madras Beach.

25. *Tetragnatha geniculata* (Karsch)

makes its big web always at sundown: the biggest of the three species mentioned by Pocock. Found on the hills with big webs over running water.

Locality. Madras Beach; Pykara, Nilgiris.

26. *Tetragnatha hasselti*, var. *birmanica* (Thor.).

Found on the bushes on the Beach associated with *T. geniculata*.

27. *Tetragnatha mandibulata* (Walck.).

Found on a bush overhanging a well. ♀ laid 250 eggs within the test-tube the same night on which she was taken. Eggs within a central mass with diameter 6 mm. covered by light grey silk.

Locality. Madras city, Madras Beach; Coonoor, Nilgiris (5600 feet).

28. *Tetragnatha* sp. ?

The commonest Tetragnathid I have discovered is one from Madras Beach. It greatly resembles *T. geniculata*, but the jaws differ. Each mandible has at its junction with the fang a large spine projecting straight in front.

The webs of *Tetragnatha* never have a stabilimentum.

EUCTA (Sim.), 1881.

29. *Eucta* sp. ?

Associated with the Tetragnathids from the Madras Beach are found specimens of a *Eucta*, which builds its big orb-web at sundown also. It is easily recognized not by its shape and coloration, but by the slightly upturned long tip of the abdomen. This species is probably *Eucta caudicula* (Karsch) reported from India by Simon, who, however, also records *E. isidis* which is common to Egypt as well as to India.

The web of *Eucta* has no stabilimentum.

ORSINOME (Thor.), 1890.

30. *Orsinome marmorea* (Poc.).

This spider I have met only once on the hills, where I was lucky enough to secure both sexes together. Simon (i. p. 733) remarks that he has no notes regarding its habits. The spiders are big (15 mm. ♀, 10 mm. ♂) and were found with their large orb-webs slung between bushes horizontally over swiftly running water. Each spider was at the centre of the web hanging inverted and almost touching the quickly flowing current. There is no stabilimentum on the web, which is almost a yard wide. Both sexes were thus found at noon on a dull misty day. Gravely has found them on the Cochin Ghauts at 1500 feet. At the same spot I found closely associated *Tetragnatha geniculata*, *Araneus mitratus*, one *Argiope*, and *Cyclosa* sp. The big webs of *Orsinome* and of *Tetragnatha geniculata* were spun horizontally over the water a distance of one yard. *Orsinome* hung lowest next the stream, then *T. geniculata*. Above were the vertically placed webs of *A. mitratus* with the characteristic white stabilimentum, above these again the vertical webs of the *Argiope*, with those of *Cyclosa* at the top. All the webs depended from bushes growing at the water side.

In appearance the sexes of *Orsinome* greatly resemble each other in colour, the colours being much duller than in *Leucauge*. The ♂ *Orsinome* is almost as big as the ♀.

Locality. Pykara Falls, Nilgiris (6000 ft.).

LEUCAUGE (White), 1841.

Leucauge = *Argyropeira* (Em.), 1884.

31. *Leucauge celebesiana* (Walek.).

Very common on its orb-web on almost any bush on the Nilgiris; web slung horizontally between the branches or bushes, the spider hanging inverted below the centre of the web.

Locality. Madras city; Nawalapitiya, Ceylon; Coonoor and Kotagiri, Nilgiris.

32. *Leucauge ditissima* (Thor.).

I have specimens resembling this species very much, but they have, when alive, on the abdomen three brilliant red dots which turn silvery after being kept in spirit. There is a pair of shoulder prominences.

Locality. Peradeniya, Ceylon; Kotagiri. This species I have not found on the plains.

33. *Leucauge argentata* (O. P.-Camb.).

Found on orb-web like that of *L. celebesiana*.

Locality. Madras city; Kotagiri, Nilgiris. Not previously reported from South India.

34. *Leucauge ventralis* (Thor.).

Spider with long fore-legs stretched out in front, ♂ and ♀ found resting on a twig of a tea-bush to which came a thread from the orb-web close by, stretched out below and between tea-bushes. The cephalothorax and legs in the living specimen are bright green.

Locality. Dolosbage, Ceylon; Carolina, Nilgiris (5600 feet); previously reported from Burma only.

35. *Leucauge* (*Callinethis*) *elegans* (Thor.) = *Argyropeira fastigata* (Sim).

Found on large orb-web between tea-bushes. ♀ laid eggs in the specimen-tube the day after her capture. There were 890 eggs within the cocoon. This species is easily recognized by the last pair of legs having a characteristic bushy pad of hairs on the distal half of each tibia. The fleecy cocoon measures 14 mm. and 5 mm. at greatest axes. The silk is yellowish.

Locality. Dolosbage, Ceylon (3000 feet).

In no case has the web of a *Leucauge* any stabilimentum. *L. celebesiana* is by far the commonest species.

36. I have also specimens of a small, beautifully silvery *Leucauge*. Both the ♂ and ♀ were taken together from the centre of a small orb-web on the eaves of an outhouse. The ♀ has the abdomen dorsally beautifully marked in silver with a median line of chocolate-brown marks. ♂ much more slender and not so silvery.

Locality. Dolosbage, Ceylon; Coonoor, Nilgiris. I have not met with this species on the plains.

NEPHILA (Leach), 1815.

37. *Nephila (Nephilengys) malabarensis* (Walck.).

Webs big and very irregular. Spider remains in a corner of the window in a tubular retreat of the web, resting here inverted during the day. Two varieties found, one much darker than the other in colour and very closely resembling *N. cruentatus* (Fabr.) from Johannesburg.

The compact egg-mass measures $19 \times 11 \times 19$ mm. and is roughly egg-shaped. It shows very clearly through the loosely made outer wrapper of strong fibres. Total size of the fibrous cocoon is 30×16 mm. at greatest diameters. Number of eggs enclosed was 618, and the whole cocoon was attached to a withered leaf which had blown on to the web, which was on the outside of the bungalow window well up to the top of the glass panes.

Argyrodes fissifrons was found commensal on this web. These small red and white spiders with black legs greatly resemble the tiny males of *N. malabarensis* in size, shape, and colour, and probably benefit thereby. Many long, slender, black *Cyclosa* sp. were on their own webs close to the big one of *N. malabarensis*, while *Uloborus geniculatus* was also present on its own webs in the corners of the windows close to the big web.

Locality. Dolosbage and Peradeniya Gardens, Ceylon.

38. *Nephila maculata* (Fabr.).

Got on its large orb-web on the roof of the verandah. A large, very handsome spider, but not so strikingly coloured as *N. malabarensis*.

Locality. Dolosbage, Ceylon.

The webs of *Nephila* have no stabilimentum present.

HERENNIA (Thor.), 1877.

39. *Herennia ornatissima* (Dol.).

A single ♀ found at the centre of her web in bright sunshine on a tree-trunk. No stabilimentum.

Locality. Yercaud, Shevaroy Hills (4500 feet). I have not seen it elsewhere.

ARGIOPE (Sav.), 1827.

Argiope lobata (Pallas) has been reported from Bellary by Simon and *A. arcuata* (Sim.) from Bangalore by Staunton, but I have seen neither of these as yet.

40. *Argiope anasuja* (Thor.) (Pl. III. figs. 3, 4; Pl. IV. fig. 5) is by far the commonest species round Madras and in South India generally. The web, often suspended between adjoining branches, is a large orb-shaped one with a very characteristic stabilimentum in the form of four white zigzag lines making a St. Andrew's cross. The cross is not always complete, sometimes only one of the four lines being present. This stabilimentum usually begins with the top left part of the \times or the whole left stroke of the \times , then the top of the right stroke may be added, but the finished product is the regular \times with the four parts all present. These white lines lie as continuations of the directions in which the spider holds its legs, *cf.* Pocock, p. 221, and serve as distinct supports to the spider.

The cocoon measures between 4 and 5 cm. in length. It is long, irregular, resembling a curled up withered leaf, cylindrical, tapering to each end, but swollen in the centre by the compact mass of yellow eggs enclosed. It is grey-green and when opened a single egg-case contained 840 eggs, another 186 young spiders.

The specimen shown in the photos was picked off by a mynah (*Acridotheres tristis*), corresponding to our starling, the torn web, cocoon, and the small commensal *Argyrodes* all being left. In this instance the circular part of the web was 10 inches in diameter and the white cross (stabilimentum) 2.5 inches along each stroke of the \times .

A. anasuja is the smallest species mentioned by Pocock (p. 226). He gives no good way of distinguishing readily between the species *A. pulchella*, *A. undulata*, *A. anasuja*, and *A. taprobanica*, which are all closely allied forms. As several varieties of each species are known, a fact already pointed out by Gravely, and as Pocock in his key deals only with the ♀, the various species will be much more easily determined once the ♂ are described systematically.

The ♂ *A. anasuja* is fairly common during the cold weather along with the ♀ on the bushes of Madras Beach. It is very much smaller than the ♀ and of a plain brown-purple. I have noticed on the bushes (1) the tiny ♂ on the same big web as the ♀ but at the respectful distance from her, (2) the ♂ on a small web of his own either in front of or behind and parallel to the big web, (3) two ♂ on the same web as the ♀, (4) ♂ on same web as ♀ but immediately behind her. The male measures 4 mm. and the female 12 mm. Simon (i. p. 765) gives the size of the male as one-fifth that of the ♀.

The small immature ♀ are often found, each on a small web of her own which has no stabilimentum proper, but sometimes the central part of the web is marked by a white lacework of stronger threads in the centre, against which the spider rests.

The mature ♀ is always found upon the stabilimentum at the centre of the vertical web head downwards. When alarmed she always raises her body outwards from the web, and then suddenly pops through the hole at the centre of the web behind her to the other side.

Locality. Madras city and Beach; Chingleput. Seen but seldom on the Nilgiris at Kotagiri.

The small commensals *Argyrodes argentatus* common on the big webs of the ♀ sometimes come close up to and touch the big *Argiope*'s leg, which she quickly moves away. She does not attack the small silvery intruder, which probably has very limited vision.

41. *Argiope taprobanica* (Thor.).

Very like *A. anasuja* in colour and appearance, and has the same type of stabilimentum. Its cocoon, however, is light green and triangular in outline, enclosing the compact central mass of eggs. Each side of the cocoon measures about 4.5 cm. Probably the distinctive shape of the cocoon may be helpful as here in distinguishing the species and so in other cases.

Locality. Nawalapitiya, Ceylon.

42. *Argiope emula* (Walck.).

Easily recognized because its abdomen is not pentagonal in outline.

Locality. Nawalapitiya, Ceylon.

Pocock in 'Marvels of the Universe' (Hutchinson & Co.) calls *Argiope* by the trivial name of the X-ray spider. He

considers that the white ribbons of the stabilimentum conceal the spider's limbs from flies and also from marauding wasps. To my mind they serve only as a background which shows up the spider's limbs. The white may attract flies, but the ribbons are essentially a central support for the body of the spider, which remains on it throughout the day full in the sun's rays.

CYRTOPHORA (Sim.), 1864.

43. *Cyrtophora (Araneus) cicatrosa* (Stol.). (Pl. IV. fig. 6.)

Spider found within a wonderfully fine web, which is roughly conical but may have several stages below the dome. This web commonly hangs under bushes of *Opuntia* or *Yucca*. *Cyrtophora cicatrosa* itself is beautifully coloured, dainty, and hangs downwards at the apex of the inverted bowl of the web. The cocoons are suspended vertically above the dome and external to it, all in line. They are whitish, but show up green in spirit. Gravely reports having found these spiders in communities with their webs, but I have got them always quite apart, each spider within its own web. The commensal *Argyrodes argentatus* is present occasionally.

The cocoon is 5 mm. long, bead-shaped, oval in outline with the inner coat very strong. I have found 20 young within the cocoon. The spider keeps adding to the number of cocoons, which therefore varies greatly. In the photo there were at first 3, then 7, and I have seen as many as 12 all in line.

The diameter of the base of the dome is usually about 6 inches. Ceylon specimens are much darker in their markings than the Madras ones; the colour of their cocoon is also deeper in shade.

Locality. Madras, Ennur, Pallavaram; Dolosbage, Ceylon; Kayencolam, Travancore.

This spider is not reported from Ceylon by Pocock. He classes *Cyrtophora* with *Araneus*, considering that no very important or constant character separates the two genera. I agree with Simon (i. p. 773) that being so very different in the form of their webs, which recall those of *Linyphia*, that it is therefore convenient to keep the two separate. The genus *Araneus*, in the limited sense, contains already some 800 described species.

Cyrtophora citricola (Forsk.).

This, the type-species, is very widely distributed. It has
Ann. & Mag. N. Hist. Ser. 9. Vol. iv. 18

been reported from Chingleput by Jambunathan, but I have not met with it as yet.

44. *Cyrtophora* sp.

I have also a very small *Cyrtophora* about 4 mm. long, the only one I have seen on the hills. Both sexes are very similar in size, shape, and colour, abdomen blackish with small white dots at sides; but unfortunately the two males obtained are immature, thus rendering identification impossible. Both ♂ and ♀ make the same type of web as *C. cicatrosa*, but the ♂ web is less perfect. Spider rests under the top sheet of the web inverted as in the case of *C. cicatrosa*. No cocoons got.

Locality. Carolina Estate, Coonoor, Nilgiris (April).

CYCLOSA (Menge), 1866.

45. *Cyclosainsulana* (Costa) = $\left\{ \begin{array}{l} Epeira trituberculata \text{ (Lucas)} \\ Epeira anseripes \text{ (Walck.)} \\ Cyclosa propinqua \text{ (Sim.)} \end{array} \right.$

is the commonest form both on the hills and on the plains. It is most variable in colour and in shape also. As regards the web, Simon (i. p. 782) remarks that the stabilimentum varies according to the species and that *C. insulana* and nearly related forms have the white lines arranged like that of *C. conica* (Pallas) as a band interrupted at the centre, while *C. bifida* (Dol.) has the stabilimentum in the form of several very irregular concentric circles, or more correctly ellipses.

At Kotagiri, on the Nilgiris, *Cyclosæ* are very common, and I carefully collected from the webs, noting specially the form of the white stabilimentum. I find that the shape is not by any means constant for the species. *C. insulana* has most often the stabilimentum as a diameter, but also as elliptical lines, as a radius, a very small irregular white mass at the centre of the orb-web, or again no stabilimentum of any kind.

Though this species is by far the most common, I have no record of its cocoons.

Locality. Madras city, Madras Beach, Pallavaram; Kotagiri and Coonoor, Nilgiris; Dolosbage, Ceylon.

46. *Cyclosa bifida* (Dol.).

I have several long, slender, almost entirely black specimens which are either this species or a closely allied one.

These are common on the Nilgiris and also upcountry in Ceylon. The Nilgiri forms had the stabilimentum as a single white line as diameter or none, while the Ceylon ones always had none.

Locality. Kotagiri, Nilgiris ; Dolosbage, Ceylon.

47. *Cyclosa hybophora* (Thor.)

is recognized by the two very distinct tubercles on the shoulders of the abdomen. The cocoons here are about 4 mm. long. There were four of them, each containing about fifty eggs. These cocoons are attached to the stabilimentum, which, in this case, was a white line placed as a radius to the circle of the orb-web.

Locality. Madras Beach, Eunur ; Kotagiri, Nilgiris.

A white *Cyclosa* (Pl. V. fig. 7) which I obtained in Ceylon has these two shoulder prominences and is probably merely a variety of this species. It had the white ribbon of the stabilimentum as diameter with nine cocoons arranged along it. These were about 5 mm. long and recalled in shape those of *Cyrtophora*. They contained about thirty eggs in each.

Locality. Dolosbage, Ceylon.

48. *Cyclosa mulmeinensis* (Thor.).

I have several examples of a beautiful little *Cyclosa* which seems to be this species. All were found on orb-webs with the stabilimentum as a radius only. The cocoons are yellow-brown covered with black debris, and as many as five are found within one outer case which is from 10 to 15 mm. long. Each cocoon contains some forty eggs. Each cocoon-case lies along the stabilimentum.

The males and immature females have small separate orb-webs of their own, apart from the others. In such cases each spider is found at the centre of the web and there is no stabilimentum. In one case the ♀ was at the centre of her web resting on a whitish mass of threads (stabilimentum), to which a single yellow-brown cocoon was attached. These cocoons are evidently formed singly and then united into one mass later on. In the case above examined, where there were five cocoons within the mass, the first two contained spiderlings almost ready to leave the cocoon, the third very immature spiderlings and the last two eggs only.

Locality. Ootacamund, Nilgiris (September).

From the Nilgiris I have several species or varieties which as yet I have been unable to identify. Some are distinctly brown in colour, others have a pale tip to the long abdomen,

while others again, mostly black, have the curious habit on the web of keeping the slender tip of the abdomen upturned over the body dorsally.

Where the stabilimentum is present, it always soon gets dirty with remains of victims. The spider on it is very often unrecognizable, even when closely looked for—it matches in colour the white band so well. This was particularly the case with the Ceylon *Cyclosa* above mentioned.

From Pykara Falls, Nilgiris, I found several forms with webs on the bushes near running water. There were no stabilimenta and the spider was silvery on the abdomen dorsally and had the tip of the abdomen upturned. The shape is not nearly so slender as in the case of the long narrow Ceylon forms (*C. bifida?*).

ARANEUS (Clerck), 1757 = *Epeira* (Walck.), 1805.

49. *Araneus laglazei* (Sim.).

A small spider, 6 mm. long, resembling a bird's dropping on a leaf. Found on a twig near the orb-web, which is about 9 inches diam. and had very wide meshes, but no stabilimentum. Spider is dark grey, almost black, with the abdomen whitish dorsally.

Locality. Madras city (previously reported from Ootacamund); Kotagiri, Coonoor, Pykara, Nilgiris. Common in and around Ootacamund (September).

50. *Araneus théisii* (Walck.).

Found resting by day under a withered bracken leaf, which it greatly resembled in colour, on the golf course at Kotagiri. Found on Madras Beach on a leaf of *Abutilon*. A very inert spider, very like *A. nauticus*, but smaller and the sternum is all dark, almost black. The dorsal pattern of the abdomen is very pretty, almost constant, and probably characteristic. Found near orb-web in evening resting on a grass-stem.

Locality. Madras Beach; Kotagiri and Ootacamund, Nilgiris.

51. *Araneus nauticus* (Koch, L. K.) = *A. pullata* (Thor.).
(Pl. V. fig. 8.)

Lies hid during the day within a withered leaf. Found in the train from Talaimanaar to Colombo. At dusk it emerged and made its web in the compartment. When touched it retired into a crevice on the roof.

Locality. Kotagiri. Dolosbage, Ceylon.

52. *Araneus rumpfi* (Thor.) = *A. decens* (Thor.) =
A. hispida (Dol.) = *A. rufofemorata* (Sim.)

is the commonest species, and greatly resembles *A. nauticus* in colour and markings. It is very common on *Calotropis gigantea* on Madras Beach. The cocoon is very loosely woven and flocculent in appearance, no stout outer covering being present. The eggs enclosed within one cocoon examined numbered 1464. These cocoons are very common on the golf course at Kotagiri and also on the banks at the road-sides attached to twigs.

This species is very fond of making its web against the wall of the house at dusk, then taking up its position in the centre of the web with its back to the wall. During the day it rests in one corner, to which a strand of the web leads. It is very inert when gently handled. If smartly touched this spider drops at once to the ground on its own thread, and if not further molested, after a short time, it climbs up again to the old position.

At the centre of the web, over which the spider places itself, there is sometimes a small white mass of thickened thread, which cannot be considered as being of the nature of a stabilimentum.

A. rumpfi is extremely variable in colour and markings on the dorsal surface of the abdomen.

Locality. Madras city; Hillgrove, Coonoor and Kotagiri on the Nilgiris.

53. *Araneus bilunifer*? (Poc.).

With two small very conspicuous white circular spots on the front part of the abdomen dorsally. This species resembles *A. rumpfi* in its vulva and scape, and has the same habits as *A. rumpfi* and *A. nauticus*, being found with its web under the eaves of the verandah. It rests in the corner of the verandah during the day. The presence of the two conspicuous spots alone connects it with Pocock's species *bilunifer*, for it differs from his description in having no shoulder processes on the abdomen, in the prevailing colour not being yellowish but dark grey, in the nature of the vulva, and in its size, for it is only 11 mm. long and quite adult.

Locality. "Carolina," Coonoor, Nilgiris.

54. *Araneus mitratus* (Sim.).

♀ resembles a small *Cyrtophora citricola* at first sight, but the posterior extremity is not bifid, and there is only a single

pair of shoulder prominences on the abdomen. The vulva has a particularly long, fine, slender scape.

♀ found all on orb-webs, which have a very faint stabilimentum arranged as one diagonal or one stroke of the \times of *Argiope's* web, the stroke from right to left. All were found resting at the centre of the webs at 11 A.M. These webs were all on the banks at the road-sides and were all in the shade. The spiders keep always behind the web and the bank. The white stabilimentum may be found arranged vertically; webs found over running water between bushes.

♂ found at 5 P.M. on a small perfect orb-web of his own. The web-strands completely crossed over the hill-path, a distance of some 5 feet. Spider was at the centre of the web, which had no stabilimentum. Is this the spider whose threads catch your face so frequently in the dark as you pass along the path?

Sometimes the webs have no stabilimentum. They are always above the ground, often as much as 5 feet, suspended between the branches of bushes and of trees.

Locality. Coonoor, Karteri, Kodanad, Kotagiri, Pykara, and Ootacamund, all on the Nilgiris.

55. *Araneus mitifica* (Sim.).

A beautiful green spider with the abdomen dorsally grey, marked prettily with characteristic black spots. Found always on the leaf of a hedge with the orb-web near by. The spider rests on the leaf under a light silk tunnel, and then rushes out when a victim alights on the orb-web, which, if damaged, is repaired every now and then. Found on *Lantana* frequently and other bushes. Interesting, as thus having the same habits as *A. melanocrania*.

Locality. Madras city; Kotagiri.

56. *Araneus (Zilla) melanocrania* (Thor.).

Web is a small orb, but the spider never takes up its position on the web, but always within a curled up leaf close by. The small cocoon is fixed near the leaf, within which the spider rests, or may be sometimes actually within the leaf beside the spider herself.

The cocoon is 6 mm. at greatest diameter. The one I opened contained 125 eggs, besides young spiders. There is no stout outer covering to the cocoon, which consists simply of fine yellow threads lightly woven together.

The small size of the spider, its blackish head, reddish

thoracic parts and legs, and the dorsally whitish porcellanous abdomen make the species easily recognisable.

Locality. Madras city, very common on bushes on the Beach.

57. *Araneus*, sp. nov. ?

Small spider only 3 mm. long, very like *A. laglazei* in appearance, but with the abdomen terminating dorsally in a very distinct, black, smooth, blunt point. Found at the centre of the small orb-web.

Locality. Chingleput ; Madras city.

58. *Araneus*, sp. nov. ?

Very pretty orb-weavers found commonly on the Nilgiris with the web always over running water. The spider is always at the centre of the web in the evening, when the web is made. The spiders are quite small, 3 mm. long, and are beautifully marked. The basal colour is a green-grey. The cephalothorax has dark bands down the centre dorsally and round the margins. The abdomen dorsally is darker down the mid-dorsal line and again at the sides, while below it is black with two distinct straight white lines a little to each side of the mid-ventral axis. These two lines run from each side of the vulva to the mamillæ and enclose a black area. The sternum is black and the grey-green legs banded with black. In spirit the lighter dorsal parts of the abdomen appear silvery. Vulva without scape. They greatly resemble young *Orsinome*.

Locality. Throughout the Nilgiris.

59. *Araneus*, sp. nov. ?

Found on a lichen-covered wall, small, only 3 mm. long. Shoulder prominences huge in proportion to the other parts. Vulva without scape.

Locality. Madras city.

60. *Araneus*, sp. nov. ?

Common as a house-spider within the bungalow, lodging especially on the wooden roof. The cocoons are of the usual white flocculent type, and are very conspicuous against the dark teak beams. Each cocoon measures 5 mm. in diameter, and is roughly globular. The cocoon contains 50 eggs.

The spider is 5 mm. long with the cephalothorax reddish

yellow, red-brown round the eyes ; legs similar, but banded with dark brown ; abdomen dorsally dark grey, ventrally lighter in front around the genital opening ; sternum pale fawn and so also are the coxæ. The vulva is covered by a triangular hard yellow chitinous plate (epigyne), the two central thick parts being brown ; scape absent.

Locality. Madras city.

Pocock's key to the species selected by him (*cf.* p. 224) is based entirely on the characters of the ♀, no ♂ being mentioned in his account. A proper key will not be forthcoming until the ♂ have all been found and described. Below I give a brief description of two of the males, viz. those of *A. rumpfi*, the commonest species of South India, and of *A. mitratus*, which I got on the Nilgiris.

Description of A. rumpfi, ♂.

Colours much as in the ♀, carapace brown with yellowish hairs ; legs brownish with darker annulations ; sternum light yellow ; abdomen dorsally varied with light and dark grey marks to form a median light band with a darker band on each side tapering at the tip behind ; front and sides of abdomen light yellow or grey ; abdomen ventrally pale yellow with darker spots at the centre and at the spinnerets. Only the coxæ of the first legs have the small red-brown apophyses, which are incurved. The tibiæ of the second pair of legs are armed with small spines as usual.

The male is not so much smaller than the female (10-15 mm.), for it measures 8 mm., the carapace being as long as the abdomen.

Description of A. mitratus, ♂.

It greatly resembles the female in general form and colour, but is smaller (♀ 7 mm. long, ♂ 3 mm.). Both have a conspicuous white St. Andrew's cross at the front end of the abdomen dorsally between the shoulder points, and on the ventral side of the abdomen there is a median rectangular black area bordered by lighter lines and ending in a pair of light spots on each side just in front of the spinnerets. The male examined was immature.

GASTERACANTHA (Sund.), 1833.

61. *Gasteracantha brevispina* (Dol.).

A very pretty, dainty, small spider on a large web at its centre without any stabilimentum. The young are only

1.5 mm. at greatest width across the abdomen. The colour is almost black, and on the abdomen dorsally there are very distinct white spots forming a St. George's cross. The colour-scheme greatly resembles that in the male of *G. geminata*, and the young are found on very small simple orb-webs about 3 inches diam. without any stabilimenta or white dots.

Locality. Madras city ; Dolosbage, Ceylon.

62. *Gasteracantha geminata* (Fabr.).

Larger and much more common than the above. The web is made against the wall of the bungalow or else out in the open between the branches of trees. Often the web is found well under the shade of trees, and as it is swung on very long threads it moves very easily in the breeze and is therefore very difficult to photograph successfully. The main lines of the web are flecked out with little white dots and dashes, which are quite characteristic. The spider remains always at the centre of the web during the day. The web of *G. brevispina* is much smaller and finer, and has no white marks anywhere upon it. Both species spin their webs in the mornings before 7 o'clock.

The ♂ *G. geminata* seem to rest on single threads only at some distance from the large web of the ♀. The commensal *Argyrodes argentatus* is quite common on the big web of the ♀ in Madras city during February. One point of interest is that the ♂ of *G. geminata* has not the same number of sigillæ as depicted by Simon in fig. 887. He shows three small on each side, but there are really four. I have also found the ♂ on small complete orb-webs of their own, quite apart from the big one of the ♀, the diameter of their webs being only about 3".

Locality. Madras city and Beach. Dolosbage, Ceylon.

POLTYS (C. L. Koch), 1843.

63. *Poltys illepidus* (C. L. Koch).

Nocturnal spider, caught by chance in the dark. So far as I know it has no web. In the twilight I saw it dimly outlined among creepers and seized it, thinking it was a fruit. It was lying among withered branches and leaves on the top of the tennis netting, where it probably rests during the day.

Locality. Madras city. Previously reported only from Ceylon.

CHORIZOPES (Camb.), 1870.

64. *Chorizopes frontalis* (Camb.).

These minute spiders, only 2 mm. long, were got all from single threads along with the ♂ *Gasteracantha geminata* from bushes. Both *Chorizopes* and *Gasteracantha* ♂ greatly resemble each other, but the ♂ *Gasteracantha* is twice the size of *Chorizopes* and has of course its own distinctive features. Simon reports (i. p. 922) never having noticed the web, which is usually a small perfect orb about 2" diam. All rest in the centre of the webs, which, like those of *Gasteracantha*, are all made in the mornings.

Locality. Madras city.

Clubionidæ.

ÆDIGNATHA (Thor.), 1881.

65. *Ædignatha retusa* (Sim.). (Pl. VI. fig. 9.)

Very dark little spider, dug out from its burrow in the hill-side. The mouth of the burrow has no web leading to it, but has the entrance curiously formed of twigs, leaves, straws, etc., filled round the central circular opening to form a small turret. A small cocoon containing a very few eggs was found within the tunnel. This complex type of dwelling is quite unusual among the Clubionids, and resembles very much what I found on the Nilgiris, where on the banks at the road-sides there was a similar opening (Pl. VI. fig. 10) (to the burrow of a Mygalomorphid), which was of course much larger in size, measuring 10 mm. in diameter. Dwelling described by Simon (ii. p. 189).

Locality. Dolosbage, Ceylon (May).

SELENOPS (Latr.), 1819.

66. *Selenops radiatus* (Latr.).

Found within kitchen; very flat spider; nocturnal.

Locality. Kotagiri, Nilgiris.

67. *Selenops* sp.?

Found under the bark of trees associating with the small scorpion *Isometrus thurstoni*, which it greatly resembles in colour and markings.

Locality. Yercaud, Shevaroy Hills.

SPARASSUS (Walck.), 1805.

68. *Sparassus lamarcki* (Latr.)

is the commonest species; found often within the bungalow at night. Abdomen is marked dorsally by a median line of small black dots and ventrally by a broad black median stripe. The mandibles have also at the top of each to the outside a characteristically red-brown spot. Outside in the open the spider during the day retires under the shade of a leaf.

I have found the female with her cocoon attached to a withered leaf of *Calotropis gigantea* on Madras Beach. The globular mass of spiderlings measured 14 mm. in diameter, and was fastened to the leaf under a stout tubular outer cover, which protected the spider as well. There were 340 young spiders within the cocoon.

Locality. Madras city.

69. *Sparassus tarandus* (Sim.).

There are a large number of Sparassids on *Calotropis* that are much smaller than *S. lamarcki* (♀ 10 mm., ♂ 7 mm.). These live within a curled up leaf, within which the simple globular cocoon is placed. The cocoon measures 6 mm. in diameter and contained 115 young. Often found within a withered leaf containing the cocoon.

Locality. Madras city and Beach.

HETEROPODA (Latr.), 1804.

70. *Heteropoda venatoria* (Linn.)

is the common species and is often met with in houses after dark. The cocoon is drab-white and measures 19 × 16 mm., being roughly oval in outline; in thickness at greatest depth it is 8 mm. The cocoon resembles a flat button, in section doubly convex. It contained 275 young ones.

Locality. Madras city; Kotagiri, Nilgiri.

THELCTICOPIS (Karsch.), 1884.

71. *Thelcticipis paripes*? (Karsch.)

A single male alone obtained. It agrees with Pocock's description in having the branches of the tibial apophysis unequal, but here the outer branch is long, curved, and sharp,

while the inner is short and blunt. Possibly Pocock may have erred in his account.

Locality. Koyencolam, Travancore. Previously reported from Ceylon.

Agelenidæ.

AGELENA (Walck.), 1805.

72. *Agelena inda*? (Pl. VI. fig. 11.)

From the nature of the web this is seemingly a colonial spider. The web is always on a bush—hill guava (*Rhodomyrtus*), *Dodonæa viscosa*, box, rose, privet, and very commonly on whin,—and has a distinct platform upon which victims alight. The spider itself lies hid in the densest central part of the web-mass, often within a curled up withered leaf, the inside of which is lined by the silk of the web. The cocoon is beautifully made and is attached to the walls of the central chamber of the web by 9 or 10 radiating points. The cocoon is a dead-white and can often be seen through the thin silk of the web, especially when the web is not covered with debris. Sometimes three cocoons are found all covered over with the debris of victims, *cf.* beetles, bugs, and flies.

Simon reports only one species of *Agelena* from India, *cf. Agelena inda*, which may be this one. The cocoon is so very unlike the typical one for the family as to be quite peculiar and interesting. It measures 15 mm. at greatest width and contained 52 young spiders. It has a very dense white outer covering. Simon (ii. p. 254) refers to the female depositing her cocoon, which is flat and formed of two concave discs, within the chamber which I have described above as the cocoon itself. I have examined several of these cocoons, and have found inside the mass of spiderlings enclosed within a single sheet of very thin tissue only. The web-mass consists of several leaves fastened together. Quite recently when in Coorg I found the cocoon within the cocoon-chamber as described above by Simon.

Since Agelenids are very rare in the Tropics, this is probably accounted for by the fact that they are found only on the hills above 3500 feet. Small Blattids and earwigs often live in the web-mass, which may harbour two spiders.

Locality. Kotagiri, Coonoor and Ootacamund, all on the Nilgiris. The spider is very common on whin-bushes in and around Ootacamund at 7200 feet (April–October). Not found on the plains.

TEGENARIA (Latr.), 1804.

73. *Tegenaria domestica* (Clerck).

This common British species is now worldwide in distribution. I found one male on the window curtain of the dining-room of the bungalow one afternoon.

Locality. Kandaloya, Ceylon. Not commonly found in the Tropics.

Pisauridæ.

EUPROSTHENOPS (Poc.), 1897.

74. *Euprosthénops ellioti* (O. P.-Camb.).

From the web stretched between prickly-pear (*Opuntia*) bushes not far from the side of the River Adyar. The spider lived for several days inside a tube which had some formalin in it. The peculiar arrangement of the anterior lateral eyes, giving the old name *Podophthalma* to the group, makes identification simple. Web is large and very irregular, the spider resting inverted below it, cf. *Psechrus*.

Locality. Madras city, banks of the Adyar. Already reported from Chingleput by Jambunathan. The spider is said to be found on bushes only near water.

THALASSIUS (Sim.), 1885.

75. *Thalassius phipsoni* (?) (F. Camb.).

Found running across bedroom floor at 10 P.M. Spider is therefore nocturnal, characterised by two very distinct, lateral, bright yellow lines passing right down the cephalothorax and abdomen dorsally. Rest of the surface olive.

Locality. Madras city.

Lycosidæ.

HIPPIASA (Sim.), 1885.

76. *Hippasa agelenoides* (Sim.).

Seems to be the common small Lycosid found on its peculiar web among the grass of the compound and at the road-sides. It is a small banded spider, from 7 to 11 mm. long, and is fond of making its web with a distinct tunnel. Very often it is got resting within the tunnel awaiting a victim to alight on the sheet-like expansion of the web. The tunnel is open at both ends. The mother carries her

cocoon behind attached to the spinnerets, as in all Lycosids. The cocoon measures 5 mm. in diameter and is globular. I have found it containing 130 spiderlings.

Locality. Madras city.

77. *Hippasa pantherina* (Poc.)

is equally common and has the same habits. It is a larger spider reaching 16 mm. Both species greatly resemble each other, and both have the sternum marked by a median black longitudinal line. Here the cocoon measures 8 mm. in diameter and I have found it with 308 spiderlings.

Locality. Pallavaram ; Dolosbage, Ceylon ; Kotagiri, Nilgiris.

LYCOSA (Latr.), 1804.

78. *Lycosa indagatrix* (Walck.)

is the largest form. It is found living in tunnels or burrows in the ground, measuring 20 mm. diameter and about 200 mm. deep. This tube is not lined with silk, but the open upper end has a circle of dead leaves around it and entering it. There may be a lining of silk round the upper part of the tube next the mouth. The leaves greatly help to conceal the opening. Sometimes one leaf acts as a kind of lid to the tube. The tube is always open, but the spiders are purely nocturnal and have to be dug out during the daytime. The young ones seem to lie concealed under the shelter of stones and do not make small burrows.

Locality. Madras city, Emmur.

79. *Lycosa catula* (Sim.).

A cryptozoic spider found lurking under dead leaves lying in the dry bed of a hill-stream.

Locality. Shevaroy Hills, Yercaud.

80. *Lycosa chaperi* (Sim.).

A small form brought home from the Madras Christian College.

Locality. Madras city.

Oxyopidæ.

PEUCETIA (Thor.), 1870.

81. *Peucetia graminea* (Poc.).

Found on the top of the fruit of *Abutilon* (Malvaceæ) and

also on the withered leaf of *Jatropha* (Euphorbiaceæ) which had attached to it the empty cocoon measuring about 10 mm. in diameter.

Locality. Madras city and beach ; Kotagiri, Nilgiris.

82. *Peucetia viridana* (Stol.) = *P. nigropunctata* (Sim.).

Found on a green leaf eating a caterpillar, on the large white flower of *Datura*, on *Jatropha*, and on the fruit of *Abutilon indicum*. The cocoon was on the *Abutilon* fruit, the eggs being covered by a compact tissue of silk, through which they are easily seen. Number of eggs present was fifty and the diameter of the egg-mass 10 mm., for it is circular in outline. Cocoon also found attached to the leaf of *Cleome viscosa* and guarded by the mother. It is white, spherical, diameter 7 mm., and the outer covering is produced into numerous white, projecting, little blunt points which give it a very characteristic appearance.

Locality. Madras city, Pallavaram.

Pocock, p. 255, designates the family as "hunting spiders, spinning no web, living amongst grass and other plants and fastening their cocoons to the leaves or stalks." This description is quite good, but he omits the interesting fact that they all can jump readily, like the next family, the Attids, and are therefore somewhat difficult to catch.

Simon (ii. p. 375) says that the *Peucetia* appear to affect glandular plants. They do so here and seem specially fond of *Jatropha glandulifera*, a very sticky plant, plentiful in the scrub-jungle around Madras city. I have also noticed them on *Cleome viscosa*, which is a common weed by the road-sides and on the Beach.

OXYOPES (Latr.), 1804.

83. *Oxyopes rufisternis* (Poc.).

Commonly found running on hedges of *Clerodendron*, etc., throughout the year.

Locality. Madras city ; Dolosbage, Ceylon (May).

84. *Oxyopes hindostanicus* (Poc.).

The cocoon is placed on a withered leaf suspended on horizontal threads between two branches. The mother protects the cocoon, covering it with her body, and will not desert it even when touched. The spider greatly resembles birds' droppings on the leaf, the legs being held close up to the sides of the body. This species is the commonest in

Madras. The cocoon on or within a withered leaf measures 10 mm. and contains 50-60 eggs. Common on *Calotropis* along the Beach. *Oxyopes hindostanicus* I have found eating the comparatively large moth *Utetheisa pulchella* (Linn.).

Locality. Madras city; Kotagiri, where they are common among dead leaves on the ground; Coonoor.

85. *Oxyopes birmanicus* (Thor.).

Found like *O. rufisternis* running on the hedge in the compound. The cocoon is placed within a withered curled up leaf. It is irregular in form and was found to contain in one case 40 spiderlings, in another instance the circular mass of eggs measured 8 mm. diameter and contained 104 eggs.

Locality. Madras city.

86. *Oxyopes wroughtoni* (Poc.).

Reported from Balsar. It greatly resembles *O. birmanicus* in colour.

LITERATURE CONSULTED.

1857. DOLESCHALL, C. L. Tweede Bijdrage Tot de kennis der Arachniden van der Indischen Archipel. Batavia.
1882. CAMBRIDGE, O. PICKARD-. "Catalogue of Collection of Ceylon Spiders," Journal of the Linnean Society (Zoology), vol. x.
1887. THORELL, T. Viaggio di L. Fea in Birmania e Regioni vicine.
- *1892. SIMON, E. Histoire Naturelle des Araignées, vol. i. Paris.
- *1895. THORELL, T. Descriptive Catalogue of the Spiders of Burma. London.
- *1897. SIMON, E. Histoire Naturelle des Araignées, vol. ii. Paris.
1898. SIMON, E. Matériaux pour servir à la Faune Arachnologique de l'Asie méridionale," Mémoires de la Société Zoologique de France pour l'Année 1897, pp. 252-262.
1899. POCOCK, R. I. "Diagnoses of some New Indian Arachnida," Journal Bombay Natural History Society, xii. pp. 744-753.
- *1900. POCOCK, R. I. The Fauna of British India — Arachnida. London.
1900. POCOCK, R. I. "Descriptions of some New Species of Spiders from British India," Journal Bombay Natural History Society, xiii. pp. 478-498.
1901. SIMON, E. "Arachnida of the Skeat Expedition to the Malay Peninsula, 1899-1900," Proceedings of the Zoological Society of London, 1901, vol. ii.
1905. JAMBUNATHAN, N. S. "Habits and Life-history of a Social Spider (*Stegodyphus sarasinorum*, Karsch)," Smithsonian Miscellaneous Collections, vol. 47.
1915. GRAVELY, F. H. "Notes on the Habits of Indian Insects, Myriapods and Arachnids," Records of the Indian Museum, Calcutta.

* These works are constantly referred to throughout this paper and are indispensable.

EXPLANATION OF THE PLATES.

PLATE II.

- Fig.* 1. *Psechrus torvus* inverted below web, which here crosses a dry mountain torrent. $\times \frac{1}{10}$.
Fig. 2. *Psechrus torvus* web edge on, to show the tubular retreat denied by Simon, also its slightly arched nature.

PLATE III.

- Fig.* 3. *Argiope anasuja*; young resting on lacework stabilimentum. $\times 1$.
Fig. 4. *Argiope anasuja*; web with full \times stabilimentum on *Opuntia*. $\times \frac{1}{4}$.

PLATE IV.

- Fig.* 5. *Argiope anasuja*; stabilimentum with only one stroke of \times , spider rolling up a fly. $\times \frac{1}{2}$.
Fig. 6. *Cyrtophora cicatrosa* within domed web. $\times \frac{1}{2}$.

PLATE V.

- Fig.* 7. *Cyclosa* sp. ? (Ceylon) with stabilimentum as diameter (broken) bearing spider and cocoons. Web against aloe-leaf.
Fig. 8. *Araneus nauticus* resting by day on bark of a cypress-tree. $\times \frac{1}{2}$.

PLATE VI.

- Fig.* 9. *Edignatha retusa*; turret at mouth of burrow. $\times 1$.
Fig. 10. Nilgiri Barychelid; turret at mouth of burrow. $\times \frac{1}{5}$.
Fig. 11. *Agelena inda*; web on aloe-bush, showing cocoon-case within.

[All the Plates are from photographs taken by the Author.]

XXV.—*Brief Descriptions of new Thysanoptera*.—X.*
 By RICHARD S. BAGNALL, F.L.S.

Suborder TEREBRANTIA.

Family *Æolothripidæ*.*Æolothrips fulvicollis*, sp. n.

♀.—This species very closely resembles the common holarctic species *A. fasciatus*, L. The following differences are evident in the material at my disposal:—

The pronotum, instead of being of the same colour as the head and body, is much lighter, being of a yellow to yellowish-brown colour. The fore-legs are only present in

* Continued from *Ann. & Mag. Nat. Hist.* ser. 9, vol. i. p. 221 (1918),
Ann. & Mag. N. Hist. Ser. 9, Vol. iv. 19

one example, and are much lighter than the intermediate and hind pairs of legs. The dark and light areas of the fore-wings are roughly subequal in extent.

The head is as long as the prothorax and has the cheeks more strongly arched. In *A. fasciatus* the third antennal joint is longer than the fourth, in this species it is the same length (excluding pedicel) or slightly shorter (16 : 16 in one specimen and 15 : 17 in two).

The small setæ on the longitudinal vein of the fore-wings are fewer, very minute, being 0.5 to 0.3 the length of the corresponding setæ in *A. fasciatus*, lighter-coloured, and therefore more inconspicuous.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. INDIA, Cawnpur; 3 ♀ ♀ in flowers of *Verbascum* sp., 20. 3. 11 (*A. D. Imms*). Reg. 197.

Family Ceratothripidæ.

Ceratothrips gowdeyi, sp. n.

♀.—Length c. 1.0 mm.; form somewhat slender.

Colour brown, antennæ entirely concolorous with head; legs yellowish-brown to brown; wings brown, apparently somewhat lighter basally.

Head transverse, 0.7 as long as broad; cheeks subparallel; eyes large, occupying about 0.4 the total dorsal length of head; eyes moderately coarsely faceted and sparingly pilose; ocelli large, set well back, with crescentic hypodermal pigmentation; interocellar and postocular setæ minute; dorsal surface transversely striate. Antennæ 6-jointed, a little less than twice as long as the head; third joint (without trichome) very much shorter and narrower than any of the other joints (excluding style), pedicellate; relative lengths of joints approximately 8 : 13 : 7 (excluding pedicel) : 16 : 23 : 3. Stout forked trichome on 4. Mouth-cone reaching across prosternum; maxillary palpi rather long, 3-jointed, the third joint longest*; labial palpi long, slender.

Pronotum slightly longer than the head, about 1.6 times as broad as long; posterior margin depressed; bristles at each posterior angle stout, about 0.4 (or slightly less) the

* Although I have not demonstrated it to my entire satisfaction, I think that the maxillary palp of *Ceratothrips britteni*, Bagn., is also 3-jointed; I described it as "apparently 2-jointed," but the unique preparation is very obscure.

median length of the pronotum; surface weakly and irregularly transverse-striate, and sparsely setose; a postero-marginal pair, one on each side of the mid-line, a little longer and stouter than the other minor setæ. Pterothorax subquadrate. Spines at apex of hind tibiæ within stout. Wings reaching to about the seventh abdominal segment, fore-wings about thirteen times as long as broad near middle; fore-vein with three spines near juncture with lower vein, and 1+1+1 in the distal third; costa and lower vein with a series of 23 and 13 or 14 spines respectively.

Abdomen oblong-ovate; apical bristles moderately long and slender; posterior margin of tergite 8 with a very jagged, sparse, and irregularly set fringe of short microscopical setæ.

Type. British Museum of Natural History (Imperial Bureau of Entomology).

Hab. AFRICA, Uganda, Kampala; 1 ♀ in flowers of tree-tomato (*Solanum* sp.), Nov. 11th, 1917. I. B. E. no. 127 (*C. C. Gowdy*).

Family Thripidæ, s. l.

Genus DINUROTHRIPS, Hood.

Table of Species.

1. Size c. 1·5 mm. Species brachypterous. Legs brown, tibiæ at most shaded to a yellowish-brown distally; basal antennal joint yellowish, second dark grey-brown. *Hab.* South Africa *D. vezenyii*, sp. n.
- Size 1·15 or 1·7 mm. Species winged 2.
2. Size 1·7 mm. Femora brown, tibiæ yellow; basal antennal joints as in *D. vezenyii*, Bagn. Fore-wings (excepting basal fifth) wholly brown. Eyes more prominent and cheeks more swollen. *Hab.* Porto Rico *D. hookeri*, Hood.
- Size 1·15 mm. Legs mostly yellow; basal antennal joint yellow. Fore-wings coloured otherwise, with the veins in the third sixth (or more) and the fifth sixth dark brown. Eyes smaller, less prominent, and cheeks very slightly arched. *Hab.* Australia *D. frontalis* (Bagn.).

Dinurothrips frontalis (Bagn.).

My *Heliothrips frontalis* from Australia is referable to the genus *Dinurothrips*, Hood. The head and the wings are typical of that genus, but the end of the abdomen is nearer the true *Heliothrips* form, and it is evident that *Dinurothrips*

should be placed near *Heliothrips*, and not with *Panchætothrips*, Bagn. The explanate lateral margins of the prothorax are narrow and take up the whole of the length. The terminal abdominal setæ are probably broken off. The reticulation of the pronotum is of a different nature to that described in *Heliothrips* and the other species of this genus; it takes the form of sunken, roundish, or elliptical areas more or less distant from each other.

Dinuwothrips vezenyi, sp. n.

♀.—Length c. 1.5 mm.

Brachypterous; wings reduced to a pointed pad with wing-scale intact, about four times as long as broad, yellow-brown, with light patch near middle and marked dark grey-brown distally; one long seta at apex of scale.

Colour reddish-brown, deeply shaded with dark grey-brown, especially in the abdomen (where dark median and lateral patches in segments 2 to 6 are noticeable) and across the pronotum; fore-part of head and the pronotum anteriorly and posteriorly more or less yellow. Antennæ broken in the unique specimen, joint 1 yellow, 2 dark grey-brown. Tarsi and tibiæ distally more or less yellowish.

Head much as in *D. hookeri*, but with the constriction behind eyes less marked and the cheeks less swollen; the deep channel separating the raised vertex and the eyes more evenly reticulated than in *hookeri*.

Pronotum much as in *D. hookeri*, the disc (excluding lateral explanation) widest at middle; the explanate lateral margins occupying the length of the pronotum, but chiefly noticeable in the distal half. Dorsal reticulation of abdomen evidently stronger than in *hookeri*, evanescent median posteriorly. Last abdominal segment stouter and less produced than in *hookeri*, less than the length of the head; bristles strong and moderately long, much as in *hookeri*.

Hab. SOUTH AMERICA, Tucuman (Argentine), November 1905; 1 ♀ (*Vezenyi*).

GENUS TRYPHACTOTHRIPS, Bagn.*

Table of Species.

1. Head and prothorax strongly transverse, spines of the fore-wing longer than the

* This genus is erected for *Dinuwothrips rutherfordi*, Bagn., in a memoir on the Thysanoptera of the Seychelles now in press, wherein *D. brevisetis* is described and *D. rutherfordi* figured.

- breadth of the wing, unicolorous. *Hab.*
 Gold Coast *T. roboris*, sp. n.
- Head and prothorax not so strongly transverse..... 2.
2. Spines of the fore-wing bicolorous, 1·8 times as long as the breadth of the wing. *Hab.*
 Ceylon *T. rutherfordi* (Bagn.).
- Spines of the fore-wing unicolorous, only 0·7 as long as the breadth of the wing.
Hab. Seychelles *T. brevisetis*, Bagn.

Tryphactothrips roboris, sp. n.

♀.—Length c. 1·2 mm.

Brown, sides of prothorax and the greater part of the first eight abdominal segments, chiefly laterally, of a very deep black-brown; hind and intermediate femora and the fore-tibiæ greyish-yellow shaded with brown; tibiæ yellowish shaded with grey to greyish-brown. Antennal joints 3–8 lost in the type, basal joints yellowish. Fore-wings yellowish-brown, darker on the veins, but with light or clear area in the basal fifth, about the fourth fifth, and at extreme tip.

Head strongly transverse, fully twice as long as broad, very markedly constricted at neck; genal and frontal explanate margins much narrower than in *T. rutherfordi*; ocelli on a raised prominence, large and well separated from the eyes, the front one forwardly directed. The reticulated surface with a crescentic series of eleven large reticulations behind, in the arc of which the reticulations are smaller and more regular than laterally and between the eyes above the arc. Pronotum twice as broad as long medianly (where it is the longest on account of both anterior and posterior margins being arcuate), and nearly three times as broad as the length at sides. Surface furnished with some setæ, of which a mid-lateral and postero-median pair are fairly prominent, being about 0·23 the median length of pronotum; they are acuminate, slightly curved, and apparently stouter in the basal third than at base. Prothorax, legs, wings, and abdomen much as in *T. rutherfordi*. Fore-wings broad in the basal third or thereabouts, thence narrow and parallel to near tip; upper vein with two spines near union with lower vein, the second being lighter and not so strong; a space and then a series of five (2+2+1); the first two being in the light area are less strong and lighter than the next two, which are situated on the dark patch before apex, whilst the most distal one is much weaker and nearly colourless; lower vein with 2 near base, then 1+4, the single one coming well before the series of five in the upper vein, and the first of the four

coinciding with the second in the said series of five; here, again, the last is weak and very light in colour, and, generally speaking, those on the lighter areas of the wing are less strong and lighter. Costal series few and irregular.

Type. British Museum of Natural History (Imperial Bureau of Entomology).

Hab. Gold Coast, Aburi; 1 ♀ in flower of *Thunbergia laurifolia*, Nov. 11th, 1915 (*W. H. Patterson*). Reg. no. 281, I. B. E. 115.

Heliothrips bicinctus, sp. n.

♀.—This species comes very near to *H. femoralis*, Reut., with which it may be mixed in collections. It is not so deep in coloration, and may be sharply separated by the coloration of the legs and wings as follows:—

Fore-wings brown excepting for a light area near base before distal fourth and at extreme tip, these areas being very short and ill-defined.

All tibiae, tarsi, and fore-femora yellow *H. femoralis*, Reut.

Fore-wings light-coloured, with two dark brown bands, the first (occupying about one-eighth the length of the wing) starting near the beginning of the second fourth and the other (occupying about one-seventh the length of the wing) just before tip. Hind-tibiae wholly yellow; fore-femora and the fore and more especially the intermediate tibiae more or less deeply shaded with grey to grey-brown

H. bicinctus, sp. n.

The antennæ are incomplete in the four specimens now before me, and until I make further preparations I am not prepared to give a fuller description. The fore-wings are obviously more linear and slender than in *H. femoralis*, and the spines of the costa, fore-vein (from union with hind-vein), and hind-vein are respectively as follows:—20 to 21; 14 and 13 to 14.

In the African example the wing-spines appear to be stronger, whilst the intermediate tibia is very dark brown excepting basally and at apex.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. EUROPE, several examples from hothouses, Brussels and Newcastle-upon-Type; on various plants with *H. femoralis*, 1907 and 1908; 1 ♀ with *H. hamorrhoidalis* on

banana-palm, Calatrava, Spain, submitted by Dr. W. E. Collinge.

AFRICA, Arusha; 1 ♀, Oct. and Nov. 1905 (*C. Katona*).

Heliothrips pattersoni, sp. n.

♀.—Length 1·3 mm.

Head and pterothorax brown, prothorax yellowish grey-brown; abdomen deep chestnut-brown, excepting the last three segments, which are yellow-brown shaded with grey; legs yellow, fore-femora and tibiæ and hind-femur lightly tinged with brown, intermediate femora and tibiæ more deeply shaded brown. Antenna yellowish, basal and apical joints more or less lightly tinged with grey-brown. Fore-wings light, with dark grey-brown bands approximating the third sixth and near tip; basally slightly clouded with smoky-yellow. Hind-wings with median vein brown, lighter in middle. Light-coloured examples with abdomen golden yellow-brown with brown lateral patches.

Head transverse, about 1·8 times as wide across cheeks (which are arched and wider than across eyes) as long; distinct collar basally. Surface deeply reticulated, with a distinct line at collar and another just behind eyes. Eyes large and coarsely faceted, vertex and space between eyes wide; ocelli normal, situated on sides and apex of a raised prominence. Antennæ about 2·8 times as long as head; segment 1 subquadrate, 2 broadest of all; 3 and 4 slender, urn-shaped, 3 being more than three times as long as broad; 5 broadly clavate; 6 broadly fusiform and broadly united to 7; 8 long and slender, forming a continuation of 7. Relative lengths of joints 3 to 8 as follows:—23 : 17 : 13 : 6 : 14. Maxillary palpi 2-segmented, apical joint long and slender.

Prothorax strongly transverse, more than 2·5 times as broad as long and about 0·75 the length of the head; sides subparallel, with well-defined angles. Surface not strongly reticulated, more or less regularly but sparsely set with longish and rather stout setæ, the longest, viz. the dorso-mid-lateral setæ, being about 0·35 the length of the pronotum.

Pterothorax a little longer than broad, stout; fore-wings with a series of about 20–22 costal spines, upper vein with 13–14 and lower vein with 9–11 irregularly set, those on the dark areas darker and stouter.

Larvæ whitish, with head, pronotum, the two basal antennal joints, basal joints of legs, and the last two abdominal segments grey-brown.

Type. British Museum of Natural History (Imperial Bureau of Entomology).

Hab. GOLD COAST, Aburi; ♀♀ and larvæ on *Grana'llia* leaves, Nov. 11, 1915 (*W. H. Patterson*). Reg. no. 279, I. B. E. 113.

Heliothrips minutissimus, sp. n.

Length, ♀, c. 0.65 mm.; ♂, c. 0.5 mm.

Same form as *H. indicus*, Bagn., but much smaller, practically colourless—greyish-white to greyish-yellow,—though probably more deeply coloured in fresh examples; wings apparently of a light grey-brown. Unfortunately the examples at my disposal are too poorly preserved for a satisfactory description, but happily the special series of bristles on the ninth tergite of the male are clearly shown, demonstrating at once (apart from the great difference in size) that the species is not a colourless form of *indicus*. There are six long bristles arranged in the form of a crescent, the outside pair being the highest and practically mid-lateral, and the inmost pair the lowest, quite near the posterior margins.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. INDIA, Surat; BOMBAY, 2 ♀♀ and 1 ♂ with numerous examples of *H. indicus* on violet, Feb. 1906 (*H. Maxwell Lafroy*).

Dendrothrips jeanneli, sp. n.

♀.—Length c. 1.0 mm.

Head dark grey-brown, lighter on inner side of each eye; antennæ brown (basal joints lighter than joints 2 and 5-8), excepting joints 3 and 4, which are yellowish-white; pronotum mottled, central part grey-brown, each side irregularly marked from white or greyish-white to brown; pterothorax mostly brown; abdomen light, whitish to greyish-white, medianly grey-brown, darker on each side of the median sculpturing and at the extreme side of the patch, and a grey-brown spot placed laterally on tergites 3 and 7. Femora marked with brown, middle pair darker than the anterior pair; hind pair longer and lighter, femora greyish-white, speckled or touched with light grey-brown; ends of tarsi brown. Fore-wings grey-brown, lighter basally, with a short light patch near middle and before tip. Head very deeply excavated between eyes, surface reticulated. An-

tennæ about 2·5 times the length of the head with the sixth joint (as in *ornatus*, Jabl., and *degeeri*, Uz.) divided, with the style long, longer than joint 6. Joints 5 and 6 broadly united.

Belonging to the section wherein the sixth antennal joint is divided and easily separated from both *ornatus* and *degeeri* by the long antennal style and the coloration of the antennæ, body, wings, &c.

Hab. E. AFRICA; 1 ♀ only, Lake Victoria Nyanza, Kismumu, a village situated at the lower end of the Bay of Kavirondo (alt. 1112 metres), Dec. 6. 1911, no. 23 (*Alluaud et Jeannel*).

Dendrothrips indicus, sp. n.

Length about 0·7 mm.

Colour brown, end of tibiæ and tarsi yellowish. Antennal joint 1 light yellowish to grey-brown, 2 brown, 3-5 yellow to greyish-yellow, 6 to 8 brown, 6 inclined to be lighter basally. Fore-wings with the second fourth grey-brown and a narrow grey-brown bar near tip.

Very near to *D. sermaculatus*, Bagn. (Ceylon), but differing sharply in the colour of the abdomen and wings. Antennal joints 5 and 6 closely united and together longer than 3 and 4, style short, 6 not divided. Antennæ more than twice as long as the head.

♂.—Smaller. Abdominal sternites 2 to 7 with a small, slightly oviform, central, thinly chitinized area.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. INDIA, N. Malabar; on leaves of arrowroot, Sept. 1918 (*Ramakrishna*), Reg. no. 337.

Scolothrips 6-maculatus (Pergande).

I have had the opportunity of examining Schille's type of *Chatothrips uzeli*, which is larger than the 0·57 mm. given in his description. It belongs to the genus *Scolothrips*, as already stated, and if not identical with *S. 6-maculatus*, it comes very near to it. The second antennal joint is greyish, and not concolorous with the first, whilst the dark bands across the fore-wings are larger. Comparison with American examples of *S. 6-maculatus* is desirable before reaching a decision as to the specific identity.

I also possess three poor examples of a smaller *Scolothrips* which agree well with *S. 6-maculatus*; the markings on the wings agree with Hind's description, but the macrochaetæ of the pronotum appear to be longer. These examples were taken in Russia, and it was noted that they were feeding on red mites (a peculiar feature observed in the American species), but I have unfortunately mislaid my Russian correspondent's letter, and am unable at present to give fuller data.

Odontothrips ulicis (Hal.).

Upon examining some examples of *O. ulicis* from Bohemia, ex Uzel's collection, I was struck by several differences readily discernible upon comparison with British examples of *ulicis* from *Ulex* spp. There is no means of knowing the flowers from which Uzel's examples were taken, and until further continental material has been studied there can be no certainty that the true *O. ulicis* exists outside the British Isles or upon other plants than *Ulex* spp. It differs from Uzel's species in its larger size, the longer hind tibiæ, which has a larger series of longer and stronger spines on the inner margin; the whole of the antennæ is of a very dark brown colour except joint 3, which is of a dirty greyish-yellow, whilst the sixth joint is comparatively longer. The two basal antennal joints in the ♂ are grey-brown. I hope to describe the species minutely when monographing the British species of the order.

Odontothrips uzeli, sp. n.

(for *Odontothrips ulicis* (Uzel), nec Haliday).

See remarks under above species, *O. ulicis*. The antennæ, apart from colour, are manifestly shorter and stouter; the following are the comparative lengths of joints 3 to 8, those for *O. uzeli* being more or less approximate:—

O. uzeli, Bagn. 43 : 38 : 26 : 36 : 5 : 10.

O. ulicis (Hal.) 51 : 48 : 34 : 47 : 8 : 13.

The interocellar bristles are shorter than in *ulicis*, measuring 10 as to 16 in the last-named species.

Separated from *O. ulicis* on material from Bohemia, ex Coll. Uzel, after whom I have pleasure in naming the species.

Odontothrips ignobilis, sp. n.

Of about the same size as *uzeli*, Bagn., and the antennæ of similar proportions, the approximate lengths of joints 3 to 8

being as follows:—42 : 37 : 26 : 37 : 6 : 11. Colour of antennæ entirely brown except for joint 3, which is of a clear light yellow. Fore-wings (excepting for a small area on the lower margin) without the clear basal space seen in both *ulicis* and *uzeli*. Fore-tibia with one "tooth" reduced to a very small sharp tooth and the other replaced by a dark stout seta.

Readily recognized by the armature of the fore-tibiæ, the obfusate base of fore-wings, and the colour of the antennæ, &c.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. SPAIN, Ortigosa (Logrosa), 1892; ♀ ♀ only (Coll. Navas).

Genus FRANKLINIELLA, Karny.

a. *Small yellow species.*

Frankliniella delicatula, sp. n.

♀.—Length c. 1.0 mm.

This species resembles *F. pallida* (Uzel) somewhat closely, and may be separated by the more slender antennæ, which has a much longer style, the apical joint being much longer than the basal. The pronotal macrochætæ are shorter than in *pallida*. The fore-wings are colourless and have noticeably fewer spines, whilst the series of spines on the inner margin of hind tibia are also fewer in number.

The species will be more closely described in a paper I hope to prepare shortly on Messrs. Alluaud and Jeannel's material from East Africa.

Hab. EAST AFRICA, 1 ♀, 1. i. 1912; Kikuyu Country, Blue Post Hotel, situated at the confluence of the rivers Thika and Tchania, about 50 kilometres from Nairobi, alt. 1520 metres (*Alluaud et Jeannel*, no. 29).

? *Frankliniella cephalica*, Crawford.

The species I recorded from Trinidad as *F. melanommata*, Williams, is not truly referable to that species. I believe that it is referable to *cephalica*, but unfortunately the anal segments of the male of neither species is described satisfactorily, no mention being made of the specialized dorsal spines of the ninth tergite.

In the type-specimen ♂ of *melanommata* the chief bristles at hind angles of abdominal segments 9 and 10 are long and moderately stout, whilst there is a pair of short rather slender setæ on the ninth tergite placed close to the posterior margin, one on each side of the mid-line, the distance separating them being about 0·6 the length of the seta, and a long bristle situated between the postero-median pair and the posterior angles.

In my Trinidad examples now doubtfully referred to *cephalica* there is a single available ♂, the bristles at posterior angles of the abdominal segments 9 and 10 are very much stouter; there is a pair of postero-median setæ much as in *melanommata*, but stouter and more spine-like, whilst there is a more widely separated pair of weaker and shorter setæ situated on a higher plane, the arrangement being roughly an obverse arc.

Frankliniella distinguenda, sp. n.

♀.—Length c. 1·0 mm.

Very like *F. melanommata*, but paler, very slightly smaller, more slender, with distinctly shorter and stouter antennæ. Head transverse, about 1·4 times as broad as long. Cheeks weakly arched, subparallel; interocellar and postocular spines present, very short and weak. Antennæ a little more than twice as long as the head, pale, first joint almost white, 3 to 5 faintly tinged with greyish-brown distally, 6 to 8 of a uniform light grey-brown. Relative length of antennal segments 3 to 8 approximately as follows:—54 (with pedicel) : 48 : 39 : 52 : 8 : 12.

Pronotum longer than the head, the two pairs of bristles at posterior angles and the antero-angular pair long; the inner of the postero-angular pairs distinctly longer than the outer, about 0·55 as long as the pronotum; the outer postero-angular and the antero-angular pair subequal, 0·4 the length of the pronotum. The postero-marginal median pair smaller still, widely spaced, containing a pair of minor setæ between them and three minor setæ on each side. Number of spines on the costa, fore-vein, and hind-vein of fore-wing approximately as follows:—23, 3+16, and 16 respectively. Segments 9 and 10 of abdomen rather long, terminal bristles moderately long, slender.

♂.—Much as in the ♀, smaller and more slender. Macrochætæ of the terminal abdominal segments long, stout. Tergite 9 as described for *F. melanommata*; with a minor

seta between the outer long pair of postero-marginal setæ and the postero-angular macrochætæ.

Hab. SOUTH AMERICA, Puerto Max (Paraguay), 1905; 5 ♀♀ and 1 ♂ with *F. gemina* and *F. oxyura*, spp. n. (*Vezenyi*).

Frankliniella gemina, sp. n.

♀.—This species is so like *F. distinguenda* that a separate description is unnecessary. It is chiefly recognized by the well-developed cephalic and the longer antero- and postero-marginal pronotal setæ. The antennæ are comparatively a little longer and apparently a shade more slender; the relative lengths of joints 3–8 are approximately :—58 : 54 : 42 : 56 : 9 and 13.

The comparative lengths of the cephalic and pronotal macrochætæ are as follows :—

	<i>F. gemina.</i>	<i>F. distinguenda.</i>
HEAD :		
Interocellar	18	8
Postocular	13	7
PRONOTUM :		
Antero-angular	24	19
Antero-marginal	20	11
Postero-angular, outer	20	19
" " inner	27	26
Postero-marginal, median	15	11

♂.—With the distinguishing cephalic and pronotal chætotaxy as in the ♀. Terminal segments with the macrochætæ longer than in *distinguenda*, but the inner pair of specialized setæ of the ninth tergite shorter and less slender; otherwise as in *distinguenda*. I can find no trace of a minor seta between the long outer pair of tergal setæ and the postero-angular macrochætæ.

Hab. SOUTH AMERICA, Puerto Max (Paraguay), 1905; 3 ♀♀ and 1 ♂ with *F. distinguenda* and *F. oxyura*, spp. n. (*Vezenyi*).

b. *Larger dark brown species, antennal joints 3 to 5 and base of 6 light yellow.*

Frankliniella fulvipes, sp. n.

♀.—Length about 1.3 mm.

Colour chestnut-brown; first two antennal joints light

brown, 3 to 5 and basal third of 6 very pale creamy yellow, almost white, and 6 distally and style light grey-brown; fore-wings dark brown, basal fourth or thereabouts much lighter; fore-femora yellowish-brown, all tibiae and tarsi pale yellow, sometimes lightly touched with pale grey-brown.

Head as in *F. insularis*, narrowed posteriorly and about 1·3 as wide across eyes as long; postocular and interocellar bristles well-developed, approximately 0·7 and nearly 1·0 the length of the eye respectively, the postocular pair almost touching the hind margins of the eyes. Antennae about 2·5 times as long as the head, general form much as in *F. insularis*, with apical setae of intermediate joints very long and strong; relative lengths of joints 3 to 8 approximately as follows:—76 : 67 : 48 : 57 : 10 : 20.

Pronotum 1·3 times as long as the head, transverse; macrochaetae as in *insularis*, almost subequal in length, the inner antero-marginal pair being nearly 0·9 or more the length of pair at posterior angles, which latter are 0·6 the length of the pronotum. Legs normal, pair of stout dark spinelets at apex of fore and intermediate tibiae within and the series on the inner edge of hind tibiae numbering 8 or 9, the pair at apex being long, stout, and straight, approximately 0·8 the width of the tibiae near apex. Wings normal, spines of costa, fore-vein, and hind-vein numbering about 26, 19, and 17 respectively.

Abdomen slightly broader than pterothorax; last two segments inclined to be darker than the rest of the body; segment 10 divided for the most of its length above; terminal bristles long, stout, dark.

This species comes nearest to *F. insularis* (Franklin), but is readily recognized by the coloration of the antennae and the relative lengths of the joints, and the coloration of the tibiae.

Hab. SOUTH AMERICA, Tucuman (Argentine); 4 ♀♀, November 1905 (*Vezenyi*), with *F. setipes*, sp. n.

Frankliniella setipes, sp. n.

♀.—Length about 1·5 mm.

Colour uniform dark chestnut-brown, fore-tibiae inclined to be lighter; all tarsi pale yellow; first two antennal joints concolorous with head, joints 3 to 5 and basal half of 6 pale lemon-yellow, distal half of 6 and style pale grey-brown.

Head not noticeably convergent posteriorly, about 1·2

times as broad as long; postocular and interocellar bristles as in *F. fulvipes*, sp. n., 0·8 and 1·1 times the length of the eye respectively. Antennæ as in *F. fulvipes*, about 2·3 times the length of the head; relative lengths of joints approximately as follows:—65 : 54 : 44 : 53 : 10 : 18.

Pronotum slightly longer than the head, transverse; macrochætæ as in *F. fulvipes*, but not quite so long compared to the length of the pronotum. Minor setæ of both head and pronotum stronger and more conspicuous than in *F. fulvipes*.

Legs normal, spines at inner apical margin of tibia not so stout as in *fulvipes*; minor setæ numerous, longer and more conspicuous, giving the legs a distinctly setose appearance even under a low-power objective.

Wings coloured as in *F. fulvipes*; curled in the available material, and therefore a count of the wing-spines is impossible.

This species is separated from *F. fulvipes* by the longer head, which is not convergent posteriorly, the shorter antennæ, and the colour of the tibiæ. It is a larger, darker, and coarser insect, and distinctly more spinose. Both *setipes* and *fulvipes* here described may be separated from all other described forms by the distinctive coloration of the antennæ.

Hab. SOUTH AMERICA, Tucuman (Argentine); 3 ♀ ♀, with *F. fulvipes*, sp. n., Nov. 1905 (*Vezenyi*).

c. *Dark species, colour of antennæ otherwise.*

Frankliniella oxyura, sp. n.

♀.—Length c. 1·05 mm.

Colour brown, abdomen generally darker than head and pronotum; pterothorax furnished with a good deal of red hypodermal pigmentation; femora brown, the fore-pair yellowish distally; all tibiæ and tarsi yellow, the hind pair lightly tinged with faint grey-brown in some specimens. Antennæ brown, joint 2 slightly darker than 1, 3 pale greyish yellow, and 4 yellowish brown, lighter basally. Wings yellowish brown, lighter, but not conspicuously so, in the basal fourth. General colour yellowish-brown in light specimens.

Head approximately 1·3 times as broad as long, cheeks practically parallel. Interocellar setæ apparently obsolete, postocular pair minute and inconspicuous. Antennæ about 2·2 times the length of the head, rather stout, segments 2, 3,

and 4 plainly broader than 6. Relative lengths of joints 3 to 8 approximately as follows:—42 (including pedicel) : 39 : 27 : 41 : 7 : 9.

Pronotum a little longer than the head, transverse; seta at each anterior angle about 0·3 and the outer pair at each posterior angle 0·4 the length of the pronotum; the inner postero-angular pair slightly longer than the outer. The antero-marginal and the postero-marginal median pair shorter, about 0·2 the length of the pronotum. Legs normal, series of spines of hind tibiæ within numbering 8 to 9; not particularly strong or conspicuous. Wings reaching to the seventh abdominal segment, fore-wings about thirteen times as long as broad near middle, veins strong, ribbed; bristles moderately long; costa, fore-vein, and hind-vein with about 23, 3 + 15 (13 to 17), and 14 (12 to 16) bristles respectively, apparently variable; cilia of lower margin wavy.

Abdomen elongate, a little broader than the pterothorax, with the last segments more than particularly long and sharply pointed. Last segment about 0·6 as broad at base as long, open for most of its length dorsally. Bristles on segments 9 and 10 moderately long, slender, the longest scarcely as long as the length of segment 10. Tergite 8 with a regularly set fringe of about twelve hair-like chitinous projections, long and fragile, with stout bases.

Recognized from the other small brown species of the genus—*tympanona*, *minuta*, and *fusca*—by the coloration of the antennæ and legs, and distinctive on account of the shape of the end of the abdomen.

Hab. SOUTH AMERICA, Puerto Max (Paraguay); 1905, ♀ ♀ only (*Vezenyi*).

Frankliniella insularis (Franklin).

Hab. SOUTH AMERICA, Los Trincheras (Venezuela); Dec. 1891, both sexes (*Meinert*).

Frankliniella varicorne, sp. n.

♀.—Length about 1·2 mm.

General colour yellowish-brown; head inclined to be lighter, shaded with grey, and abdomen of a deeper grey-brown. Thorax with light red hypodermal pigmentation. Wings very lightly washed with a suspicion of greyish-yellow, cilia light grey-brown. Antennæ with joints 2 and 6 to 8 dark brown, 1 very pale greyish-yellow, 3 and 5 dirty

yellow shaded lightly with grey-brown in the distal half or thereabouts; 4 also yellow but more deeply shaded with grey-brown in the distal two-thirds or thereabouts. Legs more or less yellowish, femora lightly touched with grey-brown.

Head transverse, about 1.5 times as broad as long, sides convergent posteriorly; interocellar and postocular bristles long and prominent, the former being decidedly the longer. Antennæ apparently more than 2.5 times as long as the head, only moderately stout, much as in *F. stylosa*, Hood, with the relative length of the joints 3 to 8 as follows:—55 (with pedicel) : 52 : 39 : 53 : 8 : 9.

Pronotum large, about 1.3 times as long as the head; bristles long and stout, the inner of the two bristles at each hind angle the longest of all, about 0.6 the length of the pronotum, the outer only about 0.7 the length of the inner. The bristles at each anterior angle also long, but the anteromarginal pair much shorter and the postero-marginal median pair shortest of all, about 0.3 the length of the pronotum. Legs normal, moderately long and stout. Fore-wing with 25, 3 (or 4) + 18, and 19 setæ on the costa, fore-vein, and hind-vein respectively.

Abdomen of normal form, comb on posterior margin of tergite 8 apparently present but indistinct in the single preparation; segment 10 open dorsally; bristles on 9 and 10 long, dark, and moderately strong.

♂.—Scarcely 0.9 mm. in length, very slender, yellow, suffused almost entirely with a light grey to grey-brown. Antennal coloration much as in ♀, but generally paler, with the shading of 4 and 5 more clearly defined. Sides of head scarcely convergent.

Relative lengths of antennal joints 3 to 8 approximately as follows:—46 (with pedicel) : 40 : 32 : 44 : 7 : 8. Costa, fore-vein, and hind-vein with 24, 3 + 15, and 15 setæ respectively. Macrochætæ of abdominal segments stout, dark; tergite 9 with a pair of postero-marginal median stoutish spines flanked by a long bristle on either side, broadly as in *F. melanommata*.

This species differs from both *F. schultzei* (Tryb.) and *F. stylosa*, Hood, in the subequal joints of the antennal style. It comes very close to the European *F. intonsa*, but is recognized by the longer prothorax, the inequality of the pronotal bristles, and the less strong terminal macrochætæ in the ♂.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. CANADA, Semans, Sask.; 1 ♀ and 2 ♂♂ on *Petalostemon purpureum*, 4. viii. 1917 (*A. E. Cameron*, no. 27).

Genus EUTHRIPS, Targ-Tozz.

a. *Sixth antennal joint entire.*

Euthrips citricinctus, sp. n.

Length c. 1.0 mm.

Head, pronotum, abdominal segments 1, 2, and 6 to 10 deep blackish chestnut-brown; pterothorax brown, abdominal segments 3 to 5 and base of 6 lemon-yellow. Forewings tinted light greyish-yellow, basal fourth lighter and a darker ill-defined brown patch in the second fourth. Hindwing with dark median vein extending into distal fourth. Anterior legs yellow; intermediate pair of femora yellow faintly shaded with grey-brown (the rest of the middle pair of legs are not present in the type-specimen); hind-femora yellow-brown; tibiæ yellow tinged with grey to grey-brown. Antennæ brown, with joints 3 and 4 light greyish-yellow, 3 being lighter than 4, extreme base of 5 yellowish.

Head 0.9 as long as broad, rounded between eyes; dorsal surface posteriorly transversely striate. Eyes moderately coarsely faceted; ocelli rather widely separated, with strong crescentic hypodermal pigmentation; mouth-cone long. Antennæ about 1.5 or 1.6 times as long as the head. Relative lengths of joints 4 to 8 as follows * :—10 : 10 : 14 : 3 : 4.

Pronotum quadrate, as long as the head, slightly broader basally, where it is 0.8 (or more) as broad as long.

Pterothorax about as long as broad, mesothorax broader than the metathorax. Wings reaching to the eighth abdominal segment, forewings broad, about fourteen times as long as broad across the middle; spines very minute, 8 or 9 on the upper and 8 on the lower vein; lower fringes of all wings wavy.

Abdomen elongate-ovate, distally obconical. Tergite 8 with a fringe on posterior margin; the lateral setæ each on a broad triangular base. Segment 10 open dorsally. Apical bristles fairly long, dark.

This species very closely approaches Karny's *E. flavicinctus* from Java. I am unable to identify it with his

* On account of the angle at which the basal part of each antenna is mounted, I cannot give a description of joints 1 to 3.

species, however, on account of the very different colouring of the legs, the shorter antennæ, and the form of the forepart of the head.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. INDIA, N. Malabar, on arrowroot-leaves; 1 ♀, Sept. 1918 (*Ramakrishna*). Reg. 337.

b. *Sixth antennal joint divided.*

Euthrips cameroni, sp. n.

♀.—Length 1.25 mm.

Belonging to the section of the genus containing *E. obscurus* (Müll.) and *E. secticornis* (Tryb.), both of which are known from North America.

Head yellowish, but largely shaded with dark grey-brown; pronotum yellow more lightly shaded with grey-brown; prothorax yellowish, but mostly shaded with brown. Abdomen uniform chestnut-brown, the segments 9 and 10 darker; legs yellowish, lightly shaded with grey-brown. First antennal joint yellowish, shaded with grey-brown, second brown; third yellow; fourth light grey-brown, basally yellow; 5 to 8 dark chestnut-brown, 5 with extreme base yellowish. Wings light greyish-yellow.

Head as long as broad; eyes occupying about 0.45 the total length of head; ocelli with deep crescentic crimson hypodermal pigmentation. Antennæ not quite twice as long as the head; joint 3 longer and narrower than 1, 2, 4, or 5 and as long as 6 (with divided part) and much narrower; fusiform and pedicellate. Joints 2 to 8 broadly as follows* :— 9 : 22 (with pedicel) : 18 : 15 : 22 (with divided part) : 4 : 5. Pronotum subquadrate, as long as the head and a little broader near base than long. Wings well-developed, spines of forewings minute, apparently few and sparse on upper vein, about 10 on lower vein.

Abdomen elongate-ovate, tapering somewhat apically; tenth segment open dorsally, bristles long and strong. Fringe of posterior margin of tergite 8 moderately long and even.

♂.—A male example is mounted laterally. It is smaller than the ♀ and apparently lighter in colour. The special series of spines on tergite 8 very stout as in *Physothrips*

* Unfortunately mounted at an angle.

lefroyi, Bagn., and set on tubercles; the inmost pair longer, stouter, and on a higher plane, another pair more widely spaced and close to posterior margins (on account of the lateral view it is impossible to say where there are one or two pairs in this posterior series, but I am almost certain there is only one pair).

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. CANADA, Semans, Sask., Aug. 4, 1917, 1 ♀ and 1 ♂ in injured wheat-stems (*A. E. Cameron*).

This species is easily separated from *E. obscurus*, Müll., and *E. badius*, Williams, by its coloration and from *E. secticornis* (Tryb.) by the 3rd antennal joint and the structure of the 5th and 6th joints in which *E. cameroni* agrees with *obscurus*. I have pleasure in naming the species after Dr. A. E. Cameron, of the Entomological Branch of the Canadian Dept. of Agriculture, who discovered it whilst investigating wheat-pests.

Genus LIMPHYSOTHRIPS, nov.

General appearance of *Physothrips* and, although the antennæ are broken in the unique preparation, it will almost certainly be found that the style is two-jointed.

Pronotum with two long bristles at posterior angles. Fore-tibiæ unarmed. Both veins of fore-wing regularly set with long bristles.

Tenth segment divided dorsally and armed with a very stout pair of dorsal spines at apex as in *Limothrips*.

Differs from all genera excepting *Limothrips* in the presence of the strong spines of the tenth abdominal segment. It further differs from *Physothrips* in the chaetotaxy of the fore-wings and from *Odonthrips* in the unarmed fore-tibia. From *Limothrips* it differs in the general character of the wings, head, and prothorax, and in the absence of the additional stout spines present in the eighth abdominal segment of that genus.

Type. *Limphysothrips paradoxus*, mihi.

Limphysothrips paradoxus, sp. n.

With the characters of the genus.

♀.—Length c. 1.3 mm.

Colour brown, wings with a yellowish tinge; fore-femora yellowish distally, fore-tibiæ and all tarsi yellowish; intermediate and hind tibiæ yellowish at extremities. Basal joints

light grey-brown shading to yellow-brown at apex of 2nd joint.

Head transverse, cheeks slightly widened and set with several short setæ behind eyes. Eyes coarsely faceted and minutely setose. Inter-ocellar bristles very long.

Pronotum transverse; bristles at hind angle long and stout. Wings long, reaching to apex of abdomen. Setæ of fore-wings long, those of costa very long, numbering 26; fore-vein 3+16 and lower vein 15.

Abdominal segment 10 cylindrical, open above with a pair of very stout horn-like dorsal spines at apex, and a pair of lateral apical bristles longer than the segment bearing them. Posterior bristles of 9 placed somewhat back, the lateral pairs long, longer than or as long as the segments 9 and 10 together, an inner dorsal pair about 0.15 the length of the longer ones. A short dorsal pair, widely spaced.

Hab. GERMAN EAST AFRICA, Alpine prairies around Bismarckhügel, altitude about 2700 metres, 1 ♀, April 1912 (*Alluaud et Jeannel*, no. 70).

Suborder TUBULIFERA.

Family Phlæothripidæ.

Genus *Haplothrips*.

a. *Fore-wings with duplicated cilia, slender, clouded.*

Haplothrips pictipes, sp. n.

♀.—Length 1.2 mm. to 1.3 mm., breadth of mesothorax c. 0.28 mm.

Colour dull chestnut-brown, tube darker basally; fore-femora yellowish distally; all tibiæ light yellow, more or less shaded with grey-brown except the base of intermediate pair and the basal two-fifths of the hind pair; the shaded part usually flecked with darker brown on the outer margin of the tibiæ. Antennæ brown, joint 3 yellow touched with light grey-brown in the distal half, 4 yellowish or greyish-yellow distally and basally. Wings clouded, clear basally, darkest before middle and lighter distally.

Head about as broad as long and 1.25 times as long as the pronotum; cheeks distinctly narrowed near base; eyes occupying about 0.38 the length of the head. Ocelli large, placed on a swelling with a strong hypodermal pigmentation; front one directed forwards, hind pair placed above a line drawn across the centre of the eyes; postocular bristles moderately

long, about 0·26 the length of the head, fundibuliform. Antennæ approximately twice as long as the head, segments 3 and 4 subequal, and 5 to 7 slightly shorter and also approximately subequal; relative lengths of 3 to 8 as follows:—36 : 35 : 30 : 30 : 30 : 21.

Pronotum transverse, nearly twice as broad as long; all setæ present, dilated apically and well-developed; those at posterior angles longest, about 0·4 the length of pronotum; the postero-marginal and mid-lateral pairs 0·35 and the antero-marginal pairs 0·3 the length respectively. Fore-femora stout; fore-tarsi each armed with a short tooth. Fore-wings normal, cilia sparse, few and widely spaced, duplicated cilia in three specimens 5 : 6, 5 : 6 and 5 : 7 respectively.

Abdomen not as broad as the pterothorax, tube 0·75 to 0·8 the length of the head, about 0·45 as broad at base as long, and half as broad at apex as at base. Apical hairs longer than tube, dark in the basal two-thirds but losing colour and very slender distally. Abdominal bristles light-coloured, the longest on segment 9 about 0·6 the length of tube, and colourless distally; those on 7 the same length, but stouter.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. INDIA, Taliparamta, Malabar, on diseased pepper-berries, September 1918 (*Ramakrishna*), Reg. no. 348.

b. *Fore-wings without duplicated cilia.*

Haplothrips unicolor, sp. n.

♀.—Length 1·5 to 1·6 mm., breadth of mesothorax c. 0·3 mm.

Colour of a uniform deep black-brown including tarsi, fore-tibiæ yellowish-brown distally; third antennal joint a little lighter in shade than the others. Wings, excepting scale which is brown, clear.

Head rather large, divergent posteriorly (though this may have been caused in mounting), and about 1·5 times as long as the pronotum; ocelli situated well forward on a produced prominence, the anterior ocelli overhanging and well in front of a line drawn across the anterior margins of the eyes. Antennæ about 1·5 times as long as the head; joint 4 broader than any of the others; relative length of segments 3 to 8 approximately as follows:—44 : 47 : 44 : 42 : 38 : 24, last two joints closely united, 4 to 7 each with a narrow basal constriction.

Pronotum transverse, setæ at each hind angle colourless, blunt, and about 0·6 the length of the pronotum; others apparently vestigial. Wings well-developed, constricted near middle, clear, and fore-wings without duplicated cilia. Cilia comparatively few and not close. Fore-tibiæ normal, fore-tarsus with a very small tooth.

Abdomen somewhat heavy, as broad as or very slightly broader than the pterothorax, narrowing gently posteriorly. Tube about 0·7 the length of the head; 0·6 as broad at apex as at base and more than twice as long as broad at base; chitinous "rod" long. Apical hairs weak, colourless distally, about 0·8 the length of the tube. Abdominal bristles moderately long, colourless.

♂.—More slender, Fore-legs rather long and not strongly incrassate and fore-tarsal tooth (tucked under the prothorax in the unique preparation) apparently small. Spines at posterior angles of abdominal segments minute except on 8 and 9.

Recognised by the colour, the clear wings, the absence of duplicated cilia in the fore-wings, and the apparent paucity of pronotal macrochætæ. *H. nigricornis* Bagn. (S. Africa), is a much larger and stouter insect, with closely ciliated wings.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. SOUTH AFRICA, Pirie, 4 ♀ ♀ and 1 ♂.

Podothrips varicornis, sp. n.

♂.—Slender; length about 1·1 mm.

Colour deep chestnut-brown; fore-tibiæ and fore-tarsi yellow. First two antennal joints concolorous with head, 3 light yellow with the distal third clouded with light grey-brown, 4 also yellow with the distal two-thirds light grey-brown; 5 and 6 light brown, basally light yellowish, 7 and 8 grey-brown. Wings clear basally and distally, but medianly clouded with a smoky-brown.

Head 1·2 to 1·3 times as long as broad, cheeks faintly arched and evidently slightly convergent posteriorly; ocelli well forward, with the anterior one overhanging. Postocular spines well back. Antennæ not quite twice as long as the head, segments 3 and 4 broadly clavate and much broader than the following; relative lengths of joints 3 to 8 approximately as follows:—39 : 40 : 37 : 35 : 36 : 24. Pronotum about 0·9 the length of the head, transverse; all setæ

apparently present, short, dark, slender but blunt at ends; of the two at each hind angle the outer is about 0.34 and the inner 0.26 the length of the pronotum, whilst the seta at each anterior angle is only about 0.2 the length. Wings slender, sub-linear, slightly constricted medianly; cilia comparatively sparse and distant; fore-wing with duplicated cilia. Legs comparatively stout, fore-legs incrassate, fore-tibiae short, only about 0.5 the length of the femur; the end within produced into the form of a tooth; tarsus armed with a strong sharp tooth.

Tube stout, about 0.8 the length of the head, about 0.7 as broad at apex as at base and a little more than twice as long as broad at base. Terminal hairs weak, colourless terminally, and longer than the tube. Abdominal bristles somewhat long, slender; those on segment 9 as long as or slightly longer than the tube.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. SOUTH AFRICA, Cape Town, 1 ♂ in flower of Sugar Bush (*Protia*), July 13th, 1914 (*E. B. Poulton*).

Trichothrips melanurus, sp. n.

♀.—Forma aptera. Length c. 1.4 mm.

This species comes into the section of the genus containing yellowish to brown species, and having the tube shorter than the head and the mouth-cone reaching across the prosternum. It most closely approaches *T. semicæcus*, Uzel, from which it differs in the shorter tube, coloration of the body, and appendages.

Head and prothorax brown, pterothorax and abdominal segments 1 to 8 more or less irregularly brown. Abdominal segment 9 yellow and tube deep black; except for extreme base and apex where it is brown. All femora light brown, fore-femora yellow apically; all tibiae and tarsi light lemon-yellow, more chitinous part of end tarsal joints black-brown. Antennal joint 1 light brown, 2 yellowish tinged with brown, 3 light lemon-yellow with distal half light yellow-brown, 4 dark brown in distal half, basal half light lemon-yellow, 5 and 6 distally dark brown with approximately the basal third and fourth light lemon-yellow; 7 and 8 wholly dark brown. The head is as long as broad, slightly longer than the pronotum, with the cheeks subparallel, only slightly narrowed at base and the front straight, so that the head is practically square with the two fore-corners cut off by the eyes. The eyes are small, the space between them wide and

dorsally occupying less than 0·2 the total length of the head. Postocular bristles long, colourless. Ocelli present, well forward. Antennæ twice as long as the head; relative lengths of joints 3 to 8 approximately as follows:—51 : 50 : 43 : 42 : 36 : 24. Joint 4 broader than 3 or 5; 3 claviform, 4 claviform; 5 subclavate, stemmed; 6 also stemmed, and 7 constricted at extreme base to a very short stem. Sense-cones stout, rather blunt.

Pronotum transverse, a little more than twice as broad as long. All setæ present, practically colourless and therefore inconspicuous; those at posterior angles the longest, the outer and inner being 0·55 and 0·45 the length of the pronotum respectively; mid-lateral pair short and the pair at anterior angles about 0·25 the length. Fore-femora slightly incrassate and fore-tarsus toothed. Pterothorax not as broad as the width across the fore-coxæ, about 0·75 as long as broad.

Abdomen slightly broader than the pterothorax; roundly narrowed apically, bristles moderately long, colourless, and inconspicuous. Tube about 0·75 the length of the head; 2·25 times as broad at base as at apex, sides straight and evenly narrowed. Apical hairs weak, short, about 0·5 the length of the tube.

Type. In Coll. Bagnall, University Museum, Oxford.

Hab. AUSTRALIA, F. T. Gulley, 27. 10. 13 (*F. Spry*).

This is the only data at my disposal.

XXVI.—*New Species and Forms in the Joicey Collection.*

By LOUIS B. PROUT.

Fam. Geometridæ.

Subfam. *ENOCHROMINÆ*.

1. *Cartaletis gracilis landbecki*, subsp. n.

Like *gracilis variegata*, Prout (Nov. Zool. xxiii. p. 274), in the extension of the fulvous markings, but distinguished by having these of the pale shade of *forbesi*, Druce, whereas in *g. variegata* they are of the warm reddish shade of *sapor*, Druce, or of *Parapytchodes tenuis*, Butl. The most constant

point of distinction between *g. gracilis* and its more southerly races is the *absence of black costal dusting* on the proximal part of the fore wing in the latter; in *g. gracilis* the costa is black or blackish to the base. Except at the base and on the hind wing *g. landbecki* is individually very variable; the pale fulvous shade may disappear before one-third of the costa, and not reappear, or it may reappear as an isolated spot in the region of the distant arcole, or with a large spot at base of veins R^3-M^1 , or it may run broadly to beyond middle of costa, becoming confluent with the last-named spots (name-type), and there may even be a further extension of the outer spots into an irregular band proximal to the black border and reaching SM^2 .

Upper Kasai District, Congo Free State (*P. Landbeck*); 7 ♂♂ in coll. Joicey.

It may be pointed out that *landbecki*, Druce (Ann. & Mag. Nat. Hist. (8) vi. p. 400), wrongly described as an *Aletis*, and cited there by me in Lep. Cat. viii. p. 79, is a *Mimaletis* (subfamily Geometrinæ), so that there is no fear of collision in the use of this subspecific name.

Subfam. *HEMITHEINÆ*.

2. *Thalassodes clarifimbria*, sp. n.

♀.—42-49 mm.

Face reddish brown. Palpus somewhat more reddish, beneath yellow-white; third joint relatively short, about half as long as second. Vertex and antennal shaft white; occiput green; thorax and abdomen green above, unmarked; beneath white to whitish.

Fore wing green, rather duller and bluer than in *semihyalina*, Walk., the white strigulation rather strong; costal edge yellow at extremity, then whitish; lines white, rather faint, obsolete costally; antemedian placed as in the allies; postmedian rather far from termen anteriorly, reaching hind margin at two-thirds; fringe almost white.

Hind wing with termen more feebly bent at R^3 than in the allies, excepting perhaps *semihyalina*; concolorous with fore wing, the elongate cell-mark and the postmedian line both present, but rather indistinct.

Underside paler green, almost unmarked; fore wing with costal edge pale yellow; both wings with fringe whitish.

Ceylon: Maskeliya, Aug. 1905 (type) and June (*G. C. Alston*), in coll. Joicey; Hakgale, April 1907 (*E. E. Green*), in coll. Brit. Mus.; the latter yellower green, perhaps faded.

Distinguishable from the allies by the whiter fringes and

browner face; also (except from *semihyalina*, which has a white dorsal line and is, especially in Ceylon, much smaller) by the shape. Assuming that the ♂ has non-dilated hind tibia, the natural position will be next to the last-named species.

Subfam. *STERRHINÆ*.

3. *Scopula linearis*, f. *alstoni*, form. n.

♂ ♀.—Differs from name-typical *linearis*, Hmps. (Ill. Het. Brit. Mus. viii. p. 123), in that the incurved portions of the postmedian line (between the radials and behind M²—both here conspicuously blackened) are followed distally by dark patches (ochreous irrorated with black, especially at their distal extremity) about as in *stigmata*, Moore, or some forms of *walkeri*, Butl.

Ceylon: Uva, 500 feet, May (*G. C. Alston*), a pair in coll. Joicey; also a poor ♂ from Pundaloya (*E. E. Green*), in coll. Brit. Mus.

I have not seen the *linearis* form from Ceylon, so that this may well prove a constant race, or even representative species, as I at first thought the hind tibia appeared still thicker; but the known variability of some species of the group in respect of the postmedian blotches makes me hesitate until more material is available. Name-typical *linearis* is fairly frequent in the Nilgiri and Palni Hills, and occurs also in Sikkim and Bhotan; from none of these localities have I seen specimens approaching the *alstoni* form.

4. *Scopula subpartita*, sp. n.

♂.—26–28 mm.

Face brown-black, narrowly whitish below. Palpus black above, ochreous whitish beneath. Vertex and antennal shaft light ochreous brown; collar darker; antennal joints slightly projecting, ciliation nearly twice as long as diameter of shaft. Thorax and abdomen light ochreous brown, more whitish beneath; abdomen dorsally with some black irroration and ill-defined medio-dorsal spots. Fore leg and (more slightly) mid leg infuscated on upper and inner side; hind tibia rather long, dilated, fringed above and with rather long whitish hair-pencil; hind tarsus nearly one-third as long as tibia.

Fore wing moderately broad, costa gently arched posteriorly, termen smooth, little curved; light ochreous brown, appearing slightly darker and rougher than in most of the *nesciaria* group, on account of slight greyish suffusions and

moderate blackish irroration; cell-dot black; markings grey; antemedian line ill-defined, strongly angled in cell, strongly oblique posteriorly, marked with slight shades on M and SM²; median shade rather thick, strongly oblique from middle of hind margin to R¹, vertical to SC³, then oblique inward but indistinct; this shade very slightly incurved between SM² and M¹ and between the radials, feebly dentate outwards on M², M¹, and R³; postmedian fine, lunulate-dentate, formed about as in the allies, accentuated by small dark dashes on the veins; subterminal pale grey shades moderately developed, leaving the clear rather broad subterminal tolerably distinct, formed of a series of lunules which are in part almost separated by very fine darkening of the veins; terminal black spots small but sharp; fringe in proximal half concolorous, with some black irroration (especially distally), in distal half paler, almost clear.

Hind wing with termen convex, rather full about the middle, but with the bend at R³ inappreciable; proximally rather paler than fore wing, and without antemedian line, otherwise with the markings continued, the median shade straight or nearly so, proximal to the cell-dot, the postmedian thicker than on fore wing, with the vein-dashes weaker.

Underside paler, the fore wing, except at hind margin, with strong brownish-smoky suffusions from base to median shade; minute black cell-dots present; postmedian line of fore wing nearly as above, of hind wing fine and faint; subterminal shades slight; terminal dots present; fringes concolorous, not irrorated.

Khasis (native collector), type in coll. Joicey. Other examples merely labelled "Assam."

Distinguishable from *attentata*, *patularia*, etc., by the less short tarsus, spotted abdomen, sharply defined dark proximal area of fore wing beneath, and by the tone of colour. Females from the same source as the paratypes, and agreeing exactly in the last respect, fail, however, of the other distinctive characters, and have also slightly narrower wings, the termen of the hind wing rather less convex, more recalling the African *khakiata*, Warr., and can for the present only be cited here with a query.

5. *Scopula segregata*, sp. n.

♂.—23-25 mm.

Face black. Palpus brown, mixed with black above and becoming pale beneath. Vertex white. Antenna ciliate

(broken in both examples). Collar brown. Thorax above pale brown; abdomen whitish. Hind tibia slender, with long thin hair-pencil, spurs wanting; tarsus as long as tibia.

Fore wing with costa very gently arched, apex acute, termen oblique, straight anteriorly, very slightly curved posteriorly; pale brown, with a tinge of fleshy-ochreous and with minute olive-grey irroration; cell-dot minute, black; antemedian line obsolete; median shade rather thick, grey, strongly oblique and straight from just beyond middle of hind margin to R^1 or SC^3 midway between cell-dot and termen, then less oblique and much fainter; postmedian line fine, parallel and approximated to median; subterminal shades rather weaker and rather less oblique; terminal line very fine, continuous, scarcely thickened between the veins; fringe concolorous or slightly more reddish, unmarked.

Hind wing not broad, costal margin relatively long; whiter than fore wing, especially proximally and costally; irroration strongest in abdominal region; cell-dot minute, black; median shade faint, only traceable in abdominal region; postmedian and two subterminals fine, weak, fleshy-greyish, nearly parallel with termen, apparently (at least the postmedian) finely crenulate; terminal line and fringe nearly as in fore wing.

Fore wing beneath with ill-defined smoky suffusions as far as the median shade, hind wing rather more uniformly coloured than above; both wings with markings nearly as on upperside, hind wing with terminal blackish dots.

Teng-yueh-ting, W. China; 2 ♂♂ in coll. Joicey.

Very distinct from any Indo-Australian *Scopula* known to me; more associated with the African group *silonaria*, Guen., *commaria*, Swinh., *fragilis*, Warr., etc.

6. *Scopula patula*, sp. n.

♂ ♀.—31–33 mm.

Coloration and aspect of *napariata*, Guen., or slightly warmer in tone. Antenna of ♂ with the fascicles of cilia considerably longer. Hind tarsus of ♂ considerably longer (at least $\frac{2}{3}$ as long as tibia).

Fore wing with termen more oblique, as long as hind margin; cell-dot subobsolete or sharply black, but in any case placed on the posterior extremity of DC^3 ; postmedian line at its costal extremity rather more displaced proximally, here somewhat thickened but vague; terminal dots rather large and sharp.

Hind wing with terminal dots rather large and sharp.

Underside similar to that of *napariata*, fore wing rather more suffused.

Sierra del Libano, Dept. Magdalena, Colombia, 6000 feet (H. H. Smith); type ♂ and three ♀ ♀ in coll. Joicey.

7. *Scopula toxophora*, sp. n.

♀.—25 mm.

Nearest to *habilis*, Warr. (Nov. Zool. vi. p. 31). Body and wings above and beneath much more ochreous.

Fore wing with antemedian line curved in cell, not (as in *habilis*) angulated; postmedian slightly less oblique, anteriorly (about R¹) forming a much stronger outward curve than in *habilis*; cell-dot obsolete.

Hind wing with termen not appreciably elbowed; cell-dot obsolete.

Fore wing beneath rather glossy, proximally somewhat suffused with rosy grey; antemedian line and cell-dot obsolete, postmedian line feeble, obsolete anteriorly; hind wing unmarked; both wings with terminal line rather weaker than above.

Bitje, Ja River, Cameroons, 2000 feet, Oct.—Nov. 1912 (G. L. Bates); type in coll. Joicey.

XXVII.—Notes on the Genus *Cricetomys*, with Descriptions of Four new Forms. By MARTIN A. C. HINTON.

(Published by permission of the Trustees of the British Museum.)

IN determining some specimens of *Cricetomys* from Zanzibar and the southern part of the Congo Basin, I have had occasion to work through all the material in the British Museum. This material, although extensive, is scarcely sufficient for an attempt to revise the whole genus. Many forms have been described, but with one exception all have been treated as mere subspecies of *C. gambianus* by modern workers—in my opinion, four species at least are at present included under the name.

1. *Cricetomys gambianus*, Waterhouse.

An examination of Waterhouse's type shows that the name *gambianus* is applicable only to the harsh-furred white-bellied forms ranging eastwards from the Gambia and

Senegal to the S.E. Soudan and the country between the Nile and the Congo. Southwards this species extends into Southern Nigeria and the Welle Basin, its range partly overlapping that of the sleek-furred species of Western and Central Africa.

C. gambianus, as I understand it, is a comparatively small species, in which the hind foot rarely measures more than 65 mm., while the condylo-basal length of the adult skull rarely exceeds 67 mm. It has loose harsh fur, which varies in density according to the subspecies. The general dorsal colour is a rather cold grey, which may or may not be more or less darkened along the spine and over the rump by long black hairs. The ears are dusky and in conspicuous contrast with the rest of the dorsal surface. The underparts are white separated from the flanks by regular, though often not very sharp, lateral lines of demarcation. The feet are whitish above, with more or less extensive dusky markings, the proximal half or third of the tail is dusky, the remainder being white.

The skull and teeth are normal; the palate without a posterior median spine, but often with a minute median notch. The bullæ show a certain amount of subspecific variation in size; and more important variations, dependent upon the development of the jaw-muscles, are discoverable between the subspecies in the region of the infraorbital canal when the skulls are studied with sufficient care.

Four subspecies, inclusive of a new one described below, are now known; but others will probably deserve recognition when further material comes to hand. These subspecies are:—

1. *C. g. gambianus*, Waterhouse.
Gambia and Senegal; type B.M. 55. 12. 24. 136 from the Gambia.
2. *C. g. dichrurus*, Osgood.
Anambara River, S. Nigeria; type B.M. 5. 12. 1. 21, ♀ adolescent.
3. *C. g. olivie*, Dollman.
Bornu, N. Nigeria; type B.M. 11. 5. 12. 9, male.
4. *C. g. grahami*, subsp. n.

C. gambianus grahami, subsp. n.

Type.—An adult male (B.M. 19. 3. 2. 1), collected on November 1, 1918, on the Nuba Mountains, S.E. Soudan (altitude 1500'), by Major C. Graham and presented by him to the National Collection. No other specimen known.

Description.—In dorsal colour this form makes a nearer approach to *dichrurus* than to other subspecies of *gambianus*; but the cranial characters are closely similar to those of *olivie*.

In its harsh loose fur, cold grey dorsal colour, and sharply contrasted dusky ears, *C. g. grahami* resembles the other races of *gambianus*. In general external appearance, length and quality of the fur, markings of the hands and feet, and in the relative proportions of the black and white of the tail it agrees best with *dichrurus*. In the latter the black hairs of the back are so abundantly developed that one could almost describe the rump as being "clouded" with black; in *grahami* this is not the case, although the black hairs are far more numerous and obvious than in true *gambianus* and *olivie*. The specimens obtained by Emin Pasha in Monbuttu are lighter-coloured and have thinner fur.

In the skull the nasals are a little shorter relatively than in *gambianus* and *dichrurus*, about as in *olivie*; nasal length equals 40.4% of condylo-basal length in *grahami*, 39.5–40.1% in *olivie*, and 41.5–42.4% in *gambianus* and *dichrurus*. The anterior palatal foramina are also short relatively; their length equals 8.6% of condylo-basal length in *grahami*, 8.9–11.6% in *olivie*, and 11.7–13% in *dichrurus* and *gambianus*.

As is well known, the cranial differences observable between closely allied species or subspecies of rodents chiefly involve characters which depend upon the greater or less development of one or other of the elements of the jaw-musculature. In order to appreciate such differences it seems better to compare the measurements relating to them with a standard representing the working surface of the jaws alone rather than with one which involves the brain-case as well; the length between the anterior face of the upper incisor and the posterior edge of *m.*³ seems to be a good constant for such a purpose. In the subjoined table certain measurements relating to the masseter and temporal muscles are shown as percentages of this constant. With regard to the masseter system, the anterior part of the *masseter medialis*, passing through the infraorbital canal, would seem to be most strongly developed in *gambianus* and *dichrurus*, while its surface of origin is shortened and its bulk slightly reduced in *grahami*, the reduction in bulk being carried still further in *olivie*; the development of the *masseter lateralis* in so far as it is indicated by the diameter of the zygomatic plate seems to stand, generally speaking, in an inverse relation to the development of *masseter medialis*. Characters dependent upon the development of the temporal and pterygoid muscles

may be similarly investigated; but in the case of the *temporalis*, far greater changes transpire with advancing age than is the case with the masseter system. The material before me in the present instance is not rich enough in old skulls to lead to any definite result beyond the fact that the posterior portion of the *temporalis* is stronger in those forms with a relatively weak *masseter medialis* than in those in which the latter muscle is more powerfully developed:—

Incisor to $m.^3 = 100$:—

<i>Masseter medialis.</i>	<i>grahami.</i>	<i>olivæ.</i>	<i>gambianus.</i>	<i>dichrurus.</i>
Length of preorbital fossa for origin of <i>Masseter medialis</i>	31·2	31-34·5	36·8-37·7	37·3
Greatest transverse diameter of infraorbital canal.....	26·5	22·3-25·7	27·1-29·2	27
<i>Masseter lateralis.</i>				
Least antero-posterior diameter of outer wall of infraorbital canal	17·8	16·3-17·7	14·5-16·4	15·4
<i>Temporalis.</i>				
Mastoid breadth minus the least distance between temporal ridges behind.	32·7	31·2	29·1	28·8

Collector's measurements of type.—Head and body 300 mm.; tail 357; hind foot 70; ear 35 (hind-foot measurement too large, 65 on skin).

Measurement of skull.—Condyl-basal length 62·4; zygomatic breadth 31·7; interorbital constriction 9·3; mastoid breadth 23·4; nasals 25·2 × 8·8; incisor to $m.^3$ 34·3; diastema 20; length of anterior palatal foramina 5·4; length of preorbital fossa for masseter medialis 10·7; least diameter of zygomatic plate 6·1; molar crowns 10·4.

2. *The emini or sleek-furred group.*

In the southern part of the tract occupied by *C. gambianus* and in the forested region to the south of it we meet with a number of forms which, if judged by external appearance alone, would all be referred to one single species. The forms in question range from the Gambia, Fernando Po, Gold Coast, and adjoining countries on the west, eastwards and southwards right through the Congo Basin; they appear also to have an outlying representative in the island of Zanzibar. All are characterized by the possession of soft, sleek, and silky fur, which varies in length and density in different parts of the enormous range indicated. Beneath the uniform coats a great wealth of variation is displayed in the skulls; and I

believe that these forms represent several perfectly distinct species. It is difficult to compare skulls of *poensis*, *dolichops*, and *emini* without coming to such a conclusion. Far more material is needed, however, before any attempt to work out the relationships can succeed. On the present occasion I have to describe two new forms: one from the southern part of the Belgian Congo, best treated as a subspecies of *C. emini*, Wroughton; the other from the island of Zanzibar, provisionally accorded full specific rank.

Cricetomys emini sanctus, subsp. n.

Type.—An adult male (teeth more than half-worn) collected at Inkongo, Sankuru, on August 27, 1912, by Mr. H. Wilson; B.M. 13. 4. 7. 5. No other specimen known.

Description.—Compared with typical *C. emini*, this form differs in having much shorter and thinner, though equally sleek fur, and more importantly in its much paler coloration and smaller size.

The back is a light brown approaching clay-colour, while the flanks are still lighter; underparts pure white. The ears and a stripe extending forwards between the eyes dusky; owing to the pallid dorsal coloration the ears are more strikingly contrasted with the pale cheeks and surrounding parts than in typical *emini*. The feet are brown, practically concolor with the back. The white of the tail occupies rather more than the terminal third.

Apart from its smaller size the skull differs from that of typical *emini* only in having relatively shorter palatal foramina; their length amounts to 9·8% of the condylo-basal length instead of 11·7–13·4% as in true *emini*.

Collector's measurements.—Head and body 297 mm.; tail 395; hind foot 69; ear 38.

Measurements of skull (with corresponding dimensions of the type of *emini* in brackets).—Condylo-basal length 65·1 (74·6); zygomatic breadth 30·8 (35·4); interorbital constriction 10·3 (11·4); mastoid breadth 23 (26·6); nasals 27·9 × 9·2 (32·7 × 11·1); incisor to *m.*³ 35·7 (40·2); diastema 22·1 (24·1); length of anterior palatal foramina 6·4 (9·5); length of preorbital fossa for masseter medialis 11·8 (13·6); least diameter zygomatic plate 5·6 (7); molar crowns 10·1 (11·4).

Cricetomys cosensi, sp. n.

Type.—An adult female (B.M. 19. 6. 9. 20) collected by Mr. H. H. Swinny on the island of Zanzibar on April 29, 1919; presented to the National Collection by Colonel Cosens.

In addition to the type we have from Zanzibar three specimens collected by Mr. J. T. Last and an adult male collected and presented by Dr. Aders.

Description.—Apart from its larger size this species is very similar in outward appearance to *C. emini sanctus*, just described. The fur is short and thin, but quite soft and sleek. In four of the specimens, including the type, the general colour of the back ranges from russet or cinnamon to mummy-brown; but one sent by Dr. Aders is considerably darker. There is no distinct trace of mid-lorsal darkening in any. The underparts are thinly clothed with pure white or yellowish hairs. The ears are brown, nearly matching the dorsal colour. The hands are whitish in colour from the wrists. The feet are dark brown above, with the digits and inner margins whitish. The terminal half of the tail is white.

The skull is about as large as in *emini* (condylo-basal length 68–73·3 mm.), and considerably larger than in *gambianus*; it agrees with that of *emini* further in its relatively small zygomatic breadth; this dimension expressed as a percentage of the condylo-basal length ranges between 46·7 and 47·8 in *cosensi*, 45·4–47·8 in *emini*, and 49–52·5 in *gambianus*. The anterior palatal foramina are relatively larger than in *emini*, their lengths ranging between 12·5 and 14·2 % of the condylo-basal length instead of between 9·8 and 13·4 %, and the breadth 4·9–6·2 % instead of 4·3–4·8 %. In other respects the skull agrees with that of *emini*.

Collector's measurements of type (with dimensions of Dr. Aders's specimen in brackets).—Head and body 343 (369) mm.; tail 390 (381); hind foot 70 (72); ear 41.

Measurements of skull of type (with those of Dr. Aders's specimen in brackets).—Condylo-basal length 72 (73·3); zygomatic breadth 33·6 (34·7); interorbital constriction 11·3 (10·6); mastoid breadth 25·1 (25·4); nasals 31 × 10 (33·3 × 10); incisor to *m*.³ 39·8 (40·7); diastema 24·2 (24·7); length of anterior palatal foramina 10·2 (9·7); length of pre-orbital fossa for masseter medialis 14·4 (14·5); least diameter of zygomatic plate 6·3 (5·3); molar crowns 10·7 (10·7).

Remarks.—The Zanzibar *Cricetomys* is of quite exceptional interest, and I have much pleasure in naming it after Colonel Cosens, who is most generously finding the funds for Mr. Swinny's collecting work. The nearest geographical allies of *C. cosensi* are the mainland forms named by Heller *C. g. enguvi* and *C. g. osgoodi*; but these in common with the numerous mountain races described from East Africa are animals of a wholly different type. They resemble *gambianus*, as well as the southern subspecies *vitellii*, *cunctator*,

and *adventor*, described from the region between Lake Nyassa and Zululand, in having long loose fur which imparts a characteristic shaggy appearance—and in their skulls, of course, they have their own peculiarities. On the other hand, *cosensi* is clearly very closely allied to the geographically remote *emini*, differing from the typical race of the latter species in little beyond its paler coloration and thinner fur.

3. Other groups.

The discussion of the relationships of the E. African members of the genus must be reserved for another occasion. Thomas has described a very distinct species, *C. ansorgei*, from Angola; this animal is of large size and the characters of its coarse pelage, dark ventral coloration, large skull, and teeth have suggested a possible affinity with some of the E. African forms. The skull-characters, however, seem to show that there is no close affinity between *ansorgei* and the many mountain forms from E. Africa. I would take this opportunity to describe a *Cricetomys* from Lagos which, resembling *ansorgei* in external appearance, is of far smaller size. It may be known as

Cricetomys servorum, sp. n.

Type.—An adult female (B.M. 10. 10. 24. 2) from Lagos; collected and presented by Captain Lawrence.

Description.—This species closely resembles *C. ansorgei* in general appearance; it is distinguished by its much smaller size (hind foot about 60, instead of 72–79 mm.) and by various cranial peculiarities.

The fur is loose, thin, and of harsh quality. The general dorsal colour is near mummy-brown gradually lightening to grey on the flanks; the flank-colour merges insensibly in the dark ashy grey of the underparts, the ventral hairs having slaty bases. Ears dull brown, sharply contrasted with the pale cheeks in front, but matching the dorsal colour behind. Hands and feet lighter dorsally, their colour being near Brussels brown; the digits and lateral margins whitish. The tip of the tail is white, but much of the caudal epidermis has peeled off in the type and only known specimen, so that it is uncertain how far upwards the white extends.

The skull is distinguished from that of *ansorgei* by its much smaller size, small bullæ, relatively shorter nasals, longer diastema and anterior palatal foramina. It lacks the

rather prominent postorbital processes which are characteristic of the larger species.

Measurements.—Hind foot measured on the skin about 60 mm.

Measurements of skull (with corresponding dimensions of a skull of *ansorgei* in parentheses).—Condylar-basal length 68·7 (77) mm.; zygomatic breadth 33 ca. (38); interorbital constriction 10·2 (11·4); mastoid breadth 24·2 (27·1); nasal 28 × 10·1 (33 × 10·5); incisor to *m.*³ 36·8 (42·3); diastema 22 (23·9); length of anterior palatal foramina 8·8 (8·2); length of preorbital fossa for masseter medialis 14 (14); least diameter of zygomatic plate 6·2 (8·1); molar crowns 10·5 (12·8).

XXVIII.—*The Method of taking the Incisive Index in Rodents.* By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

THE angle at which rodent incisors protrude from the jaw has long been recognized as an important character of different groups, but it is only recently that an attempt has been made to define that angle more exactly, instead of merely speaking of “incisors thrown forward” and so on.

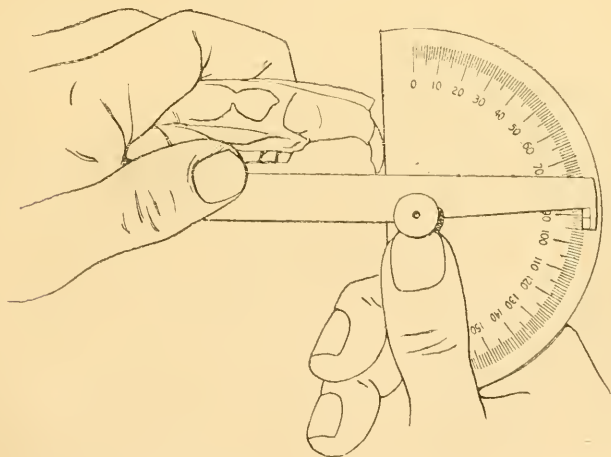


Diagram showing method of taking incisive index in rodents.

This angle, when exactly measured and defined, proves to be exceedingly useful as a systematic character, but it is essential that the way it is taken should be clearly understood.

The line of the grinding-edge of the cheek-teeth being taken as a basis, the angle was in the first paper* deduced from that formed by the terminal part of the incisor; but later on † I have found it better to use the whole extruded part of the latter tooth. But since the description of the taking of the angle might be easily misinterpreted, I have now had prepared the accompanying diagram showing the way the process is carried out and the angle read off. This will, I hope, facilitate the work of other observers.

Incisors thrown forward are those with a high resultant angle, and might be called, as suggested in 1918 ‡, "pro-odont," upright ones (approximating 90°), "orthodont," and those turned in towards the throat, with low angular index, "opisthodont."

The benefits of such definition as is given by a numerical angle have already been fully emphasized, and need not be here again detailed.

XXIX.—*Papers on Oriental Carabidæ*.—III.

By H. E. ANDREWES.

CARABINI.

Calosoma beesoni, sp. n.

Length 24–25 mm.; width 10·5 mm.

Black; vertex and sides of head, sides of prothorax, elytra, and underside (except along median line) æneous.

Head (4·5 mm. wide) convex, closely punctate, more finely on neck, strigose near eyes; mandibles not much curved, with moderate cross-striation; joints 2 and 3 of antennæ compressed, with a sharp edge, 3 half as long again as 4.

Prothorax transverse (7 × 4·5 mm.), cordate, bordered in front and at sides, slightly emarginate in front; base bisinuate, hardly wider than apex; sides strongly rounded, faintly sinuate behind, border not quite reaching base; median line faint; basal foveæ rather small, adjacent to hind

* J. Bombay N. H. Soc. xxiv. p. 408 (footnote) (1916).

† Ann. & Mag. Nat. Hist. (8) xviii. p. 302 (footnote) (1916).

‡ *Ibid.* (9) i. p. 35 (footnote) (1918).

angles; surface moderately convex, closely punctate, more sparsely on disk, more coarsely along base and front margin.

Elytra moderately short and wide, nearly four times as long as prothorax, with a long scutellary stria, a fine sutural stria, and fifteen more or less crenulate striae (punctate on disk near base); a wide aciculate marginal area, in which towards apex two further ill-defined striae can generally be detected; primary intervals (4, 8, and 12) with a series of shallow, brassy punctures, each with a fine raised point; all intervals imbricate, but on the first two or three near base the cross-lines are replaced by fine punctures; interval 6 usually wider towards apex, with the surface irregularly broken up.

Underside coarsely punctate, more finely on middle of ventral surface; metasternum smooth, middle of prosternum nearly so, the punctures more or less confluent on metepisterna and sides of ventral surface, latter irregularly depressed, last segment transversely striate; grooves on prosternal process not reaching apex, metepisterna hardly longer than wide, a tuft of hairs on their outer margin near base.

♂. Front tarsi with three dilated joints; intermediate tibiae curved, hind tibiae straight, former densely clothed on inner and middle of outer surface, latter on inner surface towards apex with light brown hairs.

♀. All tibiae straight, the intermediate ones clothed with light brown hairs on middle of outer surface.

The species belongs to Motschulsky's *Caninara* group, and is closely allied to *C. imbricatum*, Klug, but a little larger; the colour is almost identical. Head more coarsely punctate, less noticeably striate near eyes; mandibles much more finely striate, antennae thicker; prothorax more coarsely punctate, a little less contracted behind; punctures on the primary intervals of the elytra less numerous; underside much more coarsely sculptured, intermediate tibiae (♂) more curved.

N. India, United Provinces: Mondali, Kathian, Molta, and Bodyar, all Jaunsar Himalayas, 7500'–8000' (*C. F. C. Beeson*). Thanoo, Dehra Dun District, 4000'. Kalela Forest, Simla Division, "found eating the deodar's defoliating caterpillar." 11 ex., ♂ ♀. All Forest Research Institute, Dehra Dun.

N.W. Himalayas (*E. P. Stebbing*) 5 ex., all very defective. British Museum.

The type (*Beeson*) is in the British Museum.

OMOPHRONINI.

Omophron rotundatum, Chaud.

This species was described by Chaudoir from Mesopotamia and the Transcaucasian Provinces of Russia. In the collection of the Indian Museum, Calcutta, there are two examples (both very defective) which I refer to this species, one labelled "Quetta, Baluchistan (*Webb-Ware*)," the other "Mussoorie, W. Himalayas, c. 7000 ft." In both the green patch on the prothorax continues nearly to the side margin, the colour, however, merging into brown, lighter in the Quetta, darker in the Mussoorie example. In the former there is a small, rather faint fuscous spot at the middle of the base of the elytra; in both examples the sides of the median green patch on the elytra are quite dissociated from the central part, and form separate rounded spots; the hind patch is of the same width as in the type-form, but longer.

Omophron bicolor, sp. n.

Length 3.75-4.0 mm.; width 2.75-3.0 mm.

Black; upperside blue-green; labrum, clypeus, middle of front, antennæ, palpi, legs, ventral surface, and a broad border on prothorax and elytra, together with epipleuræ, testaceous.

Head moderately convex, flat in front, shiny, moderately and sparsely punctate, the testaceous colour on clypeus and front not quite reaching level of hind margin of eyes.

Prothorax strongly transverse, moderately convex, base projecting backwards in middle and bisinuate at sides, emarginate in front; front angles acute, porrect, contiguous to eyes, hind angles about right, side margin reflexed but continuing with hardly any break the contour of elytra; median line just visible, surface shiny, moderately and uniformly punctate, smooth near margin, testaceous border covering on each side in front one-fourth of width of front margin, but contracting to half the width at base.

Elytra rather flat for the genus, not much dilated below shoulder, widest at a fourth from base; striate-punctate, the punctures evanescent towards apex, striae 1-12 and 15 clearly marked, only traces of 13 and 14 visible, intervals smooth; the broad testaceous border reaches stria 9 at base, contracts to stria 10 at a third from base, expands again to

stria 7 at a half, and contracts to stria 9 at two-thirds; the green colour, pointed at extremity, does not quite reach apex, and the line of junction of the two colours is a little jagged throughout.

Underside coarsely but sparsely punctate, ventral surface smooth.

Larger than *O. brethingamæ*, Pasc., similar in outline, but much less convex, a bluer green in colour, testaceous border on both prothorax and elytra much wider, the line where the colours meet on the elytra much less regular, striæ less evanescent towards apex.

Dacca 1 ex., "India" 2 ex., all from coll. Bowring. British Museum.

Calcutta, Eden Gardens, 7.xi.1911 (*F. H. Gravely*), 1 ex., "at light." Indian Museum.

Omophron testudo, sp. n.

Length 7.0–7.5 mm.; width 4.5–5.0 mm.

Brown-black; vertex and sides of head, a large spot on prothorax, and elytra dark green; front, clypeus, labrum, palpi, front and sides of prothorax, two irregular fasciæ on elytra, with margins, apex, and epipleuræ, ventral surface and legs testaceous-red.

Head wide (2.25 mm.), front smooth, but with a little transverse striation, finely striate near eyes, green area at back coarsely shagreened, very coarsely, sometimes confluent punctate, clypeal suture angular in middle.

Prothorax strongly transverse (3.75 mm. wide), both front and hind margins produced in middle, latter slightly bisinuate on each side, median projection forming an obtuse angle, former emarginate on each side behind eyes, all angles acute, width gradually increasing from apex to base, sides slightly rounded in front and faintly sinuate before hind angles; surface coarsely shagreened, smoother at sides, longitudinally striate along base, middle of base flattened and coarsely punctate, sparsely punctate along front margin, median line fine but distinct, not reaching margins; green patch more or less rectangular, extending from middle of base a little more than halfway towards both apex and sides, margins ill defined.

Elytra shortly oval, shiny, with fifteen very finely punctate striæ, of which only 1 and 15 actually reach apex, 2, 3, 7, 8, and 11 terminating long before it, intervals convex, minutely

and sparsely punctate. The front fascia is wide at the margin and just reaches the shoulder; it contracts and almost disappears on interval 10, widens again over 7 and 8, contracting and disappearing on 5. The hind fascia is similar outwardly, but inwardly it extends over interval 4. The testaceous apical area sends an arm forward along intervals 7-9; the green colour extends nearly to apex along intervals 1 and 2.

Underside smooth and glabrous; prosternum in front of coxæ, its episterna at base, and the prosternal plate with a few punctures, last-named bordered at sides, subocular ridge well marked, extending inwards rather beyond buccal fissure, the area between it and the eye longitudinally striate. The first two joints of the front tarsi and the first joint of the intermediate tarsi are dilated in the ♂.

I have compared examples of this species with a specimen in my collection taken by Père Cardon at Nowatoli in Chota Nagpur, which (though I have not had the opportunity of comparing it with the type) I identify with *O. guttatum*, Chaud. The new species is larger, more nearly circular, but otherwise very similar both in form and pattern, though in *C. guttatum* the latter is more clearly defined. Head more roughly sculptured, more coarsely punctate, clypeal suture with an angle in the middle, instead of semicircular, subocular ridges similar; sides of prothorax more rounded, base flattened, surface more coarsely but less punctate; intervals of elytra more convex, surface more shiny, front fascia extending inwards to interval 5 only (in *guttatum* it reaches 4), hind fascia and testaceous apical area wider, the latter with a more jagged front margin; punctures on prosternum and its episterna fewer.

Annam: Keng Trap. Tonkin: Tranninh. Laos: Ko Kieng (*R. Vitalis de Salvaza*), 5 ex. The type is in the British Museum.

In the genus *Omophron* there is usually present beneath the head on each side a *subocular ridge*. This runs inwards and a little forwards from near the side of the head and extends as far as the buccal fissure or even beyond it. The area between the ridge and the eye is somewhat depressed and rugose or punctured. In *O. limbatum*, F., the ridge is short and inconspicuous, the area in front of it coarsely punctate. In the species just described the ridge is very evident, the front adjacent area longitudinally striate, without punctures. I mention this character, as I find it a variable one and I think it may possibly prove useful for purposes of classification.

OZENINI.

Before describing any new species I give a table of the Oriental genera:—

- 1 (4). Ligula bisetose or ending in a sharp spine, last joint of palpi cylindrical, genæ embracing back of eye, mentum toothed, joint 11 of antennæ shorter than 9+10.
- 2 (3). Ligula ending in a sharp spine; paraglossæ wide, with setose margins, extending far beyond ligula, but not enveloping it; genæ forming a tooth and extending outwardly beyond level of eye*; mandibles with three or four teeth; both labrum and clypeus without setæ on upper surface. PSEUDOZENA, Cast.
- 3 (2). Ligula bisetose, completely enveloped by the paraglossæ, which are glabrous; genæ not extending outwardly beyond eye-level; mandibles with one or two teeth; front margin of labrum plurisetose (8-setose in *I. castaneus*, Schm. Goeb., and 12-setose in *I. dentatus* m.) ITAMUS, Schm. Goeb.
- 4 (1). Ligula quadrisetose, paraglossæ wanting (or at all events indistinguishable), last joint of labial palpi acuminate, genæ not embracing back of eye, joint 11 of antennæ equal to or longer than 9+10.
- 5 (6). Mentum with an obtuse tooth; front margin of labrum plurisetose but not denticulate (8-setose in *D. biculata* m. and 6-setose in *D. parallela* m.); joint 11 of antennæ=9+10 DHANYA, gen. nov.
- 6 (5). Mentum edentate; front margin of labrum plurisetose and denticulate (8-setose in *E. plagiata*, Schm. Goeb., *E. japonica*, Bates†, and *E. matunga* m., 10-setose in *E. bryanti* m.); joint 11 of antennæ =8+9+10 EUSTRA, Schm. Goeb.

Itamus dentatus, sp. n.

Length 15·0–17·5 mm.; width 4·0–5·0 mm. (The further measurements given are those of the larger specimen, which is the type.)

* Of *P. spissicornis*, Fairm., of which I have not seen an example, its author says “tuberculo pone-oculari nullo.” Mr. Lesne (Mission Pavie, 1904, 62, t. 8. f. 13) says that the species belongs to another genus.

† In Ann. Soc. Ent. Belg. 1913 (published 2.i.1914), p. 418, Commandant Dupuis says that in *E. japonica*, Bates, joint 11 of the antennæ =9+10. I have numerous cotypes before me and find that 11=8+9+10 as in the other species of this genus.

Pitch-black above, dark red beneath; tibiæ and tarsi nearly black.

Head large (3.75 mm. wide), flat, uneven, sides of front depressed, leaving a raised area in middle, a few setiferous pores on vertex and sides; front margin of labrum 12-setose, including a large setiferous pore on each side, just behind the rounded angles; clypeus transverse, with well-marked suture, finely and remotely punctate, slightly emarginate in front, a seta at each side.

Prothorax transverse (4.0 × 3.5 mm.), moderately convex on disk, margins explanate and reflexed behind, with half-a-dozen setiferous pores; apex widely but faintly emarginate, much wider than base, which is truncate; sides almost parallel in front, rather strongly contracted about middle and sinuate before base; front angles sharp, slightly acute, porrect, hind angles right, but sharp, projecting a little laterally, median line short, bounded by transverse impressions, which are well marked; surface shiny on disk, with a few coarse setiferous punctures, margins rougher, longitudinally striate in front, coarsely and irregularly transversely striate along base.

Elytra elongate, parallel, not quite three times as long as prothorax, shoulders carinate but not dentate, a recurved outwardly channelled tooth at a fourth from apex; striae deep, coarsely shagreened and vaguely punctate, intervals smooth, odd ones seriately punctate, an uninterrupted row of umbilicate pores along margin.

Underside sparsely punctate and pubescent, more evidently on ventral surface; front femora with a strong tooth.

Much larger and darker than *I. castaneus*, surface rougher, front margin of labrum 12-setose, instead of 8-setose, front femora with a strong tooth (in *I. castaneus* the front femora have a short fine carina on the middle of the underside, which occasionally develops into a moderate tooth).

Tonkin: Hoabinh, 2 ex. (*R. Vitalis de Salvaça*). The type is in the British Museum.

DHANYA, gen. nov.

Ligula short, truncate at apex, quadrisetose, paraglossæ wanting.

Mentum with a broad rounded tooth in the emargination, much shorter than side lobes, which are outwardly rounded and obtuse at apex.

Palpi sparsely setose, acuminate at apex; in the maxillaries 4 is half as long again as 2, which is strongly dilated

outwardly, 3 very short; labials with penultimate plurisetose on inner margin.

Maxillæ slender, hooked at tip, inner margin ciliate.

Eyes moderately prominent, not embraced behind by genæ.

Labrum elongate, truncate, plurisetose, and without denticulations along front margin.

Antennæ clavate, pubescent, but only densely so from (and including) joint 5; joints strongly transverse towards extremity, joint 11 = 9 + 10.

Sides of prothorax not much contracted behind, margins more or less crenulate, without denticulations.

Elytra elongate, parallel, an incision and recurved tooth at external angle of apical truncature.

Tarsal joints short; in hind legs 1 = 2 + 3 + 4 = 5; claws simple; underside of front tarsi naked, but I cannot distinguish the sexes.

The type of the genus is *D. bioculata* m.

The name is derived from a Kanarese word meaning "a grain of corn."

Dhanya bioculata, sp. n.

Length 4.0 mm.; width 1.6 mm.

Dark testaceous; head, prothorax, and suture of elytra dull red, antennæ (except joint 1) fuscous; each elytron with a roundish spot just before middle, not quite reaching margin or suture, and apex black.

Head elongate, smooth, shiny, moderately convex; frontal foveæ large, fairly deep and rugose, a small curved impression behind clypeal suture; sides longitudinally striate, bounded outwardly by a ridge; eyes small, antennæ reaching a little beyond base of prothorax; ligula hidden behind base of labial palpi, labrum 8-setose along front margin.

Prothorax transverse, moderately convex, shiny, rather wider than head, equally contracted at extremities, widest at middle, truncate at base, widely though slightly emarginate at apex; sides with a fine reflexed border, very faintly crenulate towards base, gently rounded in front, with a wide though slight sinuation before base, some setiferous pores along sides and sides of front margin; both front and hind angles about right, projecting a little laterally, median line well marked, reaching base but not apex, a depressed and finely granulate area near hind angles; surface glabrous on disk, sparsely pubescent near margin, finely striate along base.

Elytra convex, parallel, rather compressed at sides, half as wide again as prothorax and three times as long, shoulders

square; surface shiny, the striæ vaguely indicated by rows of faint punctures, glabrous on disk, but with several setiferous pores on intervals 3 and 5, shortly pubescent at sides and apex, where the surface is finely granulate, a row of umbilicate setiferous pores along margin.

Underside finely granulate, nearly smooth along median line, sparsely punctate and pubescent, more obviously so on last ventral segment.

S.E. Borneo: Martapura, 1891 (*Doherty*), 2 ex. British Museum.

Dhanya parallela, sp. n.

Length 4.0 mm.; width 1.5 mm.

Testaceous; head, prothorax, and antennæ red; elytra with an ill-defined blackish area, covering the middle third of each clytron, wider outwardly, but not quite reaching either margin or suture; ventral surface fuscous.

Head convex (0.75 mm. wide), smooth, moderately shiny, a curved depressed line on middle of front, bicarinate at sides; labrum 6-setose; mandibles and maxillæ both very sharp at apex; ligula short, but not concealed, slightly emarginate at apex. I am unable to determine the number of setæ on the penultimate joint of the labial palpi.

Prothorax a little transverse (1 mm. wide), disk convex; side margins explanate, widely so behind, base truncate, hardly wider than apex, which is emarginate; sides forming an obtuse angle at two-fifths from apex, margin obviously crenulate, almost straight from front to side angle, and from side to hind angle; several setæ just inside border; front angles sharp, strongly porrect, hind angles right, reflexed, transverse impressions and median line well marked; surface moderately shiny, almost smooth, a little rough near base, with a few irregularly disposed, long, erect setæ.

Elytra more than three times as long as prothorax, elongate, parallel; shoulders very square, a re-entrant angle at suture; disk flat, depressed at a third from base, sides compressed rather behind middle; striate-punctate, but the striæ, though fairly regular, are not well defined; intervals smooth, rather shiny, 3 and 5 with a row of erect setæ.

Underside sparsely punctate and pubescent, more obviously on ventral surface; front femora with a blunt tooth.

The species differs in many points from *D. bioculata* m.; the ligula is a little longer, maxillæ more acute, labrum 6-setose; front angles of thorax more acute, sides angular, striæ of elytra more clearly defined, especially at base, disk

flat and depressed near base, dark spot less clearly defined, front femora dentate.

W. Sarawak, Mount Matang, 2000', 23.i.14 (*G. E. Bryant*).
1 ex. in my collection.

EUSTRA.

- | | |
|---|----------------------------------|
| 1 (2). Size 6 mm., labrum 10-setose, front margin of prothorax deeply excavated | <i>E. bryanti</i> m. |
| 2 (1). Size 2.5-3.0 mm., labrum 8-setose, front of prothorax emarginate. | |
| 3 (4). Side border of prothorax without denticulations, front angles very sharp and acute | <i>E. plagiata</i> , Schm. Goeb. |
| 4 (3). Side borders of prothorax evidently denticulate, front angles sharp, but less acute, very slightly rounded at tip. | |
| 5 (6). Size 3.0 mm., prothorax strongly transverse, side margin widely reflexed, border finely denticulate | <i>E. japonica</i> , Bates. |
| 6 (5). Size 2.5 mm., prothorax moderately transverse, side margin narrowly reflexed, border more strongly denticulate | <i>E. matanga</i> m. |

Eustra matanga, sp. n.

Length 2.5 mm.; width 1.0 mm.

Testaceous; apex of antennæ a little darker, head red-brown, a large ill-defined discal spot on each elytron infuscate.

Head (0.6 mm. wide) smooth, shiny, convex, moderately constricted at some little distance behind eyes, some fine ridges on each side close to eye, one of which is continued round the eye behind; antennæ clavate, moniliform, pubescent, reaching middle of body.

Prothorax transverse, as wide as head, widest at a third from apex, base truncate but oblique near hind angles, much narrower than apex, which is emarginate, sides rounded in front, sinuate before hind angles and rather widely reflexed, border with 8 to 10 small teeth, which are well marked towards base; front angles porrect, acute; hind angles reflexed, slightly obtuse; transverse impressions and basal foveæ fairly deep, median line reaching base and forming a shallow fovea where it meets front transverse impression, but not extending to apex; surface smooth, shiny, a little uneven along base.

Elytra convex, three times as long as prothorax, base emarginate, shoulders prominent; side border reflexed, very obliquely truncate at apex, with a slight re-entrant angle, a

small sharp excision just behind the outer angle of the truncature, followed by a raised tooth; a longitudinal depression at sides on each clytron; surface shiny, smooth, uneven at sides, with scattered shallow punctures, and a slight raised pubescence.

Smaller than *E. japonica*, Bates; prothorax less transverse, sides less rounded in front, reflexed border much narrower, more strongly dentate; clytra narrower, more parallel, smoother, less punctate and pubescent, infusate patches larger.

W. Sarawak, Mount Matang, 16.i.14 and 1.ii.14 (*G. E. Bryant*), 3 ex. The type is in my collection; a co-type is in the British Museum.

Eustra bryanti, sp. n.

Length 6.0 mm.; width 2.5 mm.

Brown; edges and apex of mandibles black, ventral surface fuscous, margins of the segments golden-yellow.

Head (1.0 mm. wide) convex, smooth, shiny, finely carinate at sides; labrum 10-setose; neck slightly constricted behind eyes, hardly narrowed behind.

Prothorax transverse (1.8 × 1.3 mm.), strongly contracted in front, widest at middle (but practically as wide at base); base truncate, a little oblique at sides; apex deeply emarginate (as in the genus *Sfitakantha*), sides widely reflexed, rounded in front and faintly sinuate before base, border almost imperceptibly crenulate; front angles porrect, embracing head, hind angles right, transverse impressions—especially the hind one, which terminates at each end in a shallow fovea—and median line well marked; surface shiny but uneven, very sparsely and minutely pubescent, covered with a number of dark spots, which look like punctures.

Elytra two and a half times as long as prothorax, shoulders square, disk convex, margin explanate and reflexed as far as the lateral incision, a re-entrant angle at apex, sides moderately compressed; surface shiny, strongly granulate-punctate and pubescent, more sparsely on disk; sides roughly shagreened.

The joints of the front tarsi, which are very short and hairy and decrease gradually in size from base, do not appear to offer any sexual characters.

Distinguished at once from the other described species of the genus by its much larger size, front margin of labrum 10-setose, and the deeply emarginate apex of the prothorax.

W. Sarawak, Mount Matang, 31.i.14 (*G. E. Bryant*), 1 ex. in my collection.

XXX. — *New Forms of South-American Birds.* By CHARLES CHUBB, F.Z.S., M.B.O.U., Zoological Department, British Museum (Natural History).

(Published by permission of the Trustees of the British Museum.)

Perissotriccus ecaudatus miserabilis, subsp. n.

Adult. Differs from *P. ecaudatus ecaudatus* (d'Orb. & Lafr.) in being darker green on the back, darker grey on the crown of the head and sides of face, and inclining to grey on the under surface. It differs also in having the lower mandible black and the feet much darker than in the Bolivian bird.

Total length 58 mm., exposed culmen 11, wing 34, tail 12, tarsus 13.

Hab. British Guiana.

The type, which is in the McConnell Collection, was collected on the Bonasika River in 1911.

Atalotriccus griseiceps whitelyanus, subsp. n.

Adult male. Allied to *A. griseiceps griseiceps* (Hellm.), but differs in having the back uniform green.

Total length 97 mm., exposed culmen 10, wing 42, tail 36, tarsus 16.

Adult female. Similar to the adult male, but smaller.

Wing 38 mm., tail 28.

Hab. British Guiana.

The male and female types are in the British Museum, and were collected by the late Henry Whitely, Jun., at Quonga in October and November 1887, Salvin-Godman Collection.

The species that has hitherto been known to authors and usually classified under the title *Mionectes oleagineus* differ so much from the various localities in its distribution, by the paler or darker plumages, as to be easily separable into subspecific forms. I propose, therefore, that the following be recognized:—

Pipromorpha oleaginea wallacei, subsp. n.

There are three examples from the Amazon Valley, two from Para and one from the Rio Negro, which are similar but paler green than *P. o. oleaginea* on the upper surface, and

differ also in being darker and inclining to cinnamon-rufous, not ochraceous, on the abdomen, under tail-coverts, and under wing-coverts.

Wing 61 mm.

Hab. Lower Amazon Valley.

The type is an adult bird, but not sexed, and was collected by the late A. R. Wallace at Para in May 1849, and is now in the British Museum, Salvin-Godman Collection.

Pipromorpha oleaginea hauxwelli, subsp. n.

Two examples from East Peru and one from East Ecuador differ from the typical form in being paler green on the upper parts and darker orange-rufous even than *P. o. wallacei* on the under surface.

Wing 63 mm.

Hab. Eastern Peru and Eastern Ecuador.

The type is an adult male which was collected at Pebas, E. Peru, by the late J. Hauxwell in July 1886, and is now in the British Museum, Salvin-Godman Collection.

Pipromorpha oleaginea chapmani, subsp. n.

Pipromorpha oleaginea oleaginea (nec Licht.), Chapman, Bull. Amer. Mus. Nat. Hist. xxxvi. p. 49 (1917).

Of Colombian birds there are six in the British Museum. These are slightly darker than the typical species, from Bahia, on the upper surface, darker also on the throat and fore neck, and more orange-rufous, instead of pale ochraceous, on the breast, abdomen, and under wing-coverts.

Wing 65 mm.

Hab. U.S., Colombia.

The type, which is a fully adult bird, was collected by T. H. Wheeler at Villavicencio to Medina, Llanos of River Meta, at an altitude of 800-1500 feet, is now in the British Museum, Salvin-Godman Collection.

Pipromorpha oleaginea tobagoensis, subsp. n.

Mionectes oleagineus (nec Licht.), Sclater, Cat. B. Brit. Mus. xiv. p. 112, part. (1888).

The Tobago bird is altogether darker than *P. o. oleaginea* on the upper parts, including the head, back, flight-quills, and tail-feathers. The throat and fore neck much darker,

and the abdomen, under tail-coverts, and under wing-coverts are also proportionately darker than that of the typical bird. There are six specimens of this form—one male, three females, and two unsexed.

The wing-measurements are:—♂ 67 mm., ♀ ♀ ♀ 60–61, unsexed 61, 65.

Hab. Tobago.

The type, which is in the British Museum, was collected by J. Kirk: Jardine Collection.

Hellmayr (Nov. Zool. xiii. p. 22), when naming *M. o. pallidiventris* from Cumaná, mentions that one Tobago bird agrees with the Cumaná skins in differing from thirty skins from more southern localities in the decidedly paler orange colour of the belly, much less greyish-green suffusion of the throat, and duller olive-green upper parts. The material in the British Museum, however, does not support this statement, as the six examples from Tobago in the National Collection, compared with two individuals from Bahia and two from Rio de Janeiro, are decidedly darker in every respect than in the birds from the typical locality.

Pipromorpha oleaginea macconnelli, subsp. n.

Mionectes oleagineus (nec Licht.), Salvin, Ibis, 1885, p. 293, part., Bartica Grove and Camacusa.

In British Guiana there are two forms—a smaller and more brightly coloured bird on Mount Roraima and the Merumé Mountains and a larger and darker one in the low-lying country. The latter bird is darker on the upper parts than any of the other forms. In this respect it is more closely allied to *P. o. tobagoensis*, but differs in being more brightly coloured on the abdomen, under tail-coverts, and under wing-coverts.

Wing 65 mm.

Hab. British, Dutch, and French Guianas.

The type, which is in the McConnell Collection, was collected on the Kamakabra River, 1911.

Pipromorpha oleaginea roraimæ, subsp. n.

Mionectes oleagineus (nec Licht.), Salvin, Ibis, 1885, p. 293, part., Merumé Mts., Roraima, 3500 to 6000 ft.

Adult male. Differs from *P. oleagineus oleagineus* in being

somewhat smaller, paler green on the upper surface, outer aspect of the wing bronze-colour, and the abdomen, under tail-coverts, and under wing-coverts rufous instead of pale ochreous.

Total length 116 mm., exposed culmen 12, wing 62, tail 45, tarsus 16.

Hab. Mount Roraima and Merume Mountains, 3500 to 6000 ft., British Guiana.

The type was collected by the late Henry Whitely Jun., on Mount Roraima in December 1881, and is now in the British Museum, Salvin-Godman Collection.

Elania flavogaster macconnelli, subsp. n.

The form that I propose to separate under the above title has hitherto been associated by previous authors with *E. pagana* (Licht.) = *E. flavogaster* (Thunberg) or *E. chiriquensis*, Lawr. It differs, however, from the former, *E. flavogaster flavogaster* (Thunb.), in being darker on the upper parts, and more especially so on the breast and sides of the body on the under surface, and from the latter, *E. chiriquensis*, Lawr., in being darker on the upper surface, paler yellow on the under parts, and smaller in size.

Total length 160 mm., exposed culmen 12, wing 77, tail 68, tarsus 20.

Hab. British Guiana.

The type is in the McConnell Collection, and was collected on the Supenaam River in 1911.

Elania cristata whitelyi, subsp. n.

Having compared the Guiana specimens with one of the types of *E. cristata*, Pelz., from Goyaz, which is in the British Museum, I notice that the Guiana bird is darker throughout on the entire upper surface, the flight-quills and tail-feathers are blackish brown instead of pale hair-brown, the sides of the face also darker, the throat grey (not white), and the breast and sides of the body conspicuously darker.

Wing 70 mm., tail 60, wing 68, tail 58.

Hab. British Guiana.

The types, which are in the British Museum, were collected at Mt. Roraima by the late Henry Whitely, Jun., Salvin-Godman Collection.

Periodicals published by TAYLOR & FRANCIS.

Published the First Day of every Month.—2s. 6d.

THE

LONDON, EDINBURGH, and DUBLIN

PHILOSOPHICAL MAGAZINE

AND

JOURNAL OF SCIENCE.

Conducted by

SIR OLIVER JOSEPH LODGE, D.Sc., LL.D., F.R.S.,
SIR JOSEPH JOHN THOMSON, O.M., M.A., Sc.D., F.R.S.,
JOHN JOLY, M.A., D.Sc., F.R.S., F.G.S., and
WILLIAM FRANCIS, F.L.S.

Published the First Day of every Month.—2s. 6d.

THE

ANNALS AND MAGAZINE OF NATURAL HISTORY,

including Zoology, Botany, and Geology.

Conducted by

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S., and
RICHARD T. FRANCIS, F.Z.S.

*Founded in 1877. Monthly, 1s. Annual Subscription
(‘Companion’ and 12 Monthly Numbers), 13s.*

THE OBSERVATORY,

A MONTHLY REVIEW OF ASTRONOMY.

Edited by

A. S. EDDINGTON, M.A., M.Sc., F.R.S.,
F. J. M. STRATTON, M.A., and
H. S. JONES, M.A., B.Sc.

Its Contributors include most of the leading English-speaking Astronomers,
and its Articles give an interesting reflection of the progress of astronomical
thought and achievement.

*Published Monthly. Price 1s. 8d. Annual Subscription,
16s. post free.*

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, K.S.G., F.L.S.,
LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM.

Articles by prominent Botanists; Announcements of Discoveries; Reviews;
Botanical News and Notes, &c., &c.

Red Lion Court, Fleet Street, London.

CONTENTS OF NUMBER 22.—*Ninth Series.*

	Page
XXIII. Notes on the African and Asiatic Species of <i>Melyris</i> , Fab. (sensu lato), with an Account of their Sexual Characters. By G. C. CHAMPION, F.Z.S.	157
XXIV. A Contribution to the Study of South Indian Arachnology. By W. RAE SHERRIFFS, M.A., D.Sc., formerly Professor of Zoology, Madras Christian College, Madras. (Plates II.—VI.)	220
XXV. Brief Descriptions of new Thysanoptera. — X. By RICHARD S. BAGNALL, F.L.S.	253
XXVI. New Species and Forms in the Joicey Collection. By LOUIS B. PROUT	277
XXVII. Notes on the Genus <i>Cricetomys</i> , with Descriptions of Four new Forms. By MARTIN A. C. HINTON	282
XXVIII. The Method of taking the Incisive Index in Rodents. By OLDFIELD THOMAS	289
XXIX. Papers on Oriental <i>Carabide</i> .—III. By H. E. ANDREWES. 290	
XXX. New Forms of South-American Birds. By CHARLES CHUBB, F.Z.S., M.B.O.U., Zoological Department, British Museum (Natural History)	301

*** It is requested that all Communications for this Work may be addressed, post-paid, to the Care of Messrs. Taylor and Francis, Printing Office, Red Lion Court, Fleet Street, London.

WITH FIVE PLATES.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



CONDUCTED BY

WILLIAM CARRUTHERS, PH.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,

AND

RICHARD T. FRANCIS, F.Z.S.

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

WITH ONE PLATE.

Illustrative of Mr. H. Bekker's Paper on new Bryozoa from the
Kuckers Stage in Esthonia.

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Baillière, Paris: and Hodges, Figgis, & Co., Dublin.

WATKINS & DONCASTER,

Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

G. A. BENTALL, F.Z.S.

Naturalist,

CABINETS,
STORE BOXES,
SETTING BOARDS,
TRAVELLING
CASES,
NETS,
PINS, ETC.

DUDLEY HOUSE,
SOUTHAMPTON STREET
(Opposite Hotel Cecil),
STRAND, LONDON,
W.C. 2.

BRITISH,
CONTINENTAL,
AND EXOTIC
LEPIDOPTERA,
COLEOPTERA,
BIRDS' EGGS
AND SKINS,
BOOKS, ETC.

Price Lists post free on request.

Price 21s.

THE FAUNA OF BRITISH INDIA

(Including Ceylon and Burma).

Published under the authority of the Secretary of State for India in Council.

Medium 8vo, with Text Illustrations.

COLEOPTERA (CHRYSOMELIDÆ).

TAYLOR & FRANCIS, Red Lion Court, Fleet Street, E.C. 4.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	} All Net.
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	
HALF-PAGE - -	1 2 6	1 0 0 „	17 6 „	
QUARTER-PAGE -	12 6	11 3 „	10 0 „	

All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdhurst Road, Croydon,

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 23. NOVEMBER 1919.



XXXI.—*Descriptions of new Pyralidæ of the Subfamilies*
Crambinae and Siginæ. By Sir GEORGE F. HAMPSON,
Bart., F.Z.S., &c.

[Concluded from p. 154.]

(8b) *Charltona actinialis*, sp. n.

♀. Head and thorax white, the vertex of head with short black streak, the sides of tegulae and the patagia with black stripes; abdomen white tinged with brown except at base; antennæ and palpi, except above, black; pectus, legs, and ventral surface of abdomen suffused with black. Fore wing black-brown with pure white streaks on the veins; the costal edge white; the cell and submedian fold to below end of cell with fine white streaks; the inner margin with white fascia; the cilia intersected by the white streaks. Hind wing silvery white. Underside of fore wing and costal area of hind wing suffused with reddish brown, the fore wing with rather ill-defined white streaks on median nervure and the veins arising from the cell.

Hab. N. NIGERIA, Ilorin (*Macfie*), 1 ♀ type. *Exp.* 40 mm.

(8c) *Charltona atrifascialis*, sp. n.

♀. Head and thorax white mixed with some blackish brown, the outer edge of patagia with obscure blackish brown stripes; abdomen white suffused with reddish brown; antennæ dark brown, white above; palpi black-brown, white above; pectus and legs suffused with blackish brown; ventral surface of abdomen dark reddish brown with white segmental lines. Fore wing glossy white; a cupreous brown fascia on costa to near apex; a blackish fascia in

Ann. & Mag. N. Hist. Ser. 9. Vol. iv. 23

discal fold from before middle of cell to termen; a stronger fascia below the cell and vein 4 to towards termen with an ochreous tinge below it; the inner area irrorated with blackish brown; the terminal area with black-brown streaks in the interspaces to submedian fold. Hind wing glossy white suffused with brown except on basal and inner area; cilia white. Underside of fore wing reddish brown; hind wing with the costal and terminal areas suffused with reddish brown.

♀. Antennæ wholly blackish; thorax with more black on dorsum; fore wing with strong black fascia on costa, the fasciæ in discal fold and below the cell much stronger.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 4 ♂, 5 ♀ type. *Exp.*, ♂ 34, ♀ 48 mm.

(8e) *Charltona albimixtalis*, sp. n.

Head, tegulæ, and prothorax white, the sides of tegulæ and patagia red-brown mixed with black-brown, the dorsum of thorax and abdomen white mixed with red-brown; antennæ red-brown; palpi black-brown, pectus and legs black-brown mixed with whitish. Fore wing rufous, the discal fold from middle of cell with a black-brown fascia mixed with white interrupted by an ill-defined white discoidal spot; the submedian interspace and interspaces of terminal area with black-brown fasciæ mixed with white. Hind wing white, the terminal half suffused with cupreous brown; cilia white mixed with rufous and with slight rufous line near base. Underside of fore wing and the hind wing except on basal area suffused with red-brown.

Hab. GAMBIA (*Dudgeon*), 1 ♀; GOLD COAST, Aburi (*Johnson*), 1 ♂; N. NIGERIA, Zungeru (*Macfie*), 2 ♀, Ilorin (*Macfie*), 1 ♀ type. *Exp.* 36-46 mm.

(9a) *Charltona albidalis*, sp. n.

Head, thorax, and abdomen white, the last with the 2nd and 3rd segments dorsally tinged with fulvous; antennæ rufous except above; palpi and legs slightly tinged with rufous. Fore wing glossy white, the inner half sparsely irrorated with elongate brown scales; a slight brownish fascia in base of submedian fold and a fascia in discal fold from middle of cell to termen; a terminal series of blackish points. Hind wing glossy white; a slight dark terminal line to submedian fold. Underside of fore wing and costal area of hind wing tinged with red-brown except towards termen.

Hab. SIERRA LEONE, Freetown (*Quinton*), 1 ♂; SUDAN, White Nile, Gabt el Megahid (*Dunn*), 1 ♂, 1 ♀ type. *Exp.* 30-40 mm.

(9b) *Charltona argyrastis*, sp. n.

♀. Head and thorax silvery white mixed with some blackish; abdomen silvery white tinged with red-brown; antennæ blackish; palpi, pectus, legs, and ventral surface of abdomen suffused with

rufous. Fore wing uniform brilliant silvery white, the costal edge with a fulvous tinge. Hind wing fuscous brown, the terminal area silvery white except towards tornus, the cilia with a faint fulvous tinge. Underside of both wings fuscous brown, the terminal area silvery white.

Hab. BR. E. AFRICA, N. Kavirondo, Up. Nzoi R. (*Neave*), 1 ♀. Nasisi Hills (*Neave*), 1 ♀ type. *Exp.* 30 mm.

(206 a) *Crambus chionoepela*, n. n.

Crambus chionostola, Hmps. A. M. N. H. (9) iii. p. 442 (1919); nec Hmps. A. M. N. H. (9) iii. p. 290 (1919).

Subfamily SIGINÆ.

The genus *Siga*, Hübn. Verz. p. 195 (1827), type *liris*, is older than *Schænobius*, Dup., 1844.

(3 a) *Niphopyralis chionesis*, sp. n.

♀. Head, thorax, and abdomen glossy white; antennæ fuscous except towards base; palpi with dark brown streak at sides to near tips; fore tibiæ and tarsi black-brown in front. Fore wing glossy white and thickly scaled; traces of a waved fuscous antemedial line except towards costa; a faint sinuous medial line angled outwards beyond the cell and ending at submedian fold; a rather more distinct subterminal line, excurved from below costa to vein 2, then oblique and sinuous; a terminal series of blackish striæ; cilia tinged with yellow-brown and with a slight brown line near base. Hind wing glossy white with a faint brownish shade beyond the cell; a slight blackish terminal line to near tornus and point at submedian fold; cilia almost pure white. Underside of fore wing suffused with reddish brown except on inner area.

Hab. QUEENSLAND, Townsville (*Dodd*), 2 ♀ type. *Exp.* 20 mm.

(3 b) *Niphopyralis discipunctalis*, sp. n.

♀. Head, thorax, and abdomen glossy white; antennæ fulvous yellow; palpi with dark brown streak at sides; fore legs tinged with brown. Fore wing glossy white; a black discoidal point; a slight blackish terminal line, almost obsolete except towards apex. Hind wing glossy white; a slight blackish terminal line to near tornus. Underside of fore wing with the costal area and the terminal area to vein 2 suffused with dark brown.

Hab. LOUISIADÉ Is., St. Aignan I. (*Meek*), 1 ♀ type. *Exp.* 18 mm.

(1) *Calamoschœna nigripunctalis*, sp. n.

♂. Head and thorax pale brownish rufous, the metathorax with a pair of black points; abdomen whitish tinged with brownish rufous; tarsi ringed with black towards extremities. Fore wing

pale brownish rufous; a black point in the cell near base; small obliquely placed black antemedial spots below costa and on vein 1; a small wedge-shaped black spot at lower angle of cell and two points above upper angle; small black subterminal spots below costa and on vein 1 with traces of a line between them, excurved below costa. Hind wing whitish tinged with brownish rufous. Underside of fore wing suffused with reddish brown, the inner area paler, two black points above end of cell and a punctiform black subterminal line from costa to vein 4; hind wing with subterminal black points on veins 8 to 3.

Hab. UGANDA, Kampala (*Ansorge*), 1 ♂ type. *Exp.* 20 mm.

(2) *Calamoschæna stictalis*, sp. n.

Head, thorax, and abdomen ochreous white, the last with dorsal black spots on two basal segments and slight fuscous bands on the following segments; tarsi ringed with blackish. Fore wing ochreous white; small subbasal, antemedial, medial, and postmedial spots on vein 1; a curved slightly waved fuscous subterminal line with small black spots on it below costa and on vein 1; a terminal series of blackish points. Hind wing ochreous white with a terminal series of blackish points.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 1 ♀; MASHONALAND, Salisbury (*Marshall*), 1 ♀; LOURENÇO MARQUES, Delagoa Bay (*Druce*), 1 ♂ type; TRANSVAAL, White R. (*Cooke*), 1 ♂, Pretoria (*Janse*), 1 ♀. *Exp.* 14–20 mm.

Genus STENOCALAMA, nov.

Type, *S. ochrotis*.

Proboscis aborted and small; palpi upturned, slender, the 2nd joint reaching to about vertex of head, the 3rd rather long; maxillary palpi small and filiform; frons rounded; antennæ of female somewhat laminate and almost simple. Fore wing long and narrow, the apex rounded, the termen oblique; vein 2 from towards angle of cell; 3 and 5 from angle, 4 absent; 6 from below upper angle; 7, 8, and 10 stalked, 9 absent; 11 from cell. Hind wing with vein 2 from close to angle of cell; 3 and 5 strongly stalked, 4 absent; 6, 7 shortly stalked; 8 anastomosing with 7.

Stenocalama ochrotis, sp. n.

♀. Head, thorax, and abdomen white tinged with rufous. Fore wing whitish suffused with rufous and without markings. Hind wing white, the costal area tinged with rufous.

Hab. UGANDA, Gondokoro (*Reymes-Cole*), 1 ♀ type. *Exp.* 16 mm.

Genus PLATYTESIS, nov.

Type, *P. semifurva*.

Proboscis aborted and minute; palpi upturned, the 2nd joint

reaching to vertex of head and broadly fringed with scales in front, the 3rd moderate and acute; maxillary palpi slight and filiform; frons smooth and rounded; antennæ of female somewhat laminate and almost simple. Fore wing rather narrow, the apex rounded; vein 3 from before angle of cell; 5 from just above angle; 6 from below upper angle; 7 from angle; 8, 9 stalked; 10, 11 from cell. Hind wing with veins 3, 4 from angle of cell; 5 from just above angle; 6, 7 shortly stalked; 8 anastomosing with 7.

Platytesis semifurva, sp. n.

♀. Head and thorax fulvous; abdomen whitish, dorsally suffused with fulvous; pectus and legs whitish. Fore wing fulvous with slight dark irroration; cilia silvery white with a black line near base. Hind wing white with a faint brownish tinge; the cilia with a slight blackish line near base to submedian fold. Underside white, the fore wing and costal area of hind wing suffused with fulvous.

Hab. SIAM, Biserat, 1 ♂ type. *Exp.* 16 mm.

Genus *PATISSODES*, nov.

Type, *P. fulvinotata*.

Proboscis aborted and minute; palpi upturned, the 2nd joint reaching to about middle of frons and moderately scaled in front, the 3rd moderate and obtuse; maxillary palpi minute; frons smooth and rounded; antennæ of male laminate and almost simple. Fore wing with the apex rounded, the termen evenly curved; veins 3, 4, 5 from angle of cell, 4, 5 approximated for a short distance; 6 from below upper angle; 7, 8, 9 stalked; 10, 11 from cell. Hind wing with veins 3, 4, 5 from angle of cell; 6, 7 from upper angle; 8 anastomosing with 7.

Patissodes fulvinotata, sp. n.

♂. Head, thorax, and abdomen silvery white; antennæ yellow-brown; palpi blackish above to near extremity of 2nd joint; fore tibiæ and the tarsi banded with black-brown. Fore wing silvery white; a rather diffused pale fulvous antemedial band, oblique to just below the cell, where it is angled outwards, then inwardly oblique; a diffused pale discoidal spot; a diffused pale fulvous subterminal band, interrupted between veins 5 and 3, where there is a spot beyond it on termen. Hind wing silvery white. Underside white; fore wing with postmedial series of minute blackish streaks on the veins from below costa to vein 3; hind wing with punctiform blackish postmedial line from costa to vein 3.

Hab. SINGAPORE (*Ridley*), 1 ♂ type. *Exp.* 20 mm.

(2) *Neoschænobia decoloralis*, sp. n.

♀. Head and thorax pale reddish brown, the frons with white

line at sides; abdomen white, dorsally tinged with reddish brown except towards extremity; pectus and legs white, the latter tinged with reddish brown. Fore wing pale reddish brown; an oblique sinuous fuscous antemedial line; a blackish discoidal bar; post-medial line fuscous, excurved to vein 3, then incurved. Hind wing white slightly tinged with reddish brown. Underside white, the fore wing and costal half of hind wing tinged with reddish brown.

Hab. N. CHINA, Pekin, Western Hills (*Hughes*), 1 ♀ type. *Exp.* 32 mm.

(2) *Acropentias papuensis*, sp. n.

♀. Head, thorax, and abdomen white suffused with pale fulvous brown; pectus and mid and hind legs white, the fore legs fulvous brown with the tarsi tinged with fuscous. Fore wing pale fulvous brown with slight dark irroration; the terminal half of costa with a series of black bars with white between them; a blackish antemedial line, oblique to submedian fold; an oblique black discoidal bar, defined on outer side by white; postmedial line blackish, excurved beyond the cell, then oblique; a terminal series of black points; cilia white with a dark brown line near base interrupted at the veins, the tips brown between veins 4 and 2. Hind wing white tinged with fulvous brown; a blackish post-medial line from costa to submedian fold; a terminal series of blackish striæ to submedian fold; cilia white with series of blackish points near base to vein 4, blackish at base and tips between veins 4 and 2. Underside of fore wing whitish suffused with fulvous brown, a black discoidal point with some diffused white beyond it, an oblique black postmedial line, diffused towards costa on which there is a black spot before it and obsolescent below vein 3, some black points beyond it on costa; hind wing white slightly tinged with fulvous brown, a black discoidal point and slightly waved postmedial line, incurved below vein 3 and obsolete below vein 1.

Hab. DUTCH N. GUINEA, Kapaur (*Doherty*), 1 ♀ type. *Exp.* 22 mm.

(2) *Auchmophora sufetulooides*, sp. n.

♂. Black-brown. Fore wing with numerous white points on costa; a pale antemedial line dentate above vein 1; a dark discoidal spot; a pale subterminal line slightly excurved at middle. Hind wing with pale subterminal line angled at vein 2.

♀ darker, especially the hind wing.

Hab. SIERRA LEONE (*Clements*), 1 ♀; S. NIGERIA, Warri (*Roth*), 1 ♂ type. *Exp.*, ♂ 14, ♀ 20 mill.

Genus NEOBANEPA, nov.

Type, *N. aglossodes*.

Proboscis aborted and minute; palpi with the 2nd joint porrect, extending about twice the length of head and somewhat angled

with scales above at middle, the 3rd rather long, obliquely upturned, and acuminate at extremity; maxillary palpi strongly dilated with scales; frons smooth and rounded; antennæ of male somewhat laminate and minutely ciliated. Fore wing with the apex somewhat produced and acute, the termen evenly curved; vein 3 from before angle of cell; 4, 5 shortly stalked; 6, 7 stalked; 8, 9 stalked; 10, 11 from cell, 11 anastomosing with 12. Hind wing with vein 3 from angle of cell; 4, 5 stalked; 6, 7 from upper angle; 8 anastomosing with 7.

Neobanepa aglossodes, sp. n.

Head and thorax black-brown mixed with some golden ochreous; antennæ golden ochreous; abdomen pale golden ochreous with some blackish irroration towards extremity and with lateral black stripes. Fore wing black-brown with a golden ochreous gloss, the terminal area more golden ochreous especially towards costa; antemedial line whitish defined on outer side by diffused black, angled outwards at discal and submedian folds; a black discoidal spot; the medial part of costa golden ochreous with two small black spots on it; postmedial line whitish defined on inner side by diffused black, excurved from below costa to submedian fold and incurved at vein 1; the terminal area with three small black spots on costa and a terminal series of black points; cilia with a black line near base followed by a white line. Hind wing pale golden ochreous with a slight blackish discoidal spot and faint diffused postmedial line from costa to vein 5. Underside of fore wing with the terminal area clear golden ochreous, the black spots on terminal half of costa distinct, a curved black postmedial bar from costa; hind wing with the costal area suffused with black to the postmedial line which is distinct to vein 5, the discal spot also distinct; a postmedial black bar above inner margin and mark at tornus.

Hab. PERU, St. Domingo (*Ockenden*), 4 ♂, 2 ♀ type. *Exp.* 20–28 mm.

Genus NYMPHULODES, nov.

Type, *N. (Nymphula) franciscalis*, Schaus.

Proboscis aborted; palpi porrect, the 2nd joint extending about three times length of head and fringed with long hair above and below, the 3rd moderate, upturned, naked; maxillary palpi strongly dilated with scales; antennæ of male annulate and ciliated, hind tibiæ with two pairs of spurs. Fore wing very long and narrow, the apex rounded, the termen obliquely curved; vein 3 from before angle of cell; 5 from just above angle; 6 from below angle; 7 from angle; 8, 9, 10 stalked; 11 from cell, free. Hind wing with veins 3, 4 from angle of cell, 4, 5 coincident; 6, 7 from upper angle, 8 anastomosing with 7 towards apex.

Nymphulodes franciscalis.

Nymphula franciscalis, Schaus, Pr. U.S. Nat. Mus. xxx. p. 139 (1906). Brazil.

(7) *Alpheias bipunctalis*, sp. n.

♂. Head and thorax fuscous brown with a slight cupreous gloss; abdomen pale cupreous tinged with brown; pectus, legs, and ventral surface of abdomen whitish, the fore tibiæ suffused with fuscous and the tarsi ringed with fuscous. Fore wing pale cupreous yellow, the costal area white from before middle to the subterminal line curving down to median nervure at end of cell, enclosing a diffused blackish mark on medial part of costa and defined by blackish before it on costa and below; black points in lower part of cell towards extremity and on discocellulars; rather diffused blackish postmedial and subterminal lines, somewhat incurved to vein 5 where they are slightly excurved, the subterminal line bent outwards to apex; a punctiform blackish terminal line. Hind wing whitish tinged with cupreous brown. Underside whitish suffused with brown.

Hab. JAMAICA, Moneague (*Walsingham*), 1 ♀ type. *Exp.* 12 mm.

Genus SCHÆNERUPA, nov.

Type, *S. thermantis*.

Proboscis aborted and minute; palpi porrect, extending about two and a half times length of head and roughly scaled; maxillary palpi triangularly dilated with scales; frons with slight rounded prominence; antennæ of male strongly laminate and ciliated. Fore wing with the apex rounded, the termen evenly curved; vein 3 from well before angle of cell; 5 from just above angle; 6 from below upper angle; 7 shortly stalked with 8, 9, 10; 11 from cell. Hind wing with vein 3 from well before angle of cell; 5 from just above angle; 6, 7 shortly stalked; 8 anastomosing with 7.

Schænerupa thermantis, sp. n.

♂. Head and thorax deep rufous; abdomen cupreous yellow. Fore wing bright rufous with a cupreous gloss and slight dark irroration; antemedial line whitish to submedian fold, then dark, angled outwards at median nervure; a small rather diffused blackish discoidal spot; postmedial line with white bar from costa, then blackish, angled outwards below costa, then oblique and ending in a small spot on inner margin. Hind wing yellowish tinged with cupreous rufous. Underside of fore wing rufous, of hind wing yellowish with the costal area suffused with rufous; both wings with oblique rather diffused rufous postmedial line.

Hab. ECUADOR, R. Pastaza, El Topo (*Palmer*), 1 ♂ type. *Exp.* 26 mm.

Genus ENDOTRICHODES, nov.

Type, *E. margaritifera*.

Proboscis absent; palpi porrect, extending about the length of head, the 2nd joint in male with tuft of hair above from base

curved forwards to near tips of palpi, the extremity of 2nd joint fringed with hair above hiding the 3rd joint, in female the palpi moderately scaled and the 3rd joint minute; maxillary palpi triangularly dilated with scales; frons smooth and rounded; antennæ of male ciliated. Fore wing with the apex rounded, the termen excised below apex and excurved at middle; vein 3 from below angle of cell; 5 from just above angle; 6 from below upper angle; 7 from angle; 8, 9, 10 stalked; 11 from cell. Hind wing with the termen excurved at middle; veins 3 and 5 from close to angle of cell; 6, 7 very shortly stalked; 8 anastomosing with 7.

Endotrichodes margaritifera, sp. n.

Head, thorax, and abdomen bright rufous; antennæ brownish; palpi white at base below; pectus and legs white, the fore tibiæ at extremities and the tarsi banded with black; ventral surface of abdomen whitish tinged with rufous. Fore wing bright rufous with slight dark irroration; an oblique subbasal whitish striga from costa; a strongly excurved pearly white medial line, obolescent below submedian fold and defined on outer side by blackish towards costa; a small rather diffused black discoidal spot; postmedial line double, dark brown, filled in with pearly white and with some pearly white before it on costal area, slightly excurved below costa and at middle, then oblique and sinuous; a terminal series of small silvery white spots defined on outer side by black striæ. Hind wing bright rufous with slight dark irroration; some whitish at base and on basal half of inner margin; ante- and postmedial lines deep rufous from costa to above inner margin, the former defined on inner side slightly by yellowish and sinuous, the latter slightly defined on outer side by yellowish, excurved to beyond lower angle of cell to below which it is bent inwards, then sinuous and joining the antemedial line at vein 1, a small black discoidal spot between them with a pearly white band from it to vein 1; a terminal series of silvery white striæ defined on outer side by black striæ. Underside ochreous tinged with rufous; fore wing with slight obliquely curved sinuous brown antemedial line, small black discoidal spot and double slightly waved postmedial line filled in with whitish at costa; hind wing with slight brown antemedial line sinuous to median nervure, then oblique, two black discoidal points and brown waved postmedial line excurved from below costa to vein 3 then incurved, some white between the lines below the cell.

Hab. BR. N. GUINEA, Milne Bay (*Meek*), 1 ♂, 1 ♀ type.
Exp., ♂ 20, ♀ 28 mm.

Genus EXODESIS, nov.

Type, *E. vaterfeldi*.

Proboscis absent; palpi downcurved, extending about two and a half times length of head, thickly scaled, the 2nd joint broadly

scaled above towards extremity, the 3rd rather long; maxillary palpi triangularly dilated with scales; frons smooth; antennæ of male laminate and almost simple; tibiæ smoothly scaled. Fore wing rather narrow, the apex rounded, the termen obliquely curved; veins 3 and 5 from close to angle of cell; 6 from upper angle; 7, 8 coincident and 9 stalked with them almost to apex; 10, 11 from cell. Hind wing with vein 3 from angle of cell; 4, 5 stalked almost to termen; 6, 7 from upper angle; 8 anastomosing with 7 to near apex.

In key differs from *Leucoides*, etc., in the fore wing having veins 7 and 9 stalked, 8 absent.

Exodesis vaterfieldi, sp. n.

♂. Head and thorax fuscous brown glossed with grey, the antennæ ochreous; abdomen ochreous white tinged with red-brown; pectus and legs ochreous mixed with brown, the fore legs and tarsi black, the latter ringed with white. Fore wing grey-white irrorated with pale fuscous brown especially on basal area and at termen, the costal area almost pure white from the antemedial to the subterminal line; antemedial line double, brownish, faint, rather diffused and somewhat oblique; a black bar from middle of costa, strong black discoidal bar, and some black irroration towards extremity of median nervure; postmedial line faint, brownish, rather diffused, excurved to vein 4, then incurved; a faint waved brownish subterminal line; a fine dark terminal line and ochreous white line at base of cilia, which are strongly irrorated with fuscous brown. Hind wing glossy white; a fine red-brown terminal line and red-brown line near base of cilia.

Hab. SUDÁN, Port Sudán (*Waterfield*), 1 ♂ type. *Exp.* 18 mm.

(3) **Obtusipalpis brunneata*, sp. n.

♀. White; palpi tinged with fuscous at sides; tarsi tinged with fulvous and ringed with black; abdomen dorsally tinged with fuscous on basal half and with fulvous towards extremity. Fore wing with some fuscous at base; a large brown patch from before middle to termen except on apical area, the veins on it streaked with darker brown and white and with a white spot on vein 2 near its origin, the inner margin streaked with white, the costal area white, the brown only extending to costa before middle and near apex; a fine terminal black line and some black points towards apex; cilia fulvous at base, white at tips. Hind wing pure white with terminal series of black points, the cilia yellow at base.

Hab. S. NIGERIA, Warri (*Dr. Roth*), type ♀ in Coll. Rothschild. *Exp.* 28 mm.

(5) *Obtusipalpis fusipartalis*, sp. n.

♀. Head and thorax white; abdomen white tinged with fulvous

brown leaving whiter segmental lines; antennæ tinged with fulvous brown; palpi with the 2nd joint dark brown above to near extremity; pectus, legs, and ventral surface of abdomen white. Fore wing white suffused with fulvous brown leaving the base, the costa to beyond middle, the apical part of terminal area and a spot below end of cell white; a faint oblique antemedial shade; traces of a dark discoidal annulus; a faint dark subterminal shade from costa to vein 3 with slight dark streaks on it at the veins, interrupted by a white streak in discal fold; black points on termen from apex to vein 3, rather wedge-shaped towards apex. Hind wing white; the termen with black points to vein 3 then a fine line to near tornus; cilia tinged with fulvous at base. Underside of fore wing tinged with fulvous brown except on inner area.

Hab. GOLD COAST, Kumasi (*Whiteside*), 1 ♀ type. *Exp.* 20 mm.

(6) *Obtusipalpis albidalis*, sp. n.

♂. Head, thorax, and abdomen white slightly tinged in parts with fulvous brown; palpi, with the 2nd joint black above; pectus, legs, and ventral surface of abdomen white, the fore tibiæ and tarsi banded with blackish. Fore wing white slightly tinged with fulvous; a faint dark discoidal bar and oblique diffused post-medial line from vein 4 to inner margin; a terminal series of black points to vein 4, then a fine line; cilia more strongly tinged with fulvous. Hind wing white; a terminal series of black points to vein 4, then a fine line to near tornus. Underside white faintly tinged with fulvous.

Hab. SIERRA LEONE (*Clements*), 3 ♂; GOLD COAST, Kumasi (*Whiteside*), 1 ♀ type. *Exp.* 18-20 mm.

(7) *Brihaspa tinctalis*, sp. n.

Donacavula catoxodes, Turner, Ann. Queensl. Mus. 1911, p. 118, non descr.

♀. Head, thorax, and abdomen white, the sides of head, tegulæ, and patagia tinged with fulvous brown, the abdomen with some fulvous on dorsum near base; palpi at sides and fore legs in front fulvous brown. Fore wing white tinged with fulvous brown leaving slight white streaks on the veins, the inner and terminal areas whiter; a double very slightly sinuous fulvous brown sub-terminal line, arising from apex, oblique to vein 2, then bent inwards to inner margin before middle; a black terminal line; cilia with a slight fulvous brown line near tips. Hind wing white with a very slight fulvous brown tinge. Underside of fore wing and costa of hind wing slightly tinged with fulvous brown.

Hab. QUEENSLAND, Kuranda (*Dodd*), 1 ♀ type. *Exp.* 20 mm.

(3a) *Patissa fulvipunctalis*, sp. n.

♀. Head, thorax, and abdomen white. Fore wing silvery white; a slight orange-fulvous discoidal spot and a subterminal spot on

vein 6 with a point above it on vein 7. Hind wing and underside white.

Hab. UGANDA, Gondokoro (*Reymes-Cole*), 1 ♀ type. *Exp.* 16 mm.

(3 b) *Patissa stenopteralis*, sp. n.

♂. Pure white. Fore wing very long and narrow; a pale cupreous brown point below costa near base and patch below the cell; a straight erect antemedial band; a discocellular spot conjoined to the postmedial band which is bent inwards to lower angle of cell; a subterminal highly dentate line; a fine marginal line.

Hab. QUEENSLAND, Innisfail, type †♂ in Coll. Rothschild. *Exp.* 16 mm.

(5 a) *Patissa rubrilinealis*, sp. n.

♀. Head, thorax, and abdomen white. Fore wing silvery white; a slightly inwardly oblique scarlet medial line from just below costa to inner margin; an oblique scarlet subterminal striga from below costa to vein 7 with a point below it on vein 6. Hind wing and underside silvery white.

Hab. BR. C. AFRICA, Mt. Mlanje (*Neave*), 1 ♀ type. *Exp.* 12 mm.

(5 b) *Patissa atrilinealis*, sp. n.

♀. Head, thorax, and abdomen white. Fore wing silvery white; an inwardly oblique cupreous black-brown line from upper angle of cell to inner margin; an oblique slightly sinuous cupreous black-brown line from apex to discal fold; a terminal series of cupreous black-brown points. Hind wing and underside silvery white.

Hab. BR. E. AFRICA (*Hinde*), 1 ♀ type. *Exp.* 18 mm.

(5 d) *Patissa rufitinctalis*, sp. n.

♂. Head and thorax white suffused with pale rufous; abdomen white; palpi blackish; pectus and legs suffused with pale rufous. Fore wing white suffused with pale rufous leaving some white in and below end of cell and the terminal area white except at costa; a minute black point at upper angle of cell and small spot at lower angle. Hind wing white; a pale rufous subterminal spot below vein 2 and a spot at tornus. Underside white.

♀. Hind wing with the inner area suffused with pale rufous and without the spots below vein 2 and at tornus.

Hab. SIERRA LEONE (*Clements*), 1 ♂, 1 ♀ type. *Exp.* 20 mm.

(5 f) *Patissa geminalis*, sp. n.

♂. Head, thorax, and abdomen pure white, the sides of frons, palpi, pectus, fore and mid legs suffused with fuscous. Fore wing silvery white with prominent black points at upper and lower

angles of cell. Hind wing silvery white. Underside of fore wing with the costal area tinged with fuscous.

♀. Without any fuscous except on inner side of fore legs.

Hab. BR. E. AFRICA, Mukuniu (*Betton*), 1 ♀, Samburu (*Betton*), 1 ♀; UGANDA, Gondokoro (*Reymes-Cole*), 1 ♂; "GERM. E. AFRICA," Dar-es-Salaam, 1 ♀; BR. E. AFRICA, Mt. Mlanje (*Neave*), 6 ♂, 6 ♀ type; MASHONALAND, Salisbury (*Marshall*), 1 ♂, 2 ♀. *Exp.* 20–30 mm.

(5 h) *Patissa monostidzalis*, sp. n.

Head, thorax, and abdomen white; antennæ blackish except above; palpi blackish; pectus and legs tinged with cupreous brown. Fore wing silvery white; a minute black spot at lower angle of cell. Hind wing and underside silvery white.

Hab. S. NIGERIA, Lagos (*Dudgeon*), 1 ♂; N. NIGERIA, Minna (*Macfie*), 1 ♂, 1 ♀ type. *Exp.* 20 mm.

(6 b) *Patissa ochreipalpalis*, sp. n.

♂. Head, thorax, and abdomen silvery white; palpi ochreous yellow; fore tibiæ fuscous. Fore and hind wings uniform silvery white. Underside of fore wing tinged with red-brown.

Hab. COMORO Is., Mayotta (*Meade-Waldo*), 2 ♂ type. *Exp.* 14 mm.

(6 c) *Patissa fulvicepsalis*, sp. n.

♂. Head orange-fulvous; antennæ white, brown at sides; thorax and abdomen silvery white; fore legs tinged with brown. Fore and hind wings uniform silvery white. Underside of fore wing tinged with brown except on terminal area.

Ab. 1. Tegulæ and legs tinged with orange-fulvous.

Hab. W. AFRICA (*Dudgeon*), 3 ♂; N. NIGERIA, Minna (*Macfie*), 4 ♂ type; UGANDA, Gondokoro (*Reymes-Cole*), 2 ♂; BR. C. AFRICA, Mt. Mlanje (*Neave*), 4 ♂. *Exp.* 16–22 mm.

(7 c) *Patissa atricostalis*, sp. n.

♂. Pure white; palpi at sides and shoulders black-brown; antennæ blackish. Fore wing with the costa blackish, tapering to before apex.

Hab. QUEENSLAND, Cedar Bay, Cooktown (*Meek*); W. AUSTRALIA, Sherlock R. (*Clements*), 1 ♂, 3 ♀ type, Roebourne, 1 ♂. *Exp.* 18–22 mm.

(7 d) *Patissa ochroalis*, sp. n.

♂. Head reddish brown; thorax and abdomen ochreous yellow; pectus, legs, and ventral surface of abdomen ochreous white, the fore legs tinged with brown. Wings ochreous yellow, the costa of fore wing red-brown.

♀. Head, thorax, and abdomen ochreous white, the sides of head and palpi fulvous yellow; fore wing ochreous yellow, the costa narrowly red-brown towards base; hind wing and underside ochreous white.

Hab. SURINAM, Rio Derg, 1 ♂ type; BRAZIL, Amazons, Ourem (*Schulz*), 1 ♀. *Exp.*, ♂ 22, ♀ 14 mm.

(8 a) *Patissa fractilinealis*, sp. n.

Head and thorax white more or less irrorated with chocolate-brown; abdomen white; palpi and fore legs more strongly tinged with chocolate-brown. Fore wing white irrorated with chocolate-brown; the costal edge more or less strongly chocolate-brown on basal half; a minute chocolate-brown spot at upper angle of cell; an oblique chocolate-brown line from costa just before apex to inner margin beyond middle, obsolescent towards apex, below vein 2 reduced to a small spot on vein 1, or reduced to points on the veins throughout; a fine chocolate-brown terminal line. Hind wing white irrorated with a few chocolate-brown scales on terminal half; a fine chocolate-brown terminal line. Underside white irrorated with chocolate-brown scales; fore wing with oblique chocolate-brown line from costa before apex to vein 2; hind wing with oblique punctiform chocolate-brown line from costa before apex to submedian fold.

Hab. BR. E. AFRICA, Nairobi (*Crawshay, Anderson*), 2 ♀; UGANDA, Katesa (*Betton*), 1 ♂ type, Ketoma (*Doggett*), 1 ♂. *Exp.* 22 mm.

(1 a) *Styphlolepis leucosticta*, sp. n.

Head and thorax cupreous rufous; palpi white below to near extremity of 2nd joint; abdomen cupreous rufous, the base, sides, and anal tuft whitish; pectus and legs white tinged with cupreous rufous; ventral surface of abdomen with white segmental lines. Fore wing cupreous rufous irrorated with a few dark brown scales, the costa towards base and terminal area rather browner; a small subbasal silvery white spot defined by darker brown above vein 1; an indistinct slightly sinuous brown medial line, oblique below the cell; an indistinct brown postmedial line, slightly excurved below costa, then oblique; cilia dark brown with a fine whitish line at base, the tips white at submedian fold. Hind wing white, the apical area pale cupreous brown, broadly at costa, narrowing to a point at termen at vein 3, a slight waved brown subterminal line from costa to vein 4; cilia with a rufous line near base to submedian fold, rufous at tips towards apex. Underside of fore wing with the cell and areas just beyond its upper and lower extremities dotted with white scales.

Antennæ with uniseriate laminate branches; fore wing with veins 6, 7 hardly stalked.

Hab. W. AUSTRALIA, Sherlock R. (*Clements*), 1 ♂ type. *Exp.* 50 mm.

Genus SCIRPOPHAGA, insert

Topentis, Hübn. Verz. p. 366 (1827), type *præolata*, which has priority.

(8 b) *Topentis rhodoproctalis*, sp. n.

♀. Head, thorax, and abdomen silvery white, the anal tuft rose-pink; antennæ blackish at sides; fore tibiæ on outer side, the fore and mid tarsi and the hind tarsi except basal joint fuscous. Wings silvery white, the fore wing with small black spot at lower angle of cell.

Hab. SINGAPORE (*Ridley*), 1 ♀ type. *Exp.* 36 mm.

(8 d) *Topentis flavidorsalis*, sp. n.

♂. Head and thorax white suffused with ochreous yellow; abdomen white, the two basal segments dorsally suffused with fulvous yellow. Fore and mid legs ochreous brown, the hind legs ochreous white. Fore wing chalky white, the basal area suffused with ochreous yellow, the costal edge brownish to middle; a round black spot at lower angle of cell. Hind wing silvery white, the costal area, the cell and area beyond it, and the submedian fold suffused with brown. Underside of fore wing suffused with reddish brown except on terminal area. Hind wing with the costal area to beyond middle and the area just beyond the cell tinged with reddish brown.

Hab. BHUTÁN (*Dudgeon*), 1 ♂ type. *Exp.* 30 mm.

(8 d) *Topentis brunnealis*, sp. n.

♂. Head and thorax ochreous brown; abdomen white tinged with brown; palpi fuscous brown to near extremity of 2nd joint, the tips white tinged with ochreous; fore and mid legs fuscous brown, the hind legs white tinged with brown. Fore wing ochreous brown; an oblique black bar at lower angle of cell. Hind wing white tinged with ochreous brown. Underside of fore wing fulvous brown; hind wing white tinged with fulvous brown, the inner area whiter.

Hab. BURMA, Up. Chindwisi Distr., 1 ♂ type. *Exp.* 30 mm.

(18 a) *Topentis termipunctalis*, sp. n.

♀. Head and thorax pale pink, the head with some white; abdomen white with fulvous yellow dorsal patch on 2nd and 3rd segments; pectus white; legs white tinged with pink. Fore wing pale pink irrorated with a few dark brown scales; a slight dark brown spot at lower angle of cell; a terminal series of black points; cilia white mixed with dark brown. Hind wing silvery white. Underside of fore wing white tinged with pink.

Hab. BR. C. AFRICA, Mt. Mlanje, Luchenyá R. (*Neave*), 1 ♀ type. *Exp.* 16 mm.

(18 c) *Topeutis irrorata*, sp. n.

Head and thorax ochreous tinged with red-brown; abdomen ochreous white, dorsally suffused with fulvous yellow towards base; antennæ brownish; palpi dark brown above, whitish below; pectus and legs ochreous white, the fore legs tinged with brown. Fore wing ochreous tinged with red-brown and irrorated with dark brown, the costal edge brown; an indistinct brownish discoidal bar; an oblique rather diffused brownish subterminal line; the termen rather more strongly tinged with brown. Hind wing silvery white with subterminal series of slight reddish brown points to vein 2 and terminal series of more distinct points. Underside of fore wing tinged with red-brown, a slight brownish subterminal line with diffused white beyond it; hind wing tinged with red-brown except on inner area, a slight brownish postmedial line to vein 2.

Hab. BRAZIL, Castro Paraña (*D. Jones*), 2 ♂, 1 ♀ type. *Exp.* 12-16 mm.

(1 a) *Schænobius pyraustalis*, sp. n.

♂. Head and thorax yellowish suffused with rufous; abdomen white dorsally tinged with rufous; fore and mid legs pale rufous. Fore wing yellowish suffused with rufous, the costal area suffused with dark red-brown to end of cell; small antemedial and medial black spots on median nervure and vein 1; a diffused oblique rather maculate blackish bar from upper angle of cell to vein 3 beyond the cell; a diffused maculate blackish subterminal band from costa to below vein 3. Hind wing glossy white, faintly tinged with brown except towards base. Underside of fore wing and the costal area of hind wing and the terminal area except towards tornus suffused with rufous, the costal area of fore wing suffused with dark brown to beyond end of cell.

Hab. ARGENTINA, Goya Corrientes (*Perrens*), 2 ♂ type. *Exp.* 22 mm.

(3 a) *Schænobius rufalis*, sp. n.

♀. Head and thorax rufous suffused with red-brown; abdomen ochreous white, dorsally tinged with rufous towards base; antennæ brown; pectus and hind legs ochreous white; fore and mid legs ochreous suffused with rufous, the tarsi brown with slight pale rings. Fore wing ochreous suffused with rufous and irrorated with dark red-brown; a black point at lower angle of cell; a terminal series of slight black points; cilia white tinged with rufous. Hind wing silvery white with a tinge of buff; a terminal series of black points to vein 2. Underside of fore wing ochreous suffused with red-brown, the costa whiter to beyond middle; hind wing brownish white, the costal half suffused with red-brown to beyond the cell.

Hab. BR. E. AFRICA, Alubas (*Betton*), 1 ♀; UGANDA (*Doggett*), 2 ♀ type. *Exp.* 40-44 mm.

(3b) *Schænobius ignitalis*, sp. n.

♂. Head and thorax rufous mixed with dark brown; abdomen silky whitish, dorsally tinged with rufous towards base; pectus, legs, and ventral surface of abdomen whitish, suffused with rufous. Fore wing fiery rufous, the costal half suffused with dark brown; a small black spot at lower angle of cell and smaller spot at upper angle; antemedial and medial points in submedian fold; a maculate black line from apex to submedian fold below end of cell; a terminal series of strong black points. Hind wing silky white with a slight brownish tinge; a terminal series of black points to vein 2; cilia ochreous. Underside of fore wing ochreous tinged with brown, the oblique line from apex indistinct and diffused; hind wing ochreous white, an indistinct diffused oblique brownish line from apex to vein 2.

♀. Fore wing without the black spot from upper angle of cell, the oblique line from apex indistinct and diffused.

Hab. TRANSVAAL, White R. (*Cooke*), 1 ♂, 1 ♀ type; NATAL, Durban (*Queckett, Marley, Leigh, Clark*), 7 ♀. *Exp.*, ♂ 32, ♀ 34-44 mm.

(7b) *Schænobius attenuata*, sp. n.

♂. Very slender; fore wing very long and narrow. White; head, thorax, abdomen, and fore wing tinged with ochreous. Fore wing irrorated with large dark brown scales; a fine dark terminal line. Hind wing nearly pure white.

Hab. NATAL, Kimbolton (*Hutchinson*), 2 ♂ type. *Exp.* 16 mm.

(7c) *Schænobius micralis*, sp. n.

♂. Head, thorax, and abdomen white tinged with ochreous brown; antennæ fuscous; palpi, pectus, legs, and ventral surface of abdomen white, the palpi and legs tinged with fuscous. Fore wing white suffused with brownish ochreous. Hind wing white with a slight ochreous tinge. Underside white suffused with brownish ochreous.

Hab. C. CHINA, Fokien, Ting-hai (*de la Garde*), 2 ♂ type. *Exp.* 16 mm.

(11a) *Schænobius semifuscalis*, sp. n.

♂. Head and thorax fuscous brown with a slight cupreous tinge, the vertex of head with some whitish; abdomen white tinged with rufous; fore and mid legs red-brown, the hind legs whitish. Fore wing glossy fuscous brown tinged with rufous especially on inner half; a small black spot at lower angle of cell; a terminal series of black points; cilia with some whitish mixed and a punctiform blackish line at middle. Hind wing glossy white with a slight red-brown tinge, the terminal area more strongly suffused with reddish

brown to submedian fold; a terminal series of black points. Underside of fore wing pale reddish brown; hind wing white, the costal area and terminal area to submedian fold suffused with red-brown; both wings with terminal series of black points to vein 2.

Hab. ARGENTINA, Gran Chaco, Florenzia (*Wagner*), 1 ♂ type. *Exp.* 24 mm.

(11 *b*) *Schænobius pulverealis*, sp. n.

♂. Head white tinged with pale red-brown; palpi pale red-brown, white below towards base; thorax pale red-brown; abdomen white tinged with red-brown, the 2nd and 3rd segments with dorsal fulvous yellow patch; pectus and legs white tinged with red-brown. Fore wing grey-white tinged with brown and irrorated with fuscous, the costal half to submedian fold and to the oblique line from apex browner; a small black spot at lower angle of cell and usually a point at upper angle; blackish ante- and postmedial points in submedian fold and an oblique blackish line from apex to discal fold; a terminal series of prominent black points. Hind wing white tinged with reddish brown especially on costal half; a terminal series of black points to vein 2. Underside pale red-brown, the inner area of hind wing white.

♀. Fore wing redder brown, the spot at lower angle of cell reduced to a point, the points and oblique line from apex obsolete.

Hab. PARAGUAY, Sapucay (*Foster*), 1 ♂; ARGENTINA, Santa Fé, Ocampo (*Wagner*), 2 ♂, 1 ♀ type, Gran Chaco, Florenzia (*Wagner*), 1 ♀; *Hab. ign.*, 1 ♀. *Exp.*, ♂ 22-24, ♀ 40-44 mm.

(14 *a*) *Schænobius fulvitrinctalis*, sp. n.

♀. Head and thorax pale fulvous brown; abdomen white slightly tinged with fulvous brown except at base; pectus and legs white tinged with fulvous brown. Fore wing pale fulvous brown; a diffused brown streak in and beyond end of cell; slight diffused fuscous spots at angles of cell and an oblique series of slight rather diffused blackish spots from apex to vein 4; a terminal series of black points. Hind wing silvery white with a faint brownish tinge. Underside of fore wing and costal area of hind wing tinged with fulvous brown.

Hab. PHILIPPINES, Ticao I. (*McGregor*), 1 ♀ type. *Exp.* 30 mm.

(14 *b*) *Schænobius phæopastalis*, sp. n.

♂. Head and thorax brown with a slight cupreous tinge; abdomen whitish tinged with brown; pectus and legs whitish suffused with reddish brown. Fore wing greyish suffused with reddish brown and irrorated with fuscous brown; a slight blackish spot at lower angle of cell and point at upper angle; an oblique blackish shade from apex to just beyond lower angle of cell; a terminal series of black points. Hind wing whitish tinged with

brown; a faint oblique dark shade from apex to beyond lower angle of cell; a terminal series of slight blackish points to vein 2. Underside of fore wing and the costal area of hind wing suffused with reddish brown, the rest of hind wing brownish white.

Hab. TRANSVAAL, Pretoria (*Distant*), 1 ♂ type. *Exp.* 30 mm.

(19b) *Schænobius ochritinctalis*, sp. n.

♂. Head and thorax white, the antennæ fuscous except above, the palpi reddish brown; abdomen white dorsally tinged with fulvous yellow, the 1st segment at extremity and the 2nd and 3rd segments deeper fulvous yellow; legs tinged with brown. Fore wing white, tinged with ochreous especially on basal area and costal area to end of cell, the costal edge fuscous towards base. Hind wing silvery white. Underside of fore wing and the costal area of hind wing suffused with reddish brown.

Hab. Sierra Leone (*Clements*), 1 ♂ type. *Exp.* 24 mm.

(2) *Donacaula pulverea*, sp. n.

White; head, thorax, and fore wing thickly irrorated with fuscous; abdomen less strongly irrorated and dorsally yellowish towards base. Fore wing with black point at lower angle of cell; a curved fuscous line from apex to middle of inner margin, with less irroration on each side of it towards inner margin; a terminal series of black points. Hind wing with traces of a line from apex to tornus formed by slight fuscous irroration; a terminal series of black points.

Hab. NATAL, Weenen, types in Coll. Rothschild and B.M. *Exp.*, ♂ 24, ♀ 26 mm.

(4b) *Cirrhochrista annulifera*, sp. n.

Pure white; palpi red at sides; antennæ reddish; thorax and abdomen with dorsal series of red-brown marks. Fore wing with the costa fulvous irrorated with dark brown and emitting a sub-basal speck and antemedial and medial triangular marks; an antemedial line arising from the 1st triangular mark, very oblique to vein 1 where it is angled; a large annulus between the 2nd triangular mark and tornus; a postmedial annular fulvous mark on costa emitting a line across apical area to termen, obtusely angled inwards on vein 6; a terminal line with points running inwards on the veins and expanding into an annulus at tornus. Hind wing with terminal fulvous and dark brown line joined at vein 2 by a short oblique line from vein 5.

Hab. D'ENTRECASTEAUX Is., Fergusson I., Goodenough I. (*Meek*), 1 ♂ type. *Exp.* 20 mm.

(5b) Cirrhochrista convoluta, sp. n.

♀. Pure white; palpi, sides of frons, antennæ, shoulders, and bands on fore legs rufous; abdomen with dorsal rufous stripe emitting oblique lateral lines. Fore wing with yellow and brown costal fascia; a short subbasal line; an oblique antemedial line expanding and enclosing a pale spot on costa; a pale yellow discoidal line conjoined to the costal fascia and defined by a strong brown line giving rise to fine lines enclosing a rounded space above submedian fold where they touch then an elliptical space above inner margin, the inner line being strongly dentate outwards above the margin; a line across apical area dilated and enclosing pale yellow spots on costa and termen at vein 4, strongly dentate inwards on veins 5 and 6; a terminal crenulate line and a line through the cilia. Hind wing with crenulate terminal line from vein 6 to submedian fold emitting an oblique striga at vein 3 and with a line through the cilia beyond it.

Hab. GOLD COAST, Kumasi (*Whiteside*), 1 ♀; S. NIGERIA, Sapele (*Sampson*), 1 ♀ type, Ilesha (*Hunmfrey*), 1 ♀; NATAL, Durban (*Gooch*), 2 ♀. *Exp.* 24-30 mm.

(5c) Cirrhochrista xanthographis, sp. n.

♀. Pure white; palpi, antennæ, shoulders, and bands on fore legs yellow; abdomen with dorsal yellow band on 3rd segment followed by a series of spots. Fore wing with yellow costal fascia; a yellow antemedial line defined by dark scales, oblique from costa to submedian fold where it is acutely angled; a yellow discoidal spot defined by brown lines; a waved postmedial band incurved below costa, excurved between veins 5 and 3, then bent inwards to below end of cell; a crenulate terminal line. Hind wing with waved yellow subterminal band irrorated with dark scales between veins 6 and 2; a crenulate terminal line.

Hab. D'ENTRECASTEAUX IS., Fergusson I. (*Meek*), 1 ♀ type. *Exp.* 28 mm.

(5e) Cirrhochrista diploschalis, sp. n.

♂. Head and thorax white, the dorsum of thorax tinged with rufous, the antennæ brownish at sides, the palpi, sides of head, and shoulders yellow and dark brown; abdomen white, dorsally suffused with red-brown except at base and with slight blackish bands towards extremity; fore tibiæ and tarsi tinged with rufous and banded with black. Fore wing silvery white; the costa suffused with orange-yellow with a streak of silvery and dark brown scales on it on basal area; a narrow oblique orange-yellow antemedial band, defined on outer side by dark brown scales and dilated towards costa; rather diffused dark red-brown medial and postmedial lines with some silvery scales on them towards costa, the former oblique, the latter incurved, anastomosing with the former at middle and ending at tornus, their forks towards costa and inner margin filled

in with orange-yellow; a curved dark red-brown subterminal line from costa to the postmedial line at vein 1, the area beyond it suffused with orange-yellow and with a silvery and brown streak beyond it below costa; a narrow red-brown terminal band with a series of minute silvery spots on it; cilia orange-yellow with some brown scales before tips which are whitish. Hind wing silvery white, the termen and cilia tinged with yellow. Underside white, the costa of fore wing tinged with yellow-brown.

Hab. D'ENTRECASTEAUX Is., Ferguson I. (*Meek*), 2 ♂ type. *Exp.* 26 mm.

(5 f) *Cirrhochrista bifurcalis*, sp. n.

Head and thorax white; antennæ slightly tinged with rufous; palpi black-brown glossed with silver, white below towards base; abdomen white, dorsally suffused with dark brown on medial segments, the penultimate segment with yellow band with black points at sides, the anal tuft with yellow spot and black point; fore tibiæ and tarsi banded with orange and black. Fore wing white, the costa orange; a dark brown and silvery streak just below costa to middle; a narrow oblique orange antemedial band with an incurved silvery and dark brown line on it; red-brown medial and post-medial lines with small silvery spots on them, the former excurved, the latter incurved and anastomosing with the former at middle, ending on termen above tornus, its fork towards costa filled in with orange and with an orange mark on it below vein 3; an oblique slightly sinuous red-brown line with black and silvery points on it at the veins from costa before apex to termen below vein 4, a brown and silvery streak beyond it below costa; a narrow silvery and brown terminal band with some black points before it towards apex. Hind wing silvery white. Underside white; fore wing with oblique series of dark points from costa beyond middle to vein 4 near termen and dark points on termen towards apex.

Ab. 1. Abdomen with subdorsal dark brown and silvery spots on medial segments and without the yellow mark and black points on terminal segments. Formosa.

Ab. 2. Abdomen tinged with rufous except at base; fore wing tinged with yellow-buff. Philippines to N. Guinea.

Ab. 3. Fore wing with the area below the cell suffused with black-brown between the antemedial and medial lines.

Hab. FORMOSA, Kanshirei (*Wileman*), 4 ♀; ASSAM, Khásis, 1 ♂ type; PHILIPPINES, Mt. Makiling (*Baker*), 1 ♀; S. CELEBES (*Doherty*), 1 ♂, Sangir I. (*Doherty*), 1 ♂; DUTCH N. GUINEA, Humbolt Bay (*Doherty*), 1 ♂. *Exp.* 22-26 mm.

(5 g) *Cirrhochrista primulina*, sp. n.

♀. Head and thorax white; antennæ tinged with red-brown; frons black at sides; palpi tinged with red-brown and with blackish

mixed; abdomen white, tinged with red-brown except at base; fore tibiæ and tarsi banded with rufous and black-brown. Fore wing white suffused with yellow-buff; the costa deeper yellow to middle with a dark red-brown and silvery streak below it; a narrow oblique red-brown and silvery antemedial band; medial and post-medial red-brown and silvery lines, the former excurved, the latter incurved, anastomosing with the former at middle and ending at submedian fold near termen, enclosing a spot of the ground-colour at vein 2; a curved red-brown subterminal line from costa to the extremity of the postmedial line at submedian fold, crossed by a silvery streak below costa extending to termen; a narrow silvery terminal band edged with dark red-brown; cilia orange-yellow. Hind wing silvery white. Underside white; fore wing with curved subterminal series of brown points from costa to vein 4.

Hab. BR. N. GUINEA, Kumusi R. (*Meek*), 1 ♀ type. *Exp.* 26 mm.

(5h) *Cirrhochristu aurantialis*, sp. n.

♂. Head, thorax, and abdomen pale yellow; palpi black at base and tips; abdomen banded with black. Fore wing orange-yellow with silver markings on fuscous; the base of costa streaked with silver and fuscous; an antemedial line angled inwards below the cell; an excurved medial line more or less angled at lower end of cell and approaching the 1st line at costa and inner margin, at lower angle of cell it is quite or almost conjoined to a large somewhat irregular U-shaped mark from costa beyond middle; bright silver and fuscous lines on apical part of costa and outer margin. Hind wing white becoming yellowish towards outer margin.

Ab. 1. Fore wing with the area between the antemedial and medial lines filled in with fuscous black.

Hab. AMBOYNA (*Doherty*), 2 ♂ type. *Exp.* 26 mm.

(3) *Loxostegopsis phæopasta*, sp. n.

♀. Head and thorax white tinged with fuscous brown; abdomen white, pectus and legs white, the tarsi slightly tinged with brown towards extremities. Fore wing white strongly irrorated with dark brown; a slight dark brown postmedial line, excurved to discal fold, then oblique to inner margin beyond middle; a fine dark brown terminal line. Hind wing white slightly irrorated with brown except on inner area; a rather punctiform dark brown terminal line to submedian fold. Underside of fore wing suffused and irrorated with brown.

Hab. U.S.A., Arizona, Phoenix (*Kunze*), 1 ♀ type. *Exp.* 14 mm.

XXXII.—*New Bryozoa from the Kuckers Stage in Esthonia.*
By HENDRIK BEKKER, Cand. Geol., University of Tartu
(Dorpat).

[Plate VII.]

INTRODUCTION.

In the summer of 1917, I made a collection of bryozoa in the quarries of the villages TÜRPSALU and KUKRUSE or KUCKERS, 10 km. N.W. of Jewe Station. These quarries had been taken in hand by the Russian Committee of Fuel in Petrograd, for the purpose of determining the existence and thickness of shale in the Kuckers stage of the Middle Ordovician in Esthonia. I was unable to obtain the results of their research, and because of war conditions could move without restriction only in a very limited area.

During the winter of 1917, and in the first quarter of 1918, I determined a part of the collection in the Geological Institute of the University of Tartu (Dorpat or Jurjev). For the more complete examination and study of my collection, I had the opportunity of visiting London.

I am indebted to the officers of the Geological Department of the British Museum for facilities in the library, for the use of Dr. R. S. Bassler's bryozoa collection from Esthonia, and the bryozoa material collected by Dr. F. A. Bather from Esthonia and the Swedish formations, especially those of Oeland.

I have also been permitted to work in the Library and Museum of Practical Geology.

Finally, I must express my warmest thanks to Dr. F. A. Bather, F.R.S., for his indispensable help in revising the manuscript.

KUCKERS STAGE IN KUKRUSE AND TÜRPSALU.

In the vicinity of the villages Kukruse and TÜRPSALU, 3-6 km. from the shores of the Gulf of Finland, the Middle Ordovician strata rise in a sloping terrace, varying in height from 3 to 5 or 6 metres. On the slope of this ascent the Kuckers stage (C_2 of F. Schmidt*) crops out. This stage is a white or greyish-yellow limestone or marl, with intercalated layers of bituminous shale.

* F. Schmidt, "On the Silurian and Cambrian Strata of the Baltic Provinces etc.," Quart. Journ. Geol. Soc. xxxviii. p. 514 (1882).

In a quarry on the top of the ascent in the village Türipsalu is the following section :—

Ground moraine and soil.

- 60 in.—Greyish limestone, marly in the lower part.
- 8 in.—Bituminous shale.
- 12 in.—Marly limestone.
- 16 in.—Bituminous shale.
- 20 in.—Compact greyish limestone, marly in the upper part.

The lowest limestone, of which only the upper 20 inches are here observed, contains abundant remains of different species of Orthoceratites, Brachiopoda, Cystoidea—among these *Echinospherites aurantium*, Gyll.,—and other fossils. The upper part of this limestone has thin interlayers of yellow-brown shale.

On this limestone rests a shale layer, 16 in. thick, of a rusty-brown or amber colour; the shale has absorbed a certain amount of underground water, is soft, and can be ground with the fingers. After drying the shale is lighter in colour, with different shades of light or dark brown, walnut, or amber—the lighter portions being those which contain more calcareous remains of organisms. The hardness of the shale depends on the amount of lime or clay-marl; the hardness of the lime-shale may be 1·5–2, whilst the clay-shale is very soft (1). The dry shale can be split into irregular slates with conchoidal fracture.

According to Paltshinski ("Denj," viii. 1917), the bituminous shale occurred from Zamburg (Russia) to Reval (Esthonia)—200 km.—over an area 50 km. wide. The total quantity of the bituminous shale may be 40 to 50 milliards of tons.

Then follows a thin bed (12 in.) of greyish or light yellow marly limestone; this limestone is interbedded with thin layers of shale from a quarter to three-quarters of an inch thick.

On this limestone again rests a bed of shale (8 in.), like that already described.

Finally, above this shale bed is a greyish limestone (60 in.); its lower part is marly or softer, with thin interlayers of shale; towards the top it is more compact and greyish white.

The surface of this limestone and the slopes of the terrace are covered with a ground-moraine—boulder clay, or gravel and sand,—varying in thickness from 2 or 3 in. to 80 in. and more. The lower part of this ground-moraine is the "rülk," composed of limestone boulders.

The whole thickness of the Kuckers stage, which may vary from 30 to 50 feet, is not seen in the beds of the quarry described above.

Below the terrace bituminous shale is found under peat for a distance of 1 km. northwards. The shale was to be used in the summer 1917 for fuel in some factories in Esthonia and Petrograd. In Kukruse and Tüürpsalu it was worked from quarries and adits under the terrace-like ascent.

The marly bed and the limestone of the Kuckers stage contain very fine crystals of marcasite, galena, groups of calcite crystals, and copper glance.

The fauna of the Kuckers stage is very abundant: though closely related to the Echinosphærite limestone (C₁), the development of species and individuals is greater. In great abundance are brachiopods, gasteropods, crinoids, cystideans, orthoceratites, ostracods, and fragmentary remains of trilobites. The characteristic fossil *Phacops (Chasmops) ordini* can often be found in excellent preservation, as can also other fossils. The various bryozoa exist in great abundance. Very often the shale-beds are crowded with bifoliate and other fine bryozoa, whose white calcareous skeletons compose 30 to 40 per cent. of the shale in some parts.

NEW BRYOZOA OF THE KUCKERS STAGE.

PACHYDICTYA, Ulrich.

E. O. Ulrich, 1882, Journ. Cincinnati Soc. Nat. Hist. vol. v. p. 152.

E. O. Ulrich, 1890, "Paleozoic Bryozoa," Geol. Surv. Illinois, vol. viii. part 2.

R. S. Bassler, 1911, "Early Paleoz. Bryozoa of the Baltic Provinces," Bull. U.S. National Mus. lxxvii. p. 137.

Pachydictya kuckersensis, sp. n. (Pl. VII. figs. 1-6.)

Diagnosis. Zoarium bifoliate, frequently branching. The zoöcial apertures circular, arranged in transverse, often sinuous rows.

Locality and Horizon. Kukruse (Kuckers) and Tüürpsalu, Esthonia. Middle Ordovician, stage C₂ of Prof. F. Schmidt.

Material. Holotype in my collection in the Geological Museum of the University of Tartu (Dorpat). Paratypes, two specimens of my collection in the British Museum, Geological Dept., Regd. D. 29836-7.

Description. Zoarium dichotomously branching; the branches may be situated close to (1 mm.) or at any distance (21 mm. or more) from each other (figs. 1, 2, 3). The

branches on my fragment are 2 mm. broad near the stem and gradually get broader; their normal width is 3 mm.; the zoarium is 1-1.5 mm. thick and elliptical in transverse section.

Zoecia are situated on both sides of the zoarium, but not on its margins. On the surface the shape of the zoecia is circular, sometimes one end of the aperture is slightly narrower; the zoecial apertures have a distinct peristome. Transverse to the axis of the zoarium, within 2 mm. are 5 zoecia. The transverse rows of zoecia, often sinuous, vary in number from 4 to 6 within 2 mm. according to the size of the interspaces. On the face of a zoarium 3 mm. wide in a transverse row are 7-9 zoecia. The surface of the zoarium between the zoecial apertures and on the margins is covered with numerous minute granules (fig. 4.)

A tangential section (fig. 5) shows in the greyish calcite mass lighter, hexagonally shaped figures, with circular or oval transverse sections of zoecial tubes, a little smaller than the zoecial apertures on the surface of the zoarium.

A transverse section (fig. 6) shows the zoecial tubes with thin, light-coloured, narrow walls; in the tubes are some diaphragms; the tubes are a little larger on the surface than in the interior of the zoarium. In the middle of the same section are two layers of median tubuli, as seen in transverse section.

Comparison with other Species of Pachydictya in Esthonia.*
 —*P. elegans* always has elliptical zoecial apertures, with less distinct peristome; between the longitudinal zoecial rows are distinct ridges, and the ends of the elliptical apertures are also joined by ridges. *P. flabellum* differs from *P. elegans* and *P. kuckersensis* by its oviform zoecial apertures, and from the latter by its ridges on the surface of the zoarium. *P. cyclostomoides* differs from all other species of *Pachydictya* in its large zoecial apertures and in its granular ridges between the zoecial rows. *P. crassa* differs strikingly from *P. kuckersensis* in the distinct straight ridges between the zoecial rows and in the shape of its zoecial apertures.

Pachydictya crassa, Hall. (Pl. VII. figs. 7, 8.)

Stictopora crassa Hall, 1852, Nat. Hist. New York, Pal. ii. p. 45, pl. xviii. figs. 4 a-c.

Pachydictya crassa, Hall, Bassler, 1906, "Bryozoan Fauna of the Rochester Shale," Bull. U.S. Geol. Surv. cxcii. p. 57, pl. xviii. figs. 11, 12, pl. xxi. figs. 14-16.

* See R. S. Bassler, 1911, "Early Paleoz. Bryozoa of the Baltic Provinces," Bull. U.S. National Mus. lxxvii.

Diagnosis. Zoarium dichotomously branching with parallel edges; branches in cross-section elliptical, with narrow, non-celluliferous, striated margins. Zoœcial apertures elliptical, in parallel longitudinal rows, separated by linear ridges, without granules.

Locality and Horizon. Kukruse, Esthonia. Middle Ordovician, stage C₂; in the bituminous shale.

Material. Figured specimen (fig. 8) in the British Museum, Geological Dept., Regd. D. 29832. Specimens in my collection in the Geological Museum of the University of Tartu (Dorpat).

Description. The fragmentary zoaria of my specimens possess zoœcia on both sides, branching dichotomously. The branches are 2-2.5 mm. wide. The length of the figured zoarial fragment (fig. 7) is 22 mm.

The zoœcial apertures are elliptical, a very few are slightly pointed. The apertures have a thin-walled peristome. Longitudinally to the axis of the zoarium, within 2 mm. are 3.5-4 apertures. The zoœcia are in longitudinal parallel rows; they are separated from each other by spaces equal to the half of their longer diameter. On each side of the zoarium are 7 or 8 rows of zoœcia (fig. 8). The zoœcial rows are separated from each other by fine linear ridges. The zoarium is elliptical in cross-section, with sharpened striated margins.

My specimens are in all respects very similar to the American specimens of *P. crassa* figured by Bassler (*loc. cit.*).

NEMATOPORA, Ulrich.

E. O. Ulrich, 1888, Amer. Geol. vol. i. p. 234.

E. O. Ulrich, 1890, "Paleozoic Bryozoa," Geol. Surv. Illinois, vol. viii. pt. 2, pp. 401, 644.

R. S. Bassler, 1911, "Early Paleoz. Bryozoa of the Baltic Provinces," Bull. U.S. National Mus. lxxvii. p. 155.

Nematopora bozobjubovi, sp. n. (Pl. VII. figs. 9, 10.)

Diagnosis. Zoœcia surround the cylindrical zoarium in more or less parallel rows. Between the rows of the elliptical zoœcial apertures are fine canaliculate longitudinal ridges; these are divided by little transverse ridges into squares.

Locality and Horizon. Kukruse, Esthonia. Middle Ordovician, stage C₂; rare in the bituminous shale.

Material. Holotype in British Museum, Geological Dept., Regd. D. 2:833. Paratype in my collection in the Geological Museum of the University of Tartu (Dorpat).

Description. Fragment of the zoarium (fig. 9) is 8 mm. long, the diameter of the cylindrical zoarium is 1.5 mm. The zoöcial apertures are elliptical, with rather sharpened ends; the rows of the zoöcial apertures run more or less parallel to each other, around the zoarium. In all there are 12 zoöcial rows. Longitudinally, within 2 mm. are 4 zoöcial apertures; the apertures are 0.2 mm. wide. The zoöcial apertures are separated from each other by spaces equal to, or a little less than, their longer diameter. The apertures have a distinct peristome. The surface of the zoarium is sculptured; the sharpened ends of the zoöcial apertures are connected by two fine ridges; from these some transverse ridges may go to the longitudinal ridges (fig. 10). These longitudinal ridges run parallel between the rows of the zoöcial apertures; they are grooved above or canaliculate. This fine groove is divided by numerous fine transverse ridges into little squares; little apertures sometimes occur on the bottoms of these squares.

Comparison with other Species in Esthonia.—*N. bogoljubovi* has more numerous rows of zoöcia (13, 12), whilst *N. consueta* has only 4 rows, *N. ovalis* 4 or 5, *N. fragilis* 6, *N. lineata* 6 (or less). In addition the structure of the surface is more complicated in this species.

The trivial name is in honour of my first teacher of geology in Tartu (Jurjev), Professor N. Bogoljubov.

On the table (pp. 332 & 333) are marked with asterisks the species of bryozoa recorded by Bassler (1911, "Early Paleoz. Bryoz. Baltic Prov.") from the Kuckers stage, and the stages above or below this stage. From the Kuckers shale and limestone near Jewe and Kuckers, the district in which I collected, Bassler quotes 37 species (from the Kuckers stage, from Jewe to Reval, Bassler quotes 46 species). Of these 37 species, I have found 18 in my collection.

In the columns, with the exception of the third and two last, are species which Bassler described among others from the Glauconite, Echinosphærite, and Jewe limestones, the Wassalem bed, and the Wesenberg, Lyckholm, and Borkholm limestones. I have found these species—16—in the Kuckers shale and marl or limestone in the quarries of the villages Kukruse and Türpsalu.

In the last column are marked with (x) all the species, with two new spp. and one American, which I found in the Kuckers shale and marl or marly limestone.

The bryozoan fauna in the Kuckers stage is very rich. In a very limited locality (3 to 5 km.) I have found 37 species.

With the other species named by Bassler for this stage, this makes a total of 56 species.

In the British Museum, Geological Dept., there are of the species of my collection which I found in the Kuckers stage, named on the table (pp. 332 & 333), the following:—*Protocrisina exigua*, Ulrich, Regd. D. 29830; *Pachydictya bifurcata*, Hall, Regd. D. 29838; *Chasmatopora tenella*, Eichwald, Regd. D. 29831; *Batostoma winchelli*, Ulrich, Regd. D. 29834; *Batostoma fertile circulare*, Ulrich, Regd. D. 29835. The other species that I found in the Kuckers shale and marl, named on the table, are in my collection in the Geological Museum of the University of Tartu.

The mode of occurrence of the various species is remarkable. In some places the fine delicate white skeletons of diverse bryozoa are in great abundance; locally they are absent from the shale. In the bituminous or oil shale the following abound:—*Chasmatopora furcata*, *Pseudohornella bifida*, *Protocrisina exigua*, *Pachydictya elegans*, *P. cyclostomoides*, *P. kuckersensis*, *Graptodictya bonnumai*. There is an abundance of Trepostomata in the shale and still more in the marl or limestone, e.g.: *Diplotrypa petropolitana*, *Dianulites petropolitana*, *Hallopora dybovskyi*, and various species of *Batostoma* and *Hemiphragma*.

EXPLANATION OF PLATE VII.

Pachydictya kuckersensis, sp. n.

- Figs.* 1-3. Outlines of zoarial fragments, nat. size.
Fig. 4. Portion of zoarial surface, × 12 diam.
Fig. 5. Tangential section of zoarium, × 12 diam.
Fig. 6. Transverse section of zoarium, × 12 diam.

Pachydictya crassa, Hall.

- Fig.* 7. Outline of zoarial fragment, Brit. Mus., Geol. Dept., D. 29832; nat. size.
Fig. 8. Portion of zoarial surface of the same specimen, × 7 diam.

Nematopora bogoljubovi, sp. n.

- Fig.* 9. Zoarial fragment; holotype; Brit. Mus., Geol. Dept., D. 29833; nat. size.
Fig. 10. Portion of zoarial surface of the holotype, × 13 diam.

XXXIII.—*Diagnose de Genres nouveaux de Sarcoptiles plumicoles* (Analgesinæ). Par E.-L. TROUSSERT, Professeur au Muséum National de Paris.

DEPUIS la "Révision" des genres de ce groupe que j'ai publiée dans le 'Bulletin de la Société Zoologique de France,' tome xl. 1916, p. 207, de nouvelles recherches m'ont fait connaître plusieurs types inédits appartenant principalement aux régions Orientale et Australienne, et dont le plus remarquable est le genre *Hemialges**, riche déjà de plus de 30 espèces nouvelles, et qui se distingue autant par sa distribution géographique que par ses caractères. D'autres genres, anciennement connus, ont besoin d'être subdivisés et plusieurs sont entièrement nouveaux. J'en donne ici les caractères.

ANALGES (Nitzsch, 1818), genus restrictum, 1919.

Mâle hétéromorphe.—Pattes de la III^e paire à 1^{er} article plus étroit que les suivants, rétréci à son extrémité distale; les quatre derniers articles sondés et renflés en forme de ballon; la griffe terminale du tarse dépourvue d'ambulacre.

Type: *Analges chelopus* (Hermann), sur *Passer domesticus*, d'Europe.

ANALGOPSIS, gen. nov.

Analges (partim), auctorum.

Mâle hétéromorphe.—Pattes de la III^e paire régulièrement fusiformes, sans rétrécissement au 1^{er} article, le 2^e étant le plus renflé. La griffe terminale portant quelquefois un reste de la tige de l'ambulacre, sous forme d'une griffe mince, transparente et incolore.

Remarque.—Dans ces deux genres (*Analges* et *Analgopsis*) les mâles homéomorphes (ou complémentaires), à pattes III plus grêles, diffèrent peu, et par conséquent ne peuvent être utilisés pour la distinction des espèces et du genre, qui doit être basée sur le mâle hétéromorphe.

Type: *Analges passerinus* (L.), sur plusieurs Fringillidae d'Europe.

PLESIALGES, gen. nov.

Mâle hétéromorphe.—Très semblable à *Analges* par le renflement des articles 2 et 3 de la III^e paire, mais la griffe

* Une Monographie de ce genre, avec figures, est en préparation.

terminale ayant conservé la tige de l'ambulacre renflée en forme de bouteille dépourvue de col. Abdomen entier et plus développé en largeur que chez *Analges*.—*Femelle* semblable à celles d'*Analges*.

Type: *Plesialges minus*, nov. sp., sur *Pomathorinus superciliosus*, d'Australie.

HEMIALGES, Trt., 1888 (subg. ; genus, 1915).

Bull. Soc. Zool. France, 1915, p. 218.

Mâle hétéromorphe.—Généralement très robuste, à tronc plus ou moins large, les pattes III insérées très en avant et portant des ambulacres plus ou moins courts ou atrophiés. Abdomen entier ou très faiblement échancré.—*Femelle* semblable à celles d'*Analges*.

Type: *Megninia pappus*, sur *Manucodia atra* de Nouvelle-Guinée.

Remarque.—Ce genre, qui par ses caractères s'intercale entre *Analgopsis* et *Megninia*, comprend des espèces de grande taille mais dont le polymorphisme des mâles est souvent très accusé. Sa distribution géographique, très nette, a son centre à la Nouvelle-Guinée, avec quelques espèces aberrantes s'étendant jusqu'à la Malaisie et à Madagascar d'une part, jusqu'à l'Australie Septentrionale de l'autre, et à la Polynésie occidentale.

HYPERALGES, Trt., 1915.

Bull. Soc. Zool. France, 1915, p. 219.

Mâle hétéromorphe.—Rappelant *Hemialges*, mais beaucoup plus allongé, avec l'abdomen échancré et aminci, formant trois étages ; les ventouses copulatrices placées sur l'étage intermédiaire de manière à constituer avec l'étage antéro-inférieur une poche qui reçoit l'abdomen de la femelle pendant l'accouplement.

Type: *Hemialges magnificus*, sur *Melanorhectes nigrescens* de Nouvelle-Guinée (c'est le géant des Sarcoptides plumicoles).

Remarque.—C'est par erreur que cette espèce a d'abord été attribuée à *Lophorina superba*, le premier mâle, longtemps seul connu, ayant été rencontré (accidentellement) sur ce Paradisier du même pays.

PSOROPTOÏDES, gen. nov.

Mâle hétéromorphe.—Conformation des pattes rappelant le genre psorique *Psoroptes*, c'est-à-dire le tarse des pattes
Ann. & Mag. N. Hist. Ser. 9. Vol. iv. 25

antérieures terminé par une griffe, la tige de l'ambulacre (rejetée sur le côté) longue et grêle; le tarse des pattes IV tronqué comme chez *Mesalges*.—*Femelle* à pattes III portant trois épines autour de la tige de l'ambulacre, et munie d'une plaque notogastrique. *Nymphes* et *larves* dépourvues d'ambulacre à cette patte, qui se termine par des épines.

Type: *Megninia psoroptopus* sur *Dichoceros bicornis* de Malaisie.

METANAIGES, gen. nov.

Mâle à abdomen très allongé, dépassant de beaucoup les pattes III qui ont le tarse court; pattes IV sous-abdominales, plus courtes mais aussi grosses à leur base que les pattes III, à tarse tronqué et échancré. Abdomen fortement échancré, bilobé. Manchettes des pattes antérieures peu prononcées.—*Femelle* dépourvue de plaque notogastrique.

Type: *Megninia elongata* sur *Tricholimnas lafresnayanus* de Nouvelle-Calédonie.

Nota.—C'est par suite d'une erreur d'étiquette que cette espèce a été indiquée précédemment comme trouvée sur *Ocydromus australis*. L'espèce était classée dans le genre *Ocydromus* avant la création du g. *Tricholimnas*, Sharpe, en 1893.

XXXIV.—On the Genus *Aorus*, Schh. (*Coleoptera*, Curculionidæ). By GUY A. K. MARSHALL, D.Sc.

SCHÖNHERR'S genus *Aorus* appears to have been entirely overlooked by recent students of the Curculionidæ, and this has probably been due to the fact that Lacordaire, who professed to have been acquainted with the type-species, erroneously placed it among the Cossoninæ, although Schönherr himself quite rightly pointed out its very close relationship to his South-American genus *Amalactus*. The genus has consequently been redescribed by several authors, as shown in the following synonymy:—

Genus AORUS, Schh.

Aorus, Schönherr, Gen. Curc. iii. 1836, p. 253.—Type, *A. spadiceus*, Gyl.

Leptobaris, Gerstaecker, Monats. Berl. Ak. 1855, p. 639 (syn. nov.).—Type, *A. castaneus*, Gerst.

Exarcus, Pascoe, Ann. & Mag. Nat. Hist. (5) xix. 1880, p. 372 (syn. nov.).—Type, *A. hearseyi*, Pasc.

Stenodema, Faust, Ent. Nachr. xi. 1885, p. 16.—Type, *A. castaneus*, Gerst. (= *ferrugineus*, Fst.).

Gerstaecker assigned the genus to the Baridinæ, from which, however, it must be excluded owing to the structure of the mesepimera; whereas Faust placed it in the Eriirrhiniæ, and this seems the most satisfactory conclusion.

Key to the Species of Aorus.

- 1 (14). Second joint of front tarsi as broad as or broader than long; prothorax coarsely punctate at the sides.
- 2 (5). Prothorax coarsely punctate throughout; intervals of elytra each with a single row of distinct widely spaced punctures.
- 3 (4). Punctures on the prothorax much broader than the interspaces between them; punctures in the striæ of the elytra subquadrate and as broad as or broader than the intervals. *spadiceus*, Gyl.
- 4 (3). Punctures on the prothorax narrower than the interspaces; punctures on the elytra round and narrower than the intervals *castaneus*, Gerst.
- 5 (2). Prothorax finely punctate on the disk and much more coarsely so at the sides and base; intervals of elytra impunctate or with minute irregular punctures.
- 6 (13). Prothorax not or but very slightly broader than long; length 7–10 mm.
- 7 (10). Form more elongate, the elytra nearly three times as long as the prothorax; second joint of funicle longer, the third as long as broad; colour red-brown. (Asiatic species.)
- 8 (9). Anterior tibiæ with a very strong angular process internally in the middle, bearing a tooth that is directed obliquely forwards; the width of the tibia to the tip of this tooth as great as at the apex including the uncus; the basal external angles of the elytra acute. *hearseyi*, Pasc.
- 9 (8). Anterior tibiæ only slightly and roundly produced internally, the teeth small, vertical, and not projecting more than half as far as the apical uncus; the basal external angles of the elytra rounded *ferrugineus*, Boh.
- 10 (7). Form stouter, the elytra only a little

- more than twice as long as the prothorax; second joint of funicle shorter, the third transverse; colour piceous black. (African species.)
- 11 (12). Forehead as broad as the base of the rostrum; prothorax broadest at the middle; elytra with distinct striæ containing closely-set punctures; tibiæ armed internally with stout teeth and with a long external apical spine *anthracinus*, Brancs.
- 12 (11). Forehead much narrower than the base of the rostrum; prothorax broadest well before the middle; elytra hardly striate on the disk, with rows of large rounded foveæ separated by spaces as long as the foveæ themselves; tibiæ merely serrate internally and with a very short external apical spine *cancellatus*, sp. n.
- 13 (6). Prothorax distinctly broader than long; length 5.5 mm. *picea*, Fst.
- 14 (1). Second joint of front tarsi nearly twice as long as broad; prothorax very finely punctate at the sides, more strongly so on the disk; colour reddish brown *tenuipes*, sp. n.

1. *Aorus spadiceus*, Gyl.

Aorus spadiceus, Gyllenhal, Schönh. Gen. Curc. iii. 1836, p. 254.

Leptobaris gerstaeckeri, Faust, Stett. ent. Zeit. 1894, p. 148 (syn. nov.).

SENEGAL. SIERRA LEONE. N. NIGERIA: Baro (*Dr. J. J. Simpson*). ABYSSINIA.

2. *Aorus castaneus*, Gerst.

Leptobaris castanea, Gerstaecker, Monatsb. Berl. Ak. 1855, p. 639; id., Peters's Reise Mozamb. ii. 1862, p. 315, pl. xviii. fig. 14; Faust, Stett. ent. Zeit. 1894, pp. 149 & 360.

Stenodema ferruginea, Faust, Ent. Nachr. xi. 1885, p. 17.

Leptobaris brunnea, Brancsik, Soc. Hist. Nat. Trencsén, xix.-xx. 1897 (1898), p. 124, pl. iv. fig. 16 (syn. nov.).

N. RHODESIA: Boroma (*Rev. H. P. Menyharth*). NYASALAND (*Thelwall*); S.W. shore of L. Nyasa, ii.-iii. 1910, and Ruvo Valley, iii. 1910 (*S. A. Neave*); Fort Herald, on grass, v.-vi. 1913 (*Dr. J. E. S. Old*). PORTUGUESE E. AFRICA: Mozambique (*Peters*, type).

3. *Aorus harseyi*, Pasce.

Exarcus harseyi, Pascoe, Ann. & Mag. Nat. Hist. (5) xix. 1880, p. 372.

Exarcus pascoei, Faust, Deut. ent. Zeits. 1898, p. 286 (syn. nov.).

BURMA : Rangoon (type) ; Tharrawaddy (*G. C. Corbett*).

Faust was not acquainted with Pascoe's species, and his description of *E. pascoei* agrees in all particulars with Pascoe's type. As, moreover, the localities from which the two unique types came are only 50 miles apart, there seems to be little reason for doubting that they belong to a single species.

4. *Aorus ferrugineus*, Boh.

Aorus ferrugineus, Boheman, Schönh. Gen. Curc. viii. pt. 2, 1845, p. 444.

JAVA (type). INDO-CHINA : Cho-ganh, Tonkin (*L. Dupont*) ; Kampong Kedei, Cambodia, iv. 1914 (*R. Vitalis de Salvaza*).

I am indebted to M. E. Fleutiaux for three specimens from Tonkin, which I attribute to this species. I have not seen the type, which is in Copenhagen, but the Indo-Chinese examples accord so well with Boheman's description that I can have little doubt as to the correctness of the identification. M. Fleutiaux informs me that in Tonkin this species is very common in the month of May on the ears of rice.

5. *Aorus anthracinus*, Brancs.

Leptobaris anthracina, Brancsik, Soc. Hist. Nat. Trencsén, xix.-xx. 1897 (1898), p. 124, pl. iv. fig. 17.

N. RHODESIA : Boroma (*Rev. H. P. Menyharth*, type).
PORTUGUESE E. AFRICA : Beira, vii. 1903 (*P. A. Sheppard*).
UGANDA : Kampala, x.-xi. 1917 (*G. C. Gowdey*). SENEGAL.

6. *Aorus cancellatus*, sp. n.

♂. Colour shining piceous black, without any trace of scaling or setæ ; the legs and antennæ piceous.

Head with small sparse shallow punctures, the vertex transversely aciculate, the forehead much narrower than the base of the rostrum and with a deep round central fovea. *Rostrum* stout, as long as the prothorax, slightly curved at the insertion of the antennæ, subcylindrical from the base to beyond the middle, thence distinctly dilated to the apex, distinctly and evenly but not very closely punctate throughout, the punctures at the sides being larger than those above ; the antennæ inserted at about one-fourth from the apex. *Prothorax* a little broader than long, strongly rounded at the sides, broadest well before the middle, the base truncate, the apical constriction well marked, and a shallow transverse

impression close to the basal margin; the upper surface rather flattened and with fine sparse punctures on the disk, those in the basal impression and at the sides very coarse, being much broader than the spaces between them. *Elytra* subcylindrical, rather broader than the widest part of the prothorax, the basal margin gently sinuate, its external angles rounded, and the sides shallowly constricted before the apex; the disk scarcely striate, but with rows of foveæ separated longitudinally by spaces about as long as the foveæ themselves, the rows becoming striate externally and behind and with the punctures more closely placed; the intervals with sparse minute irregular punctures, plane and as broad as the foveæ on the disk, but becoming slightly costate towards the sides and apex, the junction of the second and tenth intervals at the apex only slightly elevated. *Legs* with the femora finely and sparsely punctate and not with coarser punctures towards the apex; the tibiæ not armed internally with the usual long teeth, but with short serrations, the posterior pairs being scarcely sinuate internally, and the apical external tooth very short on all the tibiæ; the second joint of the front tarsi broader than long.

Length 8 mm., breadth 3 mm.

ANGOLA: Benguella (*Coll. Pascoe*).

Type in the British Museum.

Superficially resembles *A. anthracinus*, but differs from all the species known to me in its coarsely punctate elytra and in having the forehead narrower than the base of the rostrum.

7. *Aorus tenuipes*, sp. n.

♂. Colour light reddish brown, shiny, with the apex of the prothorax and the tips of the femora darker; the body entirely devoid of scales or setæ.

Head very sparsely punctate, the forehead rather broader than the base of the rostrum and with a large central fovea. *Rostrum* about as long as the prothorax, stout, rather strongly curved, cylindrical and not dilated at the apex; the punctation fine and rather sparse, but coarser at the sides in the basal half; the antennæ inserted at one-fourth from the apex. *Prothorax* slightly broader than long, strongly rounded at the sides, broadest about the middle, sharply narrowed at the apex but scarcely constricted, the base truncate and shallowly depressed below the level of the disk; the upper surface markedly flattened, with small deep punctures on the disk, which are narrower than the spaces between them, those at the sides much finer and shallower. *Elytra* a little more than

twice as long as broad and two and a half times as long as the prothorax, parallel-sided in the basal third, then gradually narrowed to the apex, before which there is a shallow constriction; the basal margin gently sinuate, with the external angles rounded, the apex truncate; the striæ shallow on the disk, but deeper behind and on the inflexed margins, and containing closely set deep punctures; the intervals about as broad as the striæ, slightly convex, and with a few very minute punctures, the junction of intervals 2 and 10 at the apex distinctly swollen. *Legs* comparatively long and slender; the femora minutely coriaceous and with very sparse fine punctures throughout; the tibiæ gently sinuate externally, the inner edge deeply bisinuate and armed with strong setigerous teeth in the apical half, and the external apical spine long and distinctly curved; the tarsi unusually long and slender, the second joint of the front pair being nearly twice as long as broad.

Length 7 mm., *breadth* 2.2 mm.

PORTUGUESE E. AFRICA: Beira, vii. 1903 (*P. A. Sheppard*).

Type in the British Museum.

The slender tarsi and very fine lateral punctation of the prothorax distinguish this insect from all the other species of the genus.

8. *Aorus piceus*, Fst.

Leptobaris picea, Faust, Stett. ent. Zeit. 1894, pp. 148 & 149.

SIERRA LEONE.

I have not succeeded in identifying this species, which, so far as can be judged from Faust's very brief description, must resemble a dwarfed specimen of *A. anthracinus*, Brancs.

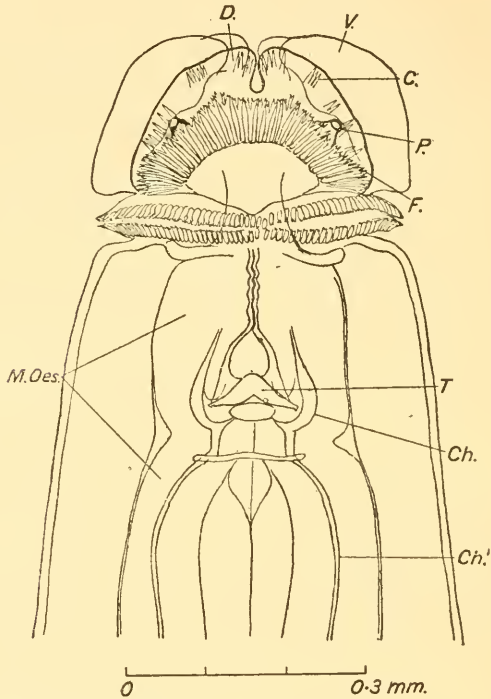
XXXV.—*Crossophorus collaris*, Hemprich & Ehrenberg, a little-known Nematode Parasite of the Hyrax. By H. A. BAYLIS, M.A.

(Published by permission of the Trustees of the British Museum.)

AN opportunity having recently occurred of examining specimens of this very curious and highly specialized Ascarid from the hyrax (*Procavia* sp.), it seems desirable to describe the species in somewhat fuller detail than has hitherto been done. The existing descriptions (Hemprich and Ehrenberg,

1828; Schneider, 1866; Hall, 1916) are not only incomplete, but in some respects incorrect. The only recent account—that of Hall—is not based on a re-examination of the animal, but embodies, in an English version, the original

Fig. 1.



Crossophorus collaris. Dorsal view of the anterior end.

C., "combs" of teeth representing the denticerous ridge on the lip; *Ch.*, *Ch'*, different portions of the chitinous apparatus of the "gizzard"; *D.*, dorsal lip; *F.*, fimbriae; *M.Oes.*, muscular wall of oesophagus; *P.*, paired papilla of dorsal lip; *T.*, base of dorsal tooth of the "gizzard"; *V.*, ventro-lateral lip.

Latin characterization of Hemprich and Ehrenberg and the German description of Schneider. The only figures existing appear to be those of Schneider (1866, text-fig., p.40, and pl. ii. figs. 1 & 2). Copies of these are reproduced by Hall.

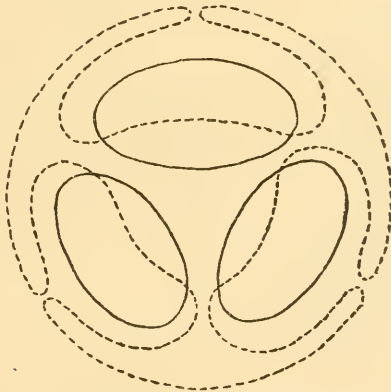
Crossophorus collaris*, Hemprich & Ehrenberg, 1828.

Syn. *Ascaris ferox*, Schneider, 1866.

The general dimensions of the worm are:—length, male, up to 65 mm., female 55 to 90 mm. Maximum thickness 1.3 mm. in the male, about 2 mm. in the largest female.

The head measures 0.44–0.5 mm. across at the widest part of the lips. The latter (fig. 1, *D.*, *V.*) are large, semicircular in general outline, with an indentation in the anterior margin, and with projecting posterior angles. The dorsal lip (fig. 1, *D.*) has two fairly conspicuous bilaterally symmetrical papillæ (fig. 1, *P.*). Each ventro-lateral lip has also two papillæ, but these are arranged asymmetrically with regard to each

Fig. 2.



Crossophorus collaris. Diagrammatic representation of the arrangement of the row of fimbriæ (dotted line) as it would be seen in a front view of the head.

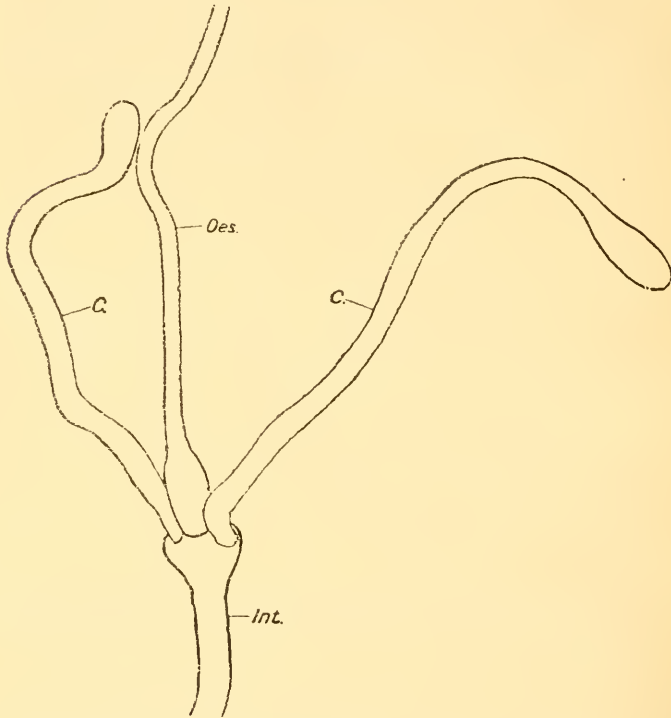
other, as is indicated in Schneider's figure (1866, pl. ii. fig. 2), *i. e.*, one papilla is situated a little to the ventral side of the middle of the outer surface of the lip, while the other occupies a more forward position at the tip of the more dorsal of the two anterior horns of the "pulp." The latter papilla is very small.

There is a very distinct constriction behind the lips, occupied by a "collar" consisting of an apparently double row of

* Not *Crossophorus*, Brady, 1880 [Crustacean], Voy. H.M.S. 'Challenger,' Zoology, i. 3, Ostracoda.

cuticular fimbriæ. The arrangement of these fimbriæ is very curious. They form, in reality, a single endless chain, which doubles on itself at the base of each lip, externally, and passes round the base of the lip on to its inner surface. Running across the lip, it emerges again at the next interlabial space on to the outer surface, where it forms another

Fig. 3.



Crossophorus collaris. Part of the alimentary canal, as displayed by dissection.

C., C., caeca; Int., anterior part of intestine; Oes., posterior part of cesophagus.

loop before passing on to the next lip. The accompanying diagram (fig. 2) may help to make this arrangement clear. The fimbriæ of the "collar" are of somewhat discoid shape, flattened from side to side, and embedded in the cuticle in such a way that their thin edges are seen in a view such as is

represented in fig. 1. Their projecting portions are slightly bifid. The fimbriæ on the inner surfaces of the lips are of quite a different shape, being drawn out to a much greater length, and branching dichotomously, so that their free anterior ends form a series of little points or teeth. In addition to these, each lip also bears, near the outer edges of its inner aspect, seven or eight groups or "combs" of pointed teeth (fig. 1, *C.*), forming an interrupted dentigerous ridge. The number of teeth in each group varies from two to seven or eight, without any appearance of symmetry.

The cuticle of the body is marked by transverse striations from $6\ \mu$ to $7\ \mu$ apart.

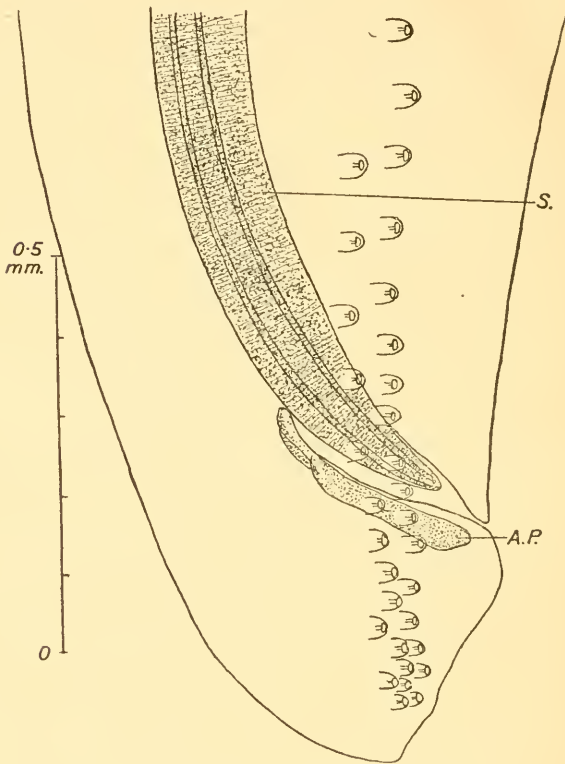
The œsophagus (fig. 3, *Oes.*) is very long and slender, measuring 15–20 mm. in length, and ends in a bulbous expansion posteriorly. This is merely a muscular enlargement of similar structure to the rest of the œsophagus, and not a specialized glandular swelling. Immediately behind this two very long anteriorly directed cæca (fig. 3, *C.*, *C.*) spring from the intestine. They have slightly swollen ends, and in a large specimen measure about 15 mm. in length. The anterior portion of the œsophagus, extending to a distance of 0.5–0.6 mm. from the anterior extremity, is specialized to form a gizzard, containing an elaborate chitinous apparatus. This consists of a chitinous lining within the muscular wall, strengthened by three wing-like processes (fig. 1, *Ch.*) of chitin embedded in the muscles, and produced internally into three serrated triangular teeth (fig. 1, *T.*) which meet in the middle of the lumen. The wing-like processes are continued posteriorly as three long narrow strips of chitin (fig. 1, *Ch.*) embedded in the thickness of the muscular wall, and connected near their origin by a transverse ring of chitin. The nerve-ring crosses the œsophagus at 0.9–1.1 mm. from the anterior end.

In the male the posterior end is curled towards the ventral side. The tail is very blunt and measures only 0.32 mm. in length. There are two equal spicules (fig. 4, *S.*), and not a single spicule as stated in the earlier descriptions. They measure 1.5 mm. in a straight line from base to tip, have a tubular mid-rib and broad alæ, and are of a granular and transversely striated appearance. There is also an accessory piece (fig. 4, *A.P.*) 0.32 mm. in length. The caudal papillæ are arranged, behind and for some little distance in front of the anus, in two parallel rows on either side. There are on either side nine postanal papillæ in each row. In front of the anus the inner or more ventral row contains a continuous series of about forty papillæ at regular intervals;

the outer row extends only a short distance and contains only five papillæ.

In the female the tail is conically pointed and measures 0.5 mm. in length. The vulva is situated in the middle

Fig. 4.



Crossophorus collaris. Posterior end of the male, seen from the right side.

A.P., accessory piece; *S.*, spicule of right side. The papillæ of the right side only are shown.

third of the body, dividing the total body-length in the proportion of 2 : 3. The vagina runs forward for about 8 mm., then doubles back upon itself to a point opposite the vulva, where it gives off two uterine branches, which run in

opposite directions, one forward, the other backward. The coils of the ovaries extend about as far as the middle of the œsophagus anteriorly and the beginning of the last third of the body posteriorly.

The eggs are of an elegant oval shape, measuring about $150 \mu \times 113 \mu$. They have a moderately thick smooth shell.

The material described above formed part of a collection of parasites made by Lieut. A. Loveridge during, or after the recent campaign in German East Africa. Locality, Dodoma.

Note on the Systematic Position of Crossophorus.

Although Railliet and Henry (1912) included this genus in the subfamily Heterocheilinae, which was intended to contain provisionally all Ascarids having œsophageal or intestinal cæca, it does not seem to possess many features in common with any of the other forms answering to this description. In the possession of a "gizzard," with chitinous armature, and of an accessory piece in addition to the two spicules in the male, it appears to stand quite alone. It should, in fact, probably be regarded as an extremely specialized offshoot of the Ascarid stock (using the term in a wide sense). The presence of *two* intestinal cæca does not, as it seems to the writer, necessarily imply close relationship with those forms in which *one* such appendage is present, but may with equal, if not greater, probability be considered in the light of an independently developed feature. If the subfamily Heterocheilinae (or family Heterocheilidæ) has any claim to be regarded as a natural group, the inclusion in it of such a form as this would merely tend to make it appear an unnatural one.

There is, as Hall (1916) points out, considerable doubt as to the position of the second species, *C. tentaculatus*, referred to this genus by Hemprich and Ehrenberg. In the absence of an adequate description of this form, it is at present impossible to determine whether it belongs to the same or to another genus.

REFERENCES.

- HALL, M. C. 1916. "Nematode Parasites of Mammals of the Orders Rodentia, Lagomorpha, and Hyracoidea." Proc. U.S. Nat. Mus. 1. pp. 1-258.
- HEMPRICH, F. G., and EHRENBURG, C. G. 1828. "Symbolæ physicæ seu icones etc." Pars Zoologica [unp.]. Berlin.
- RAILLIET, A., and HENRY, A. 1912. "Quelques Nématodes parasites des Reptiles." Bull. Soc. Path. Exot. v. 4, pp. 251-259.
- SCHNEIDER, A. 1866. 'Monographie der Nematoden.' Berlin.

XXXVI.—*The Types of the Mammals described by
M. Fernand Lataste.* By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

BY a most liberal-minded act of generosity M. Fernand Lataste, whose papers on Algerian and other mammals have made his name well known to all workers on the subject, has recently presented the whole of his fine collection of mammals and reptiles to the British Museum—a most valuable and highly appreciated accession.

In the collection there are the original specimens of practically all the species described by Lataste; but it was not the habit of workers at the date he wrote to particularize their type-specimens, and many—in fact, the majority—of the species are represented by numerous examples, often from different localities, and sometimes by individuals which have been kept alive in Paris and bred there; so that their descendants have in some cases been distributed as representing the species described.

Under these circumstances, both for the clearing up of any questions that might arise as to types and to facilitate the incorporation of the more important wild-killed individuals in the Museum collection, I have thought it wise to give a list of the species described by Lataste, to give the catalogue and register numbers of the types when these are single, and, when they are multiple, formally to nominate lectotypes for each species from the original series.

The collection being accompanied by an admirable and complete numbered catalogue, we have accepted the numbers of that catalogue as the Museum register numbers, the usual year, month, and day numbers 19. 7. 7. being placed in front of them. Thus, Lataste's no. 1234 now becomes B.M. no. 19. 7. 7. 1234. Reference to the catalogue is thereby facilitated, while the additional labelling required is reduced to a minimum.

Vesperugo (Vesperus) innesi, Lat. (now *Eptesicus innesi*).

Ann. Mus. Genov. (2) iv. p. 625 (1887). *Hab.* Cairo.

Based on two specimens, ♂ and ♀, in spirit.

Lectotype. Female, B.M. no. 19. 7. 7. 3528. *Lectopara-*
type, the male, now in the Genoa Museum.

Molossus fluminensis, Lat.

Ann. Mus. Genov. (2) x. p. 658 (1891). *Hab.* Rio Janeiro.

Type. Adult female skull, B.M. no. 19. 7. 7. 324.

M. Lataste no doubt received this skull by exchange or gift from the Santiago Museum, where the spirit-specimen may still be preserved.

Lutra angustifrons, Lat.

Faun. Barb. Act. Soc. Linn. Bord. xxxix. p. 237 (1885). *Hab.* Bône, N. Algeria.

Type. Adult, apparently female. Skull only. B.M. no. 19. 7. 7. 2531.

Bifa lerotina, Lat. (now *Eliomys lerotinus*).

Le Nat. iii. p. 61 (1885). *Hab.* Ghardaia, Mزاب, Algerian Sahara.

Lectotype. Adult. Female skin, B.M. no. 19. 7. 7. 2884, and its skull, 19. 7. 7. 2883. Lectoparatype, immature female, 19. 7. 7. 2888.

Gerbillus hirtipes, Lat.

Le Nat. ii. p. 21 (1882). *Hab.* Bamendile, Ouargla.

Lectotype. Adult female skin, 19. 7. 7. 1594, and its skull, 19. 7. 7. 1595. Ten specimens originally obtained.

Gerbillus garamantis, Lat. (now *Dipodillus garamantis*).

Le Nat. i. p. 507 (1881). *Hab.* Sidi-Roueld, Ouargla.

Type. Old female skin, B.M. no. 19. 7. 7. 1596, and its skull, 19. 7. 7. 1597.

Gerbillus simoni, Lat. (now *Dipodillus simoni*).

Le Nat. i. p. 497 (1881). *Hab.* Oued-Magra, N. of Hodna, High Plateau of Algeria.

Lectotype. Adult female. Skin, 19. 7. 7. 2347, and skull, 19. 7. 7. 2426. Twenty-five specimens originally obtained.

Pachyuromys duprasi, Lat.

Le Nat. i. p. 313 (1880). *Hab.* Laghouat, Algerian Sahara.

Lectotype. Old female skin, no. 19. 7. 7. 2348, and its skull, much deteriorated by captivity, no. 19. 7. 7. 2426 bis.

This would appear to be one of the original specimens sent alive to Paris, and was mentioned as living there when the animal was described.

The single specimen referred to by Lataste in his 'Mammals of Barbary' as undamaged by rickets is no. 19. 7. 7. 2272, from Bou-Saada. The species remains one of the rarest of Algerian mammals.

Psammodys roudairei, Lat.

Le Nat. i. p. 492 (1881). *Hab.* "Chotté," Plateau of Tunisia.

Lectotype. Female skin, no. 19. 7. 7. 1572, and its skull, 19. 7. 7. 1573.

Meriones trouessarti, Lat.

Le Nat. ii. p. 69 (1882). *Hab.* Bou-Saada, Algeria.

Lectotype. Adult male skin no. 19. 7. 7. 2902, and its skull, 19. 7. 7. 1566.

Meriones ausiensis, Lat.

Le Nat. ii. p. 77 (1882). *Hab.* Oued-Akarit, Aumale, High Plateau of Algeria.

Lectotype. Adult female skin, 19. 7. 7. 2903, and its skull, 19. 7. 7. 1567.

Meriones gatulus, Lat.

Le Nat. ii. p. 83 (1882). *Hab.* Tilremt, near Laghouat.

Lectotype. Adult female skin, B.M. no. 19. 7. 7. 1561, and its skull, no. 19. 7. 7. 1560.

Meriones longifrons, Lat.

P. Z. S. 1884, p. 88. *Hab.* Jedda, Arabia.

Lectotype. Male skeleton, B.M. no. 19. 7. 7. 2246.

Meriones albipes, Lat.

Le Nat. ii. p. 101 (1882). *Hab.* Msila, High Plateau.

Lectotype. Female adult skin, 19. 7. 7. 1570, and its skeleton, 19. 7. 7. 1571.

A co-type of *M. albipes*, the separate skull mentioned in the original description, had already been presented to the British Museum (no. 82. 7. 29. 10)—this now becoming a lectoparatype.

Meriones shawi longiceps, Lat.

Mamm. Barb. Act. Soc. Linn. Bord. xxix. p. 269 (1885). *Hab.* Tunis.

Lectotype. Old male, skull only, 19. 7. 7. 1941.

The figured skull (P. Z. S. 1884, p. 94, fig. 2) is that of a specimen of mixed parentage, no. 19. 7. 7. 2294.

Meriones shawi crassibulla, Lat.

Mamm. Barb. Act. Soc. Linn. Bord. xxix. p. 269 (1885). *Hab.* Tebessa and other localities, Algeria.

Lectotype. Adult female skin, B.M. no. 19. 7. 7. 2982, and its skull, no. 19. 7. 7. 2981. From Tebessa.

Mus spretus, Lat.

Act. Linn. Soc. Bord. xxxvii. p. 27 (1883). *Hab.* Oued-Magra, High Plateau of Algeria.

Type. Adult female skin, 19. 7. 7. 1861, and its skeleton, 19. 7. 7. 1862.

Pitymys planiceps, Miller.

Ann. & Mag. Nat. Hist. (8) i. p. 203 (1903). *Hab.* Barèges, Hautes Pyrénées, France.

Type. Adult, skull only, B.M. no. 19. 7. 7. 2190.

M. Lataste appears to have received this skull from Baron de Selys-Longchamps.

Dipus darricarrerei, Lat. (now *Jaculus*).

Ann. Mus. Genov. xviii. p. 661 (1883). *Hab.* Bou-Saada, Algeria.

Lectotype. Adult female skin, B.M. no. 19. 7. 7. 2077, and its skull, 19. 7. 7. 2078.

(Probably referable to *Jaculus jaculus deserti*, Loche.)

Ctenodactylus mzabi, Lat. (now *Massoutiera mzabi*).

Bull. Soc. Zool. vi. p. 214 (1881). *Hab.* Ghardaia, Mzab.

Lectotype. Male skeleton, without skin, B.M. no. 19. 7. 7. 1311. The skull figured in the original paper. The other co-type (now lectoparatype), female, was given to the Paris Museum.

A metatype, skin and skull, is in the collection, B.M. no. 19. 7. 7. 2924.

Massoutiera (Felovia) vœ, Lat. (now *Felovia vœ*).

Le Nat. iii. p. 287 (1886). *Hab.* Felou, Senegal.

Lectotype. Adult female skin, B.M. no. 19. 7. 7. 3233, and its skull, 19. 7. 7. 3232.

The collection contains five other skulls and a spirit-specimen of this most striking animal, which was both collected and described by M. Lataste.

Procavia latastei, Thos.

P. Z. S. 1892, p. 69. *Hab.* Felou, Senegal.

Lectotype. Male skull, B.M. no. 7. 2. 8. 6. Formerly Lataste no. 2684.

Sent by M. Lataste to the Museo Civico, Genoa, and afterwards presented by the latter to the British Museum. Introduced here to complete the list of typical specimens formerly in the possession of M. Lataste. The distinction from *P. bocagei* rested wholly on the skull, which would therefore naturally be selected as the lectotype.

The other forms described by M. Lataste (*Meriones shawi laticeps*, *Gerbillus (Dipodillus) bottæ*, and *G. (D.) quadrimaculatus*) were all based on specimens in the Paris Museum.

In conclusion, I should like to emphasize the generosity and scientific spirit M. Lataste has shown in presenting this valuable collection to the British Museum, where it will be so much appreciated. I have above only spoken of the typical specimens, but the collection, irrespective of them, is a most important accession to the Museum, containing many hundreds of specimens from Algeria, considerable numbers from Senegal, and an especially fine series of European small mammals—both skins, skulls, and spirit-specimens—including many special rarities.

And, in addition, there are good skulls of many middle-sized animals from the regions mentioned and elsewhere, such as jackals, foxes, otters, porcupines, and others, all such being very difficult to obtain, and therefore proportionally welcome as a contribution to our scientific collections.

In all, this is one of the most important additions that the mammal collection of the British Museum has ever received.

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

Bombus prshewalskii, Morawitz.

Males from Gulmarg, Kashmir, 8500 ft., Sept. 17 (*Dutt*). I have compared them with a worker from China (North Ganj-su), received from Skorikov, and am satisfied that they belong to the same species. *B. tetrachromus*, Ckll., from Baltistan, has the same remarkable colours (the abdominal bands white, yellow, red, and then white again, the yellow a bright canary-colour), but the malar space is shorter.

Friese (1918) records *B. prshewalskii* (using the spelling *przewalskii*) from Sikkim, Tibet, and Assam.

Dianthidium meliponiforme, sp. n.

♀.—Length about 9 mm.

Black, robust, with the following parts chestnut-red: clypeus, mandibles (except cutting-edge), broad band along each inner orbit, elongate mark below middle ocellus, obscure band on cheeks, antennæ (flagellum dusky above), lateral margins and lateral thirds of anterior margin of mesothorax, tubercles and much of prothorax, axillæ, very broad apical band on scutellum, tegulæ, anterior tibiæ in front, and lower side of anterior femora; the abdomen has the hind portions of the first five segments broadly and suffusedly dark coppery reddish, but is without any distinct markings. Clypeus finely punctured; front densely and coarsely punctured; mesothorax very coarsely and densely punctured, except in the vicinity of the depressed middle line or sulcus, where the punctures are sparse, exposing the dullish surface; scutellum extending backward with a sharp edge, strongly emarginate in middle; metathorax rugulose and glistening; hair of head and thorax scanty, black. Wings suffused with reddish orange except apically; stigma (which is large) and nervures bright ferruginous; b. n. meeting t.-m.; second r. n. going far beyond end of second s.m. Legs with black hair, very abundant on hind tibiæ and tarsi; spurs black; first two abdominal segments shining and finely punctured, the others less distinctly punctured, the sixth black, rather sparsely punctured, and concave in lateral profile; sides of third and fourth abdominal segments with black hair, but fifth and anterior half of sixth with conspicuous pure white

hair on extreme lateral margins; ventral scopa dark reddish brown.

Sandakan, Borneo (*Baker*, 9965).

A very remarkable insect, nearest perhaps to the Indian *D. lachrymosum* (Smith). It looks like a *Melipona*.

Dianthidium cressonii, Dalla Torre.

Ward, Colorado, alt. 9250 ft., Aug. 10 (*Cockerell*).

Anthophora himalayensis, Rad.

Island of Penang (*Baker*).

This is *A. proserpina*, Gribodo, which Meade-Waldo found to be inseparable from *himalayensis*.

Anthophora confusa, Smith.

Murree, India, 7500 ft. (*Dutt*).

Pseudomelecta californica miranda (Fox).

Ute Pass, Colorado (*Frances Long*).

Taken at flowers of *Asclepias hallii*.

Megachile sandacana, sp. n.

♀.—Length about 13.5 mm.

Rather robust, black, with clear ferruginous femora, tibiae, and tarsi; head ordinary, with dense pale ochreous hair, except on clypeus, where the hair is long and so thin that the clypeus seen from in front appears nude; clypeus rugose but shining, with a very strong median keel on upper three-fourths, lower margin straight except for a slight crenulation; mandibles black, the cutting-edge long and very oblique, with only two teeth, the apical one long; thorax densely covered with pale ochreous hair, becoming fulvous on scutellum; mesothorax strongly punctured, the punctures mainly in transverse rows; tegulae red. Wings dusky reddish; abdomen broad and parallel-sided, the hind margins of the segments with entire bands of bright ferruginous hair, the rest of the dorsal surface covered with short thin red hair, except the first segment, which has longer fulvous hair; ventral scopa whitish basally, grading into copper-red apically.

Sandakan, Borneo (*Baker*, 9602).

Smaller than *M. bicolor* (Fab.), and without black hair on thorax above. Smaller than *M. takaoensis*, Ckll., and

abdomen differently ornamented. More robust than *M. rufofulva*, Ckll. In the character of the clypeus it resembles *M. ferruginea*, Friese, from Siam.

Megachile disjuncta (Fabricius).

Madras, July 17 (*T. V. R.*); Bangalore, March 28 (*T. V. R.*); Koduvur, Kurnool district, Aug. (*T. V. R.*).

These Indian specimens have the hair at end of thorax and base of abdomen pale fulvous. In a specimen from Deli, Sumatra (*Martin*), it is white.

Megachile aureobasis, Cockerell.

The female, hitherto unknown, comes from Bangalore, India, Aug. 25, at *Cosmos* flowers (*T. B. F.*). It is extremely like the Hawaiian *M. schauinslandi*, Alfken, differing by the absence of red hair on front and occiput, entire red hair-bands on second and third abdominal segments, and white bands (interrupted in middle) on fourth and fifth.

This is evidently the species which Bingham confused with *M. stulta*, Bingh.

Megachile ramakrishnae, Cockerell.

Bangalore, March 28 (*T. V. R.*); Devanakonda, Aug. 15 (*T. V. R.*); Kodumur, Kurnool district (*Ramakrishna*).

Megachile fletcheri, sp. n.

♂.—Length nearly 13 mm.

With the coloration and general appearance of *M. bicolor* (Fabr.), with the same red hair on dorsum of thorax posteriorly, and white at sides of metathorax, the same colour of wings, and bright dense red hair on abdomen, I should refer it with little hesitation to *bicolor* (of which I possess only the female), but for the fact that it disagrees with Bingham's description of the male. The face is densely covered with pale cream-coloured hair, with no nude area; eyes green; head not proportionately larger than in female *bicolor*; anterior coxæ with large black spines; anterior femora, tibiæ, and tarsi red, the femora posteriorly and tibiæ on outer side black; anterior tarsi moderately dilated, with a large dark spot on inner side, and a rather long white fringe; middle legs black with the femora in front, and the tibiæ, except at apex and on outer side, red; hind legs

black; their spurs black; middle and hind tarsi thickened, with very long lateral fringes of shining creamy-white curled hair; keel of sixth abdominal segment strongly irregularly dentate, and emarginate in middle. Wings dusky reddish, stigma ferruginous, nervures fuscous.

Bangalore, India, Aug. 25, on *Cosmos* flowers (*T. B. F.*).

Structurally similar to *M. devadatta*, Ckll., from N. India, but larger and differing in many details.

Received from Mr. Ramakrishna Ayyar (No. 22).

Megachile geoffrei, n. n.

Megachile frederici, Meade-Waldo, Ann. & Mag. N. H., Nov. 1912, p. 474 (not Cameron, 1901).

Gambia and Nigeria.

Megachile atrata fulvipennis (Smith).

Both sexes, Sandakan, Borneo (*Baker*, 1970).

Megachile gemula albula (Lovell & Ckll.).

Minnehaha, Pike's Peak, Colorado (*Frances Long*). New to Colorado. At this locality Miss Long also took *Bombus occidentalis perixanthus* (Ckll. & Porter), *B. rufocinctus phaceliæ*, Ckll., *Andrena edwinæ*, Ckll., *A. prunorum*, Ckll., *A. medionitens*, Ckll., *Osmia bruneri*, Ckll., *O. densa*, Cress., *O. fulgida*, Cress., *O. melanotricha*, Lov. & Ckll., *O. pentstemonis*, Ckll., *O. hypoleuca*, Ckll., *Anthophora smithii*, Cress., *A. simillima*, Cress., *Titusella pronitens*, Ckll., &c.

Pasites indicus, sp. n.

♀ (type).—Length a little over 6 mm.

Head and thorax black, abdomen clear ferruginous, the fifth segment blackened above; mandibles ferruginous, stout and simple; eyes reddish brown; scape black, red at apex; flagellum red, dusky above except basally; head and thorax with appressed silvery hair, tinged with brown on middle of mesothorax; tubercles red at end; tegulæ clear ferruginous. Wings hyaline, tinged with brown; truncation of marginal cell broad, little oblique; first r.n. ending nearer to second than to base of second s.m.; b.n. meeting t.-m.; stigma and nervures ferruginous; tibiæ and tarsi, and apices of femora, ferruginous. Abdomen shining, with large patches of appressed white hair at sides of first four

segments, on fourth extended to form a broad rather narrowly interrupted band; apical half of fifth segment covered with white hair; apex of abdomen truncate.

♂.—Similar to the female; antennæ 12-jointed, flagellum blackish except at base; first abdominal segment with a black spot on each side; apical plate of abdomen rounded, densely hairy above; labrum large, ferruginous, dusky in middle.

Pusa, Bihar, India, Sept. 1912 (*Dutt*).

Sent by Mr. T. Bainbrigge Fletcher (No. 5). This greatly extends the known distribution of the genus, the nearest previously known locality for *Pasites* being Quetta. Owing to its small size, this resembles *P. minutus*, Mocs., which, however, is even smaller. It also resembles that insect in the hardly bigibbous scutellum, but it differs in the coloration of the abdomen.

Crocisa minuta, Radoszkowski.

This little species was described from Mussooree, N.W. Provinces, and was not known to Bingham. A male and female from Chapra (*Mackenzie*), sent by Mr. T. B. Fletcher (No. 28), agree with the description, but the male (with the abdomen much contracted) is only about 6.5 mm. long. The anterior projection of the band on second abdominal segment is emarginate, and the whole band on each side of the segment has the outline of a jaw-bone.

Apis florea, var. *andreniformis* (Smith).

Sandakan, Borneo (*Baker*).

Heterapis sandacanensis, sp. n.

♀.—Length about 3.2 mm.

Slender, shining black; clypeus with a large suboval reddish-white mark, but no other face-marks; middle of clypeus with dense excessively minute punctures, very much smaller than the facets of the eye (which are large); laterally these punctures run into longitudinal grooves, but the extreme sides of the clypeus are impunctate; labrum and mandibles reddish orange, the latter with curled hairs on outer side; antennæ dark brown above, yellowish fulvous below, flagellum short; upper edge of prothorax ciliated with white hair; mesothorax with sparse very minute pili-ferous punctures; scutellum similarly punctured, the disc flat; area of metathorax not defined, merely microscopically tessellate; tubercles and tegulæ testaceous. Wings hyaline;

nervures and stigma brown; b. n. falling very far short of t.-m.; first r. n. joining first t.-c.; third discoidal cell wholly confluent with second submarginal, *i. e.* the lower side of second s. m. lacking. Tibiæ and tarsi, and apices of femora, orange-testaceous; claws cleft, pulvillus large; abdomen practically impunctate, with very sparse hairs, apical half with microscopical lineolation; hind margins of segments brownish. Anterior tarsi with thickened hairs, curled at end.

Sandakan, Borneo (*Baker, 9977*).

Two specimens.

The genus *Heterapis* was based on two minute Australian species. The present insect, from Borneo, differs from both by the combination of minute size with a broad subquadrate head, but it is unquestionably congeneric. Perkins in 1912 added a third Australian species, also very distinct from that now described.

XXXVIII.—*Notes on the African and Asiatic Species of Melyris, Fab. (sensu lato), with an Account of their Sexual Characters: Supplementary.* By G. C. CHAMPION, F.Z.S.

AMONGST the eighty species of *Melyris* enumerated in my paper on these insects published in the October number of this Magazine (pp. 157–219), five only were recorded as having a modification of the intermediate or posterior tarsi in the males. This portion of the tarsal structure of four of them was figured: *M. parallela* on p. 204, *M. quadricollis* on p. 205, *M. klugi* on p. 208, and *M. bicarata* on p. 209. Owing, however, to an unfortunate mistake made in numbering the drawings of the Abyssinian *M. parallela* (No. 61) and *M. quadricollis* (No. 62), the figures and descriptions of the tarsi of these two insects have been transposed on pp. 204–206, and the error was not detected when the proofs were finally corrected by me during an enforced absence from home, and when the specimens were not at hand for checking purposes.

Figure 3 (*M. parallela*) shows the intermediate tarsus of *M. quadricollis*, ♂, and figure 4 (*quadricollis*) that of *M. parallela*, ♂; and the accompanying descriptions of the tarsal structure of *M. quadricollis* refer to *M. parallela*, and those of *M. parallela* to *M. quadricollis*.

M. albicoma (No. 36) should have been placed amongst the Somaliland forms, pp. 196–201.

Periodicals published by TAYLOR & FRANCIS.

Published the First Day of every Month.—2s. 6d.

THE
LONDON, EDINBURGH, and DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

Conducted by

SIR OLIVER JOSEPH LODGE, D.Sc., LL.D., F.R.S.,
SIR JOSEPH JOHN THOMSON, O.M., M.A., Sc.D., F.R.S.,
JOHN JOLY, M.A., D.Sc., F.R.S., F.G.S., and
WILLIAM FRANCIS, F.L.S.

Published the First Day of every Month.—2s. 6d.

THE
ANNALS AND MAGAZINE OF NATURAL HISTORY,
including Zoology, Botany, and Geology.

Conducted by

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S., and
RICHARD T. FRANCIS, F.Z.S.

*Founded in 1877. Monthly, 1s. Annual Subscription
(‘Companion’ and 12 Monthly Numbers), 13s.*

THE OBSERVATORY,
A MONTHLY REVIEW OF ASTRONOMY.

Edited by

A. S. EDDINGTON, M.A., M.Sc., F.R.S.,
F. J. M. STRATTON, M.A., and
H. S. JONES, M.A., B.Sc.

Its Contributors include most of the leading English-speaking Astronomers,
and its Articles give an interesting reflection of the progress of astronomical
thought and achievement.

*Published Monthly. Price 1s. 8d. Annual Subscription,
16s. post free.*

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, K.S.G., F.L.S.,
LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM.
Articles by prominent Botanists; Announcements of Discoveries; Reviews;
Botanical News and Notes, &c., &c.

Red Lion Court, Fleet Street, London.

CONTENTS OF NUMBER 23.—*Ninth Series.*

	Page
XXXI. Descriptions of new <i>Pyralidæ</i> of the Subfamilies <i>Crambince</i> and <i>Siginæ</i> . By Sir GEORGE F. HAMPSON, Bart., F.Z.S., &c. . .	305
XXXII. New Bryozoa from the Kuckers Stage in Esthonia. By HENDRIK BEKKER, Cand. Geol., University of Tartu (Dorpat). (Plate VII.)	327
XXXIII. Diagnose de Genres nouveaux de Sarcoptides plumicoles (<i>Analgésinæ</i>). Par E.-L. TROUËSSART, Professeur au Muséum National de Paris	336
XXXIV. On the Genus <i>Aorus</i> , Schh. (Coleoptera, <i>Curculionidæ</i>). By GUY A. K. MARSHALL, D.Sc.	338
XXXV. <i>Crossophorus collaris</i> , Hemprich & Ehrenberg, a little-known Nematode Parasite of the Hyrax. By H. A. BAYLIS, M.A. . .	343
XXXVI. The Types of the Mammals described by M. Fernand Lataste. By OLDFIELD THOMAS	350
XXXVII. Descriptions and Records of Bees.—LXXXVII. By T. D. A. COCKERELL, University of Colorado	355
XXXVIII. Notes on the African and Asiatic Species of <i>Melyris</i> , Fab. (sensu lato), with an Account of their Sexual Characters: Supplementary. By G. C. CHAMPION, F.Z.S.	360

* * * It is requested that all Communications for this Work may be addressed, post-paid, to the Care of Messrs. Taylor and Francis, Printing Office, Red Lion Court, Fleet Street, London.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.



Smithsonian Institution
DEC 23 1919
National Museum

No. 24.

DEC. 1919.

CONDUCTED BY

WILLIAM CARRUTHERS, Ph.D., F.R.S., F.L.S., F.G.S.,
ARTHUR E. SHIPLEY, M.A., Sc.D., F.R.S., F.Z.S.,

AND

RICHARD T. FRANCIS, F.Z.S.

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

WITH ONE PLATE.

Illustrative of Mr. G. J. Arrow's Paper on Ruteline Coleoptera.

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

Sold by Baillière, Paris: and Hodges, Figgis, & Co., Dublin.

WATKINS & DONCASTER,

Naturalists,

Keep in stock every kind of APPARATUS and CABINETS required by ENTOMOLOGISTS, ORNITHOLOGISTS, BOTANISTS, &c. Also NESTING-BOXES, which should be fixed up in gardens or shrubberies before the breeding Season.

A Large Stock of Butterflies, Moths, Birds, Eggs, &c.

Full Catalogue (84 pages) mailed free to any address.

36, STRAND, LONDON, W.C., ENGLAND.

SCIENTIFIC BOOKS AND SERIALS.

JOHN WHELDON & CO. have the largest stock in the country of Books in all Departments of Natural History and Science, also Transactions and Journals of Learned Societies, etc., in sets, runs, and single volumes or numbers.

Libraries or small parcels purchased.

SPECIAL CATALOGUES: Entomological, Ornithological, Zoological, Geological, Botanical, Chemical, etc., 2d. each, post free.

38 GREAT QUEEN STREET, KINGSWAY, LONDON, W.C. 2.

Telephone: Gerrard 1412.

Price 21s.

THE FAUNA OF BRITISH INDIA

(Including Ceylon and Burma).

Published under the authority of the Secretary of State for India in Council.

Medium 8vo, with Text Illustrations.

COLEOPTERA (CHRYSOMELIDÆ).

TAYLOR & FRANCIS, Red Lion Court, Fleet Street, E.C. 4.

Rates for Advertisements in the Annals and Magazine of Natural History.

	One Insertion.	Six Insertions.	Twelve Insertions.	
PAGE - - - -	2 0 0	1 16 0 each	1 12 0 each	} All Net.
HALF-PAGE - -	1 2 6	1 0 0 „	17 6 „	
QUARTER-PAGE -	12 6	11 3 „	10 0 „	

All applications for space to be made to

Mr. H. A. COLLINS, 32 Birdhurst Road, Croydon.



THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 24. DECEMBER 1919.

XXXIX.—*On Barnacles of the Genus Megalasma from Deep-sea Telegraph-Cables.* By W. T. CALMAN, D.Sc.

(Published by permission of the Trustees of the British Museum.)

THE specimens here discussed form part of the collections from telegraph-cables of which particulars were given in my paper "On Barnacles of the Genus *Scalpellum*"*. Some are from localities mentioned in the list of cable-ships given in that paper, but there are also specimens from the vicinity of Zanzibar (C./S. 'Sherard Osborn'), the Java-Australia and the Victoria-Tasmania cables (C./S. 'Recorder'), the Tasman Sea (C./S. 'Patrol'), and the coast of Cuba (probably from a cable).

The species are all referred to the genus *Megalasma* of Hoek †, as re-defined by Pilsbry ‡. It is distinguished from *Pocilasma* by "the shape of the carina, which is enlarged at the sides toward the base, with a concave plate inside." This inner plate, however, does not always terminate above in "two stout teeth," and the peduncle is sometimes far from "very short" as in Pilsbry's definition.

All except one of the species may further be included in

* Ann. & Mag. Nat. Hist. (9) i. p. 96 (1918).

† Rep. 'Challenger' Cirripedia, 1883, p. 50.

‡ Bull. U.S. Nat. Mus. lx. 1907, p. 87.

Pilsbry's subgenus *Glyptelasma*, the characters of which I have already discussed*. It is distinguished from *Megalasma*, s. str., by the fact that the basal margin of the scutum forms a distinct angle with the chord of the occludent margin, whereas in *Megalasma* the two are in line or nearly so. In the species referred to *Megalasma* also the valves are more strongly sculptured than they are in the species of the subgenus *Glyptelasma*.

Annandale's *Pacilasma* (*Glyptelasma*) *gigas* is in some respects the least typical species of the genus. The expanded sides of the carina are less marked in external view than in the other species, and Annandale was so far justified in regarding it as forming a transition to the genus *Pacilasma*.

As I have already pointed out, there is great diversity as regards the so-called "filamentary appendages" in the species referred to *Glyptelasma*, and the specific differences to be observed in the disposition of these appendages are in some cases more striking than those exhibited by the valves of the shell. In many species, however, these structures have not yet been examined.

Genus MEGALASMA, Hoek.

Subgenus MEGALASMA, s. str.

Megalasma (*Megalasma*) *minus*, Annandale.

Megalasma striatum, subsp. *minus*, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 399; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 8 (1907).

Pacilasma bellum, Pilsbry, Bull. Bur. Fisheries Washington, xxvi. 1907, p. 183, pl. iv. fig. 6.

Megalasma minus and *M. bellum*, Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, lix. 1907, p. 409, figs.

Megalasma lineatum, Hoek, 'Siboga' Exp., Cirripedia Pedunculata, 1907, p. 31, pl. iv. figs. 1-8.

Megalasma minus, Race I. and Race II. (*M. bellum*), Annandale, Mem. Indian Mus. ii. 1909, p. 96.

Locality.—Lat. 6° 58' S., long. 39° 16' E. (near Zanzibar), 270 fath. C./S. 'Sherard Osborn.' About 20 specimens.

Remarks.—The specimens are of relatively large size (up to 14 mm. capitular length); the scutum is less than twice as long as wide; the lateral border of the peduncular foramen, seen from the side, is straight; the proximal angle of the mandible is very distinctly forked; the middle segments

* Ann. & Mag. Nat. Hist. (9) i. p. 407 (1918).

of the posterior cirri have four large pairs and one small pair of anterior spines. In all these characters the specimens agree with Pilsbry's description of the form which he calls *M. bellum* and which Annandale regards as a local race of his *M. minus*. On the other hand, the base of the carina in our specimens, while varying somewhat in shape, is squarely truncate, with the lateral angles more or less produced and acute, and, although without a median tooth, agrees rather better with Pilsbry's figure of the carina of *M. minus*. Further, a specimen of *M. minus* received from the Indian Museum in 1906, and presumably one of the syntypes, has the scutum distinctly less than twice as long as broad, and therefore disposes of the sole character which Annandale retains as distinctive of the species or race.

Subgenus GLYPTELASMA, Pilsbry.

Key to the Species of the Subgenus Glyptelasma *.

- A. Carina projecting well below scutum, the basal margins of the two valves meeting at an angle as seen from the side.
- a. Basal margin of carina, seen from the side, as long as that of scutum *M. gracile* (Hoek), with [subsp. *gracilius*, Pilsbry].
- b. Basal margin of carina, seen from the side, shorter than that of scutum †.
- a. Carina transversely expanded at the base. [No filamentary appendages.] *M. gigas* (Annandale).
- b. Carina not transversely expanded at the base.
- a. Sides of carina widened in lower third *M. annandalei*, Pilsbry.
- β. Sides of carina widening evenly throughout its length. [A pair of small filamentary appendages on dorsal surface of prosoma near its hind margin.] *M. pilsbryi*, sp. n.
- B. Carina not projecting far below scutum, the basal margins of the two valves in line or forming an even curve as seen from the side.
- a. Occludent margin of scutum nearly straight, carina with narrow sides, transversely expanded at base *M. rectum*, Pilsbry.

* Based on the keys given by Pilsbry (Bull. U.S. Nat. Mus. lx. 1907, p. 83, and Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 415).

† On this point Pilsbry's description of *M. annandalei* is at variance with his key and with his figure of that species (Bull. U.S. Nat. Mus. lx. 1907, pp. 83 & 90, pl. vii. fig. 15).

- b. Occludent margin of scutum convex, sides of carina widening below.
- a. Basal width of capitulum little less than one-third of its length.
- a. Basal margin of carina, seen from the side, shorter than that of scutum *M. subcarinatum*, [Pilsbry.]
- β. Basal margin of carina, seen from the side, about as long as that of scutum. [A pair of long filamentary appendages placed far forward on dorsal surface of prosoma, and a pair of short ones close to base of first cirri.] *M. orientale*, sp. n.
- b. Basal width of capitulum not more than one-fourth of its length.
- a. Numerous filamentary appendages on dorsal surface of prosoma *M. carinatum* (Hoek.)
- β. A pair of uncinat processes on dorsal surface of prosoma *M. hamatum*, sp. n.

Megalasma (Glyptelasma) gigas (Annandale).

Pecilasma (Glyptelasma) gigas, Annandale, Journ. Straits Branch Roy. Asiatic Soc. no. 74, 1916, p. 299, pl. iv. fig. 4, pl. v. figs. 10-14, pl. vi. figs. 7, 8.

Localities.—Lat. 8° 46' S., long. 114° 44' E., 400 fath. 2 specimens.

Lat. 11° 0' S., long. 121° 0' E., 500 fath. About 15 specimens.

Lat. 11° 0' S., long. 121° 30' E., 500 fath. 8 specimens.

Lat. 11° 0' S., long. 122° 0' E., 600 fath. 4 specimens.

All specimens taken by C./S. 'Patrol' from Java-Australia cables.

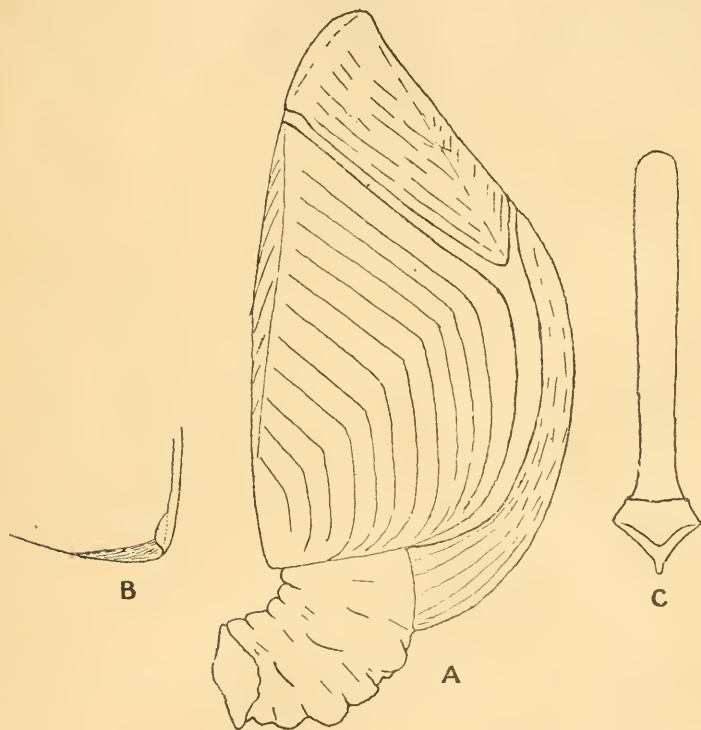
Measurements.—Largest specimen, length of capitulum 30 mm., breadth 15 mm., length of peduncle 36 mm. In another specimen, length of capitulum 25 mm., of peduncle 43 mm.

Remarks.—The specimens agree in general with Annandale's description and figures, the most conspicuous difference being that the peduncle is frequently longer—sometimes much longer—than the capitulum. The cuticle may be much paler, sometimes nearly colourless. I can find no trace of a tooth at the basal occludent angle of the tergum on either side. There is some variation in the depth of the sides of the carina. The peduncle shows, more or less distinctly, a longitudinal keel on the carinal side. There are no filamentary appendages.

It seems probable that Annandale's species is related to

M. rectum, Pilsbry, in which the "auriculate" structure of the base of the carina suggests the beginning of such a transverse expansion as is seen in this species.

Fig. 1.



Megalasma (Glyptelasma) pilsbryi, sp. n., holotype.

A. Lateral view, outlines of valves as seen after partial removal of cuticle.
 B. Basal angle of scutum, inner surface. C. Carina, inner surface.

Megalasma (Glyptelasma) pilsbryi, sp. n.
 (Text-figs. 1 and 2.)

Localities.—Lat. $9^{\circ} 15' S.$, long. $115^{\circ} 10' E.$, 800–1500 fath. 1 specimen.

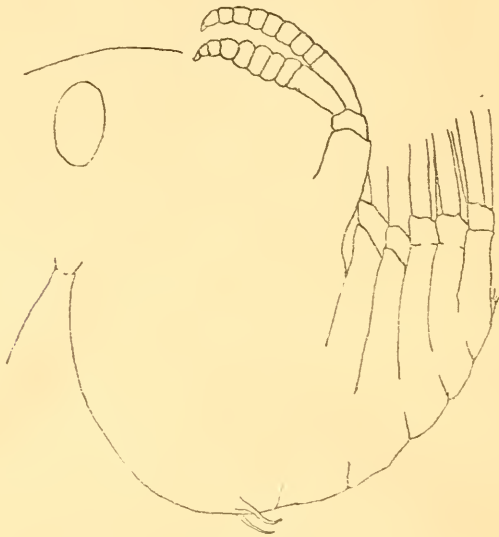
Lat. $10^{\circ} 45' S.$, long. $120^{\circ} 50' E.$, 700 fath. 2 specimens (including holotype).

Lat. $11^{\circ} 0' S.$, long. $121^{\circ} 30' E.$, 500 fath. 1 specimen.

All specimens taken by C./S. 'Patrol' from Java-Australia cables.

Description.—*Capitulum* covered with a thick opaque cuticle, the surface of which has a very fine, short, velvety pile, with stouter but still short setæ interspersed. Valves separated by distinct interspaces, that separating the scutum from the upper part of the carina being especially wide. The lines of growth are well-marked, regularly and rather widely spaced; when the cuticle is removed, rather faint radial

Fig. 2.



Megalasma (Glyptelasma) pilsbryi, sp. n.

Body, from the side, showing dorsal filamentary appendages, first cirrus, and caudal appendages.

striations are visible on the scutum. *Scutum* with occludent margin slightly convex, tergal margin straight, carinal margin convex, passing in an even curve into the straight basal margin, which forms a little less than a right angle with the chord of the occludent margin. A submarginal ridge runs from umbo to apex, but there is no definite ridge from umbo to tergo-carinal angle; the basal margin is slightly everted and thickened. On the inner surface is an umbonal tooth or

tubercle on each valve. *Tergum* with apex slightly recurved; ocludent margin convex in its upper half; angle of ocludent and scutal margins slightly produced; a well-marked groove from apex to scuto-carinal angle. *Carina* with sides expanding evenly from above downwards, so that the inner margin is regularly concave; basal margin extending well below base of scutum and at right angles with it; septum with concave margin, its lateral angles prominent in side-view.

Peduncle about one-third of capitular length, coarsely corrugated, with obscure carinal keel. Attachment almost at the margins of scuta and carina.

A single pair of rather short, slender, *filamentary appendages* on dorsum of prosoma near its posterior margin. Rami of *first cirrus* with 9 and 10 segments respectively. *Caudal appendages* less than one-fourth as long as peduncle of sixth cirri.

Measurements.—Length of capitulum 25 mm., breadth 13 mm.; length of peduncle 8 mm.

Remarks.—In some respects this species seems to approach *M. annandalei*, Pilsbry, from the North Atlantic. It differs in having no sudden widening of the sides of the carina and no excavation of the adjacent margin of the scutum, as well as in the thick cuticle covering the valves and many other details which forbid its identification with that species.

Megalasma (Glyptelasma) orientale, sp. n.
(Text-figs. 3 and 4.)

Localities.—Lat. $9^{\circ} 15'$ S., long. $115^{\circ} 10'$ E., 800–1500 fath. 5 specimens (including holotype).

Lat. $11^{\circ} 0'$ S., long. $122^{\circ} 0'$ E., 600 fath. 1 specimen.

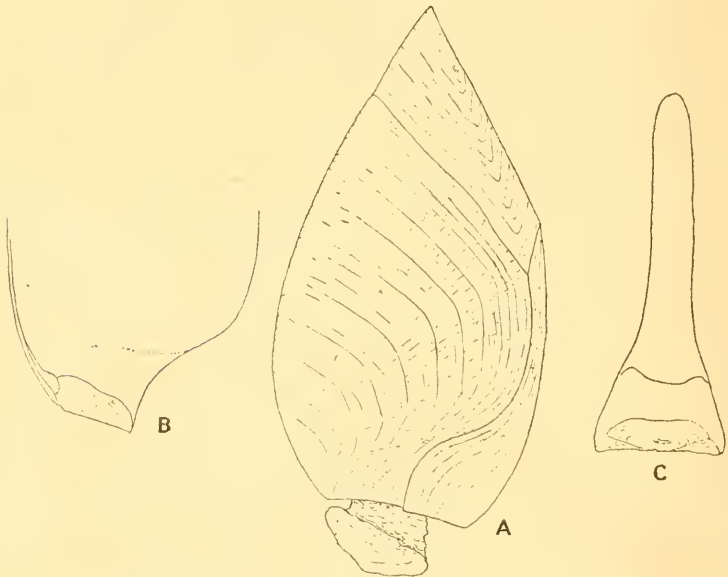
Specimens taken by U.S. 'Patrol' from Java–Australia cables.

Description.—Valves of shell resembling those of *M. subcarinatum*, Pilsbry. *Scutum* with ocludent margin convex, carinal margin convex above, deeply excavated below, basal margin everted, forming about a right angle with the chord of the ocludent margin. Submarginal ridge from umbo to apex very close to the actual ocludent margin, which is concealed when capitulum is viewed from the side. On the inner surface the "smooth basal area" has its upper edge (which marks the line of attachment of the peduncle) much less arched than in *M. subcarinatum*. *Tergum* with carinal margin inclined towards the ocludent, apex acute. *Carina*

with sides expanded in the lower part to four to five times their depth in the upper part (as against about three times in the figure of *M. subcarinatum*), transverse width of upper part (in large specimens) about one-third of that of basal margin; basal margin, as seen from the side, equal to or slightly longer or shorter than that of scutum. Inner septum with upper edge concave but not distinctly bilobed, not projecting when the detached carina is seen from the side.

Peduncle very short, its diameter much less than that of

Fig. 3.



Megalasma (Glyptelasma) orientale, sp. n., holotype.

A. Lateral view. B. Basal angle of scutum, inner surface.
C. Carina, inner surface.

the peduncular orifice, and attached some distance above the basal margins of scuta and carina.

A pair of long tapering *filamentary appendages* are attached side by side on the anterior part of the dorsal surface of the prosoma. A short finger-like appendage is placed close to the base of the first cirrus. Rami of *first cirrus* with 9 and 11 segments respectively. *Caudal appendages* very short stumps, with a few apical setæ.

Measurements.—Length of capitulum 35 mm., breadth 18 mm.

Remarks.—In the characters of the valves this species does

Fig. 4.



Megalasma (Glyptelasma) orientale, sp. n.

Body, from the side, showing filamentary appendages, first cirrus, caudal appendages, and penis.

not differ very widely from *M. subcarinatum*, but since the latter is only known from the North Atlantic ("East of New

Jersey") and its filamentary appendages have not been described, it seems advisable to record the Oriental form under another name. The larger specimens exceed in size any hitherto described in the genus.

Megalasma (Glyptelasma) carinatum (Hoek).

Megalasma (Glyptelasma) carinatum, Calman, Ann. & Mag. Nat. Hist. (9) i. 1918, p. 401, figs. 1-3 (with references).

Locality.—Lat. $14^{\circ} 54'$ N., long. $23^{\circ} 42'$ W. (Cape Verde Islands), 990 fath. C./S. 'Britannia.' 1 specimen.

Megalasma (Glyptelasma) hamatum, sp. n.
(Text-figs. 5, 6, and 7.)

Localities.—

Atlantic:

"Off coast of Cuba" (with specimens of *M. carinatum*). 2 specimens.

Lat. $14^{\circ} 54'$ N., long. $23^{\circ} 42'$ W. (Cape Verde Islands), 990 fath. (with specimens of *M. carinatum*). C./S. 'Britannia.' 1 specimen.

Indo-Pacific:

Lat. $6^{\circ} 58'$ S., long. $39^{\circ} 16'$ E. (near Zanzibar), about 270 fath. C./S. 'Sherard Osborn.' 1 specimen.

Lat. $8^{\circ} 46'$ S., long. $114^{\circ} 44'$ E. (Java-Australia), 400 fath. C./S. 'Recorder.' 2 specimens.

Lat. 11° S., long. $121^{\circ} 30'$ E. (Java-Australia), 500 fath. C./S. 'Patrol.' 2 specimens.

Lat. 11° S., long. 122° E. (Java-Australia), 600 fath. C./S. 'Patrol.' 7 specimens.

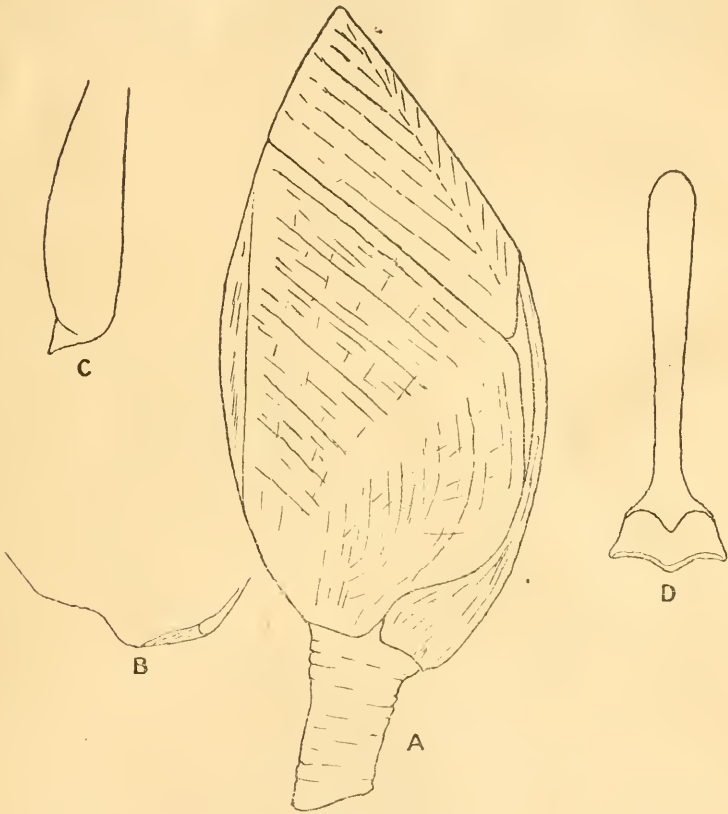
"Victoria-Tasmanian cables, north end." C./S. 'Recorder.' 2 specimens (including holotype).

Lat. 37° S., long. 165° E. (Tasman Sea), 800 fath. C./S. 'Patrol.' 1 specimen.

Description.—*Cuticle* thin, only present near edges of valves. *Valves* rather thin, lines of growth and radial striations not strongly marked; all valves in contact or nearly so. *Scutum* with occludent margin convex, tergal margin straight, carinal margin convex above, more or less deeply concave or notched below, basal margin straight, forming a right or an obtuse angle with the chord of the occludent margin; submarginal ridge from umbo to apex straight or gently curved; ridge from umbo to carino-tergal angle very

obscure ; the basal margin is more or less everted, and there is on the inner surface a small unbonal tooth on each valve ; area defined by line of attachment of peduncle very narrow.

Fig. 5.



Megalasma (Glyptelasma) hamatum, sp. n., holotype.

A. Lateral view. B. Basal angle of scutum, inner surface. C. Scutum from occludent aspect, to show eversion of basal margin. D. Carina, inner surface.

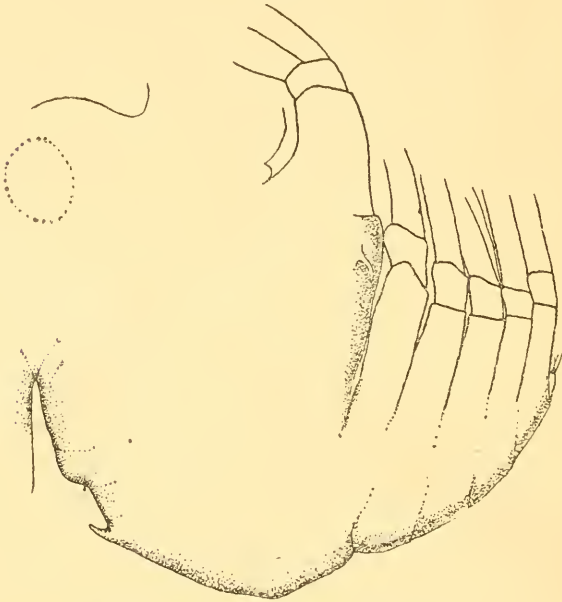
Tergum with straight margins except the occludent, which may be gently curved, carinal margin one-third to one-half as long as the occludent. *Carina* narrow, evenly curved, sides

expanding in lower part, so that the margin is convex or even bluntly angled, basal margin more or less everted, straight or gently concave as seen from the side, in line or forming an even curve with base of scutum; septum notched in the middle, lateral lobes more or less prominent in side-view.

Peduncle less than half as long as capitulum, with obscure carinal keel; attached almost at margins of scuta and carina.

In place of *filamentary appendages* the dorsal surface of

Fig. 6.



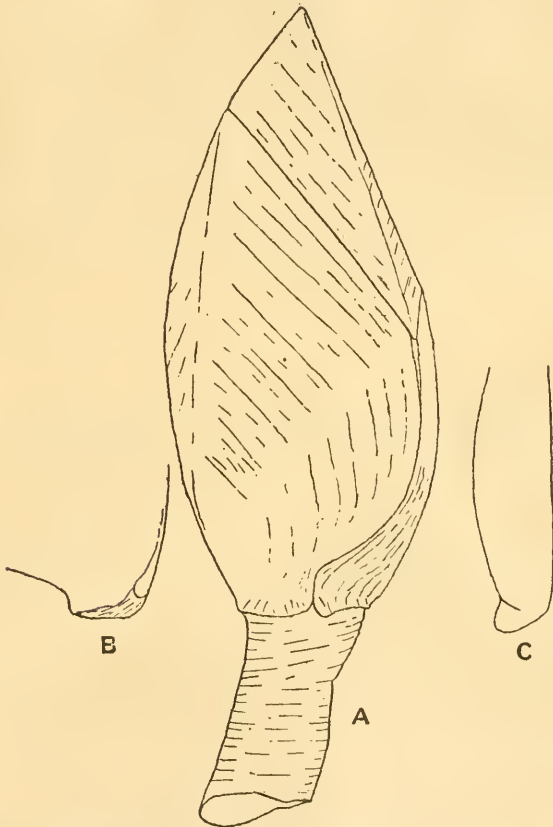
Megalasma (Glyptelasma) hamatum, sp. n.

Body, from the side, showing dorsal hooks, filamentary appendage, and caudal appendages.

the prosoma bears, about the middle of its length, a pair of short hook-like processes, turned forwards, rather more firmly chitinized than the surrounding integument; a short distance in front of these is a pair of low rounded swellings. Close to the base of the first cirrus on each side is a small appendage of varying length, sometimes reduced to a mere papilla, and in one specimen apparently absent. Rami of *first cirrus* with

from 9/11 to 10/12 segments. *Caudal appendages* very short, not more than one-fifth as long as peduncle of sixth cirri.

Fig. 7.



Megalasma (Glyptelasma) hamatum, sp. n. Specimen from coast of Cuba.

A. Lateral view. B. Basal angle of scutum, inner surface. C. Scutum from occludent aspect, to show eversion of basal margin.

Measurements.—Length of capitulum (to middle of basal margin) 24 mm., breadth 12.5 mm.

Remarks.—It is only after considerable hesitation that all

the specimens recorded above have been included under one specific name. They all agree in the possession of the peculiar hook-like organs on the dorsal surface of the prosoma—a character which differentiates them from all the other species I have seen—but they differ greatly among themselves in the characters of the capitular valves. As an example of the variation in these characters, I figure a specimen from off the coast of Cuba (text-fig. 7). It will be seen that it differs from the holotype (from the Victoria-Tasmanian cables) in the much narrower form of the capitulum, the relatively shorter carina, and the scutum with the basal margin at right angles to the chord of the occludent margin. Other specimens, however, both from the Atlantic and from the Indo-Pacific areas, are intermediate between the two forms, and I am unable to point out any characters by which they can be satisfactorily grouped.

XL.—*On Five new Mammals from Java.*

By HERBERT C. ROBINSON and C. BODEN KLOSS.

Pithecus pyrrhus sondaicus, subsp. n.

Type.—Adult male (skin and skull) collected at Tjibodas, Preanger Regencies, West Java, 4500 ft., on 12th February, 1916, by H. C. Robinson. Federated Malay States Museums, no. 164/16. Original number 7181.

Diagnosis.—Black throughout, only the back of the hind limbs with a few white-tipped hairs. Size rather smaller than the eastern typical race, *P. pyrrhus* (Horsf.) = *S. maurus* (auct.).

Dimensions of the type, measured in the flesh.—Head and body 540 mm.; tail 740; hind foot 163; ear 30.

Cranial measurements: greatest length 104·7 (110·1*); basal length 77·0 (82·0); zygomatic breadth 78·1 (85·6); maxillary tooth-row, excluding incisors, 35·7 (38·4).

Specimens examined.—The type and one other adult male from the same locality compared with eight adults from Eastern Java.

* Measurements in parentheses are those of an adult male *P. p. pyrrhus* from Ongop-Ongop, Idjen Massif, near Banjoewangi, 5700 ft., East Java. F.M.S.M. no. 585/16.

Remarks.—We have followed Thomas and Wroughton (P. Z. S. 1909, i. p. 372) in adopting the name *pyrrhus*, Horsf., for both black and yellow forms of the monkey usually known hitherto as *Semnopithecus maurus*, which latter name is inapplicable as belonging to a West-African mangabey. We cannot accept Elliot's views in adopting the earlier title *auratus*, Geoffr., 1812. Dr. Elliot makes no statement as to the skull, but remarks that the tail has black hairs intermingled with the golden-yellow ones, which tends to show that the specimen is quite immature. It is, moreover, without exact provenance. Neither Horsfield nor any other author has designated any type-locality for *pyrrhus*, and we therefore fix it as the province of Pasuruan, whence Schlegel and Jentink have cited many specimens.

As regards the present form, Schlegel (Mus. Pays-Bas, xii. p. 55, 1876) has already noted that the Eastern form is very much greyer than animals from the western parts of the island, where adults are quite black.

Rattus sabanus mayapahit, subsp. n.

Type.—Adult female (skin and skull) collected at Tjibodas, West Java, 5000 ft., on February 12th, 1916, by H. C. Robinson. Federated Malay States Museums, no. 1/16. Original no. 7178.

Characters.—A rat of the *sabanus-vociferans* group, but differing from all described Malayan forms in having the tail not bicoloured.

Colour.—Pelage of the type usual in the group, but on the whole rather less wiry. Ochraceous-tawny element rather paler and less prominent, median area of back rather dark. Under surface white, faintly tinged with cream, sharply defined from the sides. Feet separated from the limbs by a ring of mouse-grey. Brown median streak on the hands not reaching the terminal digits, which are pure white. The same area on the feet less defined than in other members of the group. Tail coarsely ringed and thinly clad with hairs dark at the base, but becoming rather paler towards the tip. Ears elongate, extremely thinly clad with very short hairs, practically naked.

Skull.—Massive, as in the group generally; nasals tapering, somewhat spatulate at the tips, tooth-rows slightly divergent, mesopterygoid space elongate, bulb-shaped, not parallel-sided. Palatal foramina rather short, bullæ small, rather more flat-

tened than in either *R. s. sabanus* or *R. s. vociferans*. Interparietal semielliptic, the length one-half the breadth.

Measurements.—Head and body (taken in the flesh) 251 (242*) mm.; tail 335 (358); hind foot 50 (49); ear 28 (30).

Cranial measurements: greatest length 55.0 (56.3); condylo-basilar length 48.0 (49.0); palatilar length 24.8 (25.0); diastema 15.0 (14.6); palatal foramina length 8.0 (8.1); greatest length of nasals 21.3 (21.6); zygomatic breadth 24.9 (25.6); length of upper molar row 9.4 (10.2).

Specimens examined.—Four; the type, an adult male from Sodong Jerok, Idjen Massif, near Banjoewangi, E. Java, and an immature male and female from the same locality.

Remarks.—The entirely uniform tail in the adult will at once separate this species from all other members of the group, apart from the characters of the median streak on the hands and feet, which may possibly not be constant. Otherwise there are no very special differences. In other localities as well as in Java rats of the group are not usually found above about 4000 ft., being replaced in the Malay Peninsula and in Sumatra by the *ciliatus* section, which, however, so far as is at present known appears to have no representative in Java or in Borneo.

In Borneo and the Malay Peninsula rats of this group are at their brightest. In outlying parts of their range (*R. s. herberti* from Central Siam and *R. s. listeri* from Sikkim) they become duller as in the present form and *R. s. ululans* of Sumatra.

Rattus bukit treubii, subsp. n.

Type.—Adult male (skin and skull) collected at Tjibodas, Mt. Gedeh, Western Java, 5000 ft., on 23rd February, 1916, by H. C. Robinson. Original no. 7271.

Diagnosis.—Allied to *R. bukit* (Bonh.) from the Malay Peninsula and *R. fraternus* (Robinson & Kloss)† from Sumatra, but less spiny than the latter, tail rather shorter; always lacking the ochraceous patch on the chest, which is always present in Sumatran animals. General size decidedly smaller.

Skull and teeth.—Similar to *R. bukit*, except in size.

Dimensions.—Measurements of the type taken in the flesh: head and body 144 mm.; tail 187; hind foot 29; ear 20.5.

* Measurements in parentheses are those of the adult male, F.M.S.M. 869/16, from Eastern Java.

† Journ. Straits Branch Roy. Asiat. Soc. no. 73, p. 273 (1916); Journ. F.M.S. Museums, viii. pt. 2, p. 47 (1918).

Cranial measurements: total length 35.3; condylo-basilar length 29.9; diastema 9.0; upper molar row 6.0; length of palatal foramina 6.1; median length of nasals 13.3; breadth of nasals 4.2; zygomatic breadth 16.0.

Specimens examined.—Twenty-four adult and many immature specimens all from the vicinity of the type-locality.

Remarks.—This species, which is the lowest-ranging of the forest-rats of the group on the Gedeh Volcano, is very uniform in coloration and degree of spininess, therein differing from *R. fratermus*, which is variable in both respects. From *R. bukit* of the Malay Peninsula it differs in its brighter, less clayey colouring, less stiff spines, and finer annulation of the tail. From *R. orbus* of the northern parts of the Malay Peninsula in its smaller size, relatively shorter tail, and lack of pectoral markings.

Rattus cremoriventer cretaceiventer, subsp. n.

Type.—Adult male (skin and skull) collected at Tjibodas, West Java, 4500 ft., on February 22nd, 1916, by H. C. Robinson. Federated Malay States Museums, no. 256/16. Original number 7263.

Characters.—A rat of the group represented in the Malay Peninsula by *R. cremoriventer* (Miller) and in Borneo by *R. kina* and *R. rapit* (Bonhote), but pelage longer and less spiny, colour duller, and with the belly almost chalk-white with only a faint tinge of cream. Teeth decidedly heavier and interparietal foramina narrower. Bullæ larger and broader.

Colour etc..—Pelage of the type usual in rats of the group, composed of three elements, viz., long black piles with pale tips or subterminal bands; broad, flattened, grooved spines, greyish green in colour, with dark tips and a woolly underfur, grey at the base, with ochraceous-buff tips. General colour-effect above a mixture of buff, drab, and black, the latter more evident on the median line, the sides more rufous buff. Head and sides of the face more brownish, the muzzle pale chocolate-brown, hands and feet silvery whitish, with narrow brown median streak, the hairs very short. Below white, sharply separated from the colour of the sides, the hairs white to the base, longer and less spiny than in the allied races. Tail brownish, coarsely ringed (about nine to the centimetre at the base), well clad with fine dark brown hairs increasing in length towards the tip, which is distinctly pencillate. An indication of a rufous-buff collar, which is interrupted in the middle.

Skull.—The cranial portion relatively shorter and broader

than in *R. c. cremoriventer*, with the parietal ridges less sharply deflected. Orbital constriction more marked and the infraorbital plate narrower; zygomatic arches decidedly more slender; nasals as in *R. c. cremoriventer*, terminating in a point posteriorly. Beneath, with the palatal foramina narrower, the interpterygoid space almost parallel-sided, not pear-shaped anteriorly; bullæ decidedly larger and more globose in an antero-posterior direction. Teeth decidedly larger, the posterior molar much larger.

Measurements.—Head and body (taken in the flesh) 137 mm.; tail 196; hind foot 29; ear 19.

Skull: greatest length 36.2; condylo-basilar length 30.8; diastema 9.1; zygomatic breadth 16.2; length of nasals 12.9; upper molar row 6.3.

Mycteromys crociduroides vulcani, subsp. n.

Type.—Adult female (skin and skull) collected at Kandang Badak, Mt. Gedeh, Western Java, 7900 ft., on 5th March, 1916, by H. C. Robinson, Federated Malay States Museums, no. 897/16. Original no. 7381.

Diagnosis.—Warmer in colour above than the type-species of the genus, *Mycteromys crociduroides* (Robinson & Kloss*), tail equal to the head and body in length. Ears large, rounded, almost naked. Pelage dense, close, and very soft.

Colour.—Above a very fine grizzle of hazel and black, the base of the fur slaty grey; hands and feet seal-brown; tail uniform black. Beneath greyish, strongly washed with ochraceous buff, more markedly so in the median line.

Skull.—As in the typical species, but the rostrum decidedly heavier and relatively shorter; teeth smaller.

Dimensions.—Head and body 95 mm.; tail 95; hind foot 24; ear 18.

Cranial measurements: greatest length 25.3; condylo-basilar length 23.0; diastema 7.8; upper molar row 3.7; length of palatal foramina 5.0; median nasal length 9.5; breadth of combined nasals 2.5; zygomatic breadth 12.6.

Specimens examined.—Two, the type and a two-thirds-grown female from the same locality.

This species differs at a glance from the large series of the genotype obtained at Korinchi, Sumatra, in its much warmer colour, shorter tail, dark hands and feet, and heavier rostrum. Out of several hundred rats trapped in the locality these were the only specimens obtained, so that it is in all probability a rare form.

* Journ. Straits Branch Roy. Asiat. Soc. no. 73, p. 271 (1916); Journ. F.M.S. Mus. viii. pt. 2, p. 57 (1918).

XLI.—Notes on Ruteline Coleoptera and Descriptions of a few new Species in the British Museum. By GILBERT J. ARROW, F.Z.S., F.E.S.

(Published by permission of the Trustees of the British Museum.)

[Plate VIII.]

THE wonderful silvery insect *Plusiotis melior*, Roths. & Jord., proves on close examination to be the normal phase of the previously-named *P. optima*, Bates, the unique type of which is a beautiful fiery crimson. The non-acute apex of the pygidium, in which the describers of *P. melior* believed a structural difference to be found, is a characteristic of the female of the species. Exactly similar red phases occur in other beetles in which the same silvery and golden colouring prevails normally—for example, the Australian *Anoplognathus parvulus* and *aureus*. The metallic lustre is also liable to disappear in patches, as though by abrasion, leaving a red-brown surface, and the type of *Anoplognathus concinnus*, Blackb., is an abnormal specimen of *A. aureus*, Wat., in which the golden colour is entirely absent from the greater part of the surface, lingering only upon the back of the head, the hinder part of the elytra, and the middle of the sternum.

Whether these abnormalities are due to accident of some kind or merely to immaturity it is not possible to say. A metallic-red colour seems to be very exceptional as a normal condition in beetles, although individual specimens so coloured commonly occur amongst species typically of some shade of metallic green—for example, in the common Rose-chaffer (*Cetonia aurata*) a red variety is occasionally found. In non-metallic green beetles a corresponding red variety also occurs exceptionally. In one or two instances in which a metallic-red colour is normal (e. g., *Poropleura bacca*) it was found by the late C. O. Waterhouse that prolonged exposure to light in the British Museum galleries had changed the colour to a bright metallic green, so that it seems possible that the occasionally-found red specimens may be individuals which have not attained their mature colouring. On the other hand, I have described one remarkable insect (*Anomala imperialis*) of which the female is metallic green and the male a deep crimson.

The following is another species, hitherto undescribed, of a beautiful golden colour:—

Plusiotis magnificus, sp. n. (Pl. VIII. fig. 1.)

Splendide viridi-aureus, clypeo, prothoracis lateribus pygidioque rufo-cupreis, pedibus corporeque subtus fusco-rufis; elongato-ovatus, nitidus, metasterno (medio excepto) longe et sat dense abdominisque lateribus parce fulvo-pubescentibus; capite minute punctato, clypeo parabolico, margine parum reflexo, integro; pronoto sat brevi, crebre et minute, lateribus densius, punctato, marginibus lateralibus arcuatis, angulis omnibus acutis; scutello subtiliter punctato; elytris grosse inæqualiter punctatis, linea juxta suturali; pygidio dense transversim ruguloso; processu mesosternali acuto, sat valido, metasterno dense ruguloso et longe hirsuto, medio lævi, nitido.

Long. 31 mm.; lat. max. 16 mm.

PANAMA: Chiriqui.

A single male specimen was contained in the collection bequeathed by the late Alexander Fry to the British Museum. It appears to be most nearly related to *Plusiotis aurigans*, Roths. & Jord., but is entirely shining above, without opaque clypeus, pygidium, or prothoracic borders. The mandibles are uniformly rounded externally and not deeply sinuated as in *P. aurigans*.

The colour is a pale greenish gold above, with the clypeus, forehead, sides of the pronotum, and the pygidium coppery red, and the legs and lower surface dark pinkish brown. The head and pronotum are rather finely but unevenly punctured and rather rugosely at the sides, the elytra coarsely and irregularly pitted, and the pygidium finely and closely transversely rugulose.

Although, as already stated, *Anoplognathus concinnus*, Blackb., is not a distinct species, *A. brevicollis*, Blackb., treated in Ohaus's recent Catalogue (which is very incomplete) as a synonym of *A. nebulosus*, Macl., is quite distinct. The elytra do not taper at the extremities, but are furnished with sharp spines at the angles, and the clypeus of the male is longer, broader in front, and almost straight at the sides, where it is not distinctly reflexed.

The following are undescribed species of this genus in the Museum collection:—

Anoplognathus pallidus, sp. n. (Pl. VIII. figs. 4 & 5.)

Testaceus, lævissime metallescens, scutello elytrisque pallide flavis, marginibus omnibus (pronoti et elytrorum lateribus exceptis)

corpore subtus tarsisque brunneis; ovatus, parum convexus, nitidus, pronoto subtilissime punctato, lateribus coriaceis, angulis anticis acutis, posticis fere rectis, basi medio emarginato; scutello fere impunctato; elytris sat crebre et æqualiter punctatis, punctis nonnullis seriatis, apicibus paulo productis et divergentibus; pygidio rugoso, undique griseo-hirto; processu mesosternali longo, acuminato:

♂, clypeo crebre punctato, subquadrato, margine antico leviter dilatata, reflexa, medio leviter incisa, pygidio detecto, obliquo, tibiis anticis obsolete tridentatis:

♀, clypeo rugoso, parum brevi, arcuato, elytris extus ante medium leviter dilatatis, apicibus magis productis, pygidium tegentibus, tibiis anticis acute tridentatis.

Long. 26-29 mm.; lat. max. 15-17 mm.

NORTHERN TERRITORY OF AUSTRALIA: Macdonnell Range, Hermanusburg (*H. J. Hillier*).

Although considerably larger and without sharply pointed elytra, there is a distinct similarity in colour, sculpture, and general form between this species and *A. acuminatus*, Ohaus. It is dark purplish brown beneath and very pale above, especially upon the elytra, with an extremely faint bluish metallic lustre, which upon the latter changes to golden green. The extremities of the elytra are produced and minutely serrated, but rounded instead of acuminate at the tips.

The clypeus of the male is longer and broader than that of *A. acuminatus*, with the front margin minutely notched in the middle and less strongly reflexed. That of the female is of the usual rounded shape, but not very broad.

One male and three females were sent at different dates by Mr. Hillier.

Anoplognathus aurora, sp. n. (Pl. VIII. fig. 6.)

Aureo-flavus, refulgens, corpore subtus, pygidio tarsisque æneoviridibus, elytris, femoribus tibiisque roseo-metallicis; elongatus, parum convexus, corporis subtus lateribus sat longe ac dense griseo-pubescentibus, processu mesosternali longo et acuto; prothoracis disco minute punctato, lateribus subtiliter rugosis, angulis anticis acutis, posticis paulo obtusis, basi medio emarginato; scutello fere impunctato; elytris sat crebre et æqualiter punctatis, punctis nonnullis seriatis, apicibus productis, separatim rotundatis, minute serratis; pygidio rugoso, fere nudo:

♂, clypeo subquadrato, margine antico paulo dilatato, arcuato, reflexo.

Long. 28-30 mm.; lat. max. 14-15 mm.

N.W. AUSTRALIA : Tambrey (*W. H. Cusack*).

I have seen only three males of this species. It resembles the preceding species, but is more brilliantly coloured, more elongate in shape, with the elytra of the male (the female is unknown) more produced at the extremities, and the pygidium naked except for a few scattered minute setæ.

The lower surface of the body, the pygidium and tarsi, are deep coppery green, the femora and tibiæ are metallic crimson and the upper surface orange, with a beautiful golden lustre, showing greenish reflections, replaced upon the elytra by a delicate pink tinge. With the exception of the outer edges of the pronotum and elytra, all the margins are narrowly outlined with greenish black. It is an unusually elongate species, with a long acute mesosternal process, and the produced apices of the elytra are minutely serrated. The sculpture of the upper surface is almost as in *A. pallidus*.

Anoplognathus antiquus, sp. n. (Pl. VIII. figs. 2 & 3)

Obscuro brunneus, fronte, pronoto, scutello elytrisq; fulvis, clypeo rufo, nigro-marginato, frontis medio nigro-vittato, pronoto scutelloque anguste nigro-marginatis, illo ante medium nigro-bipunctato; ovalis, convexus, parum nitidus, undique griseo-setosus, processu mesosternali brevi, obtuso; clypeo crebre rugoso, fronte grosse punctato, medio longitudinaliter carinato, vertice minus crebre punctato; pronoto fortiter punctato, lateribus densius, medio leviter sulcato, marginibus bene arcuatis, angulis anticis fere acutis, posticis obtusis, basi leviter trisinuato, medio haud emarginato; scutello bene punctato; elytris grosse ac rugose punctatis, haud productis, angulis suturalibus haud rotundatis; pygidio crebre rugoso:

♂, clypeo producto, antrorsum leviter angustato, margine antico paulo dilatato, arcuato, reflexo.

Long. 22-24 mm.; lat. max. 13 mm.

NEW SOUTH WALES : Richmond River.

This is a rather isolated species, with a superficial resemblance to *A. velutinus*, Boisd., but no close relationship to any known species. Its very short blunt mesosternal process ranges it with the *flavipennis* group, with which it has no other special point of resemblance. The brownish-yellow colour of the upper surface, together with the clothing of white setæ and the coarse irregular sculpture, produce an appearance more like that of *A. velutinus* than any other, although the broadly produced clypens of the male renders the resemblance less in that sex. The pair of

black spots on the anterior part of the pronotum, about equidistant from each other and the lateral margins, and the longitudinal black mark between the eyes, are features quite peculiar to the species. There is an exceedingly feeble greenish sheen upon the dark parts of the body, but this is hardly perceptible upon the upper surface.

Fruhstorferia curta, sp. n. (Pl. VIII. figs, 8 & 9.)

Pallide flava, mandibulis, antennis, vertice, tarsi elytrorumque vittulis marginalibus rufo-brunneis, capite, pronoto, elytrorum extremitatibus pygidioque subtiliter setosis, pectore longe et dense flavo-hirto; late ovata, convexa, capite opaco, parce punctato, ante oculos late dilatato, pronoto lato, minute haud crebre punctato, lateribus fortiter arcuatis, angulis anticis acutis, posticis rotundatis, basi trisinuato; scutello sat crebre punctato; elytris irregulariter sat minute, prope suturam crebrius et fortius punctatis:

♂, clypeo truncato, haud reflexo, mandibulis productis, recurvatis, acuminatis, margine externo dentato, pronoto fortiter dilatato et convexo, toto opaco, elytris opacis, regione suturali paulo nitido:

♀, clypeo majori, recurvato, bilobato, pronoto minus convexo, elytrorum lateribus opacis, marginibus externis ante medianam paulo incrassatis.

Long. (mandibulis exceptis) 15-16.5 mm.; lat. max. 9-9.5 mm.;
♂, mandibulæ long. max. 3 mm.

INDO-CHINA: Upper Mekong R., Pou Mi. (Nov., Dec.).

Examples of both sexes of this curious insect were found by M. R. Vitalis de Salvaza. It is as distinctive in its aspect as any species yet known of this remarkable genus, of which every species seems to differ entirely both in shape and coloration from all the rest. It is the smallest species hitherto described and is peculiar also for its pale yellow colour, relieved only by inconspicuous brown markings, its very broad and compact outline, and the dull, unreflecting upper surface of the male.

The colour is a pale lemon-yellow, with the antennæ, tarsi, organs of the mouth, vertex of the head, apical margins of the elytra, two or three longitudinal marks near each shoulder, sometimes a small spot on each near the apex of the scutellum, and another at the base between the latter and the shoulder of a reddish-brown colour. The abdomen of the male is also of this colour.

The body is very short and stout, with the head very broad in front of the eyes, the prothorax broader than the elytra at the shoulders, the hind angles rounded and the base

distinctly lobed before the scutellum. The puncturation of the pronotum is fine and scattered, that of the scutellum stronger and closer, while the elytra are rather strongly and closely punctured in the sutural region and more finely and sparingly elsewhere. The legs are short and not very stout, and the prosternum is not at all elevated behind the front coxæ.

The male is relatively broader than the female, with the upper surface opaque, except upon the scutellum and the sutural region of the elytra. The mandibles are produced, curved upwards, and toothed at the outer edge, as in *Fruhstorferia yunnana*, Ohaus, and the clypeus is long, narrow, convex, and truncate. The pronotum is highly convex and strongly dilated in the middle.

The female is more oval in shape and feebly shining above, with the clypeus tapering, bilobed, and recurved at the end, the pronotum less broad and convex, the elytra a little longer, and their outer margins slightly dilated and thickened before the middle.

For the sake of comparison I have photographed males of *Fruhstorferia birmanica* (Pl. VIII. fig. 7) and *F. yunnana* (Pl. VIII. fig. 10) side by side with the new species.

Nannopopillia varicolor, sp. n.

Nigro-ænea, elytris flavis, margine toto anguste vittaque mediana ab callo humerali fere ad apicem pertinenti, medio intus dilatata, nigris, pedibus nigris vel flavis, vel vitta medio interrupta, vel vitta castanea, vel elytris toto nigris; ovata, convexa, sat longe et dense albido-vestita, clypeo, elytris, lineaque mediana ventrali angusta nudis, clypeo angustato, valde recurvato, transversim ruguloso, antice arcuato, fronte rugose punctato, longitudinaliter excavato; pronoto grosse et crebre punctato, postice linea angustissima mediana lævi, angulis anticis acutis, posticis valde obtusis; scutello parce punctato; elytris fortiter punctato-sulcatis, intervallis convexis, secundo fere ad extremitatem irregulariter punctato; pygidio rugoso, processu mesosternali valido, fortiter compresso, obtuso; pedum anticorum ungue majori fisso, aliis integris.

Long. 9-11 mm.; lat. max. 5-6 mm.

BRIT. E. AFRICA: S. Kavirondo (4500 ft.), Kisii District, N. Kavirondo, Mt. Elgon, etc.

UGANDA: Mbale-Kumi Road, South of L. Salisbury (3700 ft.).

Dr. S. A. Neave found this insect in very great abundance,

often in company with *Gnatholabis hirsuta*, Ohaus, to which, in its general aspect and coloration, it bears a marked resemblance. It is remarkable, to an even greater degree than that species, for the extreme variability of its elytral coloration. Typically yellow, with a longitudinal black stripe on each elytron, dilating near the middle, the stripe is sometimes scarcely traceable, sometimes red instead of black, and sometimes interrupted in the middle. Occasionally the elytra are entirely black, whilst in pale and dark forms the legs may be either yellow or black. The pronotum and pygidium, as well as the lower surface, with the exception of a bare median line, are densely clothed with pale yellow hair, sometimes more or less rubbed away from pronotum and pygidium. The clypeus is more elongate than in the other species of the genus, the punctures of the pronotum do not coalesce transversely as in *N. ludificans*, the hind angles are rounded off, and the mesosternal process is strongly developed but not long.

XLII.—On Indo-Chinese Hymenoptera collected by R. Vitalis de Salvaça.—III. By ROWLAND E. TURNER, F.Z.S., F.E.S.

Superfamily ICHNEUMONOIDEA.

Family Evaniidæ.

Pristaulacus (Tetraulacinus) tonkinensis, sp. n.

♀. Nigra; antennis, articulis duobus apicalibus infuscatis, pedibusque flavo-testaceis; coxis posticis intermediisque nigris; abdomine nigro, segmento primo apice late, secundoque dimidio basali rufo-ferrugineis; alis flavo-hyalinis, stigmatibus venisque fuscis; macula quadrata sub stigmate fusca.

Long. 15 mm.; terebræ long. 23 mm.

♀. Head shining, very finely punctured; posterior ocelli about equidistant from the eyes and from each other, and more than twice as far from the hind margin of the head as from each other. Antennæ scarcely longer than the abdomen, the first joint of the flagellum scarcely half as long again as broad, the second twice as long as the first, the third distinctly longer than the first and second combined. Neck short, only a little more than half as long as

the distance between the tegulæ and the anterior margin of the mesonotum; pronotum unarmed. Mesonotum coarsely transversely striated, with a subtriangular depression in the middle of the anterior margin, beyond the apex of the depression a shallow and very narrow impressed line runs almost to the apex of the median lobe. Pleuræ coarsely and irregularly reticulate; scutellum and postscutellum transversely striated; median segment coarsely reticulate. First abdominal segment slender, nearly as long as the remainder of the abdomen, the apical half gradually, but very slightly, broadened and compressed laterally; the remaining segments distinctly compressed laterally and pale luteous brown at the apex. Intermediate and hind coxæ transversely striated; hind metatarsus nearly half as long again as the four following joints combined. Third transverse cubital nervure only fully defined at each end, the median portion indicated by a white scar; second transverse cubital nervure almost obsolete, only indicated by a short scar at the cubital end. Nervulus interstitial; lower abscissa of the basal nervure shorter than the upper, the basal nervure separated from the base of the stigma by a distance fully equal to its own length. First recurrent nervure received shortly before the apex of the first cubital cell.

Hab. Chapa, Tonkin; June (*R. Vitalis de Salvaza*).

This is allied to *rufobalteatus*, Cam., but differs in the much longer terebra, in the shorter apical joints of the hind tarsi, in the stouter and differently coloured antennæ, and in the yellower colour of the wings. I do not think that Kieffer's genus *Tetraulacinus* can be kept separate from *Pristaulacus*, the second transverse cubital nervure, on the presence of which it is founded, being almost obsolete.

Pristaulacus flavipennis, Cam.

Aulacus flavipennis, Cam. Proc. Manchester Lit. & Phil. Soc. xxvi. p. 134 (1888).

Aulacus magnificus, Schlett. Ann. Naturh. Hofmus. Wien, iv. p. 509 (1889). ♀ ♂.

Hab. Ceylon.

Dalla Torre suggests that *congener*, Westw., may apply to this species, but I have previously shown that *congener* is a synonym of *lateritius*, Shuck.

Evania kuchingensis, Cam.

Evania kuchingensis, Cam. Entomologist, xli. p. 237 (1908). ♂.

Hab. Hoabinh, Tonkin; October 5, 1917. 3 ♂♂.

Originally described from Borneo. Also occurs in Hong Kong.

Family Braconidæ.

Subfamily HELCONINÆ.

Brulleia euphemia, sp. n.

♀. Rufo-testacea; mandibulis apice, terebra valvulisque nigris; antennis 42-articulatis, nigris, articulis duobus basalibus rufo-testaceis, articulis 10-18 flavo-testaceis; alis flavis, tertio apicali leviter infuscatis, stigmatе venisque fuscis, venis basi rufo-testaceis.

Long. 20 mm.; terebræ long. 31 mm.; antennarum long. 14 mm.

♀. Mandibles stout, bidentate at the apex; clypeus finely punctured, short, transverse. Face much broader than long, rugose; front finely rugulose, short, concave but not deeply excavated; vertex finely punctured. Cheeks nearly half as long as the eyes; head broader than the thorax. Mesonotum finely punctured; notauli deep and crenulate; the posterior half of the mesonotum broadly depressed in the middle, the depressed portion with a median longitudinal carina and with coarse transverse striæ; scutellum finely punctured. Median segment nearly twice as broad as long, very coarsely rugose, becoming more or less reticulate towards the apex, the sides of the segment very coarsely reticulate. First tergite about three times as long as its apical breadth, slender, rugose; second tergite as long as broad, strongly but rather sparsely punctured, the remaining segments very finely punctured. Hypopygium not nearly reaching the apex of the abdomen; valvulæ thinly clothed with very short hairs. Hind metatarsus longer than the four apical tarsal joints combined, calcaria short, but stout. Second abscissa of the radius a little longer than the first, recurrent nervure received near the base of the second cubital cell, nervulus slightly postfurcal, discoidal cell sessile.

Hab. Tonkin; May, 1917.

Somewhat allied to *B. chinensis*, Turn., from N. China, but quite distinct.

Gymnoscelus rugidorsalis, sp. n.

♀. Nigra; antennis 32-articulatis, articulis 11-14 albidis; palpis pedibusque ferrugineis; femoribus posticis supra, tibiisque posticis apice nigro-suffusis; tarsis posticis articulis duobus basalibus albidis; alis hyalinis, iridescentibus, venis nigris. Long. 8 mm.; terebræ long. 5 mm.

♀. Face rugulose with a few strong longitudinal striæ; mandibles stout, bidentate at the apex, the inner tooth the longest; cheeks a little longer than the scape, strongly punctured. Third and fourth joints of the antennæ subequal. Front concave in the middle and smooth, the concave area reaching to the anterior ocellus and bounded laterally by carinæ, a low longitudinal carina between the antennæ; between the concave area and the eyes the front is finely rugulose. Vertex smooth and shining, head slightly narrowed behind the eyes, posterior ocelli half as far again from the eyes as from each other, nearer to the hind margin of the head than to the eyes. Lateral lobes of the mesonotum and the median lobe in front finely and closely punctured, from before the middle to the hind margin extends a broad and very coarsely reticulated area; notauli developed in front, but disappearing in the reticulated space. Pleuræ more or less coarsely reticulate. Basal half of the scutellum occupied by a deep depression, in which are several longitudinal carinæ, the apical half punctured. Median segment coarsely reticulate, with two longitudinal carinæ which do not reach the base, but are joined by a curved carina near the base. Abdomen sessile, first tergite nearly as long as the rest of the abdomen, nearly twice as long as its apical breadth, coarsely rugose-reticulate, the median area divided from the lateral areas by a well-marked carina on each side; the remaining tergites broader than long, smooth and shining. Hind coxæ and femora rather sparsely punctured, the femora without a spine. Second abscissa of the radius a little longer than the first, second cubital cell more than twice as long on the cubitus as on the radius; nervulus postfurcal. Anal cell of fore wing with two transverse nervures, the second indistinct and obsolescent.

Hab. Chapa, Tonkin; June 4, 1916.

In the condition of the second transverse nervure of the anal cell this forms a link between typical *Gymnoscelus* and Camerou's genus *Edyia*, which I think must sink as a synonym.

Family Ichneumonidæ.

Subfamily Pimplinæ.

Cyanoxorides erythrothorax, sp. n.

♂. Nigro-cæruleus; mandibulis apice, facie linea mediana, tibiis posticis, prope basin late albo-annulatis, tarsisque posticis nigris; tegulis pedibusque anticis intermediisque flavo-testaceis; thorace rufo-ferrugineo; mandibulis basi ferrugineis; facie utrinque late, macula orbitali utrinque supra antennis, orbitis externis; tergitis 3-5 macula angustissima transversa apicali, sexto septimoque linea longitudinali mediana albidis; alis hyalinis, leviter flavo-suffusis, venis fusco-testaceis.

Long. 14 mm.

♂. Very slender. Antennæ as long as the whole insect, 33-jointed, third joint short, only half as long as the fourth; the whole flagellum clothed with upright hairs, the apical joints not bent at an angle to the rest as is the case in the females of the genus. Clypeus very short; face closely punctured; front and vertex shining, with small scattered punctures, an acute tubercle between the antennæ. Pronotum depressed, deeply arched posteriorly, the angles acute, but not produced into spines. Mesonotum finely and closely punctured on the lateral lobes and on the anterior portion of the median lobe; the posterior portion of the median lobe reaching broadly to the scutellum and coarsely reticulate, with five distinct longitudinal carinæ; pleuræ closely punctured. Scutellum finely punctured, with a transverse smooth groove at the base, which is divided by a carina. Median segment greenish; the areola not divided from the petiolar area; no basal area; the external area well defined; the petiolar area transversely striated, the remainder of the segment more or less closely punctured; spiracles elliptical. Abdomen very slender; first tergite twice as long as the second, whitish at the extreme base, coarsely punctured-rugulose, extending beyond the apex of the trochanters. Second tergite twice as long as broad, coarsely punctured; the basal angles separated by a groove and forming small elongate-triangular spaces; the middle of the segment formed into a trapezoidal area bounded by deep grooves; third tergite longer than broad, the sculpture similar to that of the second tergite, fourth and fifth tergites subquadrate, more finely punctured, the median area convex, somewhat compressed laterally, making the segment subcarinate longitudinally in the middle; the two apical tergites

with a strong longitudinal carina, the depressed lateral spaces smooth and shining. Nervulus præfurcal; second recurrent nervure very feebly curved, received just beyond the transverse cubital nervure, nervellus intercepted a little below the middle.

Hab. Luang Prabang; May 15, 1915. 1 ♂.

The sharp bend near the apex of the antennæ in this genus seems to be a sexual character, not found in the males. The genus does not seem to be separated from *Xylonomus* by any other good character.

Cyanoxorides vitalisi, sp. n.

♀. Nigro-cærulea; antennis 28-articulatis, articulis 12-16 albis, articulis 3-5 extus albo-lineatis; orbitis internis late, orbitisque externis dimidio inferiore flavidulis; tergitis primo basi extrema, tertio linea apicali in medio, quarto fascia angusta apicali, quinto linea apicali utrinque interraptâ, sexto lateribus anguste, septimoque linea apicali lateribus dilatata flavo-ochraceis; palpis, pedibus anticis intermediisque, tibiisque tarsisque posticis flavo-testaceis; alis flavo-hyalinis, venis fuscis; terebra corpore æquilonga, valvulis fuscis, dimidio apicali ochraceis, apice extremo fuscis.

Long. 14 mm.

♀. Antennæ sharply elbowed at the base of the twentieth joint, the nineteenth joint with two slender spines at the apex, third joint almost as long as the fourth. Clypeus very short, face and clypeus closely punctured; front shining, smooth in the middle, without a tubercle, the sides of the front and the vertex finely punctured. Posterior ocelli as far from the eyes as from each other, and twice as far from the posterior margin of the head. Angles of the pronotum produced into minute tubercles; mesonotum as long as the scutellum, postscutellum, and median segment combined, very finely and closely punctured on the lateral lobes and on the front of the median lobe, the posterior half in the middle broadly, very coarsely, and irregularly reticulate. Scutellum very finely punctured, the basal transverse groove broad and divided by a low carina. Median segment without a basal area, the areola not separated from the petiolar area, punctured, spiracles elliptical, the spiracular area reticulate. Abdomen rather slender, the three basal segments rugulose, the apical segments closely and minutely punctured; first tergite about twice as long as the second, with two converging

carinæ near the apex ; second and third tergites with small spaces at the apical angles divided from the rest of the segment by an oblique groove, also with a raised space on each side diverging obliquely from the base and not reaching beyond the middle of the segment ; the second tergite half as long again as broad, the third subquadrate. Nervulus præfurcal ; second recurrent nerve received only just beyond the transverse cubital nerve.

Hab. Chapa, Tonkin ; June 21, 1916.

Allied to *annulicornis*, Cam., but differs in the colouring of the abdomen and hind legs, also in the longer and narrower second tergite.

Cyanoxorides annulicornis, Cam.

Epirhyssa annulicornis, Cam. Mem. Manchester Lit. & Phil. Soc. xliii. p. 133 (1899).

Xylonomus annulicornis, Morley, Fauna Brit. India, Hymen. iii. p. 80 (1913).

If the genus *Cyanoxorides* is kept apart from *Xylonomus*, this species must be included in it, the antennæ being sharply bent at the base of the twentieth joint. Morley evidently does not consider the distinctions as of generic value, though he does not discuss the question.

Hab. Hoabinh, Tonkin ; February, 1917. 1 ♀.

Pseudengalta aspasia, sp. n.

♀. Nigra ; antennis 39-articulatis, articulis 10–20 albidis ; scapo subtus, flagello articulis tribus basalibus subtus, facie, tegulis, macula sub tegulis, scutello macula magna, postscutello macula transversa, tergitis 1–7 fascia apicali, fascia sexta interrupta, tibiis anticis, tarsisque anticis articulis duobus basalibus flavis ; coxis, posticis apice nigris, trochanteribus femoribusque anticis intermediisque, femoribusque posticis basi testaceis ; tibiis intermediis, tarsis intermediis apice fuscis, tibiis posticis basi late, apice angustissime, tarsisque posticis, apice fuscis, albido-flavis ; alis hyalinis, flavo leviter suffusis ; venis fuscis.

Long. 15 mm. ; terebræ long. 9 mm.

♀. Eyes strongly convergent towards the clypeus ; face very finely punctured, nearly twice as long as its breadth at the base of the clypeus. Head subopaque, very finely and rather sparsely punctured, widely and shallowly emarginate posteriorly, swollen behind the eyes. Mesonotum subopaque, finely and closely punctured on the median lobe, much more sparsely on the lateral lobes ; the median lobe broadly

rounded at the apex near the middle of the mesonotum ; the apical portion of the mesonotum flattened in the middle and with four curved striæ, followed by several fine oblique striæ. Median segment coarsely reticulate, with a distinct longitudinal carina both above and below the large spiracle. Abdomen subpetiolate ; the first segment nearly twice as long as the second ; smooth and shining. Areolet with a short petiole, the recurrent nervure received at two-thirds from the base ; nervulus interstitial.

Hab. Muong Yon, Luang Prabang ; November 13, 1917.
1 ♀.

Very near *P. furcifera*, Bingham, from Luzon, of which the male only is described, but in that species the face is distinctly broader, the mesonotum much more strongly punctured, the median segment much less coarsely reticulate, and the longitudinal carina above the spiracle obsolete. I think these differences are specific, not sexual. There is also an oblique yellow fascia on the mesopleuræ behind in *P. furcifera*, which is absent in *aspasia*.

Subfamily *ICHNEUMONINÆ*.

Holcojoppa flavipennis, Cam.

Holcojoppa flavipennis, Cam. Entomologist, p. 181 (1902). ♀.

Hab. Vientiane, Laos ; July 30, 1915.

The localities of the specimens in the British Museum collection are Sikkim, Khasi Hills, and Hong Kong.

Superfamily *SPHECOIDEA*.

Subfamily *AMPULICINÆ*.

Ampulex varicolor, sp. n.

♀. Nigra ; segmento mediano, abdomine, mesosterno, coxis, femoribusque basi chalybeis ; thorace, segmento mediano lateribus, clypeo apice, scapo subtus flagelloque articulis 5 basalibus rufis ; alis hyalinis, anticis cellula radiali cellulisque cubitalibus prima apice secundoque basi infuscatis ; venis nigris, vena cubitali transversa prima oblitterata.

Long. 15-18 mm.

♀. Mandibles very long and slender. Clypeus very long and narrow, convex, but only distinctly carinate near the apex, produced at the apex into a broadly rounded process with a lateral tooth on each side ; the whole clypeus sparsely

and rather finely punctured. Eyes distinctly convergent towards the vertex, where they are separated by a distance about equal to the combined length of the third and fourth joints of the flagellum, but a little less than the length of the second joint of the flagellum. Front with three short, almost parallel, longitudinal carinæ, not nearly reaching the anterior ocellus, the space between the carinæ indistinctly obliquely striated; the front with obscure steely-blue patches. Head broadly rounded behind the eyes; vertex finely aciculate, opaque, divided by a shallow longitudinal groove, which extends almost to the posterior ocelli. Pronotum longer than broad, with a median sulcus, not raised or tuberculate posteriorly, opaque, without distinct sculpture. Mesonotum and scutellum subopaque, almost smooth, pleuræ finely and irregularly rugulose. Median segment a little longer than its median breadth, with the usual carinæ, the space between the carinæ strongly transversely striated, the third and fourth carinæ convergent at the base, the teeth at the apical angles of the segment very short and blunt. Second tergite a little longer than its greatest breadth; abdomen smooth and shining. Penultimate joint of the hind tarsi not extending as far as the middle of the apical joint. Fore wing with two cubital cells; second transverse cubital nervure reaching the radius at a distance from the apex of the radial cell equal to about half the length of the first transverse cubital nervure.

Hab. Annam, Kengtrap; November 27, 1917; Xieng Khouang, Ban Sai, December 8, 1918 (*type*).

The colouring and the exceedingly elongate clypeus render this species very conspicuous. In colour it is nearest to *A. ruficornis*, Cam., but differs in the steel-blue colour of the median segment and abdomen, in details of sculpture, and in the much greater size. I doubt if it belongs to the same group as *A. ruficornis*, both seem to mimic roughly the colouring of *Sima rufonigra*.

Subfamily PHILANTHINÆ.

Cerceris tonkinensis, sp. n.

♂. Brunneo-ferrugineus; capite, mesosterno, coxis basi, femoribus posticis, tibiisque posticis, basi ochraceis, nigris; vertice, antennis, mandibulis basi, clypeoque apice fusco-ferrugineis; tegulis, pedibus, segmento mediano macula magna utrinque areaque basali flavo-ochraceis; segmento abdominali primo lateribus et subtus, tergitis 1-6 fascia apicali, sternito secundo subtus,

sternitisque 3-6 fascia transversa flavis; alis flavo-hyalinis, venis ferrugineis; clypeo apice dentibus tribus minutis armato; segmento mediano area basali nitida, impunctata; sternito secundo arca basali elevata nulla; petiolo latitudine longiore; sternito sexto angulis apicalibus dente armato.

Long. 13 mm.

♂. Antennæ inserted a little more than half as far again from the anterior ocellus as from the base of the clypeus; the interantennal carina short, but strong; face below the antennæ and the clypeus with large sparse punctures; middle lobe of the clypeus much longer than its greatest breadth. Apical joint of the flagellum distinctly, but not very strongly curved, scarcely longer than the penultimate, and truncate at the apex. Vertex, temples, mesonotum, and mesopleuræ closely and rather strongly punctured; scutellum and median segment rather less closely punctured; postscutellum very sparsely punctured. Abdomen rather deeply but not closely punctured; the first segment longer than its greatest breadth and strongly narrowed at the apex; sternites smooth; pygidial area parallel-sided, nearly twice as long as broad, truncate at the apex, sparsely punctured.

Hab. Tonkin; May, 1917.

The spines at the apex of the sixth sternite are short, the species resembles *C. vigilans*, Sm., in the form of the clypeus and pygidial area.

Philanthus angustatus, sp. n.

♂. Niger; clypeo apice anguste, macula curvata inter antennas, pronoto margine postico, tegulis, callis humeralibus, scutello macula magna, postscutello macula parva transversa, tergito secundo macula apicali transversa utrinque, tergitis 3-5 fascia angusta apicali, tibiis anticis intermediisque supra, tarsisque flavis; articulis tarsalibus apice nigris; alis hyalinis, venis nigris; abdomine petiolato.

Long. 10 mm.

♂. Clypeus very broadly rounded anteriorly, closely punctured, and clothed with long whitish hairs, a row of stout blackish setæ springing from beneath the clypeus. Head very closely punctured-rugulose, opaque; posterior ocelli nearly twice as far from each other as from the eyes. Antennæ very little longer than the thorax without the median segment, the apical joint rounded at the apex. Thorax and median segment closely and rather strongly punctured. Abdomen sparsely punctured; first tergite more

than half as long again as the second, forming a slender petiole, gradually widened towards the apex, where it is nearly twice as broad as at the base; second tergite at the apex at least four times as broad as the apex of the first. Second transverse cubital nervure almost vertical. Tarsi very slender, much longer than the tibiæ.

Hab. Chapa, Tonkin; June 5, 1916. 1 ♂.

This approaches the genus *Trachypus* in the petiolate form of the first tergite; but has not the sharply truncate apical antennal joint characteristic of that genus. It is, however, very distinct in the form of the petiole from any Oriental *Philanthus*. The two species described by Bingham from Aden under *Trachypus* (Journ. Bombay Nat. Hist. Soc. xii. p. 107, 1898) belong to *Philanthus*, and have not the petiolate abdomen of this species.

XLIII.—A List of the Myriapoda of Ulster.

By NEVIN H. FOSTER, F.L.S., M.R.I.A.

THE word Myriapoda as here used must be merely understood as a convenient designation for an assemblage of many-legged arthropods. Prof. Carpenter has shown* that the time-honoured "Class Myriapoda" of P. A. Latreille ought to disappear from systematic zoology, and that the Orders embraced in this old Class are each worthy of Class rank.

In the compilation of this list the following papers &c. have been consulted:—Loudon's Mag. of Nat. Hist., 1836, p. 12; "Irish Myriapoda" (Pocock), 'Irish Naturalist,' vol. ii.; "New Irish Myriapods" (Selbie), *ibid.* vol. xxi.; "New Records of Irish Myriapods" (Selbie), *ibid.* vol. xxii.; "Irish Myriapoda" (Johnson), *ibid.* vol. xxii.; "Distribution of Symphyla" (Foster), *ibid.* vol. xxiv.; "Notes on Myriapoda" (Brade and Birks), *ibid.* vol. xxv.; B. N. F. C. 'Proceedings,' ser. 2, vol. vii.; Royal Irish Academy 'Proceedings,' vol. xxxi.; &c.

It is remarkable that Thompson's 'Natural History of Ireland' contains no reference to the Myriapoda. The fourth volume, which includes the Invertebrates, was published in 1856, twenty years after Templeton's notes appeared in Loudon's 'Magazine.'

* 'Irish Naturalist,' vol. xxv. p. 164.

Practically all the specimens included in this list have been collected by a few members of the Belfast Naturalists' Field Club, and from time to time have been identified by Dr. and the Rev. S. Graham Brade-Birks, Dr. H. W. Brölemann, Dr. A. Randell Jackson, the Rev. W. F. Johnson, Messrs. R. I. Pocock and R. S. Bagnall, and the late Lieut. C. M. Selbie; and to them thanks are due for the examination of the collections sent them. Further, we tender our thanks to Dr. R. F. Scharff, who has kindly permitted the extraction of Selbie's unpublished notes preserved in the National Museum, Dublin.

Exclusive of one exotic species (see p. 406) taken in a warm greenhouse, 55 species of Myriapods have been found in Ireland, and of these 52 have been identified from the Province of Ulster. It may be, as will be mentioned in the following notes, that doubt exists as to the validity of some of these species being included in the Irish list, but pending future investigation it has been considered advisable to cite them.

The subjoined table gives the number of species recorded from each of our county divisions:—

Table showing number of Species of Myriapoda recorded from each Ulster County Division.

Cavan.....	14 species.	Tyrone	18 species.
Monaghan	16 "	Armagh.....	33 "
Fermanagh ..	11 "	Down.....	39 "
Donegal East .	13 "	Antrim	41 "
Donegal West.	18 "	Londonderry..	22 "

As will be observed, the records from some of the county divisions are somewhat meagre, and in them doubtless many species await discovery. But as it appears unlikely that exhaustive collections will be undertaken in the near future, it has been considered advisable to publish the present list as a basis for future workers. It will be noted that the largest of the Ulster counties—Donegal—has been divided into East and West divisions in accordance with Praeger's scheme*. These two divisions are separated by a line running N.E. and S.W. from the head of Donegal Bay to the head of Lough Swilly, dividing the Baronies of Bannagh, Boylagh, and Kilmacrenan from Tirlugh, Raphoe, and Inishowen.

* "Irish Topographical Botany," R. I. Acad. Proceedings, 3rd ser. vol. vii. (1901).

The nomenclature adopted in this paper differs considerably (particularly in the Diplopoda) from that used in former papers on the Irish Myriapods, and we must express our thanks to Dr. Hilda K. and the Rev. S. Graham Brade-Birks, who have kindly rendered much assistance in bringing it into line with the conclusions of modern research in the group. References to the synonymy given in the subjoined list will render comparison of this with former papers a matter of little difficulty.

ANNOTATED LIST OF THE MYRIAPODA OF ULSTER.

Class *CHILOPODA* (CENTIPEDES).

Order EPIMORPHA.

Family Lithobidæ.

Lithobius forficatus (Linné).

This species is common everywhere throughout the province. Doubtless the same will prove true for Ireland, although its presence in only 14 county divisions of the 40 has hitherto been recorded.

Lithobius variegatus, Leach.

This is the largest of the Irish centipedes, and, like the preceding species, is common everywhere in Ulster. It still awaits discovery in 17 county divisions of the other provinces.

Lithobius melanops, Newport (= *L. glabratus*, C. L. Koch).

Probably occurs throughout Ireland, having been recorded from 17 county divisions in all the provinces. In Ulster it has been found in Donegal E., Donegal W., Armagh, Down, Antrim, and Londonderry.

Lithobius agilis, C. L. Koch.

The only Irish records for this species are from Coolmore, Donegal E., and Acton Wood, Armagh.

Lithobius borealis, Meinert.

The inclusion of this species is somewhat doubtful, as in the past it appears to have been confounded with the next species. All the available Irish specimens on re-examination

have proved to be *L. lapidicola*. It had been recorded from Cavan, Fermanagh, Donegal E., Armagh, and Antrim in Ulster, but the specimens on which these records were based cannot now be produced. Regarding its Britannic status, Bagnall says that a Lancashire example is truly referable to this species, most, if not all, other records of *borealis* being referable to *lapidicola* *.

Lithobius lapidicola, Meinert.

The Ulster localities for this species are Murray's Wood (Coalisland), Tyrone, and Ballynahinch and Ballymagee, Down. Elsewhere in Ireland it has been taken in Wicklow and Sligo, but, as stated above, it is probable that the Irish records for *L. borealis* should be referable to this species.

Lithobius (Monotarsobius) crassipes, C. L. Koch.

This species has been obtained in Monaghan, Armagh, Down, Antrim, and Londonderry. Outside Ulster it has only been recorded from Co. Louth.

Lithobius (Monotarsobius) microps, Meinert.

Specimens taken at Ballyquintin Point, Down, and Falca-
ragh, Donegal W., were among the last Myriapods examined by Selbie prior to his departure from Dublin to serve and die for his country. As at this time the distinction between this species and the closely allied *L. dubosqui* was not recognized by him and earlier workers, it is almost certain that the foregoing should have been allocated to the latter species, and it is unfortunate that the specimens cannot now be traced.

Lithobius (Monotarsobius) dubosqui, Brölemann.

This species was first detected in Ireland in 1914, from a specimen taken in Co. Carlow, but it was afterwards found that the few specimens labelled *L. microps* in the National Museum, Dublin, should have been named *L. dubosqui*. The Ulster records are Raughlan (Lough Neagh), Armagh; Ballyquintin Point and Hillsborough, Down; and Antrim Town and Whitepark Bay, Antrim. The specimen taken at Raughlan has been referred to the var. *fosteri* †.

* Journ. Zool. Research, vol. iii. (1918).

† 'Irish Naturalist,' vol. xxviii. p. 4.

Lamyctes fulvicornis, Meinert (= *Henicops fulvicornis* (Meinert)).

This species has been found at Aghlabeg, Donegal W. ; Maghery and Raughlan (both on the shore of Lough Neagh), Armagh ; Ballymagee, Down ; and Belfast, Torr Head, and Ballycastle, Antrim. Elsewhere in Ireland it has been recorded from Kerry S., Carlow, Meath, Roscommon, and Mayo W.

Order ANAMORPHA.

Family Scolopendridæ.

Cryptops hortensis, Leach.

Only recorded from six Irish county divisions, this species is probably rare. In Ulster it has been taken in Magee's Nursery (Knock), Down, where it may have been doubtfully native, and at Ballycastle and Cranmore (Belfast), Antrim—the latter one of Templeton's old records.

Family Geophilidæ.

Geophilus carpophagus, Leach (= *G. sodalis*, Bergsøe & Meinert = *G. condylogaster*, Latzel).

Apparently not uncommon in Ulster, having been recorded from numerous localities in those counties which have been best searched. It has been found in Fermanagh, Tyrone, Armagh, Down, Antrim, and Londonderry.

Geophilus longicornis, Leach (= ? *G. flavus*, de Geer).

Probably common throughout Ireland, but only recorded from sixteen county divisions. In this province it has been taken in Cavan, Monaghan, Tyrone, Down, Antrim, and Londonderry.

Geophilus proximus, C. L. Koch.

This is another species whose presence in Ireland is open to doubt, as the older workers did not appear to differentiate between it and *G. insculptus*. The records, however, which cannot now be authenticated, are from Cavan, Monaghan, Down, Antrim, and Londonderry.

Geophilus insculptus, Attems.

As stated above, it is probable that all the Irish records for *G. proximus* should have been allotted to this species*. The only Ulster specimens about which no doubt obtains were taken in Hillsborough Park, Down. Elsewhere in Ireland it has been verified from Co. Wicklow.

Geophilus electricus (Linné).

The only Ulster record for this species is by Templeton—Cranmore (Belfast), Antrim. It has also been found in the counties of Mayo W. and Leitrim in the province of Connaught.

Brachygeophilus truncorum (Meinert) (= *Geophilus truncorum*, Meinert).

This species has only hitherto been found in nine Irish counties, and of these four are in Ulster, viz., Monaghan, Tyrone, Down, and Antrim.

Scolioptanes crassipes (C. L. Koch) (= *Linotemia crassipes*, C. L. Koch).

The only Ulster record for this species is from Poyntzpass, Co. Armagh.

Scolioptanes maritimus (Leach) (= *Linotemia maritima*, Leach).

This is a coastal species and has been found in Donegal E., Donegal W., and Down. Outside Ulster it has been recorded in Ireland from six county divisions.

Schendyla nemorensis (C. L. Koch) (= *Hydroschendyla submarinus*, Grube).

For this we have only four Ulster records, viz., Glenveagh, Donegal W.; Poyntzpass, Armagh; Whitepark Bay, Antrim; and Banagher, Londonderry.

Stigmatogaster subterraneus (Leach).

Is probably widely distributed in Ireland. In Ulster it

* Vide "Notes on Myriapoda," Irish Naturalist, vol. xxvii. p. 27.

has been found in Cavan, Monaghan, Armagh, Down, and Antrim.

Class *DIPLOPODA* (MILLEPEDES).

Order PSELAPHOGNATHA.

Family Polyxenidæ.

Polyxenus lagurus (Linné).

The only Ulster record for this species is by the late H. L. Orr, who found it under the bark of a tree at Old Forge, Dunmurry, Co. Antrim. Elsewhere in Ireland it has been found in the counties of Dublin and Wicklow. In the latter county the writer found four specimens under a stone on Bray Head.

Order CHILOGNATHA.

Family Glomeridæ.

Glomeris marginata (Villers).

With the exception of Cavan this species has been taken in all the Ulster county divisions, where it proves to be common, as doubtless obtains throughout Ireland, though it is as yet unrecorded from eighteen county divisions. Being able to roll itself up into a perfect ball, it is known as the pill-millepede.

Family Iulidæ.

Iulus ligulifer, Latzel (= *I. scandinavicus*, Latzel).

This species is apparently not common. In Ulster it has been recorded from Cavan; Dunfanaghy, Donegal W.; Armagh; Ballynahinch, Ballymagee, and Hillsborough, Down; several stations round the coast from Cushendall to Whitepark Bay, Antrim; and Banagher and Dungiven, Londonderry. Outside Ulster the only Irish records are from Wicklow and Leitrim.

Iulus (Ophiulus) fallax, Meinert.

This is a common species occurring in numerous localities in all the Ulster counties except Cavan, where doubtless it will eventually be found.

Tachypodoiulus albipes (C. L. Koch) (= *Iulus albipes*, C. L. Koch = *I. transversosulcatus*, am Stein = ? *I. niger*, Leach).

One of the commonest of our millepedes and widely distributed throughout Ulster, though as yet unrecorded from Donegal W. It is strange that from the other provinces this species has, with the exception of Sligo and Leitrim, only been recorded from the eastern counties, viz., Wexford, Carlow, Wicklow, Dublin, Meath, and Louth; and the more so as, owing to its large size, it is not readily overlooked.

Cylindroiulus silvarum, Meinert (= *Iulus silvarum*, Meinert = ? *I. punctatus*, Leach).

This is another very common species, and is recorded from numerous localities in all the Ulster county divisions except Donegal E.

Cylindroiulus luridus (C. L. Koch) (= *I. luridus*, C. L. Koch).

The only Ulster, indeed Britannic, records for this species are from Co. Armagh, all of them being in the neighbourhood of Poyntzpass.

Cylindroiulus londonensis teutonicus (Pocock) (= *I. teutonicus*, Pocock).

This species has been taken at Whitepark Bay, Co. Antrim—the only Ulster record. It has been found elsewhere in Ireland on the Great Blasket Island, Kerry S., and at Delphi, Mayo W.

Cylindroiulus britannicus (Verhoeff) (= *Iulus luscus* of some authors; *I. luscus* of Meinert is not recognizable).

As *I. luscus* this species has been recorded from numerous stations throughout Ireland, including all the Ulster counties except Londonderry. It is, however, possible that some of these are erroneous and should be referable to the following species.

Cylindroiulus frisius (Verhoeff).

This species has been only taken with certainty once in Ireland, viz., at Rosapenna, Donegal W., in 1913, but the collection was only examined a few months ago.

Brachyiulus (Microbrachyiulus) pusillus (Leach)
(= *B. (M.) littoralis*, Verhoeff).

In Ulster this species has recently been found near Stewartstown, Tyrone; at Ballymagee, Down; and Gawley's Gate (Lough Neagh), Antrim. These specimens had been recorded * as new to Ireland, but on Bagnall's showing that this species is identical with *Iulus pusillus*, Leach, a correcting paragraph † appeared afterwards. Older records, as *Iulus pusillus* from Cranmore, Belfast (Templeton), and Slemish, Antrim, and The Spa, Ballynahinch, Down, are probably referable to this species. Elsewhere in Ireland *I. pusillus* has been recorded from Mayo W., Sligo, and Louth.

Schizophyllum sabulosum (Linné) (= *Iulus sabulosus*,
Linné).

This large and handsome millipede does not seem to be common in Ireland. The Ulster localities in which it has been found are Bundoran, Donegal E.; Navan Fort, Armagh; Cranmore (Belfast) and Kinbane, Antrim; and near Toome, Londonderry. Outside this province there are records from Carlow, Galway W., King's Co., Wicklow, Dublin, and Leitrim.

Family Protoiulidæ.

Trichoblaniulus guttulatus (Bosc) (= *Blaniulus guttulatus*
(Bosc) = ? *Iulus pulchellus*, Leach).

The Ulster records for this species are confined to four counties, viz., Stewartstown, Tyrone; Hillsborough, Knock, and Kilkeel, Down; Whiterock and Templepatrick, Antrim; and Benevenagh, Londonderry. It has been recorded from ten other Irish counties.

Amstemia fuscus (am Stein) (= *Blaniulus fuscus*, am Stein).

Recorded from fifteen Irish counties, this species has been found in six of these in Ulster. The localities are Glaslough, Monaghan; Gweedore and Cratlagh, Donegal W.; Acton Glebe, Armagh; Dromantine, Belvoir Park, Ballynahinch,

* 'Irish Naturalist,' vol. xxvi. p. 28.

† *Ibid.* vol. xxvii. p. 5.

Lisnagade, Castlereagh Hills, Hillsborough, and Gilford, Down; and Kinbane Head and Plantation Port, Antrim; and Benevenagh, Londonderry. It may be advisable to state that the examination of ♂ specimens is necessary for a definite diagnosis of this species.

Nopoiulus venustus (Meinert) (= *Blaniulus venustus* Meinert =? *Iulus pulchellus*, C. L. Koch).

With the exception of Mayo W. this species has not been found in Ireland outside Ulster. In this province it has been obtained at Virginia, Cavan; Baronscourt, Tyrone; Acton Wood and Poyntzpass, Armagh; Dromantine, Knock, Newtownards, and Hillsborough, Down; Cranmore (Belfast) and Randalstown, Antrim; and Banagher, Londonderry.

Isobates varicornis (C. L. Koch).

The only Irish records for this species are from the demesne and park, Hillsborough, Co. Down.

Polymicrodon polydesmoides (Leach) (= *Atractasoma polydesmoides* (Leach) = *A. latzeli*, Verhoeff = *Polymicrodon latzeli*, Verhoeff).

This species has been found in all the Ulster counties except Cavan. Outside this province it has been seldom detected in Ireland, there being only a few records from Kerry S., Dublin, Longford, Roscommon, Sligo, and Leitrim.

Craspedosoma rawlinsii, Leach (= *C. simile*, Verhoeff, *nec* Attems).

Apparently one of our rarer species, this has been obtained at Rossmore demesne, Monaghan; Armagh; Ballymagee, Downpatrick, and Hillsborough, Down; Cushendall, Antrim; and Banagher, Londonderry. Outside Ulster it has been recorded from one locality each in Cork E., Wicklow, Dublin, and Leitrim.

Family Polydesmidæ.

Brachydesmus superus, Latzel.

This species has been recorded from all the Ulster county divisions except Monaghan and Fermanagh, but Dr. and the

Rev. Brade-Birks consider it probable that the *forma typica* is not found in this country and that these may all be referable to the next variety.

Brachydesmus superus mosellanus, Verhoeff.

Verhoeff has shown that this differs from typical *B. superus*, and specimens taken near Stewartstown, Tyrone; Ballymagee, Down; and Gawley's Gate (Lough Neagh), Antrim, agree with his description.

Polydesmus complanatus (Linné).

We have records of this species from Glaslough, Monaghan; Dunfanaghy, Donegal W.; Acton Wood, Armagh; Belvoir Park and Kilkeel, Down; Belfast and Slemish, Antrim; and Banagher and Dungiven, Londonderry.

Polydesmus gallicus, Latzel.

This species has been found at Virginia, Cavan; Armagh; and Randalstown, Antrim.

Polydesmus denticulatus, C. L. Koch.

Apparently not common here, but we have records for this species from Hillsborough, Down; Murlough Bay, Antrim; and Benevenagh, Londonderry. From the rest of Ireland it has been obtained in Co. Wicklow and in two localities in Co. Leitrim.

Polydesmus edentulus, C. L. Koch.

The only Irish records for this species are from Poyntzpass, Armagh; and Belfast, Antrim.

Polydesmus coriaceus, Porat.

This species has been found in Ulster at Balieborough, Cavan; Hillsborough and Ballymagee, Down; Carr's Glen, Murlough Bay, and Torr Head, Antrim; and Benevenagh, Londonderry. A specimen taken by Mrs. Stelfox at Mur-

lough Bay was referred by Selbie* to his var. *securiformis*, but Dr. and the Rev. Brade-Birks do not consider this a true variety.

[*Orthomorpha gracilis* (C. L. Koch) (= *Paradesmus gracilis*, C. L. Koch).

Although doubtless an exotic species artificially introduced, nevertheless it is included here from a specimen obtained in Magee's Nursery, Knock, Co. Down.]

Class PAUROPODA.

No specimens belonging to this Class have as yet been discovered in Ireland.

Class SYMPHYLA.

Family Scolopendrellidæ.

Subfamily SCUTIGERELLINÆ.

ScutigereUa immaculata (Newport) (= *Scolopendrella immaculata*, Newport).

This species is apparently not uncommon in Ulster, having been recorded from south shore of Lough Erne, Fermanagh; Falcaraoh, Donegal W.; Coalisland, Tyrone; Poyntzpass, Armagh; Hillsborough, Ballynahinch, Banbridge, Cultra, Kilkeel, Ballyquintin Point, Ballymacormack Point, Ballymagee, and Gilford, Down; and Glenshesk, Cushendall, Glenarm, and Antrim town, Antrim. It has been recorded from each of the other three provinces, and with the exception of one other is the only species of *Symphylla* hitherto found in Ireland outside Ulster.

ScutigereUa spinipes, Bagnall.

Poyntzpass, Armagh; and Glenshesk and Antrim town, Antrim, are the only Irish records for this species.

ScutigereUa biscutata, Bagnall.

Doubtless this species will eventually prove not rare. Its

* Ann. & Mag. Nat. Hist. ser. 8, vol. xii. (1913).

Ulster localities hitherto discovered are Poyntzpass, Armagh; Ballynahinch, Banbridge, Kilkeel, and Hillsborough, Down; and Portmore, Glenshesk, and Cushendall, Antrim. Outside Ulster it has been taken at Carlingford, Co. Louth.

Subfamily *SCOLOPENDRELLINÆ*.

Scolopendrellopsis subnuda (Hansen).

Murlough Bay and Cushendall, Antrim, are the only Irish localities in which this species has hitherto been found.

Symphylella delicatula (Bagnall).

This species has been obtained at Poyntzpass, Armagh; and Hillsborough and Kilkeel, Down.

Symphylella vulgaris (Hansen).

Our only Irish records for this species are from Corry's Glen and The Park, both in the neighbourhood of Hillsborough, Co. Down.

XLIV.—*New Hispinæ*. By S. MAULIK, Professor of Zoology in the University of Calcutta.

THIS paper contains descriptions of three new Hispids—two from Africa and one from Arabia. The African insects are interesting because they belong to genera—*Monochirus* and *Phidodonta*—which have hitherto been confined to the Oriental region.

The structure of the claws is one of the important characters which are used for the recognition of the genera of the spiny Hispids. Sometimes these claws are so minute (as in the case of the insects dealt with here) that it is difficult to observe them under a dissecting microscope. A balsam preparation is therefore necessary. In making such a preparation one finds that it is troublesome to put the dissected claw on its dorsal surface (which is convex) to facilitate observation of the ventral side (which is concave). This difficulty is overcome by imbedding the claw first in collodion. The claw is run up to absolute alcohol and then through a half-and-half

mixture of oil of cloves and alcohol into a collodion syrup. It is then transferred to a little cell on a glass-slide, and the cell filled with the syrup. When this has been set in cedar oil a thin strip containing the embedded claw is cut off. This strip can be handled easily, and that side can be put up which shows the ventral surface of the claws. A balsam preparation can now be made of the strip of collodion, which is perfectly transparent. Collodion for embedding is made by mixing a concentrated alcohol-ether solution of celloidin or other nitro-cellulose with enough clove oil to make a thin syrup. For an account of orientating minute objects reference should be made to Mr. H. G. Newth's paper entitled "On the Orientation of Minute Objects for the Microtome" (Quart. Journ. Micr. Sci. 1919).

Monochirus capensis, sp. n.

Body oblong. Black. Prothorax opaque, elytra subnitid. The first joint of antennæ with a dorsal spine. The claws single, pointed. The front margin of the prothorax with two pairs of spines, each lateral margin with a pair of spines followed by a single spine. The elytra with numerous spines on the dorsal surface as well as along the margin.

Head broad, rugose; eyes convex, with a row of silvery hairs round them. The antennæ are almost as long as the head and prothorax; the first joint is the largest, armed with a large dorsal pointed spine, the second rounded, third to sixth gradually decreasing in length; the five apical joints forming a moderately thickened club covered with brownish pubescence, the six basal joints granulate with a few scattered hairs. *Prothorax* transverse, with the surface rugose, sparsely covered with scale-like hairs, and with a longitudinal impression along the middle. There are two shallow transverse depressions across the surface, the one along the base being deeper than the one in front. On the front margin there are two pairs of straight and pointed spines which are equal in length. Each side has three pointed spines of almost equal length, the front two having a common base and the third at a little distance behind them. *Scutellum* broad, granulate, with the apex truncate. *Elytra* a little broader than the prothorax at base, more shiny, punctate-striate, the punctures being deep and rounded. On each elytron there are roughly three principal rows of pointed spines, three or four on the apical area being larger and stouter. There is a short sutural row of smaller spines.

Approximately each disc has altogether about forty-five spines including the smaller sutural ones. Each margin from the humeral to the apical sutural angle has about twenty pointed spines of equal length equally distant from each other, except three on the apical area, which are larger and stouter. *Underside* dull, with scattered white hairs. The femora without teeth on the underside. Mid-tibiæ slightly curved; the tarsi are long; the claw-joint projects beyond the bilobed joint.

Length $4\frac{1}{4}$ mm.

Cape of Good Hope, Table Mt. (*W. Bevins*) (type).

Type in the British Museum.

There are three more specimens, more or less imperfect, strongly resembling the type-specimen, with the following label:—"Howick, Natal (*J. P. Cregoe*)."
Much reliance should not be placed on the authenticity of this locality.

Amenychus planus, sp. n.

Body oblong, black, subnitid. The first joint of antennæ with a long dorsal spine. The claws fused together and as broad at base as at the apex. Each side of the prothorax with three single spines. Two pairs of spines on the front margin are so far apart that they may be regarded as almost lateral. The dorsal side of the elytra without any prominent well-defined ribs or tubercles.

Head broad rugose, with an interantennal ridge and a row of silvery hairs encircling each eye. Collar very finely granulate. The first joint of the antennæ is the largest, the second small and rounded, the third to sixth of gradually diminishing length. The six basal joints are subnitid, strongly sulcate, and with a few scattered silvery hairs; the five apical joints form an elongate club and are covered with brownish pubescence. *Prothorax* almost as broad as long, broadest across the middle and slightly narrowed anteriorly and posteriorly. The sides are rounded. The surface is rugose, with scattered silvery adpressed hairs and with a longitudinal smoother area with an impressed median line. There are also two shallow transverse depressions, the posterior one being deeper than the anterior. *Scutellum* quadrate, with apex rounded, the surface very finely granulate. *Elytra* broader than the prothorax at the base, punctate-striate; the punctures, coalescing, become larger and coarser in the middle and in the apical area. Comparatively speaking, there are no prominently raised costæ; on the other hand, the interstices are not quite plain on the apical area of the disc—they

show rudimentary tubercles in some places. Each lateral margin has about twenty-seven or twenty-eight teeth-like small spines in a row on the apical margin, there being seven or eight spines of increasing lengths, although the sutural one is smaller than the next outer one. *Underside* shining, sparsely covered with whitish hairs. The femora bear minute teeth on the underside. The mid-tibiæ curved. The tarsi large.

Length 6 mm.

Arabia (type).

Type in the British Museum.

There are four more specimens from Turcomania, Kurdistan (*Milligen*), which strongly resemble the type-specimen, but one of them has the foremost lateral spine doubled, so that instead of three single spines on each side there is a pair on a common base followed by two single ones. This is evidently an instance of abnormality.

This species differs from *inermis*, Zoubkoff, and *patanine*, Weise, in not having prominent costæ bearing spines on the elytra and in having three single spines on each side of the prothorax, and from the latter particularly in not possessing a spine on the second joint of the antennæ.

Phidodonta chirinda, sp. n.

Body elongate, small, black, subnitid, or opaque. The large dorsal spine on the first joint of the antennæ, the great distance between the two pairs of spines on the front border of the prothorax (so that they may be regarded as almost lateral, pointing sideways), the equal, completely separate, and pointed claws, the absence of spines on the elytra, the minute teeth on the lateral margin, and four or five large spines on the apical margin of the elytra—all these characters (which are possessed by this species) separate the genus *Phidodonta* from all other genera of the Hispinæ. This insect, therefore, extends *Phidodonta* to the African region.

Head broad, rugose, with a longitudinal deep impression along the middle, and with a row of silvery hairs round each eye. The first joint of the antennæ is the largest and bears a dorsal spine, the third joint is longer than the second, which is rounded; fourth, fifth, and sixth rounded and almost equal; these joints are rough and bear a few bristly hairs; the five apical joints form a thickened club and are covered with brownish pubescence. *Prothorax* slightly longer than broad, with the surface rugose, scattered over with whitish adpressed

hairs, and with a smoother longitudinal area having a faint impression along the middle. There are two transverse shallow depressions across the surface. On each side there are three small, blunt, horizontal spines, the front two having a common base and the third separate. On the front margin, and situated on each side not very far in front of the anterior two of the lateral spines, are two small, blunt, and horizontal spines contiguous at the base. *Scutellum* broad, with apex rounded, and the surface very finely granulate. *Elytra* broader at the base than the prothorax, more shining than the prothorax, punctate-striate, the punctures being deep and rounded. The whole surface is tuberculate, the tubercles being more prominent on the apical area. Each lateral margin with about eighteen minute teeth, each apical margin with four or five spines of gradually increasing length. *Underside* subnitid, mid-tibiæ curved. Claws minute, but distinctly separate and brown.

Length $3\frac{1}{2}$ –4 mm.

Mt. Chirinda, S.E. Mashonaland, Nov., Dec. 1901 (*G. A. K. Marshall*) (type); 1 specimen. Gazaland, Dec. 1901; 2 specimens. Upper Buzi River, S.E. Mashonaland, 25.ix.1905 (*G. A. K. Marshall*); 3 specimens.

Type in the British Museum.

BIBLIOGRAPHICAL NOTICES.

Studies on Acari.—No. 1. *The Genus Demodex*, Owen. By STANLEY HIRST. Published by Order of the Trustees of the British Museum (Natural History). London, 1919. iii–44 pp., 13 plates, and 4 text-figures. Price 10s.

THIS memoir, dealing with skin parasites of microscopic size, represents the first part of the Author's studies on parasitic Acari. Although the detection of these creatures is not easy—living, as they do, embedded in the skin of their hosts,—Mr. Hirst has had considerable success in finding his material, and has thus substantially extended our knowledge of mammalian hosts affected by this particular form of parasite.

The matter is well arranged; the first few pages are devoted to an outline of the frequency of occurrence and effects of the Parasitism on the Host, dealing with *Demodex* and Man, and Follicular or Demodectic Mange of the Dog (and its treatment), Cat, Horse, Cattle, Pig, and the Goat. Then follows a brief

historic account, a discussion on the origin and affinities of the family, and an important account of the external Morphology and Taxonomy, whilst the rest of the memoir is devoted to the systematic treatment of the genus. It is unfortunate that a Bibliography had been omitted (due to its length and the high cost of printing and paper).

Mr. Hirst has demonstrated that the genital opening of the male is *dorsal* and situated well forward on the cephalothorax, and, basing his argument chiefly upon this fact, he suggests that the family is probably a degenerate branch of the Cheletidæ, thus isolating it from the Tetrápoda (Eriophyidæ) and suggesting a closer relationship between the Thrombidiidæ (or, as is still more widely used, Trombidiidæ) and Sarcoptidæ than has generally been accepted. As, however, the Cheletids are very closely related to other Acarids wherein the genital opening is ventral, it is possible that this feature has not the importance here attached to it.

The publication is illustrated by thirteen plates from excellent drawings by Mr. F. Highley, and it will be seen that the memoir is not only of distinct value and interest to the systematist, but also to the biologist and morphologist, and, though *Demodex* is regarded as harmless to the majority of those who have studied it, it may yet loom large in the eyes of the economic bionomist.

Report on Cetacea stranded on the British Coasts during 1918. By Dr. S. F. HARMER, F.R.S. Printed by Order of the Trustees of the British Museum (Natural History).

THESE reports are proving a valuable addition to zoological literature, and this particular one must be regarded as of outstanding interest, inasmuch as it is shown that the Cetacean recorded last year as Cuvier's beaked whale (*Ziphius cavirostris*) from Liscannor, Co. Clare, has proved, after cleaning and a closer examination than was then possible, to be a new British whale, and one of remarkable rarity, *Mesoplodon mirus*. It was only described by the late Mr. F. W. True from a female example taken at Beaufort Harbour, North Carolina, in July 1912. The Liscannor specimen is an adult male, and Dr. Harmer's researches and enquiries elicit the fact that a third example (sex unknown) is in the possession of the Museum of University College, Galway, whilst another Galway specimen in the same collection is referable to the rare Cuvier's whale (*Z. cavirostris*); both had been erroneously referred to the *Mesoplodon hectori* of Gray.

INDEX TO VOL. IV.

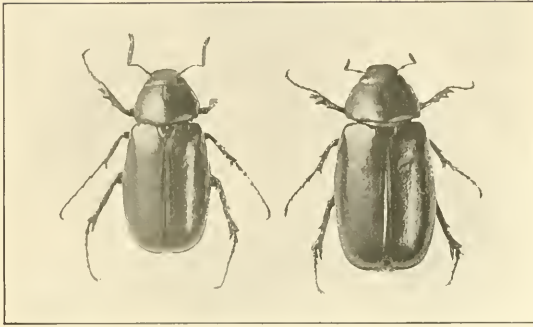
- ABROCOMA, new species of, 132.
 Acmenychus, new species of, 409.
 Acropentias, new species of, 310.
 Acutia, description of the new genus, 89.
 Æolothrips, new species of, 253.
 Æthria, new species of, 90.
 Akodon, new species of, 155.
 Allæorhynchus, new species of, 78.
 Alpheias, new species of, 312.
 Ampulex, new species of, 45, 392.
 Analgesinæ, new, 336.
 Analgopsis, description of the new genus, 336.
 Ancyolomia, new species of, 141.
 Andrewes, H. E., papers on Oriental Carabidæ, 1, 290.
 Anoplognathus, new species of, 380.
 Aorus, new species of, 341.
 Arachnida, on South Indian, 220.
 Araneus, new species of, 243.
 Arrow, G. J., systematic notes on a few Melolonthine Coleoptera, 21; notes on Ruteline Coleoptera, 379.
 Atalotriccus, new species of, 301.
 Attonda, description of the new genus, 123.
 Auchmophora, new species of, 310.
 Aves, new, 301.
 Bagnall, R. S., on the discovery of two species of Brachychæteumidæ, 79; on new Thysanoptera, 253.
 Barasa, new species of, 120.
 Baylis, H. A., on a new species of the Nematode genus *Crossocephalus* from the Rhinoceros, 94; on a curious malformation in *Tænia saginata*, 114; on *Crosso-*
phorus collaris, Hemprich & Ehrenberg, 343.
 Bekker, H., on new Bryozoa from the Kuckers stage in Esthonia, 327.
 Books, new:—S. Hirst's *Studies on Acari*, No. 1, 411; Dr. S. F. Harmer's *Report on Cetacea stranded on the British Coasts during 1918*, 412.
 Boulenger, G. A., a list of the freshwater fishes of Sierra Leone, 34.
 Brachychæteumidæ, notes on, 79.
 Brihaspa, new species of, 315.
 Brulleia, new species of, 387.
 Bryozoa, new, 327.
 Buodias, new species of, 39.
 Calamoschœna, new species of, 307.
 Callithea, new species of, 86.
 Calman, W. T., on barnacles of the genus *Megalasma* from deep-sea telegraph-cables, 361.
 Calosoma, new species of, 290.
 Campoplex, new species of, 37.
 Camptolynx, new species of, 41.
 Carabidæ, papers on Oriental, 1, 290.
 Cartaletis, new species of, 277.
 Catancyla, description of the new genus, 140.
 Ceratothrips, new species of, 254.
 Cerceris, new species of, 49, 393.
 Cestodes, curious malformation in, 114.
 Champion, G. C., notes on the African and Asiatic species of *Melyris*, Fab., 157, 360.
 Characoma, new species of, 118.
 Charltona, new species of, 153, 305.

- Chilo, new species of, 56.
 Chilopsis, description of the new genus, 56.
 Chorischizus, new species of, 36.
 Chrysocale, new species of, 88.
 Chubb, C., on new forms of South-American birds, 301.
 Cicadidæ, new, 136.
 Cirrhochrista, new species of, 323.
 Cockerell, T. D. A., descriptions and records of bees, 98, 355.
 Cœlioxyx, new species of, 101.
 Cœnotalis, description of the new genus, 152.
 Colœoptera, notes on, 21, 379.
 Conotalis, description of the new genus, 150.
 Coranus, new species of, 77.
 Coreura, new species of, 92.
 Crambus, new name, 307.
 Cricetomys, new species of, 282.
 Crocisa, new species of, 99.
 Crossocephalus, new species of, 94.
 Cryphalus, new species of, 113.
 Ctenomys, new species of, 155.
 Curculionidæ, new, 338.
 Cyanopepla, new species of, 89.
 Cyanoxorides, new species of, 388.
 Delphyre, new species of, 93.
 Dendrothrips, new species of, 260.
 Dhanya, description of the new genus, 296.
 Diamerus, new species of, 107.
 Dianthidium, new species of, 355.
 Diatræa, new species of, 53.
 Dinurothrips, new species of, 256.
 Diomea, new species of, 124.
 Diploptalis, description of the new genus, 151.
 Distant, W. L., descriptions of new species and genera of the Heteropterous family Reduviidæ from British India, 71; on two apparently undescribed species of Cicadidæ from Tropical Africa, 136.
 Donacula, new species of, 323.
 Doratoperas, new species of, 61.
 Ectomocoris, new species of, 74.
 Edocla, new species of, 73.
 Elænia, new species of, 304.
 Eligmodontia, new species of, 131.
 Elis, new species of, 44.
 Empecta, new species of, 27.
 Endochus, new species of, 76.
 Endotrichodes, description of the new genus, 312.
 Eschata, new species of, 61.
 Euagra, new species of, 91.
 Euneomys, new species of, 127, 129.
 Eustra, new species of, 299.
 Euthrips, new species of, 270.
 Exodesis, description of the new genus, 313.
 Fossorial Hymenoptera, new, 44, 69.
 Foster, N. H., a list of the Myriapoda of Ulster, 395.
 Frankliniella, new species of, 263.
 Fruhstorferia, new species of, 383.
 Galea, new species of, 134.
 Geological Society, proceedings of the, 50.
 Geometridæ, new, 277.
 Giaura, new species of, 119.
 Gudger, E. W., the Myth of the Ship-holder, a postscript, 17.
 Gymnoscelus, new species of, 388.
 Hampson, Sir G. F., on new Pyralidæ of the subfamilies Crambinae and Sigiinæ, 53, 137, 305.
 Haplothrips, new species of, 273.
 Heliiothrips, new species of, 258.
 Heliûra, new species of, 92.
 Helogale, new species of, 31.
 Hesperomys, new species of, 130.
 Heterapis, new species of, 359.
 Heteroptera, new, 71.
 Hinton, M. A. C., notes on the genus Cricetomys, 282.
 Hispinæ, new, 407.
 Hymenoptera, new, 44, 69, 98, 355, 385.
 Hypospila, new species of, 124.
 Ichneumonidæ, new, 86.
 Insecta, new, 157, 360.
 Isyndus, new species of, 77.
 Itanus, new species of, 295.
 Kaye, W. J., on new species and genera of Nymphalidæ, Syntomidæ, and Sphingidæ in the Joicey Collection, 84.
 Kloss, C. B., see Robinson, H. C.
 Lagidium, new species of, 133.
 Lepidiota, new species of, 27.
 Leucargyra, new species of, 61.
 Libisosa, new species of, 123.
 Limphysothrips, description of the new genus, 272.
 Lophoptera, new species of, 121.
 Loxostegopsis, new species of, 326.
 Mammals, new, 29, 127, 128, 154, 282, 289, 350, 374.
 Marshall, G. A. K., on the genus Aorus, Schh., 338.

- Mascarena*, description of the new genus, 26.
 Maulik, S., on new Hispinæ, 407.
Megachile, new species of, 356.
Megalasma, new species of, 365.
Melolonthine Coleoptera, systematic notes on, 21.
Melyris, new species of, 161.
Mesolia, new species of, 62.
Metanalges, description of the new genus, 338.
Mimagyrtia, new species of, 87.
Monochirus, new species of, 408.
Myctermys, new species of, 378.
Myriapoda, list of, from Ulster, 395.
 Myth of the Ship-holder, a post-script, 17.
Nannopopillia, new species of, 384.
Napata, new species of, 92.
Nematodes, new, 94, 343.
Nematopora, new species of, 331.
Neobanepa, description of the new genus, 310.
Neoklugia, description of the new genus, 71.
Neoschœnobibia, new species of, 309.
Neothodelmus, description of the new genus, 72.
Niphopyralis, new species of, 307.
Noctuidæ, new, 118.
Nomia, new species of, 104.
Nomioides, new species of, 102.
Nymphalidæ, new, 84.
Nymphulodes, description of the new genus, 311.
Obtusipalpis, new species of, 314.
Odontothrips, new species of, 262.
Odemopsis, new species of, 43.
Omophron, new species of, 292.
Oriental Carabidæ, papers on, 1, 290.
Pachydictya, new species of, 329.
Palarus, new species of, 70.
Parancyla, description of the new genus, 67.
Paraxerus, new species of, 31.
Pasiropsis, new species of, 73.
Parasites, new species of, 358.
Patissa, new species of, 315.
Patissodes, description of the new genus, 309.
Perata, description of the new genus, 127.
Perissotriccus, new species of, 301.
Pheia, new species of, 91.
Phidodonta, new species of, 410.
Philanthus, new species of, 394.
Phlœosimus, new species of, 112.
Phœnicoprocta, new species of, 90.
Phorticus, new species of, 79.
Pipromorpha, new species of, 301.
Pisces, new, 34.
Pithecus, new species of, 374.
Platypodidæ, notes on, 105.
Platytesis, description of the new genus, 308.
Plesialges, description of the new genus, 336.
Plusiotis, new species of, 380.
Podothrips, new species of, 275.
Prionopteryx, new species of, 64.
Prionotalis, description of the new genus, 152.
Pristaulacus, new species of, 385.
Prosmixis, new species of, 147.
 Prout, L. B., on new Geometridæ in the Joicey Collection, 277.
Psammœcius, new species of, 69.
Pseudogalta, new species of, 391.
Pseudomelisa, new species of, 88.
Psoroptoides, description of the new genus, 337.
Pyralidæ, new, 53, 137, 305.
Rattus, new species of, 374.
Rhizotrogus, new species of, 22.
 Robinson, H. C., and Kloss, C. B., on five new mammals from Java, 374.
Ruteline Coleoptera, notes on, 379.
 Sampson, Lt.-Col. W., notes on *Platypodidæ* and *Scolytidæ*, 105.
Schœnerupa, description of the new genus, 312.
Schœnobius, new species of, 320.
Scolytidæ, new, 105.
Scopula, new species of, 279.
 Sherriffs, W. R., on a contribution to the study of South Indian Arachnology, 220.
Sphedanolestes, new species of, 75.
Sphex, new species of, 48.
Sphingidæ, new, 84.
Simplicia, new species of, 122.
Steatomys, new species of, 33.
Stelis, new species of, 103.
Stenocalama, description of the new genus, 308.
Stenolæmus, new species of, 71.
Stictoptera, new species of, 120.
Styphlolepis, new species of, 318.
Surattha, new species of, 67, 137.
 Swinhoe, Col. C., on Indo-Malayan and Australian *Noctuidæ*, 118.

- Syntomidæ, new, 84.
 Thalassodes, new species of, 278.
 Thomas, O., on a small collection of mammals from Lumbo, Mozambique, 29; on a new species of *Euneomys* from Patagonia, 127; on mammals from North Argentina, 128; on two new rodents from Argentina, 154; on the method of taking the incisive index in rodents, 289; on the types of the mammals described by M. Fernand Lataste, 350.
 Thysanoptera, new, 253.
 Timoria, description of the new genus, 93.
 Tochara, new species of, 125.
 Topeutis, new species of, 319.
 Trichothrips, new species of, 276.
 Trouessart, E.-L., on new genera of Analgesinæ, 336.
 Tryphactothrips, new species of, 257.
 Turner, R. E., notes on the Ichneumonidæ in the British Museum, 36; notes on Fossorial Hymenoptera, 44, 69; on Indo-Chinese Hymenoptera, 385.
 Ugada, new species of, 136.
 Velamysta, new species of, 87.
 Xanthocryptus, new species of, 40.
 Xyleborus, new species of, 109.

END OF THE FOURTH VOLUME.



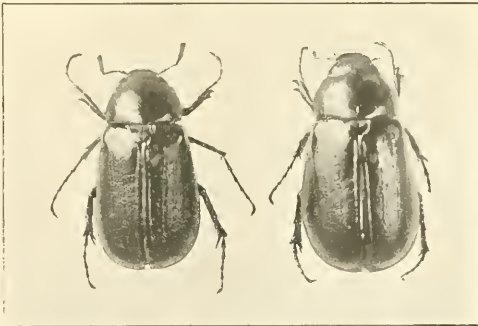
1



2



3



4

- FIG. 1. *Rhizotrogus pallens*, male and female.
- FIG. 2. *Rhizotrogus rufus*, " "
- FIG. 3. *Empecta disparilis*, " "
- FIG. 4. *Rhizotrogus gravis*, " "

The male of each on the left. All natural size.

FIG. 1.



Psechrus torvus inverted below web.

FIG. 2.



Psechrus torvus, web seen edge on.

FIG. 3.



Argiope anasuja, young on lacework stabilimentum.

FIG. 4.



Argiope anasuja, adult ♀ on web, with full stabilimentum.

FIG. 5.



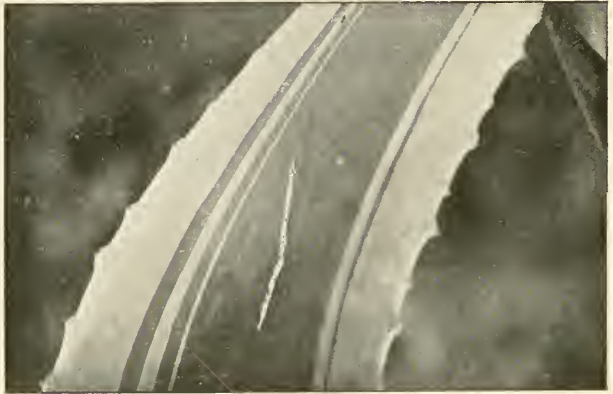
Argiope anasuja, half stabilimentum only.

FIG. 6.



Cyrtophora cicatrosa within domed web.

FIG. 7.



Cyclosa sp.? with stabilimentum as broken diameter of web.

FIG. 8.



Araneus nauticus resting on bark of cypress-tree.

FIG. 9



Ædignatha retusa ; turret at mouth of burrow.

FIG. 10.

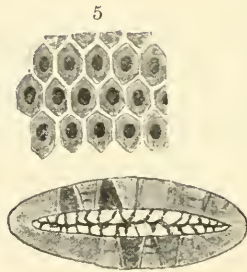
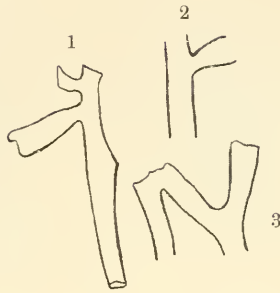


Nilgiri Barychelid ; turret at mouth of burrow.

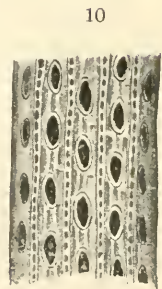
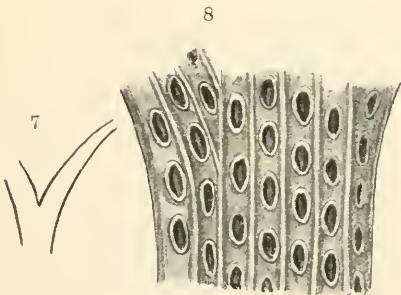
FIG. 11.



Agelena inda ; cocoon-case within web.



6

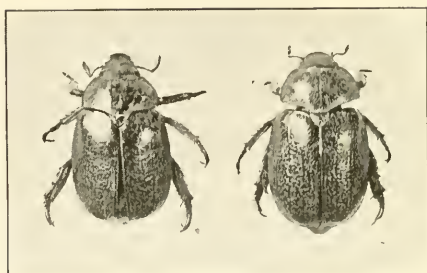


9

ORDOVICIAN BRYOZOA FROM ESTHONIA.



1



2

3



4

5



6



7



8



9



10

FIG. 1.—*Plusiotis magnificus*, sp. n., male.

FIG. 2.—*Anoplognathus antiquus*, sp. n., male.

FIG. 3.—Ditto, female.

FIG. 4.—*A. pallidus*, sp. n., male.

FIG. 5.—Ditto, female.

FIG. 6.—*A. Aurora*, sp. n., male.

FIG. 7.—*Fruhstorferia birmanica*, Arrow, male.

FIG. 8.—*F. curta*, sp. n., male.

FIG. 9.—Ditto, female.

FIG. 10.—*F. yunnana*, Ohaus, male.

All natural size.

Cambridge University Press

A Dictionary of the Flowering Plants and Ferns

By J. C. WILLIS, Sc.D., F.R.S. Fourth edition, revised and rewritten.
Crown 8vo. 20s net. Cambridge Biological Series

"This work made its first appearance in 1897 A third edition appeared in 1908 and was reprinted six years later: we now have it 'completely revised and as far as possible brought up to date.' The most noteworthy feature of this new edition is the 'incorporation of all the parts into one general dictionary and the omission of Part I of previous editions.' The result is a volume which it would be impossible to commend too warmly It should find a place in every botanical library, however small."—*The Journal of Botany*

Botany

A Text-book for Senior Students

By D. THODAY, M.A. Second and enlarged edition. Large crown 8vo.
With 230 text-figures. 7s 6d net

"It is a pleasure to be able to recommend an introductory book on botany The illustrations are excellent."—*The Gardeners' Chronicle*

Fossil Plants

A Text-book for Students of Botany and Geology

By A. C. SEWARD, F.R.S. Volume IV (Ginkgoales, Coniferales, Gnetales).
Demy 8vo. With 190 illustrations. 21s net. Cambridge Biological Series

"This fourth volume successfully completes a monumental treatise for students of botany and geology already highly valued for the thorough-going systematic treatment with which it describes the fossil remains of plants of bygone ages It is one of the most valuable and important descriptive text-books of palaeobotany yet given to the world."
The Scotsman

Palæontology: Invertebrate

By H. WOODS, F.R.S. Fifth edition. Crown 8vo. With 173 text-figures.
12s 6d net. Cambridge Biological Series

The general plan of this work is to give, in each group of the Invertebrata, first, a short account of its general zoological features with a more detailed description of the hard parts of the animals; secondly, its classification and the characters of the important genera, with remarks on the affinities of some forms; and, thirdly, a description of the present distribution, and the geological range. Some new figures have been added in this edition, and the work has been revised throughout.

Petrology for Students

An Introduction to the Study of Rocks under the Microscope

By ALFRED HARKER, LL.D., F.R.S., F.G.S. Fifth edition, revised. Crown 8vo.
With 100 text-figures. 8s 6d net. Cambridge Geological Series

This work, now offered in a further revised edition, has been written to serve as a guide to the study of rocks in thin slices, and is, of course, assumed to be supplemented throughout by demonstrations on actual specimens. The researches of British petrologists have now made it possible to illustrate almost all the leading rock-types from our own country. A number of new figures have been added for the present edition.

Fetter Lane, London, E.C.4: C. F. Clay, Manager

6-120

CONTENTS OF NUMBER 24.—*Ninth Series.*

	Page
XXXIX. On Barnacles of the Genus <i>Megalasma</i> from Deep-sea Telegraph-Cables. By W. T. CALMAN, D.Sc.	361
XL. On Five new Mammals from Java. By HERBERT C. ROBINSON and C. BODEN KLOSS	374
XLI. Notes on Ruteline Coleoptera and Descriptions of a few new Species in the British Museum. By GILBERT J. ARROW, F.Z.S., F.E.S. (Plate VIII.).....	379
XLII. On Indo-Chinese Hymenoptera collected by R. Vitalis de Salvaza.—III. By ROWLAND E. TURNER, F.Z.S., F.E.S.....	385
XLIII. A List of the Myriapoda of Ulster. By NEVIN H. FOSTER, F.L.S., M.R.I.A.....	395
XLIV. New <i>Hispinæ</i> . By S. MAULIK, Professor of Zoology in the University of Calcutta	407

BIBLIOGRAPHICAL NOTICES.

Studies on Acari.—No. 1. The Genus <i>Demodex</i> , Owen. By STANLEY HIRST	411
Report on Cetacea stranded on the British Coasts during 1918. By Dr. S. F. HARMER, F.R.S.	412
Index	413

* * * It is requested that all Communications for this Work may be addressed, post-paid, to the Care of Messrs. Taylor and Francis, Printing Office, Red Lion Court, Fleet Street, London.

